

Heat pumps on subscription

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1 Executive summary

1.1 Background

Decarbonising heating systems in buildings is an important step towards achieving net zero by 2045 in Scotland. The Heat in Buildings Strategy (Scottish Government, 2021a) outlines the steps planned to achieve this. The Scottish Government anticipates that one million zero carbon heating systems will be needed in new and existing homes by 2030, many of which will be heat pumps. This represents a major challenge because only 3,000 heat pumps are being installed each year in Scotland (Scottish Government, 2021b).

The higher upfront cost compared to gas boilers is a challenge for increasing rollout of heat pumps and effective financing options are required to enable this. This report identifies how innovative business models, such as subscriptions including payment plans, financing and 'heat as a service' models, could support the rollout of heat pumps by helping with the upfront investment, which is often a challenge for consumers.

Through a literature review and analysis, and in-depth discussion with stakeholder groups, we explore how three business models could be implemented in Scotland via pilot schemes.

1.2 Findings

- A limited number of heat pump finance offerings are currently available to customers in Scotland. Other than an upfront purchase, most of these are finance only payment plans for the purchase of the heat pump only. Uptake for these plans is very low. Funding

¹ The research was conducted in early 2023 and was correct at time of finalisation in August 2023. The market has continued to develop and we are aware of new propositions now available, for example a proprietary heat pump being offered by Octopus and their Cosy tariff.

from the Scottish Government currently includes an up to £7,500 interest-free loan and a grant to the equivalent value. There are heat pump on subscription offerings across Europe, but these are also fairly limited, reflecting an immature market.

- The following range of business models could be applied to heat pumps in Scotland:
 - **Finance only:** Monthly payments and no upfront costs for the heat pump. This can also include routine maintenance, but we have chosen not to include it here. The customer owns the appliance after paying off the loan.
 - **Financing lease:** A leasing scheme with fixed monthly payments that includes routine annual maintenance. The customer does not own the appliance.
 - **Subscription:** Similar to financing lease, with the customer paying a monthly fee, which includes a fixed cost per unit of energy or heat delivered.
 - **Heat as a Service:** The provider owns the appliance and delivers routine annual maintenance and breakdown cover, charging the customer a monthly fee to keep the home at an agreed temperature by providing heating.
- Adding the installation of energy efficiency measures, an energy tariff suitable for heat pumps and energy advice to these propositions could increase their appeal.
- There are also non-financial barriers such as complexity of installation, consumer difficulties in understanding fuel bill savings and a current lack of consumer demand.
- Specific barriers to heat pump subscription models include lack of understanding and reassurance around consumer protection and contractual issues – for example, when moving properties.
- Stakeholders have a mixed appetite for piloting new approaches, with the main challenge being provision of finance. Other challenges and risks include ensuring heat pump performance and supply chain capacity.

1.3 Proposed business models to pilot in Scotland

We propose three options for pilot schemes that could be tested in a progressive or staged approach. The business models are not expected to generate customer demand for installing heat pumps, but rather to present different financial options in a market where greater customer demand already exists.

- **Finance and routine maintenance** includes heat pump design, installation and routine annual maintenance through a finance package using monthly payments. This model would build on current market offerings to test the appetite of customers to have a more complete heat pump package by including routine maintenance. It would also test industry interest to launch such a proposition. This pilot could be rolled out fairly quickly if finance can be secured.

- **Finance, routine maintenance with energy tariff** would ensure customers are on an appropriate energy tariff for a heat pump. This makes the offering even more comprehensive and provides some reassurance around running costs.
- **Subscription with routine maintenance and breakdown cover** would test the market and consumer appetite for a subscription rather than an ownership model and could include a full maintenance package and potentially a suitable energy tariff. Based on this research, we do not consider the market nor consumers are currently ready for this pilot, but it could be tested in future.

	Pilot 1	Pilot 2	Pilot 3
Summary	Finance and routine maintenance	Finance, routine maintenance with energy tariff	Subscription with routine maintenance and breakdown cover
Features	Design, installation, routine annual maintenance, monthly payments, customer owns product	Design, installation, routine annual maintenance, monthly payments, heat pump tailored tariff, customer owns product	Design, installation, routine annual maintenance and breakdown cover, monthly payments, provider owns product

Table 1: Overview of the three proposed business models to pilot

Contents

1	Executive summary	1
2	Glossary	6
3	Introduction	8
3.1	Policy context	8
3.2	Research aims, scope and methodology	9
4	Defining heat pumps on subscription	9
4.1	Finance only	9
4.2	Subscription and leasing models	10
4.3	Heat as a Service (HaaS)	10
4.4	Proposed business models	11
5	Assessment of the Scottish market landscape for heat pumps on subscription	12
5.1	Current examples of heat pumps offerings in Scotland	12
5.2	International examples of heat pumps offerings	13
5.3	Customer and provider insights	14
6	Findings from stakeholder interviews	17
6.1	Overall thoughts on HPOS business models	17
6.2	Challenges and risks	18
6.3	Scottish Context	19
6.4	Key stakeholders to be involved in a pilot	19
7	Proposed business models to pilot in Scotland	21
7.1	Overview	21
7.2	Pilot 1: Finance and routine maintenance	22
7.3	Pilot 2: Finance, routine maintenance with energy tariff	26
7.4	Pilot 3: Subscription with routine maintenance and breakdown cover	28
8	Conclusions	32
8.1	Overview of findings	32
8.2	General recommendations	33
8.3	Piloting HPOS business models in Scotland	34
8.4	Proposed focus areas for further research	35

9	References	36
10	Appendices.....	37
	Appendix 1 Methodology: stakeholder interviews.....	37
	Appendix 2 Findings from stakeholder interviews	38
	Consumer appeal	38
	Appeal to providers.....	38
	Finance	39
	Regulation	39
	Appendix 3 Heat pumps offerings and heat pump tariffs in the UK	41
	Appendix 4 Indicative cost for E.ON heat pump offering vs. boiler offering	44
	Appendix 5 International examples of heat pumps offerings.....	45
	Appendix 6 Examples of other products on subscription	50
	Appendix 7 LCP Delta Heating Business Service Customer survey	51

2 Glossary

Term	Definition
ASHP	Air source heat pump, a renewable heating technology.
CaaS	Comfort as a Service, where the provider commits to keeping the home at an agreed temperature, by providing heating and cooling services.
DNO	Distribution Network Operator, responsible for operating the electricity distribution system which delivers electricity to most end users.
Tailored tariff	The provider incentivises a shift in energy demand by offering an energy contract specifically tailored to a heat pump, for example, a period of lower priced electricity each day, where the user can heat water and store for later use, with a higher price linked to a period where electricity demand is high.
Heat pump routine maintenance	Relates to annual routine service of the heat pump, required to maintain product warranty.
Heat pump breakdown cover	An insurance product where the customer pays a monthly fee which covers the costs of parts and labour for unexpected product breakdowns.
HaaS	Heat as a Service, where the provider owns the appliance and delivers routine annual maintenance as well as breakdown cover. The provider charges the customer a monthly fee to keep the home at an agreed temperature by providing heating.
Heat pump ready home	A home where property insulation levels and heating distribution system (pipework and radiators, for example) is suitable for heat pump installation and operation
HPOS	Heat pumps on subscription, where the appliance is owned by the provider and the customer is charged a monthly fee
kWh	Kilowatt hours used to measure units of electricity
MWh	Megawatt hours used to measure units of electricity
Leasing model	Fixed term contract which bundles appliance and routine maintenance for a monthly fee. Customer owns appliance

MCS	Microgeneration Certification Scheme. An industry scheme which regulates the quality of renewable product installation and operation.
Metered heat	Metered heat measured through a heat meter is what the supplier charges the customer for the heat provided, rather than for the energy consumed in delivering the heat.
Pain points	Relates to known challenges, for example, difficulties raised by customers in relation to the sourcing of a heat pump installer.
Subscription model	Fixed term contract which bundles appliance, routine maintenance and breakdown cover, with either electricity or heat tariff for a monthly fee. Supplier owns appliance
Supply chain	A supply chain is the system of all activities involved (raw materials, assembling, distribution, delivery) in delivering a finished product or a service to a customer.
ToU tariff	Time of Use tariff, used in connection with the supply of electricity and related to specific times of the day when costs may be higher or lower than average based on overall customer demand.
ZDEH	Zero direct emissions heating system, a term used by Scottish Government to refer to heating systems which produce zero direct greenhouse gas emissions (at the point of use) under normal operating conditions.

Table 2: Glossary

3 Introduction

This report provides an assessment of, and evidence for, a range of practical and sustainable business models to advance heat pumps on subscription (HPOS) business models at scale in Scotland.

3.1 Policy context

The Scottish Government's Heat in Buildings Strategy (Scottish Government, 2021a) outlines the steps it will take to reduce greenhouse gas emissions from Scotland's homes, workplaces and community buildings and to remove poor energy performance² as a driver of fuel poverty. Building on the policies and actions set out in the Climate Change Plan Update (Scottish Government, 2021c), the Heat in Buildings Strategy sets out a pathway to zero emissions buildings by 2045 including short and long-term actions to accelerate the transformation of the nation's building stock. It also sets out the principles the Scottish Government will apply to ensure its zero emissions heat delivery programmes support its fuel poverty objectives.

The Scottish Government aims to double the number of zero direct emission heating systems (ZDEHs) installed in Scotland every year for the next five years and for numbers of installations to reach 200,000 per year towards the end of this decade (Scottish Government, 2021c). This is considered a major challenge compared to the current installation rate of about 3,000 heat pumps each year (Scottish Government, 2021b). The high upfront cost of around £10,000 for an air source heat pump³, (LCP Delta, 2022a) compared to gas boilers (~£3,000 - 4,000), means that identifying novel financial models and propositions is essential to unlock the opportunity.

Previous independent research from ClimateXChange (Energy Systems Catapult, 2021) recommended that the Scottish Government undertake further work to explore how Heat as a Service (HaaS) models might support its heat decarbonisation agenda, as well its fuel poverty and economic development goals. There are also potential customer benefits of these models in removing finance barriers and providing ongoing routine maintenance and breakdown cover.

² Poor energy performance refers to the inefficient use of energy within a household or building. It often results from inadequate insulation, outdated heating systems, inefficient appliances, and other factors that might lead to excessive energy consumption and high energy bills.

³ This is an average cost for an air source heat pump, but the costs can vary a lot between different sizes of heat pumps which may be required in different property sizes or types.

3.2 Research aims, scope and methodology

A key principle of HPOS⁴ models is that the responsibility for the provision and operation of the heat pump rests with the supplier. This is believed to address a number of customer pain points but creates risk and uncertainty for the provider, which may impact the commercial attractiveness.

This research aimed to:

- assess the current Scottish marketplace for HPOS;
- draw learnings from case studies within the UK and across Europe;
- conduct interviews with stakeholders to understand the appeal, risks and challenges of these business models in Scotland; and
- identify options for piloting and delivering HPOS in Scotland.

In brief, the methodology for this research included literature review and analysis, and in-depth discussion with stakeholder groups (including business, policy and consumer representatives). Please see Appendix 1 for further detail of our research methodology.

4 Defining heat pumps on subscription

There are a range of business models that could be applied to support the deployment of heat pumps. This section defines these models and explains how and why they could enable the deployment of heat pumps.

This report uses the term “heat pump on subscription” (HPOS) to refer to the wide range of innovative business models and propositions that could be applied to deploying heat pumps into homes. This excludes an upfront purchase where the customer pays for the heat pump outright.

4.1 Finance only

The provision of a financial loan is a natural progression from the standard upfront purchase, where a customer pays in full for the heat pump. In this model, the provider offers finance either directly or, in many cases, using a third-party specialist provider, with the customer repaying the cost of the heat pump and its installation over a number of years and owning the appliance once the loan has been paid off. This proposition can be supplemented with routine annual maintenance, often required by manufacturers to retain the warranty protection.

The principle of using a loan to fund the purchase of a product is fully established and regulated in the market and well understood by consumers. As such, we use this as a baseline proposition to develop more progressive models.

⁴ This report uses the term “Heat pump on subscription” (HPOS) to refer to the wide range of innovative business models and propositions that could be applied to deploying heat pumps into homes, as defined in Table 1.

4.2 Subscription and leasing models

Subscription and leasing models depart from ‘finance only’ propositions as the provider is responsible for the provision and operation of the heat pump. The customer does not own the appliance and the provider delivers a service to the customer which wraps design, installation, routine maintenance and breakdown cover for the heat pump, usually over a minimum contract term, for a single monthly fee.

This model can also include the cost of energy or heat at a fixed price per unit, although the actual costs are variable and dependent on the amount of energy consumed or heat delivered.

The main attractions of a heat pump subscription model are:

- high initial costs are resolved by ongoing payments which cover product and energy used or heat delivered;
- the service provider owns the product, so appliance performance and technology risk are taken away from the customer; and
- customer pain points of arranging routine maintenance and breakdown cover are owned by the service provider.

These models introduce the fundamental concepts of subscription to consumers and are proposed as an intermediary step towards Heat as a Service (HaaS) offers.

4.3 Heat as a Service (HaaS)

HaaS builds further on the key principles of subscription and leasing and includes a commitment to maintain the customer’s property at a given temperature. The supplier owns the heat pump and takes accountability for the operational performance of the appliance as well as the amount of energy consumed to meet the agreed temperature in the home. There is usually some form of penalty levied against the supplier where the agreed temperature is not met. As with subscription and leasing, the features are consolidated into a single monthly customer payment.

The key elements that distinguish HaaS are:

- the customer benefits from a fixed cost solution to delivering heat to their home;
- the supplier is obliged to maintain a heat pump that delivers heat efficiently and reliably;
- the supplier is accountable for any costs arising from poor performance or appliance breakdowns; and
- energy use is based on an agreed level of heat or comfort⁵ rather than units of electricity.

⁵ When the supplier is maintaining the home temperature at an agreed level.

4.4 Proposed business models

High initial costs are a significant barrier to increasing the sales of heat pumps (air source heat pumps are typically around £10,000 (LCP Delta, 2022a)) particularly when compared to a standard gas boiler, the default and predominant solution in the UK. The business models identified in this research represent different approaches to resolve this issue by spreading the costs over the contract period.

We reviewed the existing market and used proprietary insight from LCP Delta (2022a) to create four business models for providing heat pumps to consumers, set out in Table 3.

Name of business model	Service offering
Finance only	Monthly payments only and no upfront costs for the heat pump. This can also include routine maintenance, but we have chosen not to include it here. The customer owns the appliance after paying off the loan.
Financing lease	A leasing scheme with fixed monthly payments which includes routine annual maintenance. The customer does not own the appliance.
Subscription	As Financing lease, with the customer paying a monthly fee which includes a fixed cost per unit of energy or heat delivered.
Heat as a Service (HaaS)	The provider owns the appliance and delivers routine annual maintenance as well as breakdown cover. The provider charges the customer a monthly fee to keep the home at an agreed temperature by providing heating.

Table 3: Overview of potential business models for providing heat pumps to consumers – categorised into four groups

The table below provides an overview of these four key business models and their features, used for the analysis for this research project. The indicative costs for each model are based on calculations from LCP Delta Heat Research Services (LCP Delta 2022a).

	Finance only	Finance lease	Subscription	HaaS ⁶
Incremental cost	£180/month, 5-year loan	£90/month, 15-year commitment	£200/month, 15-year commitment	£200+/month, 15-year commitment
Design	✓	✓	✓	✓
Product	✓	✓	✓	✓
Energy efficiency measures	✓	✓	✓	✓

⁶ HaaS rather than CaaS was used for analysis in this research given current low cooling demand in Scotland.

Heating system changes	✓	✓	✓	✓
Installation	✓	✓	✓	✓
Routine maintenance		✓	✓	✓
Breakdown cover			✓	✓
Energy			✓	✓
Heat				✓
Ownership	Y	N	N	N

Table 4: Overview of four key business models and their components

5 Assessment of the Scottish market landscape for heat pumps on subscription

5.1 Current examples of heat pumps offerings in Scotland

This section provides an overview of the current market landscape in Scotland for heat pump business models.

Overall, the uptake of heat pumps is still very low in Scotland, with around 3,000 heat pumps installed each year (Scottish Government, 2021b). We found evidence of new propositions being launched, including models incorporating routine annual maintenance, financing options and a tailored tariff (see Glossary for definitions). There are no leasing or subscription models currently available in Scotland. Further details on these offers is provided in this section.

5.1.1. Heat pump offerings in the UK

There are several examples of current heat pump offerings in the UK. Octopus, British Gas, E.ON, Scottish Power and EDF Energy each offer their own proposition (please refer to the summary table of current heat pumps offerings in the UK in Appendix 3).

Overview of offerings

The offers are all variations of an upfront purchase, finance and, in some cases, installation and routine maintenance – there are no HPOS propositions. In all cases, the customer will own the product.

The financial case for heat pumps is weak for a customer in the UK. This is due to the high installation cost of heat pumps compared to gas boilers, and the relatively high price of electricity compared to gas⁷. There are also other potentially appealing business models, such as green mortgages, where the bank will offer a reduced mortgage interest rate when renewable technology is installed. These were not considered as part of this study.

To complete this research, we also looked at existing dedicated heat pump tariffs in Scotland (a summary table of heat pump tariffs is available in Appendix 3). There is legacy evidence of providers trialling bespoke tariffs, but Octopus is the only supplier currently with a tailored heat pump tariff, which potentially indicates a lack of consumer demand.

Scottish Government support

It is also worth highlighting that eligible households in Scotland can receive financial incentives towards the cost of installing heat pumps through the Energy Saving Trust. This is the Home Energy Scotland Grant and Loan, funded by the Scottish Government, which differs from subsidies available in other parts of the UK. This includes:

- the Home Energy Scotland Grant: £7,500 towards a range of heat pumps. This increases to £9,000 for households qualifying for the rural uplift; and
- the Home Energy Scotland Loan: £7,500 interest-free loan which can be used in combination with the grant. Loans are subject to an administrative fee and can be paid back up to a maximum of 10 years for a £7,500 value⁸.

5.2 International examples of heat pumps offerings

We carried out research into the HPOS business models available across Europe. Examples from Germany, Denmark and the Netherlands show a more active market for heat pump business model offers (more details are presented as case studies in Appendix 5).

It is important to consider the specific conditions and context of each country before drawing conclusions around the opportunities to replicate these models in Scotland. In Germany, for example, gas prices are higher than electricity, which means that costs to operate a heat pump are lower than an equivalent gas boiler. There are three providers in Germany offering a rental or lease model which may serve as a positive indicator for the launch of HPOS propositions, although we do not have data on the success of these offers.

⁷ The financial case is often more positive in areas where there is no gas connection and consumers do not use gas boilers to heat their homes. For example, they may use oil or LPG boilers, or electric storage heaters.

⁸ The loan available can be defined as a finance only deal; the householder is responsible for securing the installation and maintenance themselves (although some conditions around the installation apply) and owns the appliance. However, the fact that this is interest-free makes it a financially attractive offer.

While the rental principle is more visible across Europe, only Denmark currently has a full subscription proposition. The Danish example includes the pilot scheme detailed in Appendix 5, where a full subscription model was trialled to support an accelerated roll-out of heat pumps in Denmark. Again, while this pilot was relatively successful, there are several points of difference between the Denmark and Scotland markets. Gas boilers are the default solution to heating in much of Scotland, with a penetration of 85% of households, while less than 15% of Danish households heat their homes in this way. District heating is relatively common in Denmark and the concept of buying heat in MWh is not unusual. Danes are also less likely to have problems paying for their energy because of the protection from their embedded social security and energy regulation provisions. There may also be cultural factors between the countries in terms of consumer acceptability to take on loans or debt, or the preference to own appliances rather than rent them. However, this has not been explored in this research.

5.3 Customer and provider insights

This section provides insight from LCP Delta research (2022b) around the customer perspective on different heating business models. The scope of this project did not include a literature review of customer perspectives or to undertake additional customer research. As such, the insights set out here provide an indication of the customer perspective.

5.4.2 The customer perspective

Recent customer research from LCP Delta (2022b) which is undertaken in five of the biggest European markets⁹, showed that ‘alternative finance methods’ like paying upfront, finance only or an addition to an existing mortgage, are more appealing to customers than HaaS. **The research highlighted that HaaS is perceived as a more expensive offer. This highlights that there is not currently a consumer demand for subscription models and there may be consumer concerns to overcome.**

In the UK, 43% of survey respondents stated that they would choose to pay upfront for a heating appliance, with 20% indicating that they have used a finance option through/from the heating appliance provider. These findings did not relate specifically to heat pumps but heating appliances more generally and, given that gas boilers are lower cost and more popular, it is likely that respondents were thinking about gas boilers when they answered this question¹⁰. Interestingly, in the context of willingness to fund heating appliances, people on lower incomes were less likely to want to rent a heating appliance than respondents on higher incomes. The reasons for this are not clear but it may be due to preferences to pay for equipment outright, avoid ongoing payments and attitudes to debt.

Table 5 summarises the indicative costs of a heat pump for a customer specifically calculated for the UK for three alternative purchase methods (LCP Delta, 2022a).¹¹ Note that

⁹ Germany, France, UK, Netherlands and Italy

¹⁰ Survey respondents expected their new appliance to be below £4,300, however, air source heat pumps cost around £10,000 (source: LCP Delta Heating Business Service)

¹¹ Available to subscribers only.

Table 5 has been created for illustrative purposes only and is not the outcome of a fully worked through model. It should also be noted that these costs do not include any government subsidies.

Paying upfront for a heat pump is clearly the least expensive solution over time, but the initial investment cost remains an important barrier for customers. This upfront cost can be avoided by a traditional loan which, combined with a routine maintenance and breakdown package, can provide consumer benefits.

By comparing a heat pump and a boiler finance proposition¹², the difference in-cost between the two types of heating units is apparent. Gas boilers have much lower upfront costs than heat pumps. Reasons for this include the maturity of the gas boiler market and the installation for gas boilers being much simpler and therefore lower cost than heat pumps.

	Upfront purchase + routine maintenance	Finance	Financing lease	Total cost over lifetime of product
Customer capital spend	£10,000 upfront + £130/year* for 15 years	n/a	n/a	£11,950
5 years loan (+15 year routine maintenance contract)	n/a	£180/month for 5 years + £130/year* for 15 years	n/a	£12,750
15 years loan (+15 year routine maintenance contract)	n/a	£70/month for 15 years + £130/year* for 15 years	n/a	£14,550
15 years lease	n/a	n/a	£90/month for 15 years	£16,200

*routine maintenance cost

Table 5: Customer indicative costs for three business models. (Source: LCP Delta 2022a)

¹² More details on comparative costs for a finance proposition between a heat pump and a boiler are in Appendix 4.

5.4.3 The provider perspective

The most common way of selling heat pumps is an upfront purchase for the installation and an annual routine maintenance contract. In this business model the provider receives the profit upfront and there is only a small revenue flow per customer coming from the routine maintenance over the remaining lifetime of the appliance.

Table 6 below presents the difference in revenue for the provider comparing an upfront purchase from the customer and a service-based proposition. In the second, the provider needs to invest in the heat pump installation, but the customer pays it back over a number of years, generating an ongoing and more valuable revenue stream driven by interest payments from the loan.

Upfront purchase + 15 years routine maintenance	HaaS for 15 years	Cost difference between the two business models
£11,950	£16,200	£4,250

Table 6: Indicative costs for a heat pump in the UK, comparing upfront purchase and HaaS, Source: LCP Delta (2022a)

Providing a HPOS solution offers providers the advantage of predictable revenue over a longer period of time as consumer contracts will span several years. Providers may add a premium to the monthly fee to cover any default payments, inflation and other risks. However, they are likely to also incur additional expenses (such as customer service costs, billing, remote diagnostics) compared to only selling the product. It takes several years before the provider receives a payback for their investment.

Due to the long timeframes involved, rolling out HPOS at scale **would require large capital investment over a sustained period**. LCP Delta analysis (LCP Delta, 2022a) shows that **the most promising sources of finance for HPOS are likely to be traditional routes such as banks, leasing companies, bonds and investments funds, where long term and recurring income is valued rather than venture capital funds which often expect a more immediate return**.

6 Findings from stakeholder interviews

This section provides results from the stakeholder interviews undertaken as part of this research. The interviews sought to understand stakeholder views to a range of heat pump business models, explore barriers, challenges and the likely success of these models. They also sought to understand the appetite for stakeholders to be involved in a possible pilot scheme in Scotland.

We undertook interviews with a wide range of stakeholders including Government representatives, manufacturers, installers, heat pump industry representatives, financiers, and consumer representatives. A full list is included in Appendix 1 as well as more detailed findings in Appendix 2. An overview of different business models (see Table 3 and 4 in Section 4) was presented to stakeholders as a stimulus for the interview.

6.1 Overall thoughts on HPOS business models

Installers acknowledged the potential for HPOS business models but highlighted the risk and impacts to consumer confidence of heat pumps more broadly if a HPOS pilot was poorly delivered. It was felt by stakeholders that all elements of the business model should be robust before HPOS is rolled out.

From a consumer's perspective, stakeholders felt that HPOS represents a significant change in how households use and pay for their heating. The 'finance only' option was identified as likely to be the most attractive option as this was believed to be the simplest for consumers to understand. Including routine annual maintenance and breakdown cover in the package was seen as being key to providing customer protection; a view supported by consumer groups.

From the installer representatives we interviewed, consumer demand is required to stimulate growth in the supply chain. It was felt that leasing and including routine maintenance could improve uptake by reducing upfront costs for the consumers and building consumer trust in the provider. However, it was expressed by stakeholders that a crucial factor in its success will be how the lifetime cost of the asset compares with the consumer's current heating system. One stakeholder highlighted the advantages of bundling a tariff alongside the heat pump to enable customers to ensure their bills were as low as possible. There was also some anxiety expressed around the possible impact on consumer confidence if a trial was not carefully prepared and executed.

Consumer groups also viewed HPOS as a positive concept, however highlighted that practical difficulties, such as creating a contractual framework that works for both consumer and provider, need to be overcome before this becomes an attractive proposition for either party.

The complexity of the offering for the consumer was highlighted as a key challenge. Stakeholders highlighted that this concept presents to consumers both an unfamiliar technology and payment format. Therefore, interviewees recommended that the contractual side must be very tightly controlled to ensure that consumers are protected.

We also found that product ownership resting with the supplier could be an issue for customers who are not familiar with these models, as well as the commercial opportunity and appeal of such a proposition for a service provider.

The Government representatives we interviewed were broadly supportive of the HPOS concept and acknowledge that subscription models have their place as part of a wider range of financial offerings. They also emphasised the importance of including routine maintenance within the 'finance only' option.

Distribution network operators (DNOs) were also positive towards the concept of HPOS, in particular the way in which it can provide consumers with everything they need in one package. Oversight of where installs are occurring was highlighted as important to allow DNOs to overcome the challenges presented to the electricity network from increased electricity demand.

Industry experts understood how the HPOS concept aligned with the macro trend of having access to products and services via a subscription service. It was also felt that the appeal of HPOS will vary across consumers. In a situation where the household would have ownership of the asset at the end of the subscription, HPOS could be an appealing proposition for owner occupiers and the younger demographic as it could add value to their home. For social housing providers this could be less attractive because of the tenant disruption from installation, potential difficulties with subscription fees for a tenant and it is unclear whether the lack of product ownership would be appealing to social landlords.

6.2 Challenges and risks

Stakeholders felt that the complexity of the offering presented several challenges for consumers.

Identifying a suitable provider of finance is a key challenge raised by numerous stakeholders. Whilst we did observe a positive response from finance providers who were interviewed, energy retailers did not engage in the process, so we were unable to assess their interest and likelihood to offer such a product.

Consumer lock-in (i.e., that once customers are within the contract, they are prohibited from switching heating system type or provider until the end of the term), was highlighted as a key challenge. It was felt that clarity is required on the contractual arrangements for situations where the consumer's circumstances change, or they move property.

Unfamiliarity with the technology could make it difficult for consumers to know how efficiently they are using their heat pump and ultimately how much they will be paying for their energy. Minimum performance guarantees were identified as an approach to reduce the uncertainty for consumers, for example a commitment to ensure that the appliance operates as specified for an agreed period, with a payment made to the customer where this is breached. This could be further enhanced with remote monitoring i.e. the provider being able to monitor heat pump performance remotely and potentially being able to diagnose and rectify issues.

Manufacturers highlighted the need to make homes ‘heat pump ready’ prior to rolling out a heat pump uptake scheme. The reason for homes to be heat pump ready in advance is that most heating system replacements are distress purchases (i.e., when their current system has failed, and a replacement is needed reasonably quickly). It is recognised that most distress purchases lead to customers purchasing the same heating system type (e.g., gas boiler). Therefore, carrying out works to homes in advance of a heating system breaking down could help accelerate the heat pump install process.

Consumer awareness and marketing were also highlighted as key challenges that need to be addressed to accelerate demand. DNOs also raised the potential difficulty in recruiting consumers to a potential pilot scheme. A team of coordinators and administrators would help ensure the smooth running of the scheme and that customers receive an appropriate level of support. Installers reflected on the various regulations that are currently associated with renewables and were conscious of the risk of over regulation in this area.

6.3 Scottish context

Feedback from consumer groups suggest there are several factors that could present unique opportunities and challenges to the roll-out of HPOS in Scotland, especially in remote areas.

It was felt there is a specific opportunity in rural areas of Scotland where there is no / limited access to mains gas and a high proportion of fuels such as oil, LPG or electricity. Given the higher cost of these fuels and the unregulated nature of oil and LPG markets, heat pumps can be a more financially attractive proposition for households.

Despite this opportunity, concerns were raised by consumer groups on the suitability of Scotland’s housing stock for heat pumps, especially those with lower levels of energy efficiency. This reaffirms the importance of providing energy efficiency measures as part of the HPOS offering.

Consumer groups felt that it was important that both the heating asset and terms underpinning the HPOS agreements are tailored to the climatic conditions in Scotland. A longer heating season and harsh weather conditions in some areas could influence heat pump performance and the cost to the consumer.

In remote areas, poor mobile network infrastructure coverage was also highlighted as a challenge as this could limit the installation of smart meters and reduce the effectiveness of remote monitoring. Finally, a limited number of installers and a nascent supply chain in some remote areas of Scotland could deter investment and lead to long installation lead times in.

6.4 Key stakeholders to be involved in a pilot

Due to the infancy of the market, consumer knowledge of heat pump technologies and their use in the UK is not widespread. Consumer groups highlighted their role (alongside manufacturers) to provide independent advice as well as face-to-face education to reduce the information barrier. Well trusted, independent organisations such as Changeworks,

Home Energy Scotland¹³ and Citizens Advice were considered to also have an important role in providing impartial advice and support to consumers.

Officials from both the Scottish and UK Governments recognised their roles in raising public awareness of heat pumps and removing regulatory barriers. One stakeholder also noted the role of the UK Government in regulating energy pricing, which in turn would create a beneficial environment for heat pumps. Regarding the role of the Scottish Government, one stakeholder mentioned the importance of ensuring that clarity between any HPOS pilot and existing financial incentives is clear to avoid customer confusion.

To ensure a more cost-effective pilot, DNOs also identified their role in identifying areas of the electricity network that can accommodate increased heat pump deployment (i.e. in some areas the electricity networks have constrained capacity which may impact ability to be able to connect more heat pumps).

For installers, it was suggested that funding would likely be required for small and medium sized installers to overcome the significant initial investment required and improve the rate of return. Installers did not generally see a role for themselves in providing HPOS. However, they felt that if HPOS was rolled out this could be very beneficial for the market, help stimulate demand and provide a clearer pipeline of work for them.

In order to test the scalability of HPOS, stakeholders emphasised the need for the pilot to be comprehensive, ensuring that the concept is tested across a diverse range of participants and property archetypes and ages. A potential sample of 500 - 1,000 households was suggested to achieve this objective and ensure results are statistically valid. This was based on similar pilots. Some stakeholders felt that rather than the overall size of a pilot, the more important aspect was the range of property types and consumer groups involved in order to ensure the model is scalable. Some stakeholders also highlighted the need for the contractual complexities to be well-developed and clear to ensure the pilot is robust.

In terms of evaluation, stakeholders felt that the pilot should capture information on consumer attitudes such as their satisfaction with the install, interest in the pilot and the level of disruption caused by the install. The performance of the asset and estimated versus realised financial savings were also felt important to be recorded.

Some stakeholders highlighted the importance of a robust monitoring and evaluation plan to support households and assess whether the pilot had met its original aims of objectives. Further, some stakeholders suggested this should also be included as a standard part of any HPOS offer, outside of the pilot, to ensure estimated performance was achieved.

One of the main challenges identified with a pilot were the difficulties in recruiting participants and generating sufficient levels of demand, especially given the level of drop out that can be seen. Stakeholders highlighted recruitment lessons from other heat pump or similar projects, such as engaging with community groups.

¹³ Free and impartial advice funded by the Scottish Government and delivered locally by different organisations, such as Changeworks.

Other challenges raised included the total cost of the pilot, ensuring the contractor had capacity to deliver and the practical issue of testing the success of a concept that requires long-term binding contract (such as 15 years).

7 Proposed business models to pilot in Scotland

This section explores what commercially viable and customer attractive business models could be deployed in Scotland. Three concepts for pilot schemes have been created, to address the challenges and hurdles raised in the desk-based research and from stakeholder interviews provided in earlier sections. The business models to be tested in these pilots are recommended by the research team, LCP Delta and Changeworks, in conjunction with conversations with the research steering group. It should be noted that further refinement of some of the practical dimensions of the business models will be required following this research as described in Section 8.4, such as the length of the pilot and number of households to target. These details would depend on Scottish Government ambitions and proposed timings.

There are numerous business models and variations of these models that could be applied. The models chosen here are specifically designed to be practical in terms of feasibility, delivery, and implementation. A progressive approach, as shown in Table 7 below, is recommended, starting with limited but evidence-derived features, and using lessons learnt to be deployed in successive stages.

Pilot 1 focuses on establishing the foundations of the model to overcome consumer barriers and test services that are relatively simple to implement. Pilot 2 builds on this by introducing another single component, a tailored tariff, and finally Pilot 3 consolidates these phases and moves to a subscription model where the provider owns the product.

	Pilot 1	Pilot 2	Pilot 3
Summary	Finance and routine maintenance	Finance, routine maintenance with energy tariff	Subscription with routine maintenance and breakdown cover
Features	Design, installation, routine annual maintenance, monthly payments, customer owns product	Design, installation, routine annual maintenance, monthly payments, heat pump tailored tariff, customer owns product	Design, installation, routine annual maintenance and breakdown cover, monthly payments, provider owns product

Table 7: Overview of the three proposed business models to pilot

7.1 Overview

We took learnings from the market assessment and created four offers, starting with finance-only product and adding features in each stage, as presented in Table 1. These were

used to gauge interest and engagement and to prompt discussion in the stakeholder interviews.

These pilots should be interpreted as broad options for business models that can be tested in Scotland. Note the following limitations and caveats:

- There are many variations and options for each of the three broad categories. For example, they could include optional extras that customers pay for in addition to the standard package but are not compulsory (such as making good a property after disruptive works or in-depth energy advice). They could also run at different term lengths depending on provider and consumer preference.
- Costs presented are indicative only. Actual costs are likely to vary significantly between different property types and customers (and have greater variance than typical costs of a gas boiler). For example, the installation cost of a heat pump will vary depending on the size of the home and the changes needed to the heat distribution system (i.e. radiators and pipework). There are also many factors that could influence the exact payments such as payment terms, interest rates and any add-on services. We have not modelled all of these scenarios as this was not within the project scope.
- Scottish Government incentives, in the form of a grant, have been calculated in Pilot 1 for illustrative purposes. The option to include this will depend on the availability of this grant at the time the pilot is tested.

7.2 Pilot 1: Finance and routine maintenance

7.2.1 The business model

Pilot 1 is the easiest to implement and is likely to have broad immediate appeal to customers. The model can be implemented immediately as the heating season is not specifically required for a pilot project because it is not testing product performance and we have already established that heat pumps are a planned purchase.

Overview of business model

Pilot 1 is a finance option scheme providing a complete heat pump solution. This solution includes the following services:

- heat pump system design;
- heat pump installation;
- finance for the heat pump purchase (monthly payments); and
- routine annual maintenance of the heat pump for the duration of the credit which can continue after the appliance is paid.

This model is a natural continuation from the Scottish Government's Home Energy Scotland support which currently offers customers a £7,500 grant and £7,500 interest-free loan to install a heat pump (with a rural uplift where customers qualify). The models include the addition of a routine annual maintenance solution, which we have established through the research could be a key feature and benefit for customers.

What is being tested

With this model, several questions could be tested:

- Does a straightforward finance option have a greater appeal to a consumer than an upfront purchase?
- Does the inclusion of a routine maintenance package at an additional cost have appeal?
- Is there sufficient interest and engagement from the industry to partner with stakeholders and launch such a proposition?

Customer concerns addressed

This proposal addresses several customer pain points such as the identification of an appropriate installer and access to ongoing routine maintenance. The main barrier it addresses is the upfront payment of the appliance, by offering the opportunity to spread the cost with a loan with monthly payments over 5 to 15 years. Including Scottish Government subsidies, the Home Energy Scotland loan and grant would also reduce the capital sum with the maximum funding amount for a heat pump from these being:

- £15,000 (£7,500 grant plus £7,500 optional loan); and
- £16,500 (£9,000 grant plus £7,500 optional loan if the household qualifies for the rural uplift)

Table 8 shows indicative costs when the £7,500 Home Energy Scotland grant is included¹⁴.

Pilot 1	Credit monthly payments	Maintenance cost	Total
5 years loan	£46/month	£130/year for 15 years	£4,710

Table 8: Indicative costs for pilot 1 (finance and routine maintenance) when current Scottish Government subsidies accounted for

This type of model is not strictly an ‘as a service’ offer, as the customer owns the heat pump in full after paying the loan and can extend the routine maintenance service at a cost when the loan period is complete.

Customer and properties to target

Target customers are likely to be the same group that existing offers target, i.e. owner occupiers, able to pay, well informed customers making a planned purchase, but the opportunity to spread payments via a loan removes the significant upfront payment barrier. The addition of routine annual maintenance provides comfort and addresses a customer perception that providers are difficult to engage with. There is potential to extend to social/private landlords and multi tenure dwellings as well as district heating type schemes,

¹⁴ Assumptions for the calculations: (1) Upfront purchase of a heat pump estimated at £10,000 with annual service of £130. (2) Interest rate of 4% a year.

but it is very likely that this will create additional complexity around installation, performance and contracting, as well as extending timescales significantly. Vulnerable customers are not excluded as a target customer, but access to credit for the loan finance could be a barrier for them.

It should be noted that appeal for heat pumps more generally is low. While this is expected to grow in future years, customer interest in this model at this stage could be limited.

Stakeholders involved

We would expect this proposition to be offered by a manufacturer or a retailer, likely by partnering with specialists from each sector. The approach requires the collaboration of a wide range of providers:

- appliance provider (most likely a manufacturer);
- finance provider (as retailers do not have the funds for financing, likely to be a third-party finance or a manufacturer of scale);
- installer (the retailer should engage it as a subcontractor as directly employed workforce for retailers is rare because of the costs); and
- maintenance provider (that should be provided by a subcontractor whose costs would be wrapped into the total cost or paid annually).

The benefit for the proposition provider is a potential group of consumers who were previously excluded because of the cost and limited additional risk as they will receive the revenue directly following installation.

From a customer perspective, as evidenced by the stakeholder interviews, a finance option model with at least routine maintenance included is likely to be the most instantly appealing and was also supported by consumer groups.

Indicative costs and revenue flows

Tables 9 and 10 show the costs for such business models without subsidies or grants. They are indicative costs as they were not modelled against specific Scottish property types or consumer profiles¹⁵.

Table 9 below presents the split of the total cost of a heat pump between the cost of the appliance itself and the installation. This is the lowest cost solution, but the customer must be able to self-fund – it is presented here as a comparison against the finance options considered in Table 10.

¹⁵ Assumptions from LCP Delta Heating Business service research as of September 2022: (1) upfront purchase of a heat pump estimated at £10,000 with annual service of £130. (2) interest rate of 4% a year. (3) monthly payments based on offer by Heatio promoted in the UK that never became commercially available.

Pilot 1	Appliance cost	Installation cost	Routine maintenance cost	Total
	£8,000	£2,000	£130/year for 15 years	£11,950

Table 9: Indicative costs for “pilot 1” (finance and routine maintenance) without accounting for Scottish Government subsidies

Table 10 below shows an example of a finance purchase method including a finance loan for 5 or 15 years. For the customer, a loan allows the total cost to be spread over a number of years with higher or lower monthly payments depending on the loan period. A loan is more expensive than an upfront purchase but provides the benefit for the customer of spreading the cost and accessing routine maintenance throughout the contract period.

Pilot 1	Credit monthly payments	Routine maintenance cost	Total
5 years loan	£180/month	£130/year for 15 years	£12,750
15 years loan	£70/month	£130/year for 15 years	£14,550

Table 10: Indicative costs for “pilot 1” (finance and maintenance) over different loan periods

7.2.2 The challenges

Pilot 1 is the least complex proposition and provides a measurable baseline against which more progressive and comprehensive propositions can be tested. However, the adoption of this kind of model has challenges, which are:

- **Property suitability.** This is linked to the energy efficiency measures which may be required in advance of installation to ensure operational efficiency and delivery of heat. As seen in the Danish case study, it is clearly stated that energy service providers are responsible for assessing whether homes are suitable for heat pumps before installing them.
- **‘Making good’ post installation.** Customer expectations about the look of their property post-installation (i.e., redecoration, etc) may influence overall satisfaction with the project but this would also be an additional cost to the project. This could serve as an additional costed feature (presented as an optional extra to customers) to encourage sign up.
- **Business case.** Building a model that addresses risks and generates value for all supplier stakeholders as well as maintaining customer protection is challenging.

7.3 Pilot 2: Finance, routine maintenance with energy tariff

7.3.1 The business model

We would suggest Pilot 2 is run after Pilot 1 so that insights and lessons can be implemented. However, the two stages could be run in parallel, if desired, to assess any relative appeal of the additional features.

Overview of business model

Pilot 2 provides a finance option scheme, as per Pilot 1, but with the addition of a bespoke/tailored tariff to support heat pump operation.

What is being tested

With this model, the following issues will be tested:

- Does the inclusion of a tailored tariff with a commitment to be cheaper than a standard tariff have greater appeal to customers?
- Does the introduction of a tailored tariff unlock a new group of customers?

Customer concerns addressed

This model addresses several customer pain points that have already been identified for Pilot 1, the opportunity to spread the costs with a loan and access to installers and provision of routine annual maintenance. As with Pilot 1, inclusion of Scottish Government subsidies would further reduce the heat pump capital cost and related ongoing payments.

A tailored tariff is intended to offer benefits to both the retailer and the customer. The customer is incentivised to shift their demand by being offered periods of lower cost electricity when overall demand on the network is lower. This reduces costs for the customer and offers network benefits.

Customer and properties to target

As for Pilot 1, the target audience would be informed and interested customers who are planning a heating system change, rather than a breakdown prompting a distress purchase. There is potential to extend the target to social/private landlords and multi occupancy dwellings but, again, this will add additional complexity around installation, performance and contracting. Vulnerable customers are not excluded as a target customer for this model, but access to credit could be a barrier to them.

Stakeholders involved

The inclusion of an energy tariff means that this proposition is most likely to be offered by an energy retailer. As in Pilot 1, whoever offers the proposition will need to partner with specialists, such as a manufacturer for providing the appliance, finance providers for financing the appliance and a subcontractor for installation and maintenance.

Overview of tailored tariffs

The tailored energy tariff which matches the operation of a heat pump can be one of the following:

- A Time of Use (ToU) tariff, where a heat pump customer is offered a period (or periods) of low-cost electricity when their system can operate and fill the thermal store ahead of needing it to heat the property or to use as hot water. There will likely be a corresponding period where electricity is more expensive (when there is greater demand or low renewables generation). This would be supported by a commitment that signing up to this tariff would be cheaper than a standard tariff. As described in Appendix 3, Octopus has now launched their CosyOctopus proposition, which offers exactly this. It is currently the only tariff of this kind available in the UK.
- Metered heat should be considered as a logical next step once the principle of tariff plus appliance has been tested. Introducing metered heat would mean the installation of heat meters, which adds a further level of complexity as well as additional costs and risks for the provider. With a metered heat tariff, the supplier bills the customer for the heat provided, rather than for the energy consumed in delivering the heat and is explained further in Appendix 5, using the Danish trial as an example.
- Using heat as a proxy for consumption rather than kWh may also improve understanding for a customer and lead to advanced engagement, although some form of visualisation, i.e., an in-home display or smart phone app may be needed to present this data.

Indicative costs and revenue flows

The indicative costs for this business model are the same as those presented for Pilot 1, and they do not include any subsidies or grants. As for Pilot 1, these costs presented in Table 10 were not modelled against specific Scottish property types or consumer profiles¹⁶.

7.3.2 The challenges

We find the same challenges in Pilot 2 as in Pilot 1. However, in addition to those, here we are engaging an energy retailer to develop a tailored energy tariff which may increase supplier risk but needs still to be an attractive offer to the customer. The supplier risk is linked to the following issues:

- Energy retailers must embed the risk of building a tariff that accurately reflects the variable cost of electricity at different time periods while also offering a customer price guarantee.
- Implementing tailored energy tariffs requires advanced metering infrastructure, especially for Time of Use tariffs, to accurately measure and record energy consumption in different time periods.

¹⁶ Assumptions from LCP Delta Heating Business service research as of September 2022: (1) upfront purchase of a heat pump estimated at £10,000 with annual service of £130. (2) interest rate of 4% a year. (3) monthly payments based on offer by Heatio promoted in the UK that never became commercially available.

- Introducing Time of Use tariffs requires customer education and engagement from retailers to promote understanding and adoption. Installers could also provide in home support around the efficient operation of a heat pump and how to align with a specialist tariff.

7.4 Pilot 3: Subscription with routine maintenance and breakdown cover

7.4.1 The business model

Introducing a subscription model has the potential to unlock a significant new customer segment but introduces a new set of financial and operational risks. The complexity involved in creating a proposition of this type suggests that learnings from Pilots 1 and 2 are essential as well as clearly understanding customer demand.

Overview of business model

Pilot 3 includes a complete heat pump solution, including design, installation, routine maintenance and breakdown cover, with monthly payments to spread the cost over 5 to 15 years. There is a minimum contract term of 5 years that reflects the time to repay the cost of the appliance. An electricity tariff is excluded from this model at this stage, since it is subscription specifically that is being tested, but could be included if insight from Pilot 2 suggests that this is a key feature for customers.

The customer is committed to a fixed term contract and does not own the appliance at the end of the contract. This approach provides the customer with peace of mind, as the service provider would offer a single point of contact for any issues related to their heating system.

What is being tested

With this model, we would like to test several questions:

- Does product ownership influence the customer appeal (as the consumer does not own the appliance at the end of the contract)?
- Is a subscription type product of interest to a customer?
- Is there sufficient industry ambition to launch a subscription type of model?

Customer concerns addressed

In parallel to Pilots 1 and 2, this approach addresses one of the main customer pain points of high upfront costs. A subscription model allows customers to access a heat pump solution with affordable monthly payments over a fixed term, nominally a 15 year period in this model, which also includes routine maintenance and breakdown cover. Customers benefit from a well-maintained and reliable heat pump without the hassle or expenses associated with servicing or unexpected breakdowns.

Customer and properties to target

Target customers are likely to be the same as for Pilot 1 - informed customers who have conducted their own research and are comfortable with the principle of subscription. This

could be extended to include social/private landlords and multi occupancy dwellings, but this will add further complexity around installation, performance and contracting. As the market evolves, the insight and lessons learnt from Pilot 1 and 2 can be applied to inform the decision on whether to extend the scope to include vulnerable customers or other target groups.

Stakeholders involved

This model provides long-term, predictable revenue for the provider, although this may be offset by the provision of the upfront capital and the time taken to recover that investment and generate profit. There are also additional expenses to be considered compared to a simple sale, including additional costs for customer service, billing and managing payments, remote diagnostics of the appliance and any interest attracted by loans from an investor or a finance provider. This financial risk was highlighted as a significant barrier by providers. Another concern raised by providers is their ability to offer multiple services from across the value chain (installation, asset management, financing and contracting) as a HPOS model would dictate. Building a consortium with third parties to offer these services was suggested by stakeholders as a solution to support the delivery of HPOS, which is the approach we suggest for the pilot.

We would expect this proposition to be led by a retailer or a finance provider, partnering with experts to deliver specialist services, including:

- a finance provider or manufacturer of scale who can offer finance;
- an installer, likely to be engaged as a subcontractor since a directly employed workforce adds further costs; and
- a maintenance provider, again engaged as a subcontractor, whose costs would be wrapped into the total monthly subscription cost.

Indicative costs and revenue flows

The cost for this model (see Table 11) is wrapped into a monthly subscription fee, initially including the appliance, and then standalone once the product cost has been recovered. We have modelled this pilot to run over 15 years with consistent monthly payments but there are other options. For example, the subscription could have higher initial costs to repay the product more quickly or lower monthly costs but for a longer period.

Pilot 3	Monthly payments	Routine maintenance cost	Total
15 years lease	£90/month	n/a	£16,200

Table 11: Indicative costs for “pilot 3” (subscription, routine maintenance and breakdown cover)

7.4.2 The challenges

There are several challenges linked to the subscription model. For the suppliers, the challenges are linked to a better understanding of the risks involved and how they can manage those risks to develop propositions that will be commercially viable. A further challenge is how these propositions can be attractive to customers, especially given a lack of product ownership (which we believe – with current customer insights – is not perceived to be an advantage). Understanding customer concerns, is vital to be able to design appealing offerings. Several challenges and questions are raised linked to this proposition:

- Does the subscription model work in the heating sector?
- Does the cost to serve the customer increase in line with longer contract period?
- Does product ownership create a barrier or an opportunity?
- What level of guarantee is offered to the customers once the product is paid off and what is the scope?
- Does this model work for vulnerable customers and is there opportunity to use grant funding to subsidise their costs?

	Pilot 1 Finance and routine maintenance	Pilot 2 Finance, routine maintenance with energy tariff	Pilot 3 Subscription with routine maintenance and breakdown cover
Proposition	Design, installation, and routine maintenance of a heat pump with credit monthly payments.	Design, installation, and routine maintenance of a heat pump with monthly payments and a tailored heat pump tariff.	Design, installation, routine maintenance and breakdown cover for a heat pump, with monthly payments to spread the cost.
Timescale	Immediate implementation	Launch in parallel with or upon completion of Pilot 1	Launched when or if market insights show that there is a market desire and a customer appeal. Insights from Pilot 1 and Pilot 2 first.
Target customer(s)	Informed customers first with potential to extend to social/private landlords and multi occupancy dwellings	Informed customers first with potential to extend to social/private landlords and multi occupancy dwellings	Informed customers first with potential to extend to social/private landlords and multi occupancy dwellings. As the market is expected to evolve, it would be appropriate to extend to

			wider customer groups, including vulnerable customers.
What is being tested?	<ul style="list-style-type: none"> The appeal of a finance offer versus upfront purchase, The customer appeal of the inclusion of routine maintenance package, The industry interest and engagement to partner. 	<ul style="list-style-type: none"> The appeal to customers of a tailored tariff with a commitment to be cheaper than a standard tariff, Whether the inclusion of such tariff unlocks a new group of target customers. 	<ul style="list-style-type: none"> Whether product ownership influence customer appeal, Whether a contract with two parallel payments streams (product and routine maintenance/ breakdown cover) have appeal, Whether the industry have sufficient ambition to launch a subscription type of proposition.
Proposition owner	Manufacturer or retailer	Energy retailer	Retailer or finance provider
Appliance provider	Manufacturer	Manufacturer	Retailer or manufacturer
Finance provider	Finance provider or manufacturer of scale	Finance provider or manufacturer of scale	Finance provider or manufacturer of scale
Installer	Subcontractor	Subcontractor	Subcontractor
Routine annual maintenance and breakdown cover	Subcontractor	Subcontractor	Subcontractor
Energy tariff	Not included	Energy retailer	Insights from Pilot 2 needed. If appeal is increased, then a tariff should be included.
Challenges	<ul style="list-style-type: none"> Property suitability, Post-installation, Suitability of existing heating system, 	<ul style="list-style-type: none"> Property suitability, Post-installation, Suitability of existing heating system, 	<ul style="list-style-type: none"> As per Pilot 1, plus uncertainty around the following: Does the product ownership create a

	<ul style="list-style-type: none"> • Business case that works for everyone stakeholders and consumers, • Engaging with 3rd party finance provider. 	<ul style="list-style-type: none"> • Business case that works for everyone stakeholders and consumers, • Engaging with 3rd party finance provider, • Risk of the energy retailer to develop a tailored tariff attractive to the customer. 	<p>barrier or an opportunity?</p> <ul style="list-style-type: none"> • Does a long-term commitment create a barrier or an opportunity? • What level of guarantee is offered once the product is paid off? • Does subscription really work in the heating sector? • Access to credit may limit the opportunity for vulnerable customers.
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Table 12: Summary table of Pilot schemes

8 Conclusions

8.1 Overview of findings

This research has explored how HPOS business models could be piloted in Scotland. It is anticipated that energy efficiency and climate change policy will drive demand for heat pumps towards the end of the 2020s and beyond. Given their high upfront costs, it will be necessary to help consumers with financing solutions in order to facilitate their uptake.

Our research has described a full spectrum of business models such as ‘finance only’, ‘full subscription’ and ‘heat as a service’ models. Some offerings are currently available in Scotland, but these are mostly limited to ‘finance only’ packages, which essentially provide payment plans to customers wanting to install a heat pump. There is no evidence of the uptake of these offerings, but we believe it to be very low.

There are also a multitude of additional options, alongside financing solutions that can be used to help consumers. Examples include the installation of energy efficiency measures, bundling with an energy tariff and the provision of energy advice.

Results from our desk-based research and stakeholder interviews demonstrate that the Scottish Government should be cautious in forecasting how quickly HPOS could be rolled out in Scotland or indeed how much consumer demand there is likely to be in the near term. Even if finance models are made available to consumers, there are still likely to be non-financial barriers, such as the complexity of the installation and associated costs and

timescales, ability of the appliance to deliver sufficient heat without additional insulation, consumer difficulties in understanding fuel bill savings and a current lack of consumer demand, along with wider supply chain issues.

Our research has demonstrated that there is a mixed appetite from all stakeholders for involvement in a HPOS pilot. Challenges and risks such as consumer protection and ensuring heat pump performance were raised by consumer groups and finance providers. The biggest obstacle for organisations who might want to offer a trial proposition was seen to be the provision of finance; only larger companies are likely to be able to provide this and, within this, economies of scale are required to make it attractive.

Specific barriers to HPOS models, which were raised by consumer groups and finance providers related to consumer protection and understanding of contractual issues. For example, many were concerned about product ownership when moving properties. A further key challenge for potential consumers is accessing finance if they already have difficulty in obtaining credit. As discussed in Section 6 of this report, there are multiple issues around providing finance, including a current lack of willingness from finance institutions to enter the market at scale and uncertainty around the ability and willingness of energy suppliers to provide finance packages. As a result of these challenges, the business case for HaaS is currently not strong enough, which has a direct impact on current consumer demand and limits the motivation of finance providers to engage.

A further key consideration is understanding the target customer for different propositions and that a range of propositions may be required rather than a 'one-size-fits-all' approach. For example, there may be different levels of consumer appeal to product ownership, but there is a need to test different options to provide an appropriate evidence base. This range of propositions might include a finance plan for those customers that are not able to pay upfront for a heat pump, or a full subscription proposition for those that would like to have a peace of mind (LCP Delta, 2022a).

Overall, our research concludes that there are multiple barriers to all stakeholders in quickly rolling out HPOS models to consumers in Scotland. The consumer demand, supply chain and industry is far from being ready to roll this out at scale. However, we are still able to present options for the Scottish Government to develop HPOS as part of this research.

It should also be noted that the business models presented here are not expected to *generate* customer demand for installing heat pumps, but rather to present different financial options in a market where greater customer demand exists.

8.2 General recommendations

There are many steps the Scottish Government could take to explore, analyse and test HPOS models in greater detail but the best course of action should align with policy development and priorities. Some broad recommendations are made based on this research:

- **Build on Scottish Government incentives.** The Scottish Government already provides financial support to households through a grant and loan administered by

Energy Saving Trust. This report has not considered the uptake, appeal or other factors of this loan as this was not in scope. However, having reviewed the current HPOS business models available in Scotland, we believe that understanding this would be a useful exercise to inform any HPOS pilots. Research with specific customer groups, such as customers who took out the financial support, or who applied and didn't proceed, may be a useful starting point to test appeal of elements in the proposed pilot business models.

- **Clarify regulation including customer protection.** Alongside, or before, any initial pilots of HPOS models, further examination, assessment and clarity is needed to aid further development of HPOS models. For example, consumer protection is one of the most important areas for consideration, to examine more fully what customer protection is needed and how customers in different cases may be affected, for instance when they move house. Understanding how HPOS contracts would work in detail may help understand and overcome barriers.
- **Build up to more complex and comprehensive propositions.** We do not recommend piloting more complex business models such as HaaS immediately. Whilst HaaS could be tested on a small scale, there is very little appetite from industry or customers for this business model and little chance of a large-scale adoption at this point. Instead, we present below a series of staged pilots that would test certain elements of different propositions aimed to overcome specific barriers to heat pump uptake.

8.3 Piloting HPOS business models in Scotland

Drawing on the desk-based research, stakeholder interviews and our business model analysis, we recommend three business models to be tested in Scotland:

1. **Finance and routine maintenance:** this includes heat pump design, installation, routine maintenance and a finance package using monthly payments. This model would build on current market offerings to test the appetite of customers to have a more complete heat pump package. This pilot could be rolled out fairly quickly if finance can be secured.
2. **Finance, routine maintenance with energy tariff:** this is the same as package one but includes the bundling of an energy tariff, which would ensure customers are on the lowest possible energy tariff for a heat pump. This makes the customer offering even more comprehensive and provides the customer with reassurance around running costs. Rolling out this pilot would require the involvement of energy suppliers.
3. **Subscription with routine maintenance and breakdown cover:** this model provides subscription rather than a financing model, the main difference being that the provider owns the heat pump and breakdown cover is included alongside routine maintenance. Other elements are the same as pilots 1 and 2, except that there is possibility, coming from the insights of pilot 2, to include a metered heat tariff, which will transform this model into a full subscription one. This business model is more advanced and we do not consider the market or consumers to be currently ready for it, although it could potentially be tested in future.

There are many variations of these models that could be presented and further analysis is required to define the specific features and terms that should be offered. To understand the effectiveness of any pilot requires clear pilot aims to be drawn up and appropriate monitoring and evaluation mechanisms to be implemented.

Stakeholder feedback also highlighted the risks of getting a pilot wrong in terms of potential negative impacts on the industry or negative customer opinions, therefore all elements of the business model need to be robust.

8.4 Proposed focus areas for further research

In our research we identified several current evidence gaps that would benefit from further examination.

This research has been conducted without direct feedback from customers on which business models or elements of them appeal the most or why and how this might differ between customer groups. Therefore, the findings and assumptions around customer appeal should be viewed in this context and market research would be needed to understand or test this further. Any pilot study should include an element of customer research to understand customer views. One caveat with undertaking customer research in the near term is to appreciate that attitudes to as-a-service business models *may* change as the market for these types of propositions grows, both within and outside of the heat pump market.

There are many variations around what specific features are included within each of the models proposed, for example the duration of the contract period, whether a partial up-front payment has appeal, or the type of tariff included in the proposition. Further research focussing on these particular elements may help the refinement of the pilot schemes proposed.

Further research is also needed to understand what consumer protection issues arise with HPOS models and what protection could and should be put in place. In particular, there are questions around the transfer of ownership if a property with a heat pump is sold and any obligation that may be placed on the new owner as well as appropriate regulations to ensure that customers are not exploited with long-term credit contracts.

Building on concerns identified in this research via engagement with consumer groups, we suggest that detailed understanding that directly explored consumer appetite for HPOS and any concerns that may limit uptake would also be of value.

There is also a need to explore what actions should be taken if a customer defaults on payment, or if the customer is vulnerable and unable to pay. This should include what happens to the product that has been installed and how the supplier accounts for this risk.

We also acknowledged that respondents to research questions are often using gas boilers as their reference point when responding to questions around potential models, for example, when asked about the appeal of a subscription service. There may be value in conducting research specifically using heat pumps as a baseline product.

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10 Appendices

Appendix 1 Methodology: stakeholder interviews

The methodology focussed on qualitative insights from relevant groups along with analysis of quantitative data. The methods used included:

- Desk-based research to provide an overview of the current market landscape for innovative heat pump business models in Scotland and the international landscape.
- Stakeholder interviews to explore the feasibility of testing HPOS type pilots in Scotland, including an understanding of the barriers, challenges and solutions. This involved 18 interviews with a range of representatives from heat pump installers, manufacturers, consumer bodies, financing organisation, electricity network operations, trade associations and Government. A full list is provided below.
- Analysis of business models which would be piloted in Scotland, drawing on the data above and feeding in information from the research steering group.

Eighteen stakeholders were interviewed as part of this research:

- Industry experts (2)
- Manufacturers (2)
- Consumer organisations (3)
- Trade associations (3)
- Electricity network operators (2)
- Installer organisations (2)
- Financiers (2)
- Government (1)
- Housing association (1)

We also reached out to energy suppliers, but we were unsuccessful in recruiting any for this research in the timescales.

Interviews were semi-structured using a topic guide and interviewees were sent the heating business models developed in this research as a prompt for discussion.

Appendix 2 Findings from stakeholder interviews

Consumer Appeal

The appeal for HPOS will likely vary across consumers depending on their financial situation, awareness of low carbon heating systems and desire to reduce their carbon emissions. Removing the upfront cost of a heat pump will reduce a significant financial barrier to switching to a low carbon heating solution. However, in order to represent a financially appealing proposition, many stakeholders indicated that it is important the running costs associated with heat pumps remain competitive with traditional heating solutions. This is likely to be particularly important for vulnerable consumers, such as those in fuel poverty. It was also highlighted that this consumer group could have more difficulties being accepted onto HPOS due to potentially having poor credit ratings.

Stakeholders highlighted that due to the unfamiliarity with heat pumps and the infancy of these financing models, the total cost of HPOS may not be clear to be consumers. It was therefore considered important that consumers are provided with information on expected heat pump performance and the total cost of the subscription so that they can make an informed decision. This was especially thought to be important for risk averse consumers.

Appeal to providers

The appeal of HPOS to providers is relatively limited, especially amongst small / medium sized installers. This is primarily due to the existence of several barriers that currently deter organisations from offering HPOS. It was felt that smaller installation organisations would need funding in order to overcome the significant initial investment required and improve the rate of return.

Financial risk was identified by installers and consumer groups as one of the main barriers for potential providers. Some organisations may not have access to finance required to cover the significant upfront investment required to offer HPOS. For organisations with the necessary financial backing, the return on investment may not be sufficient to cover the additional credit risk.

The lack of consumer demand creates a challenge for potential providers to justify developing the supply chain and their HPOS proposition. Policy certainty would give providers more confidence on future demand and therefore drive the development of the supply chain. Consumer groups highlighted the role Scottish Government should play in providing clarity on the policy direction for heat decarbonisation in order to drive demand.

Finally, offering HPOS, especially the more advanced business models, requires providers to offer several different services across the value chain. This includes installation, asset management, financing and contracting. Consumer groups highlighted that few organisations would have the capabilities within their organisation to fulfil all responsibilities. Disaggregating the roles (e.g. via subcontracting) was suggested as a way in which different organisations could support the delivery of HPOS.

Almost all stakeholders interviewed felt that small / medium sized organisations are more likely to face the barriers identified above and that larger organisations are better placed to offer HPOS. Multiple stakeholders indicated that only larger companies are realistically going to have the capability and appetite for offering HPOS. It was suggested that large energy suppliers are currently well positioned in the market as they're able to utilise existing relationships with customers and have access large marketing budgets to acquire new customers. Similarly, there was appetite from manufacturers to deliver or support HPOS rollout. It was felt that the prospect of a consistent payment stream could be attractive to these organisations. Unfortunately, we were unable to recruit an energy supplier to take part in the interviews.

Government indicated that, in order to justify additional investment in marketing and developing their proposition, potential providers need more clarity on the benefits that it could provide to their organisation.

Finance

Installers highlighted the role that organisations such as the Green Investment Group¹⁷ or the Scottish National Investment Bank¹⁸ should play in providing finance required to roll-out HPOS. For private investors, the attractiveness of this concept will depend largely on their risk appetite. It was believed by stakeholders that many financial organisations are interested in this but need long term policy certainty.

With regards to fixed term vs rolling contracts, it was suggested that a rolling contract could be preferable for the consumer as it could give providers an opportunity to amend terms or the option to leave if their situation changes. This option would likely be more costly for consumers to reflect the increased financial risk for providers.

Regulation

Stakeholders identified several areas in which changes to existing regulations and future regulations would be needed to support the roll out of HPOS. Currently, energy suppliers in the UK are only able to charge their customers in units of electricity consumed (e.g. p/kWh). In order to offer more complex forms of HaaS, changes to supplier licences would be required to enable suppliers to legally charge a customer for the amount of heat or warmth they receive (e.g. £/warm hours). Furthermore, it was highlighted that if the market is to offer long term contracts, the consumer's right to change supplier at any point may need to be reviewed.

It was highlighted by several stakeholders that future regulation will be required to ensure consumers are protected. Consumer groups highlighted that if the contractual arrangement is between the consumer and the HPOS provider, then it is believed that the consumer will no longer be covered by Microgeneration Scheme Certification (MCS) protections (the main

¹⁷ [The Green Investment Group](#) - The Green Investment Group is an independent organisation whose mission is to accelerate the transition to net zero.

¹⁸ [Scottish National Investment Bank](#) – a mission-oriented investment Bank in the UK with missions of which achieving a Just Transition to net zero carbon emissions by 2045.

renewable technology quality standard that is commonly used for heat pump installations). Analysis for this project suggests that this would apply to business models where the customer owns the heat pump themselves and where they have a contractual arrangement with the provider rather than the installer (as it is the installer who is MCS certified)¹⁹.

Further suggestions included ensuring that consumers are protected from extreme movements in electricity prices, especially those under long term contracts. Government highlighted that a 'cap on fair usage' policy, which could enable an upper limit on spend to be set by the customer and send alerts when this limit is approaching, to ensure there is sufficient protection for vulnerable consumers. Regulation is also required to ensure consumers can identify credible schemes to encourage uptake and trust.

Given the length and size of the contracts being proposed under HPOS, stakeholders felt that it would be likely that financial regulation would be required.

Adjustments to current energy market arrangements were also suggested by stakeholders to improve the attractiveness of HPOS. This was commented on in relation to global gas prices being a key driver of the price households pay for their electricity, especially in the UK. Decoupling of wholesale electricity and gas prices is currently being considered by UK Government as part of the wider Review of Electricity Market Arrangements (REMA). Manufacturers highlighted the significance this change could have on stimulating demand for heat pumps by reducing the impact high global gas prices have on the price of electricity, immediately reducing the cost of operating an electric heating asset.

¹⁹ A similar case study is the Assignment of Rights (AOR) which was a voluntary feature of the Renewable Heat Incentive (RHGI) scheme. Under AOR, providers installed and owned the heat pump, and received RHI payments when the customer 'assigned these rights' to them. Our analysis suggests AOR schemes provided customer protection by providing a zero value contract between the installer and the customer so that the installer still had obligations to the customer.

Appendix 3 Heat pumps offerings and heat pump tariffs in the UK

Heat pump offerings

Installation and routine maintenance	Upfront payment	Deposit payment	Finance and installation	Service only
Octopus Energy	E.ON	E.ON	British Gas	Scottish Power
	EDF Energy		E.ON	

Table 13: Summary of current heat pump offerings in the UK

Octopus Energy has a heat pump offering, “Octopus heat pump” that includes providing and installing a heat pump. Alongside this, customers can choose from two optional service plans, as outlined in table 14.

The British Gas heat pump offering includes a financial option and installation. Their Warm Home Promise offers: a free home survey, industry-leading aftercare, free service in the customer’s first winter and a 5-year warranty and an air source heat pump from the leading brands Vaillant and Daikin. The financial plan from British Gas consists of a 5-years’ interest-free credit which makes the heat pumps more affordable for customers.

E.ON offers different finance options to help customers spread their heat pump cost. These are outlined in the table 15 below. Customers can pay upfront, with a deposit or choose one of the flexible payments options by paying monthly instalments for up to ten years.

Scottish Power is offering an Annual Service Plan for air source heat pumps. Their service includes full testing of the heat pumps equipment and the associated components by specialised engineer for £14.75 per month (one year automatically renewable contract). This service plan is only for air source heat pumps that are owned by the customer and used for personal use.

EDF Energy sales and installs air source heat pumps. Their prices start from £5,500 in England and Wales or £3,000 in Scotland (including the government grant). Heat pumps (Daikin models) purchased and installed from EDF Energy come with a 3–5-year warranty.

The following tables provide more details for the current heat pump offerings in the UK as described in Section 5.1.1.

Standard warranty	Basic plan
<ul style="list-style-type: none"> • £0 a month – free with your Octopus heat pump install • 5-year warranty for your heat pump • 2-year warranty for other products Octopus installed (like your hot water cylinder and radiators) • Access to Octopus freephone helpline • No call-out fees (if the repair is covered under warranty) 	<ul style="list-style-type: none"> • £9 a month (£108 per year) • Annual full system service to validate warranty • 5-year warranty for any product we installed • Access to our freephone helpline • Site visit guaranteed within 24 hours of call (if needed) • No call-out fees (if the repair is covered under warranty)

Table 14: Octopus Energy heat pump offering optional service

Pay in full	Pay a deposit	Pay on finance
Pay the full amount upfront for the air source heat pump system. There's no need for a credit check with this option so it's quick and easy to do.	Pay a deposit and settle the balance once the installation is complete. This would be within seven days of installation and is subject to a credit check.	Spread the costs by splitting it into manageable monthly payments with no upfront payments. <ul style="list-style-type: none"> • 0% APR means the customer pay no interest charges so all it is paying for is the air source heat pump system and the cost of installation. • Up to two years 0% APR interest free credit. • Or pay over three, five, seven or ten years at 3.9% APR.

Table 15: E.ON heat pump offering finance options

Heat pump tariffs

Supplier	Status	Tariff	Details
Octopus	Active offer	Six hours of cheaper electricity a day	Cosy Octopus tariff is eligible for customers with a heat pump and a suitable smart meter
OVO Energy (no longer operating)	Trial only – no longer available	Discounted electricity tariff (all day) – 5p/kWh	A 2022 trial in social housing in Manchester. The Heat Pump Pro trial available to customers with a heat pump, a smart meter
Good Energy	No longer operational	Cheaper electricity units at times of the day	Launched in 2020, intended to help customers benefit from surplus electricity on the grid.

Table 16: Overview of previous and current heat pump tariffs in the UK

Cosy Octopus is a tariff with double dip Cosy Hours every day: six hours of very cheap electric to warm the customer's home. To be eligible for Cosy, the customer should have a heat pump (air, or ground source) at a property that Octopus supply. The customer will need a SMETS2 smart meter, or some types of first generation (SMETS1) smart meters, that Octopus can receive half-hourly consumption data from.

OVO Energy announced its trial of its type-of-use heat pump tariff, Heat Pump Pro in March 2022 being the first one of this kind in the UK. Only Daikin heat pump owners living in a Northwards Housing Association property in Greater Manchester were eligible for this trial. OVO Energy new Heat Pump Pro tariff allows members to pay a lower rate for energy used to power their heat pumps. With the Heat Pump Pro tariff trial, participants were getting 5p/kWh off their standard rate for electricity used to power their heat pump. The Heat Pump Pro trial was available for OVO members with a Daikin Heat Pump and smart meter, and who were also on OVO Energy's Simpler Energy price plan (the variable rate plan). OVO connected the customer's heat pump to its smart platform and analyse the data it receives from it in order to understand the customer's central heating system behaviour.

Good Energy had launched a heat pump offer back in 2020 which is not available anymore. The tariff was supposed to help make it more cost-effective to run a heat pump, offering cheaper unit rates at different times of day to ensure consumers can benefit from surplus renewable generation or low demand on the grid.

Appendix 4 Indicative cost for E.ON heat pump offering vs. boiler offering²⁰

	Heat pump	Boiler
Item value	£10,000 ²¹	£2,900 ²²
Upfront payment	£0	£0
Total amount of credit	£10,000	£2,900
Agreement duration	120 months	120 months
Annual rate of interest	3.9%	7.9% (fixed)
Monthly payments	£100.44	£34.61
Total amount payable	£12,053	£4,153.20

Table 17: Indicative costs in a finance proposition comparing heat pump and a boiler

²⁰We used E.ON's finance options for comparing a heat pump and a boiler offering as they have public data on their website for both offerings.

²¹ Representative example based on borrowing £10,000 for a new Daikin 9kW air source heat pump, 150 litre cylinder, eight new radiators and an in-home survey, with the £5,000 Boiler Upgrade Scheme grant from the UK government taken off the total price.

²² Based on the average cost of a new boiler installation bought after a personalised consultation, costing £2,900.

Appendix 5 International examples of heat pumps offerings

Finance	Rent	Lease	Subscription
OK (Denmark)	Viessmann (Germany)	EWE (Germany)	OK (Denmark)
	Thermondo (Germany)	OK (Denmark)	
	OK (Denmark)		
	Econic (The Netherlands)		

Table 18: Overview of current heat pumps business models across Europe

Case studies
<p>Country: Germany</p> <ul style="list-style-type: none"> • EWE leasing <p>Company overview</p> <p>With more than 90 years of existence, EWE is one of the largest contracting providers and utility companies in Germany. For many years, EWE has successfully combined the business fields of energy, telecommunications, and IT, and is thus well-placed to harness the opportunities resulting from the energy turnaround and digitalisation as well as play an active role in shaping these two trends. Today, EWE uses its experience to drive the energy revolution forward and to protect the climate. They are very familiar with heating services. Customers can rely on products and services from EWE but as well from their partner network.</p> <p>Offering</p> <p>EWE ZuhauseWärme offers a leasing scheme for air to water heat pumps. Their offer EWE HomeHeatPump includes all-round carefree package with the components of lease, service, and energy. The benefits of the leasing are the following: EWE takes care of the planning and organization, covers the acquisition and installation costs, fixed price guarantee for over 15 years, calculable and transparent monthly amount, replacement in the event of a total failure (prerequisite for regular maintenance by a specialist company or by means of a service contract with EWE). The customer can combine this offer with an optional service contract (inspection, maintenance, and repair, 24-hour availability and 365-day emergency service at monthly flat rate from € 23.80) and power supply from EWE (green electricity price guarantee for 12 or 24 months).</p> <ul style="list-style-type: none"> • Thermondo

Company overview

Thermondo was founded in 2012 and has already become Germany's largest heating system installer by bringing a new, digital approach to the staid business. Thermondo runs an online portal advising homeowners on how to modernise their heating systems.

Offering

Thermondo is offering a rental scheme for air to water heat pump. Their offering includes installation, maintenance, insurance and repairs for up to 15 years from 209 €/month. Thermondo takes care of all funding and financing processes for the customer and thus secure up to 35% state funding.

- **Viessmann**

Company overview

Viessmann is a global family business founded in 1917 and growing since. Viessmann evolved from a heating system manufacturer to a solution provider for the entire living space in four generations. They cover all applications: heating, cooling, ventilation, energy generation, and energy storage. In doing so, we use a wide variety of energy sources: sun, wind, geothermal energy, electricity, biomass, or even oil and gas.

Offering

Viessmann Wärme offers a rental scheme, and the monthly rate includes all services such as installation, warranty, maintenance, and repairs. The installation is carried out by a qualified Viessmann partner. This person remains the first point of contact for the entire duration of the contract. Only after the rental system has been successfully installed does the Viessmann heating contract begin. A rental scheme means concluding a contract with a business partner, here Viessmann. The duration of the contract is usually 10 or 15 years. In order to ensure the greatest possible flexibility, Viessman also offers options with a term of one year or more.

Country: The Netherlands

- **Econic**

Company overview

Econic is a dutch company founded in 2017 whose core activity is making houses and buildings more sustainable by installing and maintaining sustainable heat and energy systems at a fixed monthly fee. With their various (finance) solutions homeowners no longer need to invest in expensive equipment such as heat pumps, solar panels, home batteries, and EV charging stations. It also enables project developers and building owners to significantly reduce construction costs. What they began in the Netherlands, is now rolling out in Germany and finally throughout Europe.

Offering

Econic offers a rental proposition for residential customers including a heat pump, water tank and PV (EV charging and battery storage option are also possible). Their monthly membership fee is including material costs, installation, monitoring, maintenance, guarantees and service. The revenue structure is the following, there is fixed monthly fee with no upfront fee, the amount varies by customer but typically is around 250€.

Country: Denmark

The Danish Parliament decided in 2016 to investigate a new way of providing heat from heat pumps: “heat pumps on subscription” or “heat as a service”, where the heat pump is not owned and serviced by the house owner but owned by an energy service company that sells the energy to the house owner. The Danish example of heat pumps on subscription came from the pilot project from the Danish Energy Agency in order to speed the roll out of heat pumps in Denmark. Energy on subscription is a well-known concept in Denmark since about 65 % of Danish buildings are heated by district heating. District heating is characterized by a small sign-on fee, an annual fee for insuring well running system, and payment for the actual used heating. Therefore, energy companies in Denmark can offer in the same way heat pumps on subscription. Four companies with different background were selected to participate in the pilot project. The pilot project included a subsidy scheme where the companies were rewarded economically for each heat pump they installed. This subsidy scheme aims to drive the uptake of heat pumps in areas where district heating is not available and to help customers with lower incomes to invest in a heat pump.

The subscription in this trial takes the following form: customers pay an up-front fee for the installation of the heat pump, then a fixed price per kWh of heat delivered and a fixed annual payment to the service provider. The minimum subscription is 10 years. The relevance to HaaS is that customers pay a fixed price for kWh of heat output by the heat pump, not for the kWh of electricity the heat pump consumes. They also pay fixed annual prices to repay for the heat pump, installation, and any maintenance costs. OK, for instance who is currently offering this type of proposition, offer consumers a fixed monthly rate including all these costs.

It is important to note, which is relevant for all case studies and examples, that this trial was not designed to improve the energy efficiency of buildings or to help consumers afford their heating bills. However, energy service providers are responsible for assessing whether homes are suitable for heat pumps before installing them.

The results of the pilot are the following:

- Positive outcome: All four companies become more engaged, more heat pumps have been installed than would have been, without the scheme, the customers are happy with the concept due to the low sign-on fee, and heating bill, but also the convenience of other taking care of maintenance, it is another option besides buying or leasing a HP.

- Unexpected: 885 out of 1900 HP were installed, the reason behind is the longer than anticipated time to develop the business cases and to engage with the customers, this is a new concept, so more effort needed; however, more HP were installed with this scheme, two companies had prior contact with private customers and two had not.

This example is also covered in a previous ClimateXChange report (Fleck et al. 2021).

- **OK**

Company overview

OK a.m.b.a. is a Danish cooperative society. In addition to the parent company, the OK Group includes subsidiaries such as Kamstrup, EnergiData and OK Plus. OK is Denmark's best-selling petrol brand, but delivers energy solutions for electric car charging, insurance, fuel oil, natural gas and heat pumps.

Offering

OK is currently offering a heat pump on subscription, a heat pump leasing, and a loan for heat pump purchase.

Heat pump on subscription	Heat Pump Leasing	Loan for heat pump purchase
<ul style="list-style-type: none"> • OK Local heating is a different option for customers who want all the benefits of the heat pump, but do not want to invest money in a heat pump solution. OK takes care of all the practicalities, from choosing the right heat pump to monitoring operations, but also service, security and warranty. • OK Local Heating is one-time payment of DKK 35,000 (4 100 £). 	<ul style="list-style-type: none"> • Prices for leasing a heat pump start from DKK 1,495 per month (around 178 £) and cover: assembly, installation and balancing of the heat pump to service, spare parts and maintenance throughout the lease period. • The payout is only DKK 25,000 (2 950 £) or DKK 50,000 (5 930 £) – the customer chooses what suits and finances best. • After that, the customer pays a fixed, low lease payment every month. 	<ul style="list-style-type: none"> • The customer can borrow up to DKK 350,000 (41 510 £) and pay off the loan over 12 to 180 months with an energy loan from OK. The loan is for a heat pump, which is purchased through OK. • The customer decides how she/he wants to pay off the loan for your heat pump. It can also choose how large the installments should be within the installment period.

<ul style="list-style-type: none">• Fixed monthly installment for the heat used.	<ul style="list-style-type: none">• 10-year lease term• If the customer sells the house, there is the option of transferring the lease agreement to the new owner(s).	<ul style="list-style-type: none">• The customer can calculate his energy loan for a heat pump on the OK's website with their Resurs Bank's loan calculator.
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Table 19: Summary of heat pumps business models across Europe

Appendix 6 Examples of other products on subscription

Recently, the UK boiler market has seen the introduction of the boiler subscription service. On average subscription plan is liked to last between 5-10 years. The business model for boiler on subscription might be comparable to the heat pump subscription model, therefore here are some examples of boiler subscription service offerings including the pros and cons.

Offerings	Pros	Cons
<ul style="list-style-type: none"> • Hassle Free boilers 	<ul style="list-style-type: none"> ✓ A boiler subscription allows you to rent a boiler in exchange for paying a monthly fee. 	<ul style="list-style-type: none"> ✓ More expensive in the long run.
<ul style="list-style-type: none"> • Boxt 	<ul style="list-style-type: none"> ✓ The cost of a boiler subscription in the UK generally falls in the region of £35 to £50, although it would depend on the provider. 	<ul style="list-style-type: none"> ✓ The customer will never own it, at the end it is just renting a boiler.
<ul style="list-style-type: none"> • British Gas (finance plan only) 	<ul style="list-style-type: none"> ✓ What a boiler subscription includes? Installation, annual boiler service, repairs, fix or replace guarantee, mainly no deposit or interest 	<ul style="list-style-type: none"> ✓ Cancelling the subscription plan will likely incur a charge. ✓ The same applies if the customer is moving to another house (either cancels the subscription or transfers to the new homeowners).

Table 20: Pros and cons of a boiler subscription offering

Appendix 7 LCP Delta Heating Business Service Customer survey

The Heating Business Service of LCP Delta conducted an online customer survey in December 2021 and January 2022 (LCP Delta 2022b).

Here are the details about the survey:

- Survey respondents:
 - ~200 respondents from each of: France, Germany, Italy, United Kingdom, Netherlands
 - Homeowners only
- For each country:
 - 25% of respondents under 40 years old with annual household income under €40k
 - 25% of respondents under 40 years old with annual household income over €40k
 - 25% of respondents over 40 years old with annual household income under €40k
 - 25% of respondents over 40 years old with annual household income over €40k
 - No respondents connected to communal or district heating network
 - No respondents under 18 years old

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