

FACTSHEET

Heat Pumps (HPs) are among the best technologies readily available for heating decarbonisation, with rising popularity in the European market in recent years. Despite this, the transition to HP solutions has been slow due to the lack of incentives and information. In some EU countries, there is also a negative (and baseless) narrative around the switch from fossil boilers to HP, seeding doubts to potential consumers about the comfort that HP technology can bring to their lives.

This report aims to address these claims by providing a “snapshot” of current HP users’ perception of comfort, running costs and overall experience: we surveyed 670 households in 22 countries (20 EU member states plus Norway and UK) and complemented these results with 40 in-depth interviews¹. On average, we surveyed 10 to 20 households per country, with the exception of Belgium, where participation has been higher. Results were then checked with figures from the existing academic literature. Across the board, the majority of respondents are satisfied with their switch to HP, both in terms of economics and comfort.

AT A GLANCE

The following are the main conclusions from the online survey and interviews:

1

HPs can deliver the same if not more comfort than gas/oil boilers, except in a small number of exceptions, with suspected causes being primarily poorly insulated houses or badly adapted heating systems.

2

Switching to a HP is likely to result in lower or approximately similar annual costs for heating in most regions, including in cold climates. Savings are made often when users switch from electric heating, oil heating and in many cases in comparison to gas heating too. Costs in comparison to biomass will depend on local biomass prices which vary considerably. What’s notable is that the surveys were done before the current gas price peak in winter 2021-2022, which means that the relative economic benefits of HPs have increased in most countries. Even among households that reported higher bills, satisfaction scores remained high due to improved comfort conditions.

3

Interviews showed that combining the HP with solar thermal and photovoltaics results in lower costs and many users show a high level of satisfaction with the combination. This is, in particular, the case in countries with net metering, such as Poland and Hungary.

KEY FINDINGS

The most outstanding result is that comfort improved for the vast majority of respondents after the switch to HP. As an average of all 22 countries, 81% of respondents perceived an increase in comfort, and only less than 1% experienced reduced comfort.

Across the board, there is a large satisfaction in all the studied countries, with five countries where all respondents answered that they were either very happy or somewhat happy with their heat pumps. An average of all 22 countries show that 88% of users were satisfied and 8% neutral. In six countries, each has only one respondent that was not satisfied or had some concerns, while in five countries, this was the case for two or more respondents with the highest fraction being in Italy with 17% of respondents.

Regarding changes in heating costs, 64% of respondents found that the switch to heat pump has been economical. In nine countries no one reported higher costs while in twelve countries only one or two families reported higher costs. The only exception is in Belgium where 14% of respondents experienced higher payments. However, this does not come unexpected, as Belgium is known to be one of the least favourable markets for HP due to the big gap in the energy taxation between gas and electricity.

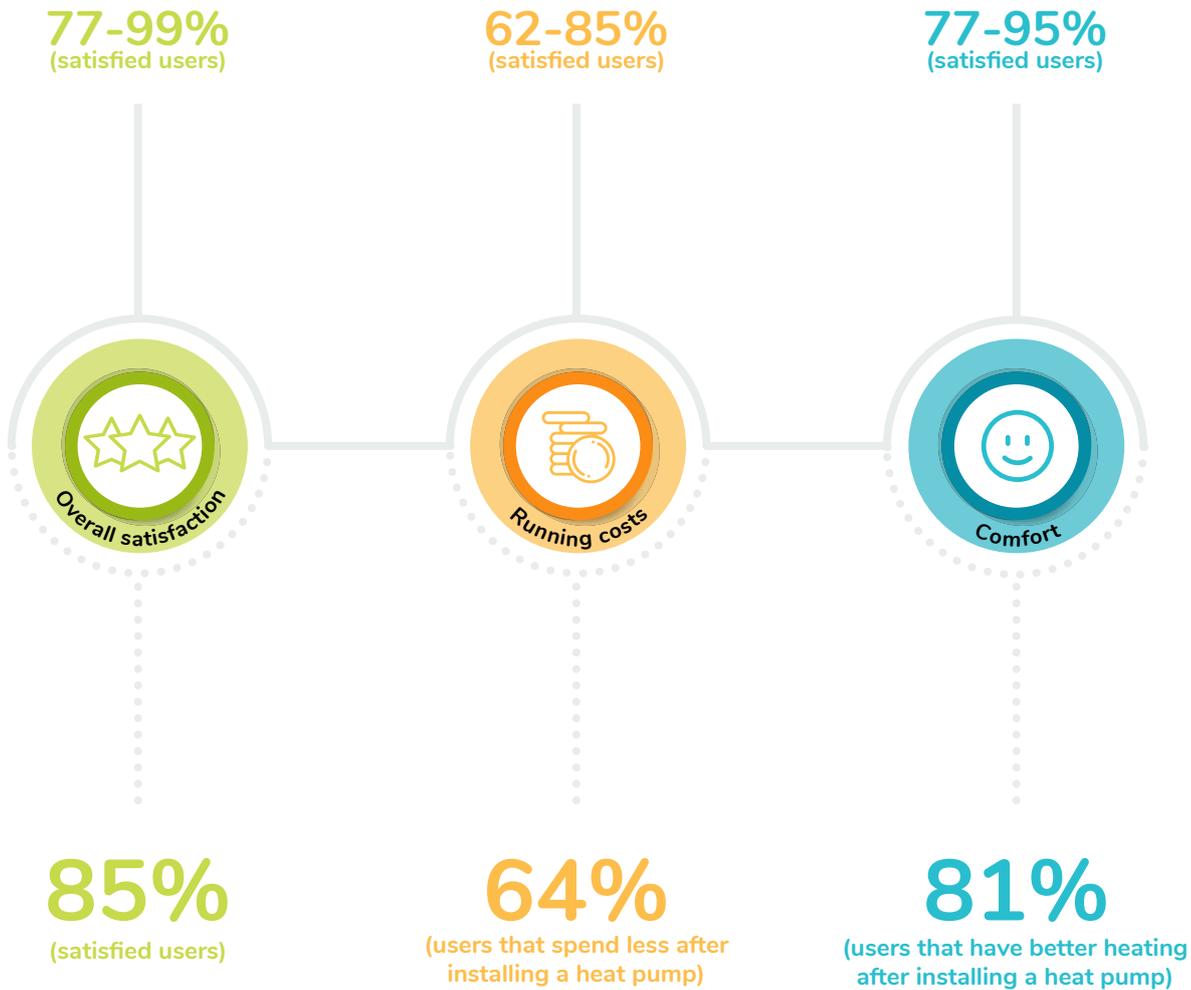
We identified gas and oil boilers as the most common sources of heating among participants before their switch to HP) in 11 countries, which were the countries where gas is popular heating, while for the other 11 countries (Bulgaria, Croatia, Denmark, Estonia, Norway, Latvia, Poland, Romania, Slovenia, Spain, Sweden), there was a mix of previous heating sources, including electric heating, coal, biomass, and a bit of district heating.

The solutions adopted by respondents to the survey were mainly hydronic systems: air-water and ground-water HP. Only six countries have a majority preference for air-air HP, an option traditionally more popular for warmer climates. This includes naturally Malta, Spain, and France, but developments in technologies have also shown air-air HP as a popular choice and effective in colder climates such as Norway, Estonia, and Poland.

The change to HP heating was motivated by a mix of economic, environmental concerns, and expectations of improvements of comfort. In Germany, Ireland, the Netherlands, and the UK, environmental concerns were the main reasons for more than half of the respondents, with lower heating costs and high comfort as secondary benefits. For the majority of the Maltese respondents and a small number of others, the reduction of hassle (i.e. getting rid of the oil or biomass supply) was the main motivator.

While the results showed an overall satisfaction with HPs, the qualitative interviews also revealed some outstanding issues, such as unexpected noise disturbance, adaptability to the controls of the system, and lack of technical support (see national interviews in the full study). Overall, the results of the online survey are compatible with the literature as the level of user satisfaction, comfort and heating costs are within the ranges observed in the literature. Possible causes for (the few) discrepancies are noted in *the full study*.

CASE STUDIES, LITERATURE



SURVEYS (AVERAGE OF RESULTS OF THE 22 COUNTRIES)

It is worth remarking that while some of the literature studies considered only one or few countries in their scope, the results are still largely comparable with the ones of the present survey, thus reinforcing one another.

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POLICY RECOMMENDATIONS

Basing on the environmental, economic, and comfort benefits of switching to HP, the evidence of which is presented in the current study, we propose the following recommendations for promoting the adoption of HPs:

- » Provide information on subsidies, tax credits and soft loans to people interested in installing HP technologies and combined solar technology; several interviewees report that they could not find information about possibilities available at the time of change.
- » Provide information on special electricity tariffs for using the HP (when available); several interviewees with special HP tariffs did not know that this possibility was available in their country.
- » Ensure that users receive proper instructions on the operation of the system (e.g. constantly on vs. turning it on when heat is needed; most efficient operation) as these types of information are not always clear to users and result in the (few) unsatisfied users, even in countries where there are general cost savings.
- » Improve the availability of qualified service to users.
- » Combat misleading information: some users are disappointed because of unrealistic expectations of running costs and the level of comfort. These unfulfilled expectations directly impact overall satisfaction.

USER RECOMMENDATIONS

We make the following economic recommendations to people interested in adopting HPs, based on the experience of interviewees:

- » Improving the insulation is highly recommended in the case of old buildings before installing a HP
- » Careful evaluation of the building identifying potential costs with additional piping and wiring.
- » Careful evaluation of the building design identifying the best location for installing the HP's indoor unit and outdoor unit to reduce noise disturbance.



You can read the
entire report here.

Family in eastern Estonia



The family of two adults, two children and two dogs live in an apartment of 46m² near Tartu, eastern Estonia (continental climate, elevation 57 m). Before the change to an air-to-water HP, the heating was reliant on biomass (wood) and electric heating. The family decided to change to improve comfort, and because of the ease of installation and the little space required from HP. with the lower running costs, the family is satisfied across the board – *“Very comfortable, low cost and silent”*.

Family S. Hoyne in Birr, Ireland



The family of two adults and four children live in Birr, central Ireland (mild winter, elevation 75 m). The house is a detached building (bungalow) of 165m² in a rural setting. As part of a major renovation under the Superhomes programme in 2015, the family replaced their oil-fired central heating with HP for environmental protection. They also renovated the building for better airtightness and ventilation, which costed approximately 20,000€ with subsidies/tax credits of approximately 6,000€. The family is very satisfied with running costs. To economise further, they use night rate tariff to operate the HP; *“The tariff at night is approximately 11c/kWh versus 20c/kWh during the day, therefore, the HP is set to run primarily at night”*.

Family in Gozo, Malta



The family of two adults and two children lives in a terraced building of 280m² in Kerċem, Gozo (Mediterranean climate). Before the switch to HPs, the family used electric water heaters and forwent space heating. Now, they use an air-to-water HP for the water and air-to-air HPs for space heating and cooling, the latter function is highly demanded because of the hot Maltese summers. In comparison, the HP is noisier than the electric heater which practically did not make any sound. On the other hand, the air-to-air systems is completely silent, and brought great comfort to a home that was previously not heated.

Family in central Bulgaria



The family of four adults and one big dog lives in an old house of 150m² at the foot of the Balkan Mountains (cold winters, elevation 800m). Before changing to an air source HP they used to heat the house using a wood pellet system, which, according to the owner, causes heavy air pollution in the area – *“In the wintertime, it is unbelievable that you can't breathe from all the wood and coal, and other unknown substances that are burned...It is one big disaster.”* With the switch to HP, the family can easily heat up the entire home and a water tank of 260L for 12kW capacity, even in colder temperatures (-10C). *“Regarding comfort, there are two types of comfort. The first type for me comes from the psychological fact that I am no longer polluting the environment. The second type of comfort for me is the fact that you only need to push one button or use the Wi-Fi kit to start or stop the HP. This is unbelievably comfortable. You don't need to take care of going somewhere to buy pellets or another type of solid fuel source and cleaning the dirt from the boiler”.* The running costs have also dropped by 30-40% compared to the previous system and they believe the savings will be more after better insulation, and installation of solar thermal panels.

Family S. Tachelet in Antwerp, Belgium



The family of two adults and three small children lives in a three-floor house of 200m² in Antwerp (cool winters). The air-to-water HP was installed in 2019 together with solar PV panels, replacing natural gas heating for environmental concerns. They received some subsidy for the change as part of a pilot scheme, using renewable electricity from Eco-power. The system has worked out great, and even allowed for floor heating. The family is very satisfied with the comfort in comparison to the previous system, and also they are also happy with the cooling possibility on the top floor.



1. The meta analysis of previous literature used 22 case studies from the sampled countries, the full bibliography of which is available in the full report. The survey was an online questionnaire that was translated into 22 languages, available on the website: https://www.inforse.org/europe/heatpump_survey.htm. Responses were collected between September and December 2021. Heat pump users filled out the online form themselves and their answers are anonymous. Contacts to the heat pump users and interviews were made through INFORSE Secretariat and its members with the help of national partners including Heat Pump Associations, Utilities, NGOs, renewable energy communities and experts.

The authors would like to thank EHPA for the help in disseminating the survey.