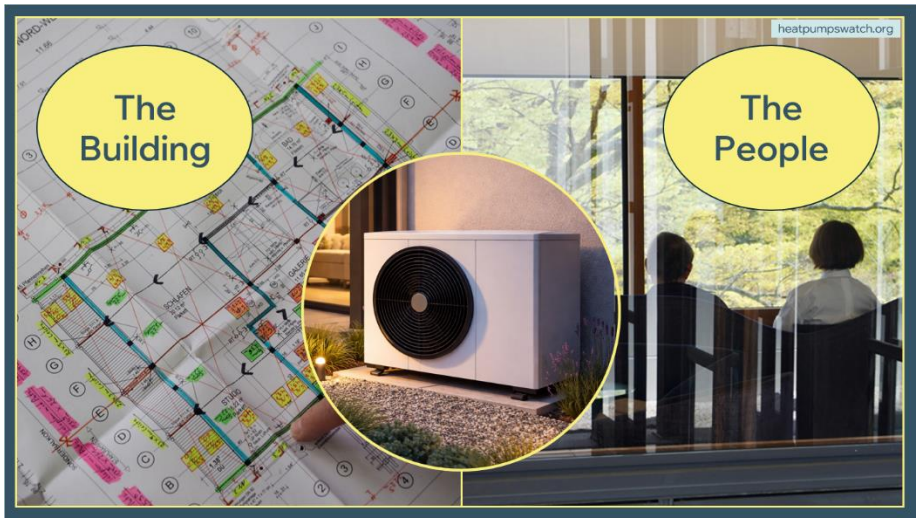
18-PART SERIES
HEAT PUMPS: YOUR BURNING QUESTIONS, ANSWERED NOW

9/18

Thousands of Heat Pump Models on the Market: How to Find the Right One for Me?

Author: Dr.-Ing. Marek Miara, published: 12.01.2026



1

The European heat pump market offers remarkable diversity: over 10,000 certified models are available – the European Heat Pump Keymark database alone lists more than 11,000 models, and in Germany alone, more than 6,200 units qualify for BAFA subsidies. This wealth of choice can feel overwhelming. Yet the selection process becomes manageable when approached systematically, bringing together two perspectives: the technical requirements of the house and the needs of the people who live in it.

The decision regarding the heat pump model is based on two perspectives: the human and the technical.

Two Perspectives, One Decision:

A house – your home – has technical requirements. Its energy needs, construction, and location determine which heat pump can be used. This perspective is objective and can be clarified through measurements and calculations.

As the resident, you bring a second perspective to the table. Your priorities, your budget, your aesthetic preferences, and the question of who you trust are just as important. A highly efficient premium model may be technically optimal, but if it exceeds your budget or your installer has no experience with it, it is not the right solution.

The interplay of these two perspectives makes the decision personal. There is no “one right” heat pump, but rather several suitable solutions. The best one meets both the technical requirements of your house and your personal priorities.

Perspective 1: What the House Requires

Principle Suitability: More Common Than You Might Think

Is my house even suitable for a heat pump? The answer is much more often yes than many people assume. In 2023, 365,000 heat pumps were sold in Germany, 85 percent of them in existing buildings and only 15 percent in new buildings[1].

The idea that heat pumps only work in new buildings is based on outdated experiences from the 1980s. As explained in Episode 4 of our series, monitoring projects show that heat pumps also work successfully in unrenovated houses. Modern devices easily reach flow temperatures of 55°C, many even 70°C or more[2]. Underfloor heating is not necessary.

Field studies from Episode 2 show that the efficiency achieved was higher in some systems with radiators than in houses with underfloor heating. Careful planning, installation, and adjustment are crucial[3].

Often, minor measures are sufficient: in many older houses, radiators are oversized. Replacing individual radiators with modern low-temperature versions can lower the flow temperature. Complete renovation is never necessary—renovation measures are helpful for efficiency, but helpful does not necessarily mean necessary.

Heating Energy Demand: Performance and Supply Temperature

Your building's energy requirements determine two key parameters: the required output and the necessary flow temperature.

The Required Output

The heating load describes how much heat the building needs on cold winter days. A professional heating load calculation in accordance with DIN EN 12831[4] is essential. A 150-square-meter single-family home from the 1960s, partially renovated with new windows and roof insulation, can have a specific heating load of around 60 to 90 watts per square meter. This results in a heating load of around 9 to 13.5 kilowatts. The required heating capacity of the heat pump is typically in the range of around 10 to 13 kilowatts at standard outside temperatures.

The dimensioning follows one principle: as large as necessary, as small as possible. Oversized heat pumps do not operate in the optimal range. Although modern devices are power-controlled and can adjust their output, oversizing is not advantageous here either, as efficiency decreases in the lower output range. Field studies show that heat pumps are usually oversized. Undersized devices are unable to heat the house sufficiently on very cold days.

The Required Supply Temperature

The supply temperature is the second key parameter. A distinction must be made between the maximum temperature on the coldest days and the average temperature over the entire heating period. The average temperature is decisive for annual efficiency and is always significantly lower than the maximum.

New buildings or very well-renovated buildings with underfloor heating can manage with average flow temperatures of 25 to 30 degrees Celsius (maximum 30 to 35 degrees). Existing buildings with modern radiators have average temperatures of 35 to 40 degrees Celsius (maximum 40 to 50 degrees). Partially renovated houses achieve average values of 40 to 45 degrees Celsius (maximum 50 to 55 degrees). Unrenovated old buildings may require average flow temperatures of 45 to 50 degrees Celsius (maximum 55 to 70 degrees)

The lower the average temperature over the heating period, the higher the seasonal performance factor (SPF). A system designed for an average of 30 degrees Celsius typically achieves an SPF of 4.5 or higher. At an average of 45 degrees Celsius, this value is between 3.5 and 4.0.

Important for model comparison: The SCOP (Seasonal Coefficient of Performance) is measured under different standard conditions. The Heat Pump Keymark database specifies both SCOP35 and SCOP55[5]. If your home requires a maximum of 55 degrees Celsius, the SCOP55 value is the relevant comparison figure.

Construction and Property: The Space as a Co-decision Maker

The building and its surrounding define where the heat can come from and the conditions under which the heat pump must operate. The choice of heat source usually depends on local conditions.

3

Why Air Source Heat Pumps Are so Popular

Around 90 percent of all heat pump installations in Germany use air as their heat source[6]. This is due to its practical availability, significant efficiency improvements over the last ten years, and generally lower investment costs. Air-to-water (air source) heat pumps can be installed quickly and flexibly. The investment costs are comparatively moderate, with an annual performance factor of between 3.0 and 4.0 in most cases. The key aspect is noise: is your house detached, or do you live in a terraced house in a densely built-up area? Modern heat pumps have become around 10 to 15 dB(A) quieter over the last 20 years[7]. The range of available models extends from 33 to 78 dB(A). In densely built-up areas, models below 50 dB(A) should be preferred. From 2026, stricter BAFA subsidy criteria will mean that only particularly quiet models will be eligible for subsidies.

Among other things, the heating energy demand, the construction method and the property, and the heat source define the technical framework of the selectable models.

Brine/water heat pumps extract heat from the ground, but require a permit and are often prohibited in water protection areas. The investment is significantly higher than for air-water systems. The advantages: consistently high efficiency (SPF 4.0 to 5.0), very low noise levels, and passive cooling. Water/water heat pumps can achieve the highest efficiencies, but require special conditions such as sufficient groundwater of good quality or access to surface water.

The Structured Way: VDI 4645

The VDI 4645 guideline describes a systematic preliminary planning process: building analysis, site evaluation, system selection, dimensioning, and economic feasibility study. As an end user, you should ensure that your specialist company works in accordance with this standard.

Perspective 2: What Matters for You as the Resident

Often, among the technically feasible framework, several suitable solutions exist. This is where your personal decision begins.

Efficiency and Cost-effectiveness: Which do You Prioritize?

A fundamental decision concerns the relationship between acquisition costs and ongoing operating costs. The efficiency range for heat pumps is considerable. As described in Episode 3 and confirmed by the evaluation of the BAFA list[8], efficiencies vary significantly. For existing buildings with higher flow temperatures, the relevant SCOP typically ranges between 3.0 and 4.5.

Let's take an example house with 150 square meters and a heating energy requirement of 150 kilowatt hours per square meter per year, i.e., a total of 22,500 kilowatt hours. A standard model with SCOP 3.5 requires 6,429 kilowatt hours of electricity per year, which at an electricity price of 23.6 cents per kilowatt hour means annual costs of 1,517 euros. A more efficient model with SCOP 4.0 consumes 5,625 kilowatt hours, costing €1,328. A premium model with SCOP 4.5 requires only 5,000 kilowatt hours, or €1,180 per year.

The analysis shows that the efficiency gains have diminishing returns. The step from SCOP 3.5 to 4.0 saves €189 per year. The further step to SCOP 4.5 brings an additional saving of €148. However, premium models with top ratings often cost €2,000 to €4,000 more.

Your decision depends on your situation. If your budget is tight, a solid model with SCOP 3.3 to 3.7 is sufficient. If you are planning for the long term and have the budget available, investing in higher efficiency may be worthwhile.

Refrigerant: Future-Proofing and Subsidies

Refrigerants are becoming increasingly relevant. Natural refrigerants such as propane (R290) offer ecological advantages and are rewarded with a 5 percent efficiency bonus through federal subsidies[9]. For an investment of €20,000, this amounts to €1,000. More important is future security: From 2028, only heat pumps with natural refrigerants are expected to be eligible for subsidies [9]. Older synthetic refrigerants with high global warming potential will be phased out and should no longer be chosen for new installations[10].

Propane is flammable and requires special precautions during installation. Installers need to be certified, and installation costs may be slightly higher. However, these additional costs are offset by the subsidy bonus. Natural refrigerants are recommended but not mandatory—regardless of the refrigerant used, every heat pump is significantly more environmentally friendly than a gas boiler. The range of R290 models on the market is growing continuously.

Design and Looks

The appearance of a heat pump is often underestimated, but it is relevant for many homeowners. Especially when the unit is visible, design becomes a legitimate

deciding factor. If the heat pump can be placed behind the house or behind a screen, design plays a lesser role.

In recent years, manufacturers have invested heavily in attractive designs. Models are now available in a variety of colors, with different surface materials and in compact shapes. Interestingly, appearance can also influence technical characteristics: larger outdoor units often offer space for larger evaporators, which leads to higher efficiency and, in most cases, lower noise levels. The choice between different designs can therefore also have an indirect technical component.

Neighborhood Installer or National Suppliers, That is the Question of Trust

The choice between a local installer and a national provider influences both the model selection and the support provided. Local installers can offer personal relationships, fast response times, knowledge of local conditions, and long-term on-site support. The model selection is typically limited to two to four manufacturers, which effectively reduces the final selection to five to ten models.

National providers such as Thermondo, Enpal, 1Komma5°, Octopus, and others work with standardized processes and sometimes offer lower prices thanks to economies of scale and digital planning tools. However, the model selection is often limited as well, as standardized processes require a restricted product range. The personal relationship is less pronounced, and service technicians may change.

Both approaches have their merits. The decision depends on your priorities: if you value personal contact and quick availability, local companies are the right solution for you. If you prefer a wider selection and digital processes, national providers are a good choice.

Single Measure or Complete System?

An important strategic question is: Do you only want to replace your heating system, or are you considering more comprehensive electrification? A heat pump as an individual measure makes sense if you already have a PV system, if you deliberately do not want one, or if your budget is primarily earmarked for replacing your heating system.

The complete electrification package includes a heat pump, PV system, optional battery storage, a wallbox for your electric car, and an energy management system that intelligently controls all components. The advantages lie in the optimal coordination of all components and significantly higher PV self-consumption. Studies show that the self-consumption of PV electricity can be increased by 30 to 50 percent with a heat pump[11].

Various national providers specialize in such complete packages and offer standardized solutions with a central contact person for all components. The decision between individual measures and a complete package depends on your energy strategy, the condition and age of your house, and your budget.

Experience and Service

The competence and reliability of your supplier is often more important than minor technical differences between heat pump models. A heat pump is a long-term

investment that should function reliably for 15 to 20 years. The relationship with your installer is therefore crucial.

You can check the experience of the specialist company by asking specific questions: The number of heat pumps installed in the last twelve months should show that heat pumps are an established and regular part of the business and are not just installed occasionally. References in buildings similar to yours are important, as a specialist company that has already installed several heat pumps in comparable situations is familiar with the typical challenges. Training in accordance with VDI 4645 demonstrates professional competence in heat pump planning. Experience with the selected refrigerant, especially R290, is also relevant.

The budget, the aesthetics, and the choice of manufacturer or installation company are subjective decisions.

Quality seals are important indicators: certification as a specialist heat pump company by the German Heat Pump Association, VDI 4645 training, or manufacturer certifications demonstrate professionalism and continuous further training.

Service aspects are just as important as the installation itself: the response time in the event of malfunctions, especially in winter, should be clarified. Maintenance intervals and their costs should be inquired about—typical maintenance costs are between $175 and $360 per year. Warranty services that go beyond the manufacturer's warranty can be a sign of quality. Remote maintenance services make it possible to solve many problems without an on-site appointment. The availability of a 24/7 emergency service is especially important in winter.

The Path to a Decision

The technical parameters initially narrow down the options: heat source, required output, flow temperature, noise levels. Personal preferences further refine the selection: priority given to efficiency, refrigerant, choice of supplier, individual measures or complete package.

Typically, this results in three to five specific offers, all of which are technically suitable. The final choice is based on cost-effectiveness, trust in the supplier, and personal impression. This decision should be made pragmatically: several solutions are good—you choose the one that best suits your overall situation.

Conclusion

There are two perspectives to consider when choosing a heat pump: the house defines the technical requirements, and you contribute your personal priorities. The key insight is that there is no such thing as “the one right” heat pump, but rather several suitable solutions. The best one is technically suited to your house, meets your priorities, and is maintained by a competent specialist company.

Put your trust in structured planning in accordance with VDI 4645, in the experience of good specialist companies, and in the fact that the technology is mature. With a well-founded, pragmatic approach, you will make a very good decision.

Further Resources

The VDI 4645 guideline defines professional standards for specialist companies. The BAFA heat generator portal offers an online database with filter functions. The BWP sound calculator enables you to calculate expected sound levels. Use the

energy consultant search to find qualified experts for heating load calculation. Further articles in this series: Part 2: 20 Years of Field Studies; Part 3: From Niche to Norm; Part 4: Heat Pumps Fact-Check

[1] Heatpumpswatch.org (2025). The Heat Pumps Fact-Check. https://heatpumpswatch.org/de/warmepumpen-im-faktencheck
[2] Bani Issa, A. A., et al. (2025). Residential heat pump systems with propane refrigerant. Applied Thermal Engineering, 266, 125560.
[3] Heatpumpswatch.org (2025). 20 Years of Heat Pumps Field Studies Prove: Heat Pumps Efficient in Existing Buildings. 20 Years of Heat Pumps Field Studies – HEAT PUMPS WATCH
[4] DIN EN 12831-1:2017-09, Energetische Bewertung von Gebäuden – Verfahren zur Berechnung der Norm-Heizlast – Teil 1: Raumheizlast, Modul M3-3. Berlin: Beuth Verlag.
[5] European Heat Pump Association (EHPA). Heat Pump Keymark Database. https://keymark.eu/en/products/heatpumps/certified-products
[6] Bundesverband Wärmepumpe (BWP). (2024). Market data and statistics.
[7] Heatpumpswatch.org (2025). From Niche to Norm. From Niche to Norm – HEAT PUMPS WATCH
[8] Bundesamt für Wirtschaft und Ausfuhrkontrolle (BAFA). (2025). List of heat pumps suitable for subsidies.
[9] BAFA. (2023). Richtlinie BEG EM.
[10] European Union. Regulation (EU) No 517/2014 of the European Parliament and the Council of 16 April 2014 on fluorinated gases. Replaced by Regulation (EU) 2024/573
[11] Weniger, J., et al. (2017). Integration von Photovoltaik und Wärmepumpen. 32. Symposium Photovoltaische Solarenergie.