chapter

2025

Cutting support time from minutes to seconds with AI

A practical guide for OEMs looking to reduce winter service pressure with AI

Introduction

The energy transition is in full swing. More and more households are switching to sustainable heating solutions, with heat pumps leading the way.

Europe's installed base surpassed 21.5 million units by 2023[1], marking a decade of steady growth.

But despite this momentum, the market is under pressure. Sales dropped by ~22% in 2024 compared to the year before[2], and in the first half of 2024 alone, volumes collapsed by nearly 50% year-on-year[3]. This volatility complicates planning and exposes systemic weaknesses in service infrastructure — especially during the winter, when installation faults and customer support requests typically spike.

At the same time, the workforce gap continues to grow. To meet climate goals, the EU will need 750,000 additional trained installers by 2030[4].

In this whitepaper, we explore how artificial intelligence — and specifically generative AI — can be deployed to speed up processes, unlock knowledge, and improve customer satisfaction. We focus on practical, real-world applications within the heat pump sector.

Installer shortfall by 2030

750k

Service capacity gaps, longer wait times

Installed heat pumps

21.5m

Broad deployment heightens support demand

Sales decline (YoY, 2024)

–22%

Volatile uptake complicates planning

Sales drop (H1 2024)

–50%

Exposes systemic strain in winter service

1. European Commission, Clean Energy Technology Observatory, 2023
2. European Heat Pump Association (EHPA), 2024
3. The Washington Post, "Heat pump sales are lagging…", Oct 2024
4. European Commission, Heat Pumps Overview, 2023

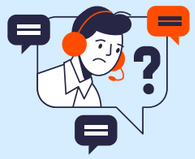
Challenges in the Sector

The demand for heat pumps has exploded. This also means: more technical questions, error codes, installation issues, and compatibility challenges.

During cold seasons, support departments often become overloaded. Customers face long waits, and technicians waste time searching manuals or calling colleagues. The result? Delays, frustration, and higher costs. Compounding the problem is the lack of a central, accessible knowledge base — a gap AI can help address when applied intelligently.

Sector insights

based on research and qualitative interviews with Chapter clients



Support teams experience consistently high workloads

due to growing installation complexity

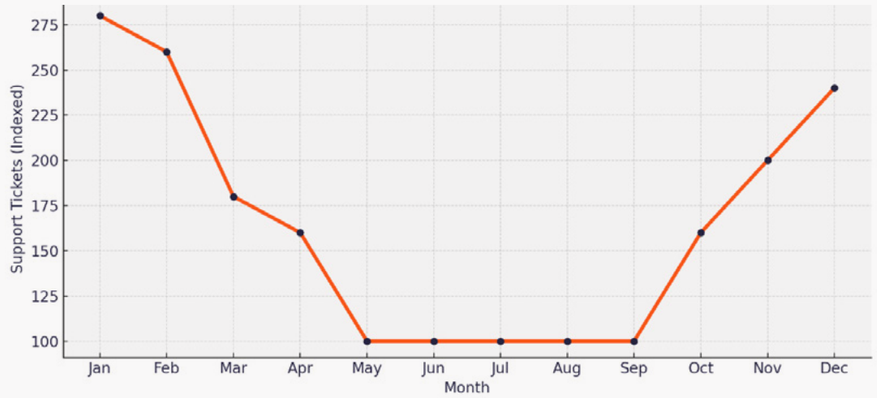
Installers hesitate to install unfamiliar systems

unless sufficient service support is guaranteed

Internal staff lose valuable time

searching fragmented documentation and internal systems

Support tickets per month
in European heat pump sector



Peak electricity demand nearly triples

According to the International Energy Agency (IEA), households that install heat pumps without upgrading insulation can experience nearly a 3× increase in peak winter electricity load[1]. This puts extra pressure on both grid infrastructure and the heat pump itself — often leading to more error codes and system faults.

Faults and failures increase during cold months

While there is no official EU publication confirming a precise 2–3× increase in faults, industry experience and field data consistently show a significant rise in technical issues during cold periods[2]. Heat pumps face heavier stress and reduced efficiency in sub-zero temperatures, resulting in more frequent failures and support needs.

Support ticket volumes surge in winter

Customer support teams across the industry report that winter months bring a ~40% increase in technical support cases[3]. Although this figure is based on internal and anecdotal estimates, the seasonal pattern is widely observed — with teams experiencing their heaviest workloads when heating demand peaks.

3x

Peak winter demand nearly triples cooling/ heating strain

2.5x

Monthly faults/failures jump 2–3× per EU seasonal standards

40%

Technical tickets +40% in winter months across support teams

1. International Energy Agency, The Future of Heat Pumps, 2022
2. Based on seasonal performance trends and interviews with Chapter clients; not directly documented in EU standards
3. Estimate based on qualitative interviews and internal research across Chapter's client base and industry discussions

What is AI and Why Now?

Artificial Intelligence (AI) is the ability of computers to perform tasks that normally require human intelligence. Think of pattern recognition, making predictions, or generating text.

Expert Systems

Rule-based systems simulate human decision-making, used in industries like medicine and engineering

Deep Learning Breakthroughs

Neural networks process unstructured data (images, sound, language), leading to big advances in speech and image recognition

1950s

1980s

2000s

1980s

2022—2025

The birth of AI

Alan Turing proposes the idea of a “thinking machine” and the Turing Test. First AI programs are written

Rise of Machine Learning

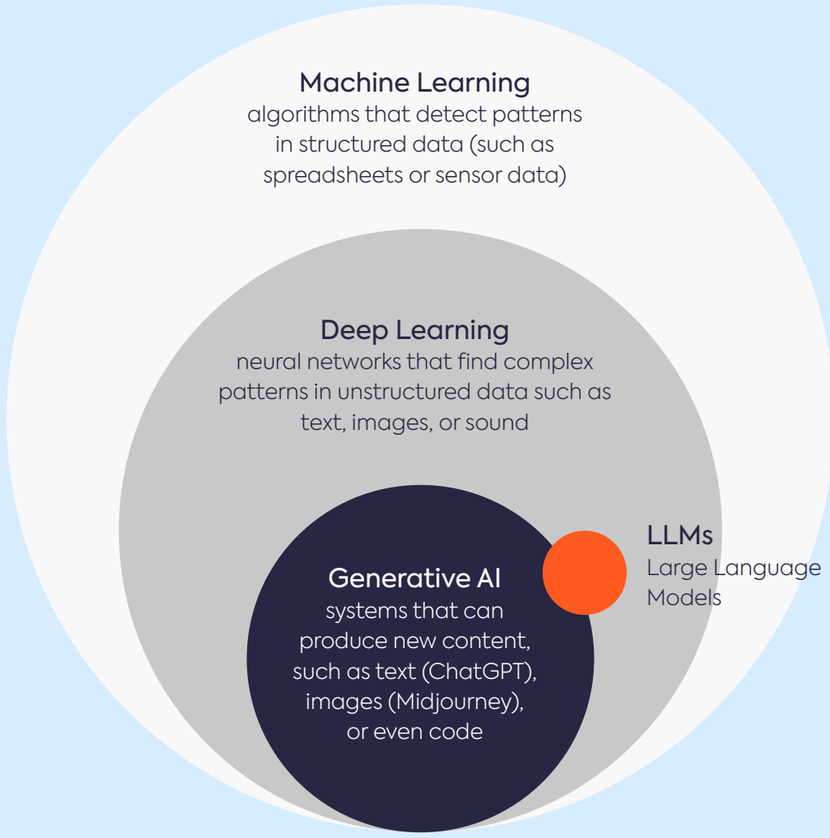
Algorithms start learning from structured data (like logs or spreadsheets), enabling prediction and classification

Generative AI & LLMs

Models like ChatGPT, Claude, and Gemini emerge. They can generate human-like text, code, and images — and integrate into business workflows like support, sales, and diagnostics

Modern AI roughly consists of three layers

What makes AI so powerful now is the recent progress in “large language models” (LLMs). These models can understand and generate human language, enabling a new role in supporting installers, customers, and inside sales teams.



AI in the Energy Sector

AI is no longer futuristic.
In the energy sector, we see applications such as:

Machine learning
for predicting energy prices, optimizing battery life, or planning maintenance

Generative AI enabling
- Automatic extraction of instructions from manuals
- Chatbots assisting with error codes or installation steps
- Automated, consistent customer responses

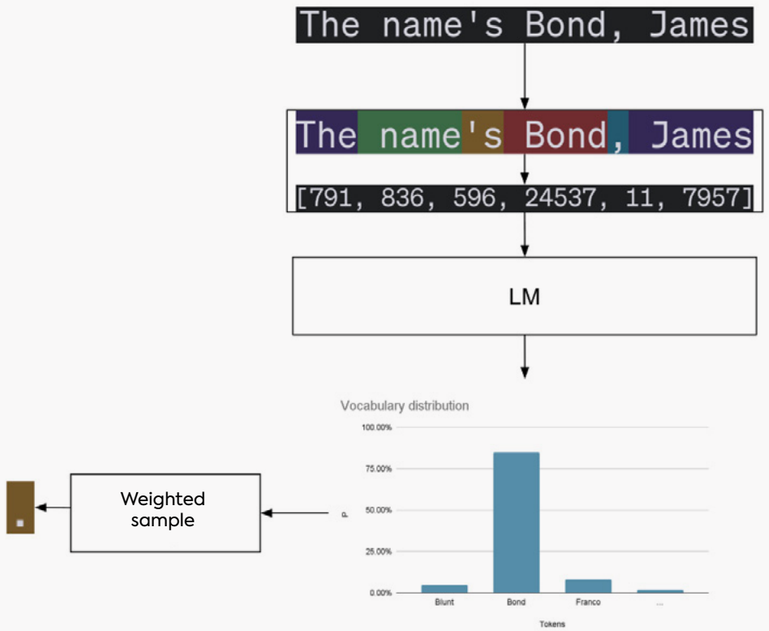
An installer no longer has to search through 160 pages of manuals to understand error code F73. AI instantly provides the correct answer based on technical documentation.

AI Application	Tangible Benefit
Predictive Maintenance Machine learning predicts when a heat pump might fail or need servicing	Fewer breakdowns, lower downtime, better planning
Energy Demand Forecasting ML models predict energy consumption patterns	Improved load balancing, smarter grid use
Instruction Extraction GenAI scans technical manuals and extracts step-by-step guides	Less manual digging, faster installs
AI-Powered Support Chat Chatbots answer installer/customer questions using real documentation	Instant answers, reduced support volume
Error Code Resolution AI understands error codes and suggests fixes	Faster diagnostics, less frustration on-site
Response Automation GenAI drafts consistent, on-brand replies to customer queries	Support teams stay focused on complex issues

How Does an LLM Chatbot Work?

A large language model (LLM) simply predicts the next word in a sentence.

For example: “The name is Bond, James ___”. The model assigns the highest probability to the word “Bond” because it has seen that pattern thousands of times in its training data.



But these models are also trained to follow instructions. Ask: “How do I install an air-to-water heat pump?” and it understands it should generate a step-by-step plan — not just repeat the question. Through human feedback (thumbs up or down), these models continue to improve and become more user-friendly.

Limitations of General AI

Although LLMs are impressive, they have clear limitations:

Hallucinations
the model may generate incorrect answers that sound plausible, because it doesn’t search factual sources

Lack of domain knowledge
generic models know nothing about your company, products, or processes

That’s why it’s essential to connect AI to your own data. Only then can a chatbot reliably answer questions like: “What does error code F73 mean for brand X?” or “Is this model suitable for installation in a third-floor apartment?”

Tailored AI solutions vs Generic tools

	Chapter AI	Generic AI Assistant
Built for the energy sector	Built for energy workflows	General-purpose
Workflow integration	Integrated in existing tools & systems	Chat-only, requires manual copy-paste to trigger actions
Smart content experience	Optimised for technical content	Struggles with non-standard content and file types
Execution power	Performs actual tasks	Answers only — no task execution
Sync & Gap Detection	Always in sync: auto-labels & updates data base, flags & fills missing data	Relies on static snapshots or manual updates

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Chapter AI: Smart AI on Your Own Data

Chapter AI bridges this gap. The platform combines the power of generative AI with your own technical documentation:

- Manuals and product information
- Training videos for installers
- Internal safety guidelines and processes
- Frequently asked questions from customers and support teams
- Subsidy documents by region or country

Real-World Examples

By linking this information intelligently, you get a chatbot that always provides the correct answer — based on your content, securely hosted, and fully under your control.

Installer Question

Error code F73 on Alpha Innotec heat pump?

Outdoor sensor not working. Check wiring, replace if needed.

Source: Manual

AI Response

Support staff Question

Compatible with Niko Smart Home?

No, currently only KNX and Modbus are supported

Source: Compatibility documentation

AI Response

Customer Question

My heat pump hums loudly at night — is that normal?

Defrost cycle is louder in cold weather. Normal unless constant.

Source: FAQ / User manual

AI Response

Colleague Question

What's the subsidy in Flanders for model X500?

€2400 if E-level is below 40.

Source: Subsidy documentation

AI Response

Agentic AI: From Answers to Actions

The next step is “Agentic AI”: systems that not only provide answers, but also perform tasks such as:

Product Identification

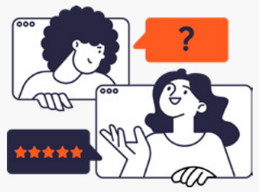
A photo of a serial number reveals maintenance history, parts list, and installation guide

Remote Firmware Updates

AI detects outdated software and pushes updates automatically

System Setting Changes

AI directly shares specific system settings in the chatbot and automatically adjusts settings, if the chatbot user wants to change his settings



Tailored Advice

AI asks about housing situation and preferences, then calculates a personalized energy solution

AI becomes a digital colleague: fast, reliable, and scalable.

Conclusion

The energy transition calls for smarter support for installers, customers, and internal teams. With AI you can:

Save time

Improve customer satisfaction

Reduce errors and waiting times

The technology is available, proven, and ready to use.

What to experience what AI can do for your organization?

Scan the QR code or contact one of our colleagues for a free demo using your own documentation.

• www.chapter.works ▸