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heat pump rollout. simple and affordable.

# Catalogue of Heat Pump Business Models

## Deliverable D2.2

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## Executive Summary

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 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 prices. 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 on heat pump's potential, regulatory barriers, mismatched incentives (e.g., landlord–tenant issues) and limited availability of qualified installers. This catalogue deals with the financing aspect of the heat pump rollout and evaluates different financing options and business models for heat pump installation.

Knowledge of innovative financing models for heat pump adoption remains limited among professionals and building owners, with most relying on the traditional purchase model supported by subsidies and loans. However, its high upfront costs and limited adaptability to diverse customer needs hinder investments into heat pumps. In response, alternative business models (BM) have emerged, tailored to different customer preferences, and often reducing upfront costs. Such alternative BM range from renting and contracting offers over group purchasing initiatives to full-service packages for all-electric buildings.

This catalogue targets potential BM providers, implementers, and policy makers. In many countries, alternative BM are still emerging and not integrated in the market. The report offers a structured overview of 12 innovative BM, comparing them to the traditional purchase model. The first part of the catalogue outlines how each BM works, illustrates market offers, and highlights strengths and weaknesses from a consumer, BM provider, and systems perspective. The second part reviews existing offers in Austria, North Macedonia, Poland, Slovenia, and the Netherlands — countries participating in the *install.res* project. Each country section discusses three to four models, highlighting opportunities and barriers to scaling up in the local context.

Table 1 shows the distribution of risks between BM provider and customer for each BM (building upon Delta EE<sup>2</sup>). Most of the 12 BM for heat pumps aim to reduce or eliminate upfront investment barriers for customers, either through leasing, renting, contracting, or bundling mechanisms. All BM require professional installation and quality assurance to ensure system efficiency. Yet, the BMs differ in scalability, complexity, and suitability for different building types. Energy Performance Contracting (EPC) and Energy Supply Contracting (ESC) are better suited for large-scale or institutional buildings due to their complexity and need for bundled energy efficiency measures. In contrast, BM like Rent a Heat Pump, Heating as a Service (HaaS), Asset Leasing, On-bill Financing, Joint Purchase Initiatives (JPI) and One-Stop-Shops (OSS) are more accessible for single-family homes. Community Financing and Project Pooling are ideal for neighbourhoods or housing blocks with similar characteristics. Lastly, Vertical Integration in Social Housing requires a critical mass of building stock to build up an in-house installation company.

Table 1: Distribution of risks between BM provider and customer

	Business model provider	Customer/ end user
<b>Rent a HP</b>	Financial risk, Technical risk, Ownership	Performance risk, Electricity price risk, Behaviour risk
<b>Heat as a service</b>	Financial risk, Technical risk, Performance risk, Electricity price risk, Behaviour risk	Behaviour risk
<b>Asset leasing</b>	Financial risk, Technical risk, Ownership	Performance risk, Electricity price risk, Behaviour risk
<b>Energy supply contracting</b>	Financial risk, Technical risk, Performance risk, Electricity price risk, Behaviour risk	Behaviour risk
<b>Energy performance contracting</b>	Financial risk, Technical risk, Performance risk, Electricity price risk	Electricity price risk, Behaviour risk
<b>On-bill financing</b>	Financial risk, Technical risk, Ownership	Performance risk, Electricity price risk, Behaviour risk
<b>Community financing</b>	coordinates	Financial risk, Technical risk, Performance risk, Electricity price risk, Behaviour risk
<b>Pooling</b>	coordinates	Financial risk, Technical risk, Performance risk, Electricity price risk, Behaviour risk
<b>Joint Purchase</b>	coordinates	Financial risk, Technical risk, Performance risk, Electricity price risk, Behaviour risk
<b>Public One-Stop-Shop</b>	coordinates	Financial risk, Technical risk, Performance risk, Electricity price risk, Behaviour risk
<b>Commercial One-Stop-Shop</b>	(Financial risk), Technical risk, (Ownership)	(Financial risk), (Technical risk), Ownership, Performance risk, Electricity price risk, Behaviour risk
<b>Vertical integration in social housing</b>	Financial risk, Technical risk, Performance risk, Electricity price risk, Behaviour risk (BM provider = customer)	

 Financial risk
  Technical risk
  Performance risk
  Electricity price risk
  Behaviour risk
  Ownership

Business models offered by a commercial BM provider are described in Table 2. Next to retaining ownership of the heat pump throughout the contract, these BM offer service packages which include installation, maintenance, and sometimes performance monitoring or energy optimization services. Some models shift technical and financial risks from the consumer to the business model provider, especially in service-based models like HaaS, Rent a Heat Pump and ESC. These BMs offer low or no upfront costs, predictable monthly payments, and full-service packages, making them attractive for end users seeking convenience and financial accessibility. However, these BMs also present notable drawbacks. Many involve higher lifecycle costs than the traditional model, long-term contractual obligations, and limited transparency in cost composition, which can deter end users who prefer ownership, customization, and want full cost transparency.

Business models where the BM provider has a coordinating role are described in Table 3. These BMs serve to simplify the purchase and installation process for end users. The ownership of the HP remains with the end user in these BMs. Often the BM provider serves as an intermediary between end users and HP manufacturer or installer. As for JPI and public OSS, BM providers simplify procurement and installation through centralized coordination. Yet, in many cases it remains a challenge establishing an independent entity which can take over the role of the coordinator. Moreover, these BMs are reliant on regional availability of qualified installers, and in some cases energy advisors and public funding. Additionally, community-driven models, while empowering end users, require significant organizational effort and consensus-building, which can slow implementation.

Looking at the local context in the partner countries, different models are prevalent or suitable. In Austria, public OSS streamline and simplify the installation process through harnessing a local network of energy advisors and qualified installers. Another unique example is the Vertical Integration in Social Housing of Sozialbau AG who have an in-house installation company to decarbonize its building stock efficiently and affordably. In North Macedonia, HaaS, EPC, OSS, and Rent a Heat Pump offer tailored, service-based solutions that lower upfront

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costs and simplify heat pump adoption for diverse user groups. Their successful implementation strongly depends on regulatory support, targeted subsidies, and increased consumer awareness.

In Poland, EPC is the most mature BM, particularly for public and commercial buildings, while HaaS and On-Bill Financing offer scalable alternatives for smaller projects. In Slovenia, the traditional installer-led model is still predominant but JPI and renting models are explored. In the Netherlands, an OSS platform simplifies decision-making, while leasing and HaaS models remain niche due to cultural preferences for ownership.

Table 2: Comparison of Business Models (Part I)

	Rent a Heat Pump	Heat as a Service	Asset Leasing	Energy Supply Contracting	Energy Performance Contracting	On-bill Financing
Lowering up-front costs	Completely	Completely	Completely	Completely	Completely	Completely
Reduced life-cycle costs of heat supply	No	No	No	Possible	Yes	No
Guaranteed operating reliability (heating breakdown protection)	Yes	Yes	Possible	Yes	Yes	Possible
Monitoring and improvement of heating system performance	Possible	Possible	Possible	Often yes	Yes	Possible
Business model provider pays for electricity	No	Yes	No	Yes	Possible	No
Reduction of heat demand due to e.g. retrofitting measures included	Often no	Possible	Often no	Often no	Yes	Often no
Behaviour risk lies with business model provider	No	Yes/Partly	No	Often no	Partly	No
Customer free to choose heat pump type and brand	No	No	Often no	No	No	Often no
Reduced time effort for customer to organise installation	Partly	Partly	No	Yes	Yes	No
Suitable for individual or institutional building owners	Individual	Individual	Both	Both	Institutional	Both

Table 3: Comparison of Business Models (Part II)

	Community Financing	Project Pooling	Joint Purchase Initiative	One-Stop-Shop (public)	One-Stop-Shop (commercial)	Vertical Integration in Social Housing
Lowering up-front costs	Partly	Partly	Partly	Often no	Possible	Partly
Reduced life-cycle costs of heat supply	Partly	Possible	Possible	Possible	Possible	Yes
Guaranteed operating reliability (heating breakdown protection)	Possible	Possible	Possible	Possible	Often yes	Yes
Monitoring and improvement of heating system performance	Possible	Possible	Possible	Possible	Often yes	Yes
Business model provider pays for electricity	No	No	No	No	No	No
Reduction of heat demand due to e.g. retrofitting measures included	Possible	Possible	Often no	Often yes	Often no	Yes
Behaviour risk lies with business model provider	No	No	No	No	No	No
Customer free to choose heat pump type and brand	Yes	Possible	Partly	Yes	Often no	Yes
Reduced time effort for customer to organise installation	Possible	Possible	Partly	Yes	Yes	Yes
Suitable for individual or institutional building owners	Both	Both	Individual	Individual	Individual	Institutional

## List of Abbreviations

<b>DBMFO</b>	Design, Build, Maintain, Finance, Operate
<b>EPC</b>	Energy Performance Contracting
<b>ESCO</b>	Energy service company
<b>ESC</b>	Energy Supply Contracting
<b>EMS</b>	Energy Management System
<b>EU</b>	European Union
<b>HaaS</b>	Heat as a Service
<b>HP</b>	Heat pump
<b>JPI</b>	Joint Purchase Initiative
<b>kWh</b>	Kilowatt-hour
<b>OSS</b>	One-Stop-Shop
<b>OBF</b>	On-bill financing
<b>PV</b>	Photovoltaic
<b>PPP</b>	Public-private Partnership
<b>RES</b>	Renewable energy system
<b>SPV</b>	Special purpose vehicle
<b>SWOT</b>	Strengths, Weaknesses, Opportunities, and Threats
<b>VAT</b>	Value Added Tax

# Glossary

<b>Business model</b>	In the context of this report, a business model describes a structured framework that defines how a heat pump solution and related energy services are offered, financed, installed, maintained, and legally arranged for end users across different building segments. A business model not only outlines the technical solution but also determines the division of financial, technical, and operational responsibilities between the business model provider and customer.
<b>Business model provider</b>	A company that offers energy services to its customers. The business model provider is the entity that designs, implements, and manages the business model, offering the solution or service to customers and coordinating the value chain. The business model providers are a heterogeneous group including energy service companies (ESCOs), technology providers, traditional energy utility companies, consulting/engineering firms, startups, HP manufacturers or other cooperations responsible for delivering the financial, technical, and operational framework enabling the uptake of energy solutions such as heat pumps.
<b>Customer</b>	The beneficiary of the business model directly engaging with the business model provider. Normally it is the owner or a property manager of a building, either private or public (municipalities, cities, schools...). In the residential area this can include individual homeowners, building owners (private or institutional), and owners' associations (e.g., condominium or housing cooperatives), who engage and gain value from the proposed solution.
<b>Energy services</b>	Energy service defines the physical benefit, utility or good derived from a combination of energy with energy-efficient technology or with action, which may include the operations, maintenance and control necessary to deliver the service, which is delivered on the basis of a contract and in normal circumstances has proven to result in verifiable and measurable or estimable energy efficiency improvement or primary energy savings (from Directive (EU) 2023/1791 on energy efficiency, §2(11)).
<b>End user/ end consumer</b>	The individual or group directly using and experiencing the benefits of the installed HP system. End users may include tenants or occupants who are not necessarily the customers, as they do not directly engage with or finance the BM but still benefit from the improved comfort, EE, or cost savings.

# I. Introduction

Knowledge of innovative financing models for heat pump (HP) adoption is moderate among professionals, including suppliers, service providers, consumer organizations, and government authorities. The most widely known and implemented model is the traditional purchase model, where consumers buy HPs using their own funds, often benefiting from government subsidies and bank loans. However, many building owners are deterred by the high up-front investment costs of HP installation, even with subsidies and loans. Limited financial literacy among consumers complicates decision-making, as many are unaware of the different financing models available to them. Certain consumer groups face specific challenges in financing HP. Low-income households struggle in particular with the high investment costs despite potential long-term savings, while larger commercial buildings require tailored financing solutions due to their complex systems and higher investment needs.

Therefore, new and innovative financing approaches are crucial in boosting HP adoption. Crowdfunding and collective investment models allow multiple households to pool resources, making HP systems more affordable. Integrating HP with renewable energy sources, such as solar power, enhances efficiency, cost-effectiveness, and sustainability of the system. Financing installation and maintenance through monthly fees is another approach that is implemented by different alternative business models (BMs) to reduce up-front costs. These innovative approaches should ease the financial burden on consumers and enabling wider accessibility to HP installations.

The catalogue should serve potential BM providers, implementers of HP solutions and policymakers as an overview of possible alternative BMs and an analysis of the most promising aspects and current barriers for up-scaling; both in a general and country-specific context. In the first part of this catalogue, 13 BMs (the traditional and 12 alternative BMs) for the HP rollout were selected and are discussed and analysed regarding their opportunities and threats for the market, end users and up-scaling. Extensive literature research including HP-related EU project results and commercial offers was conducted for the selection of BM and their analysis. BMs were selected based on their potential to stimulate the large-scale demand for HPs in existing buildings, their replicability, and their innovative approach to financing, installation, and service provision.

The catalogue defines a BM as a structured framework of how a HP solution is offered, financed, installed, maintained, and legally arranged for end users across different building segments. A BM not only outlines the technical solution but also determines the division of financial, technical, ownership-related, and operational responsibilities between the BM provider and customer. The customer can be the end user of the HP as is often the case in single or semi-detached houses or an institutional building owner (e.g., housing association, government) who is mostly responsible for the heating system in multi-apartment, public or commercial buildings.

The second part of this catalogue deals with country-specific context and potential of different BM. For each partner country of the *install.res* project (Austria, North Macedonia, Poland, Slovenia, The Netherlands), three to four BMs were selected that represent promising and innovative approaches to triggering more demand for HP adoption in these countries. The selection and classification of BMs is based on focus groups and surveys with stakeholders from the HP market, public sector, and academic institutions in each country. The selected BMs are discussed with regards to opportunities and barriers to up-scaling in each country. These country-specific fact sheets should support national policymakers and BM providers in their decision-making and inspire stakeholders from other countries for implementation of innovative financing approaches.

## Structure of the catalogue

### II. General Business Models

In the general section, the catalogue presents 13 factsheets detailing the most promising BMs for HPs. Each factsheet follows a consistent structure:

- 1. How the model works:** Offers a comprehensive overview of the BM, organized into four subtopics:
  - ▶ **Target market segment:** Specifies the types of buildings the model targets, such as single-family houses, semi-detached houses, multi-apartment buildings, office buildings, or commercial buildings.
  - ▶ **Financing:** Describes sources of financing, payment structures (e.g., monthly or lump sum payments with or without price escalation clauses), upfront cost arrangements (e.g., subsidies, equity contributions), and specialized financing bodies supporting the model.
  - ▶ **Services:** Details installation services (including planning, retrofit integration, and equipment selection options) and maintenance services (e.g., routine servicing, emergency support, remote monitoring, insurance options, and whether a full "care-free" package is offered).
  - ▶ **Legal aspects:** Clarifies ownership of the HP, contract duration, end-of-contract options (e.g., dismantling or ownership transfer), and procedures in case of insolvency (e.g., dismantling or insurance options).
- 2. Cases in practice:** Provides real-world examples where the BM has been implemented, highlighting lessons learned and practical outcomes.
- 3. SWOT analysis:** Identifies the strengths & weaknesses from the end-user's perspective, and the opportunities & threats from a broader system perspective. The SWOT analysis focuses solely on specific and significant aspects of the BM. Broader market conditions and general opportunities and threats to HP adoption have been addressed in existing literature<sup>1</sup>.

Chapter 14 | Outlook discusses strategies to scale up the BMs. Firstly, it explains refinancing options for BM providers that finance up-front investments (e.g., securitization of receivables). Secondly, opportunities evolving from flexibility options and grid integration of heat pump systems are highlighted.







### III. Country Section

In the country section of the catalogue, three to four BM that are particularly relevant to the partner countries of *install.res* (Austria, North Macedonia, Poland, Slovenia, and The Netherlands) are analysed. The country part is structured in three sections:

- 1. Description of the business model:** Country-specific description of cases in which the BM is implemented in the country or specification about how a potential offer could look like.
- 2. Opportunities and barriers to up-scaling:** Discussion of factors that support the success of the BM or hinder further up-scaling related to the national context.
- 3. Conclusion:** Summary of the key insights from the country-specific analysis, including the overall potential of the business model and its relevance in the national context.















































































## II. General Business Models

To give a simple overview of the differences and opportunities of the discussed BMs, Table 1 shows the distribution of risks between BM provider and the BM customer. Building upon Delta EE's work<sup>2</sup>, following risks are defined as being relevant to the financing, design, installation and running of a HP system.

-  **Financial risk:** The credit risk of financing up-front costs of HP purchase and installation.
-  **Technical risk:** The risk of carrying out or paying for maintenance and repair services in the case of defects or breakdown of the HP system.
-  **Performance risk:** The responsibility of ensuring an efficient functioning and heat distribution of the HP system given the existing building characteristics.
-  **Electricity price risk:** The responsibility of paying for the electricity consumption of the HP and associated risk of electricity price fluctuations.
-  **Behaviour risk:** The risk of paying for the impact of end user's behaviour and use of the HP (e.g. desired room temperature or timing of heat demand).
-  **Ownership of HP:** As ownership of HP plays a great role with regards to acceptance of the BM and legal impact, the ownership of the HP is also depicted in the table.

Given the different set-up and contractual obligations of the 12 discussed alternative BMs in the first section, these risks are distributed differently between the provider of the BM and the customer of the BM, who in some cases (e.g., private family homes) are also the end user of the HP.

Table 1: Distribution of risks between BM provider and customer

	Business model provider	Customer/ end user
<b>Rent a HP</b>	  	  
<b>Heat as a service</b>	     	
<b>Asset leasing</b>	  	  
<b>Energy supply contracting</b>	     	
<b>Energy performance contracting</b>	    	 
<b>On-bill financing</b>	  	  
<b>Community financing</b>	coordinates	     
<b>Pooling</b>	coordinates	     
<b>Joint Purchase</b>	coordinates	     
<b>Public One-Stop-Shop</b>	coordinates	     
<b>Commercial One-Stop-Shop</b>	  	     
<b>Integration into core business</b>	      (BM provider = customer)	

# 1 | Traditional Model

## 1.1 How the model works

The traditional BM for HP adoption follows the standard approach where customers directly purchase and install HPs without alternative financing or service models. This model is often chosen because of its cost-effectiveness over the life cycle, particularly when alternative BMs are not yet sufficiently developed or competitive.

Key features of this model include:

- Customers (individual homeowners, building owners, or owners' associations) finance the purchase and installation of HPs using their own reserves, available subsidies, or bank loans.
- Governments may support this model through various incentives, rebates, and financing options to lower upfront costs.
- Customers retain full ownership of the HP and are responsible for maintenance, repairs, and operational costs.

To further enhance the effectiveness of the traditional BM for HPs, various financial incentives and support mechanisms can be introduced. Governments can play a crucial role by providing targeted incentives and rebates that reduce the initial financial burden and make HPs a more attractive option for consumers. These incentives can take multiple forms, including market incentive programs, low-interest loans for both residential and commercial installations, tax credits, reduced Value Added Tax (VAT) rates, and subsidies. Additionally, governments can encourage financial institutions to support HP adoption by incentivizing lenders to offer more favourable loan terms, such as lower interest rates, extended repayment periods, or reduced down-payment requirements. By implementing these measures, policymakers can increase the affordability of HPs, accelerate adoption, and further support the transition to sustainable heating solutions.

### Targeted market segment

- Single-family and semi-detached houses.
- Multi-apartment buildings.
- Commercial buildings.

### Financing

#### Upfront costs

- Customers are eligible for one-off subsidies and grants that may reduce the cost of the initial investment.
- Customers cover the remaining costs through savings or loans.
- Public and private financial institutions may offer specialized financing (e.g., lower/subsidized interest rate) for HP investments.

#### Sources of financing

- Own reserves of tenants, owners, or housing associations.
- Government subsidies and incentives.
- Bank loans (mortgage or standard loan).

#### Charging policy

- Upfront investment by customer.

## Services

### Installation services

- Removal and disposal: Some BM providers will dismantle and dispose of the old heating system. Extra charges might apply.
- Site assessment and consultation: HP providers evaluate the building's heating needs, insulation, and existing system.
- System design: Sizing and selecting the right HP based on efficiency and capacity. Consumer is free to choose between different HP models and packages (e.g., cooling possibility, HP with a PV plant).
- Installation: Connecting the HP, integrating it with existing heating systems, and ensuring proper airflow.
- Some BM providers provide assistance with subsidy application.

### Maintenance services

- Many BM providers offer service and maintenance contracts or have certified service partners who handle inspections, repairs, and software updates. Typically, annual check-ups, filter cleaning, refrigerant checks, and emergency repair services are offered.
- Some BM providers offer remote monitoring and can diagnose problems remotely before sending a technician.
- Insurance for HPs is usually offered by third parties i.e., insurance companies.

## Legal aspects

### Ownership

- The customer owns the HP.

### Contract

- No contract established after purchase.

## 1.2 Cases in practice

Efforts to promote HP adoption in Europe combine subsidies, financial incentives, and innovative financing mechanisms. While national policies differ, most countries reduce upfront costs through direct subsidies, affordable loans, and tax incentives to encourage homeowners to transition to sustainable heating.

Up-front subsidies are the most common tool. In Vienna, currently funding covers up to 35% of eligible costs, while in North Macedonia and Slovenia, national programs provide varying support based on the system and replacement status. North Macedonia's programs, driven by air pollution concerns, include cash support and vouchers. Similarly, Slovenia's *Eco Fund* covers up to 40% of investment costs, particularly for system replacements. The Netherlands, the ISDE program subsidises around 30% of costs for purchase and installation of HPs alongside other sustainability upgrades.

Affordable financing options further support adoption North Macedonia's *Green Economy Financing Facility* and Slovenia's *Eco Fund* offer low-interest loans, some with partial grants. The Netherlands' *Heat Fund* offers zero-interest loans for lower-income households. Property-tied loans (i.e., building bound financing) are also gaining ground, aligning repayments with energy savings.

Tax incentives complement these efforts. Slovenia applies a reduced VAT (9.5%) for eligible installations, while the Netherlands' *SDE++ program* offsets long-term costs of sustainable technologies. Turnkey solutions are also

emerging. Providers like *Petrol* in Slovenia and others in Austria and the Netherlands offer full-service packages – handling installation, maintenance, and even subsidy applications - easing the transition for consumers.

## 1.3 SWOT analysis

In the following, the strength & weaknesses of the traditional model are elaborated from the end consumers point of view and opportunities & threats are analysed from a systems perspective.

### Legend:

\$ - Costs; ⚙️ - Technical performance; i - Information; ⌚ - Time Constraints; 👥 - Workforce; 🔗 - Dependencies

### Strengths

- \$ : Lower life-cycle costs compared to alternative models.
- \$ : No additional service fees beyond maintenance and electricity costs.
- ⚙️: Customer retains full control over system operation and choice of electricity provider.
- i: Traditional financing methods (subsidies, loans, personal savings, lump sum payments) are well-understood by both customers and financial institutions.
- i: Availability of independent and transparent information regarding subsidies and financing options.
- 🔗: No contractual dependency on third-party service providers.

### Weaknesses

- \$ : High upfront costs, requiring subsidies, loans, or personal savings which might deter adoption.
- \$ : Long application processes for subsidies and financing increase time constraints.
- \$ : High upfront costs make HPs less accessible for low-income households.
- i: Customers must navigate technical and financial aspects independently.
- ⌚: Lengthy coordination and installation process may delay implementation.
- 👥: Lack of expertise in installation coordination can be a barrier.

### Opportunities

- \$ : Government incentives and subsidies make adoption more feasible.
- \$ : Opportunity for the HP provider to offer bridge financing i.e., financing covering the cost of grant/subsidy that the customer awaits.
- \$ : Governments can encourage banks and lenders to provide favourable loan conditions for HP installations, including lower interest rates, extended repayment terms, or reduced initial payment requirements.
- ⚙️: Technological advancements may enhance efficiency and reduce costs.
- 👥: Expanding workforce training programs can address the skill gap in HP installations.

## Threats

- 💰 : Uncertainty regarding future electricity prices.
- 🔧 : Concerns about long-term reliability and maintenance costs.
- 👥 : Shortage of skilled workers may slow down installations.
- 🔗 : Policy changes may affect subsidies and financing options.

## 2 | Rent a Heat Pump

### 2.1 How the model works

“Rent a Heat Pump” is a BM where BM providers finance up-front investment costs and keep ownership of the equipment on a full maintenance contract basis. End users (in this case also customers) are charged a monthly fee covering financing, installation, and maintenance of the HP. Available HP brands, sizes, and types (mostly air-to-air and air-to-water) are often limited. Only if BM providers are energy suppliers or specialised service suppliers, end users can usually choose between HPs from different manufacturers. In some cases, PV systems are also offered on a rent your equipment basis in combination with heating systems.

End users select their own electricity provider and are responsible for paying the electricity consumption costs associated with the HP. The BM provider is responsible for ensuring that the HP operates flawlessly throughout the contract period. Therefore, the BM provider must have permanent physical access to its equipment. Additional services included in the service portfolio, and charged as part of the monthly fee, may be a troubleshooting hotline and insurance. The total rental costs over the term of 10 to 15 years can be higher than the purchase price of a HP, given that interest on pre-financed up-front cost and additional services are included in the fee. Ownership and residual value of equipment are also important contractual issues.

The BM provider holds the financial and technical risk. This means that the BM provider is liable for the credit repayment and any repair and maintenance services and damages to the equipment (regardless of the frequency and extent). The risks associated with the electricity consumption by the HP needed per kWh heat output (performance) and changes in electricity prices are held by the end user. Adequate design and maintenance services are therefore important to optimise the operation of the HP to avoid excessive electricity consumption.

#### Targeted market segment

- Single- and semi-attached family houses.

#### Financing

##### Upfront costs

- No upfront cost for the end user.

##### Sources of financing

- BM providers finance the HP and its installation through private equity and bank loans.
- Public funding or subsidies may be available to reduce up-front costs.
- Possibly third-party investors provide capital to the BM provider.

##### Charging policy

- End consumers pay a monthly fee including the purchase and installation of a HP and full maintenance. The fee varies based on size and type of HP, included services and contract period.

#### Services

##### Installation services

- Adequate design, installation, and maintenance of the HP.
- Possibly: Dismantling and disposal of old system.
- Possible add-on: BM provider assists with subsidy application.

- Possible add-on: Up-front energy assessment of the building (retrofit measures and optimisation).

#### Maintenance services

- Functioning of the HP is guaranteed over the contract period.
- Optional: 24/7 emergency breakdown service.

### Legal aspects

#### Ownership

- The BM provider owns the appliance.

#### Contract duration

- Fixed term contract, usually 10 to 15 years.
- Contracts are usually binding, independent of the actual end user, meaning that in case a building is sold, the new owner is obliged to take over the existing contract.

#### End of contract regulations

- Transfer of HP ownership to end user possible (customized offer).

#### Regulations in case of insolvency

- Some suppliers prefer monobloc systems, which can be dismantled quickly in the case of insolvency of the end consumer.
- Possibly a mandatory insurance for end users covering damages is required.

## 2.2 Cases in practice

Only few offers of the “Rent a HP” model exist in Germany, the UK, and Nordic countries like Denmark. In Germany, the market is most developed, with currently more than 10 BM providers (e.g., *enViaM*, *EWE*, *german contract*, *thermondo*, *Enercity*, *N-ergie*, *Viessmann*, *Enpal*, *beesandbears*, *cloover*, *getvamo*, *airahome*). In Austria, only one commercial supplier offers a similar BM with a bank as a financing partner. In general, the BM providers range from traditional energy utility companies, startups that have contracted regional installers, HP manufacturers or a cooperation between these actors.







Currently, “Rent a HP” offers vary greatly. Installation services normally include advice, planning, and installation of the HP. In most cases, dismantling and disposal of the existing plant are included in the monthly fee. Most providers offer air-to-water HPs. Only one of the compared providers also offered water-to-water systems. Most BM providers offer service packages as part of their monthly fee, including up-front cost financing, installation and maintenance services, and a 24/7 troubleshooting hotline. Only a few BM providers exclude any repair services.

Other services, like assistance with subsidy application, are included by about half of the commercial BM providers. Few offer quality assurance procedures for cost and performance optimisation, such as hydraulic balancing, a HP-readiness check of rooms and radiators, an individual renovation roadmap or various technology optimisation options including buffer storages. Installation of PV modules is often part of the HP installation offers, yet investments in PV installation are financed by the end user. Some providers also offer rent models for PV plants with a contract period of 18 to 20 years.


## 2.3 SWOT analysis

In the following, the strength & weaknesses of the Rent a Heat Pump model are elaborated from the end consumers point of view and opportunities & threats are analysed from a systems perspective.


Legend:


 - Costs; 
  - Technical performance; 
  - Information; 
  - Time Constraints; 
  - Workforce; 
  - Dependencies

### Strengths

 : No initial investment needed and predictable costs as unforeseen expenses for repairs are covered by the BM provider.


 : Regular maintenance and repairs of HP allow for stable performance.


 : Care-free package for end users, including coordination of installation, dismantling and disposal of the existing system, as well as maintenance and repair services.


 : End users receive a reliable supply of heat from an installation that they do not own and that is an asset that they may or may not be able to pay for.


### Weaknesses


 : Higher life-cycle costs than traditional BM.

 : Limited transparency of cost structure of monthly fee. End users may not be informed about interest rate payments and the proportion maintenance and service costs.


 : Electricity price risk remains with end user.



 : No incentive for providers to install more energy efficient devices since they do not benefit from lower energy consumption.


 : Long-term dependency on one BM provider. It is not possible to switch BM providers during contract period (usually 10-15 years).

 : Long-term contractual obligations. Customers cannot dispose equipment at any time. In case a building is sold, a new building owner must be found that takes over the contract.



### Opportunities

 : Some BM providers extend their renting portfolio to PV plants, batteries, and wall boxes, which offers new business opportunities and allows for a smart and highly efficient energy solution for the entire building.


 +  : BM demands high quality equipment and installation services to keep maintenance costs low.


 : Shorter realisation time as plug-and-play solutions emerge and installation times shorten due to better coordination and professionalisation.


### Threats

 +  : Only partially addresses the “Energy Efficiency First Principle”. Possible “lock-in” of inefficient heating system. BM provider has no incentive to install most efficient devices as the end user bears the electricity costs. Also, evaluation of retrofit measures and systemic optimisation is not necessarily part of the BM.

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: End user distrust may evolve from uncertainty about maintenance and repair costs during the contract period and potential delays in service through intermediaries.

: End user often prefers ownership of HP.

: Lack of skilled workers for high-quality installation is a risk for the reliability of the service.

## 3 | Asset Leasing

### 3.1 How the model works

Asset leasing is a BM in which the BM provider charges a fixed monthly fee to lease a HP system to the customer. The leasing agreement typically includes routine maintenance, repair services, and sometimes additional benefits such as energy optimization consulting, but the customer does not own the appliance. Unlike rental agreements, the lessee assumes all rights, risks, and obligations, including responsibility for damages and product failure. The customer may also have the option to purchase the HP for a nominal fee at the end of the lease period, often after several years. As the technological risks is borne by the customer, they are advised to acquire insurances. Additionally, many asset leasing agreements provide flexibility, allowing customers to upgrade or replace the appliance during the lease term.

#### Targeted market segment

- Predominantly: Single-family and semi-detached houses.
- Multi-apartment building.
- Commercial and public buildings.

#### Financing

##### Upfront costs

- No upfront costs for the customer.

##### Sources of financing

- BM providers finance the HP and its installation through internal capital, bank loans, or third-party investors.
- In some cases, public funding or subsidies may be available to reduce up-front costs.

##### Charging policy

- Customers pay monthly or quarterly fee for leasing the HP (with or without price escalation clauses).
- Service component: maintenance and support throughout the lease period (e.g., remote monitoring, regular servicing, full contractual support).

#### Services

##### Installation services

- HP planning and installation.
- Dismantling and disposal of old heating systems.
- Assistance with incentives and rebates applications.
- Equipment selection: predefined by BM provider or customizable by customer.

##### Maintenance services

- BM provider handles maintenance and repairs.
- Regular performance monitoring via remote diagnostics.
- 24/7 emergency service availability.
- Optional insurance coverage (fully comprehensive protection).

## Legal aspects

<b>Ownership</b>	<ul style="list-style-type: none"> <li>The BM provider retains ownership of the HP.</li> <li>At the end of the lease period the customer might have a possibility to purchase the HP for a symbolic price.</li> </ul>
<b>Contract duration</b>	<ul style="list-style-type: none"> <li>Fixed-term contracts, typically with a minimum period (e.g., 10 years).</li> <li>Options for contract extension.</li> </ul>
<b>End of contract regulations</b>	<ul style="list-style-type: none"> <li>BM provider dismantles the HP.</li> <li>Contract extension for a predefined period possible.</li> <li>Transfer of ownership to the customer: For free, symbolic fee transfer or customized buyout-offer.</li> </ul>
<b>Regulations in case of insolvency</b>	<ul style="list-style-type: none"> <li>Equipment is dismantled if the customer defaults.</li> </ul>

## 3.2 Cases in practice

The asset leasing BM for HPs has been practically implemented in several countries, including Slovenia, the Netherlands, and Denmark. In Slovenia, companies like *Termo Shop*, *Brima*, and *Klimaj* offer HP leasing solutions that provide flexibility, low initial costs, and comprehensive support services. These models include features such as maintenance, energy optimization consulting, and the option to purchase the unit for a symbolic price after the rental period. In the Netherlands, providers like *Leasingwarmtepomp.nl* offer HP leasing with flexible options, including renting, private leasing for homeowners, and operational leasing for businesses. In the UK, *Pure Thermal* provides HPs through flexible lease terms that extend up to 5 years, incorporating maintenance, remote monitoring, and access to the latest HP technology.

Similarly, in Denmark, *OK* offers long-term leasing options for HPs, with fixed monthly payments and no large upfront investment. The lease includes installation, service, maintenance, and spare parts, ensuring financial predictability and hassle-free operation. In the US, *Palmetto* offers a lease program that allows homeowners to install HPs with zero upfront costs, providing predictable monthly payments, comprehensive maintenance, and access to available rebates.

## 3.3 SWOT analysis

In the following, the strength & weaknesses of the Asset Leasing model are elaborated on from the end consumers point of view and opportunities & threats are analysed from a systems perspective.





### Legend:

\$ - Costs; ⚙️ - Technical performance; ⓘ - Information; ⌚ - Time Constraints; 👥 - Workforce; 🔗 - Dependencies






### Strengths

\$ : No upfront investment required for customers.




\$ : Predictable costs due to fixed monthly fees covering maintenance and repairs.

-  : Reliable heating system with regular servicing and emergency support.
-  : Convenient for emergency replacements and quick installations.
-  : No need for customers to coordinate installation and maintenance.
-  : No financial risk in terms of credit default.






## Weaknesses

-  : Higher lifecycle costs compared to direct ownership.
-  : Limited transparency in cost breakdown (e.g., financing vs. service costs).
-  : Electricity price risks remain with the end consumer.
-  : BM providers may prioritize lower-cost installations over efficiency.
-  : Long contractual commitment, making it difficult to switch BM providers.

## Opportunities

-  : As the length of leasing agreements is one of the major drawbacks, the relevance of flexible contracts could be explored.
-  : Providing a performance guarantee in addition to HP leasing services to overcome uncertainties about operational performance.
-  : Collaboration among local energy utilities and HP manufacturers to provide lease offerings with HP, installation, yearly maintenance, potential repairs, and part replacement costs included.

## Threats

-  : Uncertainty regarding long-term electricity costs.
-  : Risk of system underperformance or increased energy consumption.
-  : Consumer distrust may evolve from uncertainty about maintenance and repair costs, as well as fears about delays in service.
-  : Regulatory changes impacting leasing agreements or incentives.
-  : Legal and ownership complications - HP installation that is leased can create uncertainty around asset ownership, especially when integrated into the building.

## 4 | Heat as a Service

### 4.1 How the model works

In the Heat as a Service (HaaS) model, the BM provider owns the HP and sells its output in the form of heat on a full maintenance contract basis. The BM provider can either sell the kWh of heat and/or cooling delivered or a specific level of comfort (e.g., 21°C) to the end user. In both cases the BM provider pays for the electricity that is needed to run the HP. The BM provider guarantees that the equipment will provide heat and/or cooling throughout the contract period, which means that the maintenance, repair, and any necessary troubleshooting services are included in the price of the output delivered.

In the case of selling a specific level of comfort, either fixed prices are charged depending on a set temperature, or mixed pricing depending on temperature level and time interval is set. The latter has only been implemented in pilot projects, where the end user defines temperature levels and their time intervals in an app. The app shows the cost of the temperature schedule. This schedule could include cooling services in summer. Given the predictability of costs for the end user, comfort as a service can be an interesting model for low-income and energy poor households. Yet, this model has not been put into practice on the large scale.

For both types of HaaS, the BM provider takes over at least the following risks from the end user:

- Financial risk: The credit risk of providing the equipment for little or no upfront payment.
- Technical risk: Maintenance, repair, and any necessary troubleshooting services.
- Performance risk: The efficiency of the HP and the heat distribution system, and thermal demand of the consumer's home.
- Electricity price risk: Fluctuations in electricity prices.

In the case of selling a specific level of comfort, the BM provider can also take over behavioural risk, i.e., the impact of customer behaviour on the amount and timing of heat demand. When fixed prices are paid for set temperatures, the BM provider can even bear behavioural risk, as the duration of the heat supply can be unnecessarily prolonged, e.g., when windows are opened or tilted for a long time.

Given the above-mentioned risks, the HaaS BM incentivises BM providers to optimize the energetic performance of the HP and energy system as they benefit from lower electricity usage per kWh of heat. Therefore, the BM provider will constantly monitor and optimise the system performance to keep energy consumption low.

As selling the kWh of heat and/or cooling delivered is the most widespread application of HaaS, the remainder of this chapter deals with that type of HaaS.

#### Targeted market segment

- Single-family and semi-detached houses.
- (Possibly) multi-apartment buildings and commercial buildings.
- Pay for comfort can be interesting for low-income households and energy poor households.

#### Financing

##### Upfront costs

- Typically, no upfront investment for the end user, as the BM provider owns the heating system.
- Some models may require an initial setup fee or deposit.

### Sources of financing

- BM providers finance the HP and heating systems through internal capital, bank loans, or third-party investors.
- Government grants and subsidies may be available to support HaaS projects.
- Public-private partnerships (PPPs) can support large-scale implementations.

### Charging policy

- Predominately: Per-unit charging, where end consumers pay for the actual output delivered by the equipment (e.g., per kWh of heat or cooling delivered).
- Price escalation clauses may be included to protect the BM provider against the stark increase of electricity prices or unforeseen regulatory changes.

## Services

### Installation services

- Full system design and installation, including HP, any storage, up to in-house heat distribution and dissipation systems.
- Removal and disposal of old heating equipment.
- Some BM providers might also offer assistance with subsidy applications.

### Maintenance services

- Routine annual maintenance included in the monthly fee.
- Breakdown cover and emergency repairs provided by the BM provider.
- Energy usage reports to help customers track consumption.
- Performance guarantees a minimum heating efficiency level.

## Legal aspects

### Ownership

- The BM provider retains ownership of the heating system and related equipment.

### Contract duration

- Fixed-term contracts, typically ranging from 10 to 15 years.
- End users may have the option to renew or upgrade their service at the end of the contract.

### End of contract regulations

- End users can choose to renew, upgrade, or terminate the service.
- The BM provider removes the heating system if the contract is not renewed.
- Buyout options may be available for end consumers who wish to take ownership of the system at the end of the contract.

### Regulations in case of insolvency

- Equipment remains under the BM provider's ownership and may be removed.
- Contracts may include service fee cancellation insurance.

## 4.2 Cases in practice

Several practical implementations of HaaS have been tested across Europe and the UK, each with unique approaches. The *Danish HP Support Scheme* was introduced by the Danish Energy Agency to encourage the adoption of HPs in oil-heated homes. Under this scheme, energy service providers finance, install, operate, and maintain the HPs, while consumers pay an upfront installation fee, a fixed annual maintenance charge, and a per-MWh heat consumption fee. The program, designed to support homes outside district heating networks, requires a minimum 10-year contract, with the government subsidizing initial costs to stimulate market growth.

Another example is the *Energiesprong* model, originally developed in the Netherlands and later applied in the UK. This model focuses on deep retrofit solutions, including insulation, low-carbon heating systems, and smart controls, primarily targeting social housing. Residents continue paying for energy as before, but the improved efficiency guarantees comfort at a stable cost, often integrated into rental payments. In the UK, *Connected Response* works with social housing providers to modernize electric storage heaters. Instead of replacing these units, the company retrofits them with smart controls that optimize energy use, helping tenants lower their electricity costs while maintaining consistent indoor temperatures. Similarly, the *OVO Smart Heat Offer* provides a financing model for smart storage heaters, offering a discounted 12-month finance option combined with an Economy 7 time-of-use tariff. This model includes intelligent heat optimization, ensuring cost-effective heating for electrically heated homes. Each of these models illustrates different ways in which HaaS can facilitate the transition to low-carbon heating while addressing financial and regulatory challenges.

In the North Macedonia, *ICS Group* implemented a HaaS model in a multi-apartment building, installing, and maintaining HPs while supplying heat at a fixed price linked to regulated tariffs. However, rising electricity prices due to the energy crisis forced a contract adjustment, leading many residents to opt out, making the model financially unsustainable. This case highlights the importance of flexible contracts and system adaptability to external risks (more information see III Country Section).

## 4.3 SWOT analysis

In the following, the strength & weaknesses of the Heating as a Service model are elaborated from the end consumers point of view and opportunities & threats are analysed from a systems perspective.

Legend:

\$ - Costs; 🛠️ - Technical performance; ⓘ - Information; ⌚ - Time Constraints; 👥 - Workforce; 🔗 - Dependencies

### Strengths

\$ : No upfront investment required for the end user.

\$ : Predictable per kWh output of the equipment costs with full-service coverage and protection from unexpected expenses.

🛠️ : High reliability due to continuous monitoring and maintenance.

🛠️ + ⌚ : Customers do not need to manage planning, installation, or servicing of HP as the BM provider guarantees heat outcomes, handles maintenance and remote monitoring, and takes on technical and performance risks.

🛠️ : Integration with RES systems (e.g., PV systems).

## Weaknesses

- 💰 : Higher total lifecycle costs compared to traditional BM.
- 💰 : Dependence on the BM provider for repairs and performance.
- 💰 : Behaviour related risks remain with the consumer.
- 🔧 : Limitations on system customization and incompatibility with some homes and consumers as a physical aspect (e.g., poor building insulation) may prevent HaaS models from working effectively or economically.
- 📄 : Updates on device status and settings are essential to ensure transparency and prevent cost-related surprises.
- 🔒 : Contractual commitment results in long-term dependency on a single BM provider, leading to customers' discomfort with being locked into long-term contract.

## Opportunities

- 💰 : Growing demand for energy-as-a-service models (energy means purchase of heat and electricity output of equipment).
- 💰 : Government incentives specifically targeted at supporting third-party service BMs, recognizing the additional investments required from providers, such as in smart home technologies, monitoring systems, and software development support this BM.
- 💰 : Potential for bulk procurement and cost reductions.
- 🔧 : Integration with smart home energy management systems is in the interest of BM providers.
- 📄 : Ability to provide data-driven customization of heating services based on household demand as data is collected through connected devices and smart meters.
- 👥 : Long-term contracts ensure security for recruiting and training workforce and provide predictable long-term income streams.

## Threats

- 💰 : Volatile electricity prices pose risk to stable service costs.
- 💰 : The risks associated with this BM can lead to kWh prices that are no longer competitive for a wider group of end consumers.
- 🔧 : HaaS relies on household data collection (e.g., consumption patterns, heating behaviour, smart device interactions) which might be at risk due to hacking and unauthorised access to digital heating platforms resulting in loss of trust, trade-offs between personalization and data privacy.
- 📄 : Lack of customer awareness and financial literacy regarding HaaS, alongside the appeal of simpler and more familiar financing options like loans, subsidies, and upfront payment.
- 📄 : Potential exclusion of digitally illiterate customers or those without reliable internet access, as HaaS model requires the use of digital devices to monitor, manage and adapt energy use.
- 🔒 : Customer resistance due to contract length and perceived lack of ownership.

# 5 | Energy Supply Contracting

## 5.1 How the model works

In Energy Supply Contracting (ESC), the building owner outsources the technical and economic risks associated with energy supply activities to a contractor (BM provider) and purchases an energy service instead of the individual components necessary to ensure a continuous energy supply. The remuneration of BM providers is performance-based and depends on the energy output delivered. The customer pays for the energy supplied to the building. The behaviour risk (individual level of consumption) lies with the customer. The BM provider covers all costs relating to the outcome of the services, e.g. the electricity needed for the heat pump, as well as the project's commercial, technical, and operational risks.

ESC is most common for large-volume buildings and can take many variations in the services that are included. Typically, the contractor (i.e., BM provider) is responsible for planning, financing, and installing the HP system. Additional services such as energy optimization consulting can be offered. A variation to the model is that the customer finances part of the purchase and installation of the HP, and investments are split between the customer and BM provider. The investment made by the BM provider is reimbursed through a monthly fee paid by the customer. On top of planning and installation of the heating system, operational and maintenance services are typically offered by the provider and included in the fixed monthly or annual fee.

The BM provider assumes functional and performance risk of the HP equipment and is, in many cases, also in charge of the energy supply for the HP. On top of the fixed fee, the customer pays an operating price per kWh of energy (heating or cooling) delivered. Next to being in charge for heating and cooling, the contractor can also be responsible for the entire electricity supply for the building. The BM provider assumes the electricity price and performance risk. These incentives the BM provider to ensure an efficient functioning of the HP and the entire energy system of the building, e.g., exploiting synergies between HP and PV systems. The operating price can be subject to price escalation clause given the volatile development of the electricity market price. This variation of the model is similar to HaaS but more common to be applied in large-volume buildings, as HaaS is mostly offered in single and semi-detached houses.

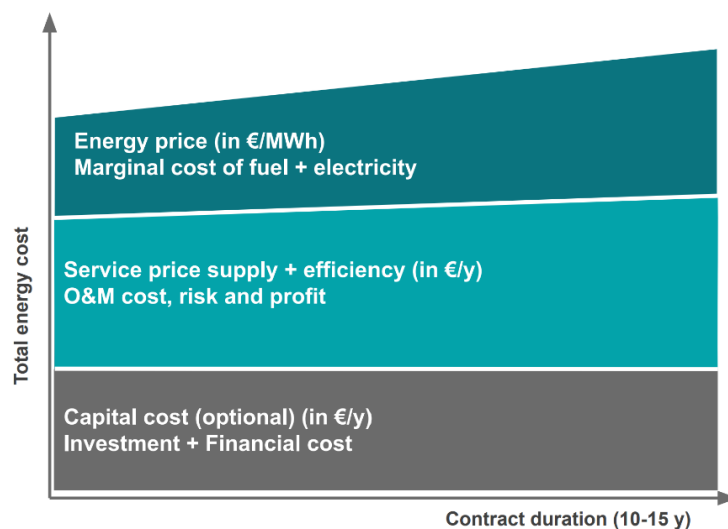


Figure 1: Revenue model and cost structure (Source: Renovation Hub<sup>3</sup>)

A further option for contracting is “Operational Management Contracting” which only covers the running costs of managing and maintaining the HP system. In this case, the heating system has already been installed by the customer. The contracting includes technical system management and is aimed at optimising the operation of the building’s heat and energy system. The services include routine maintenance, optimisation services and an optional 24/7 service hotline. Payments are issued as fixed monthly or yearly fees that normally include price escalation clauses.

### Targeted market segment

- Multi-apartment buildings.
- Commercial buildings.
- Public buildings.

### Financing

<b>Upfront costs</b>	<ul style="list-style-type: none"> <li>• Different options possible: from no upfront costs to split of upfront costs between BM provider and customer (e.g., in case the latter has better financing conditions).</li> </ul>
<b>Sources of financing</b>	<ul style="list-style-type: none"> <li>• The BM provider and customer finance the HP and its installation through internal capital, bank loans, or third-party investors.</li> <li>• Public funding or subsidies may be available to reduce up-front costs.</li> </ul>
<b>Charging policy</b>	<ul style="list-style-type: none"> <li>• The customer pays monthly or annual fee (mostly subject to price escalation clauses) which includes refinancing of upfront investment by the BM provider and operational management and maintenance of HP system.</li> <li>• If BM provider responsible for energy supply, operation price per kWh energy delivered and metering fee.</li> </ul>

### Services

<b>Installation services</b>	<ul style="list-style-type: none"> <li>• Adequate design, installation, and maintenance of the HP.</li> <li>• Planning and installation of the HP system.</li> <li>• Optional: Dismantling and disposal of old heating systems.</li> <li>• Optional: Retrofit services beyond the HP installation (e.g., insulation upgrades).</li> </ul>
<b>Maintenance services</b>	<ul style="list-style-type: none"> <li>• BM provider responsible for maintenance and repairs.</li> <li>• If BM provider responsible for energy supply, efficiency optimisation and performance monitoring.</li> <li>• Optional: 24/7 emergency hotline.</li> </ul>

### Legal aspects

<b>Ownership</b>	<ul style="list-style-type: none"> <li>• Typically, ownership with the BM provider.</li> <li>• If the customer takes over part of upfront costs, HP ownership with the customer.</li> </ul>
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<b>Contract duration</b>	<ul style="list-style-type: none"> <li>• Fixed-term contract, typically with a minimum period of 10 years.</li> </ul>
<b>End of contract regulations</b>	<ul style="list-style-type: none"> <li>• Contract extension for a predefined period possible.</li> <li>• If the BM provider owns the HP, transfer of HP ownership to the customer possible (customized offer).</li> </ul>
<b>Regulations in case of insolvency</b>	<ul style="list-style-type: none"> <li>• Equipment is dismantled if the service recipient defaults.</li> <li>• Service fee cancellation insurance may be offered.</li> </ul>

## 5.2 Cases in practice

In Austria, the first neighbourhood HP project realised in a block of existing buildings has been financed by ESC. This project is situated in Vienna, *Geblergasse 11 and 13*. As part of this project, a joint deep thermal refurbishment of several buildings was carried out. One of the challenges was that the different buildings had different ownership structures, with some of them accommodating tenants. A building owner living in the block took over the role of the caretaker who developed and communicated a solution that would convince as many owners and tenants as possible.

Since 2019, heat is supplied via a geothermal HP with deep boreholes and hybrid collectors. Summer heat surpluses (free cooling) and solar yields are stored seasonally via a cold-water network and utilised for heating via the deep boreholes in winter. This technical concept is the first time that an energy network has been realised in a densely built-up area.

Regarding financing the investments, the building owners commissioned an energy supply contractor. The contractor invested in the construction of the heating supply system and operates it for an agreed contract term of 20 years. The economic objective of the project was to keep the costs for space heating and hot water below the costs of Viennese district heating; summer temperature control included. This could be achieved given the subsidy of the City of Vienna which financed 30% of the system costs. As the contractor is the owner of the system, he is also responsible for maintaining the system. In return, the building owners made their courtyards available for geothermal drilling and the rooftops available for solar installations. Corresponding usage contracts (servitudes) for these areas were negotiated and recorded in the land register. Through this contracting model the building owners do not bear high investment costs, but these are spread over the entire term of the contract and the tenants also make an acceptable contribution to investments.

## 5.3 SWOT analysis

In the following, the strength & weaknesses of Energy Supply Contracting model are elaborated on from the end consumers point of view and opportunities & threats are analysed from a systems perspective.

**Legend:**

\$ - Costs; 🛠️ - Technical performance; ⓘ - Information; ⌚ - Time Constraints; 👥 - Workforce; 🔗 - Dependencies

### Strengths

🛠️ : No or split upfront investment required for customers.

\$ : Predictable costs due to fixed monthly fees covering maintenance and repairs and possibly system optimisation.

- 💰 : Electricity price fluctuations are borne by the BM provider.
- 🔧 : Reliable heating system with regular servicing and optional emergency support.
- 🔧 : Professional planning and construction of energy systems and energy improvement measures as incentive for the BM provider to keep energy consumption low.
- 🕒 : Convenient for emergency replacements and quick installations.
- 👥 : No need for customers to coordinate installation and maintenance.

## Weaknesses

- 💰 : Higher lifecycle costs compared to direct ownership.
- 💰 : Price escalation clauses can become financial burden for customers.
- 💰 + ⓘ : Limited transparency in cost breakdown (e.g., financing vs. service costs).
- 🔗 : Long contractual commitment, making it difficult to switch BM providers.

## Opportunities

- 🔧 : Strong incentive to install and update system to most energy efficient option and exploit synergies with renewable energy generation (e.g., PV plants).
- ⓘ : As the length of leasing agreements is one of the major drawbacks, the relevance of flexible contracts could be explored.
- ⓘ : Providing a performance guarantee in addition to HP leasing services to overcome uncertainties about operational performance.
- 👥 : Collaboration among local energy utilities and HP manufacturers to provide ESC offerings with HP, installation, yearly maintenance, potential repairs, and part replacement costs included.

## Threats

- 💰 : In case capital market interest rates increase, financing conditions might become more difficult for BM provider.
- 🔧 : Using new equipment or service providers with which the BM provider has less experience might pose a risk to performance.
- ⓘ + 💰 : As the BM provider bears the electricity costs, the contract must state what will happen if regulatory changes increase the contractor's costs (e.g., new levies on electricity prices or increased grid fees).
- 👥 : Stop-and-go support policies may threaten the business of contractors and affect cash flow for the workforce.
- 🔗 : Provisions are needed in the event of insolvency or change of ownership regarding the investment provided.

## 6 | Energy Performance Contracting

### 6.1 How the model works

Energy Performance Contracting (EPC) refers to the implementation of technical measures to utilise energy (heating or cooling) more efficiently in an existing building. It is a financing mechanism where energy-saving measures, including heating system upgrades, are pre-financed by a contractor. EPCs are financing models that can address the barrier or lack of technical expertise and/or planning capacity, as the implementation of the energy project is delegated to a specialised company. The BM provider pays for the electricity needed by the heat pump. When the outcome (heating or cooling) is billed by kWh, the behaviour risk (individual level of consumption) lies with the customer.

The BM provider uses the stream of income from cost savings or lower energy prices to repay the investment costs of the project. More precisely, the investments for the energy-saving measures and related operating costs are financed through the payments of customers who continue paying the original energy costs over the agreed contract term. The difference between lower actual energy costs after implementation of energy-saving measures and the initial energy costs paid by the customer is used to refinance the BM provider's investments. At the end of the contract term, the building owners (i.e., customers) benefit from the lower energy costs. The working principle of the EPC business model is depicted in Figure 2.

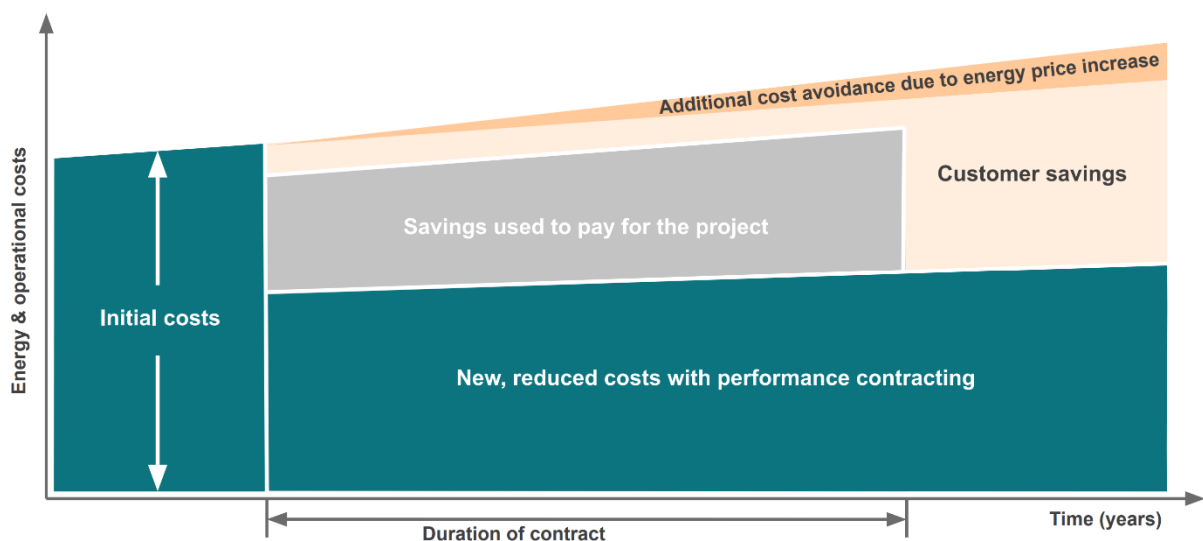


Figure 2: EPC business model and cost structure (Source: Renovation Hub<sup>4</sup>)

EPCs can have three main forms: Guaranteed-Savings EPCs, consumers finance the measures and share the savings with the contractor; Pay-as-You-Save EPCs, the contractor finances the project and recovers costs via customer surcharges; and Shared Savings Contracts, cost savings are split over a set period based on negotiated terms without a standard formula.

The BM provider, often an Energy Service Company (ESCO), guarantees energy-savings and assumes financial and operational risks. This BM enables customers to access energy efficiency improvements without upfront investment while shifting both technical and financial risks to the contractor based on performance guarantees. ESCO's remuneration is based on demonstrated performance, measured as the level of energy savings, energy produced, or infrastructure built. The ESCO does not receive its returns on the investment unless the project delivers energy savings/generation as expected. If the energy cost savings are lower than

guaranteed this is at the expense of the BM provider. At the end of the contract term, any energy savings realised will benefit the customer.

EPCs are typically most effective when multiple energy efficiency measures are bundled together (e.g., insulation, lighting upgrades, heating system optimization) along with the installation of a HP. This is because the savings must be large enough to repay the initial investment. A single measure like a HP might not generate enough guaranteed savings on its own, especially in very inefficient buildings.

### Targeted market segment

- Commercial buildings.
- Public buildings.
- Multi-apartment buildings.

### Financing

#### Upfront costs

Initial costs are generally covered by the ESCO or through third-party financing, reducing capital investment by the customer. Some models require partial customer co-financing. Transaction and measurement and verification costs may be included.

#### Sources of financing

- Third-party financing, often provided by ESCOs or specialized investment funds.
- Public grants or subsidies for HP installation or energy efficiency measures.
- Green loans or credit lines from financial institutions.

On-balance sheet financing by the customer in guaranteed savings EPC models.

#### Charging policy

- Fixed or variable service fees, depending on contract type. Payments can be tied to achieved energy savings or a predefined service fee is charged.

### Services

#### Installation services

- Comprehensive energy audit and baseline assessment.
- Design and installation of HP.
- Integration with other energy efficiency measures (e.g., insulation, smart energy management).
- Coordination with grid operators and regulatory bodies.

#### Maintenance services

- Long-term maintenance and operational management.
- Real-time energy monitoring and reporting.
- Performance guarantee with penalties if contractual savings are not achieved.
- Adjustments and optimization to maximize efficiency over time.

## Legal aspects

<b>Ownership</b>	<ul style="list-style-type: none"> <li>• The ESCO or BM provider typically retains ownership of the installed equipment during the contract period.</li> <li>• Ownership may transfer to the customer at the end of the contract.</li> </ul>
<b>Contract duration</b>	<ul style="list-style-type: none"> <li>• Contracts typically last between 5 and 15 years, depending on payback period and investment size.</li> </ul>
<b>End of contract regulations</b>	<ul style="list-style-type: none"> <li>• Renewal or renegotiation of service contracts.</li> <li>• If no renewal of contract, transfer of system ownership to the building owner or system removal or decommissioning.</li> </ul>

## 6.2 Cases in practice

As part of the EU-funded *SunHorizon* project, this BM was tested at a demo site in Sant Cugat del Vallés, Spain tertiary civic centre owned by the municipality. This technological solution was tested to enhance energy efficiency and integrate renewable energy solutions. At the demo site, a central reversible HP supplies heating and cooling through a hydronic system, complemented by variable refrigerant flow units. The system, fully electric, was integrated with solar thermal panels for space heating and domestic hot water, and a hybrid chiller for cooling, optimizing energy use and reducing grid dependence. The ESCO contract covered the design, installation, commissioning, and 10 years of operation and maintenance, including all energy-related works in the municipality's buildings. Similarly, EPC was tested at another demo site in Verviers, Belgium in the tertiary sport centre owned and managed by the municipality. A hybrid system combining solar thermal panels and a HP was installed to cover as much heating demand as possible, with solar electricity partially powering appliances. The system replaced a natural gas boiler.

EPC has been effectively used to finance the installation of HPs, typically as part of broader energy renovation projects involving multiple energy efficiency measures to ensure sufficient energy savings that can finance the investment. For example, the French company *Idex* implemented EPCs at sites such as CHU Amiens-Picardie, Ville de Senlis, and Université de Bordeaux, where HPs were installed alongside upgrades like boiler replacements, substation improvements, and comprehensive building retrofits. In Sweden, EPCs have been used to install HPs as part of broader energy efficiency upgrades in projects like Vellinge Community, County Council of Östergötland, and Nyköpingshem. These initiatives combined HP installation with measures such as lighting, HVAC, insulation, and digital controls. In Ireland, EPCs are being used to finance HP installations as part of integrated energy upgrades in public buildings. Projects like DLR EPC, SDCC EPC, and the Mid-East Energy Unit Leisure Centre upgrade include HPs alongside other measures (LED lighting, solar PV, and fabric improvements) – highlighting that EPCs typically bundle multiple interventions rather than focusing on HPs alone. For Further examples, see Section 17 | Poland.

## 6.3 SWOT analysis

In the following, the strength & weaknesses of the Energy Performance Contracting model are elaborated from the end consumers point of view and opportunities & threats are analysed from a systems perspective.

### Legend:

\$ - Costs; 🛠️ - Technical performance; ⓘ - Information; ⌚ - Time Constraints; 👥 - Workforce; 🔗 - Dependencies

### Strengths

\$ : No/ low up-front cost for customers, as investments are financed through future energy savings.

\$ : All implemented energy-saving measures are financed through realised savings, with no additional costs.

\$ : Fixed contract terms provide clarity on costs and expected savings, making budget planning easier and reducing financial risk for the customer.

🛠️: The BM provider assumes financial and operational risks related to system performance and aims at increasing energy savings which ensures reliable, consistent, and efficient technical performance.

🛠️: EPC can address the barrier or lack of technical expertise and/or planning capacity as all measures are implemented by one company that guarantees energy savings.

ⓘ: Contracts often include regular reporting and performance verification, ensuring continuous tracking of financial and energy savings.

⌚: Having one responsible contractor simplifies coordination, reducing administrative and operational burden for the end user.

🔗: The guarantee provided through the EPC shifts risks for the customers to the contractor.

### Weaknesses

\$ : If actual savings are lower than projected, the customer may not achieve the expected financial benefits.

\$ + ⌚ : High transaction and M&V costs - EPCs involve complex procurement and legal processes, which can be costly, especially for smaller projects like single HPs. The need for detailed measurement and verification of energy savings also adds significant expense and complexity.

\$ + 🔗 : EPC contracts often span 10+ years, limiting financial flexibility and committing funds for an extended period.

🛠️: Risk of underperformance if monitoring and maintenance are inadequate.

🛠️ + 🔗 : If the BM provider fails to deliver adequately, the customer may face service disruptions or underperformance.

⌚: Public tendering for EPCs can be time-consuming, delaying project implementation.

🔗: Once signed, the contract may not allow the customer to easily make changes to the system or strategy.

## Opportunities

- 💰 : Increased electricity and fuel costs make energy-saving BMs more attractive.
- 🔧 : EPCs are particularly viable for high-energy-consuming sites.
- 🔧 + ⓘ : Digital tools and smart meters improve transparency in savings verification, increasing confidence in EPC models.
- ⓘ : Development of standardized EPC contract templates can reduce complexity and speed up adoption.
- 🔗 : Market is immature in some regions, needing further development. As potential customers (e.g., public sector) gain experience with EPCs, adoption is likely to increase.
- 🔗 : Scalable model as applicable to a wide range of buildings.
- 🔗 + 🔧 : Combining decarbonisation and optimisation of energy use in one BM strategy contributes to system efficiency.

## Threats

- 💰 : Public authorities and larger companies face increasing pressure to meet climate targets while also dealing with increasing costs for energy. EPC, in this case, offers a solution where the measures are financed without large amount of upfront capital.
- 💰 + 🔧 : ESCOs may prioritize more profitable projects with shorter payback periods, such as installation of PV plants, reducing incentives to invest in long-term efficiency improvements measures.
- 💰 + 🔧 : Fluctuating energy prices may affect contract profitability and variability in energy consumption patterns can make it challenging to demonstrate clear financial benefits.
- 🕒 : Complex approval processes for public-sector EPC projects.
- 👥 : Understanding and negotiating EPC agreements require special expertise in legal, technical, and financial aspects. Lack of skilled workforce that would be able to manage EPC projects.
- 👥 + ⓘ : Limited capacity and expertise among EPC providers to manage complex or large-scale projects. Many ESCOs lack the necessary technical, financial, and organizational expertise - especially when diverse skills must be integrated within one company. This can impact project quality, delivery of guaranteed savings, and client trust.
- 🔗 : Limited awareness and trust in EPC models among potential customers.

## 7 | On-bill Financing

### 7.1 How the model works

By integrating the cost of HP installations into monthly utility bills, this financing mechanism aligns repayment with the end user's energy/utility bill, providing a seamless approach that reduces upfront financial barriers. The collaboration between energy provider, financial institutions, and often government-backed programs ensures the financing terms are structured, reducing risk for both customers and lenders.

On-bill financing (OBF) is well-suited for single-family and semi-detached homes due to their straightforward utility accounts, enabling homeowners to repay HP installation costs through their energy bills without major upfront payments. It can also be applied to multi-apartment buildings, particularly when utility accounts are building-wide, allowing tenants to contribute indirectly through their bills to shared upgrades like HP systems. However, the model is less effective for office and commercial buildings, where energy use is more variable and less compatible with residential-style repayment structures.

#### Targeted market segment

- Single-family and semi-detached houses.
- Multi-apartment buildings.

#### Financing

##### Upfront costs

- Customers typically face minimal or no upfront costs.
- Some programs may require a down payment, depending on creditworthiness or available incentives.

##### Sources of financing

- Utility companies provide upfront capital, often backed by financial institutions or government programs.
- Public subsidies and incentives may be integrated to improve affordability.

##### Charging policy

- Customers repay the investment via a surcharge on their monthly utility bill. Installation and administrative costs may be embedded within the repayment structure.
- Fixed-term repayment schedules (e.g., 5-15 years) aligned with expected energy savings.
- Default risk is reduced as payments are incorporated into essential utility services.

#### Services

##### Installation services

- Utility-approved contractors handle installation and system integration.
- Energy audits and project assessments determine cost-effectiveness.
- Coordination with grid operators for optimal energy management.

### Maintenance services

- Regular maintenance services may be included in the financing structure.
- Performance tracking to ensure expected energy savings are achieved.
- Smart metering and real-time energy monitoring options.

## Legal aspects

### Ownership

- Utility companies or third-party financiers may retain ownership during the repayment period.
- The customer owns the installed equipment upon full repayment of investment.

### Contract duration

- Typically, 5-15 years, depending on financing terms and energy savings potential.
- Early repayment options may be available.

### End of contract regulations

- Full ownership is transferred to the customer after repayment completion.
- If property ownership changes, the repayment obligation may transfer with the utility account.

### Regulations in case of insolvency

- Non-payment may result in service disconnection or alternative collection mechanisms.
- Utilities may offer flexible payment plans for customers facing financial difficulties.

## 7.2 Cases in practice

OFB is a well-established model in the United States, where it has been successfully implemented by more than 110 utilities to help households and businesses finance energy efficiency and renewable energy upgrades with no upfront costs. In Colorado, the *CCEF On-Bill Repayment Program* allows participants to install improvements like HPs, insulation, and electric vehicle chargers, repaying the investment directly through their utility bills. Vermont's *WRAP* program eliminates credit checks and links repayment to the property's utility account, making upgrades accessible to low- and moderate-income households. Meanwhile, Kentucky's *HowSmartKY* initiative helps communities affected by the coal industry decline by financing energy efficiency measures that result in immediate bill savings and long-term economic and environmental benefits.

Building on the success of such initiatives, the *Environmental and Energy Study Institute* has been working nationally to support the expansion of OFB, particularly in underserved communities. These programs commonly feature cost recovery through monthly utility bills, with repayment obligations transferring to new property occupants, thereby lowering financial and administrative barriers for participants and utilities alike.

In contrast, OFB is still relatively new in Europe. The *RenOnBill* project, funded by the EU's Horizon 2020 program, promoted and expanded the use of OFB in the European context. Focusing on Germany, Italy, Lithuania, and Spain, the project aimed to adapt North American models to European markets by developing tailored BMs, tools, and stakeholder platforms.

## 7.3 SWOT analysis

In the following, the strength & weaknesses of the On-Bill Financing model are elaborated from the end consumers point of view and opportunities & threats are analysed from a systems perspective.

Legend:

\$ - Costs; 🛠️ - Technical performance; ⓘ - Information; ⌚ - Time Constraints; 👥 - Workforce; 🔗 - Dependencies

### Strengths

\$ : No/low upfront cost makes HP installation accessible to low-income and credit-limited customers.

\$ : Fixed contract terms provide clarity on costs, making budget planning easier and reducing financial risk for the end users.

### Weaknesses

\$ + 🔗 : Long contractual obligations and payback periods.

\$ + 🛠️ : BM provider may impose restrictions on eligible manufacturers and equipment.

🛠️ + 🔗 : Long contractual obligations reduce flexibility in adapting technical system to changes.

ⓘ : Further reduces transparency of utility bills, as utility bills already contain multiple items, making it difficult for consumers to understand them and can result in reduced trust in the BM.

👥 : Potential administrative complexity in managing large-scale programs for energy utility companies.

🔗 : Potential complications selling the property because the liability is tied to the property, the next owner inherits the obligation to repay it, making the property less attractive to potential buyers.

### Opportunities

\$ : Often transferable with the property, which reduces credit barriers and supports long-term financing for BM provider.

\$ : Additional way to generate customers for energy supply contracts of ESCOs.

🛠️ : Integration with renewable energy programs (e.g., solar, district heating).

🔗 : Potential for partnerships between utilities, governments, and financial institutions.

🔗 : Scaling potential as energy utility companies have access to large pool of customers.

### Threats

\$ : Regulatory barriers or changes in utility sector policies.

\$ : Risk of non-payment impacting utility revenue stability.

\$ + 👥 : Need for significant investment in program administration by the energy utility company.

ⓘ : Resistance from property owners unfamiliar with OBF benefits due to missing transparency of utility bills, fear of hidden fees and high monthly utility payments.

## 8 | Community Financing

### 8.1 How the model works

Community financing, the pooling approach (see 9 | Heat Pump Project Pooling) and Joint Purchase initiatives (see 10 | Joint Purchase Initiatives) follow a similar logic. By pooling financial resources, homeowners can overcome the initial cost barriers that typically prevent individuals from adopting these systems. This collective investment model is especially effective in fostering economies of scale, which allows for bulk purchasing and discounted prices for both equipment and installation services. It reduces the financial risk for homeowners, as the capital costs are spread across multiple participants, making it easier to manage and commit to long-term energy solutions.

One standout feature of Community Financing is that the model follows a bottom-up approach, in which members of a community organise themselves to build up heating infrastructure. In Heat Cooperatives (HeatCOOPs), community members jointly own and manage the heating infrastructure. These cooperatives embody the principles of democratic governance, enabling members to participate in key decisions regarding the operation, maintenance, and future upgrades of the system. The model encourages long-term collaboration among residents, ensuring that the HP infrastructure is not only cost-efficient but also sustainable over time. Moreover, HeatCOOPs provide a unique mechanism for ensuring that the benefits of HP technology are shared among the community, creating a sense of ownership and collective responsibility for energy efficiency.

This cooperative structure also extends to the financial management of the HP systems. By creating shared maintenance funds, cooperatives ensure that the cost of maintaining the systems is distributed equitably. Monthly or annual contributions from the members are typically required, which helps cover operational and maintenance costs, including regular performance monitoring and troubleshooting. These contributions may be structured based on energy usage or a more equal distribution of costs, depending on the cooperative's specific governance model. In addition, cooperatives can generate income by selling excess heat to nearby consumers, which not only helps finance the maintenance of the system but also contributes to the overall financial sustainability of the initiative.

#### Targeted market segment

- Single-family and semi-detached houses in close proximity.
- Multi-apartment buildings and blocks.

#### Financing

##### Upfront costs

- Initial capital investment shared among participating households.
- Possibility of external funding or grant support.
- Flexible payment structures, including phased contributions.

##### Sources of financing

- Collective investment from homeowners.
- Bank loans or credit unions offering cooperative financing schemes.
- Public funding and local government incentives.
- Crowdfunding and community bonds.
- Support from non-profit organizations promoting sustainable energy.

<b>Charging policy</b>	<ul style="list-style-type: none"> <li>• Community members contribute monthly or annually to a shared fund.</li> <li>• Variable pricing models based on usage or equal distribution of costs.</li> <li>• Potential revenue generation by selling excess heat to nearby consumers.</li> </ul>
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## Services

<b>Installation services</b>	<ul style="list-style-type: none"> <li>• Collective procurement and installation of HPs.</li> <li>• Integration with district heating or RES.</li> <li>• Assistance with securing funding and subsidies.</li> </ul>
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<b>Maintenance services</b>	<ul style="list-style-type: none"> <li>• Centralized maintenance contracts for cost efficiency.</li> <li>• Regular performance monitoring to ensure optimal operation.</li> <li>• Collective decision-making on system upgrades and replacements.</li> </ul>
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## Legal aspects

<b>Ownership</b>	<ul style="list-style-type: none"> <li>• Community-owned or cooperative-owned heating infrastructure.</li> </ul>
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<b>Contract duration</b>	<ul style="list-style-type: none"> <li>• Long-term agreements among community members (e.g., 10 years).</li> <li>• Flexible exit strategies for participants moving out.</li> </ul>
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<b>End of contract regulations</b>	<ul style="list-style-type: none"> <li>• Options for system buyout or reinvestment in new equipment.</li> <li>• Defined policies for new homeowners joining the scheme.</li> </ul>
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<b>Regulations in case of insolvency</b>	<ul style="list-style-type: none"> <li>• Cooperative reserves or insurance funds to cover financial risks.</li> <li>• Reallocation of assets among remaining members.</li> </ul>
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## 8.2 Cases in practice

*DuCoop* in Belgium is an example of a cooperative that manages a circular system for heating, electricity, water, and waste management. Flats are connected to a local heating grid which provides heating from residual heat of nearby industry and heat recovered from wastewater and a water-to-water HP. Households pay a one-off connection cost to the local heating grid, a fixed fee per month and electricity costs. All households need to be part of the cooperative and automatically have shares (type A) of the cooperative and therefore decision-making power. Members can also buy shares (type B) that finance the projects. The cooperative can pay up to 6% of interest on the investments of the members. *DuCoop* did not follow a classical bottom-up approach as it was founded by the project developer, a water company and an innovator. Nevertheless, cooperative members are the households living in the district which have voting rights for the board and are invited to participate in decision-making processes.

In the *SmartCity Baumgarten* project in Vienna, a community financing model was established to invest in a shared RES based on HPs and an energy grid. An association was founded by property owners and a developer to finance, operate, and maintain the system, with membership including all participating buildings. Investment costs were allocated based on each building's energy demand: some owners paid upfront, and others opted for monthly instalments. In the new building, costs were included in the apartment sales price. Energy is supplied at a low cost (around 5 cents/kWh) to cover operational expenses. Ownership of the energy grid remains with the

association, enabling collective management and ensuring long-term cost savings, with economic viability expected after five years.

In the *Iglaseegasse* project in Vienna’s 19th district, the owner of a privately held Wilhelminian-era apartment building initiated the creation of a heat energy community to decarbonize the building and involve tenants and neighbouring single-family houses. The project finances the installation of a shared geothermal HP system and rooftop PV through a mix of public subsidies, equity, and mortgage-secured loans, combined with a mutually agreed increase of the monthly rent by €2/m<sup>2</sup>. The building’s thermal renovation is financed separately by the owner. A cooperative was established to operate and manage the heat and electricity systems. Each new tenant or household must purchase a cooperative share, which earns annual interest and is refunded when they leave the cooperative. The cooperative leases the building’s technical infrastructure from the owner, assumes operating costs, and supplies members with heat and electricity for a fixed monthly fee plus a variable cost based on consumption. Ownership of the building remains private, while the cooperative owns and manages the energy systems, ensuring collective participation and shared responsibility for the energy transition.

In Denmark, local energy cooperatives have incorporated HPs into district heating networks, leveraging collective purchasing power and shared maintenance costs to reduce financial barriers. Similarly, in parts of Germany, community energy groups - often organized as cooperatives - have deployed HPs as part of broader renewable energy initiatives to decarbonize local heating systems.



### 8.3 SWOT analysis

In the following, the strength & weaknesses of the Community Financing model are elaborated from the end consumers point of view and opportunities & threats are analysed from a systems perspective.






Legend:

\$ - Costs;  - Technical performance;  - Information;  - Time Constraints;  - Workforce;  - Dependencies



#### Strengths

- \$ : Lower individual investment due to collective purchasing power.
- \$ : Shared maintenance expenses reduce long-term financial burden.
- \$ : Access to better financing terms through cooperative structures.
-  : Increased efficiency through optimized system management.
-  : Strengthened community engagement and energy autonomy.

#### Weaknesses

- \$ +  : Initial organizational efforts required to set up the cooperative.
-  : Possible administrative complexity in managing shared resources.
-  : Potential difficulty in exiting the system without financial loss.
-  +  : Dependence on community-wide consensus for decision-making might slow down the process.

#### Opportunities

-  : Community approach support integration with local renewable energy sources (solar, wind, etc.).
-  : Growing interest in community-driven sustainability initiatives.

- 👥 : Increased resilience against fluctuating energy prices.
- 🔗 : Potential for partnerships with municipalities and non-profits.
- 🔗 : Flexible exit strategies for participants moving out.

## Threats

- 💰 : Regulatory uncertainties regarding collective energy ownership.
- 📄 : Difficulty in scaling up the model beyond initial participants.
- 🕒 : Changing community dynamics may affect long-term stability.
- 🔗 : Difficulty in scaling up the model beyond initial participants.

# 9 | Heat Pump Project Pooling

## 9.1 How the model works

For pooling HP projects, an independent organisation, or an institutional owner of a larger building stock, bundles potential HP projects regionally into a stock with similar specifications. This allows for issuing a joint tender for implementation by a general contractor or the joint purchase of specific components and associated installation services. This BM is most suitable in settlements where buildings have similar physical characteristics, e.g., detached, or semi-detached houses. For these clusters of similar buildings, common measures can be developed e.g., envelope renovation and HP installations. Through the implementation of similar measures economies of scale can be exploited.

There are two possible ways of implementing pooling. The first option, most suitable for residential settlements, is to pre-negotiate price benchmarks for different HP systems with regional installers and suppliers. Public bodies can hire independent organisations that perform such tasks including end consumer advisory services or training of public advisers. In this case, independent consultants are authorised to communicate the reference prices to the customers, depending on which pool they belong to. The customers then go through a list of participating installers and ask directly for concrete, binding offers. In addition, customers can be guided through the process assisted by dedicated websites where they can find standardised, comparable offers from participating installers and suppliers.

In the second option, most suitable for institutional building owners, the pooled demand for HPs is issued by a public tender to identify suitable implementers. The tenders can be issued by an independent organisation that identify and set up the pools of similar buildings for the tender based on building related data. Such a process requires a critical mass of numbers of installations to ensure sufficient bargaining power. In some cases, institutional building owners use pooling to tender EPC for bundles of office buildings. Both approaches require much coordination and communication with the customers to gather the necessary data and provide adequate advice. Collaboration with public or in-house energy advisers is required.

### Targeted market segment

- Single-family and semi-detached houses.
- Multi-apartment buildings.
- Commercial and public buildings.

### Financing

#### Upfront costs

- Customers face high upfront costs. Yet, given a stronger bargaining position through pooling the projects, lower up-front costs compared to the traditional model can occur.

#### Sources of financing

- Traditional financing models for households, housing association and other institutional building owners, such as bank loans, private equity and use of available subsidies and public incentives.

#### Charging policy

- No regular fees for customers.

- Combination with EPC is possible, especially with institutional building owners (see example below).

## Services

### Installation services

- Planning and installation services are included in the purchase offer.
- If an independent non-profit organisation offers pooling for private households, the services can range from free advisory services, over initial planning, to subsequent pooling and joint tendering steps.

### Maintenance services

- Maintenance and performance monitoring services are typically arranged independently by the customer.

## Legal aspects

### Ownership

- The customer owns the HP after purchase.

### Contract

- No additional contract after purchase is established.

## 9.2 Cases in practice






The Dutch *install.res* partner *Heat Transition Makers (DTWM)* is planning to implement the above-mentioned approach to realise HP pooling at their demo sites. HP pooling is implemented in residential settlements with 200 to 400 semi-detached houses. Most houses were built after 1992 and have a thermal quality which allows HP readiness without further retrofitting. As the houses have similar architecture, common solutions can be found. In modern neighbourhood (after 1992) hybrid solutions are preferably proposed as all-electric ready option i.e., the gas boiler is used only for hot tap water. HPs and natural gas hybrid concepts are planned for neighbourhoods with houses build before 1992. In general, similar-sized monobloc or split unit air-water or water-water HP systems should be installed, it is checked whether a combination with PV(T) is feasible. Energy consultants advise households on the most suitable technological solution for their building. Households can then find an installer through a dedicated website where regional installers upload their information. As part of this initiative, energy advisors and installers are trained and sensitised towards the advantages of HPs. The website and trainings are supported by the municipality.

In Austria, pooling of federal buildings has been practiced for many years. Federal contracting (*Bundescontracting*) pools federal building of the same or similar type located in the same region. Then, public tenders for EPC are issued. EPC normally comprises an upgrade of the building energy efficiency and change of heating systems and PV installation. Often also operational management tools for monitoring are implemented. A contractual relationship between federal agencies (or the government) and ESCOs is established to achieve guaranteed energy savings in 10 years. 80% of saved energy costs are used to cover the investments in energy saving measures. 20% of saved energy costs are returned to the building owner. Between 2014 and 2020, about 30 GWh/a were saved by this combined pooling and EPC BM and further 2 GWh/a via improved energy management. 276 building units bundled into 29 pools achieved over 19% energy savings which translated into EUR 3.6 million annual average energy savings and EUR 18.3 million total annual energy costs (electricity and heating).


## 9.3 SWOT analysis


In the following, the strength & weaknesses of the Heat Pump Project Pooling model are elaborated from the end consumers point of view and opportunities & threats are analysed from a systems perspective.


### Legend:


\$ - Costs;  - Technical performance;  - Information;  - Time Constraints;  - Workforce;  - Dependencies


### Strengths

 : The organisation offering the pooling reduces the information and transaction costs for customers.

 : Working with qualified regional installers ensures quality solutions and builds trust with customers, and local companies are interested in good long-term business relationships.



 : If the organisation offering the pooling is independent, customers get informed without commercial interest.


 : Reduced information effort for customers as they receive comprehensive advisory up to website services and can more easily find a regional installer.



 : Local businesses experience steady and increased demand by pooling offers.

 +  : This approach is particularly strengthening local value creation, employment, and cohesion.



### Weaknesses


 +  : High effort and costs for pooling organisation to offer advice, planning, data collection and setting up a network of installers.


 : Pooling organisation needs to train advisors and installers prior to launching initiative which requires planning security and financial means.


 +  : Strongly reliant on the will and budget of public support (e.g., municipalities or regional authorities).


### Opportunities


 +  : Local businesses and building professionals can benefit from reduced acquisition costs and prior evaluation of building data by energy advisors.

 : Cooperation between public authorities and local businesses enables implementation of high-quality and state-of-the art solutions.

 : Local businesses offering HP solutions benefit from information activities by the pooling organisation targeting customers.


 : Pooling by independent organisation can increase trust in HP implementation among customers.


 : Pooling potentially offers efficiency improvements and time savings for local businesses given economies of scale in procurement, planning, and implementation.


 : Support by regional authorities offers planning security for businesses to invest in training and expanding their workforce.


 : Added value creation remains in the region which strengthens local employment and social cohesion.

## Threats

 : Pooling activities and offers are only running for a limited amount of time which might not align with households' ability to timely finance up-front costs.

 : Insufficient availability of skilled local workforce poses risk to high-quality installations, low service costs and reliability for end users.

 : Political changes can threaten the planning security for businesses and therefore the sustainability of the BM.

 : Missing trust in pooling organization and regional installer networks impede uptake of initiative by end users.

## 10 | Joint Purchase Initiatives

### 10.1 How the model works

The Joint Purchase Initiative (JPI) is a collective procurement approach where an independent caretaker (e.g., consumer association) aggregates demand from multiple interested end consumers and negotiates bulk purchasing terms with HP suppliers. The model therefore follows a similar logic as Community Financing (see 8 | Community Financing) but is organised by an independent caretaker and is therefore a top-down approach. The initiative ensures that HPs of a defined technical standard, size, and quality are acquired at more favourable conditions. Depending on the model design, the initiative may also coordinate individual installation services, although installation costs might vary depending on on-site implementation requirements.

#### Targeted market segment

- Single-family and semi-detached houses.

#### Financing

##### Upfront costs

- Upfront investment by end user.

##### Sources of financing

- End user equity i.e., the property owner pays for the HP.
- Collective negotiation power to secure bulk purchase discounts.
- Public subsidies and incentives may apply to improve affordability.
- Third-party financing (banks or specialized green investment funds).

##### Charging policy

- One-time, lump sum payment by owner of HP.
- Potential financing options allowing instalment payments.
- Service fees if additional support is included in offer (e.g., installation, maintenance).

#### Services

##### Installation services

- Coordination of bulk purchase and supplier negotiations by caretaker.
- Individual installation service facilitation.
- Possibly dismantling and disposal of old systems (if negotiated as part of the joint purchase).
- Possibly assistance with subsidy applications (e.g., organizing webinars, assisting with documentation preparation).
- HP equipment is predefined by the caretaker coordinating the purchase. End user is allowed to choose among the selected HPs.

##### Maintenance services

- Responsibility for arranging maintenance service lies primarily with end user. In some cases, included as optional service in negotiated offers.
- Remote monitoring for function optimization may be included.

- Typically, no fixed guarantee of minimum seasonal performance factor and 24/7 emergency service.

### Legal aspects

#### Ownership

- End users own the HP.

#### Contract

- No contract after purchase established.

## 10.2 Cases in practice

The collective purchase model for HPs has been successfully implemented across multiple EU projects (*Street HP Reno*, *CLEAR-HP*, and *CLEAR-X*) to drive mass adoption, lower upfront costs, and support residential heating decarbonization. These initiatives aggregate demand, negotiate bulk discounts, and engage stakeholders at local, regional, and national levels to overcome barriers to HP adoption. Key strategies include using optimization tools for EE, integrating HPs into deep renovation processes, and offering "purchase and install" packages that simplify the purchasing experience.

Projects have focused on targeting energy-poor communities and lowering financial, regulatory, and knowledge barriers through workshops, educational resources, and partnerships with suppliers, installers, and financial institutions. Moreover, stakeholder engagement has been central, with platforms for consumer registration, tailored offers, and ongoing support, such as installation guarantees and after-sales services. By leveraging collective buying power and fostering collaboration among local communities, governments, and other key players, these projects have significantly reduced costs, improved access to HPs, and contributed to the broader goal of decarbonizing residential heating systems across Europe.

Additional successful examples of group purchasing models for HPs include the *West Linton scheme* (Scotland), the *Switch Together initiative* (UK), and the *Laminar Collective* (USA). These initiatives aggregated homeowner demand to secure discounted prices from vetted installers, making HPs more financially accessible. Common features included strong local or community engagement, simplified customer journeys, and strict quality assurance through contractor vetting and post-installation support. Projects also leveraged national or regional incentives to further reduce upfront costs. While West Linton focused on a rural off-gas community with personalized support, Switch Together used a national reverse auction model, and Laminar combined bulk procurement with transparency and education to empower consumers.

## 10.3 SWOT analysis

In the following, the strength & weaknesses of the Joint Purchase Initiative model are elaborated from the end consumers point of view and opportunities & threats are analysed from a systems perspective.





### Legend:

\$ - Costs; 🛠️ - Technical performance; i - Information; ⌚ - Time Constraints; 👥 - Workforce; 🔗 - Dependencies






### Strengths

\$ : Lower purchase price due to bulk discounts.





🛠️: Pre-selected HP models are of high quality ensuring long-term energy efficiency (the caretaker tests the HP performance).

-  : Faster procurement process through pre-negotiated supplier contracts.
-  : Transparent pricing and group negotiation benefits and pre-selection of HP models and installers simplify selection and procurement for end users.
-  : Raising public awareness through webinars on topics relevant to HP selection and ownership.
-  : Given ownership of HP, flexibility in changing system and no contractual dependencies.





## Weaknesses

-  : Requires up-front payment or financing solution by end users. Affordability for low-income households limited.
-  : Uncertainty regarding running costs due to changes in electricity price.
-  : Uncertainty regarding life cycle costs for repairs and maintenance in case not included in the collective purchase offer.
-  : Limited customization options for end consumers as limited to pre-selected HP models and suppliers. Therefore, not suitable for optimisation of energy systems.
-  : Some end users may require additional support to understand long-term cost benefits.

## Opportunities

-  : High-volume sales increase business viability
-  : Standardization can lead to improved quality assurance.
-  : Accelerated market uptake through simplified decision-making process for end consumers.
-  : Increased trust in HPs if independent organisation organised the JPI.

## Threats

-  : Price competition may reduce margins for manufacturers of HPs.
-  : Risk of end consumer dissatisfaction if perceived benefits are unclear.
-  : Demand peaks may strain installation capacity of HP providers and disrupt the market.
-  : Dependency on group purchasing limits individual supplier flexibility.

# 11 | One-Stop-Shop (public)

## 11.1 How the model works

One-stop-shops (OSS) based on public-private partnerships (PPP) are initiated by public bodies which partner with private actors to offer information or service packages to customers for renovating their buildings and/or decarbonizing their heating system. It is recommended that OSS focusing on replacing heating systems also include a minimum set of retrofit services to reduce overall energy consumption prior to refurbishment. OSS can take different forms, from physical offices to web-based platforms, yet the underlying idea is the same: customers should receive a quality assured standardised bundle of cross-trade services from a central point. The services are often publicly funded and range from independent general energy advice over cost-benefit analyses of recommended and applicable decarbonisation options, to hosting platforms allowing building professionals to offer pre-defined, all-inclusive heating system replacement packages. Qualified building professionals may become providers of these service packages if they agree to the conditions of participation. OSS support customers in their decision-making process and ensure high-quality installations but do not reduce up-front costs of investments in HPs. The aim of such initiatives in general is to:

- Increase consumer trust by hosting OSS by public bodies based on a public-private-partnership initiative with common goals.
- Make the replacement of an existing heating system as easy, fast and future-proof as possible.
- Reduce complexity and time as well as to avoid like-for-like emergency replacements (e.g., gas for gas).
- Include a minimum set of retrofit services to reduce overall heat consumption before replacement.
- Speak a common language regarding recommended solutions that are suitable for the site (across crafts) by passing on measures recommended by public energy consultants, including (minimum) energy efficiency measures (and beyond where appropriate) with OSS offers.

### Targeted market segment

- Single- and semi-attached family houses.

### Financing

#### Upfront costs

- Upfront investment by customers, similar to traditional model.

#### Sources of financing

- Customers pay up-front costs for installation of HPs using private equity, bank loans and possibly subsidies if available (traditional BM).
- Public OSS are financed by public sources to avoid any commercial interests. The costs of the OSS platform are primarily staff and marketing costs.

#### Charging policy

- In general, no charging policy.

### Services

#### Installation services

Services differ between OSS suppliers, possible service portfolio:

- Advice, planning and installation services: Independent platform listing regional installers that must adhere to quality and energy efficiency criteria.
- Information services: Information materials and consultation appointments free of charge. Public energy advisors recommend the most suitable heating solution.
- Temporary provision of mobile heating units possible to avoid like-for-like replacements in case of breakdown of the old heating system.
- Provision of a minimum set of retrofit services to reduce overall heat consumption by 15-20% before replacement.
- Carefree packages that include planning, installation, disposal, and all cross-related tasks by one actor. Often subsidy application is included.

#### Maintenance services

- OSS suppliers optionally offer service packages to customers which include maintenance and repair services for separate fee or included in service package.

### Legal aspects

#### Ownership

- The customer owns the appliance.

#### OSS collaboration

- Customers have contracts for planning and installation with listed OSS providers collaborating with regional installers and building professionals.
- Any provider working together with public OSS must accept participation regulations (e.g., quality criteria, complaint management and sanctions).

## 11.2 Cases in practice

Practical examples for public OSS are described in the Austrian chapter (see 15 | Austria) and the North Macedonian chapter (see 16 | North Macedonia).

## 11.3 SWOT analysis

In the following, the strength & weaknesses of the public One-Stop-Shop model are elaborated from the end consumers point of view and opportunities & threats are analysed from a systems perspective.


#### Legend:


\$ - Costs; 🛠️ - Technical performance; ⓘ - Information; ⌚ - Time Constraints; 👥 - Workforce; 🔗 - Dependencies



### Strengths


\$ : (Ideally) free independent energy advice.


🛠️: High-quality measures recommended by independent energy advisors are implemented through listed professionals, such as installers and building experts.


: A minimum set of retrofit services to reduce overall heat consumption by 15-20% before replacement is often included.

: Increased transparency and better comparability of offers due to standardised service packages.


 + : In the event of a heat breakdown, a temporary provision of a mobile heat unit avoids the need for like-for-like replacements and allows for making an informed conversion decision.


: Service packages usually cover 90% of required cross-trade services. These services are offered by a single provider and coordinated by a central point of contact (the installer) for all related heating system replacement measures.


: Significantly reduced time, coordination, and information requirements for customers.


: Conditions of participation for installers include binding quality assurance elements.

## Weaknesses

: A full-service package with one central cross-trades site-manager (the installer) involves higher up-front costs and time efforts for listed providers.


: Public and regional authorities must be willing to finance public OSS initiative, and businesses must support it.


: Difficulties in clarifying who takes responsibility for planning, design, sizing, and implementation failures in a cross-trade collaborative model, and how any related disputes can be resolved.



: Local businesses will participate in such an initiative if supply capacities are higher than actual demand. If the demand for installers is high anyway, there is little incentive for suppliers to attract additional customers and participate in OSS.


: Often only a regionally limited offer.

## Opportunities


: Free listing of qualified installers on public OSS platform increases visibility and has advertising value. Additional consumer leads are generated for regional installers and lower supply failure risks.

: Cross-trades collaboration can save costs, lower overhead costs through collaboration, and lower joint procurement costs.


 + : Including a minimum set of retrofit services to reduce overall heat consumption before replacement helps reduce investment, running costs, price, and supply dependencies.


: High quality planning as customers pass on energy advice protocol with essential planning data to listed installers.

 + : Partnerships with banks could help homeowners with their information and financing needs.

: Increased trust in HP installation due to promotion by regional authority.

: Effective division of labour, where sensible and possible, enables efficiency gains for mutual benefit.

: Listed service providers can be installation companies, collaborations between manufacturers and installers, or collaborations between installers and businesses from other sectors. This creates new business opportunities.

: Listed service providers can develop new task sharing processes between e.g., installers, manufacturers and ESCOs. This reduces the time it takes for installers to implement, enabling them to install more devices and helping industries to grow efficiently.

## Threats

💰 : If businesses are not used to collaborate, such an initiative can cause unknown risks.

💰 : Suppliers joining the initiative must find incentives to their collaborating companies for participating.

📄 : Requires clear information about responsibilities and benefits, and (personal) trust to build solid long-term relationships.

📄 + 👥 : Quality assurance of installers and availability of workforce is crucial to ensure functioning of model and maintain trust.

👥 : Installers may be reluctant to divide their usual responsibilities with third parties because it may disrupt their work routine, they are uncertain about the dependency on third parties, and they fear loss of revenue.

## 12 | One-Stop-Shop (commercial)

### 12.1 How the model works

The trend towards servitisation is leading to an increasing number of commercial One-Stop-Shops (OSS). Servitisation is a business transformation process in which companies shift from selling products alone to offering integrated solutions combining products and services. Commercial OSS are run by a private company and offer similar heat system replacement services to public OSS. However, there is less focus on reducing overall energy consumption before refurbishments, and more focus on all-electric solutions. The aim is to offer customers one point of contact where all services around initial advice, planning, installation and dismantling, operation, maintenance services and potentially performance monitoring are bundled. Most providers also offer subsidy support and connection to private loan providers. The providers of such OSS are energy utility companies, start-ups, and ESCOs. Some providers combine their OSS offer with the possibility of renting the installed equipment resulting in no upfront costs for customers (see 2 | Rent a Heat Pump).

Businesses that offer an OSS for heat pump installations often started out by offering PV installations and expand their business model towards equipping all-electric homes. In addition to PV, these companies offer heat pumps, power-to-heat rods to provide hot tap water, as well as home batteries and wall boxes. Combined with intelligent energy management systems (EMS) and possibly variable electricity prices, a cost-effective operation of devices in all-electric homes is enabled by this concept (see 14 | Outlook). Commercial OSS often have collaborations with regional installers to ensure that installations and other services are executed in a timely and efficient manner.

There is also an increasing number of commercial OSS that have expanded their business to offer holistic renovation services. These OSS are based on a multi-disciplinary team that involves the different trades needed, e.g. heating system installers, electricians to install the electrical equipment and connect it to the public grid, building professionals to improve insulation and/or install windows, and energy auditors to evaluate energy efficiency potential. If relevant, a collaboration with insulation suppliers and heat pump suppliers is set up.

#### Targeted market segment

- Single- and semi-attached family houses.
- Multi-apartment buildings.

#### Financing

##### Upfront costs

- Upfront investment by customers, similar to traditional model.
- In some cases, rent-a-system BM models are offered for PV and heat pump installations.

##### Sources of financing

- Customers pay up-front costs for installation of HPs using private equity, bank loans and possibly subsidies if available (traditional BM).
- Often referral to partner banks offering mortgage loan and loan with no security.

### Charging policy

- One-off up-front investment including any monthly fees or deferred payments for additional operation and maintenance services or any financing services.

## Services

### Installation services

- Carefree packages that include planning, installation, disposal, and all cross-related tasks by one actor. Often subsidy application is included.
- Information services: Online presences often include basic online planners that quickly provide specific product recommendations, along with initial price quotations.

### Maintenance services

- Basic operation and maintenance service packages, based on monthly or annual fee. Often includes a quality and delivery guarantee based on performance monitoring.
- Optional: 24/7 emergency breakdown service.

## Legal aspects

### Ownership

- Normally, the customer owns the appliance.

### OSS collaboration

- Contract with OSS provider that transfer services to regional installers and manufacturers.

## 12.2 Cases in practice

Commercial OSS exist in Austria (e.g. *Quickfix*, *PumpenPeter* and *Heizma*, offering a Rent a Heat Pump), Germany (e.g. *Enpal*, *1Komma5°* and Rent a Heat Pump incl. PV system packages of *German contract* and *Viesmann*), the UK (e.g. *octopus energy* operates worldwide) and other EU countries. As an example, the German provider *Enpal* offers full-service packages for HPs to customers which include advice, planning, installation, maintenance up to performance optimisation and system integration. Investment costs can be paid as lump-sum payments or deferred payments by the end consumers. *Enpal* originates from the supply of solar panels and now also offers HP solutions. Given the cooperation with local installers and an in-house training centre, the provider can keep the average time between initial consultation and installation of the system short. In addition to the installation of HPs, PV and battery systems, wall boxes and smart energy systems are offered by these commercial OSS to optimise the renewable energy use within a building.

*Energiesprong* is an example of a commercial OSS that supports a holistic renovation approach. This Dutch initiative has developed energy renovation kits for social housing built between 1950 and 1970. The idea behind the initiative is to provide long-term guaranteed net-zero energy and high-quality refurbishments with minimal disruption for tenants. *Energiesprong* connects housing associations (who own the buildings and assume financial risk via bank loans) with private contractors. The renovations target roofs, floors, façades, heating systems and wall insulation, and use prefabricated components (e.g. a prefabricated façade with an integrated heat pump and PV panels). The projects are financed by the money saved on energy bills and maintenance. Tenants pay a fixed energy service fee to the housing association instead of a utility bill, which enables the association to fund the renovations. In Europe, the BM model is currently replicated in the UK, France, Germany, and Italy.

## 12.3 SWOT analysis

In the following, the strength & weaknesses of the commercial One-Stop-Shop model are elaborated from the end consumers point of view and opportunities & threats are analysed from a systems perspective.

Legend:

\$ - Costs; 🛠️ - Technical performance; ⓘ - Information; ⌚ - Time Constraints; 👥 - Workforce; 🔗 - Dependencies

### Strengths

- \$ : Often referral to partner banks offering mortgage loans and loans with no security.
- 🛠️: Includes quality and delivery guarantee based on performance monitoring.
- ⓘ + \$ : Online presence often includes quick information on product recommendations and pricing.
- ⌚ : All services supplied by a single provider, only one central contact point for all measures.
- ⌚ : Significantly reduced time, coordination, and information requirements for customers.
- ⌚ + 👥: Quick installation within 1.5 to 2.5 months through collaboration with local installers.
- 👥: Standardisation of products and services, focus is on offering relevant competitive products (mainly strong company brands) and prices.

### Weaknesses

- \$ : Local businesses must be willing to collaborate under the roof of the commercial OSS initiative.
- 🛠️: Difficulties in clarifying who takes responsibility for planning, design, sizing, and implementation failures in a collaborative model may occur, uncertainty how any related disputes can be resolved.
- 🛠️ + \$ : Services offered often do not include cost-effective energy demand reductions.
- 👥 + 🔗 : In the start-up phase a regionally limited offer.

### Opportunities

- \$ : Additional consumer leads are generated for regional installers and lower supply failure risks.
- \$ : Collaboration can save costs; lower overhead costs through collaboration, lower joint procurement costs etc.
- 🛠️: HP often are offered together with PV, wall box and storage installations which increases efficiency of the building's energy system and can relieve the grid.
- ⓘ: Provision of a clear and complete value proposition (and quotation) that fulfils many needs of the owner.
- ⌚ : Effective division of labour, where sensible and possible, enables efficiency gains for mutual benefit.
- 👥: Cooperation with local installers and in-house training of commercial OSS can boost local economy.
- 👥 + \$ : Opportunity to enter growing markets (all-electric homes combined with energy efficient renovation).
- 🔗 : Collaboration with qualified local installers can enhance credibility and trustworthiness.

## Threats

⚡ : If local installers do not find beneficial conditions under such an approach, this can cause unknown risks.

🔧 : A holistic renovation of the building to lower energy consumption before replacing the heating system often is not included in BM providers' offers.

📄 : Requires clear information about responsibilities and benefits, and (personal) trust to build solid long-term relationships.

📄 + 👥 : A challenge is to establish a qualified local workforce offering credibility, an existing market position, and the capacity to supply a complete package of high-quality solutions.

# 13 | Vertical Integration in Social Housing

## 13.1 How the model works

This model has been realized by few social housing associations in Austria. Social housing associations have a large building stock and extend their core activity of renting out flats to offering additional in-house installation and maintenance services. Given the large building stock of housing associations, sufficient demand and need for installation and maintenance services is available. The vertical integration of HP installation into the core activity of providing social housing takes the following form: The social housing association founds a “daughter” company which employs building professionals that offer additional in-house services. The overall strategy is to offer living at lowest cost and maximum comfort by switching to renewable based heating systems. Given the social mission of social housing associations, the costs for installation and maintenance are charged without an additional profit margin which keeps possible rent increases moderate.

### Targeted market segment

- Multi-family buildings.
- Social housing sector.

### Financing

#### Upfront costs

- No burden of up-front costs for tenants. Up-front costs are financed by social housing association.

#### Sources of financing

- Regular upfront costs for social housing providers are usually fully financed by long-term reserves earmarked for building maintenance and improvement which is charged as part of the cost-rent.
- Where other sources of investment are required, these are financed through the traditional BM of private and public loans, private equity, and grants.

#### Charging policy

- In general, no additional costs for tenants.
- For more complex/expensive technical solutions, rents may slightly increase, but these increases are usually outweighed by the cost savings from switching energy sources.

### Services

#### Installation and maintenance services

- Planning, installation, and maintenance services are executed by “in-house” installer company.
- Building services include range from replacement of central or decentral heating systems by HP-based systems to realisation of neighbourhood heating solutions (cold water grids).
- In addition, a system combination with on-roof and facade PV plants enhances the phase-out of fossil fuels as affordable renewable electricity is supplied.

## Legal aspects

- Daughter company (separate legal body) of (non-profit) housing association.

## 13.2 Cases in practice

This model has been realised with two social housing associations in Austria. One countryside-based social housing organisation started to build up know-how to install wood chips and pellet installations for delivering single object and micro-grid heat (for at least two buildings). Another, urban-based social housing association started to install HPs – for single objects and neighbourhood cold water grids (anergy grids) – to replace natural gas in areas where no district heating is or will be available.

In the urban case, the idea to extend business activities evolved when tenants were allowed to install single SAT receiver systems. The social housing organisation wanted to avoid that many receivers would appear on their houses facades and started to offer centralised solutions. This business was extended to fibre optic cable for internet and security systems for doors. Finally, with a change in law, building owners became responsible for decentralised gas heaters. The social housing association developed efficient methods to centralise the decentralised heat system to heat with district heat or HP-based solutions. For further information, see Section 15.3 | Vertical Integration in Social Housing.

## 13.3 SWOT analysis

In the following, the strength & weaknesses of the Vertical Integration in Social Housing model are elaborated from the end consumers point of view and opportunities & threats are analysed from a systems perspective.

### Legend:

\$ - Costs; 🌀 - Technical performance; ⓘ - Information; ⌚ - Time Constraints; 👥 - Workforce; 🔗 - Dependencies

### Strengths

\$ : This BM enables housing associations to provide energy transition related services for its tenants at a competitive, affordable long-term price.

\$ : Costs of coordination and communication with a third-party (planners, installers etc.) are reduced.

\$ : Given the social goal of the sector, social housing associations aim at keeping the cost impact of decarbonisation measures for the end users low.

🌀 : Combined systems of HPs and PV plants enhance system efficiency and decarbonisation of building stock.

👥 : As the installer company exclusively works for the housing association, workforce well-qualified for implementing the energy transition measures in the own building stock is available.

### Weaknesses

\$ + 🌀 : Non-profit housing associations need a critical mass of existing building stock to gain enough revenues to employ a team of building professionals.

⌚ + \$ : The communication and coordination efforts required to implement such projects are very high.

⌚ : In case no legal lever exists, the housing association must wait with the heating replacement until tenants move out.

🔗 : Strongly dependent on legal framework that must allow non-profit association to found daughter companies.

## Opportunities

💰 : Non-profit housing associations can improve the worth of their building stock by switching to independent renewable heating systems.

👥 : Training qualified installers as part of the BM and thereby securing local and regional labour force.

🔗 : The social mission of non-profit housing associations is a lever to test and scale-up renewable and affordable heating systems.

## Threats

💰 : Non-profit housing associations need to pre-finance activities in new business areas, especially in the build-up phase which is why sufficient capital reserves or loans are necessary.

🔗 : Insufficient or impeding legal regulations can hamper implementation of BM.

🔗 : Non-profit housing associations might be reluctant to engage with risks of new business areas since not part of their core business.

## 14 | Outlook

### 14.1 Refinancing options for BM providers

In several BM cases, BM providers (partly or fully) pre-finance HP investments and related energy services on behalf of their customers. To remain liquid, reduce non-repayment risks and be able to pre-finance several HP projects, BM providers need a way to secure financing even if debts increase on the BM provider's balance sheet.

Generally speaking, and simplifying the process, commercial or public banks lend capital on a 1 to 4 basis to a client of good repute. Meaning that for every unit of equity, banks will lend four units of debt. A BM provider that can afford to bring in €1 million of equity would run out of funding capital after taking out €4 million of debt. With this classical way of financing, BM providers would therefore run out of capital to pre-finance HP projects.

However, there are several options how BM providers can pre-finance up-front costs of HP projects, reduce non-repayment risks or re-finance their investment expenditures. Refinancing enables BM providers to even out their balance sheet and gain financial leeway for new projects and business growth. In the following, different ways how BM provider can reduce financing risk are explained:

- **Partial customer financing:** The customer assumes part of the investment costs (especially if the customer has exclusive access to more favourable sources of debt capital or subsidies). The BM provider pre-finances the remaining up-front costs and the financing risk is spread between BM provider and customer. A similar approach can be adopted in the EPC model with shared savings, e.g. if energy savings and financing are shared equally.
- **Third party financing through equity contribution:** Third parties as financing partners invest capital directly into the BM provider or a special purpose vehicle (SPV). This equity stake helps to meet lenders' expectations regarding the level of committed equity required to finance the project pipeline. Financing partners can be private or public banks, private investors or funds, venture capitalists, fintech or climate tech venture capital firms or funds, etc.
- **Third party financing through credit lines:** Alternatively, or in addition, financing partners can offer credit lines which can be designed similarly to forfeiting (see below). Credit lines are offered on an individual basis by lenders, such as banks or credit unions. They allow the BM provider to access funds up to a predetermined limit, but the funds must not be borrowed entirely as with a conventional loan. Upon repayment, the funds can be re-borrowed which offers BM provider flexibility in pre-financing.

There are further possibilities for BM providers to securitize the instalments they receive from their customers for refinancing their investment on the capital market.

- **Sale-leaseback structures:** These arrangements allow BM providers to sell installed equipment to capital providers and then lease it back. This frees up capital and transfers ownership risks, while maintaining operational control. However, such outsourcing of assets to third parties must be agreed with the customer beforehand.
- **Sale of future cash flows (forfeiting):** Rent-a-HP, HaaS, asset leasing, ESC and EPC generate stable, long-term cash flows from repayment of the pre-financed up-front investment, as well as any guaranteed energy savings. These BM providers and primary banks can sell or assign these receivables to third-party investors, forfeiting funds or bank insurer etc. This secondary financing recycles capital, reducing the need for BM providers and primary banks to carry large debts on their balance sheets, thereby improving liquidity and reducing financial risk. The forfeiter takes over the credit risk of the customers and the BM provider guarantees the performance of the projects.

- **Use of green bonds and securitisation:** In some markets, BM providers and financiers bundle energy service loans or contracts into green bonds or asset-backed securities. This approach attracts investors focused on sustainable assets, allowing refinancing at competitive rates, and expanding access to capital. It also enables the recycling of funds for new projects. However, most energy service projects are too small for the issuance of a bond on a single-project or single-owner basis. A stand-alone energy efficiency project of EUR 10 million is unusual and still too small for a debt capital market bond. The example of a bank issuing green bonds is described below.

The latter two secondary market-based models are only now starting to emerge due to the relatively small scale of the energy efficiency finance market and the lack of standardisation and aggregation of projects. Those options are overcoming the funding barrier by selling the customer receivables (e.g., monthly fees and instalments) to dedicated capital market investors. A BM provider sells receivables from the sale and installation of HP systems and any add-on energy efficiency saving measures to a securitisation vehicle. A securitisation vehicle is a type of structured financing, where a pool of financial assets (such as receivables, loans, mortgages, or leases) is transferred to a special purpose vehicle which issues securities, backed solely by the assets transferred and the payments derived from those assets.

The companies managing the special purpose vehicles turn them into securities that raise capital through the instalments of the BM provider which go to capital market investors. The money the BM provider receives from this constellation is used to pre-finance the instalment loans. This way the risk and reward of the customer contracts are permanently removed from the BM provider's balance sheet. BM providers can then repay loans and take up new loans from the bank while retaining the revenue from maintenance services and starting new HP projects.

Green bonds have been used successfully to finance energy efficient buildings, a notable example being *Berlin Hyp*. *Berlin Hyp*'s core focus is commercial real estate finance in metropolitan areas of Germany. *Berlin Hyp* finances energy-efficient buildings, meaning buildings with an energy demand below the levels required by German energy-saving regulations (EnEV) and/or with a good sustainability certification. As of February 2017, its green finance portfolio comprised 42 loans totalling EUR 2.02 billion. This portfolio has been refinanced through the issuance of green bonds. In 2019, minimum standards for green mortgage bonds were developed together with the member institutions. Since then, further standards have been added for green public bonds and social bonds. By the end of 2023, the outstanding issue volume of sustainable bonds amounted to nearly € 23 billion. 13 German green bond banks have issued sustainable bonds to date. Further information can be found at [www.berlinhyp.de/en](http://www.berlinhyp.de/en).

A barrier to large-scale use of refinancing schemes is often limited by high transaction costs as setting up such schemes requires expertise and administrative effort. The following sources provide information on standardized contracts and templates for e.g. energy service and forfaiting contracts

- EU-project REFINE: [www.refineproject.eu](http://www.refineproject.eu)
- EU-project EaaS – Energy Efficiency as a Service: [www.eaas-initiative.org](http://www.eaas-initiative.org)
- Sustainable Energy Finance Association: [www.sefaeu.org](http://www.sefaeu.org)

## 14.2 Flexibility and electricity grid integration

Flexibility in HP operation refers to the ability of HP to adjust their electricity consumption and heat output in response to external signals, such as electricity market prices, grid requirements or the availability of renewable energy. This flexibility is primarily enabled through the integration of thermal storage and advanced control systems into the heating system, which allow HP to adapt their operation over time without compromising user comfort.

### Flexible operation systems

With appropriate planning, dimensioning and integration of hot water buffer storage and dynamic control systems, heating systems can automatically switch off a HP for around two to three hours without loss of comfort. This way flexible HP integration can contribute significantly to smoothing electricity demand and supply peaks. Battery systems and optimised sizing of HP and storage can help reduce the number of times HPs are switched off, thereby increasing their lifetime. In addition, the thermal inertia of buildings and storage systems enables heat supply to be delayed or interrupted without impacting comfort. To avoid discomfort, these flexible heating systems must be managed requiring reliable control and measurement systems, often in real time.

Technically, such a flexible operation of a HPs requires hot water buffer storage tanks to be charged by the HPs as frequently as possible, to ensure that HP are not oversized, thereby optimising overall system costs. Without the installation of an additional storage tank, switch-off time of a HP should be limited to one hour, especially if residents live in climatic conditions of low temperatures or the building envelope loses heat quickly.

### Variable electricity pricing based on electricity market prices

Grid-friendly operation can be induced by appropriate financial incentives and price signals. When an oversupply of renewable energy generation through e.g. PV, wind or hydropower occurs, electricity prices can become negative. Power plants (e.g. gas-fired power plants for district heating supply) or nuclear power plants that cannot stop their production at times of oversupply are prepared to pay for producing electricity to be able to continue plant operation which makes electricity prices negative. This is a situation that is becoming increasingly common, particularly due to the rapid increase in PV electricity generation.

Electricity suppliers increasingly offer dynamic products that reflect actual quarter-hourly or hourly electricity market prices. Therefore, end consumers are incentivised to shift their demand to times when electricity prices are low and the availability of (mostly renewable) electricity in the grid is high. As high PV and wind penetration leads to lower market prices, end consumers benefit financially from operating HP more flexible. This means price signals incentivise end consumers to operate their appliances in a way that serves the integration of wind, PV, and hydropower electricity.

Since 17 January 2025, electricity suppliers throughout the EU must offer their customers at least one flexible or dynamic electricity tariff<sup>5</sup>. Operating in response to market price signals enables end users to benefit from lower electricity prices. Energy management systems (EMS) enable exploiting low electricity prices and usually include the smart management of PV, HP, and battery systems. EMS can plan the operation of devices (e.g., HPs, batteries, and wall boxes) by considering day-ahead weather forecasts (for forecasting PV electricity production) and hourly or quarterly electricity prices, sometimes with the help of AI. However, EMS ignores the availability of renewable electricity in public electricity grids to some extent which could lead to bottlenecks or overloads in the transmission system of the electricity grid.

Nevertheless, appropriate price signals and optimisation of device operation can encourage more grid-friendly electricity consumption behaviour among end consumers and reduce overall electricity costs. Integration of EMS and dynamic electricity tariffs into alternative BM is therefore a relevant approach that should be developed further in practice.

### Cases in practice

Flexible operation of a HP such as maximisation of self-consumption of a self-owned PV system or grid-friendly HP operation are not yet offered as a standard in alternative financing models. Approaches to optimising self-consumption from PV systems are most likely to be offered in some cases. Individual providers that have grown in the area of all-round electrification packages for households have now occasionally expanded their offerings from PV systems, storage systems and wall boxes to include HPs and the smart operation of these devices (e.g.,

Enpal, 1Komma5° in Germany). Only in some cases the financing of PV systems and HPs are offered by BM providers (e.g., three German providers of rent-a-HP models).

In the area of grid serviceability, there has often been a lack of a regulatory framework. Required data and interfaces as well as standardised communication protocols for control signals across network equipment and end user devices are not sufficiently developed yet.

Some BM providers also act as ESCOs that offer flexible tariffs to optimise energy consumption and help prevent grid congestion. The UK-based provider Octopus Energy, for example, offers a flexible tariff called Cosy that allows to exploit low electricity prices and can be used in combination with the installation of a HP (see Figure 3). Octopus operates in Germany, the UK, Spain, Italy, and France.

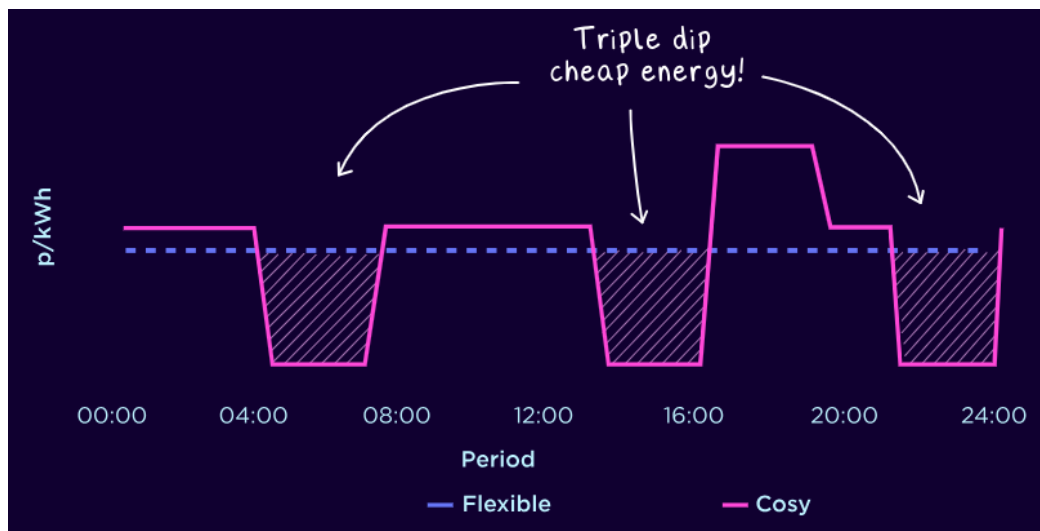


Figure 3: Flexible tariffs of Octopus Energy (Source: Octopus Energy<sup>6</sup>)

In Austria, Roots Energy offers an innovative model for decarbonising multi-apartment houses with decentralised gas heating systems. The delivery model is based on a standardised and modularly expandable cold-water network (anergy system) that provides space heating, hot water, and temperature control in summer. Instead of the gas heater, a decentralised mini-booster HP is installed, which uses brine from the anergy network as a heat source. The innovative feature here is that the hot water preparation can be supported by electric cartridges. The electric cartridges can utilise excess PV and wind power in an automated power-to-heat solution with integrated smart control technology. An integrated hot water tank can be heated up to 90°C to take advantage of periods when electricity is cheap, which helps to reduce energy costs and make use of excess electricity in peak hours.

To conclude, flexible HP operation leverages thermal storage and advances shift of electricity consumption, supporting grid stability, reducing electricity costs, and enabling integration of renewable energy. While technical and economic challenges remain, ongoing innovation and regulatory support are driving the adoption of flexible HP technologies.

### III. Country Section

The country section reviews existing offers in Austria, North Macedonia, Poland, Slovenia, and the Netherlands, countries participating in the *install.res* project. Each country section discusses three to four models (see Table 4), highlighting opportunities and barriers to scaling up in the local context.

Table 4: Business models described per country

Country	Business model
<b>Austria</b>	<ul style="list-style-type: none"> <li>• Public One-Stop-Shop</li> <li>• Commercial One-Stop-Shop</li> <li>• Vertical Integration in Social Housing</li> </ul>
<b>North Macedonia</b>	<ul style="list-style-type: none"> <li>• Heat as a Service</li> <li>• Energy Performance Contracting</li> <li>• One-Stop-Shop</li> <li>• Rent a Heat Pump</li> </ul>
<b>Poland</b>	<ul style="list-style-type: none"> <li>• Energy Performance Contracting</li> <li>• Heat as a Service</li> <li>• On-Bill Financing</li> </ul>
<b>Slovenia</b>	<ul style="list-style-type: none"> <li>• Traditional Model</li> <li>• Joint Purchase Initiative</li> <li>• Leasing</li> </ul>
<b>The Netherlands</b>	<ul style="list-style-type: none"> <li>• One-Stop-Shop</li> <li>• Heat as a Service</li> <li>• Design, Build, Maintain, Finance, Operate Model</li> </ul>

## 15 | Austria

### 15.1 Public One-Stop-Shop

Two examples of public One-Stop-Shop (OSS) initiatives were implemented in Austria. One example of a local OSS was launched in Lower Austria (2020-2022) involving 3 municipalities and the region of Lainsitztal. The starting point for the initiative were the public energy advisers in the region that have good connections to local residents, local authorities, and local heat market actors. Information, decision-making and installation packages were offered to the residents to replace their oil heating systems with heat pumps or pellet heating.

The initiative was structured into three phases: The first phase “Info Package” included direct engagement with homeowners via home visits, events, and various informational channels. The second phase “Decision-Making Package” provided free consultations by trained public energy advisers. They advised households on the most suitable heating system, including financing options like available subsidy schemes and bank loans. The last phase “All-inclusive Carefree Package” dealt with the installation of the new heating system. The regional energy agency prepared carefree packages around the replacement of heating systems together with local installers. These packages included installation of a new heating system and disposal of the oil system. By the end of the campaign, more than 50% of existing oil heating systems had been converted in the region.

The second example of an OSS was launched in the State of Salzburg as part of the EU Horizon project [Replace](#). Within the project an independent and public, “matchmaking” online platform was developed as a regional OSS. The platform enables households to easily find nearby suppliers (installers, manufacturers and ESCOs) that offer all the services required for switching heating systems, including retrofitting measures to reduce heat demand by 15–20%. Through the platform, households can contact public energy advisers that assist them with their planning.

The asset of this model is that only one actor (an installer) acts as contact person and coordinator of involved trades to the households which reduces time and coordination efforts for the households. Other advantages are the offering of all services needed for a heating system replacement and retrofit measures, obligatory quality assurance and energy efficiency criteria for the installation. Emergency boiler replacements are also offered as part of the initiative. In case of breakdown of the heating system, mobile heaters are installed for some weeks to allow the households to decide upon suitable replacement alternatives. This way like-for-like replacements of fossil fuelled heating systems are avoided.

The platform is expected to be launched in 2026 as the original launch date (Autumn 2022) was dominated by an overheated market and suppliers did not have the capacities to offer the all-round carefree packages. The initiative is particularly suited for supporting the elderly and low-income or energy poor households, as the all-round carefree package guarantees professional and individual support and advice including high quality installations.

#### Success Factors and Opportunities

- ▶ All-round carefree packages reduce time, coordination, and information effort for end consumers. The packages include free energy advice by public energy consultants, a service package by regional installation companies, subsidy advice, and possibly discount systems by heat pump manufacturers and energy suppliers.
- ▶ Before replacing heating systems, cost-effective retrofits to reduce heat demand are applied. This lowers heat pump investment and operational costs.
- ▶ Mobile heating units prevent direct replacements after sudden breakdowns.

- ▶ Builds upon established local structures of regional managers, local energy advisors and citizen roundtables offered by municipalities builds trust and acceptance among households.
- ▶ Strong cooperation between regional authorities, public energy advisors, local installation companies and regional banks allow for high-quality and reliable work force and availability of bank loans.
- ▶ Extensive public information campaign, personal contact with households and transparent offers builds trust and acceptance among end users.
- ▶ Advertisement for local installers and suppliers through appearance on trusted platform run by local authorities.
- ▶ Reduced overhead costs and supply failure risk for installers and suppliers due to reliable data supplied by public energy advisors.
- ▶ Heat installation manufacturers are open to optimising and co-organising refurbishment activities to enable installers to increase refurbishment rates, which benefits the market.

### Barriers and Limits to Up-Scaling

- ▶ Existing local structures (including public energy advisors) necessary to build upon that are trusted and valued by citizens.
- ▶ Ideally, OSS should be set up and run by independent parties to avoid the perception of commercial bias and to increase end-user confidence, therefore government support is needed.
- ▶ High effort for suppliers and installers for offering carefree packages and adhering to quality requirements. A very vibrant market reduces the incentive of installers and manufacturers to participate in OSS as they face a high demand through the traditional model.

## 15.2 Commercial One-Stop-Shop

In Austria, manufacturers, energy utility companies, and start-ups offer full-service packages for installing heat pumps in single-family homes. These packages are designed to simplify the transition to decarbonised heating systems by combining transparent pricing, professional installation, and optional energy efficiency services into one streamlined offering. *Hoval*, *Burgenland Energie*, and *Heizma* each provide such packages, with shared features that should make the transition process easy and predictable for customers. All three offer online tools to help users explore system options and estimate costs. Final decisions are made through free on-site consultations, and installations are carried out by regional partner companies. Installation is carried out by regional partner installers. All providers offer optional services like maintenance plans, support with subsidy applications, and integration with renewable technologies such as solar panels, battery storage, and wall boxes.

Each provider, however, has a distinct focus. *Hoval's* "Quick fix" includes a three-year guarantee on performance, provided the system is regularly serviced by *Hoval's* team. *Burgenland Energie's* "Pumpenpeter" offers six sizes and three configuration options. Most systems support cooling, and customers can choose from several established brands. Through a cooperation with *UniCredit Bank Austria AG* financing options are available to the customers and the most extensive service package includes 24/7 support. *Heizma* offers a broader, all-electric solution that includes heat pumps, photovoltaic systems, battery storage, and home energy management systems. The start-up manages the entire process in-house which simplifies the process for customers. *Heizma* also offers a rental model, allowing customers to use the system with monthly payments and take ownership after a fixed term. Installations are typically completed within a few days.

*Roots Energy*, based in Vienna, focuses on multi-story residential buildings, and helps building owners and housing estates transition away from gas heating. They specialise in small heat pumps that replace decentralised gas heaters connected to neighbourhood cold water grids, which they are going to establish and own. *Roots Energy's* services include:

- feasibility studies, e.g. assessing the technical, legal, and financial viability
- implementation concepts including heating and cooling simulations and cost calculations
- transition support: assisting with the entire conversion process up to commissioning
- operational management: optimizing energy costs, and providing ongoing customer service

*Roots Energy* uses scalable technologies like energy networks, geothermal probes, heat pumps, and hybrid solar modules. Their flagship project, “Roots Haus,” serves as an on-site demonstrator and research hub for urban heat transition technologies. Their mission is to offer legally secure, technically robust, and cost-effective alternatives to fossil fuel-based heating for multi-apartment buildings in Austria and Germany.

### Success Factors and Opportunities

- ▶ All services supplied by a single provider, only one central contact point for all measures.
- ▶ Significantly reduced time, coordination, and information requirements for customers.
- ▶ Standardisation of products and services, focus is on offering relevant competitive products (mainly strong company brands) and prices.
- ▶ Opportunity to enter growing markets (all-electric homes combined with energy efficient renovation).

### Barriers and Limits to Up-Scaling

- ▶ Establish a qualified local workforce offering credibility, an existing market position, and the capacity to supply a complete package of high-quality solutions.
- ▶ A holistic renovation of the building to lower energy consumption before replacing the heating system often is not included in BM providers' offers.
- ▶ Inadequate financial support (both relative and absolute) may hinder the growth potential of such businesses.

## 15.3 Vertical Integration in Social Housing

In the case of *Sozialbau AG*, a social housing association in Vienna and project partner in *install.res*, a distinct business model is applied to the installation of heat pumps. The housing association has founded a daughter company (HOB) that executes the installation and maintenance services around changing heating systems of multi-apartment buildings. *Sozialbau AG* is a social housing provider which has the mission to offer affordable and sustainable housing. Most of their building stock is heated by decentral gas systems which the *Sozialbau AG* aims to decarbonise at a big scale.

*Sozialbau AG* founded a daughter company employing installers for that are specialized in the installation and maintenance of photovoltaic, solar, electrical locking, heating, air conditioning, ventilation, and sanitary systems to phase out natural gas. The installation of heat pump is planned in about 350 of their 840 buildings, mostly where no district heating connection is available. If possible, PV plants are combined with the installation of heat pumps. A unique technical solution developed by *Sozialbau AG* is the so-called “Community boiler” (in German *Gemeinschaftstherme*). Many Viennese multi-apartment buildings have flat-wise chimneys. When the gas heaters in the flats are demounted hot water pipes are put into the former flue gas risers, that lead to the attic, where the community heat pump is placed.

Currently, around 40 building professionals are employed that offer these “in-house” services. Through the close collaboration between the social housing company and the installer company benefits of common interests, direct communication, well-trained work force and coordinated timing can be exploited. This way, an efficient and cost-effective installation of heat pumps in the existing buildings can be ensured.

*Sozialbau AG* is bound by law (Limited Profit Housing Act, WGG) to offering affordable housing by the cost-rent principle which requires social housing providers to only charge the direct costs of construction, maintenance, and management of the respective building as rent. Therefore, no excess profit can be made with providing social housing. The installation company is not bound to the WGG, yet it follows a similar social aim as *Sozialbau AG* since the social housing providers has the interest to keep costs for installation as low as possible to not increase rents.

The social housing provider financed investments into building renovation and decarbonisation through the maintenance and improvement premium (EVB; WGG §14d), public one-off subsidies, private or public loans, and private equity of the social housing association. The EVB is a premium that is charged as part of the cost-rent (max. 2.33 €/m<sup>2</sup>) and must be used for measures that are defined as maintenance and improvement measures. Therefore, reserves for financing installation and maintenance of heat pumps are made up by diverse capital flows from rents, private and public funding. In combination with the affordability objective and their own installation company, *Sozialbau AG* has developed a unique business model which allows them to finance investments into rolling out heat pumps in their existing building stock.

### Success Factors and Opportunities

- ▶ Synergies through close collaboration between social housing provider and daughter installation company: direct communication and coordinated planning result in efficiency gains and cost-effectiveness; a reliable and well-trained work force ensures high-quality installation.
- ▶ Long-term reserve dedicated to maintenance and improvement of buildings allow for financing up-front costs. Sources of investment further diversified through a mix of private and public funding.
- ▶ Social and sustainability mission of social housing provider anchored in legal structure which builds trust with end consumers and ensures affordability of decarbonisation measures.
- ▶ The BM allows for testing new, innovative, and cost-effective solutions, such as the community boiler or activation of the façade combined with a brine heat pump which allows for heating in winter and passive cooling in summer.

### Barriers and Limits to Up-Scaling

- ▶ Critical mass of building stock necessary for founding an own installation company.
- ▶ Internal motivation of housing association to engage with decarbonisation of heating system necessary as decarbonisation is not core of business activity and no profit motive exists.
- ▶ Limited profit motive and maintenance and improvement premium is specific to Austrian social housing legislation.
- ▶ A change in corporate culture and a certain degree of flexibility, foresight, and willingness to take risks is necessary to take on a pioneer role.

## 15.4 Conclusion

The public and commercial OSS, and the social housing model were selected for Austria as they represent innovative ways to support the financing and up-scaling of the HP rollout. The rationale behind public and commercial OSS is to reduce barriers for end users to inform, plan and coordinate HP installations by offering full-service packages. Public offers often include a bundle of retrofit measures prior to heat replacement, bringing down overall investment and operational costs. As public OSS build upon existing networks and public energy advisors, a supportive financing scheme by regional or national authorities is necessary to up-scale this approach. Commercial OSS are run by private companies and focus more on all-electric solutions and less on reducing overall energy consumption through refurbishments. Public and commercial OSS are geared towards single family homes, except for *Roots Energy*.

The social housing model of *Sozialbau AG* shows that affordability and decarbonisation can complement each other. Long-term reserves built up by cost-rent structures 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 necessary to put this business model into practice. Nevertheless, all models offer interesting insights into how private companies, social housing association, local installers and regional authorities can contribute to the acceleration of the HP rollout.

## 16 | North Macedonia

### 16.1 Heat as a Service

Heat as a Service (HaaS) enables consumers to access efficient heating without upfront investment, by paying a subscription fee for heating while the provider retains ownership of the heat pump system. This model includes installation, maintenance, and performance monitoring, transferring operational and financial responsibility to the service provider. In North Macedonia, HaaS is applicable to single-family houses using outdated electric or oil heating, new multi-apartment buildings with shared infrastructure, and public institutions with constrained budgets. ICS Group has prior experience with the HaaS model. ICS Group leverages its internal project development experience and access to renewable electricity for competitive power purchase agreements, allowing them to mitigate risks stemming from electricity price market uncertainty. While technical trust in heat pumps is relatively high, adoption remains low due to comfort concerns, retrofit needs, and lack of dynamic electricity pricing. Despite these challenges, HaaS can contribute meaningfully to decarbonization if regulatory and financial barriers are addressed.

#### Success Factors and Opportunities

- ▶ ICS Group's access to renewable electricity generation allows for predictable pricing via PPA contracts.
- ▶ Applicability to various sectors enables scaling through diversified customer segments.
- ▶ High efficiency of heat pumps significantly reduces emissions compared to resistive or oil-based heating.
- ▶ Continuous monitoring and maintenance ensure stable performance and reduce service disruptions.
- ▶ HaaS can support policy objectives for decarbonizing buildings without requiring large public subsidies.

#### Barriers and Limits to Up-Scaling

- ▶ Consumer scepticism about heat pump comfort, especially in buildings used to high indoor temperatures.
- ▶ Electricity price volatility increases risk exposure for the HaaS provider, affecting long-term planning.
- ▶ Building retrofits (e.g., insulation) are often required, raising total investment costs and complexity.
- ▶ Lack of dynamic electricity pricing prevents advanced service models like time-of-use billing.

### 16.2 Energy Performance Contracting

Energy Performance Contracting (EPC) is a results-based financing model where energy savings finance the installation and operation of heat pumps installation, without upfront investment by the end-user. The Energy Service Company (ESCO) guarantees savings and is incentivized to minimize operational costs to maximize returns. This performance orientation often results in higher energy efficiency than other service-based models, including HaaS.

In North Macedonia, EPC is particularly well-suited for replacing oil-based heating systems in commercial enterprises and for retrofitting public sector buildings such as schools, hospitals, and administrative institutions. The model aligns with public-private partnership frameworks, making it attractive for municipalities. However, public-private partnerships can be poorly perceived by policymakers and the public due to poor experiences in the past, despite their significant potential. With municipal elections scheduled for autumn 2025, there is a window of opportunity for initiating new collaborations between ESCOs and local governments. While regulatory

frameworks exist, their limited use in practice is due to institutional complexity, lack of local experience, and limited awareness of EPC mechanisms among companies and public authorities.

### Success Factors and Opportunities

- ▶ Strong incentives for ESCOs to maximize efficiency and reduce costs.
- ▶ Suitable for public buildings with predictable heat demand and fossil-fuel heating.
- ▶ ICS Group's capacity for electricity generation and low-cost PPA improves cost-effectiveness of business model.
- ▶ EPC can be structured as a public-private partnership, easing municipal investment burdens.
- ▶ High replication potential for commercial and public buildings that use oil heating or other inefficient heating system.

### Barriers and Limits to Up-Scaling

- ▶ Complex contracting requires legal and technical expertise.
- ▶ Risk-sharing mechanisms and obligations (retrofitting, maintenance of internal heating installation etc.) must be clearly defined, which may deter inexperienced local governments.
- ▶ ESCO market is underdeveloped and lacks bundled service offers.
- ▶ Companies and public institutions lack awareness or capacity to initiate EPC projects.

## 16.3 One-Stop-Shop

An OSS offers an integrated service approach for heat pump deployment, bundling equipment selection, financing, installation, and post-installation support. At a company level, *ICS Group* collaborates with commercial banks to streamline the loan application process for clients purchasing heat pumps. Through a shared communication platform, *ICS Group* can notify partner banks of a client's interest in obtaining a loan. With the client's consent, *ICS Group* is authorized to submit the loan request on their behalf. If the client holds an account with the bank and meets creditworthiness criteria, the process is expedited: funds are disbursed directly to *ICS Group*, eliminating the need for the client to engage separately with the bank. The client interacts only with *ICS Group*, simplifying the transaction to a single point of contact.

In North Macedonia, this model is also emerging through initiatives such as the *Green Economy Financing Facility* (GEFF), led by the *EBRD* which offers up to 20% grant for the investment. *GEFF* collaborates with local financial institutions (e.g., *NLB Banka*, *Komercijalna Banka*, *ProCredit Bank*, *Sparkasse Bank*) to offer tailored financing for high-efficiency technologies. Its Technology Selector Tool simplifies investment decisions by listing pre-approved, performance-verified equipment, including air-, water-, and ground-source heat pumps.

Additionally, the One-Stop-Shop Habitat (*OSS HABITAT*) project, launched under the LIFE Programme, extends this model by offering advisory and educational services for residential building renovation. Run by *Habitat for Humanity Macedonia*, *OSS HABITAT* will function as an integrated renovation platform, helping households and stakeholders navigate technical, legal, and financial aspects of clean energy investments. The ongoing collaboration with local demonstration sites further strengthens the ecosystem for integrated heat pump deployment and provides an opportunity for synergistic action.

### Success Factors and Opportunities

- ▶ Pre-approved technology lists reduce technical uncertainty.
- ▶ Available credit lines through trusted local banks.
- ▶ National and EU-funded programs support awareness and uptake.
- ▶ Partnerships with civil society improve outreach and trust.

### Barriers and Limits to Up-Scaling

- ▶ High dependence on grants and subsidies to stimulate investments and collaboration with OSS platforms.
- ▶ Limited customization in technology and service packages.
- ▶ OSS platforms require strong coordination across actors.
- ▶ Awareness among end-users remains low, especially outside urban areas.
- ▶ Project pipeline development is slow due to fragmented demand.

## 16.4 Rent a Heat Pump

The Rent a Heat Pump model allows households to access heat pump solutions without bearing the upfront investment. Instead, end-users pay a regular fee covering the equipment, installation, and maintenance over a fixed period. This model can be implemented via a bilateral contract with a heat pump company, or through a commercial bank or leasing company, which can act as an intermediary. The model is particularly relevant in North Macedonia for individual houses with central heating, where replacing outdated and inefficient systems (e.g., wood stoves or electric resistance heaters, historically implemented due to low fuel costs) can yield substantial cost savings and reduce local air pollution. Despite a generally high level of trust in heat pump technology, many consumers remain hesitant due to uncertainty over service quality, which this model addresses by delegating technical and operational responsibilities to the provider.

The financial predictability offered by monthly payments is attractive for consumers, though electricity price volatility remains a concern. For providers, the model offers a return on investment over time and is scalable in areas where households have sufficient thermal insulation and stable occupancy. However, targeting unsuitable buildings without proper advice can lead to underperformance and dissatisfaction. Coupling the model with on-site solar PV generation or cooling services can enhance its value proposition, especially in peri-urban or suburban settings.

### Success Factors and Opportunities

- ▶ No upfront cost improves affordability and access.
- ▶ Strong emission reduction potential in household with old and inefficient heating systems.
- ▶ Good fit for detached homes with central heating systems.
- ▶ Synergies possible with rooftop PV and summer cooling use.

### Barriers and Limits to Up-Scaling

- ▶ Legal and contractual uncertainty and unfamiliarity with rent-based and leasing-based energy services.
- ▶ Low awareness and weak marketing differentiation versus ownership.
- ▶ Risk of poor performance if used in thermally inadequate buildings.

- ▶ Electricity price uncertainty affects long-term cost perceptions, along with known higher overall costs compared to ownership.
- ▶ No tailored subsidies or incentives exist for rental models.

## 16.5 Conclusion

The four business models presented here (Heat as a Service, Energy Performance Contracting, One-Stop-Shops, and Rent a Heat Pump) offer different opportunities for accelerating the heat pump adoption in North Macedonia. They address distinct user segments and investment barriers by offering alternatives to direct ownership or upfront investment, thus supporting greater affordability, technical support, and service-based delivery. HaaS and EPC models are particularly suited to institutional and multifamily settings where upfront investment and operational risk are major obstacles. OSS platforms, supported by initiatives such as *GEFF* and *OSS HABITAT* and the bilateral activities between *ICS Group* and commercial banks, reduce transaction complexity and help consolidate fragmented demand by offering integrated renovation services. The Rent a Heat Pump model caters to individual households with central heating systems, offering predictable monthly payments and operational support.

These models demonstrate how utilities, technology providers, municipalities, financial institutions, and civil society can contribute to scaling the deployment of efficient heating systems. Their implementation in North Macedonia will require enabling regulatory adjustments, targeted subsidies, and the development of bundled retrofit solutions. While electricity price volatility and low consumer awareness remain critical barriers, the alignment of technical capacity, service innovation, and external funding opportunities creates a strong foundation for accelerated deployment.

## 17 | Poland

### 17.1 Energy Performance Contracting

The EPC model is a strong mechanism for scaling HP adoption, with clear environmental and public health benefits. In Poland, it is best suited for large-scale projects (e.g., public housing, commercial buildings) where energy savings can justify investments. EPC models directly link payments to achieved energy savings, delivering strong decarbonization impact while reducing long-term operating costs. Their scalability makes them well-suited for multifamily buildings, and they benefit from public-private collaboration, which is especially valuable for municipal or institutional projects. However, high upfront costs, grid limitations, and financing risks remain key challenges. EPC is the most mature of the three models in Poland; ca. 60–80 % of active ESCO contracts are now found in public buildings (schools, hospitals, universities, street-lighting), with first pilots in housing co-operatives and shopping centres. The biggest untapped potential lies in post-1970 apartment blocks and mid-sized district-heating systems.

#### Success Factors and Opportunities

- ▶ Strong contractual frameworks – to ensure thermal comfort and cost predictability.
- ▶ Public-private collaboration – to secure incentives and streamline regulations.
- ▶ Scalable solutions – particularly for large projects, integrating renewables and storage where feasible.
- ▶ Grid modernization – to support widespread electrification without excessive upgrade costs.

#### Barriers and Limits to Up-Scaling

- ▶ High upfront costs – requires significant capital, though mitigated by long-term savings.
- ▶ Grid limitations – large projects may need infrastructure upgrades.
- ▶ Contract complexity – requires precise terms to ensure comfort and savings.

### 17.2 Heat as a Service

This business model shows strong potential, especially due to its climate alignment, flexibility, and user-centred benefits. In Poland, it is best suited for residential and commercial users seeking risk-free, performance-based heating solutions with long-term cost predictability. As a user-centric model, consumers pay for the actual heat output rather than owning the equipment, which lowers the perceived investment risk. Its strong climate alignment is reflected in the way payments are tied to energy performance, directly incentivizing efficiency and reducing emissions. The model's inherent flexibility allows it to adapt to various building types and comfort requirements, making it a versatile solution across sectors. HaaS is still in the pilot stage; the first nationwide offer was launched in 2024 by Swedish newcomer Aira, advertising a “zero-CAPEX heat-pump subscription”. Early adopters are single-family homes off the gas grid, while municipal district heating operators test “heat-as-a-service” tariffs for new 4th-generation networks.

#### Success Factors and Opportunities

- ▶ Reducing upfront cost barriers through targeted subsidies or incentives
- ▶ Ensuring regulatory stability and clarity in financing frameworks.
- ▶ Upgrading energy infrastructure, especially electricity grids.

- ▶ Strengthening public sector collaboration to overcome legal and social challenges.

### Barriers and Limits to Up-Scaling

- ▶ High dependency on subsidies – needs financial incentives to scale.
- ▶ Grid infrastructure strain – requires upgrades for mass electrification.
- ▶ Regulatory & legal complexities – requires clear frameworks for contracts.

## 17.3 On-Bill Financing

On-Bill financing (OBF) is a flexible and scalable financial tool that helps consumers overcome upfront cost barriers by spreading payments through utility bills. This low-barrier approach makes adoption easier for end users by eliminating the need for separate financing arrangements. As a utility-driven model, it leverages existing billing infrastructure, enabling seamless repayment and reducing administrative complexity. Additionally, OBF offers potential for integration with dynamic pricing or time-of-use tariffs, supporting grid optimization and more efficient energy use. These features make OBF an accessible and adaptable solution for promoting energy-efficient technologies across a broad customer base. OBF remains niche but proven; the EU-funded pilot *FinEERGo-Dom* (≈ PLN 100 million) has shown that 20-year heat-pump retrofits can be repaid via utility bills in housing co-operatives. Future growth hinges on simpler rules for DSOs and commercial banks.

### Success Factors and Opportunities

- ▶ Strong utility involvement to manage dynamic pricing and repayment structures.
- ▶ Grid readiness to handle increased electricity demand from heat pumps.
- ▶ Clear contractual terms ensuring thermal comfort and customer support.
- ▶ Regulatory stability to avoid delays in project approvals.

### Barriers and Limits to Up-Scaling

- ▶ Limited decarbonisation push – doesn't inherently incentivize efficiency or directly drive emissions reductions, however it does facilitate HP adoption, contributing to broader decarbonisation goals.
- ▶ Grid capacity issues – mass adoption could strain existing infrastructure thus grid limitations should be carefully managed.
- ▶ Less flexibility – tied to utility structures, limiting customization.

## 17.4 Conclusion

Energy Performance Contracting (EPC) remains the most effective decarbonisation tool—especially for large-scale public- and commercial-sector projects—because payments are directly linked to verified energy savings. Although it requires higher up-front capital, its long-term savings and scalability are unrivalled, as proven by Polish demonstration sites in multifamily housing: two cooperatives connected to a municipal district-heating network chose EPC retrofits with air-source heat pumps delivered by Veolia ESCO PL. The owners were convinced by the contractor's reputation, a 10-year contract supported by an in-house energy-management platform, a financial guarantee of results, and equal instalments spread over the contract term.

Heat as a Service ranks second, offering a balanced solution for mid-scale projects (single-family homes, small businesses) where zero up-front cost, comfort and flexibility are decisive. The subscription model is gaining traction and could scale rapidly in new developments or 4th-generation district-heating networks.

On Bill Financing is the easiest to adopt—the charge added to the utility bill removes entry barriers—but it has the least transformative impact. It works where utilities can handle dynamic tariffs and billing, delivering moderate decarbonisation and scalability potential.

Selecting the appropriate model should depend on project scale, available financing and the regulatory environment:

- EPC – highest CO<sub>2</sub>-reduction impact and scalability for large facilities and housing cooperatives.
- HaaS – greatest cost predictability and user convenience for medium-sized projects.
- OBF – quick, low-friction uptake where EPC or HaaS are not yet feasible.

Strategically deploying these models in the right market segments will allow Poland to maximise emission reductions, accelerate heat-pump adoption and build a resilient, user-friendly heating sector.

## 18 | Slovenia

### 18.1 Traditional Model

This BM is the most widespread and commonly adopted approach to heat pump deployment in Slovenia. It is based on a standard market-driven exchange in which the homeowner directly purchases a heat pump system from a specialised heating installer. The installer provides a complete package that includes advice, dimensioning of the heat pump, delivery, installation, and system commissioning. Many installers also support the homeowner in applying for national subsidies for heat pump installations. Some offer additional services such as post-installation maintenance or extended warranty contracts.

In Slovenia, heating installers often act as resellers for specific heat pump brands and operate with a regional or national reach. They typically obtain equipment from domestic wholesalers or directly from international manufacturers, depending on their company size and supplier network. Some larger companies also operate showrooms and offer bundled services including other building renovation measures (e.g. insulation, window replacement, etc.).

From the homeowner's perspective, this model is appealing due to its simplicity and convenience. It allows a relatively fast transition to a heat pump system, tailored to the individual needs of the household. The main disadvantage is the lack of market transparency and limited possibilities for price comparison, especially in regions with fewer installers or during periods of high demand.

#### Success Factors and Opportunities

- ▶ High trust in local installers and personal recommendations play a key role.
- ▶ Public subsidies significantly increase affordability and uptake.
- ▶ Widespread availability of equipment and technical expertise.
- ▶ Opportunity for installers to expand services and up-sell additional renovation measures.

#### Barriers and Limits to Up-Scaling

- ▶ Fragmented installer network leads to regional disparities in service availability.
- ▶ Limited market transparency hinders competition and price optimisation.
- ▶ Shortage of skilled labour during peak seasons.
- ▶ High upfront costs without subsidies remain a barrier for many households.

### 18.2 Joint Purchase Initiative

This BM is coordinated by the *Zveza potrošnikov Slovenije* (ZPS – Slovenian Consumers' Association), which organises group purchasing campaigns to help households access heat pumps under more favourable terms. The aim is to reduce investment costs, simplify decision-making, and ensure quality installation services by leveraging collective consumer power.

The process begins with a public call for participation, where interested households sign up with no initial obligation. ZPS collects data about participants' heating needs, building characteristics, and regional distribution. Based on this, ZPS publishes a public tender to heating system providers. Installers submit bids and are evaluated on the basis of price, technical criteria, warranty terms, and service quality. The selected provider(s) commit to

fixed prices and conditions that apply equally to all participants. In 2023, for example, the selected provider offered high-efficiency air-to-water heat pumps with A+++ energy labels, professional installation, and support for applying for Eco Fund subsidies.

ZPS also provides comprehensive guidance through webinars, FAQs, and individual consultations. This ensures participants are well-informed and supported throughout the process – from choosing the right system to submitting documentation for subsidies. The group purchase model thus enhances transparency and trust while reducing consumer risk and administrative burden.

Although each campaign is time-limited, this model has already enabled hundreds of households to switch to efficient heat pump systems. It is particularly attractive to those who value simplicity, consumer protection, and reliable service.

### Success Factors and Opportunities

- ▶ Collective bargaining power results in lower prices and better warranty conditions.
- ▶ ZPS acts as a trusted intermediary, increasing consumer confidence and reducing perceived risks.
- ▶ Educational support empowers households to make informed decisions.
- ▶ The model is replicable and can be scaled to include other technologies (e.g. solar PV, battery storage) or reach new regions.

### Barriers and Limits to Up-Scaling

- ▶ Campaigns require significant coordination, legal preparation, and administrative resources from ZPS.
- ▶ Time-limited nature may exclude consumers who need immediate solutions.
- ▶ Dependent on installer interest and capacity, which can fluctuate due to labour shortages or supply issues.
- ▶ Currently limited to ZPS initiatives – broader adoption would require engagement of additional organisations or public support.

## 18.3 Leasing

This emerging BM allows homeowners to install a heat pump system without the need for a significant upfront investment. Instead, they enter into a leasing agreement with a service provider who retains ownership of the equipment throughout the lease term. The homeowner pays a fixed monthly fee covering the use of the heat pump, maintenance, and service support. At the end of the lease period (typically 3, 5, or 7 years), the homeowner has the option to purchase the heat pump at a symbolic residual value.

The lease package typically includes:

- Delivery and professional installation of the heat pump
- Comprehensive maintenance and servicing throughout the lease term
- 24/7 response in case of malfunctions, with the provision of a replacement unit if necessary
- Remote monitoring and optimization of the system
- The possibility to return or exchange the heat pump if it does not meet expectations

This BM is particularly attractive to households that prefer predictable monthly expenses and wish to avoid the risks associated with equipment ownership. It also appeals to those who may not qualify for traditional financing options or who are hesitant to commit to a long-term investment in heating technology.

In Slovenia, the leasing model for heat pumps is still in its infancy and not widely available to residential customers. To explore its viability and potential for broader adoption, a pilot project is planned within the *install.res* project. This pilot will test the practical implementation of the leasing model in the Slovenian context, assess customer satisfaction, and evaluate the financial and operational aspects of the service.

#### Success Factors and Opportunities

- ▶ Eliminates the barrier of high upfront costs, making heat pump technology accessible to a broader segment of the population
- ▶ Provides predictable and manageable monthly expenses for homeowners
- ▶ Ensures high-quality maintenance and service, potentially extending the lifespan of the equipment
- ▶ Offers flexibility, with options to upgrade or return the system if it needs change
- ▶ Aligns with energy efficiency goals by promoting the adoption of renewable heating solutions

#### Barriers and Limits to Up-Scaling

- ▶ Limited awareness and understanding of the leasing model among consumers
- ▶ Potential regulatory and legal challenges related to third-party ownership and service agreements
- ▶ Need for service providers to develop robust infrastructure for maintenance and customer support
- ▶ Uncertainty regarding the long-term financial viability for providers without sufficient scale
- ▶ Potential reluctance from consumers who prefer ownership to leasing arrangements

## 18.4 Conclusion

The three selected business models reflect the current market reality and emerging trends in Slovenia. The first model (Traditional – direct purchase via installer) is dominant in terms of market share and represents the standard approach. The second model (Joint Purchase via *ZPS*) introduces an innovative collective approach that empowers consumers and improves market functioning. The third model (Leasing) addresses affordability and risk-sharing issues and has strong potential for growth.

Together, these models capture a diverse range of user preferences, financial capabilities, and service expectations. They offer insights into how different actors – from private companies to civil society organisations – can contribute to accelerating the uptake of heat pumps in residential buildings.

## 19 | The Netherlands

The traditional model is by far the most common in the Netherlands, due to the high level of homeownership and single-family homes. Yet, alternative business models are emerging of which three (OSS, HaaS and full-service packages) are discussed in the following.

### 19.1 One-Stop-Shop

One-Stop-Shops aim to unburden residents by providing a mix of advice, offers, and financial guidance for taking sustainability measures. An example of a One-Stop-Shop (OSS) in the Netherlands is a web-tool called the Local Heat Pump Calculator (*Lokale Warmtepompvergelijker*) a tool that helps residents easily identify and install the right heat pump for their homes. The tool simplifies the process for consumers that are interested in a heat pump, by enabling them to directly request an offer by an installer after filling out information in the tool.

This website can be reached either through the municipalities' sustainability website, or by following a link or QR code provided in information letters and brochures for residents. On the webpage, residents first have to confirm that their address lies within the municipality, before going through a list of questions about their house. Most important is the annual gas usage, which gives the most accurate estimate of the heat demand.

Based on this information, the web tool calculates what heat pump would suit the building's heat demand, and suggestions are given based on lowest investment, energy usage and fastest rate of return. When a resident then clicks on one of the products, next to the technical details of the heat pump, the local installation companies that supply them are presented, and the price-range in which they offer this. While this project is still relatively small, there is a large market potential.

#### Success Factors and Opportunities

- ▶ Simplified decision-making: Bringing together heat pump advice and local supply reduce time, coordination, and information effort for end consumers.
- ▶ Public private collaboration: Strong cooperation between regional authorities, public energy advisors, and local installation companies allow for high-quality and reliable work force.
- ▶ Local relevance: Extensive public information campaign, personal contact with households and transparent local supply builds trust and acceptance among end users.
- ▶ Advertisement for local installers and suppliers: through appearance on trusted platform run by local authorities.
- ▶ Elaborate web-tool: Reduced overhead costs and supply failure risk for installers and suppliers due to reliable data supplied by the filled in web tool.

#### Barriers and Limits to Up-Scaling

- ▶ Integration with other sustainability measures: While the “Lokale Warmtepompvergelijker” does provide an OSS for heat pumps, insulation and ventilation are not considered in the tool.
- ▶ Financial barriers: The online tool does provide information about financing options for a heat pump but does not collaborate with the financing institutions that provide funds and loans directly.
- ▶ Consumer awareness: Campaigning through brochures and information letters does not reach all households in the neighbourhoods which is why further communication activities must be taken by the local authorities.

- ▶ Dependency on local installers - The success of the platform relies on the availability and quality of local installers, which may be limited in some regions.

## 19.2 Heat as a Service

Heat as a service (HaaS) products are not common in the Netherlands. Only few examples of HaaS exist in the Netherlands. One example is a pilot project in the Utrecht neighbourhood of Rijnvliet, where housing association Bo-Ex partnered with energy company *Eneco* to offer a HaaS model to social housing tenants. The project involved 56 new-build apartments, where *Bo-Ex* owns the buildings and *Eneco* installs and operates individual heat pumps in each dwelling.

Tenants do not own the heat pumps, nor are they billed for the electricity use of the system. Instead, they pay a fixed monthly fee to *Eneco* for heat and hot tap water. The contract provides for heating up the home to 20 degrees, and enough hot water to shower around 30 minutes per day, using a heat pump. The fee includes installation, maintenance, and performance monitoring. *Eneco* guarantees a predefined indoor comfort level and bears the performance risk — for example, if the heat pump fails, *Eneco* must fix it without extra cost to the tenant.

This setup offers tenants predictable monthly costs, while Bo-Ex is assured that sustainability targets are met without needing to manage the technical system. *Eneco*, in turn, benefits from a long-term service contract and control over system performance and optimisation. The heat as a service model suits the target group of social housing, as the interests of the parties are aligned: The interests of Bo-Ex (decarbonisation and tenant affordability), *Eneco* (long-term service revenue), and tenants (comfort and cost certainty).

### Success Factors and Opportunities

- ▶ New-build setting: Installing systems in new homes simplified integration and avoided retrofitting costs.
- ▶ Performance guarantees: Clear agreements on comfort levels and responsibilities made the service tangible and accountable.
- ▶ Scalability through repetition: Once proven, the model can be replicated in other new-build social housing projects with minimal redesign.

### Barriers and Limits to Up-Scaling

- ▶ Limited applicability to existing buildings: Retrofitting older homes is more complex and costly, making fixed-fee models harder to implement.
- ▶ Regulatory uncertainty: Dutch energy regulation and tenancy law do not yet provide clear frameworks for HaaS contracts, especially in rental housing.
- ▶ Tenant trust and communication: Even with guarantees, tenants may be sceptical of third-party ownership or fear losing control over their heating.

## 19.3 Design, Build, Maintain, Finance, Operate Model

The DBMFO (Design, Build, Maintain, Finance, Operate) model allows project developers, housing corporations and municipalities to implement large-scale heating projects without bearing the upfront costs and risks associated with system ownership and operation. The DBMFO model integrates multiple stages of the project

lifecycle — from design and construction to maintenance and operation — into a single, comprehensive contract. This not only simplifies the process for stakeholders but also ensures the long-term performance of the heating systems.

DBMFO business models for heat in the Netherlands can be found in different forms. A company that offers complete service package for building owners is *Equans* for commercial and residential buildings. For a full-service package, the client can hand over responsibility for heating and cooling to *Equans* and they will take care of all steps of the chain for years to decades, depending on the wishes of the client. They will then also take care of environmental management, communication, and general service. By also being responsible for service, they get paid by service users, making the initial investment for clients relatively low.

Another DBFMO example is the *WarmteMaatschappij*, which provides small scale cold district heating systems, up to 40 buildings. In these systems, an energy grid is built that circulates water temperatures between 7-13 degrees, that is upgraded to 60 degrees in individual heat pumps at home. The source of these low temperature heating nets is the network itself because they are at 2 metres deep, the temperature remains constant. Together with this heating net, The *WarmteMaatschappij* installs an energy net to create a smart grid. This makes it possible to monitor energy use and enables peak shaving.

### Success Factors and Opportunities

- ▶ Comprehensive service package: The DBMFO model simplifies the process for property owners, project developers and residents. It reduces the administrative burden and ensures a long-term coordinated approach.
- ▶ Financial predictability: Residents and property owners benefit from a predictable, fixed-cost model, reducing the financial uncertainty often associated with the upfront investment and ongoing maintenance of heating systems.
- ▶ Broad application possibilities: DBFMO models are relevant for new multifamily homes and commercial buildings. Project developers can rely on this market to take up responsibility for heating for these buildings.

### Barriers and Limits to Up-Scaling

- ▶ High initial capital investment: The financing aspect of the DBMFO model often requires significant upfront investment, particularly for large-scale projects that involve extensive infrastructure. Securing this capital can be a challenge, particularly for smaller cooperatives or companies with limited financial backing.
- ▶ Consumer adoption and acceptance: Although the DBMFO model offers a predictable cost structure, consumer acceptance of district heating networks can vary. Some residents may be hesitant to switch from individual heating systems to a communal network, particularly if they are unfamiliar with the benefits or if the service does not meet their comfort expectations.
- ▶ Dependency on long-term contracts: The DBMFO model often involves long-term service contracts that can be challenging to manage over time. Changes in energy policy, or disruptions in the energy market, could impact the financial stability of the contract, creating uncertainty for both providers and consumers.

## 19.4 Conclusions

The three business models discussed above (One-Stop-Shop, Heat as a Service and Design, Build, Maintain, Finance, Operate Models) tend to different parts of the market and are therefore likely to keep co-existing. While the traditional model remains the most common in the Netherlands, all three models discussed have the potential to grow in the heat market. Each have their own opportunities and barriers.

- One-Stop-Shop: By providing a comprehensive, user-friendly platform that helps residents make informed decisions and connect with local professionals, this model significantly reduces the complexity of adopting HPs. However, to scale this model effectively, addressing local supply, consumer awareness, and financial accessibility can be challenging.
- Heat as a Service: Projects like *Rijnvliet* demonstrate that it is possible to align comfort, affordability, and sustainability through a service model. However, realising the full potential of HaaS will require supportive regulation, robust partnerships, and targeted strategies to overcome the financial and technical barriers in existing buildings.
- DBFMO: the model reduces complexity, risk, and upfront costs for project developers and residents, especially for new building projects, where heating services still have to be designed. However, its scalability in existing buildings is more difficult, given the complexities of individual houses and dependencies of individual homeowners.

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