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APRICUM WHITE PAPER

# *Heat Pumps & Europe’s Energy Future*

*Heat pump market trends and implications for heat pump players in Europe.*

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THE CLEANTECH ADVISORY.

# Executive summary.

| | |
|---|---|
| Customer needs | • When choosing energy solutions, customers aim to reduce energy costs and $CO_2$ emissions. Smooth & fast installation process and convenience of operations & maintenance are additional factors that drive customer behavior<br>• To maximize energy cost savings, customers are looking for a full suite of energy solutions, from energy assets to HEMS:<br>  • Full offering of heat pump, solar PV, battery storage and HEMS[1] can reduce annual energy cost by up to 75%<br>  • Heat pump owners are likely to have other low carbon technologies installed<br>• Current heat pump installation customer journey is complex (e.g., government guarantees application, financing, integration with existing energy solutions), fragmented, and contains risks of low heat pump performance due to poor installation quality. This negatively impacts customer willingness to install heat pumps |
| Market players' response | • Market players are building integrated offerings and are improving customer journeys:<br>1. Integrated energy systems are offered by multiple players, including heat pump manufacturers<br>2. While operating via a direct-to-installer model, heat pump manufacturers invest into end-customer and installer experience<br>3. New disruptive heat pump manufacturers with a one-stop-shop offering and direct-to-consumer sales approach emerge<br>4. Advanced business models (e.g., leasing, heat-as-a-service) are being employed<br>5. Players partner with utilities to benefit from special tariffs and get access to end-customers |
| Threats & opportunities | • Heat pump manufacturers, advanced installers and utilities, while having distinct strengths (e.g., strong brand or established relationships with end-customers), need to develop a competitive offering and establish partnerships with other players to protect their market share in the future<br>• Changes in the heat pump market landscape create new investment opportunities for market players and financial investors |
| How Apricum can help | • Apricum can help market players to navigate the changing market landscape in Europe through market assessment, strategy development, partner/target search and M&A support |

Source: Apricum; 1) HEMS – home energy management system

# Agenda.

# Customers are looking for a full suite of energy solutions from energy assets to HEMS.

## Customer needs

| Customer needs | Desired functionality of energy solutions | Respective product and service offering |
| --- | --- | --- |
| 1 Energy costs reduction<br>2 $CO_2$ emissions reduction<br>3 Convenience | **Prosume**<br>Provision of the assets that generate, store, and consume electricity | Solar PV<br>Heat pumps<br>EV charging<br>Repair and service for energy assets<br>Battery energy storage |
| | **Measure & monetize**<br>Granular measurement of electricity generation and consumption | Smart metering |
| | **Control & optimize**<br>Smart control and optimization of DERs[1], ensuring optimal match between demand and supply | Home energy management system (HEMS) |
| | **Aggregate & trade**<br>Participation in the wholesale energy market | Virtual power plant |

1) DERs – distributed energy resources

# Full offering of heat pump, solar PV, BESS and HEMS can reduce annual energy cost by up to 75%.

## Example of average annual energy costs and savings for 2–4 people in Germany

| Products | Single-family house built in 1980 | | Terraced house built in 1990 | | Single-family house built in 2005 | |
|---|---|---|---|---|---|---|
| | €6,400 | | €2,900 | | €2,950 | |
| | €4,521 | 29% | €2,068 | 29% | €2,126 | 28% |
| | €3,139 | 51% | €1,171 | 60% | €1,045 | 65% |
| | €2,870 | 55% | €904 | 69% | €815 | 72% |
| | €2,623[1] | 59% | €826[1] | 72% | €745 | 75% |

*Deep dive on the next slide*

Source: Apricum analysis, RWTH AACHEN University 1. Assumption – same % reduction vs. a heat pump + solar PV + battery system as for single-family house built in 2025

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# % of savings

Gas boiler

Heat pump

PV panel

BESS

HEMS

# Future-proof HEMS can unlock additional revenue streams/cost savings by actively participating in the electricity markets.

## HEMS maturity level

Maturity level

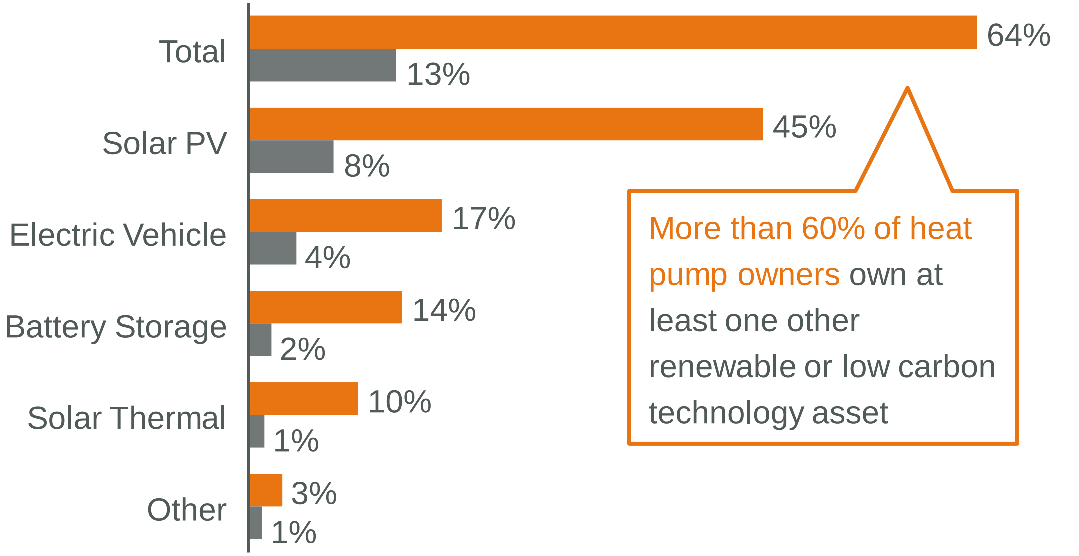
| | Key characteristics | Typical applications |
|---|---|---|
| Single device monitoring | • Basic on/off and adjustment functions<br>• Manual scheduling or control (either locally or remotely)<br>• Primarily targets single appliances or limited coordination between devices | • Real-time monitoring of household energy use through dashboards<br>• Remote operation of lights, sockets and basic heating systems<br>• Use of programmable thermostats for scheduled and zoned heating |
| Self-consumption optimization | • Coordinated use of several energy assets e.g., solar panels, heat pumps and EV chargers<br>• Incorporates external data inputs (e.g., weather forecasts) aligned with user behavior and energy consumption trends | • Connected energy assets that interact to maximize on-site consumption and minimize grid reliance<br>• Smart services that adjust energy usage based on forecasts, dynamic pricing and behavioral patterns |
| Flexibility monetization | • Comprehensive integration of major household energy-consuming devices<br>• Connection to platforms that enable financial returns through energy flexibility or participation in community-based energy schemes | • Monetization of household energy flexibility, e.g., selling excess energy or shifting demand in response to price signals<br>• Participation in community-level virtual power plants (VPPs), contributing to grid stability and decarbonization |

Source: Apricum analysis

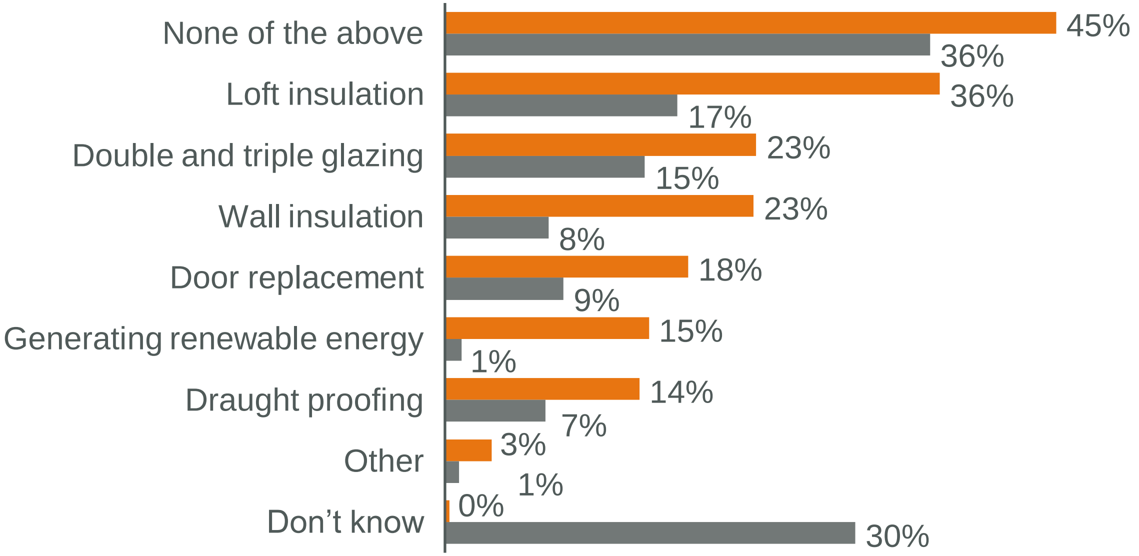
# Heat pump owners are likely to have other low carbon technologies installed, as UK surveys illustrate.

## Customer purchasing behavior in the UK in 2023

Percentage of respondents in the UK that own renewable or low carbon technologies (2023)




Percentage of respondents in the UK that carried out energy efficiency upgrades in parallel with heat pump / gas boiler installation (2023)




The tendency shouldn’t be fundamentally different in continental European countries, as there are no specific incentives for combining low carbon technologies in the UK

Source: Nesta, Apricum

# Customer journey is complex, fragmented, and contains risks of low heat pump performance due to poor planning and installation quality.

Pain points along the end-customer heat pump installation journey

| Energy solution / installer selection | Planning | Financing | Installation | O&M | Energy supply |
|---|---|---|---|---|---|
| Uncertainty about cost savings | | High initial investment | Risk of poor installation quality that impedes future heat pump performance and energy cost savings | Separate warrantees from heat pump manufacturers and installers; low credibility of the local installers' warrantees | Standard electricity tariffs, limited ability to extract value from demand response |
| Complexity of assessing multi-system feasibility | | | Long materials supply and installation process | On-demand repair, no regular service | |
| Difficulty comparing models, brands and efficiency ratings | Complexity of the planning process, e.g., overwhelming technical jargon, conflicting information | Independent and complex government subsidy application process | Limited capabilities of local heating & cooling installers in integration with other energy solutions (e.g., HEMS) | | |
| | Risk of poor planning quality that impedes future heat pump performance and energy cost savings | Independent financing application process (bank loans) | | | |

Source: Apricum analysis

# Agenda.

Customer needs

Market players’ response

Implications and key questions to answer

How Apricum can help

# Historically, end-customers acquired heat pumps via local installers that were purely focused on heating & cooling solutions.

## Traditional player positioning in the value chain

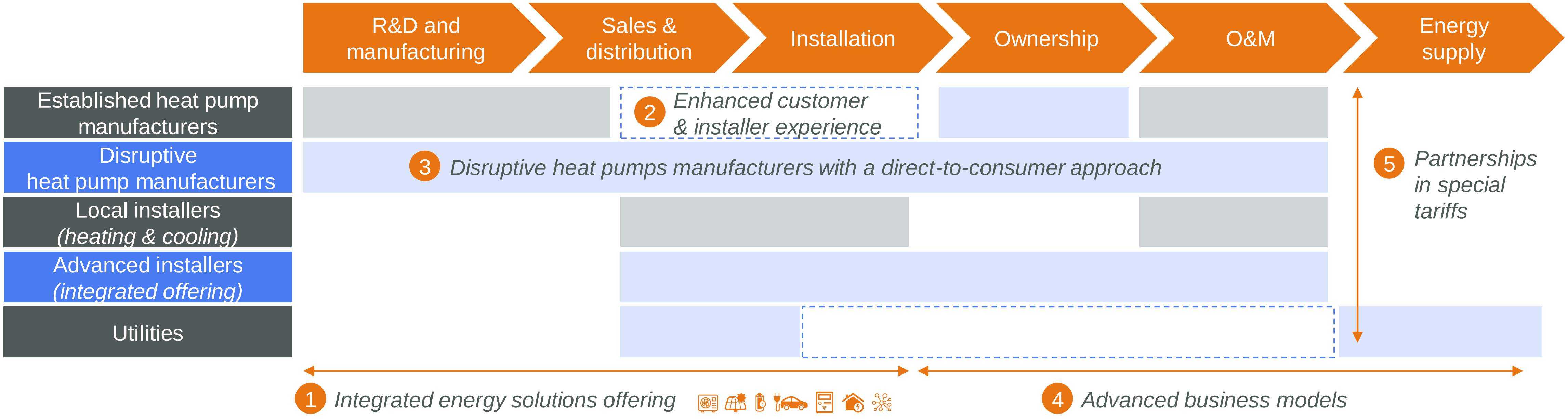
| | R&D and manufacturing | Sales & distribution | Installation | Ownership | O&M | Energy supply |
|---|---|---|---|---|---|---|
| Established heat pump manufacturers | Heating & cooling solutions manufacturing | | | N/A<br>• No leasing<br>• Independent financing providers (e.g., bank loans) | Manufacturing warranty | |
| Local installers | | Heating & cooling solutions installation | | | Installation warranty, on-demand repair | |
| Utilities | | | | | | Standard electricity tariffs applied |

**Direct-to-installer sales approach**

- Depending on geography, heat pump manufacturers sell to wholesalers or directly to installers
- Various incentives and support are offered to installers, including training

# Now players of different archetypes are building integrated energy solutions offerings and enhancing customer journey.

## Emerging player positioning in the value chain




### Commentary (see the following slides)

1. Integrated energy systems are offered by multiple players, including heat pump manufacturers
2. While operating through a direct-to-installer model, heat pump manufacturers invest into end-customer and installer experience
3. New disruptive heat pump manufacturers with a one-stop-shop offering emerge
4. Advanced business models are being employed, e.g., leasing, heating-as-a-service
5. Players partner with utilities to benefit from special tariffs and get access to end-customers

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Market players: Traditional player | New entrant

Value chain positioning: Traditionally active | Recent entrance | Partially active

# 1 Market players across sectors are building integrated energy solutions offerings.

## Player archetypes with integrated energy solutions offerings

| | a Utilities | b Advanced installers | c Established heat pump manufacturers | d Disruptive heat pump manufacturers |
|---|---|---|---|---|
| Examples | e·on, EnBW, octopus energy | thermondo, Enpal., 1KOMMA5° | VIESSMANN Climate Solutions, Vaillant, BOSCH | AIRA, Quatt |
| Product offering | | | | |
| Comments | • Offer integrated energy solutions to their customers while partnering with manufacturers and installers<br>• Offer special tariffs | • Offer and install integrated energy solutions while partnering with manufacturers | • Manufacture and offer integrated energy solutions while partnering with installers | • Cover full value chain and customer journey, direct-to-consumer sales approach<br>• Focus on customer experience and heat pump performance |
| Right to win | + Well-known brand<br>+ End-customer relationships<br>– Brand is not associated with technical expertise | + Installation capabilities<br>+ End-customer relationships<br>– Relatively unknown brand and limited track record | + Strong brand associated with technical expertise and long history<br>– No existing end-customer relationships | + Installation capabilities<br>+ End-customer relationships<br>– Unknown brand |

Source: Apricum analysis, companies' website



Heat pumps · Solar PV · BESS · EV charging · Smart metering · HEMS · VPP · Limited functionality / under development

# 1a Utilities leverage existing customer relationships to offer energy solutions. Octopus energy provides an E2E service.

Product and service offerings of utilities

| Player archetype | Company | Product offering | Service offering | Comments |
|---|---|---|---|---|
| Utilities | e.on | (thermostat) | • Government incentives application support<br>• Flexible payment plans, incl. interest-free<br>• Quality assurance | • Partners with Vaillant and Daikin<br>Vaillant DAIKIN<br>• HEMS and VPP provided to business customers |
| | octopus energy | (thermostat) | • Quotation, system design and installation<br>• Guarantee (8 years)<br>• Annual service<br>• Special tariffs for heat pumps, batteries, solar panels, EV chargers | • In 2022, Octopus Energy acquired Renewable Energy Devices (RED) – a heat pump manufacturer in the UK<br>• In 2025, Octopus Energy acquired Daulto GmbH – a heat pump installer in Germany |
| | ovo energy | (thermostat) | • Preliminary quotation; connection with installers and equipment manufacturers<br>• Special tariffs for heat pumps, batteries, solar panels (Smart Export Guarantee), EV chargers | • Partners with Vaillant, Viessman and Mitsubishi Electric for heat pump supply<br>Vaillant VIESMANN Climate Solutions MITSUBISHI ELECTRIC<br>• Partners with Heat Geek for installation<br>Heat Geek |



Heat pumps Solar PV BESS EV charging Smart metering HEMS VPP Limited functionality / under development

1b

# Advanced installers started with PV installation and are now growing market share in the heat pump installation market.

## Product and service offerings of advanced installers

| Player archetype | Company | Product offering | Service offering | Comments |
|---|---|---|---|---|
| Advanced installers | Enpal | | • Installation<br>• Financing<br>• Support with government incentives<br>• Maintenance contract (yearly) | • Accelerated growth: heat pump sales in Germany grew from 600 in 2023 to 4300 in 2024 (~2% of the market)<br>• Partners with Bosch BOSCH<br>• Aims to build a VPP via a JV with Entrix |
| | 1KOMMA5° | | • Installation<br>• Support with government incentives<br>• Optimization (stand-alone and with other assets | • 4000 heat pumps sold in 2024 (~2 % of the market) – growth from 50 units in January to 700 units in December |
| | thermondo | | • Installation<br>• Financing (term of 15 years, effective interest rate 6%)<br>• Support with government incentives<br>• Maintenance contract | • Over 6000 heat pumps installed<br>• Partners with Buderus (Bosch Group) and LG with for heat pump supply<br>Buderus Bosch Group LG |

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Heat pumps · Solar PV · BESS · EV charging · Smart metering · HEMS · VPP · Limited functionality / under development

1c

# Established heat pump manufacturers are expanding their product and service offering.

Product and service offerings of established heat pump manufacturers

| Player archetype | Company | Product offering | Service offering | Comments |
|---|---|---|---|---|
| Established heat pump manufacturer | Viessmann Climate Solutions | | • Preliminary quotation and installer selection<br>• Government incentives application support<br>• Financing and leasing<br>• Annual service, fixed price repair | • Acquired by Carrier Global Corporation from Viessman Group<br>• Partners with OVO energy on special tariffs |
| | Bosch | | • Preliminary quotation and installer selection<br>• Government incentives application support<br>• Guarantee on the quality of manufacture<br>• Annual service, fixed price repair | • Partners with Enpal (exclusive heat pump supplier)<br>• "Energy manager" software solution enables optimal use of solar power by a heat pump |
| | Vaillant | (thermostat) | • Preliminary quotation and installer selection<br>• Guarantee on the quality of manufacture<br>• Annual service, fixed price repair | • Partners with OVO energy on heat pump supply and special tariffs |
| | Daikin | (thermostat) | • Preliminary quotation and installer selection<br>• Guarantee on the quality of manufacture<br>• Annual service, fixed price repair | |

Heat pumps · Solar PV · BESS · EV charging · Smart metering · HEMS · VPP · Limited functionality / under development

# 1d Disruptive manufacturers are focused on the customer experience and heat pump performance while also expanding product offering.

## Product and service offerings of disruptive heat pump manufacturers

| Player archetype | Company | Product offering | Service offering | Comments |
|---|---|---|---|---|
| Disruptive heat pump manufacturer | AIRA | (thermostat) | • Installation<br>• Support with government incentives<br>• Flexible financing<br>• Extended guarantee (15 years)<br>• Maintenance visit every 2 years (UK) | • Partners with Octopus Energy to obtain green tariffs octopus energy<br>• Partners with Vaillant for heat pumps supply in Germany (in addition to own heat pumps) Vaillant |
| | Quatt | (thermostat) | • Installation | • Heat pumps purchased from a white label manufacturers<br>• Installation by Quatt or by a partner (as a contractor) |
| | QVANTUM | (thermostat) | • Installation<br>• Guarantee<br>• Subscription-based service and maintenance | • flexready® software and hardware – heat pump software and hardware (including thermal battery) are prepared to participate in different flex markets (price management, capacity market, frequency market) |

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Heat pumps · Solar PV · BESS · EV charging · Smart metering · HEMS · VPP · Limited functionality / under development

# 2 While operating through a direct-to-installer model, heat pump manufacturers invest into end-customer and trade partner experience.

## Case study: Viessman Climate Solutions service offering for end-customer and trade partners

VIESMANN Climate Solutions

| R&D and manuf. | Sales & distribution: Customer acquisition | Sales & distribution: System design & contracting | Installation: Planning | Installation: Procurement & logistics | Installation: Installation & commissioning | Ownership | O&M | Energy supply |
|---|---|---|---|---|---|---|---|---|
| | Viessmann Leads, ViContact (Pro): pre-qualified **leads generation**, lead management tool | | | PartnerShop: online **ordering** tool, incl. delivery planner | Adminprofi: **registration** of power-generating systems **with grid/ network operators** | | **Extended warranty** | |
| | ViGuide Planning: a tool for consultation, planning, and **preparation of quotes** | | | | | | Viessman **service contracts** | |
| | PV calculator: automated **quotes preparation** | | | | | | ViGuide: remote **monitoring** | |
| | | | | | | | ServicePlus: daily **remote inspection** | |
| | | | | | | | ViCare: **heating control** app | |
| | | | | | | | ViShare[1]: **smart electricity rate**, energy cost planning | |
| | FörderProfi (Subsidy Pro): overview of customer **subsidy application** | | | | | | Viessmann MobileHeating: **mobile heating systems for rental** (interim) | |

Heating & Electricity: **leasing** contract

Viessmann Academy: face-to-face and online **training**

Viessmann **support**, including personal advice, marketing, recruitment, maintenance and trouble shooting

PartnerPortal: **digital platform**, interface with digital services

Partner **network**

Peccon: **insurance** solutions

Source: 1) In the process of re-branding

XXX Service for trade partners | XXX Service for end-customers | XXX Service for trade partners and end-customers

# 3 Disruptive heat pump manufacturers employ a direct-to-consumer sales approach and address various customer pain points.

Case study: Aira

AIRA

| R&D and manufacturing | Sales & distribution | Installation | Ownership | O&M | Energy supply |
|---|---|---|---|---|---|
| Product offering includes<br>• Aira heat pumps (and Vaillant heat pumps in Germany)<br>• Solar panels<br>• Heat control system (room thermostat, Aira app)<br>• Home insulation | • Heat pump cost calculator<br>• Support with accessing available government incentives<br>• Flexible financing (direct payment or €0 acquisition costs and fixed interest rate) | • Own installation team; training at the Aira Academy<br>• Disposal of old boilers | • N/A | • Extended guarantee (15 years)<br>• Maintenance (every 2 years) | Green electricity tariff in collaboration with Octopus Energy<br>• Aira Clean Energy tariff: a time-of-use tariff, lower rate (49% discount to day rate) for off-peak periods and peak rate (50% above day rate) for the peak period<br>• Aira Solar Export Easy: constant feed-in tariff for solar PV<br>• Aira Solar Export Flow: dynamic feed-in tariff for solar PV with battery storage |

# 4 Advanced business models are being employed by market players.

Overview of advanced business models employed in the heat pump market

| Model type | Description | Example providers |
|---|---|---|
| Heat (output) as a Service | Fixed monthly fee for appliance lease and energy supply; customers charged per heat output | e.on, Viessmann Climate Solutions, thermondo, EWE |
| Heat (outcome) as a Service | Fixed monthly fee for heat pump and central heating boiler | Eneco |
| Asset leasing | Monthly fee for appliance lease with maintenance; ownership options at term-end | engie, Viessmann Climate Solutions, Feenstra |
| One-off sale with an energy supply contract | Heating system is sold as a one-time purchase, while the customer signs a separate ongoing energy supply contract | EDF |

- Heating is shifting from asset ownership to service-based models, with varying degrees of risk-sharing and performance guarantees
- Viessmann and Thermondo lead with hybrid strategies, spanning multiple models

Financial risk · Technical risk · Performance risk · Behavior risk · Energy price risk

# 5 Utilities offer special electricity tariffs, including partnerships with manufacturers and installers.

Examples of special tariffs for heat pumps

| Country | Utility | Partners | Product | Offer |
|---|---|---|---|---|
| UK | OVO energy | Vaillant, Viessmann Climate Solutions, Heat Geek | Heat pumps | • Heat Pump Plus: a type-of-use tariff, lower rate for electricity heat pump uses<br>• Available for heat pumps provided by partners |
| UK | octopus energy | AIRA | Heat pumps, Solar PV, BESS | • Aira Clean Energy tariff: a time-of-use tariff, lower rate (49% discount to day rate) for off-peak periods (4am – 7am, 1pm-4pm, 10pm – 2am) and peak rate (50% above day rate) for the peak period (4pm – 7pm)<br>• Aira Solar Export Easy: constant feed-in tariff for solar PV<br>• Aira Solar Export Flow: dynamic feed-in tariff for solar PV with battery storage |
| Germany | ostrom | Viessmann Climate Solutions | Heat pumps, HEMS | • Green dynamic electricity tariff by Ostrom<br>• Integration of the Viessmann heat pump control system into the Ostrom app from 2025 for a price optimized operation of the heat pump; further options are then conceivable, such as the direct integration of dynamic electricity tariffs into the Viessmann ViCare app |

# Agenda.

Customer needs

Market players’ response

Implications and key questions to answer

How Apricum can help

# Heat pump manufacturers risk losing market share to players with more comprehensive offering and better customer journey.

## Implications for market players (1/4): Heat pump manufacturers

| Risks | Key questions to answer |
|---|---|
| *For established heat pump manufacturers* | |
| • Losing market share to players that establish exclusive partnerships with utilities & advanced installers (heat pump supply, green tariffs) | • Should they establish partnerships and with whom? |
| • Losing market share to heat pump manufacturers that offer integrated energy solutions<br>• Losing market share to heat pump manufacturers that ensure good customer journey and quality of installation for end-customers | • What parts of the offering / customer journey are critical from the customer standpoint?<br>• What parts of the offering are critical to attract skilled installers / ensure their effectiveness? |
| • Missing out on attractive business opportunities to expand the offering, given a competitive advantage / right-to-win | • What energy solutions are attractive as a business opportunity? Is there a right to win?<br>• How to capture the opportunity? |
| *For disruptive heat pump manufacturers* | |
| • Losing market share to established heat pump manufacturers with integrated energy solutions offering and good customer journey delivered via a direct-to-installer approach | • How to differentiate from established heat pump manufacturers with an advanced customer journey and integrated offering? |

# Advanced installers need to position themselves against established heat pump manufacturers and utilities with integrated energy solutions.

## Implications for market players (2/4): Installers

| Risks | Key questions to answer |
|---|---|
| *For advanced installers*<br>• Losing market share to heat pump manufacturers or utilities with integrated energy solutions and advanced partner schemes for installers | • How to position oneself vs. heat pump manufacturers and utilities?<br>• What players to partner with (e.g., utilities, established heat pump manufacturers without integrated energy solutions offering)? |
| *For local installers*<br>• Losing market share to players that partner with larger players (e.g., heat pump manufacturers, utilities, advanced installers) or become advanced installers<br>    • Partners generate additional leads<br>    • Partners reduce share of admin tasks that allows to increase number of installations per installer | • Which players to partner with?<br>• How to develop a full offering of energy solutions and become an advanced installer (from a local installer)? |

# Utilities can leverage customer relationships to generate additional revenue streams from integrated energy solutions.

## Implications for market players (3/4): Utilities

| Risks | Key questions to answer |
|---|---|
| • Missing out on attractive business opportunities by not using their competitive advantage – customer relationships - and by not entering the energy solutions space | • Is offering energy solutions an attractive opportunity as a business opportunity? Is there a right to win?<br>• How to capture the opportunity?<br>• Who to partner with? |
| • Losing market share in the core business to other utilities by not offering energy solutions or green tariffs | • What elements of the offering are critical for existing customers (e.g., green tariffs, integrated energy solutions)?<br>• How to mitigate the risk of losing market share?<br>• Who to partner with? |
| • Achieving suboptimal returns in the energy solutions business due to lack of necessary capabilities | • How to mitigate this risk?<br>• Who to partner with? |

# Changes in the heat pump market landscape create new investment opportunities.

## Implications for market players (4/4): Investors

### Risks

- Missing out on attractive investment opportunities (e.g., advanced installers, disruptive heat pump manufacturers, HEMS & digital solutions along the customer journey)

### Key questions to answer

- What markets are attractive for potential investments?
- What players to invest into?

# Agenda.

Customer needs

Market players' response

Implications and key questions to answer

How Apricum can help

# Apricum can help market players with market assessment, strategy development, partner/target search and M&A support.

## How Apricum can help

| | Utilities | Installers | Heat pump manufacturers | Investors |
|---|---|---|---|---|
| Market analysis and assessment | ✓ | ✓ | ✓ | ✓ |
| Strategy development | ✓ | ✓ | ✓ | |
| Business model design and review | | | ✓ | |
| Partner search | ✓ | ✓ | ✓ | |
| M&A support | ✓ | ✓ | ✓ | ✓ |

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