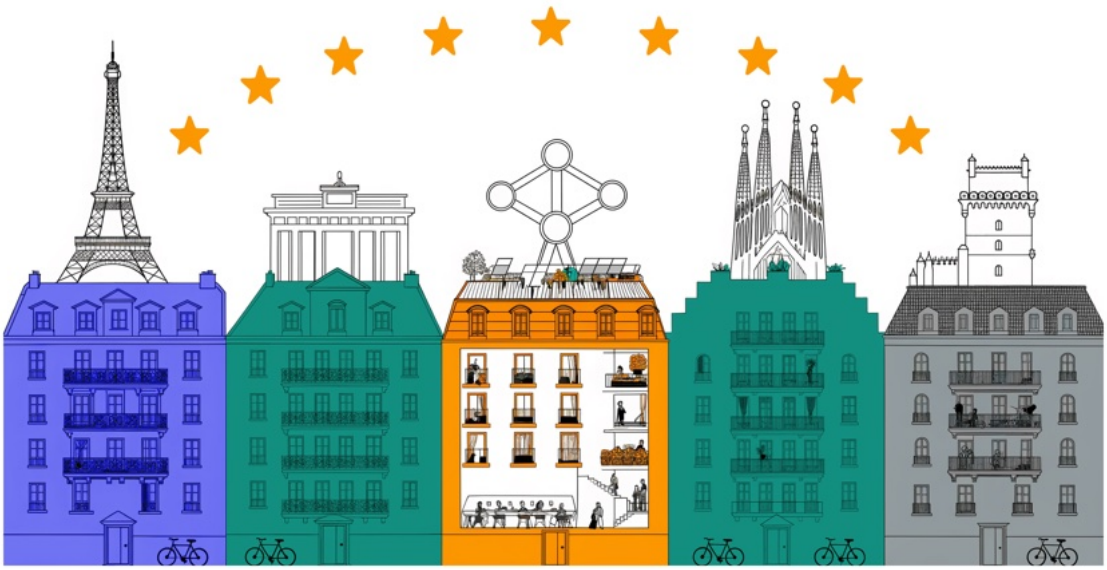
Fachhochschule Kärnten — Carinthia University of Applied Sciences
Master's Programme in Sustainable Real Estate Management

MASTER THESIS

Tackling Europe's Housing Crisis Together: How the Formation of a Pan-European Housing Cooperative Could Foster a More Sustainable Way of Urban Living



Submitted in partial fulfilment of the requirements for the degree of
Master of Science in Engineering (MSc)

Jonathan Imme

First supervisor · Dipl.-Ing. arch. Daniel Bednarzek
Second supervisor · Mag. DDr. Barbara Lorenz

Berlin, August 2026

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Abstract

Europe's housing crisis raises a connected question: how can cities provide homes people can afford while reducing environmental harm and sustaining social life? This thesis examines how a pan-European housing cooperative could contribute to that response.

It first analyses the crisis's economic, ecological and social dimensions, their underlying drivers and the limits of current policy. It then examines Europe's cooperative housing traditions, assessing their contributions to sustainable living alongside barriers to access and expansion. This review identifies a gap in cross-border cooperation: local initiatives often lack access to finance and expertise available elsewhere.

Building on this analysis, the thesis develops the European Housing Coop (EHC), a proposed network combining local resident control with shared resources and patient capital. Its design converts suitable under-used offices into mixed-use buildings with long-term homes, furnished mid-term accommodation and commercial space. Long-term rents cover the homes' costs; surplus from the other uses supports entry contributions, reserves and further projects.

The study follows Design Science Research, informed by Action Design Research. An economic model, harmonised European data and the public platform housingcoop.eu support financial scenario testing and exploratory observation of public interest.

The modelling suggests that the proposed arrangement can cover project costs under favourable building and financing conditions. Stress tests reveal where those conditions become insufficient and additional support would be needed. Financial feasibility does not establish affordability for individual households. Platform engagement indicates interest in cooperative-housing information, while willingness to join, invest or deliver projects remains untested.

The contribution is a transparent design and a staged programme for testing it in practice. The thesis identifies a possible route towards non-speculative housing through cross-border cooperation, while leaving its ecological and social benefits, and its accessibility, to be demonstrated through real projects.

Keywords

Housing crisis, Pan-European cooperative, Cooperative housing, Affordable housing, Collaborative housing, Housing financialisation, Sustainable urban living, European Cooperative Society (SCE), Adaptive reuse, Office to Housing conversion, Office vacancy, Embodied carbon, Design Science Research, Action Research, Patient capital / Impact investment, Cost rent

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List of Abbreviations

Abbreviation	Meaning
ADR	Action Design Research
AIFMD	Alternative Investment Fund Managers Directive
AR	Action Research
BGK	Bank Gospodarstwa Krajowego (Polish development bank)
CLT	Community Land Trust
CSEE	Central and South-Eastern Europe
DSCR	Debt-service coverage ratio
DSR	Design Science Research
EFTA	European Free Trade Association
EHC	European Housing Coop
EIB	European Investment Bank
EPRS	European Parliamentary Research Service
ESG	Environmental, Social and Governance
ETS	EU Emissions Trading System
GBV	Gemeinnützige Bauvereinigung (limited-profit housing association, Austria)
GDPR	General Data Protection Regulation
IBB	Investitionsbank Berlin (Berlin development bank)
ICA	International Co-operative Alliance
JRC	Joint Research Centre (European Commission)
KfW	Kreditanstalt für Wiederaufbau (German development bank)
LETI	London Energy Transformation Initiative
LiM	Living in Metropolises SCE
LTC	Loan-to-cost
LTV	Loan-to-value
MOBA	Central- and South-Eastern European cooperative-housing network
OECD	Organisation for Economic Co-operation and Development
RICS	Royal Institution of Chartered Surveyors
SCE	Societas Cooperativa Europaea (European Cooperative Society)
SPV	Special-purpose vehicle (Objektgesellschaft)
STR	Short-term rental
WGG	Wohnungsgemeinnützigkeitsgesetz (Austrian limited-profit housing law)
WLCA	Whole Life Carbon Assessment

1 Introduction

1.1 Setting the scene

Across Europe, homes grow scarcer alongside under-used offices, and buildings that could still serve are pulled down to make way for something that earns a higher yield. It's a strange way to run a housing system, and it sits at the centre of an emergency that is at once economic, ecological and social. Rents and prices have outrun incomes across much of the continent (European Commission, 2025b); the buildings Europeans already live in are among the largest single sources of the region's carbon emissions (Keliauskaitė, 2025); and the insecurity that follows is wearing down the social fabric of its cities. The shortage, in the end, is less of buildings than of good ways to own, allocate and look after them.

In the last two years the crisis has climbed from a local worry to a European one. In 2024 the European Commission created its first dedicated housing portfolio and appointed Dan Jørgensen as the inaugural Commissioner for Energy and Housing (De La Feld, 2024); the following year it published the European Affordable Housing Plan (European Commission, 2025a). Both the Commission and the European Central Bank now treat housing as a central economic concern (Bates et al., 2025). The cooperative idea is having its own moment: in 2024 the United Nations declared 2025 the International Year of Cooperatives (United Nations General Assembly, 2024). And higher rates and falling office demand have repriced the commercial cycle hardest, leaving owners of half-empty offices with buildings they can neither let nor easily sell (European Central Bank, 2025, Chart 1.11; Graaf et al., 2025, p. 4). The timing is real (Fig. 1.1).

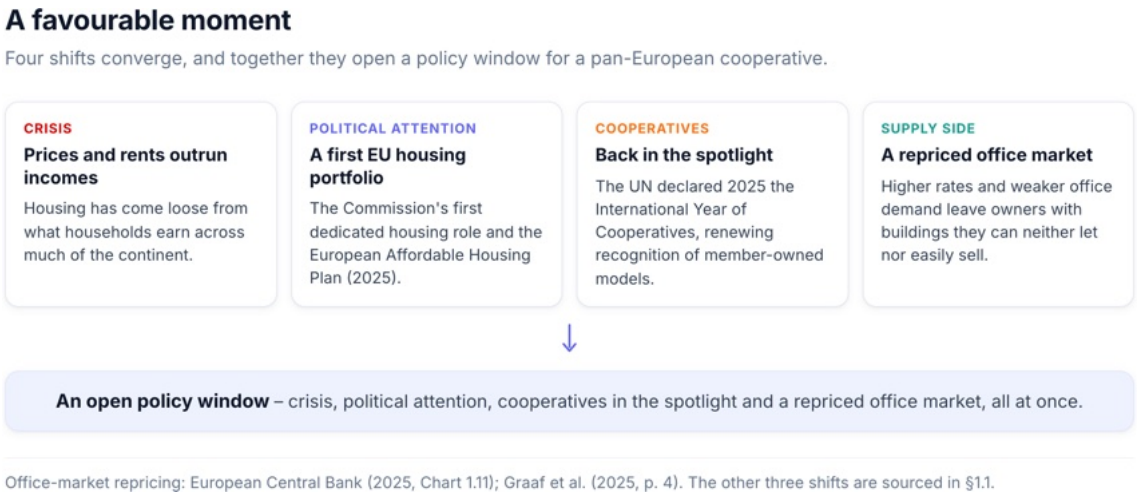


Figure 1.1 – *The favourable moment*

Against that backdrop, I propose a pan-European housing cooperative, called throughout this thesis the European Housing Coop (EHC). No such organisation has yet been incorporated. What I can offer here is its design, developed most fully in Chapter 4, and an examination of what would have to hold for it to come into being. The distance between those two things is part of the inquiry.

But the EHC is not only an idea on paper. Alongside it I have built a digital platform, housingcoop.eu, as the idea's first practical embodiment. It began in the summer of 2024 as a vision with a simple public page attached; I rebuilt it from scratch a year later, and the version that went live in August 2025 is the one this thesis assesses. It grew steadily more capable, until visitors could register interest, contribute resources, propose partner organisations, ask an AI assistant about the knowledge base, and draw on the country-, city- and project-level datasets the empirical passages rely on. Inside the thesis the platform does a second, methodological job: it is the artefact through which I explore the EHC idea in practice, and the main site of the action research of §1.4 and Chapter 5. I treat it as an evolving intervention, report its reception as an early, limited signal, and mean to keep it running beyond submission.

1.2 Research question

This thesis pursues a single overarching question:

> **How could the formation of a pan-European housing cooperative foster a more sustainable way of urban living?**

The word *could* matters. With no operating EHC to observe, I can ask how the proposed design might work and what evidence would justify trying it. I cannot report benefits that residents have not yet experienced.

'Sustainable urban living' also needs a definite meaning. Following the three-pillar conception associated with the Brundtland report, I use it for housing that is affordable, ecologically sustainable and socially cohesive (World Commission on Environment and Development [WCED], 1987). The crisis puts all three under pressure. A response that improves one while worsening another would leave the central problem unresolved.

The comparison is with prevailing speculative, market-led provision; the geographical setting is the city. Housing is the means through which this thesis addresses urban living, not a claim to explain every part of it. Five sub-questions make that inquiry manageable. The first two state the design arguments of Chapter 4, drawing on the diagnosis and cooperative precedents developed in Chapters 2 and 3:

- **SQ1 – Supply.** How could a pan-European cooperative add low-carbon homes, with day-one affordability and a widening market discount conditional on local costs and financing, by converting Europe's under-used building stock to residential use? *(Chapter 4.3, on the foundation laid in Chapter 2.)*
- **SQ2 – Finance.** The model proposes a mixed-tenure cross-subsidy: a market-facing "engine room" of mid-term housing units and commercial space lowers the entry cost of a long-term affordable majority, which is designed to cover its modelled costs through resident charges. Can such an arrangement be made viable for every party at once, and under what conditions is its senior debt bankable? And can the patient impact capital that funds the buildings be bought out over time, so residents and members come to own the network outright? *(Chapter 4.4 and 4.5, probed in Chapter 5.)*
- SQ3 – The pan-European premise. Which functions could a pan-European cooperative share across borders beyond the reach of individual local providers, and how could it overcome the constraints that hold that sector back, above all its shortage of patient capital and its difficulty securing suitable land and buildings? (Chapter 3, into Chapter 4.1-4.2 and 4.5.)
- **SQ4 – Demand and readiness.** What early evidence is there that people want information about such an organisation, and what evidence would be required to test whether stakeholders are ready to take part in it? *(Chapter 5.)*

- **SQ5 – Pathway.** Along what implementation pathway, and under what conditions, could the model move from an articulated design towards a credible first pilot? *(Chapter 6.)*

Four of these questions (SQ1, SQ2, SQ3 and SQ5) ask what a design could do and under what conditions. SQ4 asks what can already be learned from the platform's reception, and even that answer is partial. Section 1.4 explains how I approach the distinction. It should remain visible when the argument moves from a model result to a claim about people.

1.3 Scope and delimitations

Europe provides the setting, but the thesis does not treat every place as interchangeable. Thirty focus countries, the EU-27 plus the United Kingdom, Norway and Switzerland, give the comparison in Chapters 2-3 its breadth. Thirty-six cities with more detailed data provide the cases for developing and testing the economic model (Table 1.1).

Those cases serve the argument. Frankfurt appears because it makes the conversion opportunity particularly clear (§4.3), not because the thesis has secured a building there. Where a pilot might begin is a separate question. Chapter 6 widens the search to 104 EU cities, using a readiness ranking documented in Appendix C. That EU boundary reflects the common single-market setting for cross-border activity, while local legal and project conditions still need examination. Figures retain their source trails in the platform databases and should be read as indicative orders of magnitude.

Table 1.1 – The three geographic sets and their role in the thesis.

Set	Size	Purpose	Used in
Focus countries	30	Comparative housing & cooperative-sector context	Ch. 2-3
Focus cities	36	Deep-data set for developing & probing the model	Ch. 4-5
EU opportunity universe	104	Pilot-readiness ranking for rollout	Ch. 6 · App. C

Numerical outputs are conditional model results, not observations of an operating co-operative. Section 1.4 defines the evidence boundary.

The model is also captured at one moment in a project I intend to continue beyond submission, so its empirical record is early, partial and self-selected; Chapter 6 sets out the next tests. Two neighbouring questions remain open. The legal vehicle receives only a concise assessment, because this is a real-estate management thesis rather than a legal study (§4.7), and building-specific financial engineering is left to the live model and Appendix A.

1.4 Methodological positioning

How should a proposal be judged before the organisation exists? The answer cannot be to wait until every uncertainty has disappeared. Nor should a plausible design be allowed to count as proof of its own success. I approach the question through Design Science Research and Action Design Research, developed in §5.1. These traditions treat building and evaluating a research artefact as a contribution in its own right.

There are four linked artefacts here: the institutional and economic model, the harmonised data pool, the public platform and the pilot-readiness index. Together they make the proposal inspectable. None is offered as a validated solution.

My position is part of the method. I built the platform and use it to examine the reception of the idea it presents. That gives access an outside observer would not have, alongside an obvious risk of favourable interpretation. The design can still be judged by the coherence of its reasoning, the openness of its assumptions and the evidence it can actually supply. That is the standard I ask to be held to. Chapter 5 applies it; Chapter 7 returns to the difficulty of being both researcher and practitioner.

The apparatus

The method rests on three instruments, all of which I built. The harmonised data pool, the country-, city- and project-level databases, supplies the empirical inputs. The economic model is the EHC's financial logic made live, with every assumption an adjustable lever: for any focus city it rebuilds the cost-rent, bankability and viability case from that city's own market data, then re-runs it under stress scenarios (§4.4). The platform makes both publicly inspectable, through its resource library, city and country profiles, comparison tool and AI assistant, and its architecture records the demand signals I read. Only the pilot-readiness index stands apart, an output of the probing rather than

an instrument. Between them they turn an argument that could have stayed on paper into something a reader can inspect, change and argue back to.

Two hypotheses and the evidence they rest on

The first layer of evidence concerns the model itself. The six assumptions, A1-A6 in §4.8, are examined through adjustable inputs and sensitivity tests across the focus cities. The tests show how the design behaves when its conditions change. They cannot establish whether those conditions will be available in practice.

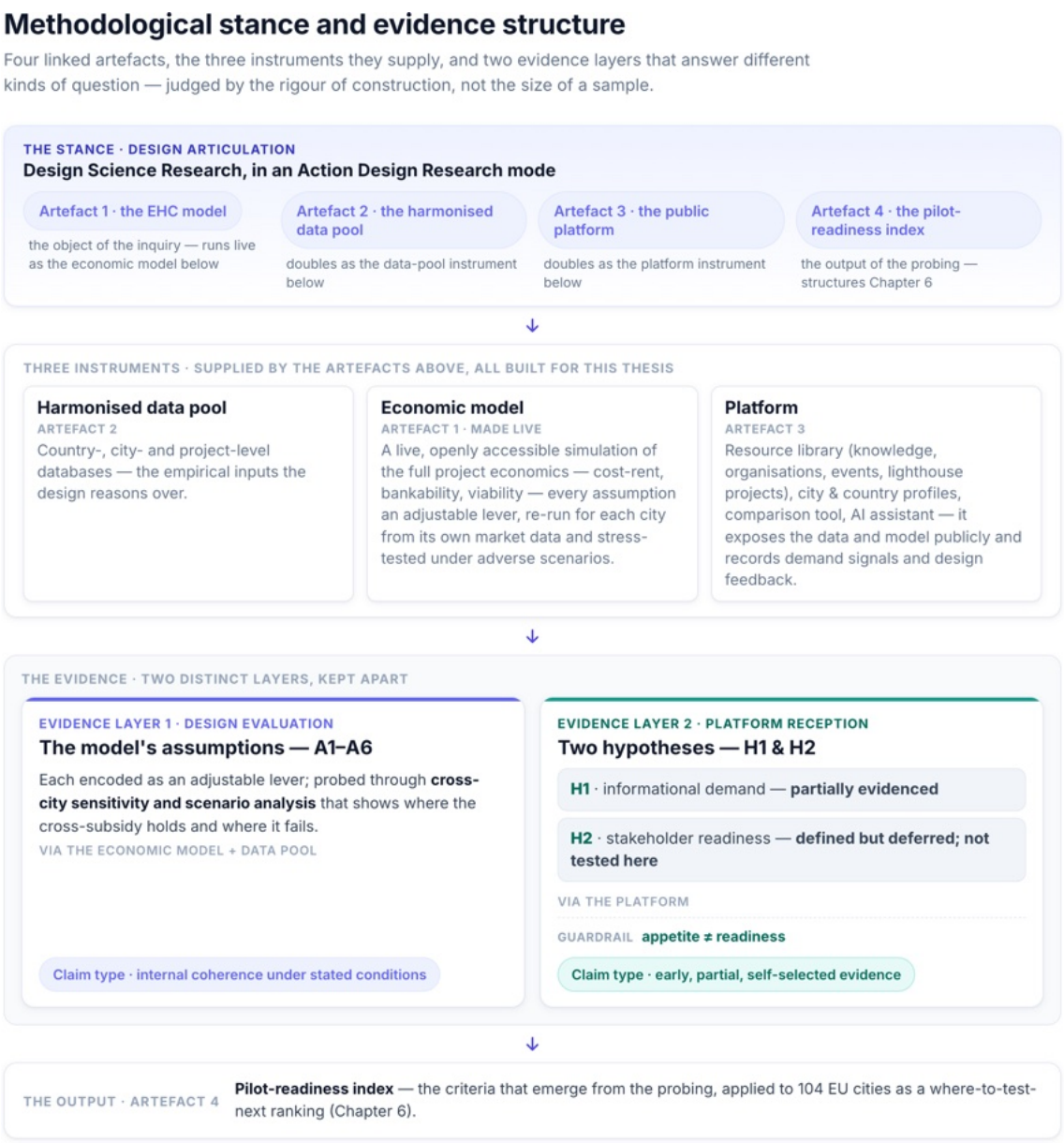
The second layer concerns the audience, through two related but distinct hypotheses. H1 asks whether organic informational demand exists for cross-border knowledge about cooperative and sustainable housing in Europe. Platform analytics and knowledge-library use provide the evidence, assessed against the retrospective criteria in §5.7 and documented in Appendix D. These are low-commitment signals, which is appropriate to the limited question being asked.

H2 asks whether stakeholders are ready to participate in the proposed organisation. Reading about a cooperative is a long way from helping to finance or deliver one. This thesis does not test H2: structured surveys, research interviews and transaction-level evidence fall outside its empirical scope. The platform's participation signals instead inform the design and the tests proposed in Chapter 6. H2 remains defined but deferred.

The distinction also matters for how people are treated. Conversations were held with consent, and Appendix I sets out the privacy-minimising approach to platform data. This is not a finding of legal compliance. IP-derived analytics may remain pseudonymous personal data; the controller, lawful basis, retention and data-subject rights still require documented implementation.

The evidence boundary

This is the boundary I carry through the thesis. The model supports claims about internal coherence under stated assumptions (§4.8, Chapter 5). The early, partial and self-selected platform record offers modest support for H1 under the retrospective criteria in §5.7; participation and outreach inform the design but do not test H2. Later chapters return to this boundary where a result might otherwise be mistaken for evidence that the cooperative is ready to operate (Fig. 1.2).



Author's own design; A1–A6 and H1–H2 as defined in §1.2.

Figure 1.2 – *The methodological stance*

1.5 Structure of the thesis

The argument begins with the housing system and ends with the conditions for trying something within it. Chapter 2 connects affordability, ecological sustainability and social cohesion. Chapter 3 asks what cooperative housing already contributes and what holds it back, distinguishing benefits supported by evidence from those that depend on particular arrangements.

Chapter 4 develops the EHC through adaptive reuse (§4.3) and cost-rent with a mixed-tenure engine room (§4.4). Delivery, governance and finance give those mechanisms an organisational form (§4.5); six assumptions expose what they depend on (§4.8). Chapter 5 then examines the model and the platform's reception. Chapter 6 takes the unresolved questions towards a pilot. The conclusion returns to the research question, the limits of the answer and my own position in producing it (Fig. 1.3).

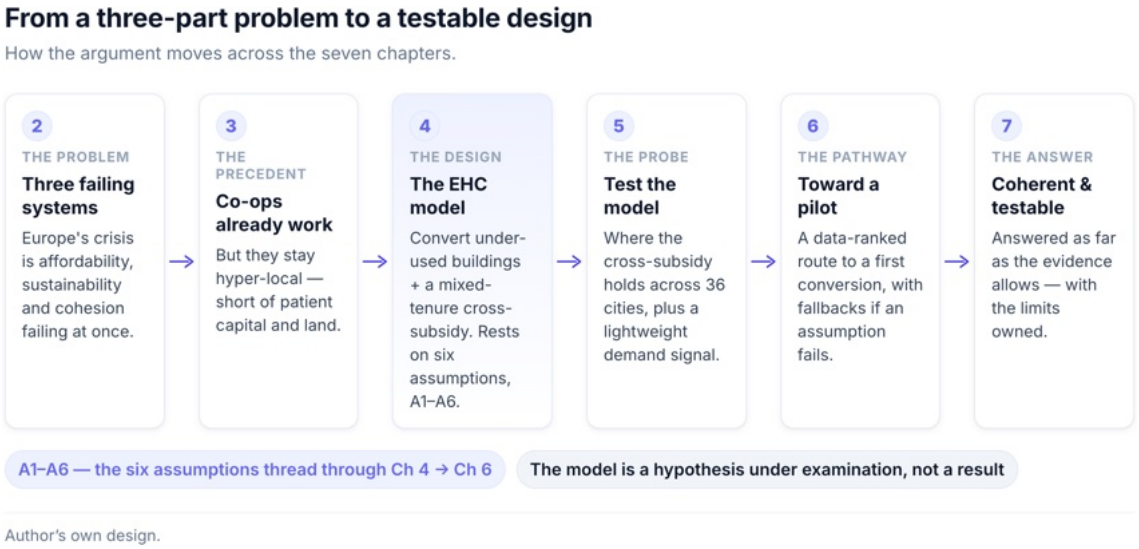


Figure 1.3 – *The thesis at a glance — the argument map*

2 Understanding Europe’s Housing Crisis

A new home can ease a shortage and add to the carbon bill. An energy upgrade can make a building cheaper to heat and too expensive for its tenants to remain. These are not reasons to stop building or renovating. They are reasons to ask what kind of housing response the crisis requires. I begin with affordability, then follow its connections to ecology and social life, before asking what current policy leaves unresolved (§1.2).

2.1 Affordability and the financial scope of the crisis

‘The European housing crisis’ is one label stretched over several different problems. At its broadest, it is a crisis of prices coming loose from incomes. Between 2010 and 2025, house prices in the European Union rose by 60,5% and rents by 28,8%, the gap widening after 2015 (Eurostat, 2025a). And the price indices understate the squeeze: in 2024, 8,2% of EU residents spent more than 40% of disposable income on housing, rising to 31,1% among people at risk of poverty (European Commission, 2025b, p. 48) (Fig. 2.1).



Figure 2.1 – *Europe’s widening price-to-rent gap*

A single European average hides more than it shows: Europe does not have one housing market but dozens. Owner-occupancy runs from about 36% in Switzerland and 45,5% in Germany to 95,8% in Romania; cooperative sectors range from roughly 19% of the stock in Poland and 22% in Sweden down to 0,02% in the Netherlands (Eurostat, 2023; Housing Europe, 2025a). The same macro-shock therefore lands differently from

place to place: Berlin, where about 84% of households rent, passes price pressure straight to most residents, while Romania, owner-occupied at 95,8%, meets the crisis as a wall facing younger and first-time households (Eurostat, 2023; EHC Cities Database, 2026). In many cities and tourist regions, a third of average income is no longer enough to rent or buy even modest housing (European Commission, 2025b, pp. 4-5) (Fig. 2.2).

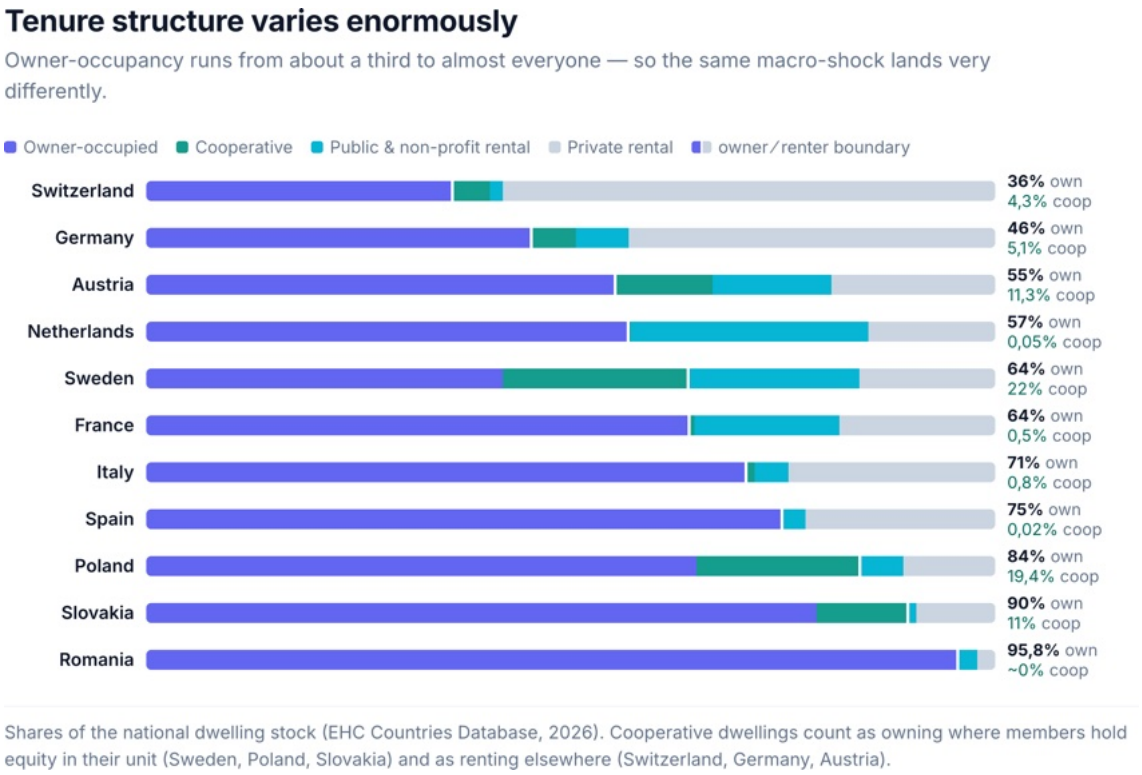


Figure 2.2 – *Tenure mix across the focus countries*

This fragmentation changes who finds themselves in difficulty. The crisis reaches beyond households usually described as poor or socially excluded and increasingly into the *missing middle* of urban housing systems: households earning too much for scarce social or subsidised housing, yet too little, and often with too little inherited wealth, to buy or rent suitable market housing where they work. The Commission's own affordability framing points the same way: around 40% of the urban population would need a mortgage longer than twenty years, eating 30% of average income, to buy even a 25 m² apartment, and about 30% would cross the same threshold to rent one (European Commission, 2025b, pp. 4-5). A job in another city, a growing family, a separation or the decision to downsize can put a household back on the open market. Each move means meeting that market at its hardest. What looks like ordinary life becomes a test of whether the next home is still within reach.

The squeeze bites hardest in capital and high-demand cities, where the gap between incomes, sitting rents and entry prices is widest. Table 2.1 sets out seven major markets.

Table 2.1 – Affordability and vacancy indicators in selected European cities (2024-26), by new-let to sitting-rent factor.

City	Renter share	New-let rent (€/m²·mo)	Median rent, all stock (€/m²·mo)	Factor	Vacant dwellings	Vacancy rate	Full-time STR units (est.)
Lisbon	~41%	16,00	7,10	2,3×	~48.000	15,4%	11.304
Berlin	~84%	15,78	7,10	2,2×	~40.500	2,0%	2.921
Amster-dam	~70%	25,30	11,80	2,1×	~12.000	2,6%	1.485
Vienna	~77%	13,70	7,50	1,8×	~25.000	2,5%	4.896
Athens	~28%	11,50	6,80	1,7×	~110.000	24,8%	7.898
Madrid	~26%	23,30	14,20	1,6×	~97.000	6,3%	7.687
Paris	~62%	27,20	26,60	1,0×	~137.000	9,8%	18.884

Note. Factor = new-let rent divided by the median rent across the full rental stock, indicating the insider-outsider gap. Rent and tenure figures are compiled in the EHC Cities Database (2026); original sources include Investitionsbank Berlin, OLAP, Idealista, the Spanish Ministry of Housing (SERPAVI), INE Portugal, ELSTAT, Pararius, the City of Amsterdam, Statistik Austria and Inside Airbnb. Both vacancy measures refer to residential dwellings (apartments and houses, any tenure) – not whole empty buildings and not vacant office space: "Vacant dwellings" is the count of empty homes, and "Vacancy rate" expresses that count as a share of all dwellings in the city. The counts come from the most recent national census or register (Destatis Zensus 2022; INSEE 2022; INE 2021; ELSTAT 2021; Statistik Austria; CBS) and exclude second homes and holiday lets; because definitions and reference years differ, cross-city comparison is indicative only. Full-time STR units are entire-home listings active year-round (Inside Airbnb).

The factor column shows what a move can cost. In Lisbon, Berlin and Amsterdam, new-let rents exceed twice the median across the rental stock. Vienna's larger regulated sector narrows the gap without closing it: €13,70/m² on a new lease against

€7,50/m² across the stock. Paris has a different problem, with little gap but high rents on both sides (EHC Cities Database, 2026). A household looking for a home therefore encounters a market quite different from the one a sitting tenant may know.

That is the insider-outsider divide. Newcomers can fall outside social-housing priorities while remaining unable to buy, leaving them exposed to the most expensive part of the rental system. The table also shows scarcity alongside vacancy in every city, from around 2% in Berlin to 24,8% in Athens, as well as thousands of homes in full-time short-term letting. The question is how both conditions can persist together.

Any remedy has to answer both halves of that picture, and most address only the scarcity. The conventional answer is volume. The Joint Research Centre reckons the Union needs more than two million new homes a year to 2035, an investment of about €1,68 trillion and some 650.000 dwellings a year beyond current output (Balouktsi et al., 2025, p. 2; Joint Research Centre, 2025). Supply has plainly not kept pace. Yet the cities with the steepest entry barriers also hold tens of thousands of empty dwellings apiece, so the shortage is as much a question of how existing stock is used as of how much is built. This *vacancy paradox* returns in the ecological section, where empty space becomes a carbon and land question, and in the drivers section, where it becomes a question of financial incentives and short-term-rental extraction.

When entry rents and prices come loose from incomes, mobility stalls: households stay in unsuitable homes or crowd into too-small flats. Scarcity then drives new construction even as the existing stock sits half-used.

2.2 The environmental dimension

The housing crisis is also a climate crisis, and the two are tied together more tightly than we usually admit. Buildings account for roughly 40% of energy use and 36% of energy-related greenhouse-gas emissions in the EU, which puts the residential stock at the centre of any serious decarbonisation pathway (European Commission, 2025b, p. 135; Keliauskaitė, 2025). And the carbon arithmetic does not stop at *operational* emissions, the heating, cooling and power used in occupation. A growing literature stresses *embodied* carbon: the emissions locked into a building's materials and construction before anyone moves in. Whole-life-carbon analyses show that keeping and converting an existing structure can sharply undercut the embodied emissions of demolition-and-new-build, which makes adaptive reuse a climate strategy, not only an architectural one (Remøy et al., 2025; Urban Land Institute, 2025). The point is in-

creasingly put in rights terms: with barely a decade of carbon budget left, the Bloxhub report argues that fair access to low-carbon housing and mission-led, public-private investment belong to one transition, to be pursued together (Vind, 2024, pp. 6-7).

This matters because Europe is doing two contradictory things at once: demolishing usable buildings, and failing to renovate the rest. Campaigners reckon a building is demolished somewhere in Europe roughly every minute, throwing away both embodied carbon and serviceable space. The figure is an arresting restatement of the 5% to 15% of the existing stock that the European Environment Agency projects will not still be standing in 2050 (European Environment Agency, 2022, Rationale section; HouseEurope!, 2026). At the other end of the cycle, *deep* energy renovation remains near 1% of the stock a year against the EU Renovation Wave's 3% target. National rates are around 0,7% in France and 0,9% in Germany. Even Denmark, the best performer, reaches only 1,8% (Council of the European Union, 2025, p. 5; EHC Countries Database, 2026). Energy poverty is the human face of it: between 8% and 20% of households in southern and eastern member states cannot keep their homes adequately warm, 17,1% in Spain and 20,7% in Bulgaria (Eurostat, n.d., EU-SILC indicator ilc_mdes01; EHC Countries Database, 2026) (Fig. 2.3).

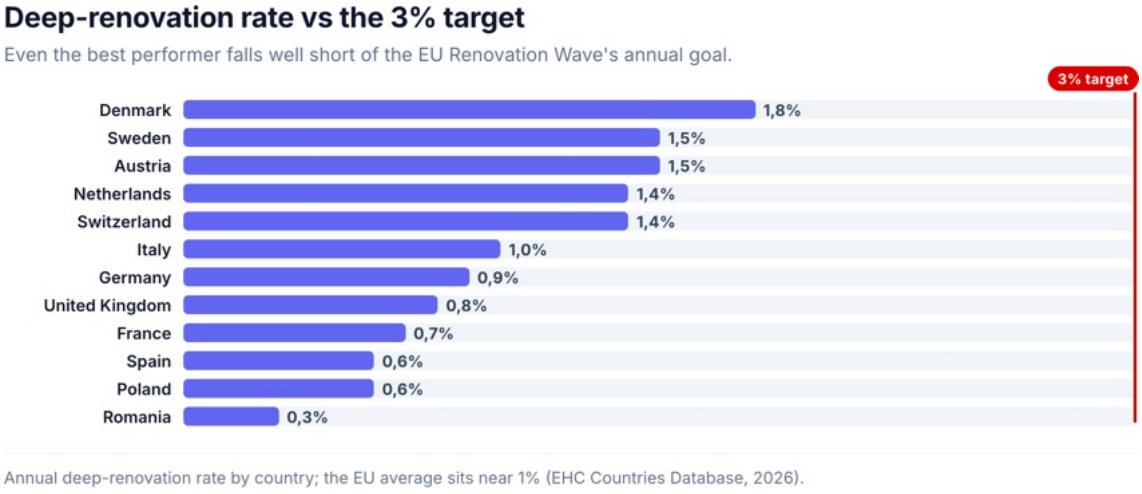


Figure 2.3 – *Deep-renovation rate vs the 3% target*

Two further tensions sharpen the picture. First, the planetary-boundaries view holds that simply *building more* on the current model breaks ecological limits, and that meeting housing need within those limits means using existing space far more intensively (Horn et al., 2025). Carbon is only one of the boundaries under pressure: modelling that pairs climate with biodiversity goals shows housing expansion breaking both at once, as greenfield growth seals soil and destroys habitat (zu Ermgassen et al., 2022,

p. 1). Second, the distributional politics of decarbonisation are fraught. From 2028 the EU extends carbon pricing to buildings and road transport through a second emissions trading system, ETS2 (Directive (EU) 2023/959, 2023; European Commission, 2025c). ETS2 prices heating and transport fuels, with costs expected to reach household bills. Poorer households spend a bigger share of their income on energy and are likelier to live in poorly insulated homes they cannot afford to upgrade, so the scheme risks being sharply regressive. Modelling of ETS2 bears the worry out: without targeted compensation, the cost of greening the stock falls hardest on lower-income households and lagging regions, and could trigger a backlash that stalls the transition altogether (Schwab et al., 2026, p. 21).

That sharpens a real dilemma. The climate demands deep cuts in the emissions of the existing stock. Yet the two usual routes, retrofitting occupied homes or knocking them down for higher-performance replacements, are both costly, and both can displace the very residents they are meant to protect. So the prize goes to interventions that cut carbon while *adding* affordable homes. The most direct route is to make fuller use of the buildings Europe has already built. Which brings the argument back to the vacancy paradox of Section 2.1: converting under-used offices and commercial space into homes, treated in detail in Chapter 4, can add dwellings while avoiding much of the embodied carbon of new construction (Graaf et al., 2025).

The choice also changes the city around the building. Arup, C40 Cities and Urban Partners estimate that brownfield and infill development could spare Europe around 770.000 hectares of urban sprawl by 2035. Residents of dense, transit-served areas typically drive 30-70% less than those in sprawling, car-dependent places (Chartier et al., 2025, p. 17). A home's location therefore belongs in its ecological account. Land take is a boundary in its own right: the EU's soil strategy commits to no net land take by 2050 (European Commission, 2021), yet construction continues to seal farmland and habitat at the urban edge, a main driver of biodiversity loss (European Environment Agency, 2024, p. 23). So brownfield redevelopment is not only an embodied-carbon strategy. It is a land-use and mobility strategy too: it reuses already-serviced sites, limits peripheral expansion, and cuts the infrastructure and transport emissions that come with greenfield growth.

2.3 The social dimension

Hectares of sprawl and tonnes of carbon are one way to count the crisis. Another is to ask what it does to people, to the communities they form, and ultimately to the political fabric itself. The European Commission now frames housing in explicitly social and economic terms. Its first European Affordable Housing Plan opens with the admission: “What Europe is facing is more than a housing crisis. It is a social crisis. It weakens our cohesion, and it threatens our competitiveness, by limiting labour and educational mobility” (European Commission, 2025a, p. 1). Housing precarity is a corrosive social force, and its effects run from the single household all the way out to the European project.

Homelessness is the sharpest edge of that social crisis: the EU counts some 1,12 million people without a home, a figure extrapolated across the 27 member states and excluding the United Kingdom (FEANTSA, 2025, p. 74). The same system leaves an estimated 47,5 million dwellings empty Europe-wide, the vacancy paradox of Section 2.1 at continental scale: need and waste side by side, which civil-society groups read as the mark of a system tuned for assets, not residents (FEANTSA, 2021, p. 21). But the squeeze now reaches well beyond the most vulnerable. One pan-European investigation found that more than one in seven municipalities is now unaffordable for a nurse, an essential, relatively stable job used as the test case for ordinary market access (Grull & Thurm, 2026). Market renters have lost ground even where official overburden rates have fallen, because that measure tracks sitting tenants, while the people trying to move stay invisible to it (Hick et al., 2025, p. 1074). The generational divide is sharpest of all. In the socio-demographic analysis for the European Parliament’s Special Committee on the Housing Crisis, young adults, single parents and lower-income renters come out as the groups whose housing costs have risen fastest and whose chances of ownership have receded furthest (Dubois et al., 2025, pp. 14-15). For young adults the consequence is demographic: they form households later, and stay in the parental home longer.

Beyond homelessness lies a quieter crisis of segregation and belonging. Financialised, tourism-driven and supply-starved markets sort residents by income, pushing lower-paid and migrant households to the edge and thinning out the mixed neighbourhoods that social trust depends on (Birkner & Apostolopoulou, 2025; Vidal et al., 2025). Discrimination compounds it: large-scale correspondence testing across the EU found that applicants with a migrant or minority background got roughly 27-32% fewer responses

to rental enquiries, a barrier so entrenched that German courts can fine up to €250.000 for overtly discriminatory adverts (Kassam, 2024). For newcomers and racialised households, the affordability barrier sits on top of an access barrier, deepening the segregation that erodes cohesion.

More space has not necessarily brought more connection. Europeans occupied around 35-36 m² per person in 2018, roughly 16% above the 30-31 m² of 2000 (Gynther, 2021; Lehner et al., 2024, p. 216). Much of that change follows smaller households (§2.4): more room, less company. The gain is also uneven, with under-occupation among older owner-occupiers alongside overcrowding among younger and poorer households. Loneliness tracks the same fault lines. In the first EU-wide loneliness survey of 2022, 13% felt lonely most or all of the time, equivalent to almost 50 million Europeans. More than a third reported loneliness at least some of the time (Schnepf et al., 2024, p. 168). Prevalence is highest among young adults and mobile residents. Recent arrivals in a municipality reported it at 19,6%, against 14,2% among those settled for more than a decade (Berlingieri et al., 2024, pp. 47, 51).

Housing insecurity does not remain a private trouble. It also changes how people read the institutions around them. Bohle and Ehrich (2025) link unaffordable housing to falling institutional trust and to the rise of a radical right that folds housing grievance into nativist narratives. Abou-Chadi et al. (2025) approach the relationship from the policy side, finding that broad-based social housing and participatory densification can weaken those narratives. The Commission's warning at the start of this section thus has a political as well as a welfare dimension. The ability to find and keep a home bears on whether institutions appear to work for ordinary life (Fig. 2.4).

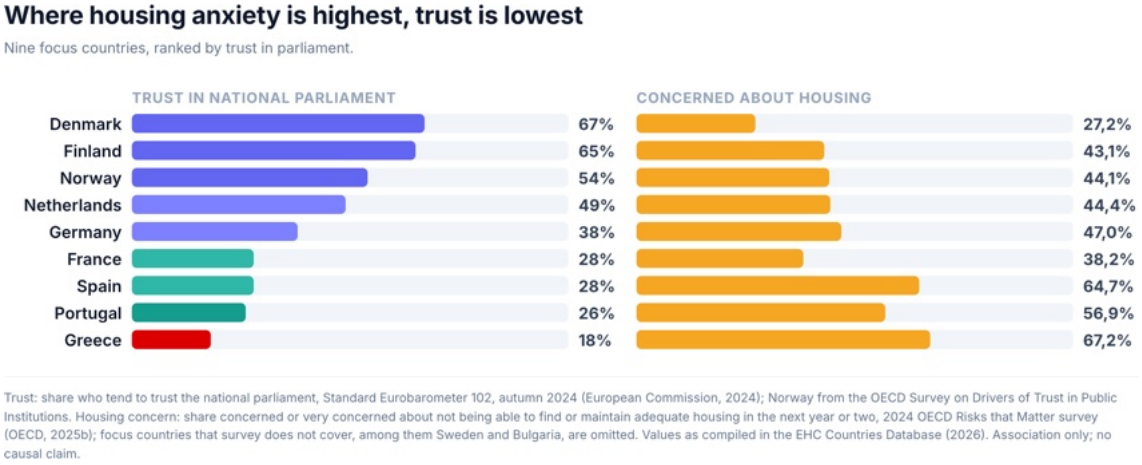


Figure 2.4 – *Where housing anxiety is highest, trust is lowest*

2.4 Key drivers

How does a system arrive at expensive homes, unused space and pressure to build still more? Six mechanisms help explain the combination. They overlap, with each changing the conditions in which the others operate (Fig. 2.5).



Figure 2.5 – *Six drivers of the housing crisis*

Financialisation. The deepest driver turns housing from somewhere to live into a globally traded asset class, owned to extract rent rather than to be lived in. Aalbers (2017) describes a *variegated financialisation*: mortgage-backed securities, listed landlords and yield-seeking capital enter national housing systems through different institutional routes. Gabor and Kohl (2022) focus more specifically on the arrival of large corporate landlords and real-estate investment trusts, showing how they reframe the European home as *an asset class* and disconnect prices from local incomes. The scale is now measurable. Tangible assets of the EU-27's listed residential funds grew from €4,8 billion in 2004 to €198,7 billion in 2024, a 42-fold rise against a 19-fold rise in rental income, leaving property valued at roughly eleven times annual rent where other listed sectors sit near parity (Aalbers et al., 2026, p. 29). The same study identifies a shift from debt-driven to wealth-driven financialisation: between 2015 and 2024, EU household credit fell by 18% while house prices rose 61% (Aalbers et al., 2026, p. 7).

Rising rents, weaker security of tenure, tenant contention and widening wealth inequality are consistent consequences across this literature (Hochstenbach et al., 2025; Vidal et al., 2025). Wijburg (2021, pp. 1282-1284, 1287) qualifies any single causal account: financialisation varies by market and can be reversed through public, cooperative and non-profit ownership – the reversal route that Chapter 3 examines.

Short-term and 'grey-market' rentals. A second driver pulls dwellings into tourist and serviced lets, the Airbnb-ification of the inner city. Severity shows up best as local concentration: by 2016, 17% of housing in Barcelona's Old Town was listed on Airbnb (50% on some streets); short-term rentals reached roughly a quarter of properties in central Paris and 19% in historic Rome (Colomb, 2025, p. 12). The local effects are measurable. In Barcelona's highest-Airbnb neighbourhoods, rents rose by 7% and transaction prices by 17% (Garcia-López et al., 2020, p. 1). In Berlin, each commercial listing displaced 0,2-0,4 long-term units and pushed local rents up by as much as 2,4% (Duso et al., 2024, p. 1). By 2016, a quarter of Lisbon's Alfama housing stock had become short-term lets. Buy-to-let investors supplied 78% of that stock, displacing long-term residents (Cocola-Gant & Gago, 2021, pp. 1679-1680). At European scale the platforms are a parallel residential system, recording 854 million guest nights in 2024 (Eurostat, 2025c). And regulation often shifts the pressure without solving it: medium-term furnished rentals now make up about 20% of Airbnb listings in Paris and 40% in Barcelona, slipping past both short-term and ordinary tenancy rules (Colomb, 2025, p. 16; Pijuan, 2025).

Construction costs and interest-rate shocks. The post-2021 jump in materials and financing costs choked new supply exactly when it was most needed: EU construction producer prices for new residential buildings rose 52% between 2010 and 2023, the sharpest annual spikes in 2022 and 2023 (Eurostat, 2024). Higher policy rates also raised the cost of development finance. Rents respond on a different timetable: the European Central Bank's work shows how *sticky* they are and how slowly monetary tightening reaches housing costs (Bates et al., 2025). Institutional assessments describe the resulting pressure on project viability as supply-chain inflation met tight money across the continent (Council of the European Union, 2025; European Commission, 2025b).

Land speculation. A fourth driver is land itself. Goulding et al. (2025, pp. 6, 21-22, 26) take apart the dominant *supply-side* story, showing that property-led development often captures little public value while routing rent extraction to landowners and investors.

Hoarding makes the scarcity worse: work on the German market points to ‘ghost’ dwellings and the asset value of old, below-market leases that keep usable homes off the market (Simons, 2026, pp. 8, 12). Tax treatment compounds it again, as targeted breaks for property funds pull capital into real estate and push prices up across Europe (Investigate Europe, 2022).

Insufficient non-market supply. A fifth driver is the long retreat of public, social and cooperative provision. The contrast is sharp: social housing is roughly 29% of the Dutch stock and 17% of the French, but only about 2,3% in Germany and 2,5% in Spain, where the cooperative sector is negligible too (OECD, 2023; Housing Europe, 2025b; as compiled in the EHC Countries Database, 2026). The State of Housing in Europe report finds the continent building barely half the social and affordable homes it needs, with residential permits down about 20% in many markets (Housing Europe, 2025b, p. 4). That variation is patterned rather than random. Kemeny (1995) distinguishes dualist rental systems, where a residual social sector is held apart from an unregulated market, from unitary systems, where cost-renting non-profits compete directly with private landlords and pull market rents down with them. Cooperative housing is strongest in the unitary cases: tenure structure, not stock size alone, decides how far a non-profit sector moves prices (Kemeny et al., 2005).

Demographic change and the erosion of space efficiency. A sixth driver runs against intuition: Europe has never had more residential floorspace per person, and still demand keeps outrunning supply. The single-person household is now the commonest type in the EU, so even a flat or falling population needs more separate dwellings each year (Eurostat, 2025b). The result is structural under-occupation, the mismatch of space to household described in Section 2.3 – and the European Environmental Bureau reckons Europe’s vacant and under-occupied dwellings could in principle house around 100 million people (Leyvraz, 2025, p. 3). Sufficiency research treats this mismatch as one of the biggest untapped levers in housing and climate policy at once, arguing that using the existing stock harder could stand in for years of new building (BPIE & Ramboll, 2024, p. 3; Kohl et al., 2025, p. 2). Urbanisation deepens it, with the urban share of Europeans projected to climb from roughly 76% to 84% by 2050 (Bezombes, 2024; European Commission, 2020). This dynamic is the empirical backbone of the adaptive-reuse and sufficiency arguments in Chapter 4.

2.5 The intersection: economic × ecological × social

Affordability, carbon and cohesion each have their own discipline, policy language and preferred remedy. A household experiences them in the same home. I argue that the connections are central to the crisis: an intervention can succeed on its own terms while making another part of housing life worse.

Three failure modes show what that means in practice. The *deregulated-supply* remedy, building more by loosening planning and standards, can lift output, but it tends to throw up market-rate and luxury units in the most profitable spots: little help for affordability, and fresh embodied carbon on top (Goulding et al., 2025; Horn et al., 2025). The *retrofit-first* remedy calls for deep energy renovations to hit climate goals. But without tenant protection it can cause *renovictions*: landlords raise rents after upgrading a building and force the original tenants out, so the cost of greening the stock falls unfairly on lower-income households (Keliauskaitė, 2025; Schwab et al., 2026). Evidence gathered for the European Parliament shows how deliberate this can be: corporate landlords in Denmark and Sweden pursued renovation-based rent increases so systematically that the Danish government legislated against the practice in 2020 (Aalbers et al., 2026, pp. 45-47). The *price-control* remedy, rent caps without investment, shields sitting tenants but can choke maintenance and new supply, and does nothing for outsiders shut out of the regulated stock altogether (Fig. 2.6).

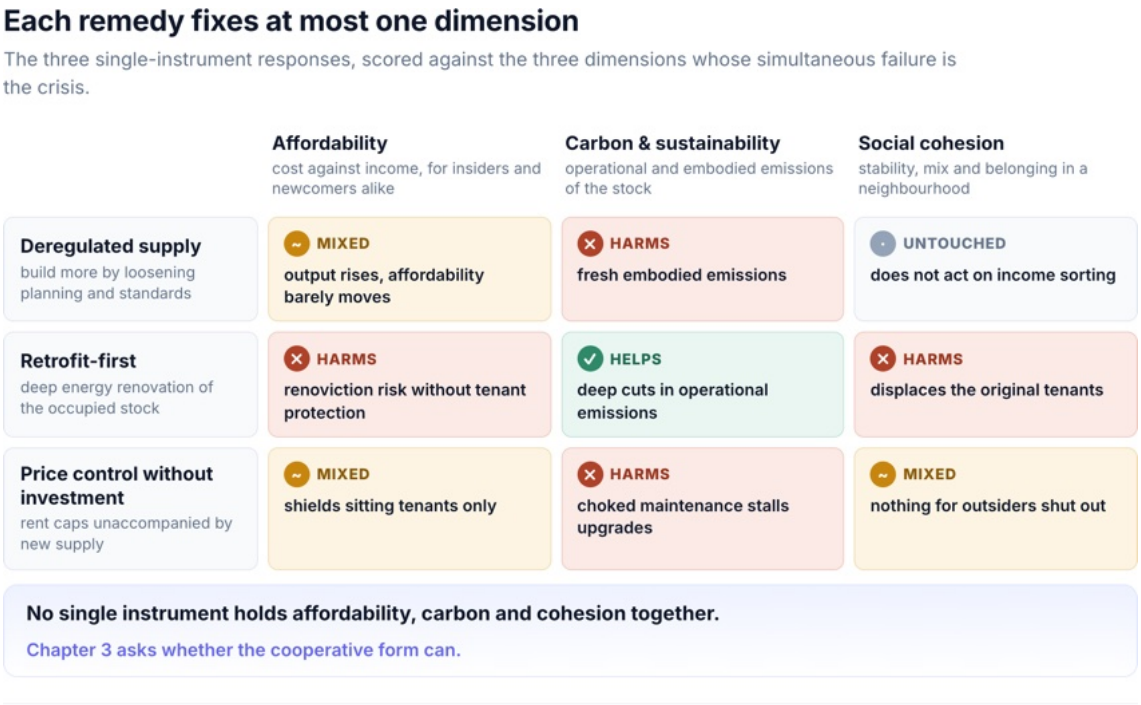


Figure 2.6 – *Three partial remedies against three dimensions*

The insider-outsider data of Section 2.1 make the interaction concrete. Where the non-market sector is thin, as in Lisbon, the steep rent gap collapses affordability for newcomers, and the churn erodes neighbourhood cohesion; a large municipal and cooperative sector narrows the gap without closing it. Vienna's expansive non-market stock does more than moderate prices: because cost-based housing shields tenants from speculative rent rises, the city can run deep retrofits without driving "renovictions" (Aldana Cohen et al., 2025; Marquardt & Glaser, 2023), and the same stability preserves mixed-income neighbourhoods and feeds cohesion. The entry barrier nevertheless remains. Even a strong non-market system cannot protect every newcomer who has to find a home in the private market, particularly when its own stock stops growing.

So a durable response has to work on all three at once: *affordable* by design, *low-carbon* by putting reuse and deep renovation first, and *cohesive* by binding residents into stable, mixed communities. Few existing instruments manage all three. The rest of this thesis argues that the cooperative form, and a pan-European cooperative in particular, is well placed to hold them together: it takes housing out of the speculative market, holds buildings long term, converts existing stock without a profit imperative, and binds residents through democratic membership. Affordability, low-carbon stewardship and cohesion, in a single tenure form. It is not the only tenure that can do this. Well-run

public and limited-profit housing can too, as Vienna already shows. But the cooperative is distinctive in pairing decommodification with resident self-governance, and it is that pairing Chapter 3 explores.

2.6 Existing policy responses and their limits

Europe's policymakers have, belatedly, recognised the crisis (Hernández-Morales & Coi, 2024). For the first time the Commission put housing in a dedicated Energy and Housing portfolio (von der Leyen, 2025), then, in December 2025, published the European Affordable Housing Plan introduced in Section 2.3 (European Commission, 2025a). The Plan proposes to mobilise public and private investment of around €150 billion, restates the two million additional homes a year of Section 2.1 as a policy target rather than an estimate of need, foreshadows tighter short-term-rental regulation, and floats a pan-European platform for affordable-housing investment through the European Investment Bank (European Commission, 2025a; Hernández-Morales, 2025). The European Parliamentary Research Service has argued in parallel for a genuinely *coordinated* EU approach that aligns funding, regulation and data (Pape, 2025).

At member-state level, the responses are mixed and instructive. Germany has launched a *Bau-Turbo* to speed up building permits (Die Bundesregierung, 2025) and raised federal funds for social housing construction to a record €23,5 billion through 2029 (Bundesministerium für Wohnen, Stadtentwicklung und Bauwesen [BMWSB], 2025), betting mostly on supply. Austria leans on its limited-profit (*gemeinnützig*) and municipal sector, the Vienna model of Sections 2.1 and 2.5, which sustains a roughly 20% municipal and 18% cooperative share in the capital (Statistik Austria and Wiener Wohnen data, as compiled in the EHC Cities Database, 2026). The Netherlands runs the EU's largest social-rental sector (§2.4; OECD, 2023), yet affordability has worsened sharply for middle-income renters (Hick et al., 2025, p. 1074). Spain offers a natural experiment in divergence: Barcelona's rent caps cut rents on new contracts by around 6,4% (Ajuntament de Barcelona, 2025), while Madrid went for deregulation, with sharply different outcomes (Palomera, 2025). France pairs rent control in Paris with the SRU law's social-housing quotas (Loi n° 2000-1208, 2000; OECD, 2021). Progressive analysts warn, though, that without conditionality the new wave of investment could enrich institutional investors while doing little to expand genuinely affordable, permanently decommodified stock (Siatitsa et al., 2025, p. 32). The Parliament's study of housing speculation presses the same point: institutional capital overwhelmingly acquires existing dwellings, so easier finance does not of itself add affordable supply, and the Plan's

answer to speculation stays confined largely to monitoring and transparency (Aalbers et al., 2026, p. 8).

The difficulty is that European ambition meets a largely national and local housing system. The Commission can mobilise funding, coordinate policy and use relevant regulatory powers. It cannot simply legislate a common housing system into being. The Commission is stretching the levers it has, though: the January 2026 revision of the Services of General Economic Interest (SGEI) State aid rules now explicitly exempts affordable-housing subsidies from prior Commission approval, lifting a major regulatory barrier (European Commission, 2026). Yet a deep contradiction remains. Competition rules have been loosened to allow housing subsidies, but national strategies are still bound by the recently reformed EU fiscal rules. Despite the 2024 economic governance update, strict deficit limits keep penalising the large-scale public borrowing that social housing actually needs to scale (Housing Europe, 2025b, p. 7; Pape, 2025, p. 7).

One actor already works at the continental scale the problem demands: civil society itself. HouseEurope!'s Power to Renovation European Citizens' Initiative, concluded on 31 January 2026, translated the case against demolition into a proposed "Right to Reuse" built on tax incentives for renovation and recognition of embodied carbon (HouseEurope!, 2026).

Taken together, these limits leave a **pan-European gap**: the crisis is continental in its drivers, among them cross-border capital, platform tourism, shared climate obligations and a common single market, yet the institutional response stops at national borders. Recent evidence makes the mismatch concrete: where Denmark, Berlin and Barcelona moved against speculative acquisition, mobile capital largely shifted to other jurisdictions, which is why the same parliamentary study closes by recommending an EU-level anti-speculation toolbox alongside expanded cooperative and non-profit provision (Aalbers et al., 2026, pp. 8, 58). Where public borrowing is constrained and private provision fails to reach the missing middle, civil-society organisations have a reason to explore what they can share across borders. They do not thereby escape the need for public policy. The question is whether they can connect resources that existing arrangements leave apart. That is the opening the cooperative tradition, and the proposal developed here, seeks to address (Fig. 2.7).



Figure 2.7 – *The pan-European gap*

3 The Role of Cooperative Housing in Europe

Across the EU and EFTA, at least 7,9 million dwellings were held in cooperative legal forms as of 2025, with more than 22.000 cooperatives in the Housing Europe network alone (Housing Europe, 2025a, pp. 51-52; Moreau & Pittini, 2012; Pfatteicher et al., 2024). The headline counts legal forms, not protected affordability. An indicative database reconciliation identifies roughly 5,3 million dwellings in ownership-aligned cooperatives and 2,7 million in rental or right-of-use cooperatives (EHC Countries Database, 2026). This classified subset is incomplete; Appendix B.5 discloses its post-cut-off audit status and unresolved snapshot provenance. The affordability case in §3.3 rests on the smaller group, and the larger one is part of the diagnosis. The stock is unevenly spread, too – from mass tenure backed by public finance and municipal land, to near-absence (Fig. 3.1).

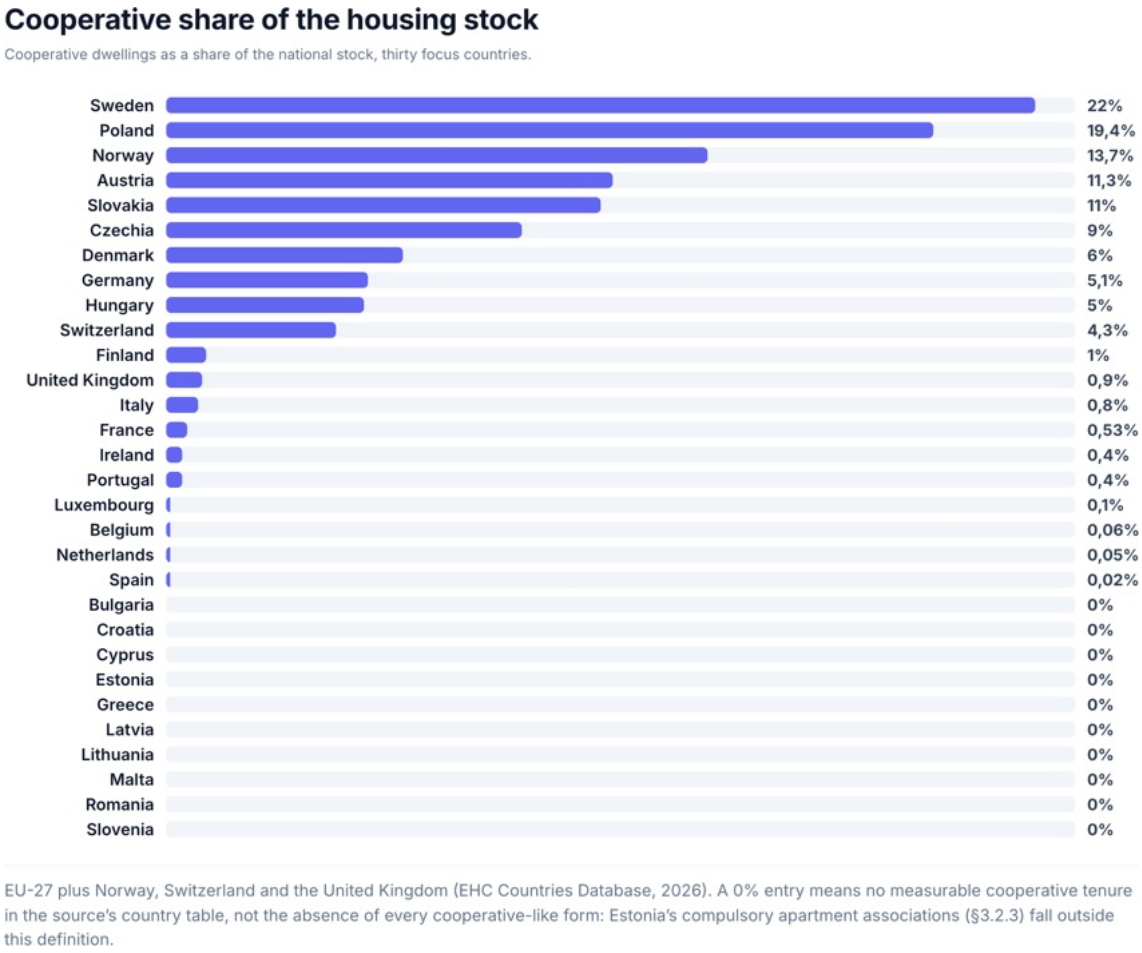


Figure 3.1 – *Cooperative share of the housing stock*

The promise behind the form is easy to understand: a home held for use, with residents involved in looking after it. Collective ownership, democratic governance and cost-based pricing can protect affordability over time (Czischke et al., 2020; Sanjinés & Duyne Barenstein, 2018). The harder question is what keeps that promise intact. This chapter follows it through different equity arrangements, public-support systems and organisational scales, then asks how far the supporting capacity can travel.

3.1 What is cooperative housing?

What does someone own when they join a housing cooperative? The answer depends on the model. At its broadest, a cooperative is a member-owned organisation through which people organise housing provision or management. The rights attached to that membership can differ substantially.

I focus here on rental and right-of-use models. The organisation retains the asset; residents hold an occupancy right under its statutes and tenancy rules, without a claim on the home's rising market value when they leave. Charges generally follow housing costs, and exit values are capped or absent. That arrangement connects collective ownership to long-term stewardship. It must not be read into every organisation bearing the cooperative name (Czischke et al., 2020; Sanjinés & Duyne Barenstein, 2018; Fig. 3.2).

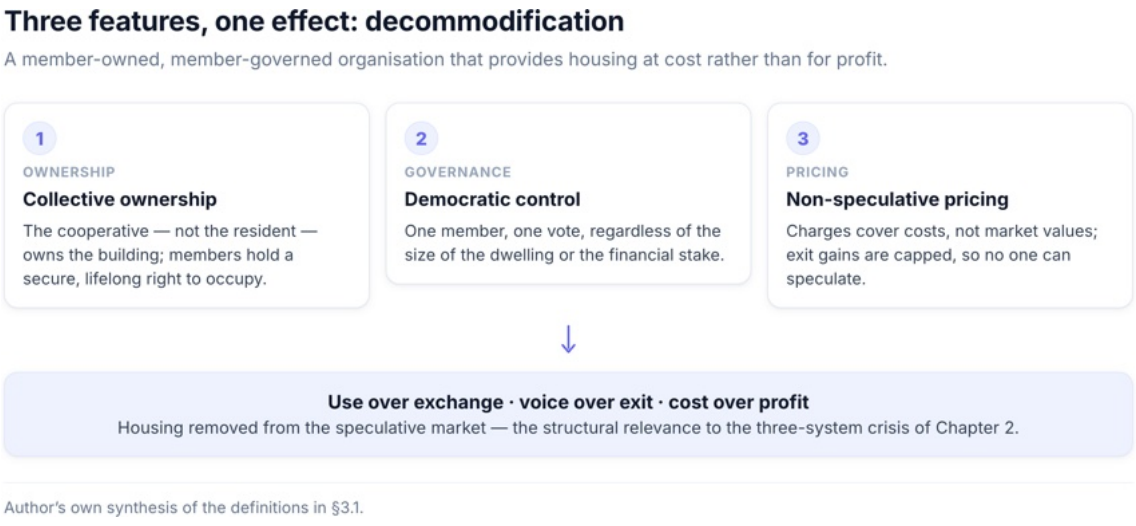


Figure 3.2 – *The decommodification spectrum*

The democratic and mutual character of the organisation is expressed in the seven co-operative principles of the International Co-operative Alliance (1995): voluntary and open membership; democratic member control; member economic participation; au-

tonomy and independence; education, training and information; co-operation among co-operatives; and concern for community. Housing cooperatives apply them to shelter, and belong to the wider family the literature increasingly calls collaborative or collective housing, alongside co-housing groups, community land trusts (CLTs), tenant self-management organisations and limited-profit housing associations (Czischke et al., 2020, p. 1; Griffith et al., 2022).

The label also needs separating from neighbouring ideas. Cooperative ownership tells us who owns and governs the organisation. Social housing tells us about the terms on which homes are provided and allocated. The two can overlap. A cooperative can therefore provide social housing, as Austria's *gemeinnützige* sector illustrates (Lang & Giovannini, 2025). A condominium instead combines individual ownership of dwellings with collective management of common property. Ownership-aligned cooperatives can resemble it economically when member shares are freely tradable, even though the legal structures differ. Rental and right-of-use cooperatives retain collective ownership without that route to private gains. Their purpose is to serve members' housing needs, unlike investor-owned landlords and Real Estate Investment Trusts (REITs), whose principal obligation is to their investors.

Behind these legal distinctions sits an older problem: how do people govern something they hold in common? Housing cooperatives give that question a building and a membership. Ostrom (1990, p. 90) showed that durable commons institutions share identifiable design features: clear boundaries, collective-choice arrangements that let those affected write the rules, monitoring and graduated sanctions, accessible conflict resolution and, for commons embedded in larger systems, nested enterprises. That last principle matters here. Ostrom layers governance across tiers, and does not confine it to the smallest unit – which is the reading §3.5 returns to.

3.2 Models across Europe

Cooperative housing takes many forms. A Swiss *Wohnbaugenossenschaft*, a Swedish *bostadsrättsförening*, a Polish *spółdzielnia mieszkaniowa* and a Catalan *cessió d'ús* project are all cooperatives, yet they differ in how members hold equity, how housing is financed and what the state does. Their differences become easier to read through the circumstances in which they emerged and the practical arrangements they now use.

3.2.1 Waves of origin

Cooperatives did not arrive across Europe in one wave or for one reason. Their history follows housing need, but also the moments when law, public finance and resident organisation made a response possible. Figure 3.3 traces those overlapping waves without imposing one chronology on every country (Housing Europe, 2025a; Lang & Giovannini, 2025; Pfatteicher et al., 2024; Sørvoll et al., 2025).

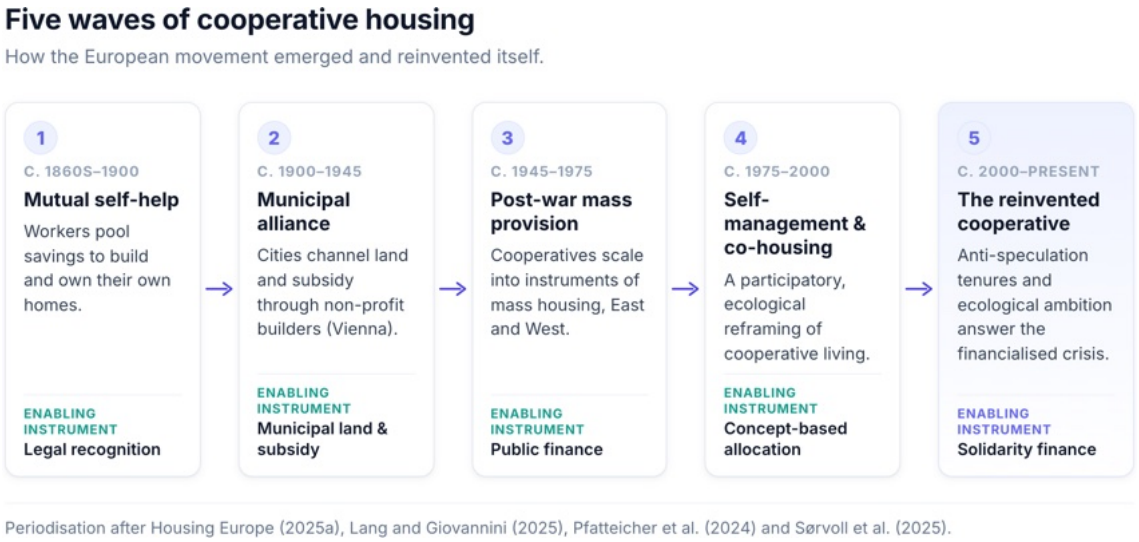


Figure 3.3 – *Waves of European cooperative housing*

The first wave grew out of nineteenth-century efforts to improve urban housing through mutual self-help. Legal recognition made those efforts easier to organise and finance. In Germany, the Cooperative Societies Act (*Genossenschaftsgesetz*) of 1889 strengthened the legal footing of a movement that had already begun, including through limited liability (Pfatteicher et al., 2024, pp. 41-42).

The interwar period brought housing provision more closely into public policy. Vienna's housing-construction tax (*Wohnbausteuer*) and land acquisition illustrate the resources municipalities could mobilise. Municipal and cooperative provision remained distinct, but public land and financial support became important parts of the wider non-market housing system (Sørvoll et al., 2025).

After the Second World War, cooperative housing expanded through different public-finance arrangements: state construction loans supported Nordic provision, while centrally planned systems used cooperatives alongside other forms of housing delivery in the socialist East. Poland and Czechia retain substantial cooperative stocks from that

history, although their ownership arrangements later changed (Bengtsson, 2025; Pfatteicher et al., 2024).

A later renewal placed greater emphasis on resident participation and smaller, self-managed projects. In Switzerland, new cooperatives formed during the 1980s and 1990s with stronger member involvement (Sanchez-Bajo, 2024). This was a change in how residents organised housing, not the result of one allocation instrument. Concept-based land tenders are one way municipalities have supported such initiatives, judging proposals by social and design aims rather than price alone (Lang & Giovannini, 2025, p. 16).

The fifth wave, emerging since the early 2000s, renews cooperative housing as a resident-led response to the affordability crisis and housing financialisation. It combines non-speculative tenure with ambitions for shared living, ecological sustainability and active participation, challenging both investor-led provision and the less participatory practices of some established housing organisations (Czischke et al., 2020; Lang & Giovannini, 2025). Collective ownership and restrictions on private gains seek to keep homes oriented towards use across successive generations of residents. The renewal extends beyond established strongholds to new initiatives in countries such as the Netherlands and Portugal, where it also reconnects with older cooperative traditions (Cooperative Housing International, n.d.-a; Housing Europe, 2025a).

3.2.2 Contemporary models and institutional arrangements

The legal names become more useful when translated into practical questions. Who holds the building? What must a member contribute, what happens on exit, and what protects affordability? Table 3.1 compares selected arrangements on that basis.

The categories overlap. Grant-of-use belongs to the wider right-of-use family, and a Community Land Trust can support different building tenures. The countries listed indicate active examples, not necessarily widespread provision. Post-privatisation arrangements complicate the picture further (§3.2.3): collective management may continue after protection from speculative gains has weakened.

Table 3.1 – Selected cooperative-housing and related institutional arrangements in Europe.

Institutional arrangement	Core principle	Equity and affordability protections	Countries with examples	Illustrative project / provider
Rental / right-of-use cooperative	Cooperative retains the asset; members hold occupancy rights under its rules	Restricted private gains and cost-oriented charges; entry costs and ongoing affordability vary	Switzerland, Austria, Germany, Netherlands	Zollhaus, Zurich (CH)
Ownership / shared-equity cooperative	Member holds a transferable share associated with a dwelling	Transfer values may be capped or market-based; tradability can weaken affordability protection	Sweden, Norway, Finland, Denmark	HSB / OBOS estates (SE/NO)
Grant-of-use (cessió d'ús)	Collective ownership and non-transferable use rights; often supported by public-land leases	Restrictions on private gains protect non-speculative use; charges depend on project costs and finance	Spain (Catalonia)	Cirerers & La Balma, Barcelona (ES)
CLT-cooperative hybrid	Land held in trust, combined with cooperative building ownership or management	Land and resale restrictions seek to preserve affordability; outcomes depend on the combined arrangements	Belgium, France, UK	CALICO, Brussels (BE)
Solidarity-syndicate / cooperative-adjacent model	Project company combines resident control with a syndicate veto on sale	Veto rights resist speculative resale; solidarity transfers support further projects	Germany, Austria	Bikes and Rails, Vienna (AT)

The final row is cooperative-adjacent, falling just outside the strict legal definition. Germany's *Mietshäuser Syndikat* and Austria's *habiTAT* organise each house as a limited-liability company whose shareholders are the resident association, which holds the majority and runs the building, and the syndicate, whose stake exists to give it a veto on sale (Griffith et al., 2022). That project-level structure is the closest analogue in Table 3.1 to the ring-fenced vehicle and steward-ownership lock the EHC adopts in §4.5.

3.2.3 Country vignettes and lighthouse projects

The same cooperative intention meets very different conditions across Europe. In one country it can draw on a century of institutions; in another, a new group must assemble

the support as well as the housing. The following cases put the arrangements into that setting before §3.3 examines what they deliver.

Switzerland: land access and the rental cooperative. Cooperatives house close to a fifth of all dwellings in Zurich against 4,3% nationally, across roughly 1.500 organisations. Favourable municipal land leases are an important enabling condition (Housing Europe, 2025a, p. 42; Statistik Stadt Zürich, 2024). Older organisations such as ABZ (1916) now sit beside a fifth-wave revival in Kalkbreite (2014) and Zollhaus (2021), both mixed-use and both on leased city land (Genossenschaft Kalkbreite, n.d.-a, n.d.-b; Jacobs & Totté, 2020). Favourable land terms give these projects an economic footing. What the newer cooperatives do with it, including mixed uses and shared facilities, shows how public support can leave room for resident-led invention.

Austria: statutory affordability and contrasting governance arrangements. Austria links cooperative provision to its *gemeinnützige* (limited-profit) sector. Its 97 housing cooperatives manage roughly 460.000 homes, more than one Austrian household in ten, inside a wider limited-profit sector of 998.000 (Housing Europe, 2025a, p. 8; EHC Countries Database, 2026). The limits on costs, returns and surplus give affordability a statutory basis. Who actively shapes life within the building remains a separate question. A contemporary cooperative example is Vienna's Die HausWirtschaft, which brings housing, workspaces and shared facilities together in a community-oriented project. Its cooperative organisation supports shared infrastructure and collaboration among members, illustrating how cooperative management can extend to mixed-use urban living (Die HausWirtschaft, n.d.).

Germany: established rental provision and new resident-led projects. Germany holds Europe's second-largest cooperative stock by unit count, around 2,2 million units across some 2.237 organisations (GdW Bundesverband deutscher Wohnungs- und Immobilienunternehmen [GdW], 2023). The historic *Wohnungsgenossenschaften* are joined by newer projects in Berlin and Munich. Möckernkiez and Prinz Eugen Park, the latter on plots Munich awarded by concept rather than price, illustrate the scope for cooperative development on substantial urban sites (Lang & Giovannini, 2025, p. 16; Landeshauptstadt München, n.d.; Möckernkiez eG, n.d.). New resident-led projects thus sit alongside a much larger established rental sector, with municipal land allocation supporting some recent developments.

The Nordics: scale without uniform protection from financialisation. Sweden's *bostadsrätt* sector holds some 1,03 million units across roughly 28.000 associations; Norway also has a substantial sector organised through umbrella bodies such as OBOS (Statistics Sweden, 2023; EHC Countries Database, 2026; Bengtsson, 2025; Cooperative Housing International, n.d.-b). Both stocks are mostly ownership-aligned. Their scale demonstrates the reach of collective organisation, while tradable shares can weaken affordability over time (Thompson, 2024). Norway's federations offer "home purchase models" for lower-equity buyers (Housing Europe, 2025a, p. 29). Brf Viva in Gothenburg, completed in 2019, provides a concrete example within Sweden's ownership-aligned cooperative sector. Its 132 apartments combine shared facilities with solar electricity and car- and bicycle-sharing in place of private car parking (Riksbyggen, n.d.). These sustainability features do not change the ownership-aligned nature of its tenure.

Spain: non-speculative tenure and shared living. Spain holds around 6.000 dwellings in standing cooperative tenure, barely 0,02% of the stock, excluding the larger build-to-sell movement that dissolves into individual ownership on delivery (Housing Europe, 2025a, pp. 45-46; COCETA and CEPES census data, as compiled in the EHC Countries Database, 2026). Catalonia's fifth-wave *cessió d'ús* (grant-of-use) model has influence beyond that small stock. Promoted by organisations such as Sostre Cívic and demonstrated in pioneering projects such as La Borda, it combines collective ownership and non-transferable use rights, with long public-land leases providing an important route to delivery (Baiges et al., 2020; Ahedo et al., 2023, p. 637). Cirerers and La Balma, both on city-tendered sites and built in timber, combine affordability protections with shared spaces and social programming (Lacol, n.d.; Sostre Cívic, n.d.-a, n.d.-b; urbanNext, n.d.). These projects connect the ownership rule to a way of living: restricted private gains alongside common space and ecological design choices.

The Netherlands: enabling a renewed sector. Despite a vast social-housing sector, resident-led *wooncoöperaties* house only around 1.500 dwellings. New financing instruments are intended to expand that base. Amsterdam lends up to €50.000 per dwelling from a fund announced at €50 million but appropriated at €23,5 million, and the state added €60,6 million nationally in 2025 (Cooplink census data, as compiled in the EHC Countries Database, 2026; Verordening Stimuleringslening wooncoöperaties Amsterdam, 2024; Rijksoverheid, 2026). De Torteltuin, part-financed by a citizen-bond campaign, illustrates the combination of public enabling measures and member-led

mobilisation (Arcam, n.d.; De Torteltuin, n.d.; Henley, 2024). The Dutch challenge is to turn these funding commitments into homes on terms residents can afford.

Poland, Czechia and Estonia: collective management after privatisation. Poland retains Europe's largest cooperative stock by unit count, around 2,7 million units, and Czechia around 480.000 (Housing Europe, 2025a, p. 33; ZRSMRP and SČMBD data, as compiled in the EHC Countries Database, 2026). Post-1990 privatisation left many socialist-era *spółdzielnie mieszkaniowe* and *bytová družstva* administering privatised flats, weakening the link between cooperative organisation and non-speculative tenure (Marčetić, 2021, p. 45; Hölzl, 2025). Estonia made apartment associations mandatory for the privatised stock. This differs from voluntary cooperative membership, yet the associations have served as vehicles for EU-funded energy renovation (Housing Europe, 2025a, pp. 12-13). Collective management can therefore support building improvements without establishing non-speculative ownership or participatory governance. New initiatives pursue different paths. Czechia's První vlaštovka and Vzletný Racek, linked to Sdílené domy and MOBA (§3.5), develop use-based provision (Hölzl, 2025; Pósfai et al., 2024). Poland's 2022 act on *kooperatywy mieszkaniowe* opens preferential municipal-land access, alongside development-bank support for social rental housing. Take-up remains untested (Ustawa o kooperatywach mieszkaniowych, 2022; Sobczak, 2023, p. 157; OECD, 2025a, pp. 46, 140).

The wider CSEE frontier: building support where it is weak. Across much of Central and South-Eastern Europe (CSEE), current statistics record little cooperative-housing provision (EHC Countries Database, 2026). Emerging initiatives face gaps in finance and development capacity as well as the task of organising residents. MOBA Housing SCE is one response, providing cross-border coordination and developing shared financing mechanisms; §3.5 examines its role in detail (Hölzl, 2025; Pósfai et al., 2024; Pósfai & Jelinek, 2022). They face two construction tasks at once: the homes, and the organisations that make the homes possible.

Across these settings, legal form alone does not determine affordability, environmental performance or resident control. Land access, financing, restrictions on private gains and governance shape what each model can achieve (Fig. 3.4). The examples identify relevant arrangements and design choices rather than exhaust them: at the 31 July 2026 cut-off the platform's project library recorded more than 150 cooperative and community-led projects across seventeen countries, each with its own sourced profile

(EHC Projects Database, 2026). Assessing their outcomes requires the research evidence examined next.

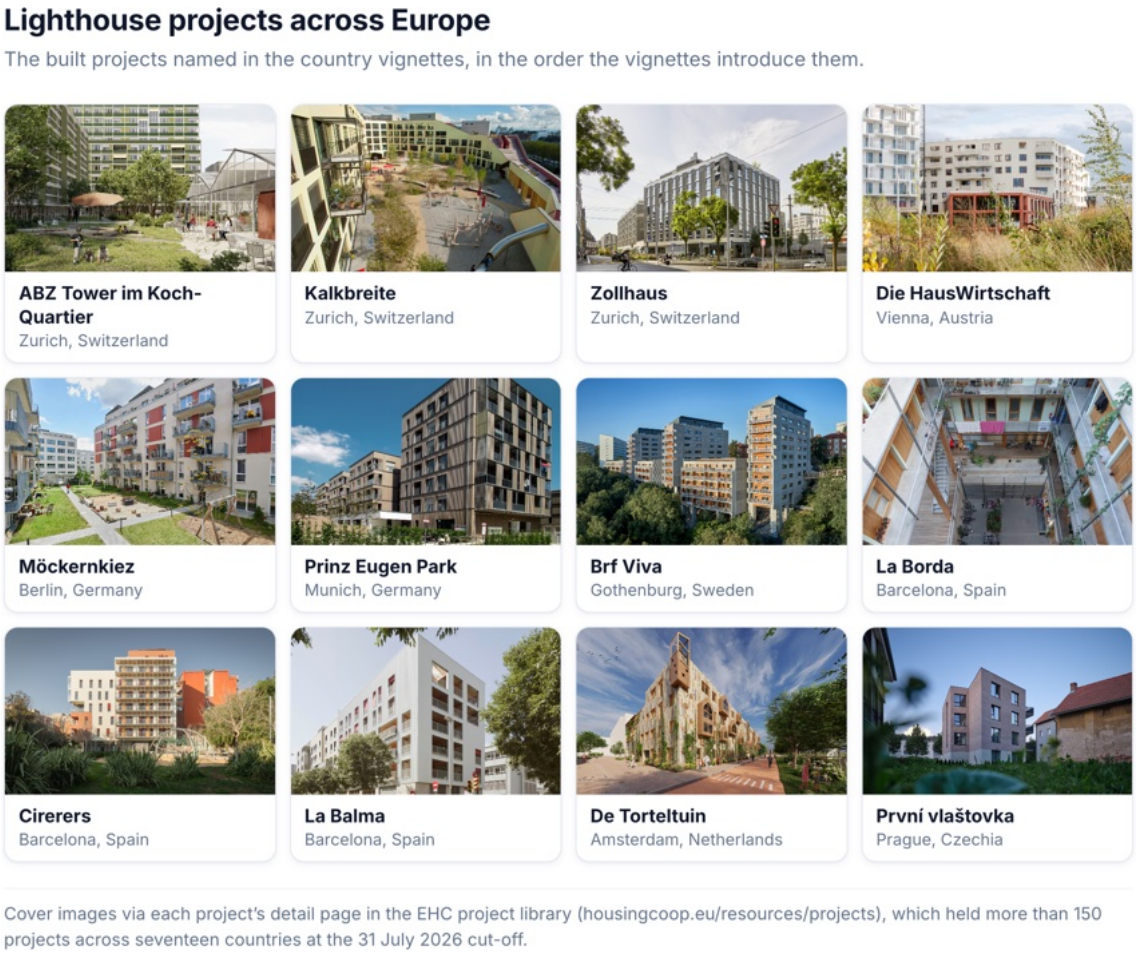


Figure 3.4 – *Lighthouse cooperative projects*

3.3 How cooperative housing fosters sustainable living

The buildings and institutions show what cooperative housing can look like. What difference does living in one make? I return here to the sustainability question in §1.2. Rent comparisons and tenure rules provide one kind of evidence; studies of resource use, participation and health provide others. They need to be read on their own terms before they can support a common conclusion.

Economic sustainability: protecting affordability over time. Rental and right-of-use cooperatives can resist the financialisation described in Chapter 2 by restricting resale and private gains. The level of housing costs is a separate question. Zurich's cooperative rents run roughly 40% below market, while Berlin's cooperative stock lets at €6,27 per m² against €15,78 for new market contracts (Housing Europe, 2025a, p. 42; Statis-

tik Stadt Zürich, 2024; EHC Cities Database, 2026). The Berlin figures compare existing cooperative tenancies with new market lettings; they do not isolate a tenure effect. Land terms, public support, financing history and the age of the stock also influence charges. Restrictions on private gains can preserve non-speculative ownership across successive generations of residents, while charges still have to meet financing, maintenance and reinvestment costs. Neither low absolute costs nor a widening market discount follows from the legal form alone (Czischke et al., 2020; Sanjinés & Duyne Barenstein, 2018). Unlike a housing allowance, these protections operate through the ownership arrangement itself. Benefits can also extend beyond members: Austria's limited-profit stock is associated with private rents around 5% lower on average (Klien et al., 2023, p. 1).

Ecological sustainability: long-term ownership and sufficiency. Chapter 2 argued that the strongest interventions reduce carbon while expanding affordable housing. Non-speculative rental and right-of-use cooperatives can support both, because collective ownership extends the decision horizon beyond a sale cycle. Members who expect to occupy and govern a building for decades have reason to assess retrofit against its lifetime costs, and prominent projects pair affordability with timber construction, deep retrofit, adaptive reuse and shared facilities (Genossenschaft Kalkbreite, n.d.-a, n.d.-b; LaFond et al., 2024; Vind, 2024). The best-known exemplars are new-build. The reuse-led cases on which Chapter 4 draws are rarer and smaller. Beyond individual projects, the form carries a lever particularly compatible with resident self-governance: democratically adopted occupancy rules. In Switzerland, where minimum-occupancy requirements are widespread in the non-profit sector, private living space per person in that stock runs markedly below the national average in the dwelling sizes the rules cover (Lage, 2025, p. 4). Floor space per head is a first-order driver of residential energy demand, so sufficiency here is institutional design rather than exhortation. The measured saving is in private area, though, and shared rooms recover part of it. Putting these intentions into practice requires finance and delivery capacity. Polish and Czech retrofits proceed slowly and with little resident involvement (Frankowski et al., 2026; Van Opstal et al., 2025), while Estonia's associations renovated at scale once EU capital was supplied (§3.2.3). Ecological outcomes therefore depend on governance, finance and enabling regulation.

Social sustainability: cohesion by design. Cooperatives build social connection into their physical and governance structures: shared kitchens, courtyards, workshops and

guest rooms, democratic assemblies, rotating responsibilities. The ties form early, since planning, designing and financing a project together can itself generate mutual trust (Czischke et al., 2020). The evidence runs at two levels. At the governance level, a large-scale household survey in Vienna shows cooperatives generating linking social capital, connecting residents upward to housing managers and municipal decision-makers (Lang & Novy, 2014). That survey covers large, professionally managed limited-profit organisations, so the finding may belong to institutional scale as much as to self-management. At the individual level, a scoping review finds recurrent evidence of social inclusion, reduced isolation and improved mental health, particularly among older and lower-income residents (Alday-Mondaca & Schiff, 2025). Residents of Catalan grant-of-use cooperatives also report better self-rated health, mental health and social support after moving in, measured before and after without a control group (Reyes et al., 2024). The study with a comparison group found no significant difference in physical health (Carrere et al., 2020, p. 7). These findings concern benefits experienced by residents, but the study designs differ in how confidently those benefits can be attributed to the housing arrangement. They do not establish how accessible those benefits are to households outside the projects.

There is still someone missing from these outcome studies: the household that could not get in. An upfront share, time and the skills to self-organise shape access, with projects skewing towards higher incomes and education (Lang & Giovannini, 2025, p. 13). Without wider redistribution, unequal access to land, property and capital narrows the form to an alternative for the ‘happy few’ (Ferreri & Vidal, 2022, p. 150), and tradable shares reopen the same gap from the other side (Bengtsson, 2025). Unequal access is a substantive challenge, and one of the scaling problems §3.4 takes up: a tenure only the organised and the moderately capitalised can enter cannot reach the households Chapter 2 identified, however well it performs for those already inside. So a credible pan-European design has two things to secure. An entry cost low enough to reach the households the market has priced out (§4.4), and a lock that keeps the asset out of the market (§4.5).

3.4 Challenges to scaling

Cooperative housing in Europe’s pressured cities is not short of takers. In Berlin, 92% of residents now know the model, against 61% when the survey series began in 2000, and 82% of those who know it could imagine living in one, up from 64% five years earlier (forsa, 2024). What that appetite meets is a closed door. Berlin’s cooperatives hold

some 192.000 homes for roughly 317.000 members, and many have stopped admitting members at all, because they have no home to offer a new one in the foreseeable future (BBU, 2026). A similar access pressure appears at Amsterdam's oldest cooperative: De Samenwerking holds more than 4.100 members for 900 homes and has closed its roll (Gemeente Amsterdam, 2019, p. 9).

Recent figures show slowing construction and uneven progress towards expansion, including in well-established sectors. Berlin's cooperatives completed 178 homes in 2025, their lowest in fifteen years and more than 60% below 2024 (BBU, 2026). Austria's limited-profit sector, the most institutionalised in Europe, completed 14.000 homes in 2024, 16% below its ten-year average, with leading indicators pointing to a multi-decade low (Housing Europe, 2025a, p. 8; GBV, 2025; Housing Europe, 2025c). Municipal targets also coexist with limited progress. In 2011 Zurich's voters wrote a third of the rental stock for non-profit housing by 2050 into the municipal constitution (Kockelkorn et al., 2024). That share slipped from 29,3% to 28,9% between 2019 and 2023 (Stadt Zürich, 2024, p. 2). This is a relative measure, not evidence that the absolute non-profit stock declined. Amsterdam has committed to 40.000 cooperative homes by 2045, more than twenty-five times the entire Dutch stock (Gemeente Amsterdam, 2019, p. 13; !WOON, n.d.). And Barcelona allocated 24 municipal plots carrying 849 homes under its 2020 ESAL agreement, yet only three came forward in the past three years, and Catalonia's whole grant-of-use sector counts just over 1.200 homes (Habicoop, 2025).

The pattern is a queue without enough new doors opening. In these pressured markets, strong interest and closed admission rolls point mainly towards constraints on provision. That does not spare an individual project from testing demand at its actual rent and entry contribution. It does explain why the sector's wider task is to deliver more homes. Municipal targets become useful when land, finance and delivery arrangements follow them. The figures establish the difficulty; they do not identify a single cause in every city.

Drawing on the literature, I distinguish five interrelated constraints: capital; land and suitable buildings; delivery capacity; effective member governance; and the legal and policy framework (International Co-operative Alliance, 2016; Lang & Giovannini, 2025; Lang & Roessl, 2013; Pósfai & Jelinek, 2022). Non-speculative returns and member control shape how cooperatives meet these problems, although the problems extend beyond the form itself. A new resident group and a provider with decades of experience

also start in different places. Favourable land terms can ease the financing. Neither the terms nor the money can supply a capable delivery team. I use the distinction to ask what shared cooperative capacity could change, and where agreements with owners, lenders or public authorities remain decisive.

Capital access. New cooperative projects need long-term finance without offering an unrestricted speculative return. Conventional lenders can find organisations with limited collateral, capped returns and resident-led governance difficult to assess (International Co-operative Alliance, 2016; Pósfai & Jelinek, 2022). Established providers face a different problem: affordable rents on existing homes do not necessarily generate enough surplus to finance development at today's costs. A large cooperative stock on a city map is not one large account from which the next project can draw. It belongs to separate organisations with their own obligations and investment choices. Rules for retaining and reinvesting surpluses therefore matter. Austria's limited-profit law binds equity to housing purposes, requires reinvestment and retains a regulated base rent after amortisation (Wohnungsgemeinnützigkeitsgesetz [WGG], §§ 7, 14; Kössl, 2024). Swiss solidarity contributions offer another route, illustrated by Baugenossenschaft Frohheim (2025). In Germany, the end of the former non-profit housing regime altered the statutory framework; reinvestment must be examined through each organisation's rules, commitments and decisions rather than inferred from the absence of a general obligation (Pfatteicher et al., 2024). Dedicated financial institutions can support expansion: Austria's six housing-construction banks have issued roughly €23 billion in tax-privileged bonds since 1993, part-financing about every second home the sector built over three decades (Housing Europe, 2025a, p. 10). In parts of CSEE, where comparable finance is scarce, project-specific grants and emerging solidarity-finance mechanisms remain important (Hölzl, 2025; Pósfai et al., 2024).

Land and buildings. Cooperatives seeking sites in high-demand cities face competition from buyers able to pay more or proceed faster. Public-land leases, concept-based tenders, land foundations, CLTs and OFS-style land separation can reduce acquisition costs or protect land from speculative resale (Baiges et al., 2020; Ferreri & Vidal, 2022; O'Brien et al., 2025). Their dependencies differ. Municipal programmes rely on available land and continued political support; independent trusts and foundations must assemble their own assets and finance. Switzerland's umbrella body is developing the Soliterra land foundation as a sector-level instrument (Housing Europe, 2025a, p. 43).

No single route removes the need to secure a site on terms the housing project can sustain.

For an adaptive-reuse strategy, this access problem takes a particular form: finding suitable existing buildings and securing them on workable terms. Chapter 2 identified under-used commercial space alongside housing scarcity and the carbon cost of new construction (§2.1, §2.2). Vacancy alone, however, establishes neither conversion suitability nor an owner's willingness to lease or sell on favourable terms. A project must find the asset, assess it and negotiate access. These tasks require expertise that a small resident-led group may struggle to assemble; municipalities and other partners can assist but cannot make every candidate building viable.

Delivery capacity and risk. Money and a site do not yet make a housing project. Someone must carry the work between the first appraisal and the day residents move in. Established cooperatives may have experienced staff and substantial portfolios: Germany's *Wohnungsgenossenschaften* average well over a thousand dwellings each, while some Nordic federations operate at much larger scale (Theurl, 2023, p. 13; Bengtsson, 2025). Many newer resident-led groups instead rely on volunteers and have limited reserves to absorb delays or cost overruns (Lang & Giovannini, 2025). They need access to appraisal, design, procurement, construction management and operating expertise. For a conversion, that includes assessing the existing structure and pricing the risks it carries. Professional partners and federations can supply expertise or share risk, as Sweden's regional associations do through development-loan guarantees (Housing Europe, 2025a, p. 39). Their contribution depends on the services offered, the terms of access and the responsibilities they are prepared to carry.

Governance quality. As the organisation grows, who can still follow the decisions being made in its name? Professional staff can strengthen delivery while making the work more specialised. Members may then find it harder to scrutinise a proposal or influence its priorities. Research describes risks of managerial dominance and declining participation, not an inevitable loss of democracy (Lang & Roessl, 2013). Vienna's large limited-profit organisations also show that professional management can support links between residents and institutions (Lang & Novy, 2014). The task is to make member authority usable as responsibilities become more specialised. Training, accessible information and federation support may help. Representative structures can also matter. But the organisation must still decide which choices belong to members and how they can exercise that authority (§4.7).

Enabling framework. Law and public policy influence all four constraints. The contrast runs from Austria's established limited-profit framework to settings in CSEE with much less dedicated support (Marčetić, 2021; Hölzl, 2025; Douvitsa, 2021, p. 22). Standing rules and funding programmes can make provision more predictable than repeated project-by-project negotiation. They do not remove local decisions about land, planning or individual applications. Municipal support also operates within regional and national rules; a city cannot supply every part of that framework itself. European institutions have given affordable and cooperative housing greater policy attention, while sector bodies continue to press for support (European Commission, 2025a; Pape, 2025; EURICSE, 2024, p. 22; Cooperatives Europe, 2025; Housing Europe, 2025a, pp. 53-54). Housing policy remains primarily a national and local responsibility, but EU powers over areas such as finance, competition, cohesion and energy affect the conditions of provision (§2.6). The challenge is to make these different levels work together.

3.5 The pan-European gap

Local roots do not require every cooperative to work alone. Many manage hundreds or thousands of homes in one city, while national organisations combine professional support with local member cooperatives (§3.2.3, §3.4). Sharing capacity beyond the individual project is therefore already part of the tradition.

The question is what happens at the border. Could a new initiative draw on finance and experience held elsewhere without handing over control of its homes? That is where the constraints in §3.4 become a design question for a European organisation.

Established cooperatives and federations hold substantial expertise, but new initiatives outside their geographical remit cannot reliably draw on it. A cross-border legal vehicle already exists in the European Cooperative Society; capitalising organisations able to use it remains difficult. Public land policy, rent regulation and subsidised long-term credit also remain tied to national or municipal frameworks. Emerging cross-border initiatives have begun to address the financing gap, but their reach remains limited, leaving projects in much of CSEE dependent on project-specific support (Pósfai et al., 2024; Hölzl, 2025).

Sector organisations have also called for stronger European cooperation. In Housing Europe's survey, Sostre Cívic asked the Union to "cultivate a network of cooperative housing entities across Europe", and Estonia's EKYL to "encourage collaboration around the EU and alliances between cooperatives" (Housing Europe, 2025a, pp. 13,

48). These calls support the case for exchange and coordination. They do not establish demand for the EHC's particular legal structure or financial model.

There have been first attempts to bridge the gap, and their contrasting designs are instructive: both adopted the SCE form but allocated development and ownership responsibilities differently. MOBA Housing SCE is a bottom-up federation of initiatives in Croatia, Czechia, Hungary, Serbia and Slovenia, pooling knowledge and assembling a shared revolving credit pool so members can develop and own housing in their own cities (Pósfai et al., 2024, pp. 227–229; Hölzl, 2025, pp. 121–126). LiM, the Living in Metropolises SCE, founded in Berlin in 2018, took a developer-owner approach: a pan-European developer that aimed to build and own projects in several countries, letting each to a local cooperative / housing operator under a master lease. Its Berlin pilot was delivered, 40 timber flats on Ewaldstraße; the announced follow-ups in Latvia and Finland were not, and on liquidation in 2025 the Berlin project passed to that local partner (LiM – Living in Metropolises SCE [LiM], n.d.; North Data, 2026). The cases differ in their relationship to local member initiatives and in how they organise capital and delivery. These documented differences inform the EHC design; they do not establish why the organisations followed different trajectories.

These precedents leave room for a further combination. The European Housing Coop would connect suitable buildings on workable terms with patient capital, shared infrastructure and local member control. Table 3.2 turns the constraints into the brief for that design.

In Ostrom's terms, the European level would be a nested tier supporting local governance. Its purpose would be to make resources available where a project cannot readily assemble them alone. How to do that without moving everyday authority away from residents is the question I take into Chapter 4.

Table 3.2 – Constraints on cooperative provision (§3.3–§3.5), how they affect organisations and the proposed EHC responses.

Constraint	How it affects cooperative provision	Proposed EHC response (Ch. 4)
Capital access	Non-speculative returns restrict some funding routes; reinvestment capacity varies by provider	Cross-border patient-capital pool and Fund (§4.5)

Constraint	How it affects cooperative provision	Proposed EHC response (Ch. 4)
Delivery capacity and risk	New initiatives may lack professional expertise and reserves; established providers differ in capacity	Shared development partners and technical support (§4.6)
Effective member governance	Professionalisation and growth can make participation and oversight harder without suitable arrangements	Nested governance and local member decision rights (§4.7)
Land and suitable buildings	Competition, acquisition terms and suitability constrain projects across non-market provision	Asset sourcing, owner partnerships and project appraisal (§4.3, §4.5)
Legal and policy framework	Rules and support differ across jurisdictions and levels of government	Cross-border coordination with jurisdiction-specific implementation (§4.1, §4.6)
Household access	Entry contributions and self-organisation requirements can exclude the intended residents	Entry-equity support and affordability testing (§4.4)
Uneven cross-border support	Access to established expertise and finance remains geographically uneven	SCE coordination alongside local organisations (§4.1, §4.7)

4 Designing the EHC: A Pan-European Cooperative Model

An under-used office, a cooperative with a waiting list and an investor looking for a useful place to put patient capital may all exist in the same city. Bringing them together is another matter. Chapter 3 showed how access to buildings and finance, delivery capacity and member governance can each hold a project back. The European Housing Coop (EHC) begins with the proposition that people and organisations could pool their different resources across borders, while leaving control of a home close to those who live in it.

The alliance gives two mechanisms somewhere to work. Adaptive reuse turns under-used non-residential buildings into cooperative housing. Inside those buildings, long-term cost-rent homes sit alongside furnished mid-term flats and commercial space. I call the latter the “engine room”: space that earns a surplus and helps carry the wider cooperative project. The question is whether that combination can make access easier without allowing the commercial side to take over the purpose of the building.

What follows is the design of that system. It asks who would contribute, how money would move, and which decisions belong at the kitchen-table scale of a local cooperative or at the scale of a European network. The EHC remains a proposition, and the distinction matters. Suitable buildings, favourable terms and willing participants cannot be designed into existence. Section 4.8 makes those dependencies explicit.

4.1 Why a pan-European cooperative?

Why should a housing cooperative be European? Most of what makes a home work is local: a building, its neighbours, the people who look after it and the rules they can live with. A distant umbrella would add little if it simply placed another organisation between residents and their decisions. Its reason to exist has to lie in things local projects struggle to do alone.

Patient capital is the first. Money raised in a country with a mature cooperative tradition could support a project where the tradition, and the finance around it, is weaker. The resources need not originate where the housing need is greatest. Pooling across borders could make that mismatch useful, provided the local project remains accountable to its residents.

Membership offers a different connection. A member moving for work or family reasons could remain within the same cooperative network, drawing on furnished mid-term homes while finding their feet in another city. The move would also bring demand to the engine room described in §4.4. Mobility becomes one of the services through which a European membership earns its purpose.

Knowledge is the less visible resource. Financing templates, conversion appraisals and governance practice could travel with the network, sparing each new group some of the work of starting from nothing. A larger pipeline could also improve negotiations with municipalities, lenders and asset owners, and support shared procurement or eventual framework lending. None of this requires a central office to decide how a local common room should be used. It requires agreement on what is worth sharing.

These opportunities coincide with a favourable policy moment. The European Union has placed affordable housing higher on its agenda than at any point in recent memory (European Commission, 2025a; Pape, 2025). The European Cooperative Society offers a ready-made, if imperfect, cross-border legal form (§4.7), and the EIB's lending pipeline is increasingly open to social and affordable housing (European Investment Bank, 2025, p. 9). Research for the European Parliament also recommends cooperative, non-profit and community-land-trust models where social housing is thin (Aalbers et al., 2026, p. 58). This does not establish feasibility, but it identifies a setting in which the proposal could be tested.

The EHC would complement public and cooperative systems, particularly where national support is weak. Vienna illustrates the value of strong municipal ownership alongside cooperative housing. In Kemeny's (1995) terms, its unitary rental system allows cost-rent providers to compete with, and influence, private rents. In dualist systems, cost-rent housing occupies a more separate segment. Favourable entry terms and patient capital may therefore matter more to an EHC project there.

A second objection is that existing organisations could undertake these functions. Representative bodies such as Housing Europe and Cooperative Housing International provide advocacy and knowledge exchange, while MOBA already combines cross-border coordination with catalytic finance (§3.5). The EHC extends this approach by combining three things: a pipeline of adaptive-reuse projects, a financing model that uses surplus from mid-term and commercial space, and a shared membership system

across countries. Its contribution lies in that combination, not in claiming an empty institutional field.

The alliance brings together seven groups with different contributions: citizens provide demand and equity; local cooperatives and developers deliver projects; investors supply patient capital; and built-environment companies provide products, services and organisational capital. Asset owners provide buildings, municipalities shape planning and land policy, and supporting organisations extend participation (Fig. 4.1).

Shared purpose need not mean identical motivations. Residents may want a secure home, investors a modest return with a useful social purpose, and companies an opportunity to supply something they believe in. An owner may want a future for a stranded building; a municipality may want housing it cannot deliver alone. The EHC asks whether these interests can hold together beyond a single transaction. A common purpose is a starting point. It is not a substitute for terms everyone understands.

Company membership makes that question particularly concrete. Materials suppliers, architecture and engineering practices, and proptech firms could bring products, appraisal tools and delivery knowledge into the network. Shares would contribute capital and dues would help sustain the umbrella. In return, firms could gain opportunities to work across projects and learn from their results. Early participation might also provide a credible basis for communication and corporate social responsibility (CSR), so long as the claims follow actual contributions.

There is a tension here worth keeping in view. A supplier may genuinely support affordable housing and still want to win the next contract. The cooperative should be able to benefit from both motivations without making membership a purchasing obligation. Section 4.5 sets out the safeguards. Chapter 6 tests the commercial offer, including the proposed fit of innovative, non-listed family-owned firms. Their willingness to remain involved across several project cycles is a recruitment hypothesis, not a virtue inferred from family ownership.

The first residential target is Chapter 2’s missing middle: households above social-housing eligibility thresholds that struggle to obtain secure market housing. Resident equity remains an access barrier. Section 4.4 explains how entry-equity support, public assistance and cheaper patient capital could widen access.



Figure 4.1 – The multi-stakeholder alliance

4.2 The EHC model at a glance

The model combines adaptive reuse with cost-rent homes and surplus-generating space. Local delivery, pooled finance and democratic safeguards support these mechanisms; a shared platform connects them.

The delivery unit is a converted building. A local cooperative or mission-aligned developer secures the permissions and delivers the conversion, then operates the homes itself or contracts an operator. Long-term residents buy cooperative shares and pay cost-rent. Furnished mid-term accommodation serves individual members and employees of company members looking for 3-12 month stays. Where feasible, a mission-aligned external operator runs a publicly accessible commercial ground floor with co-working, gastronomy and event space. It connects residents with the wider neighbourhood and city-based EHC members, while also providing a venue for member-company events. Together, the mid-term accommodation and ground-floor lease form the engine room. Its surplus lowers entry equity, builds reserves, repays patient investors and funds future projects; it does not buy down long-term rents.

A common framework does not require a single legal entity or centralised resident governance. The resident cooperative controls the building and local operators deliver. The EHC umbrella originates projects, manages membership and the platform, and sets shared standards and mission protections. The separate Fund pools the cooperative's own committed capital with external impact capital for patient project equity at a fixed return, and is open to members and non-members alike. Membership carries a vote and no return; Fund investment a return and no vote. Local partners thereby gain access to cross-border demand and capital, EU-level relationships and shared infrastructure. This division assigns responsibilities against which the proposal can be tested.

4.3 Adaptive reuse

The supply-side proposition.

Europe does not lack buildings; it lacks buildings in the right use. Across the thirty focus countries, the office sector carries large quantities of empty floor space, deepened by hybrid work, while many residential markets stay acutely tight. The gap between those two vacancies is the supply-side opening this thesis calls the vacancy paradox. Platform city data show it most sharply in financial-centre markets: Stockholm runs roughly 10,3% office vacancy against barely 1% dwelling vacancy; Rotterdam about 11,5% against 2,1%; Frankfurt 10,7% against 3,2% (commercial-broker and national register data, as compiled in the EHC Cities Database, 2026). Berlin holds the largest absolute pool of vacant office floor space of any German city. The market has already begun to act on that opening. Across nine European markets, acquisitions for conversion exceeded 30% of office transactions by floor area in the first four months of 2025. This compares with 17% in 2024 and an 8% average since the global financial crisis (AEW, 2025; Graaf et al., 2025, p. 4). Conversion is therefore not the untested part of the proposition. What this thesis tests is whether the EHC's proposed combination can support conversion-led cooperative provision under the stated financing and operating assumptions.

The EHC focuses on one part of the wider brownfield agenda: under-used office and commercial buildings where housing need, planning conditions and local delivery capacity support conversion (Fig. 4.2).

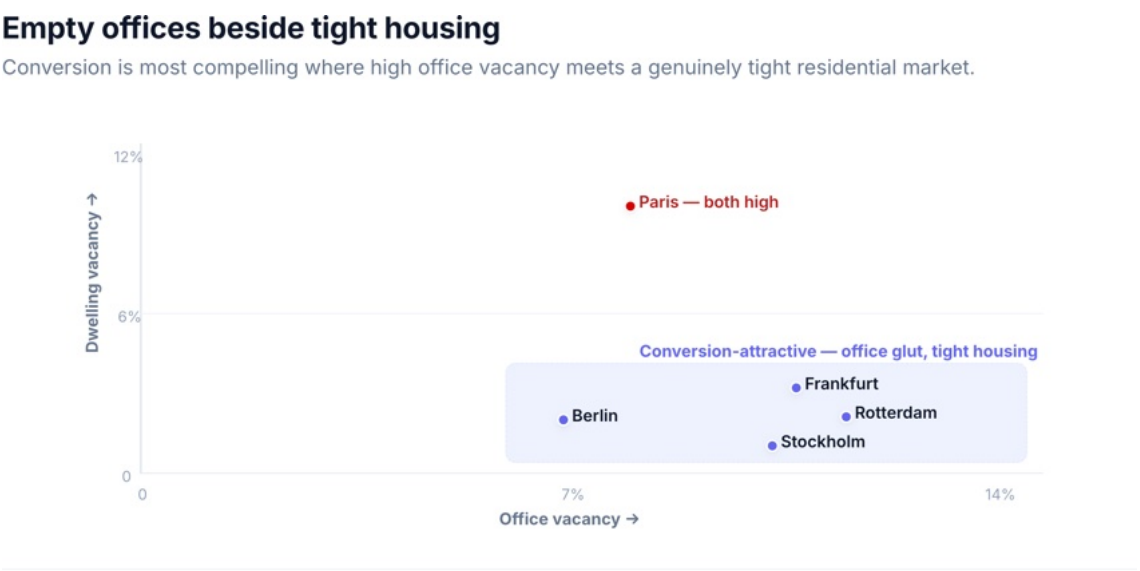


Figure 4.2 – *The vacancy paradox*

The paradox is not universal, and the counter-cases matter. Paris combines high office vacancy with high recorded dwelling vacancy; Warsaw pairs moderate office vacancy with a very high residential-vacancy figure; Italy and Spain show elevated vacancy on both sides. Conversion is most compelling where the office glut meets a genuinely tight housing market: the German, Dutch, Swiss and Nordic pattern. Where both vacancies are high, the case rests less on shortage and more on quality, location and embodied carbon.

The scale of the opportunity can be estimated, cautiously, from the office stock the platform already holds. The method is simple and inspectable: take vacant office floor space, apply an adjustable convertible fraction, deduct a residential-efficiency loss for cores and circulation, and divide by an average dwelling size. The base case is a 30% convertible fraction, 80% net-residential efficiency, a 66 m² average dwelling and 2,2 occupants per home, bracketed by 15% and 45% convertible fractions. That dwelling is the EHC's own home of §4.4, measured net of cores and circulation, so the estimate counts homes of the kind the cooperative would build rather than an unrelated average.

At country level, converting 30% of vacant office stock across the thirty focus countries would yield roughly 234.000 dwellings, within a band of about 117.000 to 351.000 as the convertible fraction moves from 15% to 45% (EHC Countries Database, 2026; author's calculation). The opportunity concentrates in the largest office economies, led by Germany (~80.000 homes at the 30% case), the United Kingdom (~32.000) and France (~20.000). At city scale, the thirty-six focus cities hold an indicative 106.000

dwellings, led by Paris (~23.000). These are orders of magnitude. Their value is to show the convertible pool is large enough to matter (Fig. 4.3).

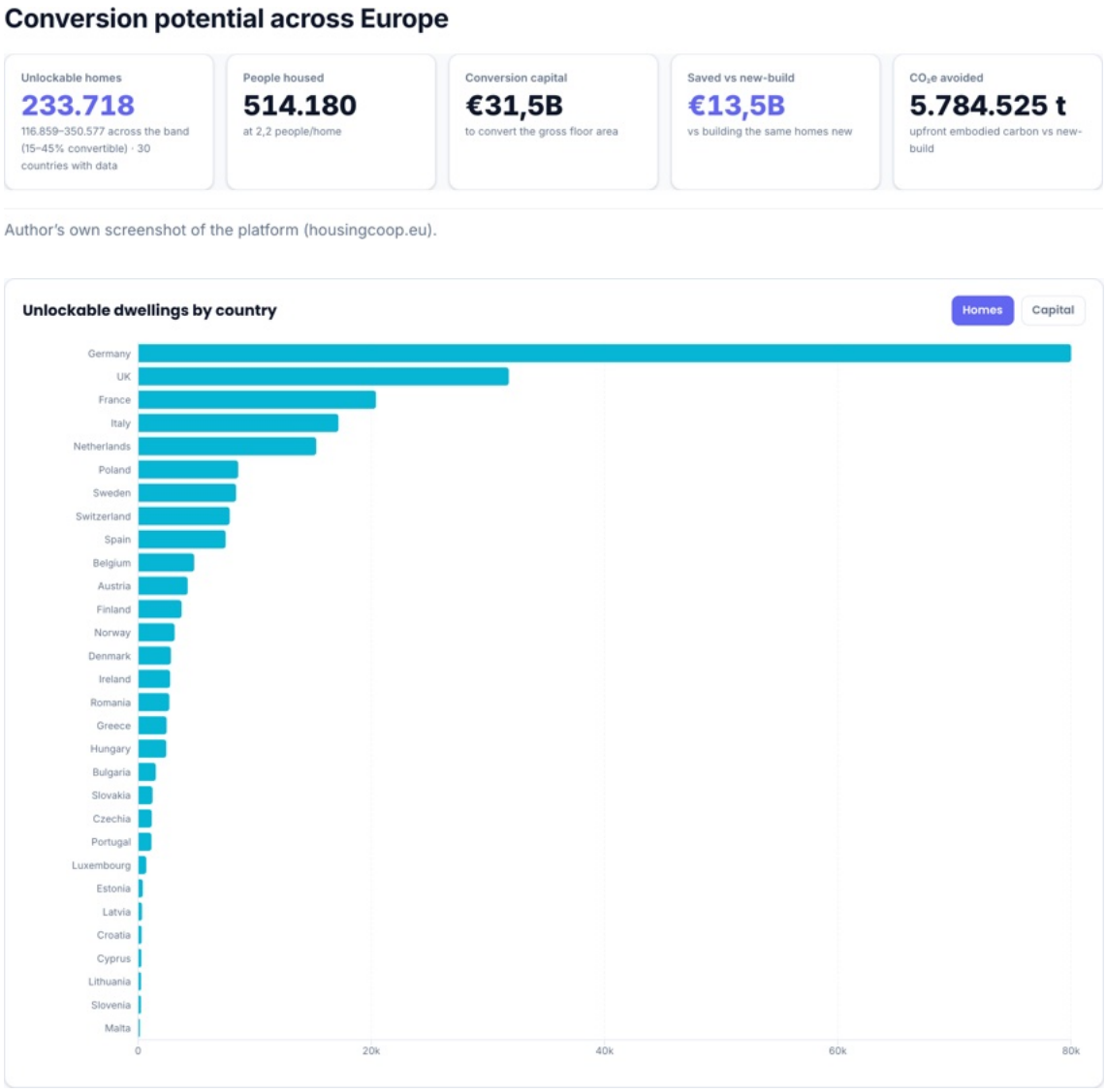


Figure 4.3 – *Conversion potential across Europe*

Where the opportunity sits relative to cooperative capacity matters as much as its size. Part of the pool lies in markets with deep cooperative or limited-profit sectors able to absorb it, part where the sector is thin. That mismatch is one reason a pan-European structure is useful.

The model prices conversion at around 0,65-0,76 of local new-build cost, excluding land. This assumes the building has first been screened for suitability. Studies of screened buildings support factors of roughly 0,65-0,85 (Gensler, 2024; Gniechwitz et al., 2022, p. 44; The Housing Agency, 2024, p. 10). Studies of unscreened stock find

no general saving and greater uncertainty from hidden defects and hazardous materials (Graaf et al., 2025, p. 17; Stiernon et al., 2023, p. 6). Façade retention is a major cost driver (BDA Bayern, 2025, p. 92).

The model therefore assumes a saving of roughly one-quarter to one-third for suitable buildings, not for offices generally. That qualification does a great deal of work. A frame that can be kept, a floorplate that admits daylight and a façade that needs selective repair describe a different project from one requiring extensive replacement. Both may appear in a vacancy register as an empty office. They should not enter an appraisal at the same cost.

Realised Dutch transformations show how wide the range can be, from a few hundred euros to around €2.400 per square metre of rentable floor space (Remøy et al., 2025, p. 140). I therefore treat the conversion factor as a question to take to a building, not an answer to bring from the database. Whether the particular asset meets the assumed cost is A4a. The factor must be revised after appraisal and tested up to cost parity with new-build; Appendix A.3 weighs the evidence behind that choice.

A wider cost frame strengthens the argument. Brownfield regeneration can lower projected public infrastructure costs by around 20% against greenfield development, with infrastructure-delivery savings of roughly 10-60% where existing roads, utilities and services can be reused (Chartier et al., 2025, p. 24). Adaptive reuse should therefore be judged against the total urban cost of adding homes at the edge, not only against the construction cost of a new building.

The climate case follows the same logic. Retaining structure avoids much of the upfront carbon emitted in demolition and new construction. Studies report embodied-carbon savings of roughly 40-80% against demolition and rebuilding, with multi-case averages near 60% (Urban Land Institute, 2025, p. 14; Stiernon et al., 2023, p. 4). Retaining the frame and foundations accounts for much of the saving (Royal Institution of Chartered Surveyors [RICS], 2023, p. 25; London Energy Transformation Initiative [LETI], 2020, p. 26). This is not automatic; a poor conversion candidate can lose much of that advantage. But where the building is suitable, adaptive reuse aligns the two goals Chapter 2 treated as central: adding homes and lowering carbon.

Frankfurt illustrates the calculation (Fig. 4.4). Vacancy and floor space are city-specific; new-build cost and the conversion factor use German benchmarks (EHC Cities and Countries databases, 2026). Cost and carbon use gross converted area, while dwelling

counts use net residential area. The result ranges from about 2.240 homes at 15% convertible stock to 6.710 at 45%. This is an opportunity estimate, not a development appraisal.

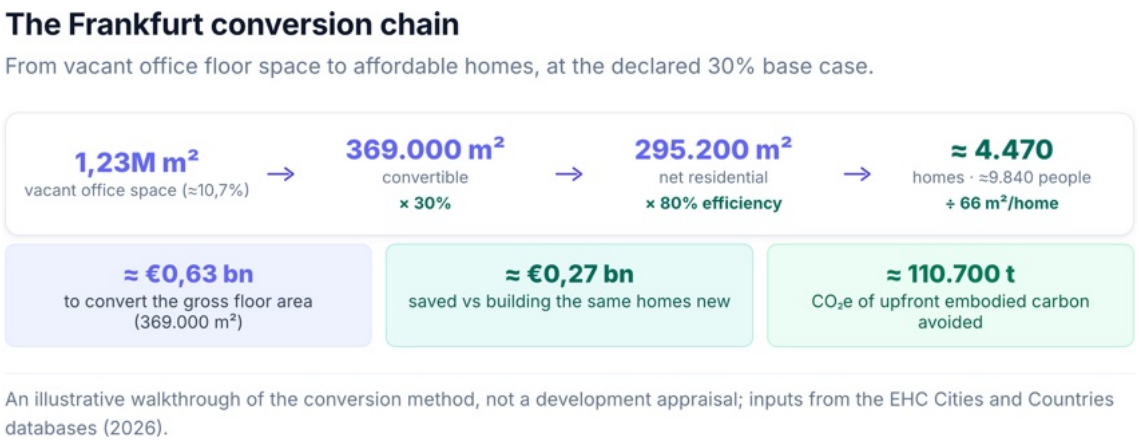


Figure 4.4 – The Frankfurt conversion chain

The building-level conversion gate.

The city-level calculation is only a search filter. A candidate building enters the economic model only after the evidence gate set out in Table 4.1, where failure on a non-mitigable criterion stops the conversion case instead of being averaged away against a favourable score elsewhere.

Table 4.1 – The building-level evidence gate: what each criterion must show, and the failure response.

Gate	Minimum evidence	Pass condition	Failure response
Structure and grid	Measured drawings, structural review and load assessment	Residential subdivision and retained-frame strategy are feasible	Reject or re-scope the asset
Floor depth, daylight and ventilation	Measured floorplate and concept layouts	Compliant homes can be formed without disproportionate unusable depth	Reduce net efficiency or reject

Gate	Minimum evidence	Pass condition	Failure response
Façade and envelope	Condition survey and opening-up strategy	Retention or selective replacement remains inside the A4a cost range	Re-price the conversion factor
Fire, access and cores	Fire concept, escape analysis and accessibility review	A code-compliant route exists without destroying the reuse advantage	Redesign or reject
Planning and change of use	Pre-application review with the competent authority	Residential use and the proposed tenure mix are legally plausible	Change use mix, jurisdiction or asset
Hazardous materials and hidden conditions	Phase-one survey and intrusive follow-up where indicated	Risk allowance is evidence-based and fundable	Increase contingency or reject
Whole-life carbon	Early WLCA against a demolition-and-new-build counterfactual	Retention produces a material whole-life-carbon advantage	Do not claim ecological superiority
Entry terms and finance	Owner heads of terms, valuation and lender feedback	Mortgageable tenure and total cost fit the bankability boundary	Renegotiate, add support or reject

I draw these criteria from conversion research and practitioner guidance rather than invent a new set. Appendix H identifies the source behind each one, then translates them into a scoring instrument with an evidence register and clear stopping points.

The regulatory pathway carries as much weight. Change-of-use regimes range from permissive, where conversion proceeds largely by right, to highly discretionary, where every conversion is assessed case by case at the cost of time, certainty and viability.

Germany has eased office-to-residential change of use, including through Berlin's Umnutzungsverordnung. The Netherlands has a substantial record through its *transformatie programme* (Graaf et al., 2025, p. 4). France has also promoted office conversion; Poland and Sweden rely more on case-by-case decisions. The design implication is straightforward. The EHC must screen projects by jurisdiction before applying the cost advantage.

A cooperative is the right vehicle because conversion alone does not solve affordability. A speculative developer can convert an office and still sell the homes at the highest market price. The cooperative removes the building from that cycle, holding it for use at cost.

4.4 Cost-rent and the engine room

The financial mechanism.

The base-case building has 7.500 m² of gross floor area, of which 6.250 m² is usable. Usable space is divided into 58% long-term homes, 19% furnished mid-term flats, 13% commercial space and 10% shared commons. Thus roughly three-quarters of residential space serves long-term residents. The mid-term flats and commercial ground floor form the engine room; the commons earn no rent. Total project cost is €17,55 million, about €2.340 per gross square metre, with roughly three-fifths borrowed (Fig. 4.5).

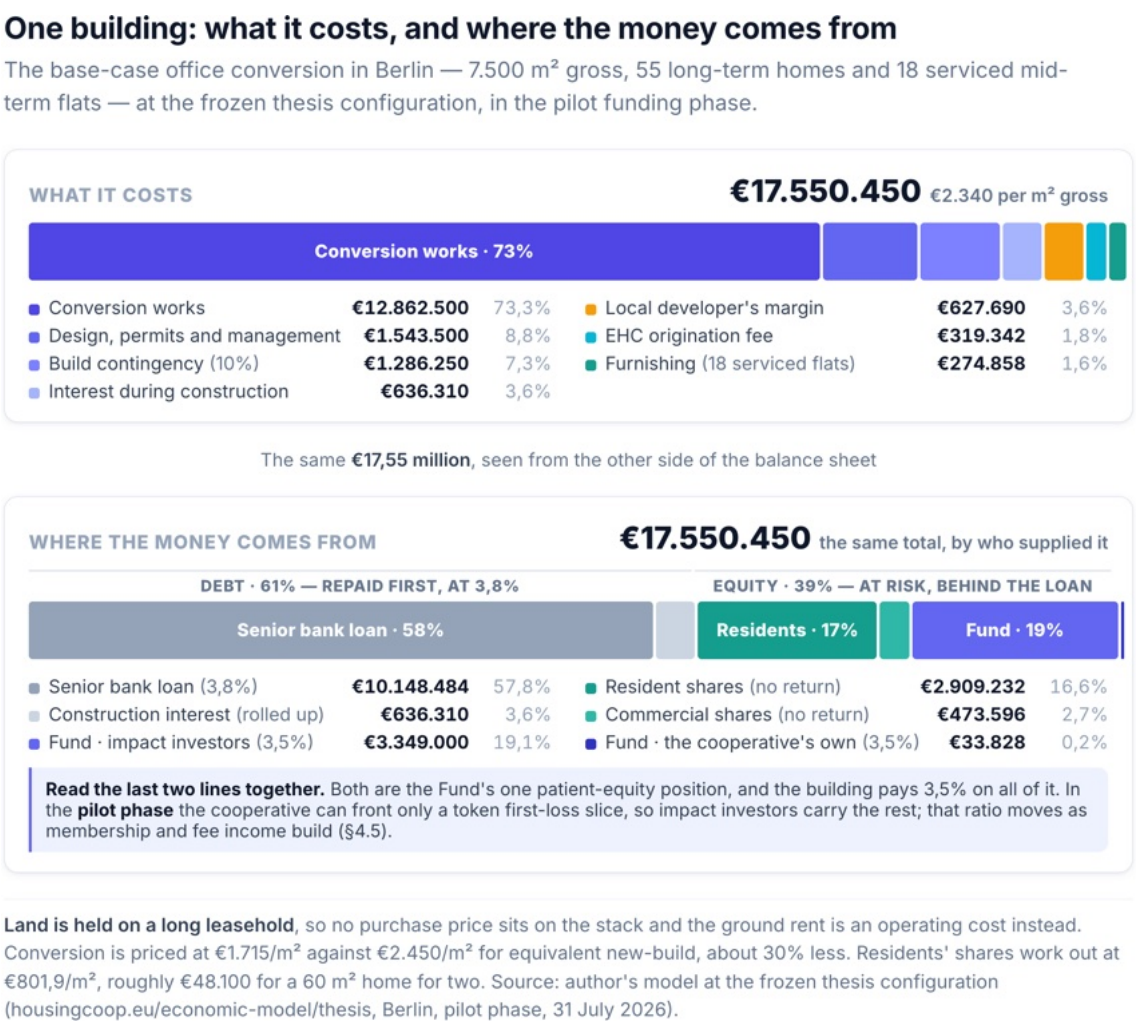


Figure 4.5 – *One building: what it costs, and where the money comes from*

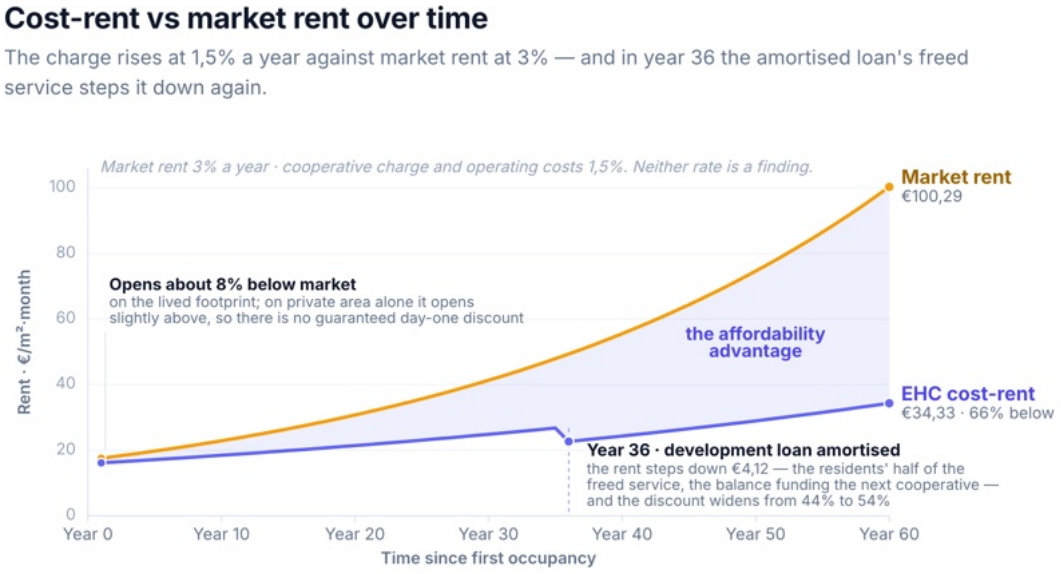
Long-term homes are priced at cost-rent. The opening rent covers operating costs, a renewal reserve, debt service and the fixed return on Fund equity. Both borrowed and invested capital therefore carry a cost.

This distinction sets the limit of the claim. Any project can calculate a rent that covers its costs. The real question is whether that rent is affordable, below market and bankable. In an expensive city, day-one cost-rent may begin close to or above market rent. The projected advantage depends on market rents growing faster than cooperative charges; neither that relationship nor continued cost coverage is guaranteed. Day-one affordability remains the design aim. City selection, adaptive reuse, favourable leasehold terms and affordable patient capital are the levers meant to reach it. The comparison also depends on what counts as the home. I compare the household's charge with a market home of the same lived footprint: its private area plus its share of the com-

mons. On private area alone, the Berlin base case opens slightly above market. Include the shared space and it opens about eight per cent below.

I use the lived footprint because residents do have access to those common rooms. That is a defensible choice, not a neutral one. Every “below market” count in Chapter 5 uses this basis.

After the first year, rent rises at a fixed rate below assumed market growth. Unlike strict Kostenmiete, it is not recalculated annually from actual costs. Loan repayment therefore does not reduce rent to running costs alone (Fig. 4.6).



Frozen thesis baseline (Berlin), 60-year horizon; author's calculation in the EHC economic model (Appendix A). The household's charge against a market home of the same lived footprint — private area plus its share of the commons — the basis used for every "below market" count in Chapter 5. Modelled outcome, not a forecast.

Figure 4.6 – *Cost-rent vs market rent over time*

Two assumed growth rates make the discount widen. Market rents rise by three per cent a year; the cooperative charge and its operating costs rise by one and a half. The widening advantage comes from that 150-basis-point difference, compounded over time. Neither rate is a finding.

This asks quite a lot of the market. Section 2.1 records European rents rising 28,8% between 2010 and 2025, or about 1,7% a year. My justification for using faster growth is the focus on high-pressure cities, where rents have outpaced that average. It is not a reason to assume they always will.

Set the two rates equal and the discount stops widening, leaving only the day-one position. The cooperative does not control that gap. Section 4.8 therefore treats it as a condition to test, not a future to promise.

A governance rule allocates the homes' freed debt service: half reduces residents' rent and half helps finance further projects. The engine room transfers all its freed debt service to the network. Across the building's life, residents receive roughly one-third of the combined total. The Mietshäuser Syndikat's Solidartransfer provides a comparable solidarity principle. Appendix A.1 explains the calculation.

The escalation rule does not guarantee cost recovery. The model keeps costs and charges on the same growth path; a real cooperative cannot assume that they will stay together. Operating costs may rise faster, refinancing may be dearer, or the renewal reserve may need more money.

Who then pays the difference? Drawing on reserves, making an exceptional rent adjustment, asking members for fresh capital and reducing the solidarity transfer would affect residents differently. The pilot statutes must set out which response comes first. Chapter 6 treats this as a rule to agree, not an answer the calculator can supply.

Access and allocation.

Who can get in is a substantive design question. The first-phase target is the middle the market is failing: broadly, households around or somewhat below local median income that earn too much for social housing yet lack the capital the open market requires. Residents subscribe a per-square-metre project share, not a deposit, with engine-room surplus reducing the amount required. Allocation rules stay transparent and mission-bound, and the steward-ownership lock prevents speculative gain on exit.

The Berlin base case makes the difficulty plain. The resident share is around €800 per square metre, or roughly €48.000 for a 60 m² two-person home. That figure varies by project and city, but it is enough to prevent a comfortable claim that a lower rent makes the offer accessible. A household can afford a monthly payment and still have no plausible way to assemble the entry capital. The 'happy few' problem of Chapter 3 returns at the front door.

Several routes could ease entry, but they should not be confused with what the baseline actually does. Engine-room surplus does not reduce the first residents' contribu-

tion. It is pooled as equity for later buildings, where the baseline uses it to replace outside impact capital, not resident capital.

An earlier version recycled a building's surplus into reducing its own buy-in. That route was removed: the members had already made the contribution. The opportunity lies with the next cohort instead. An explicit lever lets residents in a later project contribute a smaller share of their building's equity, with the accumulated Surplus Pool covering the difference through the Fund.

Better-resourced members could also help meet another household's contribution through the internal equity cross-subsidy. Public land, grants or cheaper patient capital offer further routes beyond what the unaided building can sustain. Their timing and dependencies differ. None of these entry-relief routes is switched on in the configuration assessed in Chapters 5 and 6.

For the first residents, timing is decisive. Future engine-room surplus is not cash at financial close. Any reduction in their required equity must be advanced by committed Fund or solidarity capital, or by public support where available. The amount, provider and repayment terms have to appear in the pilot capital stack. No such advance is established here.

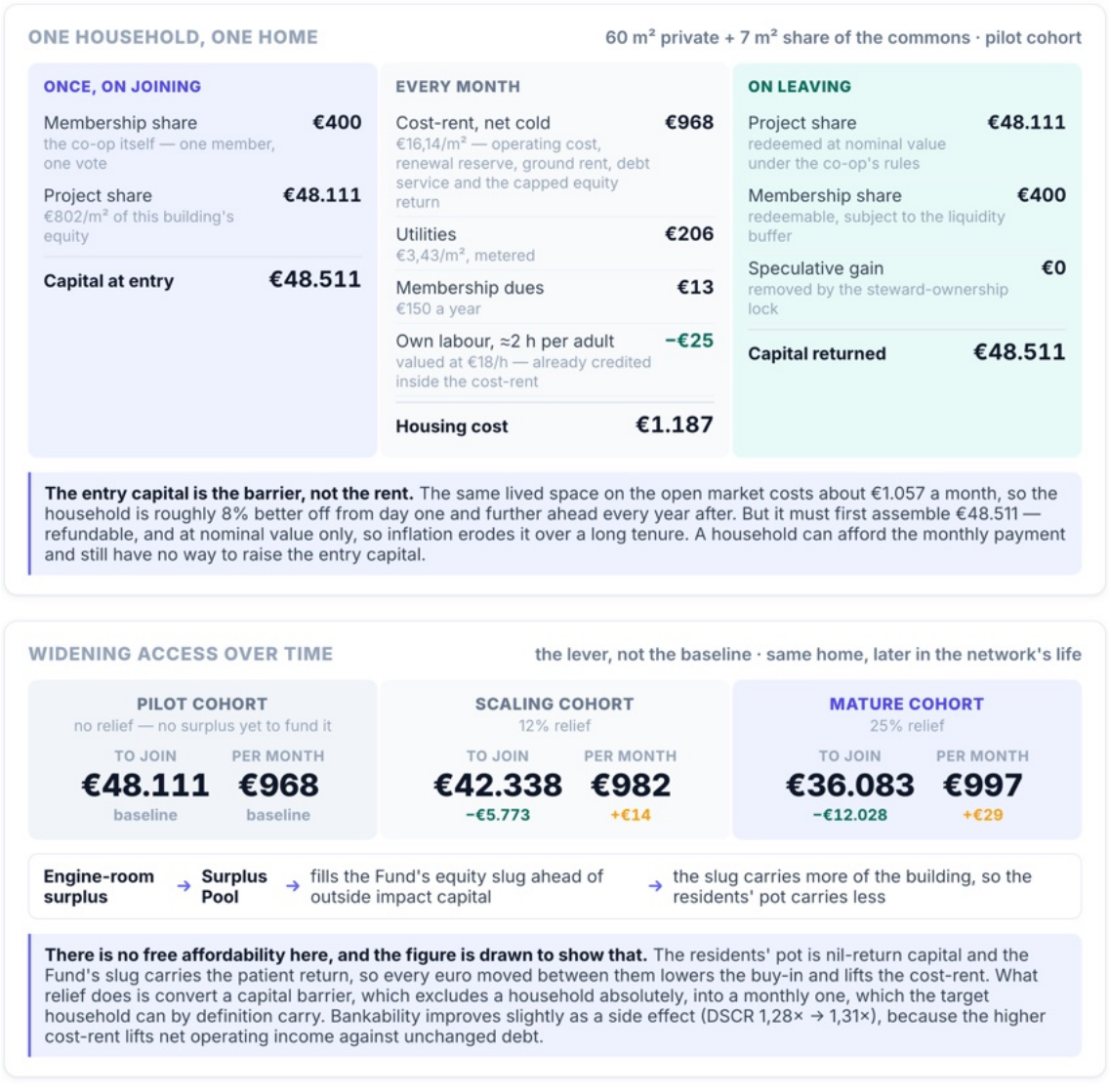
This leaves an access question to be tested alongside the appraisal. Which households can meet both the monthly charge and the entry contribution, and which remain outside? I retain the missing middle as the first-phase target because it is the group the base design seeks to reach without direct subsidy. Whether the support mechanisms widen that reach is an outcome to observe, not something the label 'affordable' can settle.

Figure 4.7 follows one household's side of the arrangement: the upfront contribution, monthly charges, what comes back on leaving and what changes when entry relief is applied. Relief is not free. Resident capital earns no return, while the Fund's stake carries the patient return. Replacing one with the other lowers the entry contribution but raises the rent.

The aim is to turn an upfront barrier into a manageable monthly cost. Whether the target household can carry that cost still needs checking.

What a household pays — and how a later cohort pays less

A two-adult household in a 60 m² home in the Berlin base case, at the frozen thesis configuration. Above: everything the household puts in, and what returns. Below: the entry-equity relief lever, which lets a later cohort hold less of its building's equity, funded by recycled surplus.



Base case: Berlin, 7.500 m² gross, 55 long-term homes, leasehold entry, 40% whole-building equity, patient capital at 3,5%. Monthly figures are for the 60 m² home; the market comparison prices the household's full lived footprint, private area plus its share of the commons. Relief is **off in the assessed baseline** — the figures in Chapters 5 and 6 are the pilot column. Source: the live model at the frozen thesis configuration (Appendix A.7).

Figure 4.7 – What a household pays — and how a later cohort pays less

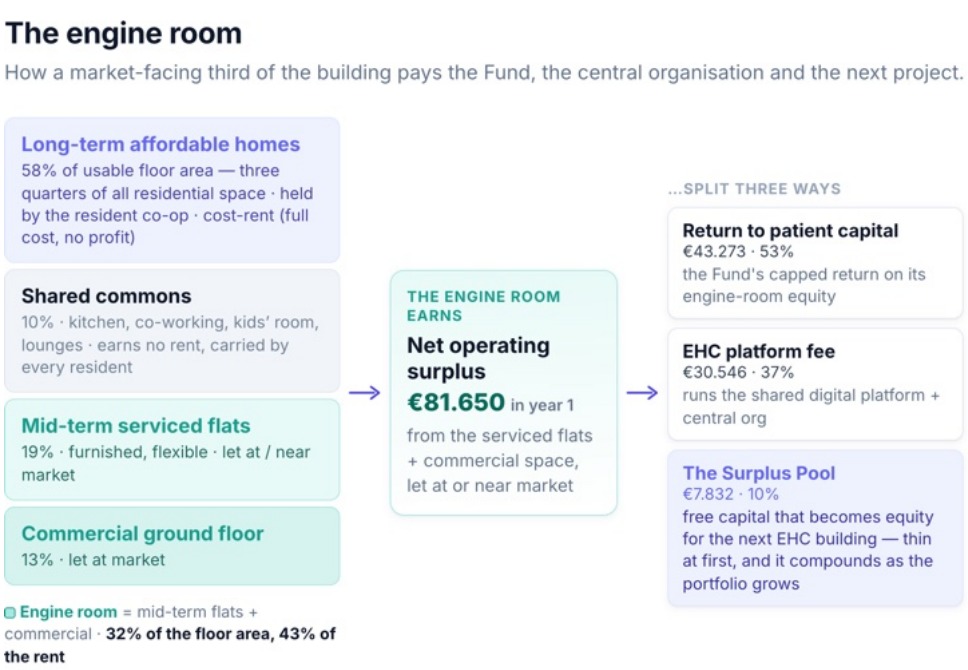
The engine room and its demand.

The baseline combines conversion savings, favourable leasehold terms, engine-room surplus and patient equity. It assumes no direct public grant or subsidised debt. It nevertheless depends on concessions: below-market entry terms and equity accepting less than a commercial return. Public support can improve affordability further. The de-

sign also reflects proposed conditions for housing support, including capped returns and protection against speculative exit (Aalbers et al., 2026, p. 56).

The engine room must justify the space it occupies. Every square metre assigned to furnished mid-term accommodation is a square metre unavailable for another long-term home. The premium has to do enough useful work to warrant that choice. Furnishing and flexible terms offer a different service, but they also bring turnover, management and periods without rent. Gross revenue alone settles nothing.

The comparison is therefore between what each use leaves after its own costs. Long-term homes cover their costs without seeking an operating margin; the engine room earns from the flexibility and services it provides. Its surplus can help households cross the entry-equity barrier and support later projects (Fig. 4.8). This is the financial wager behind the mixed-tenure design. Giving up some long-term floor area today might make more non-speculative housing accessible over time. If the surplus is too small or too unreliable, the additional complexity has little justification. The model makes the comparison concrete. After running costs and debt service, a square metre of long-term home returns about €21 a year, a mid-term flat about €48 and commercial space about €30. On that basis, the serviced tier earns roughly twice as much as a home; the ground floor earns about half as much again as a home. Mid-term bookings also send member fees to the umbrella, outside this building-level comparison.



Author's own design. Shares are of the building's usable floor area; amounts are year 1 of the base case at the frozen thesis configuration (Berlin). The long-term homes are not subsidised from this surplus: they carry their own full cost, their share of the equity return included, inside the cost-rent (§4.4).

Figure 4.8 – *The engine room*

This mechanism has a moral risk. Incorporating a mid-term furnished housing offering into each building looks, at first glance, like reproducing a driver criticised in Chapter 2: the extraction of residential space into temporary, high-yield rentals. The EHC tries to turn that risk around. It would add homes through adaptive reuse, keep them in non-speculative ownership, and use the mid-term premium to support entry equity and future projects rather than extract private profit. This remains unproven and depends on A1-A3: resident acceptance, actual member mobility, and corporate or institutional demand for the serviced tier. The exposure is regulatory as well as moral. The serviced tier is let for three to twelve months rather than nightly, and Appendix I sets out how far that distinction protects it.

Commercial evidence supports investigating this demand. Savills (2026, p. 3) reports annual demand growth of about 5,9% for serviced and flexible apartments since 2019 and occupancy near 79% in 2025. These figures do not establish demand for the EHC offer. Its proposed mid-term users are cooperative members and employees of company members, with stays kept separate from paid short-stay tourism. Whether membership lowers marketing costs or stabilises occupancy remains to be tested under A2 and A3.

The employer demand behind this tier is visible in the renewed attention to employee and corporate housing. German studies on *Mitarbeiterwohnen* describe affordable staff housing as a tool for recruitment, retention and location competitiveness, with contemporary examples ranging from municipal utilities to industrial employers (Wieland et al., 2018; Wieland et al., 2024). The same pattern appears in the serviced-apartment sector, where relocation and project-based corporate demand are identified as growth drivers. Mobility providers also describe housing availability and suitability as increasingly decisive for assignment success in European business centres (Sirva, 2026). This does not prove that EHC company members will pay the modelled rates, or prefer a cooperative provider over established operators, but it grounds A3 in an observable employer-housing problem rather than an unsupported behavioural assumption.

Three operating assumptions help produce that margin. Stays of three to twelve months mean less turnover than nightly lettings. Guests arriving through the member network should cost less to recruit than those reached through paid channels. Residents would also take on some reception and onboarding work that a commercial operator pays staff to do. These are expectations built into the design, not observed savings.

The demand calculation leaves little room for disappointment. It builds occupancy from the local member pool, the share who move and the length of their stays. In the Berlin base case, this yields about 36 stays a year against 37 places. The resulting lack of headroom makes A2 more consequential than the single-factor ranking in §4.8 might suggest.

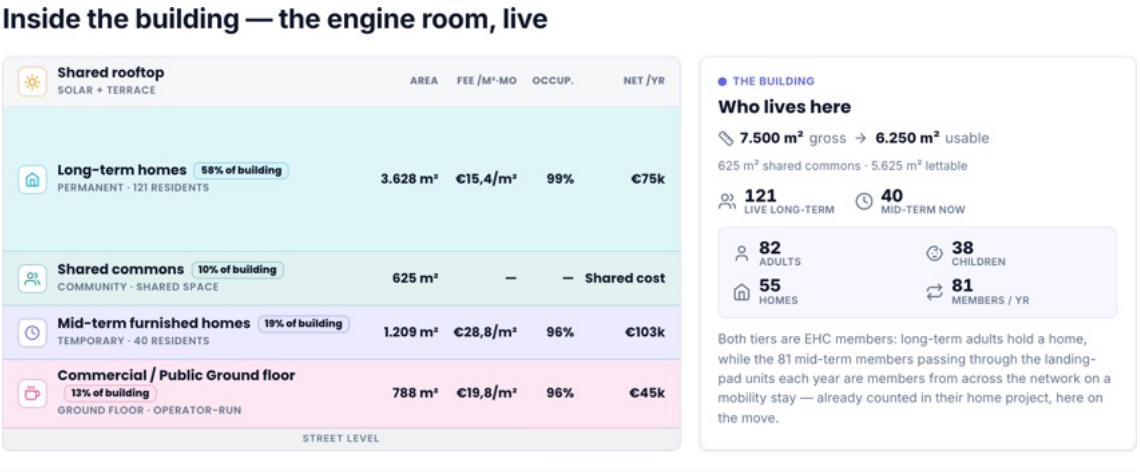
The design also limits private floor space. An average 66 m² home houses about 2,2 people, with a further 7 m² per home allocated to shared commons. The base building contains 55 long-term homes for about 121 residents and 18 mid-term flats for around 40 occupants at a time, or 81 over a year (Fig. 4.9).

Each resident therefore uses roughly 30 m² privately and 3 m² in common. This is towards the lower end of European provision, where national averages range from 29,6 m² per person in Latvia to 48,7 m² in Sweden (Lehner et al., 2024, p. 224). Three square metres of shared space per person sounds small. Across this building, it becomes 625 m²: enough to make the commons a substantial part of everyday life.

That space could hold shared kitchens and calm working areas, a playroom or a workshop. A household would not need to fit every occasional activity inside its own flat.

This is the sufficiency choice behind the area schedule, close in spirit to the shared-space arrangements of Zurich's Kalkbreite and Mehr als Wohnen. Less private area means less capital for the rent to service; useful common space can return something that a smaller flat appears to take away.

The word *useful* matters. An impressive common room that residents rarely enter still costs money to build, heat and maintain. Nor should sharing become an obligation to be sociable. The design makes room for collective life while keeping a private home as the resident's own retreat. Whether the balance works for long-term and mid-term residents together is a social question the area calculation cannot answer.

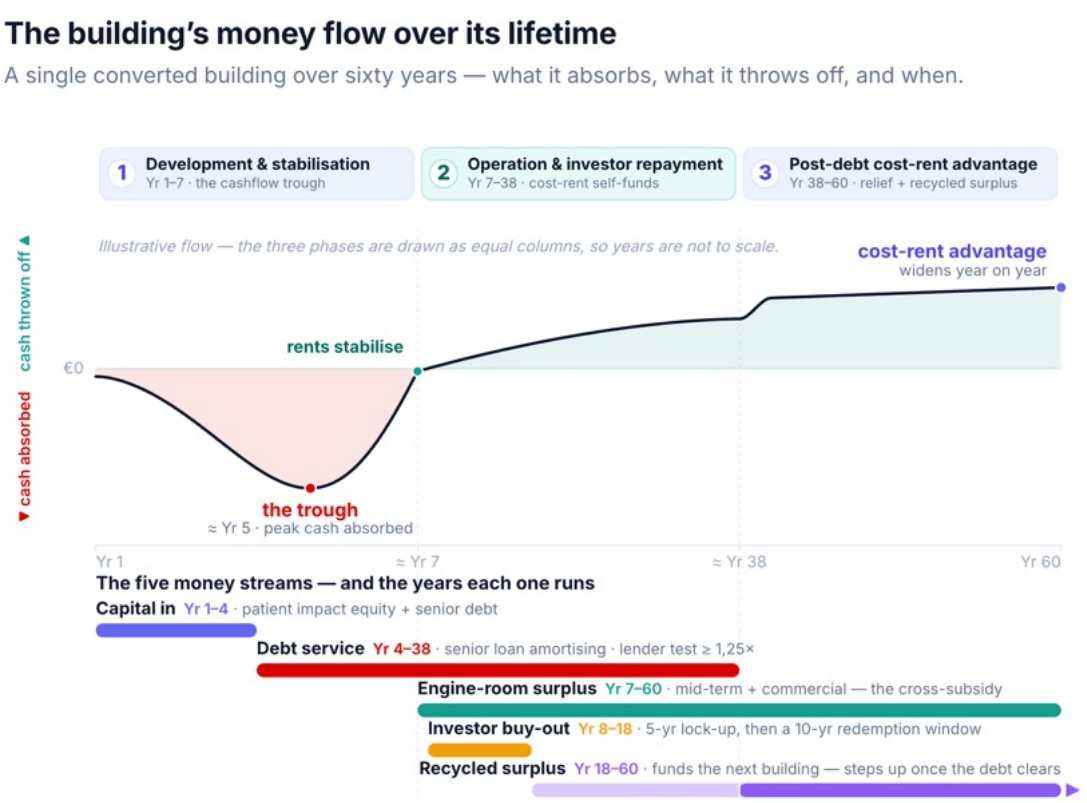


Author's own screenshot of the platform (housingcoop.eu).

Figure 4.9 – *Inside the building — the engine room, live*

The lender test asks whether available income covers annual debt payments by roughly 1,25 times. It also limits borrowing relative to total project cost. These debt-service coverage and loan-to-cost benchmarks reflect lending practice, not uniform European rules (Fannie Mae, n.d.; Gąsiorowski et al., 2026; Trepp, 2023).

Coverage must hold throughout the senior loan's life, to about year 38 under the model's defaults (Fig. 4.10). Lower engine-room occupancy reduces surplus and can require more equity. Possible responses include additional resident or Fund equity, public support or a smaller project. Chapter 5 tests these sensitivities.



Schematic, not a per-year forecast. The phase boundaries and stream spans follow the model's own defaults — a three-year conversion, a 35-year senior term, a five-year investor lock-up with a ten-year redemption window, and a sixty-year horizon. The per-year figures are the live Money-River view (§4.4, §4.5).

Figure 4.10 – *The building's money flow over its lifetime — the three phases and when each money stream runs*

The live instrument at housingcoop.eu/economic-model/thesis reports city-specific affordability, bankability and project cost coverage alongside those thresholds. Chapter 5 evaluates it; Appendix A.7 documents the saved configurations.

Table 4.2 – The model's load-bearing inputs and how each is set (sourced vs author-set).

Key input	Set by	Basis
Conversion cost factor (~0,65-0,76 of new-build)	Externally benchmarked + author-curated	Gensler (2024)/ULI conversion benchmarks, adjusted per country by the author; corroborated by Graaf et al. (2025) and BDA Bayern (2025); Appendix A

Key input	Set by	Basis
Serviced / mid-term rent premium	Author-set, curated	Benchmarked to the serviced-apartment market (Savills, 2026); city-specific in the live model
Member mobility rate (A2)	Author assumption	No direct cooperative precedent; flexible-living demand as a proxy (Savills, 2026)
Company membership growth, dues and organisational shares	Author-set network parameters	Recruitment, payment and renewal unvalidated; pilot protocol in Appendix E.4, separate from A3
Platform fee charged to each project	Author-set parameter	No cooperative benchmark for an umbrella service charge; charged against engine-room surplus so cost-rent is untouched (§4.5; Appendix A)
Patient-capital return (3,5%, fixed)	Design parameter	Below commercial equity, in line with mission capital (Pósfai et al., 2024; European Investment Bank [EIB], 2025)
Mid-term occupancy and void	Author-set lever	Placed between mid-term market occupancy in larger European cities and vacancy in affordable or cooperative housing, with a void allowance (Appendix A)

4.5 Delivery, governance and finance architecture

Four roles, four vehicles.

A building needs someone to own it, someone to make decisions about it, someone to deliver and run it, and someone to supply the money. Those roles can overlap, but treating them as interchangeable makes it difficult to see who carries the risk. The EHC separates them deliberately.

A local project vehicle holds the title or leasehold and the associated debt. The resident cooperative controls the project, local partners develop and operate it, and the Fund supplies patient equity without taking over resident governance. The equity proportions change as external investors are repaid. The distinction between capital and control is meant to survive that change: living in a building should not become less democratic because its construction required money from elsewhere.

Who supplies the money matters as much as the total. Senior debt covers about three-fifths of the base-case building's cost. Occupiers contribute a further fifth: residents through project shares and the ground-floor tenant through a share proportionate to its area. That equity earns no return. The remaining fifth comes from the Fund and carries the patient return.

Within the Fund's stake, the cooperative's pilot-phase contribution is small: tens of thousands of euros beside some €3,3 million from external impact investors. A modest EHC contribution does not mean the building needs little patient capital. It shows who is carrying the larger commitment at this stage.

The separate project vehicle also sets a boundary around liabilities. A serious overrun in one conversion should not automatically put every other building in the network at risk. That is the purpose of ring-fencing. It depends on enforceable contracts and the absence of cross-guarantees, not on drawing separate boxes in an organisational diagram. The proposed protection is only as strong as the obligations those boxes actually carry.

A failed project can still expose residents to loss. The design proposes that resident equity rank ahead of patient-investor equity, with tenure protections, step-in rights and a rehousing protocol. Step-in rights mean that a designated party can intervene if the project vehicle fails to meet critical obligations. These protections require enforceable statutes and contracts and funded delivery arrangements; they are not guarantees against insolvency or displacement. A severe failure could reduce a member's buy-in. Appendix I identifies the legal and financing evidence required before these protections can be relied upon (Fig. 4.11).

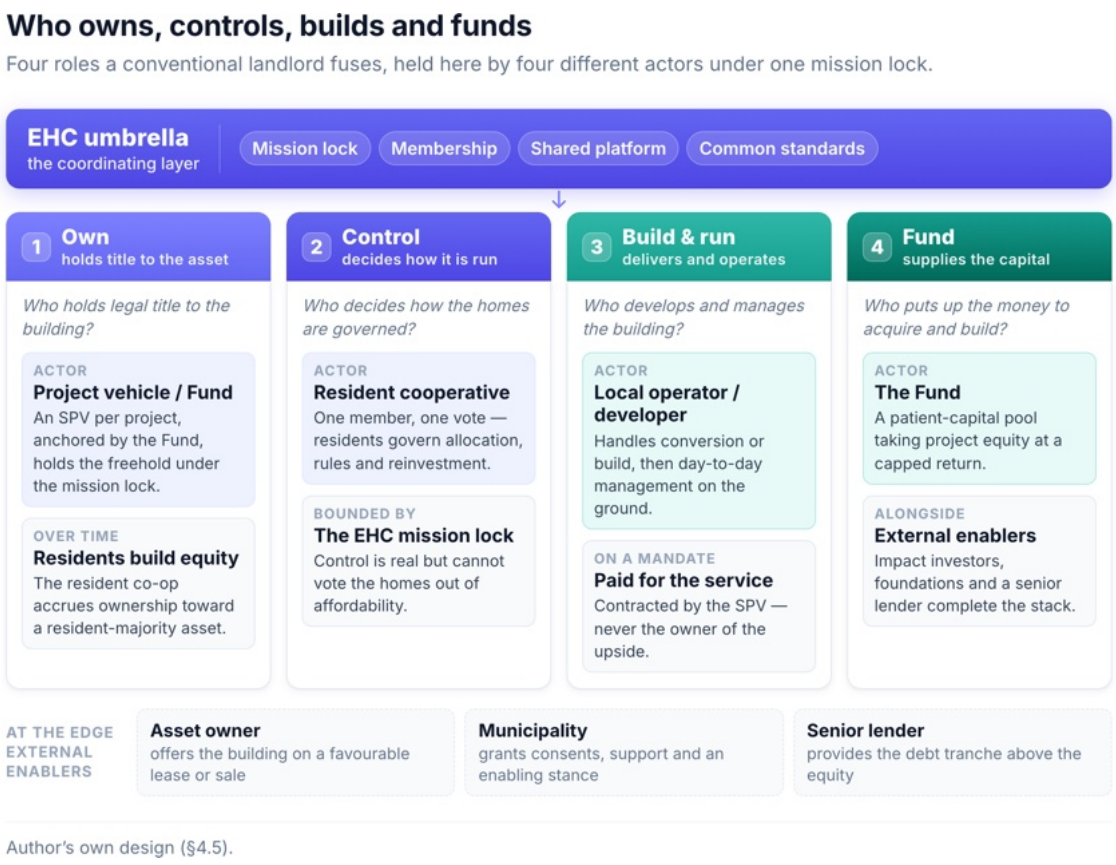


Figure 4.11 – *Who owns, controls, builds and funds*

Delivery: who builds, who operates.

Delivery is led locally, but the roles it bundles are separable. A resident cooperative that will occupy the building is assumed to develop and then operate it. Otherwise a mission-aligned local organisation takes the developer role, securing change-of-use consents and managing the conversion, and may contract operation and maintenance to a separate operator. The development margin and cost-overrun risk sit with whoever leads the conversion, the management fee with whoever runs the finished building.

Buildings may be identified by the EHC, local partners, members or allied professionals. The platform connects candidates with pre-qualified local development partners that are EHC members (§4.6). Delivery responsibility stays close to the building.

From sourced asset to project.

A promising address is still a long way from a project. The sequence is screening, project-specific demand testing, agreement of entry terms, capital structuring, then detailed design and consent. Table 4.1 governs the first screen. The important pause

comes before substantial commitments: a workable building and a credible first resident group must both be in view. Chapter 6 turns that principle into the pilot procedure.

The entry route depends on what the building can carry. A favourable long leasehold reduces the capital needed at the outset, which is why it remains the base case. Purchase is also modelled and may be the right route at an affordable price. An owner contributing an asset in kind would change the equation again, but that exceptional possibility is not priced into the baseline. The appraisal must follow the terms actually offered.

Who undertakes the first screen is an organisational choice with consequences of its own. A central EHC team could accumulate conversion knowledge across cities, but would need funding before project income arrived. A local partner could carry the work using common templates and the model, keeping appraisal close to the party responsible for delivery. Specialist company members offer a third route. Digital surveying and AI-assisted layout testing could support all three; their cost and reliability need to be established in use.

The network's aim is to make learning cumulative. A rejected candidate should leave behind something more useful than an invoice. Yet shared knowledge does not transfer professional responsibility: whoever carries conversion risk must adopt the final appraisal, using the common evidence register in Appendix H.

Decision rights across borders.

Residents decide local occupancy rules, common-space use and operating budgets under national cooperative law. The ground-floor operator also subscribes a project share per square metre, held at nominal value without a dividend, and votes as a member-occupant. The project vehicle holds the building's economic and use rights.

Umbrella members vote on admission, platform standards and shared resources on a one-member-one-vote basis. A golden share provides a limited veto against speculative resale and breaches of affordability or mission rules. It does not govern ordinary local management.

This division follows subsidiarity: decisions remain local unless they require network coordination. Residents know whether their common room works; the umbrella is better placed to maintain a shared membership system or negotiate a framework loan. The line will not always be obvious, particularly when a local decision affects the resources

or reputation of other projects. It needs to be written into the structure before such a disagreement arises.

Cross-border disputes would follow a route from local resolution to mediation, with the veto reserved for specified mission breaches. Language and distance make participation harder, even where voting rights are formally equal. Shared templates and participation tools could help (§4.6), but the aim is understandable decisions, not simply more documents. The governance question is whether members can exercise the authority the statutes give them.

Company membership would sit at umbrella level, subject to the chosen legal form and statutes, without displacing local resident control. Membership, Fund investment, supply contracts and accommodation purchases require separate terms even where one company occupies several roles. The conflict that remains is supplier influence: company members that also compete for work on the projects. Admission and voting rules have to address that directly. Procurement should assess whole-life cost, quality and evidenced sustainability, with conflicts disclosed and interested members recused. Company members are encouraged to offer discounted goods or services as a contribution to project affordability, though the local project developers / operators are of course free to choose their suppliers and partners.

Funding the model.

Three capital relationships must remain distinct. Membership shares give democratic rights and pay no dividend. Project shares give residents and commercial occupiers a stake in their building. Separate Fund investments are the only return-bearing route and confer no control over resident governance.

The Fund invests across the whole building alongside occupier shares and senior debt. Its fixed return is allocated by cost: homes pay their share through cost-rent; the engine room pays its share from surplus. Returns on externally supplied capital go to investors. Returns on the cooperative's own committed capital stay with the cooperative and are recycled. The Fund's share of project equity can vary without changing local decision rights.

Individuals and companies subscribe membership shares and pay annual dues. Shares provide capital; dues provide operating income. Neither purchases accommodation or guarantees a supply contract.

A large membership is not the same as a large resident community. The configuration in Chapter 5 assumes roughly four and a half associate members for every long-term home. By the end of the projection, most individual members hold no EHC home. Much of the umbrella's recurring income therefore comes from people whose reason for joining must extend beyond living in one.

Some may be waiting for a project in their city. Others may support the purpose or want access to mobility rather than tenure. Whatever the reason, the offer must be worth its dues without promising a home. Recruiting and retaining members at that density is a behavioural assumption, just as A2 and A3 are. A6 makes it explicit, and Chapter 6 sets out how to test it.

Projects also pay a platform fee for the shared services in §4.6. This comes from engine-room surplus after the Fund's return and before the expansion reserve, not from long-term cost-rent. Company recruitment, payment and renewal therefore affect the umbrella's budget and available capital. Chapter 6 tests these dependencies separately from demand for employee accommodation under A3.

The umbrella has five income streams: individual dues, company dues, platform fees, booking fees on mid-term stays and events, and one-off project-origination fees. They do not arrive together. Dues and founding share capital come first. Building-related fees follow only when projects open; the model places origination income five years after a scheme starts, at handover.

The organisation begins with a team equivalent to three full-time posts, supported by member capital and a fixed operating reserve before project income arrives. Staffing grows only as fee revenue can pay for it.

The model also assumes that a mature network can handle roughly twice as many members and buildings per person as it does in the first year. Central costs consequently fall as a share of revenue. I treat that productivity gain as a design parameter, not an observed economy of scale. It affects when the milestones in §5.5 are reached.

The Fund is open to members and non-members, including individuals, companies, foundations and institutions. Members seeking a return must invest separately from their membership. The model assumes a fixed 3,5% return, below commercial-equity expectations (Pósfai et al., 2024; European Investment Bank, 2025, p. 9). Whether this attracts enough capital is A5.

The 3,5% parameter has two reference points. It matches the statutory ceiling on invested-capital returns in Austria's limited-profit cost-rent sector, which rises to at most 5% when capital markets tighten (OECD, 2021, p. 64; Deutsch & Lawson, 2012, p. 24). It also targets the concessionary end of impact investment. Roughly one-fifth of impact investors accept below-market returns (Hand et al., 2025, p. 34). Observed return concessions range from about 2,5 to 3,7 percentage points (Barber et al., 2021, p. 162). The rate is a charge priced into each building beside debt service, not a promise attached to the instrument: whether a building can carry it is what the tests of §4.4 decide.

The Fund finances buildings; dues and platform income sustain the umbrella. Investors cannot buy a claim on the umbrella's growth. Within the Fund, grants or foundation capital could absorb first losses and lower the return required by other investors, reducing the blended cost of equity.

Membership shares remain a claim on the cooperative, subject to its redemption rules. They do not become a member's direct investment in whichever building the network happens to finance next. The cooperative commits only part of its pooled capital to the Fund and retains a liquidity buffer. This matters because a building is long-lived and illiquid, while members may eventually want their shares redeemed. A promising portfolio does not pay a withdrawal request by itself.

Projects draw on the cooperative's committed capital first, the Surplus Pool of recycled internal capital second, and external impact equity for the remaining need. The ordering is intended to reduce dependence on new outside money as projects mature. It does not eliminate that dependence during the early years, when the network has little accumulated surplus to recycle. A future framework loan would introduce a different choice. Lending against the portfolio rather than one building requires a lasting, diversified equity base. The Fund would have to decide how much of each stake to retain instead of recycling.

The trade-off is real. Recycling capital puts it to work in the next building sooner. Keeping a small stake in each project builds the collateral that could let the network borrow more cheaply than fifty separately financed buildings. The base case assumes full recycling and no framework facility. Cheaper portfolio financing remains an option, not a saving already counted.

The proposed Fund initially relies on the cooperative's team, connecting the work of originating projects with the work of financing them. Management of external capital must nevertheless carry an explicit fee, paid from the Fund's gross return rather than added to cost-rent. Otherwise members' dues could end up financing a service whose returns go to external investors. That separation is both a budget question and a matter of fairness between the parties.

The legal separation of liabilities, permissible management arrangements and regulatory status must be assessed before fundraising (§4.7). Cooperative status does not establish an exemption from fund regulation.

Patient capital also needs an exit that does not undo the purpose for which it entered. Selling a successful building at market value would repay investors, but would return the homes to the cycle the cooperative was meant to interrupt. The model instead gives each building time to buy down the external share of its own equity.

An initial lock-up allows the project to stabilise. During a subsequent redemption period, reserved surplus repays external patient equity without asking a new resident cohort to supply the exit money. Investors may leave or reinvest in further projects. Cash exits are managed through a Fund-level queue, because no individual building can turn its walls back into cash on demand. Repaying a building's investors and meeting an investor's withdrawal request are related, but they are not the same obligation. The building can repay only what its earnings and financing allow. The Fund can pay out only the cash available across the portfolio. That is why the withdrawal queue belongs at Fund level.

If reserved surplus cannot clear a stake within its window, the model uses refinancing capacity. A stabilised building with more equity can replace part of the stake with debt. Returns no longer payable on redeemed capital also leave more money for the next repayment.

If neither sufficient surplus nor acceptable refinancing is available, repayment must wait. How long an investor can be asked to wait belongs in the agreed terms. The model cannot agree to it on the investor's behalf.

As external shares are redeemed, the cooperative acquires a permanent stake of about one-tenth of building equity; residents ultimately hold the majority. The Fund remains in place even as its external capital is repaid. What changes is who supplies the

money within it. Appendix A details those transfers (Fig. 4.12). This makes the intended end state legible: impact-funded at the beginning, increasingly held by residents and the cooperative as the building matures.

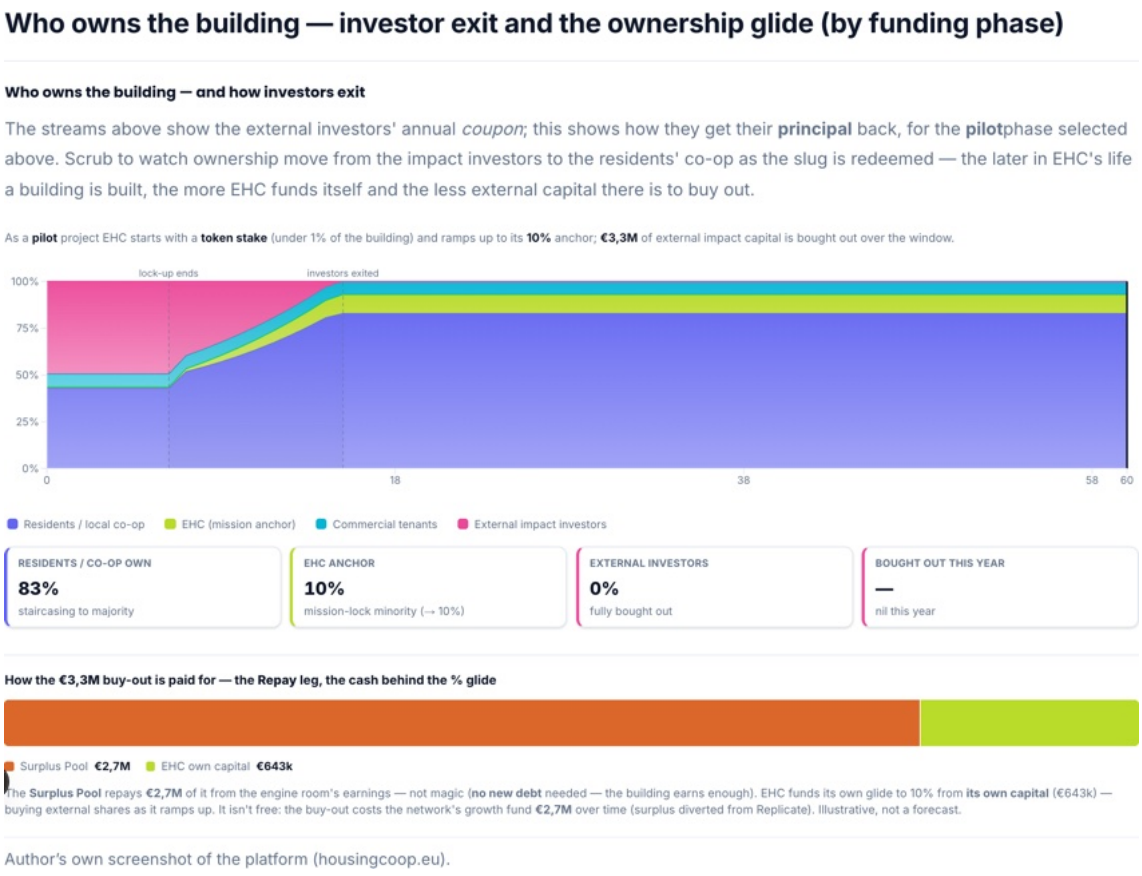


Figure 4.12 – *Who owns the building — investor exit and the ownership glide (by funding phase)*

This is the Repay-Replicate-Reward sequence. Engine-room surplus first repays patient investors, then enters the Surplus Pool to finance further projects. Residents' rent reduction comes separately from the homes' freed debt service (§4.4).

Debt, bridge finance and the early years.

On the debt side, the base case borrows at commercial bank rates. There is no subsidised debt; only the equity is priced below market. Where a city or country offers below-market loans or subsidies, these are layered on top. In a mature state, the EHC's ability to aggregate a pipeline could let it negotiate an EU-supported framework loan with an institution such as the European Investment Bank or the Council of Europe Development Bank, then distribute the capital across local projects. The harder phase is development finance, before any rent arrives. A network can recycle a central catalytic

bridge facility from project to project as buildings stabilise and refinance. A single local cooperative usually cannot.

Section 5.5 reports these capital needs under the saved rollout configuration.

The network model's outputs distinguish three milestones. Operating break-even is the first year EBITDA turns positive. EHC own-cash recovery is the year the cooperative recovers its central rollout expenditure. Network external-capital retirement is the year the external impact-equity book has been fully redeemed. This last milestone is distinct from project cost coverage, which means revenues meet modelled full costs, and from bankability, which adds the stated lender thresholds (Fig. 4.13).

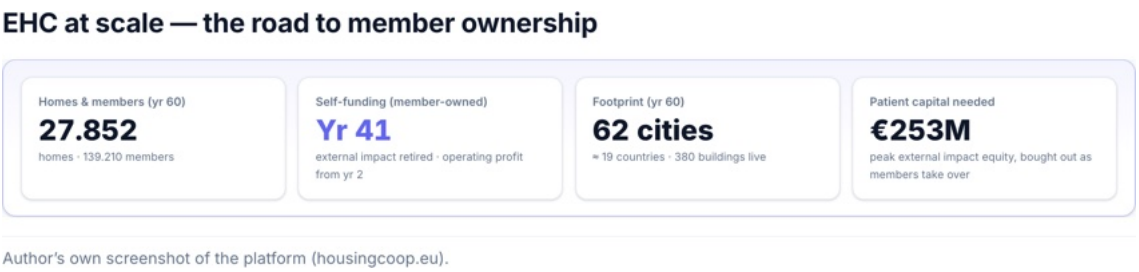


Figure 4.13 – EHC at scale — the road to member ownership

Tenure and mission protection.

A long lease must permit residential use, last sufficiently long and be acceptable as lender security. Appendix G assesses the available instruments across thirty countries. Weaker lender acceptance increases the equity required in the model (§5.4). The existence of an instrument does not establish that an owner will offer favourable terms; that remains A4b. Currency adds another boundary. The focus set includes cities in Sweden and the United Kingdom, while the wider European universe includes several EU member states outside the euro area. A Fund paying one fixed return across those markets would carry exchange-rate exposure that the model does not price.

For the first projects, the choice is to stay within the euro area or make that exposure explicit at Fund level. A shared European identity does not make the currencies interchangeable.

The architecture relies on one legal safeguard and one operational safeguard. The legal safeguard is the steward-ownership lock: anti-speculation covenants, resale-value caps and use restrictions, backed by the golden share. Where enforceable, these prevent the building from being reset to market pricing through speculative resale, which

the speculation typology developed for the European Parliament treats as removing valuation-driven speculation at its root (Aalbers et al., 2026, pp. 10-11). The operational safeguard is knowledge transfer: the EHC codifies what it learns into shared templates, appraisal routines and governance documents, so partners in thin-sector markets are less likely to weaken the model when adapting it locally.

Table 4.3 shows who bears the principal risks across the structure.

Table 4.3 – Who bears which risk in the EHC structure.

Risk	Borne by
Entry terms and leasehold bankability (A4b)	Screened per jurisdiction (Appendix G); residual priced as a per-country equity surcharge
Conversion suitability (A4a)	Screened before acquisition; residual sits in the project vehicle
Construction and cost overrun	Whoever leads the conversion (earns the development margin)
Refinancing and interest rate	Project vehicle, under senior-lender covenants
Patient-capital availability (A5)	The EHC Fund and its investors
Mid-term occupancy and void	Project vehicle; modelled with a void allowance
Mission drift or speculative resale	Addressed through mission covenants and a golden share, subject to enforceability

4.6 Platform, measurement and learning

A pan-European cooperative needs infrastructure that local projects should not each have to rebuild. In the proposed operating model, the digital platform would handle member onboarding, share management, mid-term booking, project documentation, impact reporting and asset matching. The platform that already hosts the public knowledge resource and economic model would become the operational backbone for the membership and mobility offer.

Chapter 5 describes and evaluates the existing public model, data profiles and knowledge resources. The operational services proposed here are a further development stage.

Core platform development and control remain inside the EHC cooperative. External proptech members could supply specialist software or development capacity through defined contracts without taking ownership of the common infrastructure. Data rights, licensing, interoperability and exit arrangements must prevent supplier lock-in and preserve cooperative control. Membership provides no access to resident data beyond an authorised delivery purpose.

Membership could eventually support a quieter form of mobility as well. A resident away for a few weeks might make their home available to another EHC member, earning credits for a later stay elsewhere. The exchange would not depend on finding a household wanting to swap in the opposite direction on precisely the same dates. Nor would it be a paid short-stay letting business.

This is a future service, separate from the dedicated mid-term flats and their revenue. Its value would lie in using temporarily empty homes more fully and making shorter visits possible within the cooperative community. The same central platform used for mid-term bookings could also coordinate these short stays. Participation would remain voluntary and governed locally. Trust is an advantage of membership, but it does not replace clear rules about care, access and responsibility. The legal treatment would also require review, including where even non-commercial short stays face restrictions.

A network also needs to remember what its projects teach it. The next conversion should benefit from knowing which part of the previous appraisal was wrong, which shared spaces residents actually used, and where a promising operating arrangement became difficult. Without that feedback, expansion would repeat the work and possibly the mistakes of each local project.

Project reporting would therefore cover financial performance, environmental effects and resident outcomes, using the indicators in Table 5.6. The framework would draw on the EU Taxonomy and building-assessment standards, alongside emerging social-taxonomy work (EU Taxonomy Study, 2021; Platform on Sustainable Finance, 2022, p. 7). The ambition is a common account of performance that remains useful to residents and delivery partners, as well as to capital providers.

This gives the platform a purpose beyond administration. Actual conversion costs could improve the next screen; operating experience could sharpen the model's allowances; resident feedback could change the allocation or design of common space. The evidence would still need local interpretation. A successful arrangement in one building is something to learn from, not a template to impose on every other city.

The same infrastructure carries a social function. If the EHC is to seriously tackle the social cohesion dimension of sustainability, community cannot be left to the hope that shared walls produce shared life. Each project would therefore pair common rooms and shared facilities with routines, roles, ideas and digital tools that make participation easy, treating long-term and mid-term residents as one building community. The aim is not to prescribe intimacy. It is to lower the friction of neighbourly exchange.

The platform's city-ranking tool supports the search for projects (§6.4). Its inputs, like those used in the economic model, come from compiled data whose provenance and limitations are assessed in §5.3.

4.7 Legal frame: SCE and local vehicles

A pan-European cooperative needs a legal form that can operate across borders, and one already exists: the European Cooperative Society (Societas Cooperativa Europaea, SCE), created by Council Regulation (EC) No 1435/2003 and complemented on employee involvement by Council Directive 2003/72/EC. The SCE provides a European organisational framework without harmonising tax, insolvency, property, security or housing law; applicable national and EU rules continue to govern these matters (Council Regulation (EC) No 1435/2003, recital 16, art. 8). The EHC therefore proposes local project vehicles to support resident governance and the intended separation of project liabilities, subject to jurisdiction-specific legal review.

The SCE offers something the EHC needs: a shared legal identity for members and operations in several countries. Without it, the same European intention would have to be expressed through national entities and contracts between them. Formation routes include qualifying cross-border groups, mergers and conversions, subject to the Regulation's conditions. One-member-one-vote is the starting principle.

That makes the SCE an attractive umbrella, although its available legal features should not be confused with the choices made here. The framework permits non-user investor members under specified conditions and voting limits; the proposed EHC umbrella has

no such class (Council Regulation (EC) No 1435/2003). Article 64 also provides for securities and bonds issued to non-members (Keßler & Herzberg, 2009). A legal possibility is not automatically part of the model's capital offer.

Article 8 refers many unresolved matters to the law of the registration state. The resulting national variation remains substantial. A recent evaluation describes the result as "not one SCE but 30 models of SCE" (EURICSE, 2024, p. 11). Low take-up confirms the thinness of the supranational shell: after eighteen years, only 113 SCEs had ever been registered across the EU and EEA by mid-2024, and just 75 were active (EURICSE, 2024, p. 13). For the EHC, the SCE is useful for membership, identity and coordination, but not sufficient as a single vehicle for holding and operating all buildings.

The precedents in §3.5 establish different uses of the SCE. LiM used it as a European developer-owner above local master tenants; MOBA uses it for transnational coordination and catalytic finance (LiM, 2025; European Federation for Living, 2025; MOBA Housing SCE, n.d.). Their experience shows that incorporation does not settle the allocation of asset, delivery and financing risk.

The allocation in §4.5 therefore requires legal review for each jurisdiction. MOBA's revolving bridge-finance instrument provides a precedent for cross-border coordination, but does not establish the regulatory treatment of the EHC Fund (MOBA Housing SCE, n.d.).

The Fund's regulatory status must be assessed before capital is raised. Cooperative status or member-only participation does not itself exclude a vehicle from the AIFMD; classification depends on its substantive investment characteristics (Directive 2011/61/EU, arts. 2(2)(b), 4(1)(a); ESMA, 2013, paras. 4–5, 12). Staged development remains possible, but cannot assume an initial exemption followed by regulation only when institutional investors enter. The applicable management regime also depends on assets under management, leverage and redemption arrangements, while investor type affects marketing requirements (Directive 2011/61/EU, arts. 3, 43). Any later delegation of portfolio management to the cooperative would require compliance with Article 20.

The SCE is therefore an available legal starting point for the umbrella, rather than confirmation that the complete structure is feasible. The pilot-preparation gate in Chapter 6 must establish the appropriate vehicles, regulatory permissions and enforceable alloca-

tion of responsibilities. Tax treatment also requires jurisdiction-specific assessment: the SCE Regulation supplies no common tax regime (Council Regulation (EC) No 1435/2003, recital 16). Appendix I sets out the legal and tax questions to resolve before the proposed structure can be relied upon.

4.8 Assumptions, risks and sensitivity bounds

The model now has a building, a flow of money and an allocation of responsibilities. It is tempting to read that completeness as confidence. I read it differently: the more explicit the design becomes, the easier it is to see what it still asks the world to supply.

Some mechanisms have support in the literature. Others depend on the particular building, or on people accepting an offer they have not yet received. Table 4.4 distinguishes those evidence levels from the outputs the model calculates. The distinction keeps the proposal open to challenge at the places where a challenge would matter most.

Table 4.4 – Evidence and output types in the EHC design.

Evidence status	Examples in this chapter
Literature-backed mechanisms	Cost-rent advantages over time in mature cooperative and limited-profit systems; embodied-carbon benefits where existing structure and façade are retained
Plausible but context-dependent	Conversion cost advantage for screened buildings; leasehold bankability; jurisdiction-specific enforceability of the mission lock
Behavioural assumption	Member mobility demand; acceptance of a rotating mid-term population; corporate willingness to pay serviced-tier rates
Conditional model outputs	Cost-rent, DSCR, resident buy-in, required equity, network external-capital retirement year and rollout scale; baseline and stress tests across the 36-city probe set

Adjustable parameters allow sensitivity testing; they do not establish whether the underlying assumptions hold. Resident acceptance and mobility demand require behav-

ioural evidence, while conversion costs and entry terms require project-specific appraisal. Table 4.5 separates these assumptions and identifies how each is probed.

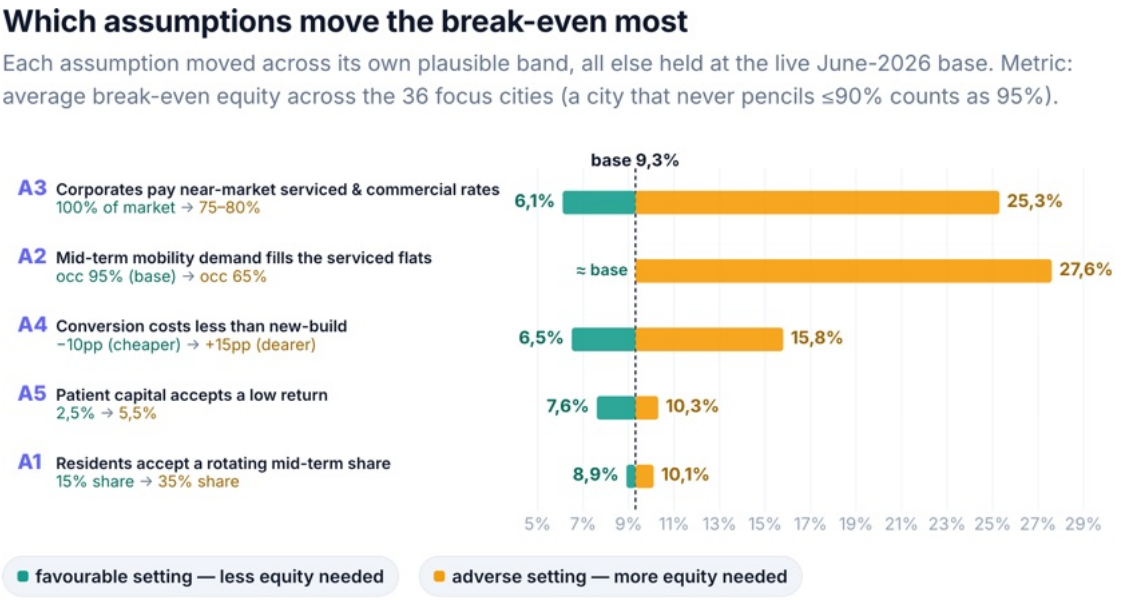
Table 4.5 – The six core assumptions (A1–A6), their literature signal and how each is probed.

#	Assumption	Literature signal	Model probe / required evidence
A1	Long-term residents will accept living alongside a 20-30% rotating mid-term population on the stated rent, entry-equity and participation terms. Residual engine-room surplus first repays investors, then funds later projects. The baseline does not reduce resident contributions; optional later-cohort relief substitutes Fund equity and raises rent. Commons are costed within building charges, not funded by a promised surplus distribution.	Czischke et al., 2020; Khatibi, 2022	Model lever + resident testing in Chapter 6 on the actual financial and participation terms. First-cohort entry relief requires separately committed funding; future surplus is not available at financial close.
A2	About half of members will use mid-term mobility roughly once every three years.	Effectively untested in cooperative literature	Model lever + mobility-demand testing

#	Assumption	Literature signal	Model probe / required evidence
A3	Corporate or institutional users will pay serviced-tier rates for landing-pad accommodation.	Supported directionally by employee-housing and serviced-apartment evidence: *Mitarbeiterwohnen* research links staff housing to recruitment, retention and location competitiveness; serviced-apartment reports identify corporate relocation and project work as demand drivers. Still untested for the EHC's cooperative offer and modelled rates.	Model lever + employer / partner testing
A4	Acquisition and conversion economics: each building can be secured and converted at the modelled cost basis. Two limbs, tested separately. **A4a – the works:** a screened building converts at the curated cost factor (~0,65-0,76 of new-build). **A4b – the terms of entry:** the building comes on a durable, mortgageable long leasehold (60+ years) at a below-market ground rent from a mission-aligned owner, or enters as in-kind equity, rather than as a market freehold purchase.	A4a mixed: supportive for screened stock, weaker for unscreened stock or full-envelope replacement. A4b: instruments exist across the focus countries, but duration, residential use, lender acceptance and owner willingness require separate checks (Appendix G).	A4a: conversion sensitivity to parity + developer and owner due diligence. A4b: Appendix G tests lender treatment of leasehold, not owner willingness. Market sale or market ground rent requires a separate appraisal and may invalidate the assumed entry terms.

#	Assumption	Literature signal	Model probe / required evidence
A5	Patient capital, member shares, catalytic bridge finance and senior debt can underwrite the early years and bank the senior loan.	Pósfai et al., 2024; Cooperative Housing International; EIB Operational Plan 2025	Bankability sweep + investor testing
A6	A large associate membership — around four and a half members per long-term home — will pay and renew annual dues without receiving an EHC home.	Untested. Cooperative membership at this density has no direct precedent; waiting-list and supporter membership in mature cooperative systems is the nearest analogue.	Model lever (associate density, dues) + membership recruitment and renewal testing in Chapter 6

Affordability, bankability and organisational solvency require separate assessment (§4.5). Below-market cost-rent may still be unaffordable to the target household, and a bankable building may sit within an underfunded network. Single-factor tests identify sensitivity to individual parameters; scenarios examine changes in market conditions with design settings held fixed. Figure 4.14 summarises the sensitivity analysis reported in §5.5. The ranking shows sensitivity within the tested ranges, not the probability of failure.



Source: EHC economic model, cross-city break-even sweep at the live June-2026 base.

Figure 4.14 – *Sensitivity of the five core assumptions (A1–A5)*

Stakeholder readiness to participate (H2) remains unresolved: workable project economics do not establish that members and partners will sustain cross-border cooperation. Chapter 5 examines the design through the economic model and its supporting data, alongside early engagement evidence, distinguishing what these probes establish from what remains to be tested in practice.

5 Methodology: Designing and Probing a Pan-European Cooperative Model

How far can a cooperative be tested before anyone moves in? Chapter 4 gave the European Housing Coop (EHC) a sufficiently definite shape to ask that question. Its buildings can be priced, its financing can be put under strain, and the information behind the proposal can be opened to readers. The people who would make it work are a different matter.

This chapter brings those two kinds of inquiry together without treating them as the same evidence. I assess four research artefacts: the economic model, harmonised data pool, public platform and pilot-readiness index. The practical sequence is straightforward. Compile traceable inputs, run the model under stated assumptions, change those assumptions, and examine what happens. Alongside that work, read how an early audience uses the public platform. The aim is to discover where the design holds together and where its next question must be put to someone outside the model.

First, I need to make clear what evidence this chapter draws on, and where that record ends.

Assessed evidence snapshot.

The assessed record closes on 31 July 2026 at 23:59:59 CEST. It includes the 30-country comparison, 36-city model tests, 104-city EU opportunity universe, saved scenarios, platform analytics and timestamped interest forms. The detailed analytics by channel and content end earlier, on 22 April 2026, because the measurement system changed. Appendices A and D document the saved configurations and data extraction. Later activity is excluded.

5.1 Research design and methodological positioning

The methodological problem follows from the object of study. I am proposing an organisation, not observing a cooperative that already has residents, accounts and a history of decisions. Waiting for all of that would make the design impossible to assess within this thesis. Treating a completed spreadsheet as sufficient evidence would be a rather convenient shortcut.

Design Science Research (DSR) offers a way between those positions. It asks whether a proposed solution addresses a relevant problem and whether its usefulness, quality and effectiveness are evaluated rigorously (Hevner et al., 2004, p. 82; Peffers et al., 2007, p. 52). In this case, the immediate task is to make the choices behind cooperative conversion and financing explicit enough to inspect. The model must show where costs fall, how the capital is repaid and what happens when an assumption weakens. Table 5.1 connects that task to the research position established in §1.4.

Action Design Research (ADR) explains the other half of the work: learning while the artefact is being built and used. The public platform was released and revised during the inquiry, so building and evaluation overlapped (Sein et al., 2011, p. 40). What visitors sought and the questions they raised could inform the next revision. The intervention is real at the level of the platform, even though the cooperative it describes has not yet operated. That unevenness determines how far the evidence can travel.

Table 5.1 – Methodological requirements of Action Design Research, how each is met, and the limit.

Methodological requirement	How this thesis addresses it	Limit
DSR artefact	EHC model, economic engine, harmonised data pool and public platform	Artefacts are early-stage and not yet embedded in a real cooperative
Problem relevance	Responds to Europe's housing crisis and to the cooperative sector's capital, land and scale constraints	Relevance does not prove feasibility
Design evaluation	Runs the model across focus cities, tests assumptions through sensitivity analysis, and reads platform reception	Evaluates internal coherence and early signals, not stakeholder commitment
ADR intervention	Platform was built, released and observed as a live knowledge and participation environment	Organisational embedding remains weak until a pilot exists

Methodological requirement	How this thesis addresses it	Limit
Reflection and learning	Findings are used to sharpen the assumptions, identify stakeholder tests and structure Chapter 6	Formal learning continues after the thesis through the forward programme

I designed the model, operate the platform and interpret its use. This gives direct access but creates a risk of favourable interpretation. Explicit assumptions, source records and reproducible scenarios make the analysis open to scrutiny. Section 5.9 addresses the remaining limitations.

Artefact-evaluation protocol.

Table 5.2 sets out the protocol for each artefact (Fig. 5.1).

Table 5.2 – The artefact-evaluation protocol: question, method, criterion and limitation per artefact.

Artefact	Evaluation question	Method and evidence	Criterion	Limitation
Economic model	Is the proposed operating logic internally coherent and robust to changed assumptions?	Reproducible scenarios, sensitivity tests and failure thresholds across the city set	Outputs reconcile with inputs; bankability and project cost-coverage boundaries are explicit	No transaction or occupied-building validation
Harmonised data pool	Are cross-city inputs sufficiently traceable and comparable for exploratory modelling?	Source register, common definitions, provenance fields and gap flags	Every material input is traceable and uncertainty is visible	National and asset-level heterogeneity remains
Public platform	Is the knowledge artefact usable and is there early informational demand?	Usage analytics and self-selected interactions	Continued traffic and knowledge-content use provide a modest H1 signal; referral claims apply only to attributed visits	No representative inference; H2 is not tested
Pilot-readiness index	Does the artefact improve where-to-test-next decisions?	Transparent scoring, re-weighting and Chapter 6 decision gates	Rankings expose assumptions and direct attention to missing evidence	It ranks search priorities, not feasible projects

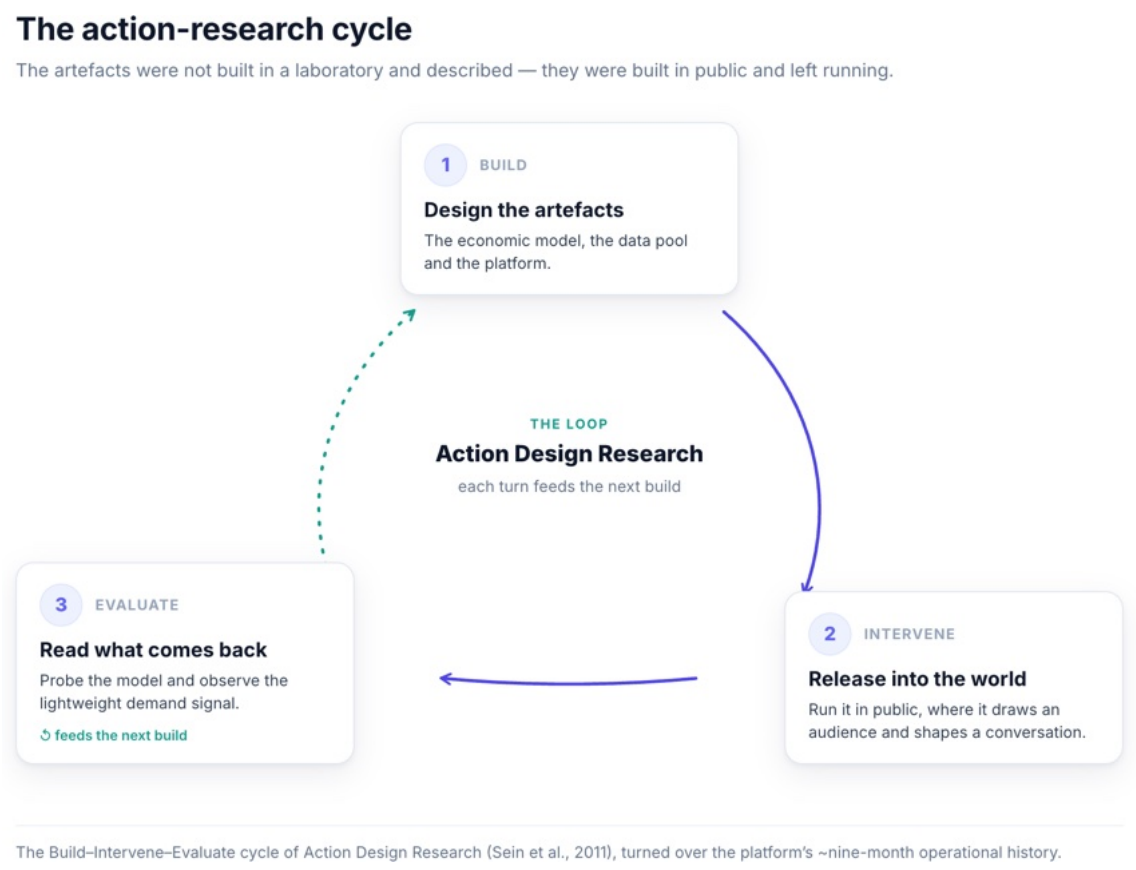


Figure 5.1 – The action-research cycle

5.2 The designed artefacts

The data pool supplies inputs; the model calculates financial outcomes; the platform records informational use and feedback; and the index prioritises further investigation (Fig. 5.2). Support and leasehold registers add policy and tenure conditions. Each artefact is evaluated against its own task, using the protocol in Table 5.2.

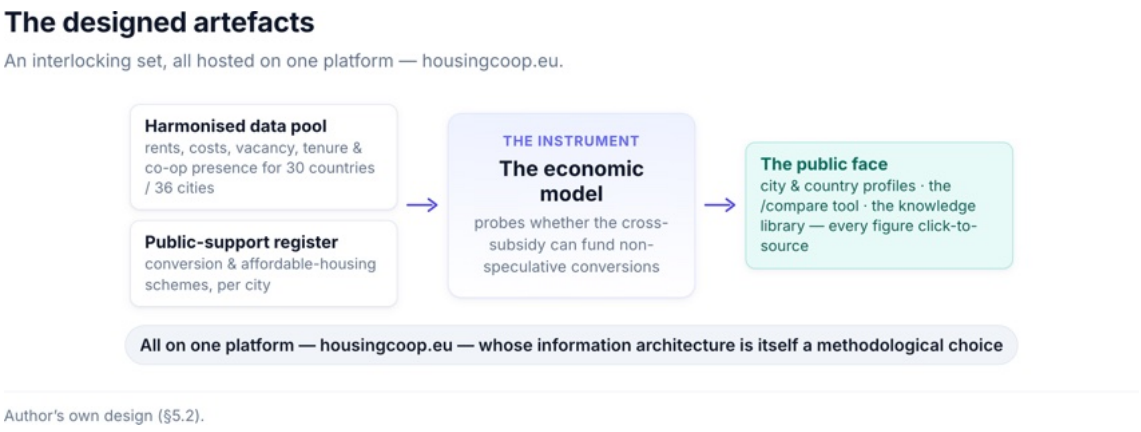


Figure 5.2 – The designed artefacts

Analytics are aggregate and cookieless; profiles collect minimal information with consent. Informal conversations are reported anonymously. Self-selected participation is not treated as representative.

5.3 The data pool: sourcing, harmonisation and provenance

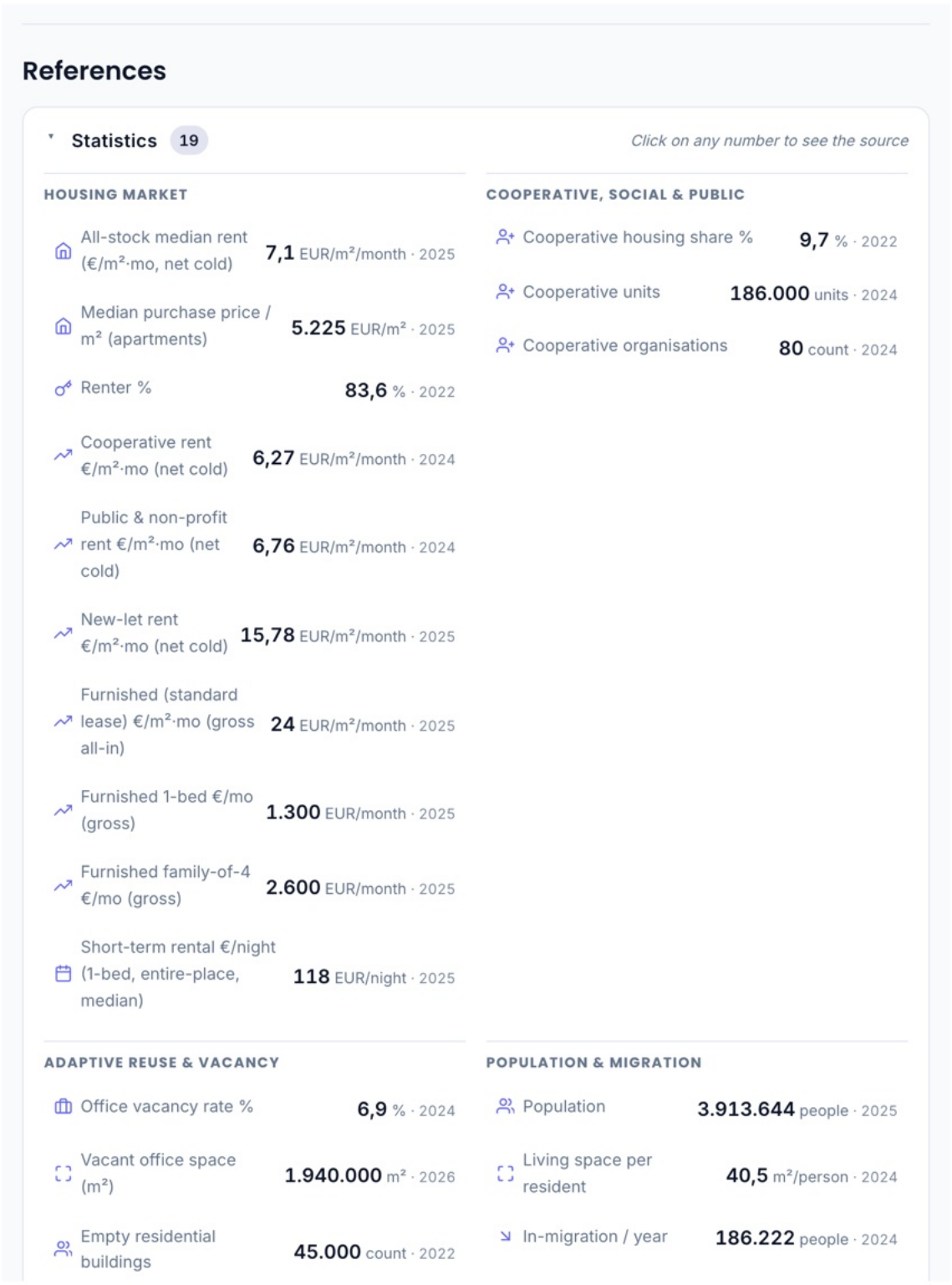
A comparison between cities begins well before the first model run. A cooperative share in one country may count rental housing, while the same label elsewhere includes homes whose shares can be sold at market value. Rent may mean what a sitting tenant pays or what a newcomer is asked to pay today. Placing the figures beside one another is easy. Making the comparison meaningful is the work.

This is why the data pool belongs in the methodology. Cooperative-housing figures are scattered across statistical offices, sector bodies, municipal publications and research. Commercial reports supply much of the office-market evidence. The compilation brings these sources into a common structure, while retaining the distinctions and gaps that matter for interpretation.

The Countries database holds national indicators, including cooperative share, unit and organisation counts, indicative rents and tenure models. The Cities database supplies local rents, vacancy and market conditions. The Projects database records Chapter 3's examples. Every numerical field carries its source, and derived indicators are calculated from those sourced inputs. A reader should be able to follow a figure back through that chain and see what it does, and does not, describe.

These databases are a compilation layer, not new official statistics. Chapters 2-4 cite them as the immediate source, with primary-source attribution where a figure is especially important. Appendix B summarises definitions and provenance; the platform retains the per-field records (Fig. 5.3).

A city profile, click-to-source



Author's own screenshot of the platform (housingcoop.eu).

Figure 5.3 – *A city profile, click-to-source*

Public profiles cover the thirty-six focus cities, thirty focus countries and project library. The comparison tool uses the same fields and displays sources and missing values.

Harmonisation remains incomplete. Rental and ownership cooperatives are counted differently, sources refer to different years, and coverage is uneven. These estimates support exploratory comparison, not a single-year census.

5.4 Model inputs: public support and leasehold conditions

Public support and land tenure enter the model as explicit inputs. The support register separates conversion incentives from affordable- or cooperative-housing programmes. It records grants, soft loans, rent caps, binding periods and source confidence. Switching support on or off shows its effect on affordability and required equity.

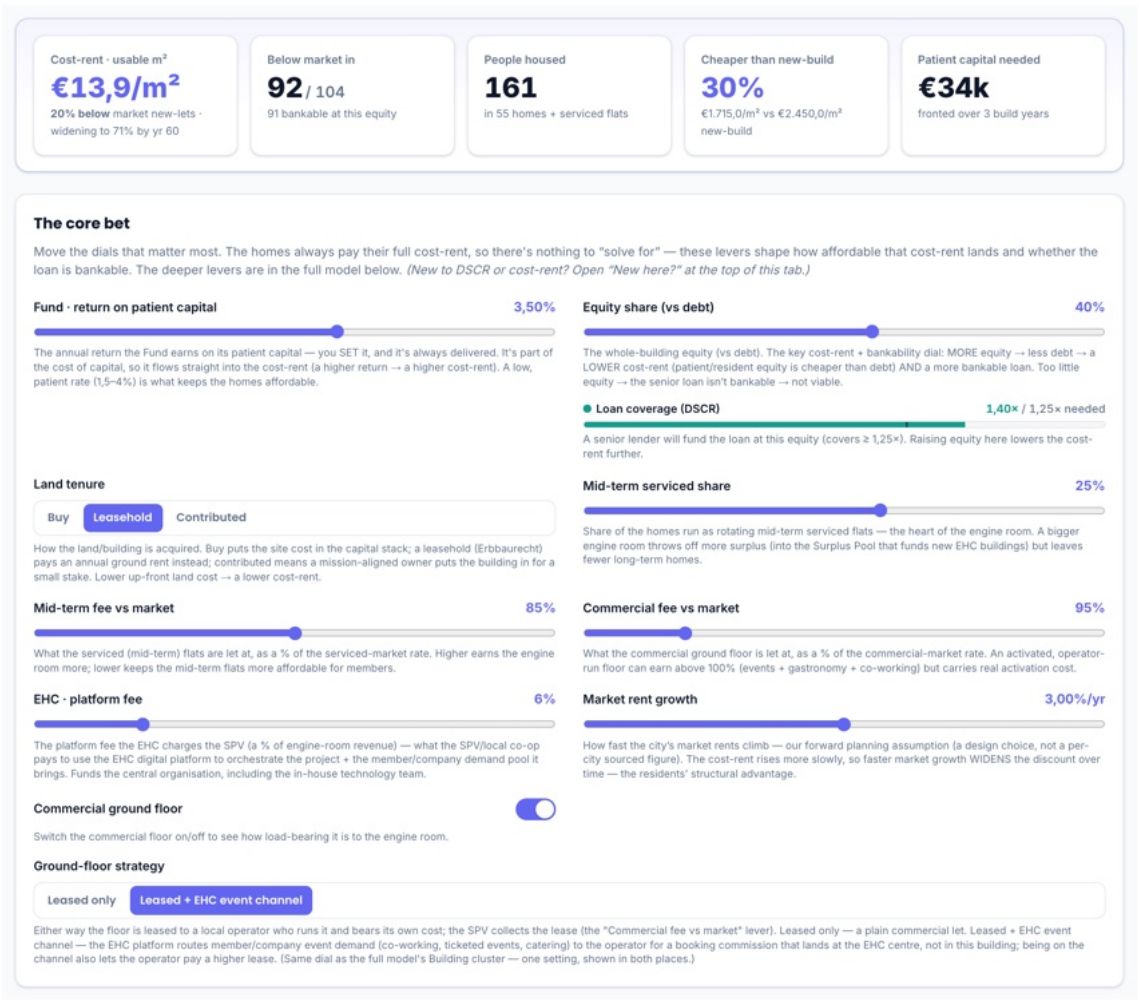
The baseline retains §4.4's financing conditions: commercial bank debt, no direct grant, favourable entry terms and concessionary patient equity. Support is added separately. Since schemes change, the register is a dated research input, not a current legal inventory.

The leasehold register assesses whether each country has a durable instrument accepted as mortgage security and used in housing. Its three tiers translate into reduced permitted borrowing, and hence more required equity, where lender acceptance is weaker (Appendix G). This tests one part of A4b: the financing treatment of leasehold. It does not test owner willingness or price the loss of favourable entry terms.

5.5 Probing the economic model

The economic model is deterministic: the same inputs produce the same outputs. It calculates one converted building's costs, rents, financing needs and surplus, then repeats that calculation across thirty-six cities in thirty countries using their market data (Fig. 5.4).

The economic model interface



Author's own screenshot of the platform (housingcoop.eu).

Figure 5.4 – *The economic model interface*

The model is most useful when something is changed. One city may look promising at the opening settings, but how much of that promise rests on the conversion price? Another may need little equity until its mid-term occupancy falls. The first procedure is sensitivity analysis: move one input while keeping the city's other conditions fixed, and observe which outputs respond. This helps locate the assumptions carrying the result.

The second procedure repeats the financing calculation across cities. The cross-city sweep asks whether revenues cover the modelled full costs and how much equity is needed to meet the lender threshold. This allows the same design to encounter different relationships between rents and building costs. The third procedure combines adverse changes into scenarios, because a project in difficulty rarely has the courtesy to change only one variable at a time.

These procedures answer different questions. A single-input test helps explain a mechanism; a scenario tests a bundle of conditions; comparison across cities shows where the same design becomes more demanding. The conversion estimate in §4.3 remains a separate measure of potential supply. It establishes neither the number of projects available to the EHC nor the finance needed to secure them.

The outcome measures remain distinct: cost coverage means revenues meet modelled full costs; bankability adds lender thresholds; viability also requires the modelled reserves and solvency conditions. Repayment of all external network capital is a separate milestone (§4.5).

The thirty-six focus cities were selected because they provide enough comparable data to expose the model to different market conditions. At the commercial baseline (author's calculation in the EHC economic model, evidence cut-off 31 July 2026; no public support and no below-market debt), all thirty-six cases achieve project cost coverage if a structurally suitable building can be secured at the assumed conversion factor. Thirty-five meet the senior-debt bankability threshold with an equity share of 25% or less, and thirty do so at the lowest level swept. Valletta is the clearest outlier, needing a markedly heavier patient-equity stake.

I read the pattern primarily as a map of sensitivity. Where annual market rent is low relative to building cost, the engine room has less surplus to work with. More patient equity is then needed to reduce the debt burden and restore lender coverage. Two cities with similar housing pressure can therefore behave quite differently in the model.

This is an important distinction for the architectural argument. A city may need more homes and hold substantial vacant office space, yet still produce a difficult conversion appraisal. Need, opportunity and financing do not line up automatically. The sweep makes that tension visible and helps identify where a building-specific search may be more demanding. It cannot establish that a suitable asset or willing lender exists in any city.

The representative stress scenario models a demand-led recession during years 1-7. Mid-term occupancy falls ten percentage points and commercial occupancy five. Market rents fall about 8%, with annual growth slowing from 3,0% to 1,0%. Serviced rents fall about a tenth, new lettings require concessions, and arrears double to 3,0%. Conversion costs rise about 8% and construction takes a year longer.

Seventeen of the thirty-six cities still meet the bankability threshold at 25% equity or less. Only one loses project cost coverage. The greatest strain falls on markets with low rent relative to building cost.

Further tests examine commercial income and combined shocks. Removing all ground-floor commercial rent causes one city to lose cost coverage and raises average patient equity to about 38%.

The adverse scenario raises conversion cost to 0,85 of new-build, lowers occupancy by fifteen percentage points and cuts commercial rent by one-quarter. Debt costs rise by 1,5 percentage points. Thirty-five cities retain cost coverage, while average break-even equity rises from about 8% to 43%. Under the severe scenario, twenty-five cities retain cost coverage and eleven require subsidy.

These results show how additional patient equity can offset stress, not general resilience. Cost coverage fails more widely when conversion costs, demand and financing conditions worsen together. A5 becomes more demanding, and the weakest cases need subsidy (Fig. 5.5).

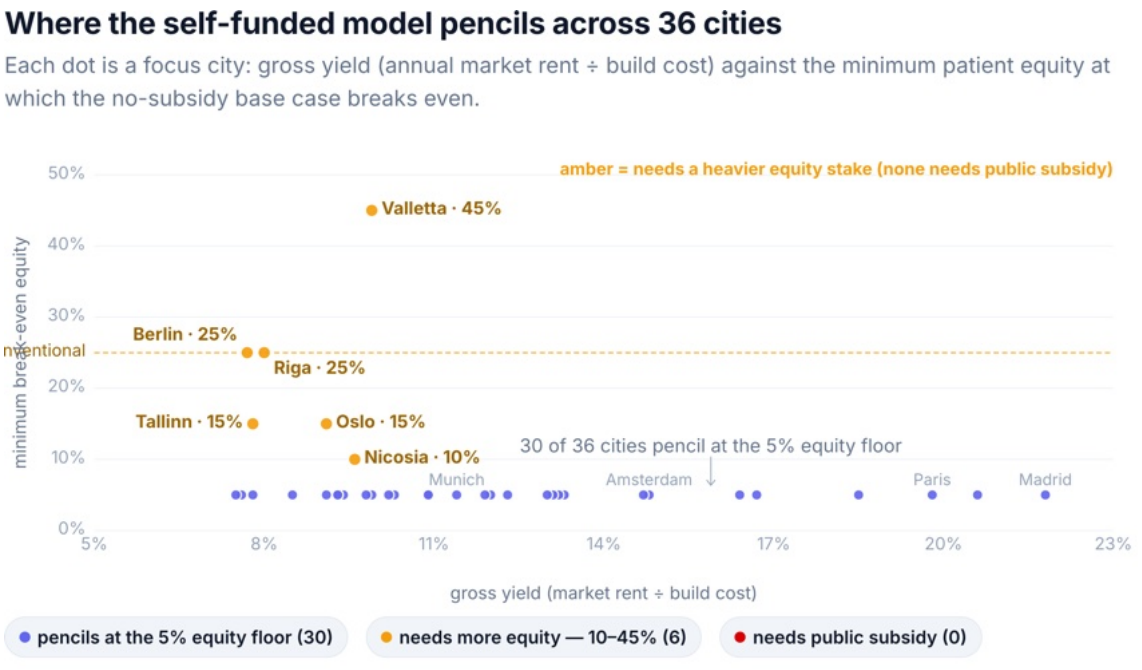


Figure 5.5 – *Cross-city break-even sweep*

The network simulation applies the building model over a sixty-year rollout. In the saved central configuration, external impact capital peaks at about €253 million. Oper-

ating profit begins in year 2, the cooperative recovers its own expenditure around year 20, and external capital is fully repaid around year 41. These milestones use the definitions in §4.5.

By year 60, the illustrative network reaches about 62 cities, 380 buildings, 27.850 homes and 139.200 members. In the recession scenario, peak external capital rises to about €404 million and full repayment moves towards year 50. These are reproducible scenario outputs, not forecasts (Appendix A.7).

Table 5.3 records what was tested for each assumption and what remains open.

Table 5.3 – How each assumption is probed in Chapter 5 and tested in Chapter 6.

Assumption	Chapter 5 probe	Evidence status after Chapter 5	Chapter 6 test
A1 – residents accept a rotating mid-term population	Model lever; exploratory conversation themes	Unconfirmed; socially sensitive	Resident survey, co-design and pilot rules
A2 – members use mid-term mobility	Interest-form signal; occupancy lever	Design feedback only; behaviour untested	Mobility-demand testing and booking behaviour
A3 – corporate or institutional users pay serviced-tier rates	Serviced-rent sensitivity; broad company-partner interest is not accommodation-demand evidence	Unconfirmed and demand-dependent	Employer accommodation-demand testing
A4 – conversion economics and entry terms support the rent structure	A4a: conversion-cost factor, city data and sensitivity analysis. A4b: leasehold-viability register and per-country equity surcharge (§5.4, Appendix G)	A4a partly probed for screened stock; building-specific. A4b instruments mapped across thirty countries; suitability and owner willingness unconfirmed	Project due diligence with owners and operators (A4a); owner outreach on entry terms (A4b)

Assumption	Chapter 5 probe	Evidence status after Chapter 5	Chapter 6 test
A5 – patient capital is available on affordable terms	Bankability sweep, equity requirement and investor-interest signal	Untested in this thesis; interest is not commitment	Investor conversations and letters of intent
A6 – associate members pay and renew dues without a home	Associate-density and dues levers (§4.5, §5.5); no interest-form option asked it	Untested; no precedent at the assumed density	Priced membership offer; recruitment and renewal tracking

Appendix A.7 documents the saved scenarios and automated checks of the headline results. The thirty-six-city tests use the commercial baseline; the network rollout uses the separate configuration saved at the citable model URL, housingcoop.eu/economic-model/thesis. Keeping these configurations distinct is essential to reproducing the reported results. AI assistance and researcher responsibility are discussed in §5.9.

5.6 The platform as knowledge-exchange intervention

The platform changes who can question the research. A visitor can open a city profile, follow its sources, compare it with another city and inspect the model's assumptions. The comparison tool is the clearest expression of this: the reader gets to make the comparison, including one I did not choose for the chapter (Fig. 5.6).

That is the knowledge-exchange intervention in practical terms. The same data support the thesis and become something another person can use. Analytics indicate which resources receive attention, while voluntary role declarations and informal conversations help refine the routes through which people might participate. The first channel concerns information use; the second concerns design feedback. Section 5.7 keeps their evidential roles separate.

The comparison tool



Author's own screenshot of the platform (housingcoop.eu).

Figure 5.6 – *The comparison tool*

In ADR terms, the intervention changes as it is used. Its early reception informs revision; it does not establish that the proposed cooperative can be financed or delivered.

5.7 Early informational demand and stakeholder-design feedback

Platform use addresses H1: informational demand for cross-border cooperative-housing knowledge. H2 concerns readiness to participate in the proposed organisation and remains untested. Table 5.4 separates informational use from self-selected design feedback.

H1 is assessed through traffic continuing beyond launch and visits to knowledge content. These criteria were defined retrospectively, not pre-registered. Visitor identifiers rotate daily, so cross-day repeat use cannot be measured. Automated activity and un-

attributed traffic further limit interpretation (Appendix D). The assessment is descriptive, not a formal hypothesis test.

Table 5.4 – Platform signals, the hypothesis each speaks to, and its status.

Signal	What it supports	Status
Organic platform traffic and knowledge-library use	H1 – informational demand	Modest support; self-selected audience
City, country and project-profile engagement	H1 – interest in comparative cooperative-housing knowledge	Useful directional signal
Timestamp-filtered profiles and stakeholder-typed declarations through 31 July 2026; exact totals generated by the Appendix D extraction	Design feedback relevant to the future H2 test – visitors can imagine a role	Self-selected; not commitment
Unsolicited LinkedIn and email outreach	Design feedback relevant to the future H2 test	Self-selected; not readiness evidence
Exploratory conversations	ADR learning and design feedback	Reflective, not formal qualitative evidence

During the twelve months from August 2025, the platform recorded roughly 66.000 visitor records and 114.000 page views. Excluding the final month's automated surge leaves about 44.000 records and 88.000 views. Visitor records are not distinct people (Fig. 5.7).

Search engines and AI assistants led the attributed referrals in the detailed series ending 22 April 2026. Most traffic was direct or unattributed, so its origin is unknown (Fig. 5.8). City, country and project profiles received attention alongside the knowledge resources. Timestamp-filtered interest forms contain 121 profiles and 183 declarations across six roles; Appendix D reconciles the categories.



Figure 5.7 – *Platform reach since launch*

Taken together, the record provides modest support for H1: an audience is looking for this knowledge, and part of it reaches the platform through attributed search. The city and country profiles matter here because they are the public face of the compilation work, not simply pages promoting the cooperative proposal.

The next inference is much harder. A person exploring a city profile may be a prospective resident, a researcher or someone with no intention of joining anything. An expression of interest takes more effort than a page view, but still leaves the actual terms untested. I therefore use the stakeholder mix to shape the questions in Chapter 6, not to count a founding coalition in advance (Fig. 5.9).

The thirty-six company-partnership declarations show why this restraint matters. They do not count distinct committed companies, and the category does not ask whether an employer will purchase accommodation. A company might want to supply materials or support the mission without needing a single mid-term flat. Paid membership, supply collaboration and serviced-tier purchases consequently require separate tests.

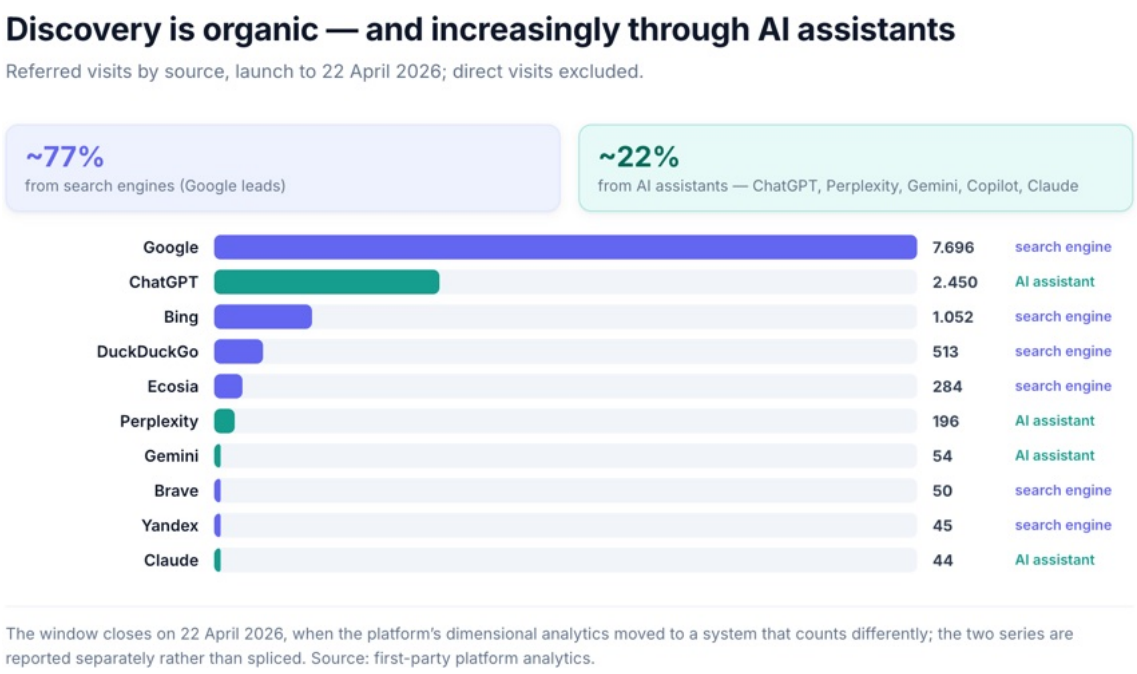


Figure 5.8 – *Discovery channels*



Figure 5.9 – *Stakeholder-typed interest*

The engagement register records conversations with representatives of thirty-four organisations, separately from three roundtables (Appendix D.7). These conversations were unstructured and unrecorded. They informed design but were not collected as formal qualitative evidence and do not test H2.

The conversations suggested interest in pan-European exchange and a digital-capacity gap among smaller cooperatives. They also identified access to buildings, land and patient capital as constraints. Other themes were investor openness to a European vehicle, limited capacity to coordinate mixed use, and interest in reuse despite its complexity. These reflections shaped the questions for Chapter 6 (Fig. 5.10).



Figure 5.10 – Exploratory conversations

5.8 Evaluation against Design Science and Action Design Research criteria

What, then, has the work achieved? The strongest answer concerns utility. A reader can now take the EHC's financial proposition apart, change an assumption and see what follows for a particular city. That is a more useful object of disagreement than a general promise that cooperation and conversion will make housing affordable. Table 5.5 records the assessment against the research criteria.

Quality rests on a different kind of evidence: source records, explicit settings and saved scenarios that return the same results when rerun. Those features make errors easier to identify and claims easier to examine. They do not certify the underlying data or prove that the chosen assumptions are right. A calculation can be reproducible and still depend on a cost estimate that a building survey later overturns.

Real-world effectiveness remains the least established part. The model shows where the design could work and how much additional capital particular stresses demand. The platform shows a limited audience engaging with the knowledge around it. Neither gives the EHC an occupied building. Keeping those achievements in proportion allows the research to make a positive contribution without borrowing certainty from a future pilot.

Venable et al. (2016, p. 81) distinguish artificial evaluation from evaluation in real use, and formative evaluation from final assessment. This study is artificial and formative: it uses real city data under controlled model assumptions to identify weaknesses and improve the design. Evaluation with residents, owners and lenders belongs to the next phase (Fig. 5.11).

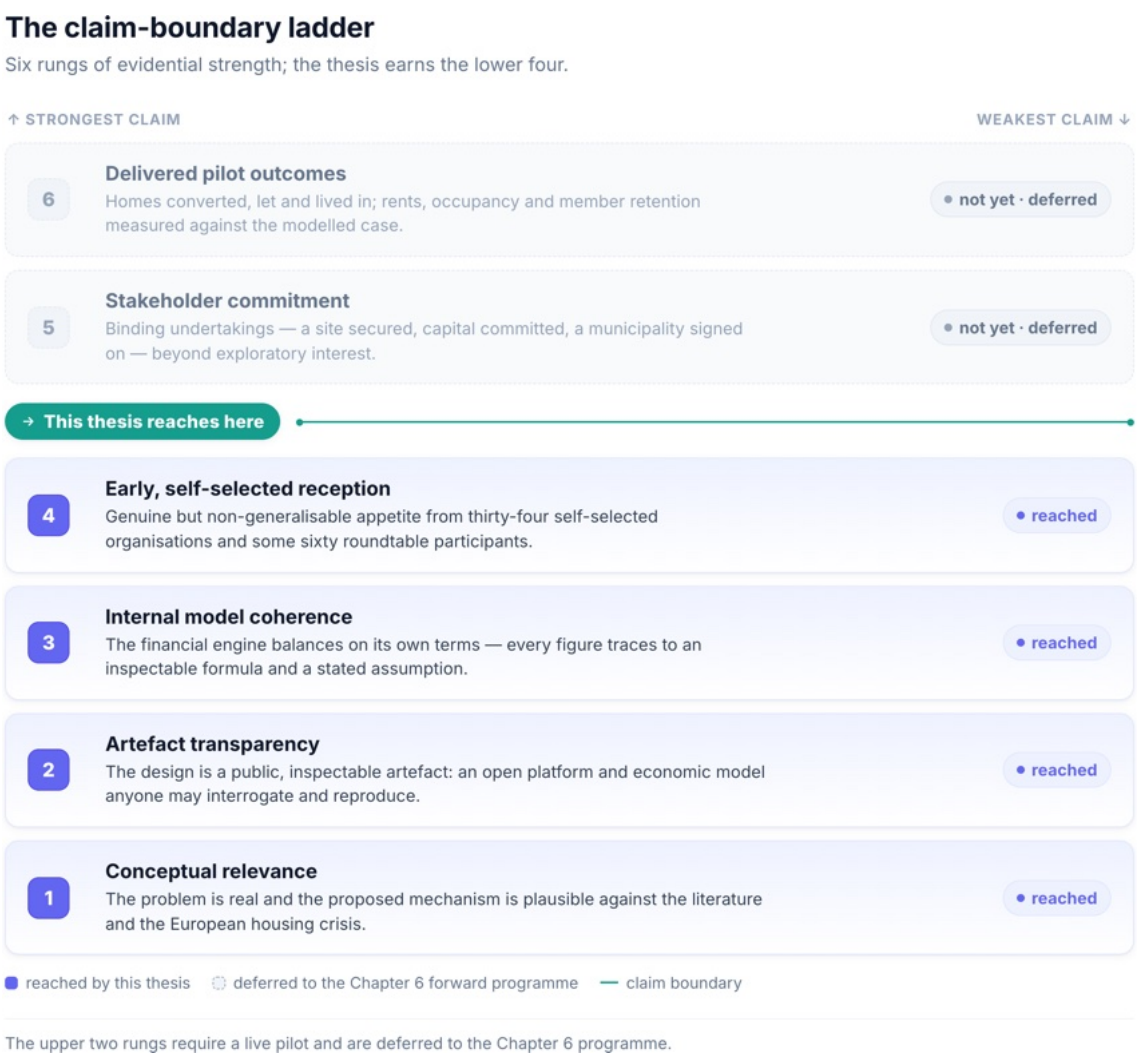


Figure 5.11 – *The claim-boundary ladder*

Table 5.5 – The designed artefacts evaluated against the Design-Science criteria.

Criterion	The economic model	The data pool and platform	Evaluation status
Utility	Makes cost-rent, banka-bility, equity need and sensitivity visible for each city	Creates a public, cross-border knowledge and data layer for co-operative housing	Demonstrated in Chapter 5

Criterion	The economic model	The data pool and platform	Evaluation status
Quality	Deterministic engine; saved scenarios; explicit levers; reproducible outputs	Curated primitives, source fields, click-to-source profiles and documented limitations	Demonstrated, with curation caveats
Internal coherence	Cross-subsidy closes under stated assumptions and stress tests reveal where it weakens	Data structure supports the model and public profiles consistently	Partly demonstrated
ADR learning	Model sensitivities identify which assumptions matter most	Platform reception informs artefact iteration; H2 remains untested	Useful for Chapter 6
Real-world validity	Depends on residents, investors, partners, buildings and lenders acting as assumed	Demand signal is self-selected and non-representative	Not established; deferred to Chapter 6

Transferable design knowledge.

The artefacts suggest five design propositions for testing beyond the EHC case:

1. Protect the cost-rent core. When long-term homes cover their full operating and financing costs, ancillary surplus can support entry equity, reserves, impact investor retirement and replication.
2. Separate local stewardship from network infrastructure. Resident-controlled local vehicles hold and operate the assets; the cross-border layer pools capital, data, standards, membership and learning.
3. Model the failure frontier. Scenario work should identify where bankability and project cost coverage fail, not present one forecast as a prediction.

4. Keep behavioural assumptions outside the calculator. Sensitivity analysis shows consequences; resident, owner, lender, employer and investor behaviour needs field evidence.
5. Use geographic rankings as search tools. City scores prioritise investigation. They do not replace building-level feasibility or local institutional commitment.

Sustainability evidence matrix.

Table 5.6 takes each dimension of the §1.2 definition in turn.

Table 5.6 – Sustainability evidence matrix: what is established, and what a pilot must measure.

Dimension	EHC mechanism	What this thesis establishes	What remains open	Pilot metric
Economic	Cost-rent homes, mixed-tenure surplus and patient-capital retirement	Conditional internal coherence and explicit bankability / project cost-coverage boundaries	Real asset price, finance terms, conversion cost and operating performance	Cost-rent/market ratio, DSCR, equity requirement and cost variance
Ecological	Adaptive reuse, retained structure and sufficiency-oriented shared space	Literature- and design-level plausibility	Building-specific whole-life-carbon and operational-energy result	$kgCO_2e/m^2$ against a new-build counterfactual, operational energy and retained structure
Social	Democratic governance, commons, allocation and contribution rules	Institutional and spatial mechanisms are specified	Observed resident outcomes and distributional effects	Access profile, participation, satisfaction, perceived fairness, conflict and tenancy stability

The combined evaluation justifies structured field testing: the design is sufficiently explicit to identify what must be tested, without establishing that the required actors will participate.

5.9 Limitations, reflexivity and handover to Chapter 6

The main limitation is the gap between calculated outcomes and observed behaviour. The tests show consequences of assumptions, not whether those assumptions hold. Data comparability (§5.3), changing support schemes (§5.4) and self-selection in platform use (§5.7) further restrict the conclusions.

Access deserves particular attention. The design asks residents for money at entry and time during occupancy. Households without savings, secure residence status or discretionary time may be excluded. The support mechanisms in §4.4 can be costed, but their adequacy cannot be established inside the model. A pilot must examine who can actually enter and remain.

My combined role as designer, operator and researcher creates a further difficulty. I know how the model was assembled and can revise it when a weakness appears. That access is useful, but it also makes it easy to explain an unwelcome result away as something the next version will solve. The saved configurations limit that freedom: the thesis must assess a defined object, even while the live project continues to change.

Large language models supported coding, literature and data discovery, and prose editing. They made a more extensive instrument possible within the available time, while adding their own need for checking. Responsibility for the research design, assumptions, sources and interpretation remains mine. Visible source records and reproducible scenarios allow others to scrutinise the work; they do not turn the act of building it into independent validation.

The result is a proposal that can now be questioned more precisely. Chapter 6 takes those questions to the people and buildings the model has so far represented through assumptions.

6 Implementation Strategy and Next-Phase Research

At some point, the model has to meet a building whose owner can say no. It also has to meet residents who may reject the contribution, a developer who will price the risk differently, and investors with their own understanding of patience. That is the next step for the European Housing Coop (EHC). The calculations have made the questions more precise; they have not answered on anyone's behalf.

This chapter sets out how to begin that encounter. The aim is a first pilot capable of teaching us something, with enough evidence at each stage to justify the next commitment. City selection helps direct the search, stakeholder tests give it substance, and the decision gates leave room to change course.

6.1 From design to validation

The thirty-six-city tests show how the design behaves under its assumptions. The next research cycle asks whether people will accept those terms and whether a particular building can support them. That changes the character of the inquiry. An occupancy rate can be adjusted in the model; a household must decide whether the home is worth the rent, equity contribution and obligations attached to it.

I therefore treat this chapter as a research programme with an implementation pathway, rather than a business plan whose destination is already settled. The wider 104-city ranking helps locate the work. It does not extend the financial findings to every city in that universe, and a high score cannot stand in for a local partner or an owner agreement.

6.2 Assumptions, stakeholders and tests

The six assumptions do not all call for the same kind of answer. Residents can explain what would make mixed-tenure life acceptable, but cannot establish a conversion cost. A developer can assess a building, but cannot promise that members will use its mid-term flats. Table 6.1 assigns each question to the evidence needed next (Fig. 6.1).

As the offer becomes more concrete, the evidence should become harder to give casually. A survey can reveal objections and preferences; a reservation on stated terms tells us something different. Letters of intent from employers or investors may help narrow the gap, although their conditions still matter. For A4, the test must reach meas-

ured drawings, an appraisal and owner terms. Enthusiasm for conversion in general is no substitute for finding out what this building requires.

Table 6.1 – Minimum next-phase evidence per assumption, and the decision implied.

Assumption	Minimum next-phase evidence	Decision implication
A1 resident acceptance	Survey and interview evidence that mixed long-term and mid-term occupancy is acceptable under specified rent and contribution conditions	Proceed with mixed-tenure design or revise allocation and community rules
A2 mobility use	Sign-up behaviour or survey evidence of sufficient interest in mid-term mobility	Keep the mobility engine or reduce reliance on it
A3 serviced-tier demand	Letters of intent or paid reservations from companies for their (future) employees at target rates	Include the serviced tier or rely more on individual mid-term demand
A4 conversion, entry terms and delivery	A candidate building with preliminary feasibility (A4a), an owner willing to grant a long leasehold or contribute in kind (A4b), and a capable local partner	Move to pilot preparation or change city, asset type or partner model
A5 patient capital	Indicative commitments within the return band, tolerant of the early trough	Begin capital structuring or reduce scale and lean on public support
A6 associate membership	Priced sign-ups and first-year renewals at the stated dues and assumed density (Appendix E.5)	Keep the assumed density or re-price the offer, cut central costs and slow expansion

Paid company membership requires a separate test alongside A1-A6. Recruitment should test the proposed fit of mission-aligned, non-listed family-owned suppliers, architectural practices and proptech firms against other ownership forms. Family ownership alone proves no advantage. A priced offer must distinguish shares, dues and supply commitments from employee accommodation under A3. Appendix E specifies payment and renewal measures. Weak uptake requires a revised, funded umbrella budget.

The sustainability tests run across these groups. Table 5.6 supplies the indicators for whole-life carbon, space use and resident outcomes. A pilot must measure these alongside its financial performance.

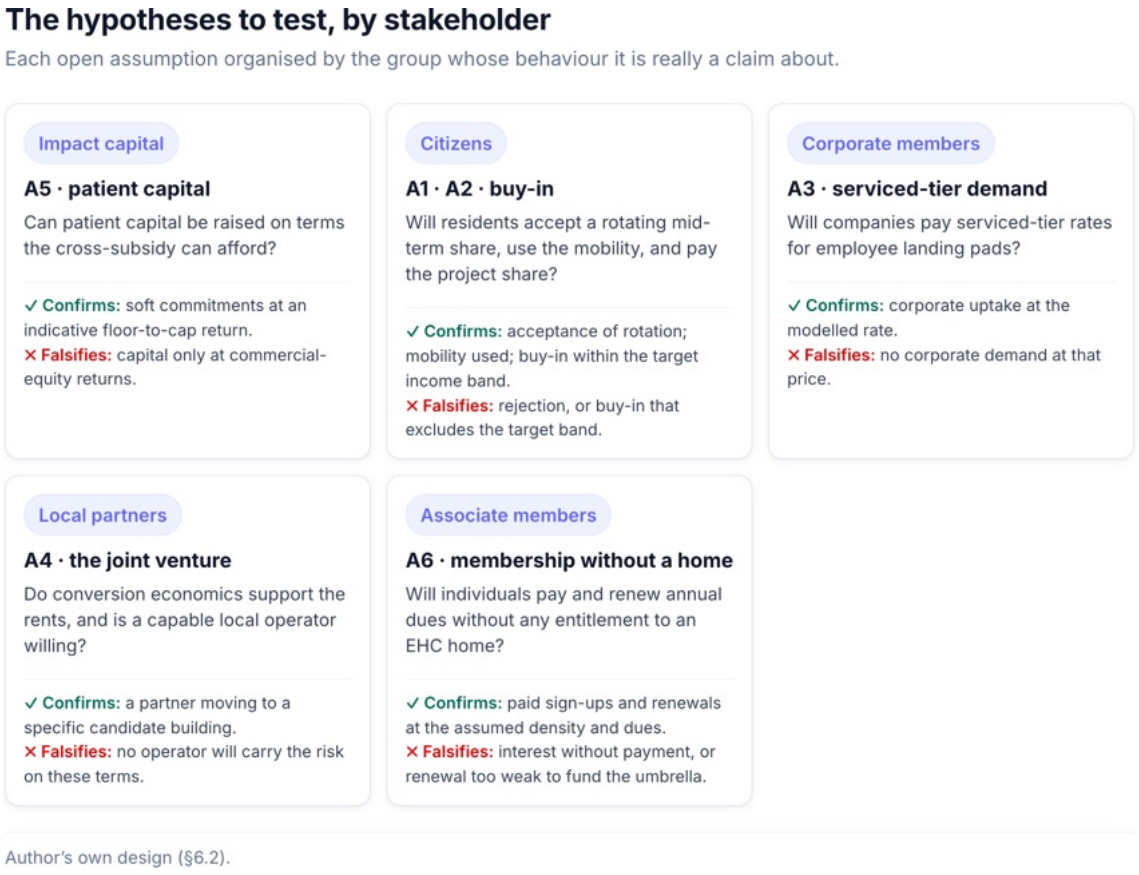


Figure 6.1 – Hypotheses by stakeholder group

6.3 The pilot pathway

A pilot gives these questions an address. It means one conversion with a capable local partner, stated tenure and governance terms, and monitoring from appraisal through occupancy. The project should test the EHC's combination, including its affordability

trajectory, without being asked to demonstrate continental scale before the first homes are occupied.

Preparation begins with local delivery capacity and a plausible owner route. The order matters because each step costs something, and the expensive commitments should follow the evidence. Brownfield practice places similar weight on long-term relationships, the right skills and incremental risk reduction (Chartier et al., 2025, p. 37). Here that becomes a practical discipline: one building before a portfolio, and a credible appraisal and resident group before major expenditure (Fig. 6.2).

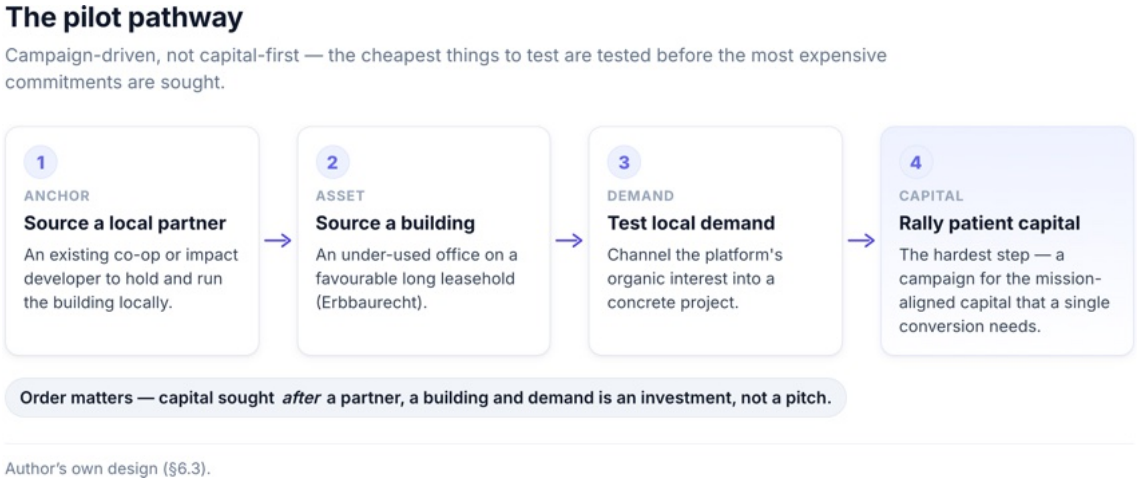


Figure 6.2 – *The pilot pathway*

1. **Screen the candidate.** Apply Table 4.1 through measured drawings, concept layouts, a conversion estimate, preliminary planning advice and a building-specific model run. Compare central, local-partner and specialist-led appraisal to establish a reliable, affordable process.
2. **Test project-specific demand.** Present actual rent, equity and participation terms to prospective residents. Assess acceptance of the tenure mix and shared space, credible resident-equity subscriptions and likely mid-term use. A waiting list alone is insufficient.
3. **Agree entry terms.** Once preliminary feasibility and demand are credible, seek owner heads of terms for mortgageable leasehold or an affordable purchase. An in-kind contribution remains an exceptional possibility. Reappraise the project if terms depart from the baseline.
4. **Structure capital.** Assemble resident shares, patient Fund equity, senior debt and development bridge finance, with public support where available. Settle the legal receiving structure and regulatory requirements before fundraising (§4.7).

Test company membership on specified shares, dues and activation conditions; contract supplies separately.

5. **Complete design and consent.** Undertake resident co-design, detailed design, change-of-use and building approvals, then the construction contract. The developer must accept the appraisal and its assigned cost and programme risks.

The commitment gate follows the first two stages. Neither a suitable building without credible demand nor an interested resident group without a feasible building justifies substantial project expenditure. A failed candidate should therefore leave the programme with a bounded appraisal cost and something learned about the search, rather than an acquisition it must now find reasons to defend.

This is also where the partnership becomes real. A local development partner may welcome the European idea but lack capacity for this particular conversion. A specialist company may be willing to undertake the first screen without wanting a longer operating role. The pilot should establish who can carry each task on clear terms, allowing development and operation to sit with different organisations where appropriate. The first project is testing that working relationship as well as the building.

6.4 Selecting the pilot cities

A European proposition still has to begin somewhere. The search covers the hundred largest EU cities by population plus the remaining member-state capitals: 104 cities across all 27 states. This is a wider opportunity universe than the thirty-six-city financial test set.

The readiness index brings ten equally weighted components into one comparison (Table 6.2). All 104 cities carry local market data, so every one is ranked on it. Appendix C documents the weights and coverage. The score is a way to organise attention: where might housing need, conversion opportunity and financing conditions justify looking more closely?

Equal weights are a transparent starting choice, not a discovery that every condition matters equally. Re-weighting makes the priorities open to challenge. A local partner may bring information that changes the search more than a small difference between two city scores. The value of the ranking is to make the initial choice explainable and revisable.

At equal weights, high-ranking cities tend to have large rental sectors and strong housing pressure. Munich scores 72 out of 100; Berlin, Amsterdam and Hamburg score 69. Paris, Frankfurt am Main and Copenhagen follow at 68 (model snapshot, 31 July 2026; Table 6.2).

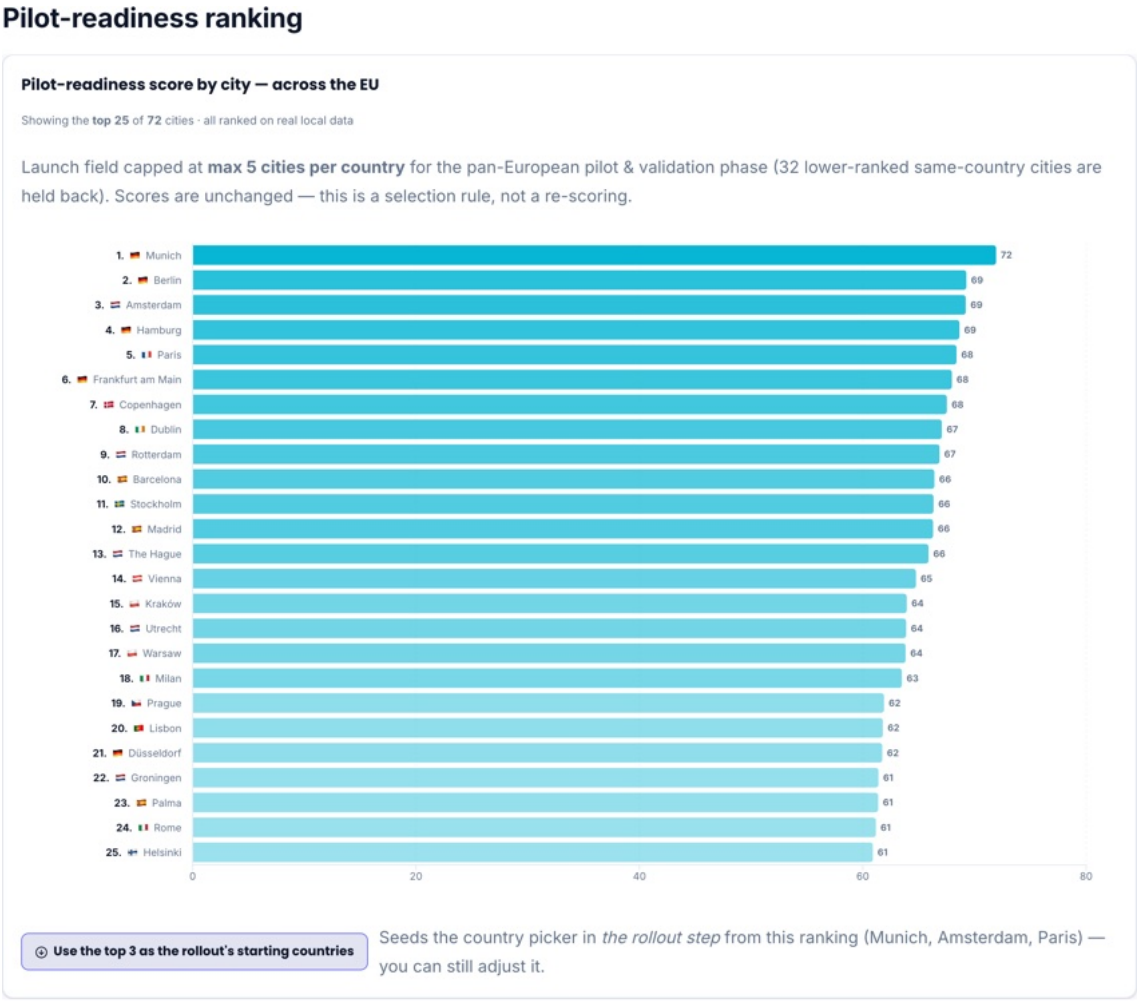
Munich, Berlin and Amsterdam form a provisional first shortlist, subject to the project evidence above. Four German cities rank in the top ten. The rollout's five-city cap per country limits concentration; several high-ranking cities are not national capitals.

Observed conversion activity provides a useful challenge. Among nine European markets, Frankfurt and Madrid had the highest conversion-transaction shares in 2020-24; Paris and Munich had the lowest (AEW, 2025). Yet Paris and Munich rank highly here. The index uses the vacancy gap, not completed transactions, and may understate planning and transaction barriers. Building screening must therefore examine both regulation and competition from commercial converters.

Table 6.2 – Pilot-readiness ranking of the EU opportunity universe: top five with component scores; score = the component mean ÷ 0,948 × 100 (Appendix C).

#	City	Score	Aff.	Cap.	Conv.	Mid-T	Pop.	Supp.	Crisis	Eco.	EU	Rent.
1	Munich	72	0,70	1,00	0,40	0,59	0,75	0,87	0,37	0,28	1,00	0,87
2	Berlin	69	0,45	0,67	0,45	0,70	0,89	0,82	0,25	0,35	1,00	1,00
3	Amsterdam	69	0,90	1,00	0,33	0,64	0,68	0,75	0,27	0,15	1,00	0,83
4	Hamburg	69	0,44	1,00	0,36	0,55	0,79	0,87	0,25	0,33	1,00	0,92
5	Paris	68	0,83	1,00	0,30	0,69	0,80	0,62	0,39	0,13	1,00	0,73

Top five of the 104-city EU opportunity universe; full ranking, column definitions and per-city coverage in Appendix C. Aff. = affordability impact · Cap. = capital efficiency · Conv. = conversion opportunity (vacancy gap) · Mid-T = mid-term demand depth · Pop. = population reach · Supp. = public support · Crisis = housing-stress severity · Eco. = cooperative ecosystem · EU = EU & currency-union access · Rent. = rental-market reach. The off-by-default local-champion overlay is omitted (Fig. 6.3).



Author's own screenshot of the platform (housingcoop.eu).

Figure 6.3 – *Pilot-readiness ranking*

6.5 Timeline, governance and decision gates

Progress depends on evidence rather than fixed dates. Exploration leads to pilot preparation, then a first conversion, further pilots and possible replication. Table 6.3 specifies each gate; Figure 6.4 shows the sequence.

Table 6.3 – Decision gates: evidence required and decision taken at each.

Gate	Evidence required	Decision
Exploration → pilot preparation	Priority city, local partner, plausible owner route and early stakeholder demand	Proceed, change city or continue exploration

Gate	Evidence required	Decision
Pilot preparation → first conversion	Building feasibility, legal structure, capital commitments, governance terms and tested company membership with a funded central operating budget	Proceed, redesign the project or pause
First conversion → second / third pilot	Operational, financial, resident and ecological monitoring; company-member renewal and supplier performance	Replicate, adjust tenure / finance mix or stop at learning pilot
Pilot portfolio → continental rollout	Repeatable partner model, capital pool, risk controls and evidence of resident benefit	Scale, narrow the geography or redesign the model

Pilot preparation must resolve the legal questions in §4.7 and Appendix I. The umbrella, project and Fund each need an appropriate vehicle, enforceable responsibilities and a funded operating arrangement. Fund classification depends on substantive investment characteristics; management and marketing requirements also depend on scale, leverage, redemption terms and investor type. A cooperative or member-only pilot cannot assume exemption. The assessment must precede fundraising.

The role allocation in §4.5 becomes contractual at this stage, including separate development and operating duties where different organisations perform them.

The next phase should be documented as research while it is being delivered. Appendix E provides the stakeholder instruments, Appendix H the building evidence register, and Table 5.6 the indicators to follow into occupation. A research diary should record why the design changes, including the alternatives rejected along the way. Otherwise the completed project may tell a tidier story than the decisions that produced it.

The ethical difficulty becomes sharper once the proposal has an address. Someone joining a research conversation about housing may reasonably hope it will lead to a home. Consent and clear explanations of data use remain necessary, but so does an honest account of what participation offers. Research interest, a conditional reservation and an allocation decision are different relationships. The programme must make that distinction understandable to participants, not merely record it in its own files.

Unsuccessful tests deserve the same care. A household declining the equity requirement or the shared-living arrangement is providing information the design needs. The process should allow that answer without treating the person as insufficiently committed to cooperation.

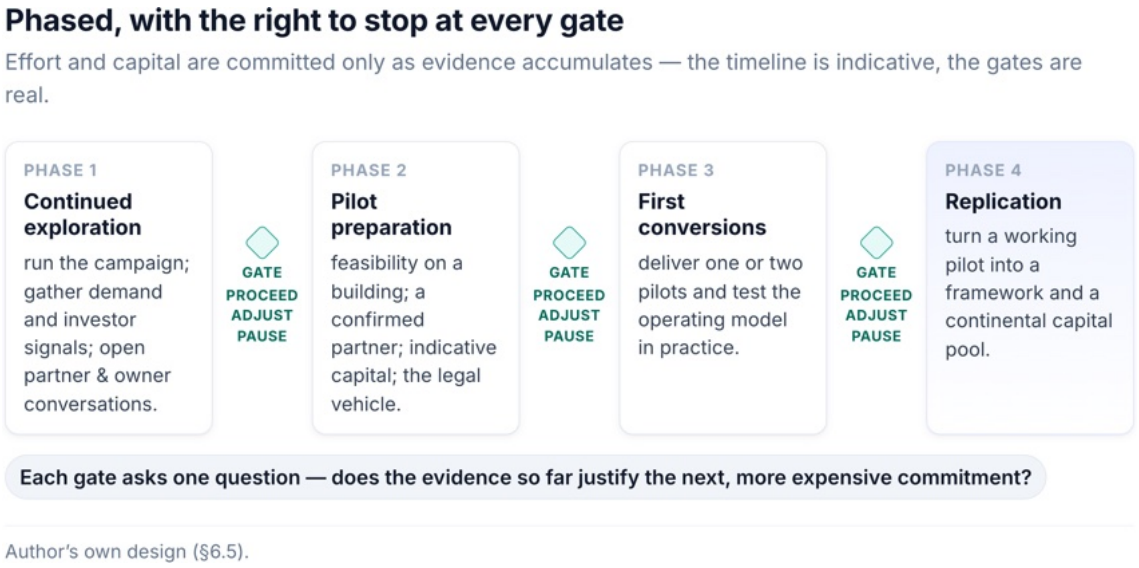


Figure 6.4 – *Timeline and decision gates*

6.6 Alternative pathways if assumptions fail

Failed assumptions require a revised design and a new appraisal. If residents reject rotating occupancy (A1), test a predominantly long-term building with less ancillary income. If member mobility is weak (A2), lower the assumed occupancy and mid-term share. If institutional users reject the price (A3), test individual demand or remove the serviced tier. In each case, recalculate entry-equity support and financing needs.

If conversion costs fail A4a, change the building or market; consider new-build only where reuse cannot compete. If owner terms fail A4b, renegotiate or reappraise at the actual acquisition cost. The leasehold adjustment in Appendix G does not price that loss of favourable terms. Replace an inadequate delivery partner. If A5 fails, reduce scale, slow the programme or seek public support.

If companies will supply projects but will not pay membership dues, retain suitable suppliers under ordinary contracts and revise the umbrella's funding plan. Slower recruitment, lower fees or non-renewal must be reflected in network cashflow and Fund contributions before expansion. A viable building cannot stand in for a funded umbrella.

The uncomfortable possibility is that several concessions are needed at once: a different building, more public support, fewer mid-term flats and a smaller central organisation. At that point the programme has to ask whether it is still testing the same useful proposition, or merely keeping a project alive. The decision gates are there to make stopping or narrowing a legitimate outcome.

A successful pilot would justify further testing, with the next building asking whether the result can be repeated elsewhere. That is a slower conclusion than a European rollout announcement. It is also the one this thesis can responsibly support. The contribution survives a changed route because the assumptions and the reasons for changing them remain visible.

7 Conclusion

The empty office and the household looking for a home remain the starting point. This thesis asked whether a pan-European cooperative could connect them while addressing affordability, carbon and shared urban life. Its contribution is to make that proposition concrete enough to test – and to show what must hold before it can become a home.

The economic argument is that long-term homes could cover their modelled costs while patient impact capital is gradually repaid. The ecological argument rests on keeping suitable structures and making more careful use of space. The social argument puts residents inside the decisions about their homes and provides room for shared life. The model can examine the first under stated conditions; the other two still need building-level and resident evidence. A common room is a design choice. Whether it becomes part of a supportive community is something people will determine.

7.1 What this thesis contributes

I have not proposed a new form of cooperative ownership or invented adaptive reuse. The contribution lies in bringing existing mechanisms together across borders: conversion, mixed-tenure finance and local resident control within the European Housing Co-op (EHC). The design makes their dependencies visible, especially suitable buildings on favourable terms and enough patient capital to finance them.

The six assumptions, A1-A6, give that proposal a form that can be challenged. Each is set against the literature, platform evidence and model results, with its limits left in view. The diagnosis of Europe's housing crisis explains why the combination is worth examining. The economic model, data pool and public platform make it possible to examine it. Chapter 6 sets out the pilot inquiry; §5.8 and Appendix J identify transferable principles, formalised using Gregor et al. (2020, p. 1633).

The baseline achieves modelled project cost coverage in all thirty-six cities, and thirty-five meet the bankability threshold at no more than 25% equity. The wider finding is where the combination works under the model's assumptions, and where it needs more equity or public support. Every actual building still requires appraisal. In Gregor and Hevner's (2013, pp. 345, 347) terms, the contribution is an *exaptation*: established solutions extended to a new problem. Here, cost-rent tenure, cooperative ownership,

adaptive reuse and separate project vehicles are combined to address affordable housing across European borders.

The EHC as a societal-transformation design.

The EHC's wider ambition is an open Europe made tangible in everyday life. Chapter 2 links housing insecurity to weakened cohesion, constrained mobility and institutional distrust (§2.3). An unconventional alliance of residents, cooperatives, municipalities, companies and patient investors could respond through building a network of homes people can afford and govern. Resident control could strengthen democratic practice; shared membership could sustain belonging across borders. These are possible contributions to European cohesion, not demonstrated effects (Fig. 7.1).

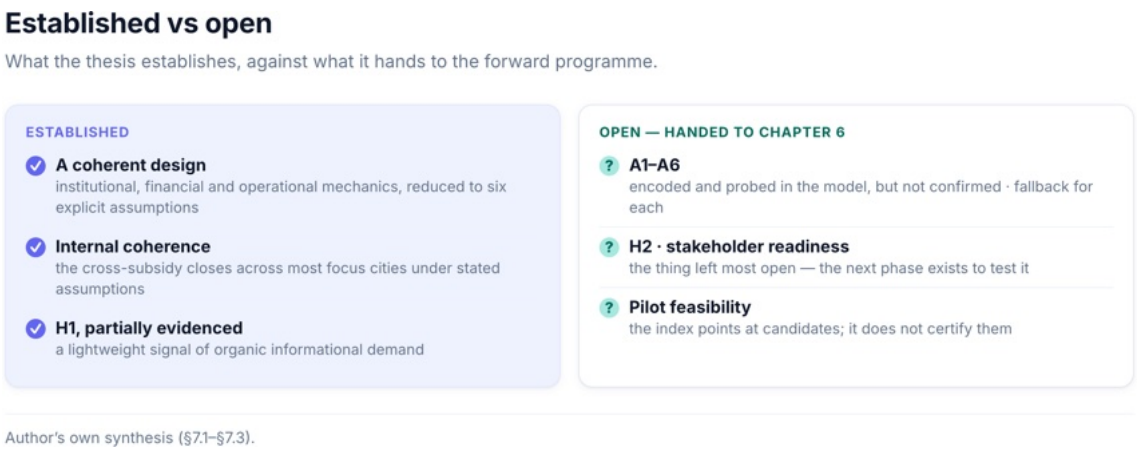


Figure 7.1 – *Established vs open*

7.2 What this thesis does not claim

There is no occupied EHC project behind these results. I have not demonstrated its cross-subsidy in operation, secured stakeholder commitment at scale or established the feasibility of a pilot in a particular city. The scorecards describe the design under stated conditions. The city ranking directs investigation. H2, stakeholder readiness, was not tested.

Nor has the access problem disappeared. Cooperatives can become provision for a relatively secure middle, while member authority may weaken as an organisation grows (Ferreri & Vidal, 2022, p. 150; Lang & Roessl, 2013). Lower entry contributions and anti-speculation covenants address parts of that problem, but cannot settle it on paper. A pilot must show who gets through the door, who remains outside and whether residents retain a meaningful say once ordinary operation begins.

7.3 What remains open

The next answers must come largely from outside the model. Screened conversion costs give A4a the strongest evidential base, but the owner terms in A4b remain unresolved. An available leasehold instrument is not an owner willing to offer it cheaply. The European Investment Bank's evolving mandate provides grounds to explore patient finance and framework debt, without confirming A5 on the required terms (European Investment Bank, 2025, p. 9).

Residents must be heard directly on mixed-tenure life and mobility under A1 and A2. Employer demand under A3 also deserves early attention: it matters to the serviced tier, and the evidence for this particular offer remains weak. A6 asks a different question: will enough people keep paying for membership without receiving a home?

The next cycle must replace the self-selected platform audience with structured engagement, deepen comparison with MOBA, LiM, Zurich, Vienna and the Nordic movements, and select the legal vehicle against a real building and jurisdiction. LiM remains a cautionary case: a transnational cooperative form can be established, yet still fail to produce a durable operating model (§4.7). Chapter 6 organises these unresolved questions into tests and decision gates.

7.4 Reflection: researcher and practitioner

A word on where I am writing from. I am not a detached observer of the EHC: I designed the model, built the platform, and would carry the venture forward. The value is access and momentum – the practitioner role enabled the construction of the instruments and access to the conversations behind them.

The risk is motivated reasoning. Someone who wants the model to work can reach for convenient assumptions, read the analytics generously, and hear commitment in ordinary politeness. I cannot remove that risk by acknowledging it. What I can do is expose the assumptions (§4.8), keep contested settings adjustable and show where the model fails. I keep informational demand separate from participation feedback. Whether those safeguards are adequate is for others to judge as well as for me.

7.5 The question, answered

The answer to the research question is conditional, but it is now specific. On **supply** (SQ1), the EHC could turn suitable under-used buildings into homes while retaining

structure, subject to each building's feasibility (Stiernon et al., 2023; Urban Land Institute, 2025). On **finance** (SQ2), long-term homes cover their modelled costs through resident charges. Patient impact capital supports the early network, peaking near €253 million and being fully repaid around year forty-one in the saved baseline scenario. These are modelled outcomes, not commitments (author's calculation in the EHC economic model; Appendix A). Cost coverage does not settle access: both the entry contribution and the monthly charge must be affordable to the household.

The **pan-European premise** (SQ3) is that capital and learning can cross borders while control of everyday housing remains local. A shared pipeline could give individual projects access to resources they would struggle to assemble alone. On **demand and readiness** (SQ4), the platform provides modest support for informational demand, H1. It leaves willingness to co-found, finance or deliver the organisation, H2, untested. The **pathway** (SQ5) makes that the next task, through a ranked search and a staged pilot process dependent on local partners, workable owner terms and patient capital.

Taken together, these answers give the proposal enough definition to take into the world and ask where it breaks (Fig. 7.2). I have not shown that the cooperative will form or that its first building can be delivered. I have shown how the proposed combination can be examined, what it depends on and what evidence should precede further commitment.

I want to take the EHC towards a first pilot beyond this thesis. I want to see a housing model come alive that helps turn Europe into a canvas of opportunities: enabling more of us to live wherever adventure, love and work take us throughout our lives, without losing access to a home or community. Suitable buildings, workable terms and patient capital remain necessary. Whether the EHC can bring them together in service of that freedom is the next stage's task.

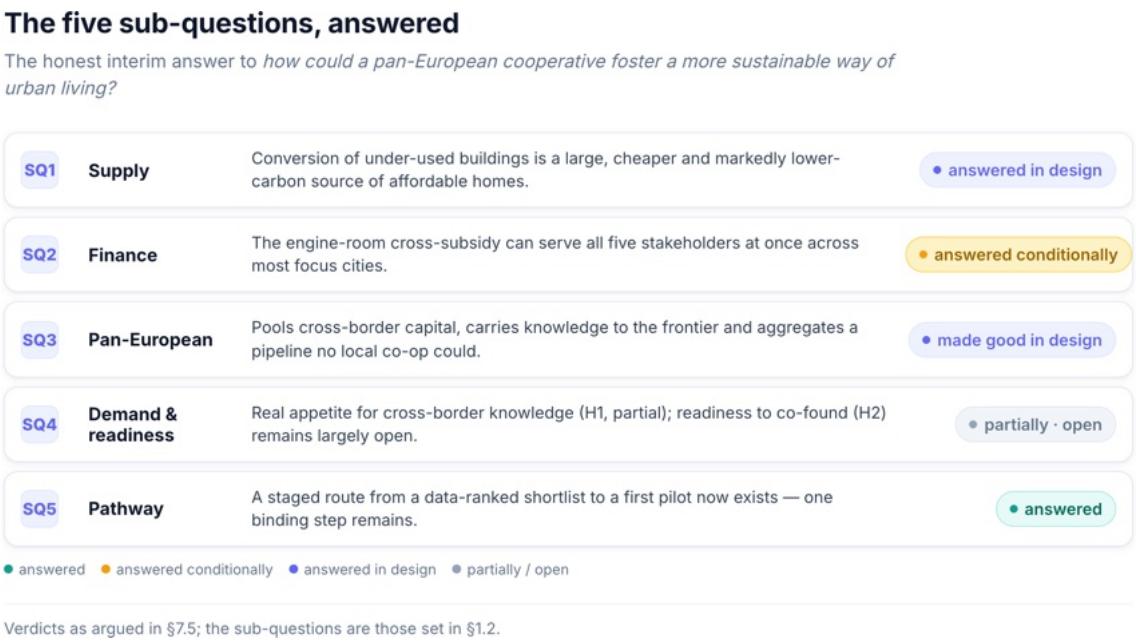


Figure 7.2 – *The five sub-questions, answered*

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Appendices

The main chapters make the argument; these appendices let the reader look behind it. I set out how the economic model works, where its data come from and how the pilot-readiness index orders the search. The platform record and reflective design feedback show what I could learn before a cooperative exists. The instruments for later fieldwork make equally clear what still needs to be tested.

Throughout the appendix set, the design rests on six assumptions (A1–A6): resident acceptance of the rotating mid-term population; member mobility; serviced-tier demand; acquisition and conversion economics; patient-capital availability; and associate-member recruitment and renewal without an entitlement to a home. A4 retains its separate works and entry-terms limbs, A4a and A4b. These are six assumptions, not six validated findings. Chapter 5 distinguishes their model probes from the field evidence still required; Appendix E sets out the proposed tests.

Evidence snapshot and audit trail

I use one empirical cut-off for the assessed evidence: **31 July 2026, 23:59:59 CEST**. It fixes the record of model configurations, databases, analytics and timestamped interactions, not the life of the platform. The website and software continued to change.

Later extraction, verification and document compilation remain within that window only where they use preserved cut-off-date values. Appendix B.5 is different: it reports a post-cut-off consistency audit, and the available record does not establish that all its values match the frozen data. Later platform activity otherwise sits outside this thesis unless explicitly reproduced in a revised submission. Table A.1 records what is frozen and where each component is used.

Table A.1 – Evidence snapshot: what is frozen at the 31 July 2026 cut-off, the audit rule and where each component is used.

Component	Frozen scope	Audit rule	Thesis location
Geographic universe	30 focus countries, 36 focus cities and 104-city EU opportunity universe	Preserve the named set, exclusions and missing-data flags	Appendix B; §§5.2-5.5

Component	Frozen scope	Audit rule	Thesis location
Economic model	Commercial baseline; coherent recession; adverse and severe bundles	Re-run each configuration on its own object — the saved rollout in the frozen tool, the city sweeps over the code-level baseline — and reconcile outputs to stated assumptions	Appendix A; §5.5
Baseline outputs	36/36 conditionally achieve project cost coverage; 35/36 at ≤25% equity	Report as conditional model outputs, not forecasts	Appendix A; §5.5
Stress outputs	Recession: one fails project cost coverage and 17/36 at ≤25% equity; adverse: 35/36 achieve project cost coverage and average break-even equity about 43%; severe: 25/36 achieve project cost coverage and 11 requiring subsidy	Preserve each bundle's definition; do not mix shocks across scenarios	Appendix A; §5.5
Capital retirement	About year 41 in the baseline and year 50 in coherent recession, with positive modelled operating cash	Treat as modelled timing	Appendix A; §5.5
External registers	Support-scheme register and leasehold assessment	Retain source, date, coverage and uncertainty for every entry	Appendices B and G; §§5.2-5.4
Platform evidence	Common 31 July 2026 cut-off for headline reach analytics and timestamped interest-form records; dimensional analytics available only through 22 April 2026 because the measurement system changed	Filter every record at 31 July 2026, label the dimensional series as a disclosed subset, use the evidence for H1 and artefact iteration only, and leave H2 untested	Appendix D; §§5.6-5.8

The appendix set

Appendix A – Financial-Model Walkthrough

Supports §4.4, §4.5, §5.5. This walkthrough begins with one converted building and follows the money through it. It identifies the three lettable blocks and shared commons, each block's capital stack, the available blend of commercial, subsidised and EU-framework debt, and the way demand builds within the model.

From there, it follows cashflow and the projected market-rent discount over several decades, then the funding trough of the wider project pipeline. The five-stakeholder scorecard reports the parties' modelled outcomes; it is distinct from the six-assumption framework, A1–A6. Single-input sensitivities and combined scenarios show how financial outcomes change. A6 concerns associate density, dues and renewal at network level, so a bankable building does not establish that the umbrella can fund itself. Each cited figure belongs to a reproducible, shareable scenario. *Source: the live model (*housingcoop.eu/economic-model/thesis*) and the financial-model workbook.* Table A.2 sets out the evaluation criteria.

Table A.2 – Evaluation criteria for the designed artefacts (the standard against which Chapter 5 judges them).

Criterion	What it asks	Evidence in this thesis	Limit
Construct validity	Are the model's inputs conceptually appropriate?	Curated data pool + literature; A1-A6 named explicitly	Bounded by source quality (App. B.3)
Internal coherence	Does the model close under stated assumptions?	Break-even & multi-variable sweeps (§5.5)	Coherence is not real-world feasibility
Transparency	Can inputs and outputs be inspected?	Public live tool; click-to-source provenance; appendices	Requires the reproducibility discipline of §5.3
Robustness	What breaks the model?	Single-input financial sensitivities and combined adverse/severe bundles; associate-density and dues levers address the separate A6 network-funding dependency (§5.5)	Model levers expose consequences, not behavioural validity; no completed A6 recruitment or renewal test is reported
External plausibility	Are the assumptions plausible in practice?	Literature signals (§4.8); exploratory conversations used as reflective design feedback (§5.8)	H2 untested; real-world validity deferred to Chapter 6

A.1 How the economics are modelled – full walkthrough (detail from §4.4)

I start with one building: in the base case, an under-used office converted to mixed use. The network model then follows a pipeline of such projects. Working outwards from the building keeps the larger proposition tied to somewhere people could actually live.

The three lettable blocks differ in who funds and occupies them. Alongside them sit shared commons, about a tenth of the usable floor area, which earn no rent. All three blocks carry a proportionate share of their build cost; the homes carry their running cost. The long-term affordable block is owned by the local cooperative and its resident-members and priced at cost-rent. Patient capital funds the mid-term serviced flats and commercial ground floor, with demand drawn from the pan-European membership.

Because the homes are initially priced to cover their own full cost, the engine room's net operating surplus can do other work. It first pays the Fund's return on engine-room equity, then the EHC co-op's platform fee for the shared central services defined in §4.5. The residual first supports repayment of the building's external patient investors. Once those investors have been repaid, surplus can flow through the Surplus Pool into equity for later buildings: Repay before Replicate (§A.2). This pool is growth capital, not a budget for everyday community spending. The tool also allows part of the surplus to support a higher but bounded investor return; that is an optional setting, not the fixed-return baseline. None of these uses buys down the homes' baseline rent.

Entry-equity relief is a separate choice (§4.4). In the assessed baseline, recycled surplus replaces external impact capital in later projects; it does not reduce residents' project-share contributions. The earlier route that used a building's surplus to reduce its own residents' buy-in was removed because those residents had already supplied that capital. An optional lever instead lets a later cohort contribute a smaller share of its building's equity, with accumulated Surplus Pool capital covering the difference through the Fund. That lowers the upfront contribution but raises the rent: resident capital pays no dividend, whereas the replacement Fund equity carries the patient return. It changes the timing and form of the household's burden, rather than making the missing capital free.

None of the entry-relief routes is switched on in the assessed configuration. For the first cohort, future surplus is not cash at financial close. Relief requires an advance from committed Fund or solidarity capital, or available public support, with its amount, provider and repayment terms recorded in the pilot capital stack. A contribution from a better-resourced member towards another household's project share is a separate support route. Neither it nor the later-cohort lever establishes first-cohort funding.

This distinction also defines A1. Residents are asked to accept a rotating mid-term population whose surplus supports investor repayment and subsequent replication,

with entry relief for later cohorts only where explicitly enabled and funded. They are not promised reimbursement of their own entry contribution or an engine-room-funded rent discount. Acceptance must be tested on the actual charges, project share, contribution rules and use of shared space. The commons are costed within the building's capital and service charges (§A.5); they do not depend on a promised surplus distribution.

Costs follow core mechanism 1: conversion is priced as a fraction of new-build, using per-city construction costs and land values from the EHC Cities Database (2026). But a conversion budget is more than bricks and mortar. It includes the purchase or in-kind contribution of the building, contingency for the risks of working with an existing structure, the local developer's margin and interest accumulated during construction. The capital stack must cover that all-in cost.

I build the stack separately for each lettable block. Its sources are EHC patient capital, resident project shares, an optional local-cooperative equity contribution, commercial-tenant shares and debt. In the base case, all borrowing is at commercial bank rates. The baseline tests bankability with commercial bank debt and no direct public grant. Favourable entry terms and concessionary patient equity remain explicit assumptions. A city's real subsidy or conversion grant, an on-top concessional loan from a cooperative or development bank, or, in the mature state, an EU-supported framework facility, is layered in only where it is genuinely available, to deepen affordability or restore project cost coverage where the unsupported case fails.

The model does not simply assume that every space is full. It builds mid-term occupancy from the local member pool and the rate at which members move (A2), and commercial take-up from corporate-member demand (A3). Demand is therefore calculated within the model, although the behaviour behind it remains assumed.

Operating costs receive the same attention as the build budget. Management, maintenance, utilities and ground rent are only the beginning. The model also sets aside a sinking-fund renewal reserve for roofs, façades, heating and lifts, and allows for arrears and bad debt. The reported engine-room surplus is what remains after these modelled costs, not the more flattering gross income. The model then follows the building over several decades. Market rents grow at an assumed 3,0% a year, while cooperative charges and operating costs rise at 1,5%. The widening discount depends on that spread. The market comparison includes private area plus the household's share of

commons; a private-area-only comparison gives a different opening result (§4.4). Neither the growth path nor the discount is guaranteed by the tenure form.

Cross-subsidy needs a careful reading here. The long-term homes are initially priced to cover their own modelled costs; continued coverage depends on the later cost and rent paths. The engine room does not pay a recurring subsidy into their baseline rent.

Instead, its near-market net income supports the lender's assessment of the whole building, while its surplus pays the patient-capital return and helps build the expansion reserve. A direct transfer into the homes' rent arises only where a statutory subsidy cap prices funded units below their own cost.

The affordability argument therefore rests on the structure: conversion at a lower capital cost than new-build, patient and resident equity priced below senior debt, and non-speculative rent whose projected discount depends on relative rent and cost growth. I regard this as the stronger arrangement. The homes' baseline charge does not require the serviced flats and commercial space to out-earn their costs every year, even though the wider project's bankability and growth still depend on that income.

The rent trajectory departs from the textbook account of cost-rent, and that departure should be easy to see. Long-term rent starts at full cost, then rises at a fixed, deliberately slow rate below assumed market growth. It is not recalculated from the building's actual costs each year. Paying off the development loan therefore does not bring rent down to bare running cost, as a classical Kostenmiete eventually would.

Instead, a governance rule divides the freed debt service between a permanent rent reduction for sitting residents and a solidarity transfer to the Fund to help capitalise the next cooperative. This is the mechanism the Mietshäuser Syndikat formalises as the Solidartransfer, and the model exposes it as a single adjustable lever, its default easing the incumbents' rent by roughly half of the homes' freed service and devoting the rest to network growth. The engine room's freed service is not covered by the lever; it transfers in full, so residents receive roughly a third of the building's total freed debt service. Rents are initially cost-covering and subsequently follow the model's escalation and solidarity rules. The projected market discount depends on relative rent and cost growth; an enforceable mission lock protects against speculative repricing, not all cost shocks. The model therefore does not guarantee lifelong affordability or an eventual fall to operating cost.

A higher charge is not yet a surplus. A furnished-flat business must pay to keep its rooms occupied: reception, marketing, gaps between lets and the repeated work of welcoming new occupants can consume much of the premium. The EHC's proposed advantage lies partly in avoiding those costs.

In the design, mid-term residents arrive through a growing member network and its own booking platform rather than the open market. That is intended to keep marketing costs low and occupancy high. Stays have a modelled median near six months rather than a few nights, reducing turnover. Resident members would handle onboarding through the modest monthly contribution expected of each household, in place of a paid reception.

These arrangements explain the operating margin assumed for the mid-term block. They do not establish it in practice. The advantage over a conventional serviced operator depends on the member network and resident contribution working as intended. The two engine-room blocks consequently have different characters. The commercial let, a simple lease, is the steadier ballast. The mid-term flats offer more scope to scale, but depend more heavily on the member network delivering the assumed occupancy.

The live instrument shows the per-square-metre premium for any chosen city so the reader can inspect that assumption. If it falls towards parity with a long-term home, the mixed-tenure case fails there. Thin serviced rents or too few members to fill the flats could bring that point closer. The model should show when the extra complexity stops earning its place. As elsewhere in this chapter, these magnitudes are illustrative parameters of a designed artefact, not empirical findings; Chapter 5 probes the conditions under which the premium holds.

When setting the engine room's rents, I distinguish market inputs from design choices. The model holds the former fixed within a run and labels the latter as adjustable assumptions. Keeping that distinction visible matters more than making every input appear equally certain. The per-city market rents, construction costs and land values are of the first kind, drawn from the EHC Cities Database (2026) and shown in the live instrument with their source; the serviced premium (A3) and the policy levers are of the second. The commercial ground-floor rent sits between the two, and the model is explicit about how it is handled. No open, pan-European, city-level commercial-rent series covers the tier this design needs. Property advisers publish prime high-street and cen-

tral-business-district rents, on the order of five to sixty times residential rents. Those are not useful comparators for a member-run ground floor on a neighbourhood street.

Rather than borrow a number from the wrong market, I derive ground-floor rent from the sourced residential rent. The model uses roughly 1,2 times residential rent in most cities, rising towards 1,5-1,8 times only in the cheapest markets. There, even a neighbourhood unit can command a commercial rent well above the local housing level. I checked that multiple against secondary, neighbourhood-tier commercial rents, explicitly not prime, in Vienna, Paris, Madrid, Berlin, Warsaw and Amsterdam in 2025, where the ratio of neighbourhood commercial to residential rent sits in a band of about 0,8 to 1,3 and clusters near parity. I place the design at the upper end of that range because it combines food-and-beverage, co-working and events uses rather than a plain lock-up shop. The assumption remains adjustable for each project. The dedicated sensitivity in §5.5 tests how far the financial case survives if this rent disappears entirely. These are indicative cross-market checks on asking rents, not a formal index, so the figure is carried as the kind of explicit, inspectable assumption this section describes, not a sourced benchmark.

A.2 Capital retirement, the investor buy-out and the surplus flywheel (detail from §4.5)

Patient capital is not necessarily permanent capital. Even a mission-aligned investor will usually want a credible route back to the original investment, not only an annual return. I therefore model external equity as a stake that can leave without requiring the building to be sold.

It stays through an initial lock-up while the building stabilises, then is bought down to zero over a defined redemption window. The lock-up, the window and the cooperative's target share are all explicit levers. The timing follows the project's exposure. Cumulative cash reaches its low point around handover, and debt-service coverage is thinnest in the first operating year. Capital must therefore stay until the building is let and stabilised: roughly the development period plus a lease-up tail.

Earnings during the lock-up build a redemption reserve. When the window opens, the building uses that accumulated surplus to repay its investors first. Repay comes before Replicate. Borrowing covers only what the reserve and earnings during the window cannot clear in time. Several sources then work in parallel to retire the external stake without changing the homes' cost-rent. The cooperative gradually buys its mission-

anchor share from its own capital, not the building's budget. The building redeems the balance from its surplus, with the Surplus Pool (§4.5) directed towards its own investors before financing new projects.

Additional resident contributions towards the investor buy-out are available as a lever but switched off in the base case. Residents still supply their initial project shares. As the external stake is redeemed, their local cooperative acquires a larger economic interest without asking them for further contributions under this setting. That ownership transfer is distinct from lowering or refunding the entry contribution. Only if these sources cannot clear the stake in time does the model draw on refinancing capacity: a more equity-rich, less risky building can replace part of the remaining stake with modestly cheaper senior debt. The coupon the redeemed investors no longer draw recycles into the following year's capacity. The reported market-rate runs clear the external stake within the redemption window. Optional subsidised configurations, including Berlin with support switched on, instead reduce the cooperative's coverage backstop towards its target as the building becomes less risky. These supported cases are distinct from the no-grant commercial baseline.

Repayment changes who owns the building economically. The cooperative settles at a deliberate minority of roughly a tenth of its equity. This mission anchor sits alongside the golden share, which carries its specified control rights without an economic claim. The residents' local cooperative gradually acquires the balance, becoming the building's majority economic owner as well as its democratic one. The illustrative building run retires external equity around the fifteenth year, within the sixty-year horizon. That timing depends on its configuration and is not a contractual exit guarantee. A converted block cannot hand an investor cash on the day it is requested. Liquidity must sit at Fund level, through a revolving redemption queue across the portfolio. After the lock-up, pooled cash would meet an investor's exit: fresh subscriptions alongside buy-out proceeds and reserves from maturing buildings. The Fund temporarily holds the share until a resident or the cooperative takes it. In the modelled growing network, subscriptions and repayment flows can contribute to redemptions. This does not guarantee liquidity on demand; redemption windows, committed reserves and a funded backstop require explicit contractual limits. This is the portfolio counterpart of the permanent-minority-and-revolve choice the model carries as a lever (§4.4), and it is what lets the same patient euro pass through several buildings over the horizon rather than lie buried in one. The aggregate model follows the same rule: each building repays its own

investors before its surplus becomes growth equity. This lets me trace reliance on external impact capital rather than assume it away. The requirement peaks early, while the first cohorts remain inside their redemption windows. It then declines towards nil before the model's horizon as mature buildings both repay investors and finance the next cohort. The cooperative's own multi-year funding trough, underwritten by that patient capital and members' shares, is driven by the pace of expansion and is essentially unchanged by where each building's equity is sourced; what the buy-out-and-recycle logic changes is who ultimately holds the network's equity, not how deep the organisation's own early cash gap runs.

Where the Fund's own capital comes from matters just as much as where it goes. Members' and companies' subscribed shares remain legal claims on the cooperative. Only the deployable portion reaches the Fund: 80% in the base case, with the remainder held against redemption. Accumulated operating surplus can also be committed, but only after the cooperative has set aside about fifteen months' operating costs. That runway-first rule explains the shape of the early years: with fees not yet covering the team, the cooperative's own share of a building's patient-equity slug is a token first-loss position of about 1%, and external impact investors carry almost the whole book. The share rises to about 10% as the network scales and about 15% at maturity.

Internal capital is deployed ahead of external throughout: the cooperative's own committed capital first, then the Surplus Pool flowing up from buildings that have already repaid their own investors, with external impact capital funding only the residual those two cannot. Under the stated growth and surplus assumptions, that ordering allows internal capital to replace external funding over time. It does not establish whether investors will supply what the early years require. None of it makes the Fund a temporary vehicle. The cooperative's mission anchor is a permanent minority position held through the Fund, bought with the cooperative's own capital and not the building's, so what retires over a building's life is the external slice of the book while the vehicle itself revolves on. The at-scale run reads exactly that way: reliance on external impact capital peaks while the early cohorts sit inside their redemption windows, then is squeezed toward nil as member capital and recycled surplus displace it, which is what the network external-capital-retirement milestone of §4.5 marks.

A.3 Conversion-vs-new-build: the cost and carbon evidence (detail from §4.3)

Choosing a conversion factor means deciding how much weight to give very different buildings and studies. Gensler assessed more than a thousand office buildings across North American cities. Where conversion was feasible, it cost around 30% less than equivalent new construction and took about half the time. Only about a quarter of offices were physically suitable (Gensler, 2024). Practitioner estimates gathered by the Urban Land Institute are more cautious, putting the saving at 15-20% (Urban Land Institute, 2024). I give the European evidence greater weight. Germany's ARGE building-research institute put office-to-residential conversion at roughly €1.281/m² against €3.405/m² for new-build housing (Gniechwitz et al., 2022, p. 44). The European Commission's conversion study includes that comparison alongside completed cases at or below new-build cost. One Barcelona social-housing conversion came in about 20% below its comparable new-build (Graaf et al., 2025, p. 18). Ireland adds realised rather than estimated figures: Tuath Housing's completed office conversions delivered homes at about €309.000 and €353.000 per unit against contemporaneous new-build apartment benchmarks of roughly €411.000-460.000, realised factors of about 0,67 to 0,77, almost exactly the curated band (The Housing Agency, 2024, p. 10; Society of Chartered Surveyors Ireland [SCSI], 2021, p. 7). I do not carry the strongest benchmark straight into the model. The German figures alone imply a saving near 60%, or a factor close to 0,38. The curated per-country factor instead combines several sources and leaves a margin for fees, change-of-use difficulties and energy upgrades that a best-case comparison can omit. It therefore prices a roughly quarter-to-third saving, or a factor of about 0,70. The counter-cases deserve their own space. The Commission study finds no basis for claiming that conversion is consistently cheaper. It also finds greater cost uncertainty than in new-build: hidden defects and hazardous materials may appear only when a building is opened up (Graaf et al., 2025, p. 17).

A Brussels life-cycle study priced conversion at €1.800-2.200/m², slightly above demolition-and-new-build (Stiernon et al., 2023, p. 6). Expert interviews for the German federal building institute put conversion at best on a par with new-build, and often above it (BBSR interviews, as cited in Landeshauptstadt München, 2025, p. 20). These are not awkward exceptions to discard. They help identify when the saving should not be assumed. The distinction is whether suitability has already been established. Studies of screened candidates with reusable frames and façades and workable floor depths clus-

ter at factors of roughly 0,65 to 0,85. Studies of average or unscreened stock, or projects requiring full envelope replacement, cluster at parity or above.

The model deliberately takes the first route. Its conversion factor applies only after the suitability screening represented by the convertible fraction. Within that screened pool, the largest cost driver is how much of the façade can be kept. In the German cost-structure comparison the envelope swings between 5% and 48% of conversion cost against a stable quarter in new-build (BDA Bayern, 2025, p. 92).

The carbon evidence points the same way and is less contested. A whole-life assessment of twenty-four completed commercial-to-residential conversions in the United States, each measured against a hypothetical new build of the same size and use, put avoided embodied emissions at 39-72% below new construction, averaging 62%, closely matching the 61% average an independent Arup assessment of twelve New York office typologies reached (Urban Land Institute, 2025, p. 14). The European evidence points higher still: the Brussels life-cycle study whose cost finding is reported above put the greenhouse-gas emissions of an office converted to housing at 22% of the demolition-and-new-build alternative across stages A1-A5, the lowest of its four scenarios apart from renovating the offices in place (Stiernon et al., 2023, p. 4). The mechanism is the one that drives the cost split too: substructure and superstructure carry a larger share of embodied carbon than any other element (Royal Institution of Chartered Surveyors [RICS], 2023, p. 25), roughly 59-65% of the total in LETI's element breakdown for offices and residential buildings (London Energy Transformation Initiative [LETI], 2020, p. 26). A conversion that keeps frame and foundations therefore captures most of the available saving; one forced into structural strengthening or full envelope replacement gives much of it back.

A.4 The downturn stress test and robustness checks (detail from §5.5)

The engine room earns near-market income, so it must also face a market downturn. I expose the operating risks through mid-term occupancy, member churn, a void allowance and management costs. Market rents can also be reduced across the Years 1-7 trough, when the converted project is most exposed.

The cross-city recession described in §5.5 combines lower demand with a longer, costlier build. Mid-term occupancy falls ten percentage points and commercial occupancy five. Market rents fall about 8%, with annual growth slowing from 3,0% to 1,0%; serviced rents fall about a tenth. New lettings require concessions, arrears rise from about

1,5% to 3,0%, conversion costs rise about 8%, and construction takes an extra year. These settings belong to the cross-city test, not automatically to the separate saved network preset.

This scenario assumes borrowing costs and operating inflation ease with weaker demand. It therefore does not also impose an inflationary credit-and-cost squeeze. A separate rate-and-inflation scenario tests that different regime. Under that coherent downturn seventeen of the thirty-six still pencil at 25% equity or less, and only one crosses out of project cost coverage altogether. This is the honest cost of holding the baseline to commercial debt: a downturn bites, but as a sorting rather than a uniform collapse. Most cities retain project cost coverage, but need a markedly heavier patient-equity stake: roughly five to eighty per cent of cost. The model absorbs the dip through more patient capital rather than higher rent. Low-gross-yield markets carry the greatest strain because they began with the thinnest cushion. The structural reading is the one that matters: the tested downturn primarily raises the patient-equity requirement and deepens the funding trough. Initial cost-covering charges do not insulate residents or projects from every possible shock. That is why A5, patient capital tolerant of a long horizon, is the assumption the model's resilience leans on hardest under stress, and why, in the lowest-yield cities, patient capital paired with public subsidy is the structural condition of delivery, not an optional extra.

Two further checks probe robustness in ways a single coherent downturn cannot. The first isolates the commercial ground floor: holding everything else at the base case and lowering the commercial rent to half, then to nothing, leaves the cross-subsidy standing in all but one focus city even when the ground floor earns zero. With no commercial income at all, the patient-equity requirement rises to an average near 38%. Yet only one city loses project cost coverage. In this test, the serviced mid-term tier does most of the engine room's work; the shopfront is not what keeps the case standing. The second moves several assumptions together. Under an adverse bundle (conversion at 0,85 of new-build, mid-term occupancy fifteen points lower, commercial rent down a quarter, and debt 150 basis points dearer) thirty-five of the thirty-six still achieve project cost coverage, though the average break-even equity climbs from about 8% to 43% and one city needs public support. Under a severe bundle (conversion at parity, occupancy thirty points lower, commercial rent halved, and patient capital 300 basis points dearer) twenty-five achieve project cost coverage and eleven require subsidy. The tested individual shocks and coherent recession mainly raise the equity requirement, with most

cities retaining modelled cost coverage. A compound severe downside requires public support in eleven cases. These results remain conditional on sufficient patient capital (A5), not a claim that the design absorbs any shock. Both bundles are reproducible. The frozen configuration at housingcoop.eu/economic-model/thesis serves the model and its levers, and reproduces the at-scale rollout figures of §5.5 directly. The thirty-six-city counts reported here come from the two cross-city sweep routines in the platform repository, which compose over the model's code-level baseline; the tool's own scenario table reports the wider rollout footprint rather than the focus set, so the two should not be read against each other.

A.5 Designing for sufficiency: how the commons are costed (detail from §4.4)

A smaller private home changes the economics before it changes the furniture. There is less to buy, build and finance for each person housed, and therefore less capital for cost-rent to service. Sufficiency is part of the affordability mechanism, not an aesthetic addition to it.

The commons still have to be paid for. Their capital cost is allocated across the whole building by floor area and recovered within its charges, so the mid-term flats and commercial ground floor each carry a share. Running costs are recovered through a small per-capita service charge across long- and mid-term residents. For a given shared-space budget, more residents mean a smaller contribution per person. Members would govern the spaces rather than employ a dedicated manager; the model therefore adds no such management overhead to the building surplus or scorecard. The rooms would also be co-designed. Long-term members joining during development would help decide what belongs in the building, with the EHC bringing the perspective of the mid-term residents who will share it. Guest accommodation is proposed as a member-to-member exchange rather than a dedicated guest flat. A resident could offer a home or spare room for a short stay, matched through platform credits. This remains a future service (§4.6), separate from the dedicated mid-term flats and their revenue; any modelled access benefit is an assumption, not observed use. The home is smaller but not poorer: a good life rests on enough well-designed space, much of it shared, not on maximised private square metres.

A.6 Independently reconcilable model example: Frankfurt conversion module

This example independently checks the arithmetic used in the Frankfurt conversion walkthrough of §4.3. It tests the supply-and-cost module only; it is not presented as an independent validation of the full multi-decade cash-flow engine. Table A.3 shows the recalculation step by step.

Table A.3 – Independent recalculation of the Frankfurt conversion arithmetic (§4.3), step by step.

Step	Input / formula	Recalculated result	Check
Convertible gross area	1.230.000 m² vacant office × 30%	369.000 m²	Exact
Net residential area	369.000 m² × 80%	295.200 m²	Exact
Dwellings	295.200 m² ÷ 66 m²	4.472,7; reported as approximately 4.470	Rounding disclosed
Residents	4.472,7 × 2,2	9.840,0; reported as approximately 9.840	Rounding disclosed
Conversion cost per m²	€2.450 × 0,70	€1.715/m²	Exact
Total conversion works	369.000 m² × €1.715	€632.835.000; reported as approximately €0,63 billion	Exact before rounding
Equivalent new-build works	369.000 m² × €2.450	€904.050.000	Exact
Indicative works saving	€904.050.000 − €632.835.000	€271.215.000; reported as approximately €0,27 billion	Exact before rounding

The reconciliation shows that the published rounded values follow from the disclosed inputs without a hidden adjustment. It does not establish that 30% of Frankfurt's vacant stock is physically convertible or that €1.715/m² will apply to a specific building. Those propositions remain subject to the screening instrument in Appendix H and project-level quantity surveying.

A.7 Reproducibility manifest

If a reader wants to check a number, an assurance of transparency is not enough. This section identifies where the relevant record can be found. The economic model is deterministic: the same configuration returns the same outputs. Table A.4 distinguishes the frozen route and saved rollout from the verification routines used for the city sweeps, so each figure can be checked against the right configuration. Where I calculate a number separately rather than take it from the model, I label it as an author's calculation.

Table A.4 – Reproducibility manifest: the frozen identifiers behind the thesis's empirical and model claims.

Component	Frozen identifier	Where to verify it
Economic-model baseline	THESIS_SNAPSHOT in src/lib/economic-model/thesis-snapshot.ts — the site default captured 2026-06-16, city Berlin, EU-104 pool, committed to the repository rather than held in the database so it cannot be overwritten	Load the citable route below; its "reset" control returns to exactly this baseline
Citable model route	housingcoop.eu/economic-model/thesis	Public, no login required; a banner marks the frozen state. Verified reachable on 18 August 2026
Empirical cut-off	31 July 2026, 23:59:59 CEST (2026-07-31T21:59:59Z)	Table A.1; no later platform event, form record or model input enters the assessed totals
Analytics dimensional subset	Launch to 22 April 2026	§D.3–D.5; the shorter window is a measurement-system limit, not a different dataset
Data pool	EHC Countries, Cities and Projects Databases — 30 focus countries, 36 focus cities, 104-city EU opportunity universe	Appendix B; each field carries its own source and tier in the platform
Document build	scripts/thesis-build-all.sh –final, chaining thesis-export-md.ts → thesis-assemble.py → thesis-paginate.py → thesis-polish.py → thesis-formal-check.py	Repository; the final step re-checks length, margins, spacing, font and the mandatory front matter

Component	Frozen identifier	Where to verify it
Repository state	Branch main, commit 79f15c940 (18 August 2026)	Private repository; access for examination on request
Model figures — verification	scripts/verify-thesis-frozen-checks.ts	Asserts that the frozen configuration still reproduces every number the thesis prints — the 36-city baseline, the recession, adverse and severe bundles, and the Berlin project spine. Exits non-zero on any drift. Last run 18 August 2026: all checks reproduce
At-scale figures (§5.5) — verification	housingcoop.eu/economic-model/thesis?view=aggregate (add &preset=stress for the downside)	Read directly from the frozen route rather than recomputed, because the rollout footprint is assembled in the product. Re-verified 7 September 2026: 62 cities, 19 countries, 380 buildings, 27.852 homes, 139.210 members, €253M peak and retirement in year 41, moving to €404M and year 50 under stress
Interest-form counts — verification	Population: profiles created through the public website form, at the cut-off	Re-derived 18 August 2026: 121 profiles, 183 declarations, split 52/38/36/22/21/14 as reported in Appendix D

Appendix B – Data Pool, Sources & Focus Set

Supports §5.3 (data) and §5.4 (schemes). A cross-country comparison is only as useful as the numbers being compared. This appendix explains how I organise those numbers and keep their origins visible.

B.1 – the harmonised data layer covers the Countries / Cities / Projects schema, field definitions, coverage limits and source attribution. Each figure links to its source. The

curated-primitive → derived-indicator rule distinguishes entered base values from indicators calculated from them.

B.2 – the public-support-scheme register records the schemes behind §5.4, with one entry per focus city. Each scheme is separated into capital grant (€/m²), soft-loan rate and term, conditional rent cap and binding period. Source, access date and confidence tier stay with the entry.

The focus set and the wider rollout universe answer different questions. The 30 focus countries – the EU-27 plus the United Kingdom, Norway and Switzerland – support the broad comparison of housing and cooperative sectors in Chapters 2-3. The 36 focus cities provide the data-rich set in which I develop and stress-test the economic model (Chapters 4-5):

Amsterdam · Athens · Barcelona · Berlin · Bratislava · Brussels · Bucharest · Budapest · Copenhagen · Dublin · Frankfurt am Main · Hamburg · Helsinki · Lisbon · Ljubljana · London · Luxembourg City · Madrid · Milan · Munich · Nicosia · Oslo · Paris · Prague · Riga · Rome · Rotterdam · Sofia · Stockholm · Tallinn · Valletta · Vienna · Vilnius · Warsaw · Zagreb · Zurich.

Where to search for projects is a wider question (Chapter 6). The pilot-readiness index covers the 100 biggest European Union cities by population, plus each remaining member state's capital. That produces 104 cities with all 27 member states represented. The EU single market provides the scope for a euro-denominated capital pool; the United Kingdom, Norway and Switzerland remain in the country comparison but outside this rollout map.

Every city in the ranking has local market data (100%). Targeted research filled the last twelve gaps across Finnish, Romanian, Baltic, Czech, Slovak, Bulgarian and Italian secondary cities. The ranking therefore uses observed rents throughout rather than country-typical estimates.

B.3 – Underlying sources for the EHC Database figures. Per §5.3, every figure in the Countries and Cities databases is stored with its own source and is click-to-source on the live profiles. This appendix consolidates, at the publisher level, the named primary sources behind the indicators the thesis draws on across the 30 focus countries and 36 focus cities – around seventy recurring sources, classified by the reliability tier the database records: official (national and municipal statistics), institutional (research

institutes, central banks and sector bodies) and commercial (market advisers and listings portals). Table B.1 names the principal sources by indicator group.

Table B.1 – Principal named sources by indicator group (focus set: 30 countries, 36 cities).

Indicator group	Principal named sources
Rents (cold, furnished, serviced; absolute levels)	Eurostat; national statistical offices (INSEE, ISTAT, INE, ONS, Destatis, Statbel, SCB, Statistik Austria, CBS, STATEC, Statistik Stadt Zürich); market data (Idealista, Numbeo, HousingAnywhere, Spotahome, JLL, CBRE, Colliers, Deloitte Property Index, empirica, Deutscher Mieterbund)
Office & dwelling vacancy	Eurostat; commercial-property advisers (JLL, CBRE, Colliers, Cushman & Wakefield, Savills); national censuses (Census/Zensus 2021-22) and statistical offices
Stock & tenure mix	Eurostat; national censuses and statistical offices (CSO, ČSÚ, GUS, KSH, DZS, NSO Malta, Statistikaamet, ŠÚ SR); national EPC registries
Public, social & cooperative housing	Housing Europe; ICA Housing; OECD Affordable Housing Database; national cooperative federations (GdW, Aedes, Legacoop Abitanti, HOAS, LOSZ)
Construction costs & land values	Eurostat; Destatis; Deloitte Property Index; municipal building departments; national statistical offices
Short-term-rental & mobility flows	Inside Airbnb; AirROI Market Atlas; municipal building departments
Climate & energy performance	BPIE (Building Performance Institute Europe); national NECPs; Concerted Action EPBD; Energy Poverty Advisory Hub; municipal climate plans
Social hardship, exclusion & wellbeing	FEANTSA (Overview of Housing Exclusion in Europe); JRC EU Loneliness Survey; Standard Eurobarometer 102; national social ministries; municipal social-services counts and courts

Across the focus set roughly 3.200 curated field-values carry an explicit source. Among the recurring publishers the official and institutional tiers dominate, with commercial market data a smaller share used chiefly for current advertised rents and office vacancy – consistent with the source hierarchy of §5.3 (official statistics preferred for stock indicators, sector bodies for cooperative-specific counts, market data only for current rents).

For the cooperative-housing figures that Chapter 3 leans on, the per-country primary sources make this provenance layer concrete. Germany's stock, society count and share come from the GdW Jahresstatistik 2023. Austria and Switzerland draw on Housing Europe and Cooperative Housing International's Housing Cooperatives in Europe (2025), paired with the GBV limited-profit register and Wohnbaugenossenschaften Schweiz respectively.

For Sweden, Statistics Sweden (SCB) Bostadsstatistik supplies the share and stock, and the Bolagsverket bostadsrättsföreningar register the society count. Norway combines the same Housing Europe source with NBBL; Denmark uses Danmarks Statistik (BOL207) and ABF.

The Netherlands draws on the Cooplink and De Nieuwe Wooncoöperatie census (2024), and Spain on COCETA/CEPES with Housing Europe. Post-socialist stocks come from national statistical offices and federations: ZRSMRP in Poland, and SČMBD with the ČSÚ 2021 census in Czechia. Where a second independent figure exists, the database stores it as a cross-check, most often against Housing Europe's State of Housing series, together with the confidence tier and the derivation method, all surfaced click-to-source on the live country profiles.

A further ~430 value-components are not external sources but EHC auto-derivations: comparative indicators computed from the primitives above under the §5.3 derivation rule and labelled "EHC auto-derivation from curated primitives" on the platform. They add no new external authority and are noted here only for completeness. The full per-field, per-city provenance – exact title, year and access date – is held in the database and surfaced click-to-source on each profile page; this appendix is its publisher-level summary.

Source: the platform databases; the scheme register is held in the model for the 36-city set.

B.4 The aggregation and harmonisation rule (detail from §5.3)

Cross-national comparability is won or lost before the chart is drawn. I separate individually sourced base values – population, dwelling counts, tenure shares, rent levels and vacancy – from the indicators calculated from them. Renter share, cooperative share, per-capita measures and net-cold rents follow fixed derivations rather than being

entered again by hand. The comparison tool labels them “EHC auto-derivation from curated primitives”.

Three rules govern that process. The first is a common denominator. Stock shares are recalculated against total dwellings, so a country counting rental right-of-use cooperatives and one counting ownership shares use the same base. The dominant tenure model remains a separate classification (Section 3.2). A shared denominator makes the arithmetic comparable; it does not make the tenures identical.

The second rule concerns dates. Where sources give the same base value for different years, the most recent dated value takes precedence. The pool is therefore a recent composite, with a date attached to each field, rather than a portrait of one common reference year.

The third rule concerns disagreement. Official statistical offices take priority for stock indicators, sector federations for cooperative-specific counts, and market or consultancy sources for current advertised rents. Each curated value records the choice, while its provenance retains the alternatives.

The derivations run in the application’s data layer: Next.js and PostgreSQL over a Notion content layer. Public profiles and the comparison tool read from that same layer. The methodological gain is consistency: the same formula reaches every city and country, and the result can be traced back to its source. The limit is equally important. Differences in national definitions survive the arithmetic, and the audit below shows why even the denominator needs checking.

B.5 Deriving the cooperative tenure split, and a denominator defect (detail from the Chapter 3 opening)

Chapter 3 reports roughly 5,3 million dwellings in ownership-aligned cooperatives and 2,7 million in rental or right-of-use cooperatives. Table B.2 documents a retrospective consistency check queried on 5 September 2026 across 39 database rows, including a UK comparator; this is a database selection, not a count of EU and EFTA countries. Ten rows carry a tenure-model classification. The available audit record does not establish whether every queried value was unchanged since 31 July. This reconciliation is therefore labelled a post-cut-off audit, not part of the frozen model evaluation. It supports an indicative tenure distinction, not a fully verified cut-off-date total.

Table B.2 – Derivation of the cooperative tenure split reported in the Chapter 3 opening* (EHC Countries Database, queried 5 September 2026).*

Step	Countries and units	Total
Rental / right-of-use, as classified	Germany 2.200.000 · Austria 460.000 · Switzerland 199.000	2.859.000
Ownership-aligned, as classified	Poland 2.672.000 · Sweden 1.030.000 · Czechia 480.000 · Norway 370.000 · Hungary 220.000 · Slovakia 200.000 · Denmark 165.000	5.137.000
Adjustment: Austria's 140.000 individually owned cooperative homes moved to the ownership side (Housing Europe, 2025a, p. 8)	−140.000 rental / +140.000 ownership	—
Reported in the Chapter 3 opening	rental / right-of-use 2.719.000; ownership-aligned 5.277.000	≈ 2,7m / 5,3m

Three qualifications belong with those numbers. First, the rental figure is a floor, not a total. The audit reports 765.280 units across the 29 unclassified rows. Excluding the United Kingdom's 250.000 leaves about 515.280 in the following EU and EFTA entries: Italy 250.000, France 200.000, Finland 30.000, Portugal 15.000, Ireland 8.000, Spain 6.000, Belgium 3.500, the Netherlands 1.500, Iceland 1.000 and Luxembourg 280. Several of these are unambiguously rental or use-based — Italian *proprietà indivisa*, French HLM cooperatives, Dutch *wooncoöperaties*, Catalan *cessió d'ús* and Irish co-operative rental — so classifying them would move the cost-rent side towards roughly 3,2 million. The 2,7 million should therefore be read as the classified minimum.

Second, the aggregate diverges from the chapter's headline. Summing the audit's EU and EFTA entries gives about 8.511.280 units against the "at least 7,9 million" reported in the Chapter 3 opening. The words "at least" mean the totals need not contradict one another; they do not constitute a reconciliation. The headline follows published sector sources, while the higher database aggregate is driven mainly by Poland's 2.672.000. Differences in coverage, date and classification remain unresolved. Neither figure is adjusted merely to match the other.

Third, one denominator in the source data is wrong, and it affects a figure Chapter 3 quotes. Austria's *Total dwellings* is stored as 4.060.000, which is an Austrian household count rather than a dwelling count; the 2021 census records 4.909.410 dwellings.

The stored denominator therefore overstates Austria's *Cooperative housing share %* at 11,3% where the correct figure is about 9,4%, and it propagates into the two derived indicators computed from the same base, *Private rental share %* and *Non-market housing share %*. Denmark needs the same check (2.778.000 stored against 3.071.987 in the census), while Germany (43,4 million), Switzerland (4,62 million) and Czechia (5,1 million) cross-check acceptably against their census counts. The correction is logged on the Austrian country record; §3.2.3 avoids the defect by reporting the sector's own "more than one household in ten" rather than a share of dwellings.

Appendix C – Pilot-Readiness Index

Supports §6.4. Where should the EHC look first? The index offers an explicit way to order that search, not a verdict on where a building will work. It uses **ten equally-weighted components**, each with its own data, calculation and sources, at a default weight of 0,10:

Affordability impact · capital efficiency · conversion opportunity (the office-vs-residential vacancy *gap*) · mid-term-demand depth · population reach · public support & enabling environment · housing-stress severity (overburden + middle-class squeeze) · cooperative ecosystem · EU & currency-union access · rental-market reach.

A subjective **local-champion** overlay sits alongside these measures at zero weight. It can be switched on where an ambassador is known, rather than quietly influencing the default result.

The scope is the **EU opportunity universe: the 100 biggest EU cities by population plus each remaining member state's capital, making 104 cities with local market data**. It is wider than the 36 probing cities. The main text shows the top five; this appendix reports the top twelve. *Source:* ***`scorePilotReadiness`*** *over the EU scope of the live data pool; the table is generated from the frozen index snapshot.*

Scores use a 0-100 scale while the components use their own 0-1 scale, so the two need a stated bridge. A city's raw standing is the mean of its ten components: Munich's average 0,683. That mean is divided by the achievable ceiling of 0,948 – the mean of the best value observed on each component anywhere in the universe – and multiplied by 100. Munich therefore reaches 72, in the low-70s, and every row of Table C.1 reproduces the same way. A score of 100 would require matching the best observed val-

ue on all ten components at once, which no real city does; it is not the expected score of a promising pilot location.

I revised the earlier eight-component index in three steps. First, I separated economic viability into affordability impact and capital efficiency: how far below market cost-rent falls, and how little patient equity per home is needed for bankability. Those are related achievements, but not the same one.

I then added population reach and rental-market reach as separate components. The latter measures the share of a city that rents, and therefore the base from which the cooperative would recruit members and mid-term residents. Finally, I moved the subjective local-champion factor out of the default score. The result is ten equally-weighted, data-derived components, with the champion available as an off-by-default overlay. The earlier refinements are retained: a mid-term-demand factor (the cross-subsidy is funded by the mid-term tier, so a city must actually have a transient market), a middle-class-squeeze term inside housing stress (the EHC's audience is median earners priced out of buying yet too well-off for social housing), and a eurozone refinement of EU access (no currency risk on a long-duration capital pool).

The ranking (top twelve of the EU opportunity universe; components normalised 0-1). The leaders are closely grouped: Munich, Berlin, Amsterdam, Hamburg, Paris, Frankfurt am Main and Copenhagen sit within about four points of one another (live model, evidence cut-off 31 July 2026). They combine deep rental markets with differing financial and institutional strengths.

London, first in Europe on the middle-class squeeze, remains outside the ranking as a non-EU comparator. Table C.1 gives the top twelve.

Table C.1 – Pilot-readiness ranking: top twelve of the EU opportunity universe, components normalised 0–1; score = the component mean ÷ 0,948 × 100.

#	City	Score	Aff.	Cap.	Conv.	Mid-T	Pop.	Supp.	Crisis	Eco.	EU	Rent.
1	Munich	72	0,70	1,00	0,40	0,59	0,75	0,87	0,37	0,28	1,00	0,87
2	Berlin	69	0,45	0,67	0,45	0,70	0,89	0,82	0,25	0,35	1,00	1,00
3	Amsterdam	69	0,90	1,00	0,33	0,64	0,68	0,75	0,27	0,15	1,00	0,83
4	Hamburg	69	0,44	1,00	0,36	0,55	0,79	0,87	0,25	0,33	1,00	0,92
5	Paris	68	0,83	1,00	0,30	0,69	0,80	0,62	0,39	0,13	1,00	0,73

#	City	Score	Aff.	Cap.	Conv.	Mid-T	Pop.	Supp.	Crisis	Eco.	EU	Rent.
6	Frankfurt am Main	68	0,57	1,00	0,53	0,49	0,66	0,82	0,28	0,17	1,00	0,93
7	Copenhagen	68	0,67	1,00	0,33	0,53	0,64	0,58	0,51	0,76	0,85	0,53
8	Dublin	67	0,91	1,00	0,64	0,57	0,62	0,55	0,34	0,16	1,00	0,56
9	Rotterdam	67	0,90	1,00	0,54	0,49	0,64	0,70	0,24	0,04	1,00	0,79
10	Barcelona	66	0,96	1,00	0,24	0,62	0,77	0,75	0,44	0,18	1,00	0,34
11	Stockholm	66	0,54	1,00	0,60	0,54	0,69	0,33	0,29	1,00	0,85	0,44
12	Madrid	66	0,98	1,00	0,36	0,59	0,87	0,66	0,47	0,08	1,00	0,28

Columns: Aff. = affordability impact · Cap. = capital efficiency · Conv. = conversion opportunity (vacancy gap) · Mid-T = mid-term demand depth · Pop. = population reach · Supp. = public support & enabling environment · Crisis = housing-stress severity (overburden + middle-class squeeze) · Eco. = cooperative ecosystem · EU = EU & currency-union access · Rent. = rental-market reach. The off-by-default local-champion overlay (zero weight) is omitted.

Two forces help explain the leading cluster. German and Dutch cities offer broad rental-market reach: Munich, Frankfurt, Hamburg, Berlin, Amsterdam and Rotterdam have a large base from which the cooperative could recruit. Strong capital efficiency also lifts them, with conversion economics that work on relatively light patient equity.

EU and currency-union access adds a second advantage. Every eurozone city scores 1,00 on that component; Copenhagen and Stockholm, inside the EU but outside the euro, follow at 0,85. London, which would otherwise rank highly on the most extreme middle-class squeeze in Europe, sits outside the ranking as a non-EU comparator, as do Zurich and Oslo. Dublin (8th) still leads the whole set on the sharpest office-vs-residential vacancy gap; the high-yield Spanish cities Barcelona and Madrid sit lower in the top twelve on top affordability impact. The ranking leaves two tensions worth keeping visible. A strong cooperative culture does not necessarily produce strong unsubsidised project economics. Vienna sits mid-table on a ~5% yield: moderate patient equity is enough in the base case, but the §5.5 downturn requires a much heavier stake. Giving the ecosystem more weight lifts Vienna and the Nordic cities. That is a different judgement about priorities, not a more authoritative ranking.

Berlin shows the other tension. It is the only city with a committed-champion flag, yet reaches second without using it: the overlay has zero default weight. Its rental market, population reach and enabling environment compensate for modest raw economics. Adding weight to the champion would lift it further. A person able to carry the work locally can matter greatly, but that judgement should enter the score openly.

A ranking of only the thirty-six focus cities might simply rediscover the cities chosen at the start. Widening the index tests that concern. It now covers the whole EU opportunity universe – the 100 biggest cities by population plus each remaining member state's capital – with local market data for every city (100%). Targeted research filled the last twelve gaps, removing reliance on country-typical estimates. The wide ranking confirms the earlier finding rather than overturning it: the leading places remain established major centres, and a useful negative result persists. The cheaper regional cities of the long tail (several Romanian, Czech and Slovak secondaries) score near the bottom on low-yield, subsidy-dependent economics, so trading a primary city for a cheaper regional one does not, by itself, rescue the project case without direct public subsidy. The wider data pool does reveal a shift at the top. Scoring rental-market reach lifts German and Dutch cities with large renter populations. Five of the top ten are not national capitals, with Munich leading. Looking only at capitals would therefore miss several of the model's strongest openings.

A pre-June-2026 fifty-city re-run over the focus countries had reached the same qualitative conclusion before the universe widened. Table C.2 shows how alternative priorities change the leading group.

Table C.2 – How the top of the ranking moves under alternative weightings (EU set, max five per country; live index, evidence cut-off 31 July 2026).

Weighting lens	Top six cities
Equal weights (baseline)	Munich · Berlin · Amsterdam · Hamburg · Paris · Frankfurt am Main
Financial-viability first	Amsterdam · Madrid · Barcelona · Munich · Dublin · Paris
Cooperative-ecosystem first	Copenhagen · Stockholm · Munich · Berlin · Hamburg · Frankfurt am Main

Weighting lens	Top six cities
Housing-stress first	Madrid · Barcelona · Munich · Paris · Copenhagen · Warsaw

Appendix D – Informational Demand & Platform Design Feedback

Supports §5.7 / §5.8. What can a public platform tell me before anyone commits to a cooperative? This appendix sets out the informational-demand evidence and reflective design feedback discussed in §5.7 and §5.8, together with how the platform recorded them.

It replaces the earlier “Interview Protocols & Transcripts” appendix. No formal interviews or surveys were conducted within the thesis (§1.4, §5.7), and H2 was not tested. The figures come from reproducible, read-only extractions of the platform’s analytics and database at the 31 July 2026 cut-off. Their limits belong alongside them.

D.1 The platform and how engagement is measured

I rebuilt the platform (housingcoop.eu) from scratch in the summer of 2025 and launched the new version in August 2025. It uses a Next.js application, Notion for content and PostgreSQL for structured data. Its predecessor, a simple public page online since the summer of 2024, had no comparable measurement system and sits outside this record.

The rebuilt platform hosts the curated knowledge library, city and country profiles, the /compare tool, the interactive economic model and a stakeholder-typed interest form. Its own analytics are cookieless and designed to minimise personal data. That describes a design choice, not verified legal compliance (Appendix I).

A page view registers only when the browser sends a client-side signal, or beacon. Crawlers that do not execute JavaScript therefore leave no record. Declared bots and crawlers are rejected before a row is written, and administrative traffic is excluded. The visitor identifier is a salted SHA-256 hash of the IP address, rotated daily. It cannot track a visitor across days, although an IP-derived hash may still be pseudonymous personal data.

This has an important consequence for the word ‘visitor’. A reader returning on several days counts once on each day. The totals below are summed daily uniques, or visit-days, not distinct people.

The bot filter also has limits. Automation that executes JavaScript and presents itself as an ordinary browser still registers. The final month shows a marked surge consistent with that pattern. D.2 reports it separately rather than letting it inflate the trend (Fig. 5.7).

A further boundary concerns the breakdowns. On 22 April 2026, the per-referrer, per-country and per-page series moved to a separate self-hosted analytics instance that counts differently. D.3 to D.5 stop at that date and retain the earlier, more conservative series. Joining the two systems would make a longer table, but not a sounder comparison.

D.2 Reach and growth

From the rebuilt platform's launch in August 2025 to the 31 July 2026 cut-off, the first twelve months produced approximately 66.000 analytics-defined visitor records and 114.000 page views. The headline is more impressive than the evidence warrants.

July 2026 alone contributes some 22.200 visitor records at only 1,16 page views each, compared with 1,48 to 3,79 in the other full months. That pattern points towards automated traffic rather than readers. The August 2025 launch month is not comparable: its 19,4 page views per visitor-day come from just 16 visitor-days.

Excluding July gives approximately 44.000 visitor records and 88.000 page views over eleven months. I use that more conservative reading in §5.7. The remaining series shows growth from a standing start to several thousand visitor records a month through spring and early summer 2026, with fluctuations along the way (Fig. 5.7). Table D.1 gives the monthly record.

Table D.1 – Monthly platform visitors and page views, August 2025 to the 31 July 2026 cut-off.

Month	Visitors	Page views
2025-08 (launch)	16	311
2025-09	1.234	2.983
2025-10	2.271	8.614
2025-11	4.082	12.249
2025-12	3.298	6.147

Month	Visitors	Page views
2026-01	4.906	10.444
2026-02	5.732	10.794
2026-03	8.144	12.062
2026-04	4.764	8.824
2026-05	2.702	5.773
2026-06	6.469	9.567
2026-07 (flagged)	22.215	25.783

(July 2025 was a pre-launch month with 9 visitors, excluded so that the series is exactly the first twelve months. The final row is the flagged month.)

D.3 How visitors arrive (discovery)

Among attributed referrals, discovery is predominantly through search engines and AI assistants. Of the referred visits from launch to 22 April 2026 (direct/unattributed visits, the majority, excluded), roughly **77% came from search engines** and about **~22% from AI assistants** – chatbots increasingly surfacing the platform's knowledge content in their answers. The named sources (**Fig. 5.8**; Table D.2):

Table D.2 – Referral sources for visits to the platform, launch to 22 April 2026.

Source	Referred visits	Type
Google	7.696	search engine
ChatGPT	2.450	AI assistant
Bing	1.052	search engine
DuckDuckGo	513	search engine
Ecosia	284	search engine
Perplexity	196	AI assistant
Gemini	54	AI assistant
Brave	50	search engine
Yandex	45	search engine
Claude	44	AI assistant

Source	Referred visits	Type
Copilot	39	AI assistant
LinkedIn	38	social

The AI-assistant share stands out: a discovery channel that barely existed when comparable platforms were last studied now accounts for roughly a fifth of all referred traffic.

D.4 Geographic spread (and the bot caveat)

The country breakdown suggests a pan-European readership, with Germany clearly in the lead and smaller audiences across the major Western European markets. It covers launch to 22 April 2026 (Table D.3). As with the headline totals, geography needs to be read alongside the bot caveat.

Table D.3 – Page views by country of origin.

Country	Page views
Germany	17.942
United Kingdom	1.839
Spain	1.331
Italy	1.278
Netherlands	1.274
France	1.217
Belgium	1.149
Austria	870
Switzerland	755
Portugal	733
Poland	666
Ireland	657
Sweden	513
Greece	437

The reported full focus-region total is approximately 33.600 page views; the selected countries listed in Table D.3 sum to 30.661. Large volumes also come from Singapore (~16.100), China (~7.200), the United States (~6.200) and Hong Kong (~1.000). I set these aside from the conservative readership estimate because their traffic patterns bear the hallmarks of automated crawling, not simply because they originate outside Europe.

Germany records eight page views per visitor against roughly one in those locations. The pattern persists after the measurement change: on the successor system, the United States, Singapore and China account for the three largest traffic blocks between late April and the end of July. Germany falls to roughly a thousand page views. This separate record supports the interpretation of the closing surge in D.2 as automation rather than a sudden widening of readership; it does not identify every individual visit as human or automated.

D.5 What holds attention (engagement)

Readers spend much of their attention on the material that also does methodological work in the thesis: city and country profiles, lighthouse projects and knowledge articles. The resource-submission page is among the most visited too. Table D.4 covers launch to 22 April 2026.

Table D.4 – The most-viewed pages on the platform.

Page	Page views
Home	6.119
/resources (library)	3.234
/cities	1.665
/countries	1.227
/resources/projects/spreefeld	653
/resources/projects/r50	650
/cities/berlin	584
/resources/submit	522
/countries/sweden	491
/resources/projects/sargfabrik	452

Page	Page views
/cities/copenhagen	361
/countries/austria	344
/participate	336
/cities/vienna	321

The three most-read project pages, Spreefeld, R50 and Sargfabrik, are themselves landmark cooperative conversions and new-builds, which is consistent with an audience genuinely interested in the model rather than passing through.

D.6 The interest form – the one structured instrument

The interest form is the one structured instrument used within the thesis. It asks visitors which participation roles interest them, without turning registration into a lengthy survey. **121 profiles were registered**, with **183 expressions of interest** across six options (**Fig. 5.9**; Table D.5). These are possible roles, not direct tests of the model's assumptions.

The unit of observation is a profile created through the public website form. Profiles synchronised from the organisation's People database are excluded because those people did not respond through this instrument. Of the 121 profiles, 83 selected at least one option. Multiple selections were allowed, so the 183 declarations average 2,2 per declaring profile.

The count is unchanged whether registration date or record-creation date is used. No profile in this population was created after the cut-off.

Table D.5 – Declared interest options from the stakeholder-typed registration form, and what each maps to.

Interest option	Count	Maps to
A long-term co-owned home	52	residents (the core demand)
Access to mid-term temporary stays	38	A2 – mobility used
Company as a partner	36	general company-partnership interest; membership and supply roles unresolved, not A3 evidence

Interest option	Count	Maps to
Impact investing	22	A5 – patient capital
Becoming a development partner	21	delivery partners (§4.5)
Holding suitable real-estate assets	14	A4b – asset owners / entry terms

I read these figures as a record of expressed curiosity. The form is consented and minimal, not a representative survey. Its value lies in the mix of roles: mid-term mobility (A2), impact capital (A5), delivery partners (§4.5) and asset owners (A4b) all attracted declarations. Those are roles the model needs, but selecting one does not establish willingness to accept its particular terms.

The thirty-six company-partnership declarations are profile-level expressions, not a verified count of distinct companies. The option does not distinguish paying membership, supplying goods or services, and purchasing employee accommodation. It therefore cannot support A3 without accommodation-specific follow-up. The recorded totals remain unchanged.

These role-typed declarations do not test readiness (H2). They show only that respondents could imagine a role, from co-owning a home to investing or partnering. The six form options are not one question for each of A1–A6. None asks whether an individual would pay and renew associate dues without a home, so the form provides no direct A6 test. Nor does interest in a long-term home establish acceptance of rotation under A1 or of the actual entry-equity terms. The self-declared fields of expertise help shape the later sampling and engagement design, but neither an imagined role nor an offered skill is a behavioural commitment.

Unsolicited inbound outreach. Beyond the form, the platform's visibility drew direct, self-initiated approaches. Over the operating period 162 people wrote through LinkedIn and a further 135 by email to voice collaboration interest in the European Housing Co-op. These are logged as self-selected design feedback. Although an approach requires more effort than a click, it is not a commitment and does not establish readiness.

D.7 Exploratory conversations

Alongside the platform record, I discussed the model with 34 organisations across five stakeholder types, eleven cities and seven countries. Three international roundtables

reached some sixty participants (Fig. 5.10). These were open, consented, unstructured and unrecorded conversations, reported anonymously rather than as formal interviews.

Their role was to help develop the design. In Action Design Research, practitioner feedback gathered while an artefact is in use feeds the build-intervene-evaluate cycle (Sein et al., 2011, p. 40). I therefore report the conversations in aggregate rather than present them as a separate coded qualitative study. Table D.6 gives the stakeholder breakdown.

Table D.6 – Organisations engaged in open, consented conversation, by stakeholder type.

Stakeholder type	n	Where
Local housing cooperatives	15	Berlin · Dublin · Amsterdam · Barcelona · Frankfurt · Munich · Hamburg · Milan · Rotterdam
Municipality representatives	6	Berlin · Łódź · Munich · Amsterdam · Dublin
Housing developers	5	Frankfurt · Berlin · London
Pan-European foundations	5	built environment · democracy · European cohesion
Impact-focused international banks	3	(impact-investment focus)

The three roundtables were the International Social Housing Festival (Dublin, June 2025), the European Gathering for collective action (Piedmont, July 2025) and a cooperative-housing barcamp (Berlin, April 2026). I draw six themes from this reflective record, without coded frequencies: appetite for pan-European knowledge exchange; a digital and AI capacity gap among smaller cooperatives; supply, land and patient capital as binding constraints; interest in a pan-European vehicle; limited capacity to orchestrate mixed use; and curiosity about adaptive reuse paired with concern about complexity. These themes are design feedback in the ADR sense: they shaped the artefact and the forward programme, and the readiness hypothesis H2 is left to the tests Chapter 6 sets out.

D.8 Limitations of the demand signal

The caveats belong with the numbers. People who find and use a cooperative-housing platform are already a self-selected group. A substantial share of raw traffic appears automated or comes from outside the target region, which is why I distinguish it from the conservative readership estimate. High bounce rates on a content site – above

80% here – are also easy to over-interpret (Kaushik, 2010, pp. 51-53). There is no counterfactual against which to judge the absolute totals.

Most importantly, a click is not a signed share. Role declarations, unsolicited outreach and exploratory conversations do not test the readiness hypothesis (H2).

I also gathered and interpreted this record as the platform's operator and the proposal's author. I have a stake in a favourable reading (§5.9). Reproducible figures and explicit limitations make that reading open to challenge; they do not remove the position from which I make it.

Source: platform web analytics and interest-form database; reproducible read-only extractions at the 31 July 2026 cut-off.

Appendix E – Forward-Programme Engagement Instruments *(designed, not deployed)*

Supports Chapter 6. The next stage needs to ask people about an actual offer, not only whether they like the idea. I organise these proposed instruments by the stakeholder group best placed to challenge each of the six assumptions, A1–A6. They are designed for post-thesis validation and have not been deployed. Company membership and supply participation are tested separately in E.4; A6 concerns individuals who pay and renew associate membership without receiving an EHC home (E.5).

The matrices set out the planned tests; full question wording will be drafted as the forward programme begins. Table E.1 shows how the design could respond to failure, Table E.2 states the minimum conditions for a pilot, and Table E.3 identifies the engagement instruments.

Table E.1 – Risk-response matrix: how the design bends if each assumption fails.

Assumption	Failure signal	Model consequence	Fallback design
A1 – rotation accepted	Residents reject the rotating mid-term share on the stated charges, entry contribution and participation terms	A smaller mid-term tier reduces surplus for investor repayment and replication; optional later-cohort entry relief has less capital behind it. Baseline resident contributions are not reduced by surplus	Reduce the mid-term share or appraise an all-long-term cooperative; re-test bankability, capital repayment and access without assuming a surplus-funded entry discount
A2 – mobility used	Members rarely use cross-city mobility	Mid-term occupancy and its surplus fall	Lean on individual mid-term demand; a smaller temporary share
A3 – corporate willingness-to-pay	Corporates won't pay serviced-tier rates	Engine-room yield drops; the effect depends on the city, output and scenario	Smaller serviced tier; deeper patient equity or public support
A4 – acquisition & conversion economics	A4a: conversion doesn't pencil in a market. A4b: owners insist on a market sale or market ground rent	Higher works or entry costs may defeat project cost coverage. The Appendix G lender haircut does not estimate the loss of favourable owner terms.	A4a: choose suitable buildings and markets, or appraise new-build separately. A4b: renegotiate, seek another owner or in-kind contribution, and reappraise actual entry costs.
A5 – patient capital	Capital available only at commercial-equity returns	The Years 1-7 trough cannot be underwritten	Slower, smaller rollout; lean harder on the public schemes of §5.4
A6 – associate membership	Recruitment or renewal falls below the assumed density at stated dues	Central income and deployable member capital fall	Re-price the offer, reduce central costs, secure committed alternative funding or slow expansion

Table E.2 – Minimum viable conditions for a first pilot.

Condition	What must hold
Building suitability	A screened, reusable frame/façade at roughly the curated conversion factor (A4a)
Leasehold	A durable, mortgageable 60-year-plus ground lease in the jurisdiction (A4b; App. G)
Lender acceptance	Senior debt bankable at the chosen equity (DSCR ≥ ~1,25×)
Local operator	Accountable development and operating capacity, in one organisation or separately contracted (§4.5)
Patient capital	Impact equity at the fixed return, tolerant of the Years 1-7 trough (A5)
Resident demand	Project-specific demand on stated rent, entry-equity and participation terms; a waiting list alone is insufficient
Mid-term demand	A member/corporate pool deep enough to fill the serviced flats (A2/A3)
Associate and company membership; central funding	Tested individual-associate and company offers, recorded commitments and a funded umbrella budget; shortfalls covered by committed alternatives, not assumed future dues
Public-law feasibility	Change-of-use consent, and any conditional support, secured (§5.4)

Table E.3 – Forward-programme engagement instruments: what would support or challenge each assumption.

Stakeholder group	Probes	What would support / challenge it	Instrument
Impact capital – foundations, mission funds, citizen micro-investors	A5 (patient capital)	Support: soft commitments / letters of intent at an indicative fixed return, tolerant of the Years 1-7 trough. Challenge: capital available only at commercial-equity returns.	Structured investor conversations + the interest-form investor signal

Stakeholder group	Probes	What would support / challenge it	Instrument
Citizens – as residents	A1 (rotation) · A2 (mobility)	A1 support: acceptance of a 20-30% rotating mid-term population on the actual rent, project-share and participation terms, with surplus first repaying investors and then financing later projects. Explain that the baseline gives no entry-equity relief; a funded later-cohort option lowers the contribution but raises rent. A2 support: mid-term mobility used roughly once every three years. Challenge: rejection of rotation on those terms, or negligible mobility uptake. Assess the two assumptions separately.	Resident survey + the sign-up flow
Prospective residents – entry-equity capacity	Resident buy-in (the per-m² project share)	Support: capacity and willingness to meet both the project share and monthly charge. Test the baseline separately from an explicitly funded relief offer, disclosing the higher rent when Fund equity replaces resident capital. Challenge: either burden excludes the target income band, or relief depends on surplus not yet available (§4.4).	Survey block + the implied-income-band test
Employers / institutional accommodation users	A3 (serviced-tier willingness-to-pay)	Support: corporates pay temporary-tier rates for employee landing pads. Challenge: no corporate demand at the modelled rate.	Accommodation-specific survey, followed by letters of intent or paid reservations at target rates

Stakeholder group	Probes	What would support / challenge it	Instrument
Companies as paying organisational members and potential suppliers	Umbrella membership and funding (§4.5); delivery capability (A4a); organisational shares relevant to A5, distinct from A3	Support: authorised commitments specifying shares, recurring dues and renewal conditions, followed by payment when legally possible, plus separately scoped supply offers. Challenge: interest only in publicity or guaranteed contracts, refusal of dues or safeguards, or no deliverable capability.	Company interviews, a priced membership offer and pilot-cohort tracking; protocol below
Local cooperative partners / impact developers	A4a + the §4.5 joint-venture logic	Support: a partner moving from general openness to a specific candidate building. Challenge: no local operator willing to carry the development + operating risk on these terms.	Semi-structured partner conversations
Asset owners – building owners	A4b – the entry-terms limb (the §4.3 / §6.3 leasehold assumption)	Support: willingness to grant a favourable leasehold (Erbbaurecht) on an underused office. Challenge: owners require a market sale.	Owner outreach
Individuals – associate members without a home	A6 (recruitment and renewal)	Support: paid membership and renewal at stated dues, sufficient for the budgeted density. Challenge: interest without payment, weak renewal or recruitment costs that leave the umbrella underfunded.	Priced membership offer, cohort tracking and network cashflow re-run; protocol in E.5
Cities / municipalities	The enabling environment (§5.4)	Support: support, land and consents available on workable terms. Challenge: no municipal route.	Municipal engagement

E.4 Company membership and supplier participation: pilot protocol

A company can want to supply a building without wanting to join the cooperative. It can also need employee accommodation without wanting either role. This proposed protocol keeps paying membership, supply contracts and accommodation demand separate.

The test concerns H2 and organisational funding. It is distinct from A6, which concerns individual associate membership without a home. Recruitment would begin during pilot preparation, before the first conversion. Renewal and delivery would then be followed through operation.

Sampling and eligibility. Prioritise innovative, non-listed family-owned businesses across materials and building systems, architectural and engineering practices, and proptech. Include other ownership forms as a comparison rather than assuming family ownership predicts commitment. Record ownership, size, jurisdiction, decision-maker authority and intended role. Assess alignment through documented housing-related contributions, environmental performance and willingness to support European cooperation. Membership is not environmental certification.

A defined offer. Present the organisational share and annual dues separately, with the services, governance rights, liabilities and exit terms attached to each. Test a transparent size-sensitive schedule rather than assuming a blended model value suits every firm. State that membership offers participation, shared learning and opportunities to compete for projects, not a guaranteed pipeline. Any employee-accommodation purchase, Fund investment or supply agreement is priced and documented separately. Before incorporation, record conditional commitments with activation and refund terms where relevant; collect money only through a lawful, disclosed receiving structure.

Interview prompts.

1. What would make early EHC membership worthwhile: access to potential projects, shared learning, European collaboration, housing impact or evidence-based CSR communication? Which benefit is essential before a first building exists?
2. Would an authorised decision-maker commit to the stated one-off share and annual dues without guaranteed contracts? What amount, timing and conditions would be acceptable, and what would justify renewal?

3. What specific goods or services could the company provide to the pilot, on what price, capacity, programme and liability terms? Distinguish paid work from any voluntarily offered discount or in-kind contribution.
4. Would the company accept resident control, conflict disclosure, procurement recusal and competition from non-members? What information, intellectual-property rights and data access would delivery require?
5. What demonstrable environmental or housing contribution would justify public claims about the partnership? What evidence could be shared without disclosing resident data or overstating impact?
6. Separately, does the company need employee accommodation at the target rate, duration and location? Record this only in the A3 demand track.

Evidence and decision rule. Track contacted and eligible companies, priced offers, authorised commitments, paid shares, collected dues, recruitment costs and staff time. Record renewal when due, reasons for refusal or withdrawal, and each separately contracted contribution's cost, timeliness, quality and environmental evidence. Compare results by sector and ownership form, disclosing self-selection and small samples. Expressions of interest, conditional promises and payments remain separate evidence levels.

Before outreach, set a pilot-period recruitment target and minimum net dues contribution from the approved central operating budget. Proceed only where collected dues and other committed funding cover that budget, and required delivery capacity is contracted or credibly funded. A small paying cohort tests an offer, not a continental growth curve. Re-run network cashflow with observed fees and recruitment costs, slower growth and lower renewal; report effects on central cost coverage and Fund contributions separately from building bankability. If companies will supply but not join, retain suitable contractors and revise organisational funding. If dues remain insufficient, reduce central expenditure, secure alternative committed finance or pause expansion. No such test is reported as completed within the assessed record.

E.5 Associate membership without a home: A6 protocol

A6 asks whether individuals will join and renew without an entitlement to an EHC home. The model assumes roughly four and a half associates per long-term home (§4.5). This density is untested; company membership and employee-accommodation purchases cannot establish it.

Present the actual share, annual dues, services, voting rights and exit terms. Ask why someone would join, which benefit justifies payment before a local project exists, and what would justify renewal. Distinguish supporters, prospective residents and mobility users; record refusals as well as interest.

Track priced offers, authorised commitments, payments when lawful, renewal when due, recruitment costs and reasons for withdrawal. Set the recruitment and net-income requirement from the pilot budget before outreach. Re-run network cashflow at observed uptake and lower renewal. Interest alone does not support the assumed density; an unfunded central budget requires alternative committed finance, lower expenditure or slower expansion. This is a proposed test, not completed research.

Appendix F – Glossary of Key Terms

EHC – European Housing Coop. The proposed pan-European housing cooperative; a model, not an incorporated organisation.

Engine room. The mid-term serviced and commercial uses whose residual surplus supports investor repayment and then replication. Entry-equity relief for later cohorts is a separate, optional use of accumulated capital (§4.4; Appendix A.1).

Cost-rent. Initially cost-covering resident charges, including the modelled cost of capital. Subsequent escalation and solidarity rules determine the trajectory; a widening market discount is conditional (§4.4).

Project cost coverage. Project revenues cover modelled full costs under the stated configuration; not a guarantee of real-world performance.

Bankability. Meeting the modelled senior-lender thresholds, including DSCR around 1,25× and the applicable LTV/LTC limits (§4.4).

Viability. Project bankability together with the modelled reserve and solvency conditions (§5.5).

Network external-capital retirement. Full redemption of the external impact-equity book; distinct from project cost coverage and operating break-even (§4.5).

Cross-subsidy. The engine room supports whole-building bankability, investor repayment and later projects. The baseline replaces external impact capital, not resident contributions; later-cohort entry relief is optional and raises rent where return-bearing

Fund equity replaces resident capital. Statutory rent-cap transfers are separate (Appendix A.1).

Entry equity. The resident's upfront project-share contribution, unchanged by surplus recycling in the baseline. Optional later-cohort relief uses accumulated capital through the Fund; any first-cohort reduction requires a separately committed advance or public support (§4.4).

Patient capital. Long-horizon, mission-aligned capital accepting the stated return and exposure to the early funding trough.

Member (user member). A resident, prospective resident, individual using or supporting the network, or company. Membership carries one vote and access to the housing and mid-term mobility offer. Members subscribe an organisational share; residents also subscribe a project share. Shares are held and redeemable at nominal value, subject to the applicable redemption rules, and pay no dividend. Annual dues continue for as long as membership lasts. A company's share is graded by its size (§4.5).

Investor. Someone providing return-bearing capital to the EHC Fund, whether or not they are also a member. Fund investment carries the stated capped return but no co-operative vote. The proposed EHC umbrella has no investor-member class. The SCE ceiling on non-user investor votes therefore remains a constitutional safeguard, not a class used in this design (§4.5, §4.7).

Vacancy paradox. Housing scarcity alongside unused dwellings or non-residential space; the office-conversion application is developed in §4.3.

Convertible fraction. The assumed share of vacant office floor space suitable for residential conversion.

Gross yield. Annual market rent divided by build cost, as used in the economic model.

Adaptive reuse. Conversion of existing buildings to a new use; here principally offices to housing.

Data pool. The harmonised Countries, Cities and Projects databases (§5.3).

Focus set. Thirty countries for comparison and thirty-six cities for detailed model probing.

Opportunity universe. The 104-city EU set used for pilot-readiness ranking (§6.4).

Pilot-readiness index. A weighted search-priority score; not a building-feasibility assessment.

A1–A6. The six assumptions in §4.8: A1 resident acceptance of rotation on the stated financial and participation terms; A2 member mobility; A3 serviced-tier demand; A4 conversion works and entry terms; A5 patient-capital availability; A6 associate-member recruitment and renewal without an EHC home.

Associate member. An individual member without an EHC home. Membership carries no entitlement to housing; willingness to pay and renew is A6.

A4a / A4b. Conversion works / owner entry terms and tenure conditions. Lender treatment is distinct from owner willingness.

H1 / H2. Informational demand / stakeholder readiness. H1 receives modest support; H2 is not tested.

SQ1–SQ5. The five research sub-questions in §1.2.

DSR – Design Science Research. Research contributing and evaluating designed artefacts (Hevner et al., 2004, p. 82).

Exaptation. Extension of a known solution to a new problem (Gregor & Hevner, 2013, p. 347).

ADR / AR. Action Design Research / Action Research; participatory development and learning during intervention (§5.1).

Triple bottom line. Economic, social and environmental dimensions of assessment.

SCE – Societas Cooperativa Europaea. European Cooperative Society: an EU cross-border legal form with substantial national-law dependencies (§4.7).

CLT – Community Land Trust. An organisation holding land for community benefit, potentially alongside cooperative housing.

Erbbaurecht / Baurecht / tomträtt / erfpacht. National building-right or ground-lease instruments; terms and bankability differ (Appendix G).

Generalmieter. Master tenant, as in the LiM/local-cooperative arrangement (§3.5).

Kostenmiete. Cost-based rent; the EHC's subsequent escalation and solidarity rules are specified separately (§4.4).

SPV / Objektgesellschaft. A project-specific legal vehicle intended to hold an asset and its liabilities separately.

Steward-ownership / mission lock. Proposed covenants and veto rights protecting non-speculative use, subject to legal enforceability.

Catalytic bridge finance. Interim development finance intended to be recycled as projects stabilise.

First-loss capital. Junior capital absorbing losses before more senior funding.

GBV / WGG / gemeinnützig. Austria's limited-profit housing sector, its governing legislation and public-benefit status.

EIB / CEB. European Investment Bank / Council of Europe Development Bank.

spółdzielnie / kooperatywy mieszkaniowe / lokatorskie. Polish housing cooperatives / co-building groups / tenant-cooperative terminology (§3.2.3).

ETS / ETS2. EU emissions trading systems; ETS2 addresses heating and road-transport fuels (§2.2).

Embodied carbon. Emissions associated with materials, construction and other non-operational life-cycle stages.

Whole-life carbon / WLCA. Operational and embodied emissions across the building life cycle / their assessment.

RICS / LETI. Royal Institution of Chartered Surveyors / London Energy Transformation Initiative.

DGNB / ÖGNI / DK-GBC / GBCe. Green building councils referenced in the taxonomy assessment (§4.6).

EU Taxonomy / Social Taxonomy. Environmental sustainable-finance classification / the social-taxonomy work discussed in §4.6.

ESG. Environmental, social and governance considerations.

CSR. Corporate social responsibility; company-membership communication must reflect evidenced contributions and outcomes.

Company member. An organisational member contributing shares and recurring dues; supply contracts, Fund investments and accommodation purchases remain separate.

GDPR. General Data Protection Regulation; Appendix I separates privacy-minimising design from compliance verification.

LiM – Living in Metropolises SCE. Cross-border housing cooperative discussed as a developer-owner precedent (§3.5).

MOBA. Cross-border cooperative-housing network and catalytic-finance precedent (§3.5).

ICA. International Co-operative Alliance.

STR. Short-term rental; distinguished from the proposed mid-term tier, whose legal treatment requires local review.

EPRS / JRC. European Parliamentary Research Service / Joint Research Centre.

Appendix G – Leasehold-Tenure Viability Across the Focus Countries

Supports §4.5 and the entry-terms limb of assumption A4 (A4b, §4.8). A long ground lease avoids buying the freehold, but it does not avoid the legal question. Can the right last for the modelled sixty-year period, support a mortgage and be used for housing in the chosen country?

This appendix examines those conditions behind the model's per-country loan-to-value haircut. The assessment is also available as the "Leasehold landscape" in the live tool. It tests the tenure instrument and lender treatment. Whether an owner will offer favourable terms remains a separate part of A4b.

I assess each of the thirty focus countries – the EU-27 plus the United Kingdom, Switzerland and Norway – against three questions. How long can the leasehold or building right legally last? Can the right itself secure a loan, and do commercial lenders accept it or only public lenders? Is it used for residential, affordable or cooperative housing, rather than only farmland or commercial ground?

The research proceeded in three passes. A broad comparative-law review identified the instruments. Country-level research then tested their decisive features, paired with

an independent adversarial verification. Where corroboration was thin, the assessment took the more cautious reading.

A final review reconciled the borderline cases. Belgium and Estonia moved from the top to the middle tier, and Poland to the weakest tier. Those changes reflected a stricter reading of commercial-lender appetite and the residential phase-out of Poland's perpetual usufruct.

Primary authority received the greatest weight. Sources include national civil codes, land-registry and notary bodies; EU, UNECE and European University Institute comparative-property-law reports; Community Land Trust networks; and reputable legal-practice notes. Each country profile in the live tool retains its source links.

Leasehold or related instruments appear across all thirty countries. The useful distinction is not simply whether one exists, but how mature and bankable it is for housing over the modelled horizon.

Fourteen countries fall in Tier A: strong, mortgageable and housing-proven, including Germany's *Erbbaurecht*, the Dutch *erfpacht* and Swedish *tomträtt*. Twelve fall in Tier B, where housing use is thin, reform is unsettled or lending relies mainly on public institutions. Four fall in the weak Tier C.

The model translates these tiers into an equity surcharge only where the project actually uses a lease: none for Tier A, ten percentage points for Tier B and twenty for Tier C. These are explicit modelling adjustments, not a substitute for a lender's offer. Two countries carry a specific structural flag. Poland is converting its residential perpetual usufruct to freehold, and Hungary's building right caps at fifty years, below the model's horizon; both are treated as weakest-tier and freehold-preferred. Propagated across the whole sixty-year rollout, the haircut raises the network's peak external-capital requirement by about two per cent and does not move the network external-capital retirement year. This tests lender treatment of the tenure instrument, not the loss of below-market entry terms. An owner requiring market acquisition terms needs a separate project appraisal. Table G.1 gives the per-country assessment.

Table G.1 – Leasehold-tenure viability across the thirty focus countries, by bankability tier.

Country	Tier	EU	Instrument (local)	Max term	Mortgageable	Housing-proven
Austria	A	EU	Baurecht	100 yr	Strong	Yes
Denmark	A	EU	Bygning på lejet grund	No cap	Conditional	Yes
Finland	A	EU	Maanvuokra	100 yr	Strong	Yes
France	A	EU	Bail Réel Solidaire	99 yr	Conditional	Yes
Germany	A	EU	Erbbaurecht	No cap	Strong	Yes
Ireland	A	EU	Long leasehold	No cap	Strong	Yes
Italy	A	EU	Diritto di superficie	No cap	Conditional	Yes
Malta	A	EU	Ċens perpetwu	Perpetual / term	Conditional	Yes
Netherlands	A	EU	Erfpacht	No cap	Strong	Yes
Norway	A	–	Tomtefeste	No cap	Strong	Yes
Spain	A	EU	Derecho de superficie	99 yr	Conditional	Yes
Sweden	A	EU	Tomträtt	No cap	Strong	Yes
Switzerland	A	–	Selbständiges und dauerndes Baurecht	100 yr	Strong	Yes
United Kingdom	A	–	Leasehold / Long lease	No cap	Strong	Yes
Belgium	B	EU	Erfpacht / Emphytéose	99 yr	Conditional	Yes
Bulgaria	B	EU	Право на строеж	No cap	Conditional	Emerging
Croatia	B	EU	Pravo građenja	No cap	Conditional	Emerging
Czechia	B	EU	Právo stavby	99 yr	Conditional	Emerging
Estonia	B	EU	Hoonestusõigus	99 yr	Strong	Emerging
Greece	B	EU	Δικαίωμα επιφανείας	99 yr	Conditional	Emerging
Lithuania	B	EU	Užstatymo teisė	No cap	Conditional	No
Luxembourg	B	EU	Bail emphytéotique / emphytéose	99 yr	Conditional	Yes
Portugal	B	EU	Direito de superfície	No cap	Conditional	Emerging
Romania	B	EU	Dreptul de superficie	99 yr	Conditional	Emerging
Slovakia	B	EU	Nájom pozemku	No cap	Conditional	Emerging
Slovenia	B	EU	Stavbna pravica	No cap	Conditional	Emerging
Cyprus	C	EU	Εγγεγραμμένη μίσθωση ακινήτου	99 yr	Conditional	Emerging

Country	Tier	EU	Instrument (local)	Max term	Mortgageable	Housing-proven
Hungary	C	EU	Építményi jog	50 yr	Conditional	No
Latvia	C	EU	Apbūves tiesība	No cap	Conditional	No
Poland	C	EU	Użytkowanie wieczyste	99 yr	Conditional	Emerging

Columns: Tier – A strong / B viable-with-caveats / C weak. Max term – the statutory ceiling (the model needs 60-99 years). Mortgageable – whether a lender takes the leasehold itself as collateral (Conditional often means only public / social funds do). Housing-proven – actively used for residential, affordable or cooperative housing. Full per-country instruments, durations, reversion rules, reforms and sources are in the live tool's "Leasehold landscape" (housingcoop.eu/economic-model).

Source: a structured comparative-law assessment (three-pass research and adversarial verification, included in the 31 July 2026 evidence snapshot), wired into the live economic model as the per-country LTV haircut; 14 Tier A, 12 Tier B and 4 Tier C.

Appendix H – Building-Level Adaptive-Reuse Screening Instrument

Supports §4.3, A4a and the pilot-preparation gate in Chapter 6. A city can have plenty of empty offices and still offer very few buildings worth converting. This instrument brings the inquiry down to the candidate asset. It must be completed before that building enters the project-specific economic model; a favourable city average cannot stand in for the inspection.

H.1 Scientific grounding of the criteria

I draw the criteria in Table 4.1 from conversion research and practitioner guidance rather than devise a new set from scratch. The main reference is Geraedts and van der Voordt's transformation-potential method. It examines functional, technical, legal and financial conditions, separating absolute vetoes from criteria that can be weighted and scored (Geraedts & van der Voordt, 2003, pp. 80–90). Its later revision is the Transformation Meter for Offices (Geraedts et al., 2025, pp. 131–158).

That distinction shapes the hard stops in §H.2. A strong score elsewhere cannot compensate for a condition that makes the building unsuitable. Table H.1 identifies the source behind each gate.

Table H.1 – Scientific grounding of the screening criteria: the evidence base behind each gate of Table 4.1.

Gate (Table 4.1)	Grounding	Source
Structure and grid	Structural integrity and floor-to-ceiling height recur as primary determinants of conversion potential; retained frame and foundations also carry the largest share of the embodied-carbon advantage	Geraedts & van der Voordt, 2003, pp. 80–90; Geraedts et al., 2025, pp. 131–158; RICS, 2023, p. 25
Floor depth, daylight and ventilation	Floorplate size and depth are screened as functional conditions on which compliant residential layouts either can or cannot be formed	Geraedts & van der Voordt, 2003, pp. 80–90; Geraedts et al., 2025, pp. 131–158
Façade and envelope	Gated separately because envelope works are the widest cost swing in office-to-housing conversion, ranging between 5% and 48% of conversion cost against a stable quarter in new-build	BDA Bayern, 2025, p. 92
Fire, access and cores	Fire safety and accessibility appear across the conversion literature as code-driven feasibility conditions rather than design preferences	Geraedts et al., 2025, pp. 131–158; Graaf et al., 2025, p. 17
Planning and change of use	The permitting regime is treated as decisive for conversion viability, with the Dutch *transformatie* record and recent German easing as the reference cases	Graaf et al., 2025, p. 4
Hazardous materials and hidden conditions	Hidden structural defects and hazardous materials, asbestos above all, surface only once a building is opened up, and are the stated reason conversion carries greater cost uncertainty than new-build	Graaf et al., 2025, p. 17; Stiernon et al., 2023, p. 6
Whole-life carbon	Follows assessment convention instead of assuming a retention benefit; the saving is concentrated in substructure and superstructure and is lost where strengthening or full envelope replacement is required	RICS, 2023, p. 25; LETI, 2020, p. 26; Urban Land Institute, 2025, p. 14
Entry terms and finance	Applies the senior-lending thresholds of §4.4 (DSCR around 1,25× with an LTV/LTC limit), consistent with commercial-real-estate underwriting practice and borrower-based measures	Fannie Mae, n.d.; Gąsiorowski et al., 2026; Trepp, 2023

Two qualifications belong with the table. Page locators are given only where the specific claim could be verified in the cited edition; where a locator could not be confirmed, the point is attributed to a source whose page is verifiable rather than carrying an approximate reference. And the grounding establishes that the criteria are the right ones

to ask about, not that a particular building passes them: that remains the function of the scored instrument below.

H.2 Scoring and stop rules

Each criterion is scored **2 = evidenced pass**, **1 = conditional / further investigation**, or **0 = fail**. The total supports comparison but never overrides a hard stop. The proposed threshold is at least 20 of 28, with no unresolved hard stop and a dated document and named reviewer behind every score. This is an author-set decision rule for pilot testing, not a validated threshold established by the cited literature.

Hard stops: no credible residential change-of-use route; non-mitigable fire or access failure; structural unsuitability; floorplate that cannot form compliant homes; non-mortgageable tenure; confirmed hazardous-material or envelope exposure that pushes the evidenced cost above the model's failure boundary; or no whole-life-carbon advantage over the counterfactual while an ecological advantage is claimed. Table H.2 sets out the scoring instrument.

Table H.2 – Building-level adaptive-reuse screening instrument: scoring criteria, evidence required and stop rules.

Criterion	Evidence required	2 – pass	1 – conditional	0 – fail
Structure and loading	Survey, drawings, structural report	Frame retained with ordinary interventions	Material strengthening required but costable	Unsafe or economically prohibitive
Grid and floor depth	Measured plans and test fits	Efficient residential layouts	Efficiency haircut required	Compliant layouts not achievable
Daylight and ventilation	Concept design and code check	Compliant by ordinary design	Atria, cuts or façade changes required	Compliance implausible
Façade and envelope	Condition and energy survey	Major retention feasible	Selective replacement	Full replacement destroys advantage
Fire safety and cores	Fire strategy and escape analysis	Compliant route identified	Additional core or major works	No acceptable route
Accessibility	Access audit	Inclusive access achievable	Material intervention needed	Non-mitigable exclusion
Planning and use	Planning review / pre-application advice	Supportive or by-right route	Discretionary but plausible	Residential use blocked
Hazardous materials	Desktop and intrusive surveys	No material issue	Known and costed remediation	Unbounded exposure

Criterion	Evidence required	2 – pass	1 – conditional	0 – fail
Utilities and servicing	Capacity checks	Existing capacity adequate	Upgrades costed	Capacity unavailable
Acoustic conditions	Noise survey and façade assessment	Residential standard achievable	Enhanced mitigation required	Unacceptable exposure
Tenure and title	Title, lease heads and lender view	Durable and mortgageable	Conditions to resolve	Non-mortgageable or unstable
Total development cost	Independent concept estimate	Inside base / adverse range	Inside severe range with support	Outside failure boundary
Whole-life carbon	Early WLCA and counterfactual	Material reuse advantage	Marginal or evidence incomplete	No advantage
Delivery capacity	Named team, programme and risk owner	Capable team committed	Capability gap with funded plan	No accountable delivery route

H.3 Evidence register

A score needs a traceable reason. For each criterion, record the source document, author/reviewer, inspection date, version and score. Add the unresolved question, responsible person, deadline and effect on the economic model.

Any change to net efficiency, conversion factor, programme, contingency, tenure or debt terms must enter a saved project scenario. Leaving it in the survey notes while the calculator keeps the old assumption would defeat the purpose of the screen.

Appendix I – Legal, Regulatory and GDPR Boundary Matrix

Four tax questions can change the project economics and require answers in the pilot jurisdiction (§4.7). How is conversion treated for VAT compared with new-build? What tax treatment applies to the Fund, alongside the separate question of its regulatory status (§4.5)? How is the engine-room surplus taxed? And does an owner contributing a building for equity trigger a taxable disposal?

The last question can make an apparently generous in-kind contribution difficult to deliver. All four need resolving before the structure is fixed, rather than after the financial model has become attached to it.

The engine room also needs a clear answer on short-let regulation. The proposed mid-term tier differs from the market facing tighter rules in Paris, Barcelona and elsewhere (§2.4), but describing that difference does not establish an exemption.

Three features warrant examination. Stays last three to twelve months rather than a few nights, so the design treats the flat as a home for that period. Genuinely short stays are a separate member-to-member exchange: someone makes their own home available while away, through an internal arrangement rather than a commercial booking. Finally, the cooperative ownership structure raises the question of whether some payments could be characterised as usage fees rather than rent. That characterisation remains untested. National law, not the name chosen for the payment, will decide.

A municipality might also distinguish an offer whose surplus supports permanently affordable housing from a conventional commercial operator. I would not treat that possibility as legal protection. If a jurisdiction classifies the serviced tier as a regulated short let, the design may need a longer minimum stay and greater reliance on the commercial ground floor. The financial case would then have to be tested again. This is a first-order question for pilot due diligence.

Supports §4.5–§4.7, §5.2, §5.9 and Chapter 6. This matrix separates design intent from propositions that require jurisdiction-specific legal advice. It is not legal advice. Table I.1 sets out the matrix.

Table I.1 – Legal, regulatory and GDPR boundary matrix: thesis-level status and the evidence required before a pilot.

Issue	Thesis-level status	Boundary / risk	Evidence required before pilot
SCE umbrella	Available in principle for cross-border cooperative coordination	Article 8 refers material questions to national law; incorporation does not establish operating feasibility	Registration-state opinion, statutes and employee-involvement process
Local asset vehicle	Proposed local cooperative or ring-fenced project vehicle	Ownership, insolvency and resident rights vary by jurisdiction	Local vehicle comparison and insolvency analysis
EHC Fund / external capital	Proposed patient-capital pool	Collective investment may trigger AIFMD or national fund rules	Regulatory perimeter opinion, manager / marketing analysis and investor classification
Investor and resident ranking	Design intention	Loss waterfall and redemption promises are not self-enforcing	Statutes, financing contracts, security package and insolvency review

Issue	Thesis-level status	Boundary / risk	Evidence required before pilot
Company membership and procurement	Organisational membership proposed alongside separately contracted supply	Supplier influence, related-party transactions and eligibility depend on statutes and applicable procurement rules	Admission and voting rules, resident-control safeguards, conflicts register, recusal procedure and independent contract approval
Technology partnerships and impact communication	External tools under cooperative control; contribution-based CSR claims	Vendor lock-in, inappropriate data access and unsupported environmental claims	Licensing and exit terms, data/processor review, substantiation of claims and agreed use of the EHC identity
Golden share and mission lock	Proposed governance safeguard	Enforceability and compatibility with cooperative law vary	Country-specific opinion and amendment / enforcement mechanics
Leasehold / building right	Comparatively assessed in Appendix G	Legal existence does not prove owner willingness or lender acceptance	Owner heads of terms, valuation and lender confirmation
Resident allocation	Transparent, mission-bound allocation proposed	Discrimination, consumer, subsidy and housing-allocation rules may apply	Published criteria, equality review, conflicts policy and appeal route
Analytics data	Cookieless and privacy-minimising design	IP-derived hashes may remain pseudonymous personal data; anonymity is not assumed	Data-flow map, controller determination, lawful basis, retention, access controls and processor agreements
Interest-form profiles	Consented, minimal and self-selected	Consent must be specific and withdrawable; research use and operational contact must be distinguished	Privacy notice, consent record, deletion route, purpose separation and export log
Interviews and conversations	Not used as coded H2 evidence in this thesis	Future formal research requires consent, secure notes and a lawful basis	Protocol, information sheet, consent form, retention schedule and ethics approval where required
Automated / AI services	Knowledge assistant and AI-supported development disclosed	Input data, hallucination, vendor processing and AI Act duties require control	Vendor and data review, user notice, human review and prohibited-data rules
Authorship and AI disclosure	Author retains responsibility and discloses assistance	Wording must match FH Kärnten's authorised declaration	Supervisor approval, tool-use log and final declaration check

I.1 Minimum GDPR record before field research

Before field research, the data record needs to say who is responsible and what each piece of information is for. Name the controller and processors, map every field and

purpose, and document the lawful basis. Collect no more than is needed, set retention and deletion rules, and document access controls and security.

The record must also provide for data-subject rights, keep newsletter, research and housing-allocation purposes separate, complete a DPIA screening, and record breaches and vendor transfers. Until this work is complete, I describe the platform as privacy-minimising, not legally certified or anonymous.

Appendix J – Design Principles

What could someone take from this design without adopting the EHC as a whole? Section 5.8 develops five transferable principles, and Chapter 7 summarises their contribution. Here I make each explicit enough to be challenged or used elsewhere.

Following Gregor et al. (2020, p. 1633), a principle identifies who would implement it, for whose benefit, in what context, through which mechanism and for what reason. Table J.1 sets out the five in that form. The structured format serves a purpose: another project should be able to test a principle without first agreeing with the entire proposal.

Table J.1 – The five EHC design principles stated in the schema of Gregor et al. (2020).

#	Design principle	Aim — for whom	Context	Mechanism	Rationale
1	Protect the cost-rent core	For the cooperative, so residents obtain housing at durable cost	Mixed-tenure conversion in a high-pressure urban market	Price long-term homes at full modelled cost, including debt service and the fixed return on Fund equity; resident shares pay no dividend. Route residual surplus first to investor repayment, then through the Surplus Pool to later projects. The baseline replaces outside impact capital; optional later-cohort entry relief replaces resident capital with Fund equity and raises rent. First-cohort relief requires separately committed funding	Initial cost-based pricing and enforceable mission rules resist speculative repricing. Subsequent cost coverage and the market discount depend on the stated escalation, cost and solidarity assumptions (§4.4)

#	Design principle	Aim — for whom	Context	Mechanism	Rationale
2	Separate local asset control from network capital and infrastructure	For the network, so local democracy survives cross-border scale	A cooperative operating across jurisdictions with differing legal forms	Hold each building in its own locally controlled vehicle under national law; pool capital, standards and digital infrastructure centrally; reserve the golden-share veto for mission breaches alone	Enforceable ring-fencing can limit contagion, while local control keeps decision rights close to residents. Shared capital and infrastructure seek economies of scale without transferring all governance upwards (§4.5)
3	Model the failure frontier, not a single forecast	For the designer and the examiner, so the limits of the claim stay visible	Financial modelling of an unbuilt system under contested assumptions	Expose the load-bearing assumptions as adjustable levers, and report the point at which each breaks the case alongside compound stress bundles	A single forecast invites belief; a stated breaking point invites testing, and is falsifiable in the sense §4.8 requires
4	Keep behavioural assumptions outside the calculator	For the researcher, so arithmetic is not mistaken for evidence	A design whose viability depends on how residents and owners actually behave	Fix behavioural parameters as declared inputs rather than derived outputs, and route each to a named field test	Embedding a behavioural guess inside a calculation launders it into a result; separating the two keeps the burden of proof where it belongs (Chapter 6)
5	Treat city rankings as search tools; the building is the unit of feasibility	For implementers choosing where to act	Continental screening where data coverage is uneven	Use weighted city scores to order investigation, then admit a project only through a building-level evidence gate	City averages cannot establish that a particular building converts within the rent structure; the gate stops a high score standing in for due diligence (§4.3)