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DECARBONISATION THROUGH INNOVATION

Insights from testing three innovative business models for the heat pump rollout

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Abstract

Heat pumps are essential for decarbonizing heating in buildings, yet their adoption is hindered by high upfront costs, limited consumer awareness, and fragmented supply chains. This paper presents insights from three innovative business models tested within the EU-funded LIFE project install.res to accelerate heat pump uptake in existing residential buildings across Austria, Slovenia, and the Netherlands.
The first case study examines a social housing model in Austria, where a social housing association established an in-house installation company to ensure affordability and streamline heating transition towards heat pumps. The second case explores the "Rent a Heat Pump" (RaHP) model in Slovenia, which offers long-term rental contracts to reduce financial barriers and transfer technical risk to providers. The third case introduces the Dutch Heat Pump Comparator (HPC) platform, a digital solution developed with municipalities to simplify homeowner decision-making by enabling transparent comparisons of heat pump options, installation costs, and performance metrics.
Results show that cross-sector collaboration, trust-building mechanisms, and tailored financing approaches are critical for overcoming adoption barriers. The Austrian model demonstrates how organizational capacity and supportive regulation enable cost-effective decarbonization in multi-apartment buildings. The Slovenian RaHP model highlights the importance of contract clarity, service readiness, and policy alignment for market viability. The Dutch HPC platform illustrates how digital tools combined with municipal engagement can significantly enhance transparency and consumer confidence, leading to higher uptake rates. These findings provide actionable pathways for scaling heat pump deployment and achieving climate targets through innovative, locally adapted business models.

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Keywords: Heat Pumps; Business Models; Heat Transition; Local Collaboration.

1. Introduction

Recent technological advancements have made heat pumps a competitive alternative to fossil fuel heating in existing buildings. Their ability to provide both heating and cooling from a single unit makes them especially attractive in the context of a changing climate. Heat pumps emit less greenhouse gas emissions and offer a higher efficiency than traditional oil or gas boilers [1]. In 2023, only 26.2% of heating and cooling was generated by renewable energy sources [2]. The installation of heat pumps in the EU has slowed down between 2022 (3 million units) and 2024 (2.2 million units) which shows that there is still a long way to go to reach the RePowerEU target of installing 60 million additional heat pumps in the EU by 2030 [3-4].

Heat pumps are the main means for the electrification of the heat sector in the built environment and increasingly support grid integration by leveraging periods of renewable energy surplus and low electricity

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prices [5,6]. Therefore, heat pumps act as a crucial technology to achieve efficiency gains and leverage cost-effectiveness of renewables for the clean energy transition. Despite these advantages of heat pumps and growing importance of electrifying heating systems, many building owners are reluctant to install heat pumps. Barriers include high upfront costs, limited awareness about the full spectrum of benefits, regulatory barriers, mismatched incentives (e.g., landlord–tenant issues) and limited availability of qualified installers [7].

This paper deals with the financing aspect of the heat pump rollout. More specifically, innovative business models around the heat pump rollout are explored. Within the EU-founded LIFE project install.res, innovative demonstration projects are being implemented in five partner countries (Austria, North Macedonia, Poland, Slovenia, and The Netherlands) targeting predominantly existing residential multi-apartment and single-family buildings [8]. From these demonstration projects, three case studies that test the implementation of alternative business models are examined in more detail. Firstly, the social housing model in Austria focuses on ensuring affordability to tenants and founding an in-house installer company. Secondly, the Dutch example represents a multi-stakeholder project where an independent caretaker works with municipalities, trains energy advisors, and matches local installers and households via an online platform. Thirdly, insight from the implementation of the Rent a Heat Pump (RaHP) model in single-family homes in Slovenia is examined.

2. Social housing with installer daughter company in Austria

The Austrian heat pump market has experienced a steady growth from 2012 to 2022. In 2022, a peak of 60 357 sales of heat pumps and a stock of 430 000 heat pumps was reached [9]. In 2025, sales of heat pumps have declined by around 20% compared to 2024 [10]. The market share of renewable heating systems is 73% and 46% of heating systems sold are heat pumps [11].

The Austrian demonstration projects of install.res are operated by Sozialbau AG. Sozialbau AG is a social housing association in Vienna which has developed a distinct business model for decarbonizing their buildings. The housing association has founded a daughter company that executes the installation and maintenance services around changing heating systems of multi-apartment buildings. Social housing associations in Austria operate under the limited-profit principle which determines the core of their business activities as providing affordable housing and requires reinvesting funds into their building stock [12-13].

Currently, most of the associations' building stock is heated by decentral gas systems which the housing association aims to decarbonize at a big scale. To master this challenge, the social housing provider has founded a daughter company employing installers that are specialized in the installation and maintenance of photovoltaic, solar, electrical cooking, heating, air conditioning, ventilation, and sanitary systems to phase out natural gas [14]. The installation of heat pumps is planned in more than half of the building stock, mostly where no district heating connection is available. If possible, PV plants are combined with the installation of heat pumps.

Key success factors in this case study lie in the close collaboration between the housing provider and its affiliated installation company. This partnership builds upon the common interest of executing the heating system change in a cost-effective and minimally invasive manner which saves costs and increases acceptance among tenants. Moreover, through direct communication and coordinated planning which takes the different states of buildings in the portfolio and availability of workforce into account, efficiency gains can be achieved. The availability of a reliable and well-trained workforce further ensures high-quality installation outcomes.

The social and sustainability mission of the social housing provider is embedded in its legal structure, fostering trust among residents and guaranteeing the affordability of decarbonization measures. Financial sustainability is supported by long-term reserves earmarked for building maintenance and improvement, which facilitate the upfront investment required for energy retrofits. Additionally, funding sources are diversified through a strategic mix of public and private capital. The business model also serves as a platform for piloting innovative and cost-effective solutions, such as the community boiler – making use of disused chimneys for connecting flats to a heat pump in the attic – or façade activation systems combined with brine heat pumps, which provide both winter heating and passive summer cooling [15-16].

Despite this model being a cornerstone of the social housing association's pioneering role in decarbonization of heating system, some limitations to replication for other social housing providers apply. First, the establishment of an in-house installation company by a social housing provider requires a critical mass of building stock to ensure operational viability and economies of scale. Second, the limited-profit principle for social housing providers is reinforced by the specific legislative framework in Austria that mandate a maintenance and improvement premium, aligning financial practices with long-term sustainability goals. Third, an organizational culture is necessary that embraces flexibility, foresight, and a willingness to take calculated risks to pursue decarbonization.

3. Rent a Heat Pump in Slovenia

Heat pump uptake in Slovenia has increased steadily and is set to expand substantially under the national decarbonisation pathway. Official data indicate around 106,600 heat pumps in 2024 – mainly in single-family dwellings – rising to approximately 240,000 units by 2040 across the residential and service sector which aligns with the general building sector transition of the National Energy and Climate Plan [17-18]. In terms of market potential, household attitudes point to broadly favourable social acceptance of heat pumps. In 2022, 49% of households living in single-family homes reported a favourable stance toward heat pumps and around one-fifth already use a heat pump [19].

The business model tested in Slovenia to expand the heat pump market uptake in Slovenia is the RaHP model. Under a RaHP arrangement, the provider finances, owns, installs and maintains the heat pump for the duration of the contract—typically 10–15 years—while the end user pays a predictable monthly fee that covers the equipment and servicing; electricity consumption remains with the user and a buy-out option may be offered at term. Although conceptually simple and well aligned with the transition from product ownership to service provision, the model has yet to gain traction in Slovenia despite several attempts. In the install.res project, one of the Slovenian pilots focuses on understanding why a seemingly attractive offer has not converted into uptake, and what would be required—commercially, operationally and institutionally—to unlock adoption at scale. The immediate objective of this case study is to test a RaHP arrangement in the Slovenian context; the broader aim is to provide a replicable framework that peers can adapt in markets where the rental proposition is similarly nascent.

RaHP is not only conceptualized as a financing mechanism that lowers the barrier of high upfront costs for households, but also as a bundled performance proposition that transfers technical risk to professional providers and can, if well designed, accelerate decarbonization of existing buildings. This wider framing is crucial in a country where ownership norms are strong, energy-renovation decisions are episodic and often event-driven, and trust in long-term service contracts depends on clarity, responsiveness and visible accountability.

The market inquiry has two complementary tracks. On the supply side, installers and vendors are engaged through structured interviews tailored to their starting point—firms with prior experience of service-based offerings as well as those that operate purely on a sell-and-install basis. The interviews test business viability under a rental model, including access to capital and guarantees, management of credit risk and non-payment, logistics of long-term servicing, spare-parts planning and remote diagnostics. Particular attention is paid to contract design elements that drive trust and bankability: indexation rules for monthly fees; inclusions and exclusions (maintenance, callouts, repairs, replacement of major components); customer transfer and early-exit terms (e.g., in case of home sale); service-level commitments and remedies; and end-of-term options such as purchase or renewal.

On the demand side, large surveys of households are carried out to measure awareness, perceived benefits and concerns, willingness to pay a monthly fee and the value respondents place on specific “assurances”, such as transparent price-cap rules, extended warranties, 24/7 support, or verified commissioning. Because heat pumps intersect with broader renovation decisions, how RaHP sits alongside roof insulation, window replacement and electrical upgrades are also explored, and whether bundling or staged pathways would increase acceptance.

Finally, recognizing that business models are shaped by policy, the interaction of grants, guarantee schemes and VAT treatment with rental propositions is examined, and how consumer-protection templates might standardize terms in a way that is both user-friendly and financeable. The aim is to produce a coherent market picture: what a credible RaHP product for Slovenian single-family homes looks like; what price bands feel acceptable to different segments; what operational capabilities providers must build before entering; and which public-sector levers would most efficiently close viability gaps without distorting competition.

At the time of submission, fieldwork is ongoing, and the survey is still in execution; at the conference the quantitative results from these efforts will be presented. Yet, based on instrument design, scoping interviews and early qualitative feedback, several themes are already emerging. First, trust-by-design matters: standardized, plain-language contracts with clear inclusions, simple indexation and unambiguous early-exit and transfer provisions appear decisive for overcoming reservations about long commitments and non-ownership. Second, pairing the service offer with access to dedicated green finance (or risk-sharing mechanisms) is likely to be pivotal for providers, particularly smaller installers, who otherwise face balance-sheet constraints and exposure to credit risk that they are not set up to manage. Third, service capacity is a precondition, not an afterthought: providers contemplating RaHP need credible national coverage for maintenance, turnaround times that are explicit and monitored, and remote monitoring to detect under-

performance before it becomes a customer problem. Fourth, policy alignment can raise or lower the waterline for adoption: if rental models are clearly eligible for support on par with upfront purchases—ideally with outcome-based elements such as verified commissioning or minimum seasonal performance—bankability and user confidence improve together.

4. Connecting installers, municipalities and households via a platform in the Netherlands

In the Netherlands, one in twelve individual homes has installed a heat pump [20]. Since 2019, the market for heat pumps has grown steadily, reaching a peak in 2023. In 2024, 393 000 heat pumps were sold, of which 269 000 were air-conditioning units [21]. In new dwellings, heat pumps are the most common sold heating system with a market share of 75% [20]. Due to a relatively low heat-demand-density in single family home neighborhoods, district heating is often not relevant. It is therefore to be expected that a large share (around 70%) of all homes in the Netherlands will switch to heat pumps up to 2030.

For homeowners it is difficult to get an overview of the complex market for heat pumps, the available heat pump options and prices, and in particular the differences in price and performance. Moreover, homeowners often lack the information which installation company offer which brands and options of heat pumps. The best way to get more specific information about installing the adequate heat pumps for a building is to contact an installation company and ask for a quote. However, installation companies mostly have hands on experience with just a couple of brands and types of heat pumps. They often do not offer advice in favor of brands or types of heat pumps that they are not accustomed with.

The Dutch install.res partner, De WarmteTransitieMakers, has developed a digital platform that enables homeowners to find a suitable heat pump, show the costs of installation, and compare the performance of the different heat pumps for their building. The platform can work on a national level, but it is specifically designed to operate as a local platform (i.e. on a municipal level). This platform is called “The Heat Pump Comparator” (HPC) and is implemented in the Dutch install.res demonstration sites. The platform targets homeowners and is implemented through a collaboration between local installers and municipalities.

The HPC platform can be set up for a municipality or a region. Local installation companies are contacted and offered the possibility to make their products and services visible on the platform. Via a back-end interface the local installation company can indicate which heat pumps they offer and in what price range they offer installation of those heat pumps. As the HPC platform has an extensive database of heat pumps, their characteristics and prince range from national dealers, the installation company does not need to provide a lot of information themselves. They can simply check the brands and types of heat pumps that they offer. In addition, they can change the price range of installation costs. They can do this centrally in one go for all products, or they can differentiate installation costs for each product.

Once the platform has been configured with the data provided by the installers, the subsequent user journey proceeds as follows. Homeowners that visit the HPC platform are asked to fill out their address. Available data from the national residential register is retrieved (i.e. the construction year, expected insolation status, living area of the building) and a first estimation of the current heat consumption is made. The homeowner is asked to check the data and adjust where needed. In addition, the homeowner must indicate what type of heating systems is currently installed and if the house is heated through traditional radiators, low-temperature convectors and/or underfloor (or in-wall) heating systems. To assess the space for placement of installation units, the homeowner also needs to indicate if there is space available on a roof, garden or wall to place an outdoor unit. Once all necessary data on the building is inserted into the platform, the homeowner is asked about their most important purchasing criterion: 1) low upfront investment, 2) return on investment, 3) sustainability performance, 4) best performance (lowest energy consumption) or 5) lowest noise level.

Having enquired all the information from the homeowner, the HPC platform shows what types of heat pumps are suitable for the homeowner’s preferences. The platform matches the heat pumps output power with the current heat consumption. Depending on the availability of space, the outcome will include or exclude ventilation heat pumps, split units, monobloc, brine heat pumps. In addition, the HPC platform prioritizes the different heats pumps to the most important purchase criterium.

The homeowner can now compare the different heat pump options with each other. Not only the price levels are made available, but also the expected performance levels, meaning if a building has traditional radiators, the platform will calculate savings based on the seasonal coefficient of performance (SCOP) when delivering 55 degrees of heat. Moreover, homeowners can see which local installation companies offer the different heat pumps and at what price range. It is also possible to enquire whether they offer additional services like maintenance and service to ensure optimal operational settings. To obtain a definitive price, the homeowner may select an installation company and submit a quotation request with a single click. It is possible for the

homeowner to request multiple quotes for different heat pumps from different installation companies to compare these. Following the submission of a quotation request to a local installation company, an installer will conduct an on-site visit to assess the property and subsequently provide a customized offer with a tailored price.

The primary objective of the platform is to simplify the decision-making process for homeowners by enabling them to compare and identify a suitable heat pump that aligns with their household's heat consumption. Through the platform, homeowners can evaluate prices and performance metrics, select a heat pump that meets their key purchasing criteria, and request a quotation from an installation company—all within a single, integrated interface.

The HPC platform is developed in close collaboration with municipalities, accompanied by targeted communication campaigns to ensure residents are well-informed about its availability and benefits. Jointly designing communication strategies with municipalities has proven highly effective. These campaigns focus on specific neighborhoods that must transition from natural gas to fully electric solutions, as well as those that would benefit from an initial step toward hybrid or all-electric-ready options. Municipal involvement significantly enhances the platform's credibility. Homeowner trust in the platform's impartiality and independence is essential for its success. By partnering with municipalities, the platform reinforces its neutrality, as municipalities aim to promote local sustainable entrepreneurship and maintain independence from individual brands or companies. To further emphasize transparency and eliminate any perception of commercial bias, the platform is implemented as a white-label solution, allowing municipal branding and logos to be integrated seamlessly.

Key advantages for the different stakeholders evolve from implementing the HPC platform in different municipalities in the Netherlands. First, the platform is attractive to installation companies as they only spend little time in setting up and maintaining their product offers. Moreover, they profit from an additional channel to reach potential customers and rising awareness among residents. Second, the decision-making process for homeowners is simplified. Homeowners receive a realistic price range for installation costs and know which upfront investments are required. This simplicity and reliability of offers leads to homeowners tending to decide more often for buying a heat pump. Third, municipalities benefit from an increased uptake of heat pumps in their neighborhoods to reach their climate targets. Also, the setup of the platform within a municipality does not require high upfront investment (10.000€ to 15.000€ per municipality). However, active and repeated communication is needed to ensure that homeowners start and continue using the platform.

5. Conclusion

Each of the case studies is a distinct way to approach different barriers in the heat pump roll-out. Key takeaways from the implementation of these innovative business models are that cross-sector collaboration and deployment of intelligent, cost-optimized solutions are key assets. Through identifying appropriate demand and supply-related retrofit measures and bringing together stakeholders from diverse sectors, such as installers with public institutions and/or housing associations, or manufacturers with end users, synergies in planning, implementation, and social acceptance of heat pumps can be achieved.

The case of the social housing association in Vienna shows that affordability and decarbonization can complement each other. Long-term reserves built up by the limited-profit structure and the founding of an own installer company allow for a cost-effective and efficient installation of HP in multi-apartment buildings. Next to a supportive regulatory framework, internal motivation and willingness to try new approaches are essential to drive innovation and implement pivotal decarbonization solutions in the built environment.

In the Slovenian case, the authors expect that a viable Slovenian RaHP pathway will combine a transparent product profile (contract length, inclusions, end-of-term options) and indicative monthly-fee thresholds anchored in household reality, with a provider readiness roadmap (capital access, credit screening, asset management and service logistics) and a light-touch policy toolkit that levels the playing field without picking winners.

The Dutch case effectively addresses the complexity of the decision-making process for homeowners by providing them with transparent comparisons of costs, performance, and installation options. Its collaborative implementation with municipalities ensures trust, impartiality, and strong local engagement, while supporting climate goals. By simplifying decision-making and connecting residents with local installers, the platform accelerates the adoption of sustainable heating solutions in a cost-efficient and user-friendly manner.

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