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Position on the EU Action Plan for the acceleration of heat pumps

EPEE, as the voice of the Refrigeration, Air Conditioning and Heat Pump industry in Europe, welcomes the new Action Plan for the acceleration of heat pumps and the renewed ambition of the Commission, but would like to highlight that a few concerns need to be addressed in parallel to this Action Plan.

First of all, a careful assessment of all the ongoing EU files related to heat pumps (F-gas Regulation Revision, PFAS Restriction dossier, REPowerEU, Ecodesign, Taxonomy, among others) needs to be conducted by the Commission to ensure consistency. A comprehensive view is needed to ensure that the legislative framework is sufficiently supportive for the roll-out of heat pumps, as many ongoing policy files are interlinked, restricting refrigerant choice will limit technology choices, and there are regulatory barriers to alternative refrigerants. Fast-paced legislative changes will have negative impacts on the R&D of the sector.

Then, the right incentive is necessary to encourage consumers to make well informed choices and ensure the phase out of fossil fuel boilers. This is especially the case for households and other private building owners, where the upfront cost could be reduced thanks to financial support schemes at national or local levels, but also where the electricity to gas cost ratio will also determine the affordability and operating costs of heat pumps. A more favourable electricity price across Member States will contribute to the roll-out of heat pumps. However the upfront investment should also be balanced with more information on the long-term cost comparison with gas boilers.

However, accelerating the installation of heat pumps in renovated, existing and new buildings requires proper training of the workforce from the beginning of their careers, engaging new installers to join the sector. Beyond residential and commercial buildings, the variety of applications available to heat pumps should be acknowledged. They can serve as large-scale solutions in the industrial sector, district heating and cooling networks, and in coordination with solar and geothermal energy.

POLICY RECOMMENDATIONS

- 1. Ensure legislative consistency and an appropriate framework at EU and national level**
- 2. Address the electricity to gas cost ratio to increase the affordability of heat pumps**
- 3. Coordinate with national associations and manufacturers to provide good training standards, including for reskilling the existing workforce, and ensure that consumers and other private building owners make well-informed choices**

1. Ensure legislative consistency and an appropriate framework at EU and national level

Heat pumps represent an efficient energy solution, and a large-scale deployment can significantly support decarbonisation targets at EU level. Indeed, heat pumps currently available on the market are already 3 to 5 times more energy efficient than gas boilers¹. They are also a more efficient solution than hydrogen boilers, especially when considering their use in residential and commercial buildings, where hydrogen raises technical and safety issues². **Heat pumps are a mature technology that can be deployed today.**

In order to reach the objective of 60 million heat pumps installed by 2030³, the right EU framework needs to be implemented, but Member States also need to address any regulatory barrier at their own levels. The Action Plan needs to be carefully considered in light of the potential upcoming prohibitions concerning the use of F-gases and PFAS. EPEE is especially concerned that due to potential restrictions on refrigerant choices, heat pump production could fall short of European targets because not all heat pump solutions can be provided without F-gases.

The diversity of EU buildings and systems (including District Heating and Cooling networks) requires a diversity of heat pump solutions, with both non-fluorinated and fluorinated refrigerants.

The F-Gas Regulation revision and the future possible REACH-PFAS restriction will limit the refrigerant choice pushing the market to uptake alternative refrigerants with higher flammability ratings, that is both the so called ‘natural refrigerants’ – e.g., hydrocarbons like propane – and some low Global Warming Potential (GWP) fluorinated refrigerants. Due to their A3 (propane, hydrocarbons) and A2L flammability ratings, those refrigerants already face regulatory barriers to their use in several Member states; in particular, a survey conducted for the Commission in 2016 assessed that “national legislation that may create barriers” was found in Austria, Belgium, France, Germany, Spain, Italy and Sweden.⁴ Those countries represent a large part of the European building stock. In the context of the EU’s decarbonisation of heating and cooling objective, those national barriers, when considered with the impacts of the F-Gas Regulation revision and the PFAS restriction, mean that end-users limited by the national

¹ See IEA, *The Future of Heat Pumps*, page 11: <https://www.iea.org/reports/the-future-of-heat-pumps>

² See for instance: ECOS and coolproducts, *Burning question: why hydrogen boilers are not the answer* (2023); <https://ecostandard.org/wp-content/uploads/2023/04/ECOS-COOLPRODUCTS-REPORT-Why-hydrogen-boilers-are-not-the-answer.pdf>

³ As estimated by EHPA and based REPowerEU and other relevant legislation.

⁴ Gluckman Consulting, Ricardo-AEA (2016), *Topic A Briefing Paper: Barriers related to standards and legislation*, see: https://climate.ec.europa.eu/system/files/2016-11/ta_paper_en.pdf

barriers will have no choice but to continue using fossil-fuel-based or to adopt hydrogen-based heating systems (note that even green hydrogen is six times less efficient than a heat pump⁵). Addressing those legislative barriers and their root causes is therefore vital to achieving the EU's climate and environmental objectives.

The 2016 report identified that key EU standards currently applied to the RACHP sector are overly restrictive on charge size limits (the amount of refrigerant used) for what is needed to guarantee a safe use of the equipment in the context of the implementation of the 2014 F-Gas Regulation. While the Commission identified standardisation deficiencies and determined actions to address them⁶, progress to deliver the actions has been partial; and this is even more detrimental to the cause of heat pumps given that the ongoing F-Gas Regulation revision and PFAS restrictions will lead to the further uptake of A3 and A2L refrigerants. As such, in the first instance EPEE recommends that the Commission update the 2016 report on “barriers posed by codes, standards and legislation to using climate-friendly technologies”, and most significantly adopts a detailed list of Actions in the Heat Pump Action Plan to address national barriers. The key action will be to ensure that the relevant standards be revised/updated in a timely manner.

A holistic approach is needed to ensure that the legislative framework is sufficiently supportive for the roll-out of heat pumps.

On the other hand, key legislation related to the decarbonisation of buildings is yet to be properly implemented in Member States. The Energy Efficiency Directive and the Renewable Energy Directive, recently revised, require a quick implementation at national level as they are both going in the right direction. The adoption of the Energy Performance of Buildings Directive, in Trilogues until at least October 2023, must be accelerated to begin the phase out of fossil fuels boilers in new buildings.

Furthermore, if the decarbonisation of the European building stock is truly lifted by the European initiatives, it should be supported within the framework of the Ecodesign directive of 2009 as well. The current proposal of the revision of the implementing regulation on space heaters (ENER Lot 1) proposes an efficiency requirement of 115% from September 2029 -- which is impossible to reach for stand-alone fossil fuel boilers. This requirement, if entered into force, represents the cornerstone of the deployment of heat pumps: they can easily achieve

⁵ David Cebon (Hydrogen science coalition), *Hydrogen for heating? A comparison with heat pumps*, April 15, 2022, available: <https://h2sciencecoalition.com/blog/hydrogen-for-heating-a-comparison-with-heat-pumps-part-1/>

⁶ COM(2016) 749 final, *REPORT FROM THE COMMISSION on barriers posed by codes, standards and legislation to using climate-friendly technologies in the refrigeration, air conditioning, heat pumps and foam sectors*: <https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A52016DC0749>

the 115% tier, whether alone or combined with existing boilers, increasing the efficiency in buildings.

In that regard, EPEE recommends for the tier to be adopted towards Member States, jointly with the European Heat Pump Association, the European Coalition on Standards and the European Environmental Bureau. The industry and NGOs are calling for consistent support to the heat pump market⁷.

Decarbonisation ambitions in proposals have to be matched with proper implementation. A harmonised approach at EU level is also necessary to avoid further fragmentation of the internal market.

2. Address the electricity to gas cost ratio to increase the affordability of heat pumps

Price is also a remaining issue for consumers, especially low-income households. **The ratio between electricity per kWh and gas is still a challenge** and determines the competitiveness of heat pump operating costs. Based on the Seasonal Performance Factor (SPF) of heat pumps, it is estimated that for a heat pump to remain cost-effective, the price of electricity has to not exceed three times the price of gas and oil⁸. The vast majority of Member States exceeded this ratio in 2021. The price of buying a fossil fuel boiler should also reflect its externalities (CO₂ emissions, pollution, *etc*), on which Member States can have an influence due to the VAT. This will enable heat pumps to be even more affordable, and thus facilitate its roll-out. It will make heat pumps compete with conventional technologies. **Energy prices should therefore be fair, transparent, and harmonized.**

There are currently heat pump solutions available and ready to be installed for most buildings. While some buildings can require renovation to ensure that the equipment is efficient, 41% of all EU dwellings now heated by gas boilers are properly insulated and heat pumps can function at high efficiency in these buildings⁹. Hence, the priority for funding is not in the R&D, but in the actual roll-out of heat pump solutions and in raising awareness on their range of applications: District Heating and Cooling networks, recovery of waste heat from industrial processes, *etc*.

⁷ See our recent joint statement here: https://epeeglobal.org/wp-content/uploads/2023/07/Ecodesign-Joint-Statement_120723-1.pdf

⁸ Toleikyte, A., Roca Reina, J.C., Volt, J., Carlsson, J., Lyons, L., Gasparella, A., Koolen, D., De Felice, M., Tarvydas, D., Czako, V., Koukoufikis, G., Kuokkanen, A. and Letout, S., [The Heat Pump Wave: Opportunities and Challenges](#), Publications Office of the European Union, Luxembourg, 2023, page 7.

⁹ *Ibid.*

In addition, this roll-out could have consequences on the electricity grid that should be properly and timely tackled. The large stock of heat pumps expected by 2030 will be composed of around 52.4 million devices, of which 11 millions in new dwellings, 11.4 millions from the existing stock of 2022, and 30 millions to replace existing gas and oil boilers. Considering that "There are approximately 68 million gas and 18 million oil boilers in residential buildings in the EU," those 30 million heat pumps will replace around 35% of existing gas and oil boilers.¹⁰

Although the current capacity of the power system would allow an additional heat pump capacity of 11 TWh, which would cover 32% of space heating in buildings, this situation could change with an increasing uptake of renewables. Therefore "MS should ensure the security of supply, possibly by implementing additional capacity reliability mechanisms, if not already in place."¹¹

More broadly, access to finance is at risk for investments in the heat pump sector. The Taxonomy's Delegated Act on Technical Screening Criteria (TSC) for Climate Change Mitigation is the most appropriate instrument to address F-gases in this framework, and already indicates a Global Warming Potential threshold at 675. However, the recent Delegated Act on the environmental objective for 'The Transition to a Circular Economy' includes a provision also applicable to heat pumps with a criteria that they "do not contain fluor[inated]gases". EPEE has been informed by DG ENER that fulfilling one objective is sufficient for an activity to be Taxonomy-aligned. However, this contradiction raises issues on the overall interpretation of the Taxonomy, including on the reporting obligations under Article 8 on reporting of non-financial entities. Article 8 is implemented by the Disclosures Delegated Act¹², Annex I, of which requires such entities to also disclose information on Taxonomy-eligibility and contribution to multiple environmental objectives.

Thus, it appears that the contradiction between the TSC remains of concern for the classification of heat pumps as sustainable under the Taxonomy, and could complicate investments in the technology.

¹⁰ Toleikyte, A., Roca Reina, J.C., Volt, J., Carlsson, J., Lyons, L., Gasparella, A., Koolen, D., De Felice, M., Tarvydas, D., Czako, V., Koukoufakis, G., Kuokkanen, A. and Letout, S., [The Heat Pump Wave: Opportunities and Challenges](#), Publications Office of the European Union, Luxembourg, 2023.

¹¹ Georg Thomaßen, Konstantinos Kavvadias, Juan Pablo Jiménez Navarro, The decarbonisation of the EU heating sector through electrification: A parametric analysis, ELSEVIER, 18 October 2020, <https://doi.org/10.1016/j.enpol.2020.111929>

¹² COMMISSION DELEGATED REGULATION (EU) 2021/2178: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2021.443.01.0009.01.ENG&toc=OJ:L:2021:443:TOC

3. **Coordinate with national associations and manufacturers to provide good training standards, including for reskilling the existing workforce, and ensure that consumers make well-informed choices.**

Tackling the knowledge and skills gap

An accelerated roll-out of heat pumps requires an accelerated installation in buildings. However, there is a **current lack of trained installers** and a knowledge gap between the characteristics of fossil fuel boilers and heat pumps that leads to a reluctance in offering the latter to consumers. This existing workforce is also aging. Underrepresented groups (such as young people and women) should be incentivized to consider those career options.

Heat pumps represent a low intrusive opportunity for many households. Anyhow to avoid bad surprises in the shape of high operational cost (OPEX) and ensure they perform in line with expectations (delivering the expected emissions savings) and according to Seasonal Coefficient Of Performance (SCOP) requirements as per Ecodesign rules, **correct installation is a must**.

The performance of a heat pump depends on the energy provided by the heat source and the electricity used to create the temperature lift between the heat source and the heat sink. The electricity consumption increases with the temperature lift. Therefore, the supply temperature of the hydronic system needs to be minimized for an optimal coefficient of performance.

For renovation purposes, the existing heat emitters and hydronic circuit are often kept. If the hydronic systems of the buildings are not optimized when installing the heat pumps, this leads to a far lower coefficient of performance than nominal, and therefore higher electricity use and operational costs.

Furthermore, even a modulating heat pump that is not properly installed will work with more frequent on-off cycles at part load conditions, meaning lower durability and higher peak demand in electricity. If millions of heat pumps will be installed, such poor installation will heavily **impact the grid with unpredictable peaks and over-dimensioned power supply**, ultimately further increasing cost for end-users as utilities will recover the cost for building up capacity.

Education of installers and designers and appropriate campaigns for end users should then address the above perspective with attention to:

- Consider and include all aspects when choosing the heat pump type and sizing the heat pump, including the building itself, heat emitters, potential auxiliary heat sources, hydronic circuits.

- In case of hydronic heat pumps, **optimize the building's hydronic system** for heat pump operation to ensure that consumers benefit from the full potential of a “boiler to heat pump” replacement. This includes for example thermostatic radiator valves with optimized setting for heat pumps and dynamic hydronic balancing which enables much lower operating temperatures.

EPEE recommends improving gender representation in the workforce by ensuring access to STEM (Science, Technology, Engineering and Mathematics) education.

Training standards are already available in several countries (e.g. the Netherlands, Germany¹³ or France), prepared and shared by national heat pump associations and local manufacturers, but those best practices must be shared more widely as well. Regular sessions are necessary to ensure that installers can properly install a heat pump within a building's system, especially if it is not as repetitive as installing a boiler. Skills are also evolving. New challenges in terms of technologies and overall energy systems require new competences to be acquired: smart integration or use of non-fluorinated refrigerants. Furthermore, training programmes starting from school must include those skills and knowledge from the start, and match with the decarbonisation objectives of all Member States. Indeed, it is estimated that replacing 30 million oil and gas boilers would lead to a reduction of 59 Mt of CO₂ emissions¹⁴.

More coordination between local actors, national associations, manufacturers, and local governments would help to first assess the quantitative need for additional installers and for the reskilling of established installers. Then, based on existing successful standards, the Commission must adapt them at EU level as **harmonised Guidelines on training standards** to then be implemented in all Member States.

When preparing and implementing those standards, it is necessary to be reminded that most of the companies across Europe providing heat pump installation (and generally heating and cooling systems) are SMEs (small- and medium-sized enterprises). This means that introducing or updating those standards needs to be accompanied by supportive financial measures, when necessary, to ensure that workers receive the time and resources to follow the necessary training.

¹³ Guidelines on the design and installation of heat pumps are available ([VDI 4645](#) and VDI 4645-part 1) and used in [trainings conducted](#) by the German national heat pump association GWP. Those trainings are already used by many German manufacturers.

¹⁴ Toleikyte, A., Roca Reina, J.C., Volt, J., Carlsson, J., Lyons, L., Gasparella, A., Koolen, D., De Felice, M., Tarvydas, D., Czako, V., Koukoufikis, G., Kuokkanen, A. and Letout, S., [The Heat Pump Wave: Opportunities and Challenges](#), Publications Office of the European Union, Luxembourg, 2023, p. 5.

Ensuring that consumers make well-informed choices

For households and commercial buildings, the choice to replace a boiler is generally informed by the installers themselves and driven mainly by the upfront cost, especially for vulnerable households.

Access to information can be facilitated by both the installer and/or architect, and awareness campaigns at local level should be targeted at households and citizens. On that note, information on the affordability and the efficiency of heat pumps should be more spread, as now, for instance, most of the installers will offer to replace a fossil-fuel space heater with another fossil-fuel space heater – but less often with a renewable solution such as heat pump. Despite that fact, electric heat pumps are the most affordable for consumers looking to decarbonise their homes, as compared to hybrid hydrogen/electric heat pumps and hydrogen boilers.¹⁵

ABOUT EPEE

EPEE represents the Refrigeration, Air-Conditioning, and Heat Pump industry in Europe. Founded in the year 2000, EPEE's membership is composed of over 50 member companies as well as national and international associations from three continents (Europe, North America, Asia). With manufacturing sites and research and development facilities across the EU, which innovate for the global market, EPEE member companies realize a turnover of over 30 billion Euros, employ more than 200,000 people in Europe and also create indirect employment through a vast network of small and medium-sized enterprises such as contractors who install, service and maintain equipment. Please see our website (<https://www.epeeglobal.org/>) for further information.

¹⁰ See a study conducted by BEUC, *GOODBYE GAS: why your next boiler should be a heat pump* (2023), on 4 member states: https://www.beuc.eu/sites/default/files/publications/beuc-x-2021-112_goodbye_gas_why_your_next_boiler_should_be_a_heat_pump.pdf