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APPLiA Position on the F-Gas Regulation Proposal

APPLiA, the EU trade Association representing manufacturers of home appliances, including, ventilating and air conditioning and heat pump equipment, would like to share with the European policy-makers its stance and views on the new proposal for a Regulation on F-Gases revising (EU) No 517/2014 published on 5 April 2022.

SUMMARY

Unrealistic phase-down path: home appliances manufacturers are committed to provide solutions that can mitigate climate change and reduce carbon emissions. However, the efforts in the area of heating and cooling technology for buildings are at risk by the too drastic phase-down mechanism, being *per se* a *phase-out*. Therefore, we are calling on the policy-makers to at the very least not make the current phase-down under Regulation (EU) No 517/2014 more stringent until the REPowerEU objectives are achieved (2030).

- **Contradiction with the REPowerEU's objectives:** APPLiA is perturbed to face contradictory plans between the F-Gas Regulation Proposal that would require bans of heat pumps for buildings, and the REPowerEU objectives urging the massive deployment of such technology.
- **Propane is not a one-size-fits-all solution suitable for all applications:** the new phase-down proposal is based on unrealistic assumptions of widespread use of propane for hydronic heat pumps and air-to-air heat pumps below 12 kW from 2024, as there is today only a very limited number of this product using alternatives to F-Gas, such as R290 propane.
- **Safety as first principle:** the use of R290 poses risks and constraints in terms of safety, governed by standard IEC 60335-2-40 which does not address other safety aspects of equipment during the transport, maintenance or end-of-life phases of the products.
- **Unworkable and incoherent assumptions used for determining the new phase-down schedule:** the new phase-down is based on questionable assumptions and leads to an unrealistically strict scenario leaving the market with no possibility to meet consumers' demand for renewables and highly efficient cooling and heating technology.

New unrealistic bans impeding path towards innovation: there is a fundamental contradiction between promoting new technologies such as heat pumps for buildings and at the same time having the same products and equipment banned listed in Annex IV, points 17 and 18(b).

- **Heat pump based technologies to heat and cool buildings are essential:** heat pumps are needed to decarbonize heating and cooling while achieving energy independence vis-à-vis Russian fossil fuel.

Export of pre-charged equipment issue unsolved: the exclusion of pre-charged equipment needs to be removed from article 16(2)(c) as it heavily affects the competitiveness of our European industries.



Unrealistic phase-down path

Since it first entered the scene in 2006, the home appliance industry has been supportive of the aims fostered by the F-Gas Regulation and has actively invested in new technologies and innovations (i.e. products, factories and test laboratories), as an integral part of its broader emission reduction efforts. In this sense, the sector continues to move towards highly energy efficient and affordable products using heat pump technology and at the same time move away from high Global Warming Potential (GWP) refrigerants. Home appliances manufacturers are committed to provide solutions that can mitigate climate change and reduce carbon emissions, which requires investments, research and development, business planning and redesign steps, etc. However, the efforts in the area of heating and cooling technology for buildings are at risk by the too drastic phase-down mechanism, being *per se* a *phase-out*, and the product restrictions of the Proposal.

APPLiA believes that the current phase-down under Regulation (EU) No 517/2014 should not be made more stringent until at least 2030, to ensure high expected demand, due to climate objectives, decarbonisation and REPowerEU objectives, can be met for heat pumps for buildings in the most efficient manner, and ensure the room for innovation. Already today, the European Union (EU) is well on track to meet its international commitment under the Montreal Protocol Kigali amendment.

The new proposed HFC phase-down would drastically reduce the availability of critical refrigerants for heat pumps to heat and cool buildings and would undermine manufacturers' efforts in further innovating their production processes and investments. The new rapid phase-down proposed to start in 2024 with such strict quotas' reductions is not taking into account the recent political and economic realities. The timeline proposed by the Commission is too short from a point of view of development time, adaptation of production processes, market readiness and availability of viable alternatives of refrigerants for certain products. The Proposal is unrealistic and a potential threat for the manufacturing process of heat pumps for buildings. Also, the proposal will lead to stranded investments for manufacturers that have invested hundreds of billions euros for ramping up production capacity to meet the anticipated market demand and political objectives.

➤ **Contradictions with the REPowerEU's objectives**

The proposed phase-down coupled with the Annex IV of the F-Gas Regulation Proposal, which lists products and equipment prohibited from being placed on the market as referred to in Article 11(1), in particular point 17 and 18(b) covering heat pump equipment, are unrealistic in terms of timeline and in contradiction with other relevant EU targets such as the Green Deal and more recently, the REPowerEU Plan in light of the need to increase rapidly heat pump uptake for heating/cooling and water heating.

Indeed, the current geopolitical situation has pushed the EU to reconsider the resilience of its energy system and hence has led to the publication of the REPowerEU Plan to phase-out Europe's dependency on Russian fossil energy imports as soon as possible. This plan provides that the EU should "*aim at doubling the current deployment rate of individual heat pumps, resulting in cumulative 10 million units*



over the next 5 years”¹. At the same time, the F-Gas Regulation Proposal would require the phase-out of heat pump equipment using F-Gases for unreachable timelines, i.e. 2025 and 2027.

APPLiA is perturbed to face contradictory plans between the F-Gas Regulation Proposal that would impose bans on heat pumps for heating and cooling buildings, and the REPowerEU objectives urging the massive deployment of such technology.

We consider that the phase-down of the current F-Gas Regulation (EU) No 517/2014 is not in line with the REPowerEU objectives. It was established at a time when no one imagined that the EU would consider such massive and accelerated recourse to the deployment of heat pumps for buildings. By consequence, in view of manufacturers’ actual concerns on existing quotas, we are calling on the policy-makers to, at the very least, not make the current phase-down more stringent until the REPowerEU objectives are achieved (2030).

➤ **Propane is not a one-size-fits-all solution suitable for all applications**

In general, APPLiA welcomes a certain number of progresses in the better control of fluids such as the extension of the scope of the Regulation to all alternative fluorinated fluids in terms of leak checking, recovery, training and certification.

However, the new phase-down proposal by the Commission is based on assumptions of widespread use of propane for hydronic heat pumps and air-to-air heat pumps below 12kW from 2024². This proposal is unrealistic as there is today only a very limited number of air-to-air heat pumps below 12kW using alternatives to F-Gas, such as propane (R290). Therefore, we consider that switching the entire hydronic heat pump market to propane refrigerants will require at least 15 years to see the light of day. However, even in that case, the Commission’s proposal will remain unworkable for air-to-air heat pumps, but also very challenging for heat pump water heaters, in particular those hermetically sealed (monobloc units) that are installed in the house (unlike monobloc heating heat pumps which may be installed both inside and outside).

➤ **Safety as first principle**

Furthermore, we would like to highlight that propane (R290) is a highly flammable gas (classified A3), as specified in the standard ISO 817 (table 5)³. Its use poses risks and constraints in terms of safety, which is governed by standard IEC 60335-2-40 (recently revised in May 2022), but which is not yet harmonised at European level. Even the current harmonised standard EN 60335-2-40 (Ed. 4.2) does not yet allow for the safe use of all products/applications that are foreseen by the Commission in its proposal. It only deals with the use phase of the product but does not address the question of the

¹ European Commission, REPowerEU Plan, p. 6.

² Öko-Institut, Ricardo and Öko-Recherche, Table 113: AnaFgas sector sheet for the proportionate action scenario: Room AC - Single Split in *Support contract for an Evaluation and Impact Assessment for amending Regulation (EU) No 517/2014 on fluorinated greenhouse gases, CLIMA.A2/ETU/2019/0016, Impact Assessment Final Report - ANNEXES*, 14 March 2022, p. 140.

³ [ISO 817:2014, Refrigerants - Designation and safety classification](#) or ANSI/ASHRAE, 2013, Standard 34: Designation and Safety Classification of Refrigerants.



safety of equipment during the transport, maintenance or end-of-life phases of products (recovery notably). Accidents have been observed in recent years (fires related to incorrect maintenance and transport of appliances containing R290 in particular in Belgium and Germany), which demonstrates the need to train the entire sector in the use of this specific gas (more than 60,000 installers in France, 1.5 million in Europe, not including end-of-life equipment recovery and treatment companies).

> *Unworkable and incoherent assumptions used for determining the new phase-down schedule*

APPLiA strongly questions the assumptions used for the proportionate scenario that led to the new phase-down schedule proposal. Taking as an example the scenario elaborated for split air-conditioners and heat pumps below 12kW, the study and modeling both fail to show how the sector would reasonably and technically transition to propane at more than 96% by 2024. Indeed, the modeling developed by the consultant hired by the Commission assumes that all split air-conditioners and heat pumps would transition within 3 years (between year 2022 and 2024) to flammable refrigerants, regardless of installations' needs, supply chain transition, new components development, let alone safety considerations.

For instance, multi-splits represented in 2015 17% of the total EU units sales⁴ and have been growing since then, which would most likely bring this share to 20% for the range 0-12kW nowadays (e.g. in France the multi-split shares went from 22% of the market in 2015 to 33% in 2021⁵). Multi-splits are assumed to be able to transition to flammable refrigerants while it is well known that with the current safety standards, those equipment could not reasonably be constructed with such flammable refrigerants. Therefore, we question how it can be assumed that 96% of the market would be able to transition to propane while already almost 20% of the market would not be able to do so in reality?

Same could be said for larger reversible air-conditioners. In 2020, the Commission itself released a report leading to the conclusion that F-Gases were needed for certain single-splits and multi-splits. While today, not even two years after that release, the modeling totally disregards this conclusion, which constitutes another 15% of the sales on the market.

Last but not least, it is assumed that the sector can transition within 3 years from F-Gas to a new refrigerant, where currently only a very limited number of units are available on the market with alternatives to F-Gases. In that regard, we would like to recall that the transition to R32 in those units took 10 years between the first units on the market and today.

For those reasons, **we strongly challenge the assumptions used to build up the new phase-down**, which leads to an unrealistically strict scenario that will leave the market with no possibility to meet consumers' demand for renewables and highly efficient cooling and heating technology.

⁴ Lot 10 ErP study Task 2 on markets

⁵ UNICLIMA, Bilan 2021 et perspective 2022 des industries thermiques, aérauliques et frigorifiques, 2022. Online source [here](#).



As a general conclusion, **we are calling on the policy-makers to at the very least not make the current phase-down of Regulation (EU) No 517/2014 more stringent until the REPowerEU objectives are achieved (2030).**

New unrealistic bans impeding the path towards innovation

APPLiA would like to first highlight that the products restrictions proposed in the F-Gas Regulation Proposal under points 17 and 18(b) of Annex IV related to heat pumps for buildings, are not feasible to ensure heat pumps remain as an energy efficient and affordable solution to heat and cool buildings. This risks jeopardising the recently published REPowerEU Plan as already emphasised, asking to drastically increase the heat pump uptake in the coming years. There is a fundamental contradiction between promoting new technologies such as heat pumps for buildings and at the same time having the same products and equipment banned through the proposed revised F-Gas Regulation.

As heat pump equipment are generically included in both of the proposed restrictions of point 17 and 18(b) of Annex IV, we would like to emphasise that heat pump based technologies' deployment in heating and cooling buildings is necessary and will play a central role to mitigate GHG emissions in the EU, to achieve the EU climate targets, as well as for the decarbonisation of buildings under the Green Deal. **For this reason, APPLiA suggests avoiding introducing additional bans on heat pumps.**

Finally, we would like to highlight that definitions are missing in the Proposal for terms such as: (i) self-contained refrigeration equipment; (ii) heat pump equipment; (iii) air-conditioning equipment; (iv) plug-in room and other self-contained air-conditioning and heat pump equipment, that are accentuating the unrealistic character of this Regulation Proposal.

Furthermore, APPLiA is highly concerned about the reference to 'parts thereof' in Art. 11. Applying the placing on the market prohibitions to 'parts' of products and equipment would mean that repair and upgrade of existing equipment would no longer be possible.

> Heat pump based technologies to heat and cool buildings are essential

APPLiA is concerned that the restrictions proposed by the Commission will have the effect of slowing down the deployment of heat pumps for buildings, at a time when the EU has set itself ambitious targets to decarbonise buildings in Europe through its REPowerEU initiative (30 million hydronic heat pumps to be deployed by 2030, including 10 million in the next 5 years).

We regret that the Commission has preferred to set requirements that are too restrictive for heat pumps to heat and cool buildings: by wanting to drastically tackle HFCs, the Commission is proposing measures that will heavily affect the deployment of heat pumps.



Today, HFCs used in all sectors represent 2.5% of CO₂ equivalent emissions worldwide, whereas the building sector alone accounts for 36% of CO₂ emissions in Europe through its energy use for cooling and heating.

A simple Total Equivalent Warming Impact (TEWI) analysis shows that an air to water heat pump emits on average over its entire lifespan four times less CO₂ compared to a gas condensing boiler to heat a building, or six times less than an oil boiler. As identified by REPowerEU, there is therefore an urgent need to decarbonise heating and cooling while achieving energy independence vis-à-vis Russian fossil fuel. Heat pumps are the primary solution to ensure the transition away from fossil fuels in buildings provided that there are no legislative and regulatory obstacles to its deployment.

The Commission's Proposal, if adopted, would also not only significantly impact hydronic heat pumps, but also the further deployment of the air-to-air heat pumps which have an important role to play in the decarbonisation of heating and cooling buildings. Indeed, based on ecodesign requirements, air-to-air heat pumps are the top-category on energy efficiency.

We would like to reiterate what we explained at the stakeholder workshop of May 2021:

- To reach the (new) EU climate targets, new and more advanced technology will need to be deployed, such as affordable heat pumps for buildings, on a large scale. Heat pumps will need to play a central role to reach the new EU climate targets by 2030, and later by 2050.
- Further, 80% of total EU greenhouse gases emissions (GHG) today are related to energy production and energy consumption. The heating and cooling sector represents almost 50% out of the total and final energy consumption. Lastly, 80% out of these 50% is allocated to fossils fuels being used for heating purposes⁶. Therefore, it is important to emphasise that deployment of heat pump based technologies for heating and cooling buildings is necessary and will play a central role to mitigate GHG emissions in the EU, to achieve the EU climate targets, as well as for the decarbonisation of buildings under the Green Deal, and the decarbonisation of the energy-infrastructures (e.g. demand side flexibility) as put forward in the Energy System Integration strategy.
- 99% fixed split air-conditioners placed on the EU market are reversible and can be used to both heat and cool buildings, thus being air-to-air heat pumps. Once again, this technology should be promoted in reaching the climate targets and ambitions of the Green Deal.

In addition, **we welcome the proposed Article 11(2)** stating that *"The prohibition set out in paragraph 1 [...] shall not apply to equipment for which it has been established in ecodesign requirements adopted under Directive 2009/125/EC that due to higher energy efficiency during its operation, its lifecycle CO₂ equivalent emissions would be lower than those of equivalent equipment which meets relevant ecodesign requirements"*. In this context heat pumps to heat buildings need to be compared to other methods that perform the same final function, i.e. heat buildings.

⁶ Eurostat: SHARES summary results 2019, A renovation wave for Europe 2020, EU Strategy for heating and cooling, 2016. Online source [here](#).



For those reasons, **we strongly challenge the products' restrictions under point 17 and 18(b) of Annex IV in the F-Gas Regulation Proposal**. The bans are unclear, unverifiable for market surveillance and unrealistic in terms of timing and capacities. The modeling fails to demonstrate that all units (all indoor unit types, all capacities, all piping lengths) are available on the market today from a safety and energy efficiency point of view. Indeed, it is known that high efficiencies require higher charges, leading to important safety considerations as thoroughly exposed in our Annex pp. 8-12.

Export of Pre-charged equipment issue unsolved

As a final important remark, APPLiA would like to stress on a major issue in terms of competitiveness for our European industries.

Article 16(2)(c) foresees an exemption from the reduction of the quantity of hydrofluorocarbons (HFCs) placed on the market when it is "*supplied directly by a producer or an important to undertakings, for export out of the Union, not contained in products or equipment, where those hydrofluorocarbons are not subsequently made available to any other party within the Union, prior to export*". While this can safeguard the global competitiveness of EU F-Gas producers, it is not the case for EU producers of equipment containing F-Gases. The exclusion of pre-charged equipment needs to be removed from this article. We consider the proposal (not applying also to exported pre-charged equipment) to contradict the principle of proportionality and to be discriminatory.

It has to be further highlighted that this requested exclusion will not prevent the EU from meeting its commitment to the Montreal Protocol and Kigali amendments. The quantity of exported gas in pre-charged equipment should be handled by the country/region that receives the equipment, which is the logic that the EU applies itself when pre-charged equipment is instead imported to the EU.

APPLiA and its members would like to thank policy-makers for their consideration and further feedback regarding our contribution, as well as on the recommendations we have throughout this paper.

We remain at your disposal to discuss the points we have raised above. Please do not hesitate to contact us via email: naomi.marc@applia-europe.eu



Annex

APPLiA's key messages on splits air-conditioning systems under 12kW

Please find APPLiA's key messages particularly with regards to splits air-conditioning systems under 12kW, extract from our Position Paper from 24 May 2021⁷ shared with the competent authorities.

- As there are no studies available identifying all the related and existing models of split systems, indoor unit types, and piping lengths that are necessary for the EU market, R290 should not be identified as a viable refrigerant for all new fixed air-conditioners with a cooling capacity below 12kW systems at this stage. A thorough assessment including cooling and heating, of all different types of indoor units (such option could actually *de facto* ban certain indoor units from the EU market – floor mounted types for instance), piping lengths, future Minimum Energy Performance Standards (MEPS) levels, and additional potential energy improvements (the consideration should not only be made in relation to the MEPS as consumers are encouraged to go for higher energy labels than the MEPS), would be necessary to conclude if, and for which applications, refrigerants with a GWP<150 could be a viable alternative.
 - The definitions, the very few modeling information given, and interim results so far presented do not allow industry to properly assess the modeling data inputs, assessments, and determined paths. We have no information on how a 'split unit' has been considered for the purpose of the modeling. **We also fail to see the link and the cross-checks with ongoing energy policies such as the Ecodesign Lot 10 review study.**
 - According to the Lot 10 review study¹ of Regulation 206/2012 and 626/2011 on air-conditioners and comfort fans, respectively, the Consultant determined two representatives' units for the EU market: a 3,5kW unit and a 7,1kW unit.

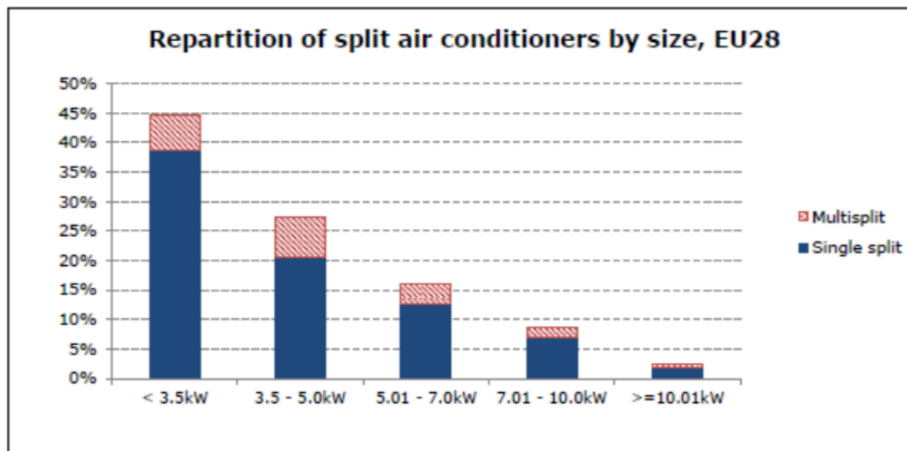


Figure 7: Split sales distribution by size, source BSRIA.

⁷ APPLiA, Evaluation and impact assessment for amending Regulation (EU) No 517/2014 on f-gases: APPLiA comments and questions, 24 May 2021.



RTOC⁸ Report places the average size for split units at 3.8kW, and the smallest unit at 2.0kW. While another recent study puts the average capacity of installed room air conditioners in Europe between 4-5kW⁹.

- It is equally important to recall that splits A2A equipment are in their vast majority reversible. The Lot 10 estimated that a split AC functions 350 hours at cooling full load, and 1400 hours in heating mode. We would appreciate to understand which projections have been used in the model as presented by the Consultant back in May 2021. Indeed, we fear that the Consultant has approached the split sector as a 'cooling only' sector, fully setting aside the importance of A2A heat pumps in EU's decarbonisation process.
- **Efficiency and reversibility of the system need to be considered while modelling** the feasibility of shifting to refrigerants with more restricted charge sizes. As seen in the Figure herein below, a higher charge is required to achieve higher efficiency, synonym with lower lifecycle emissions to satisfy the increasing requirements from the Ecodesign legislation.

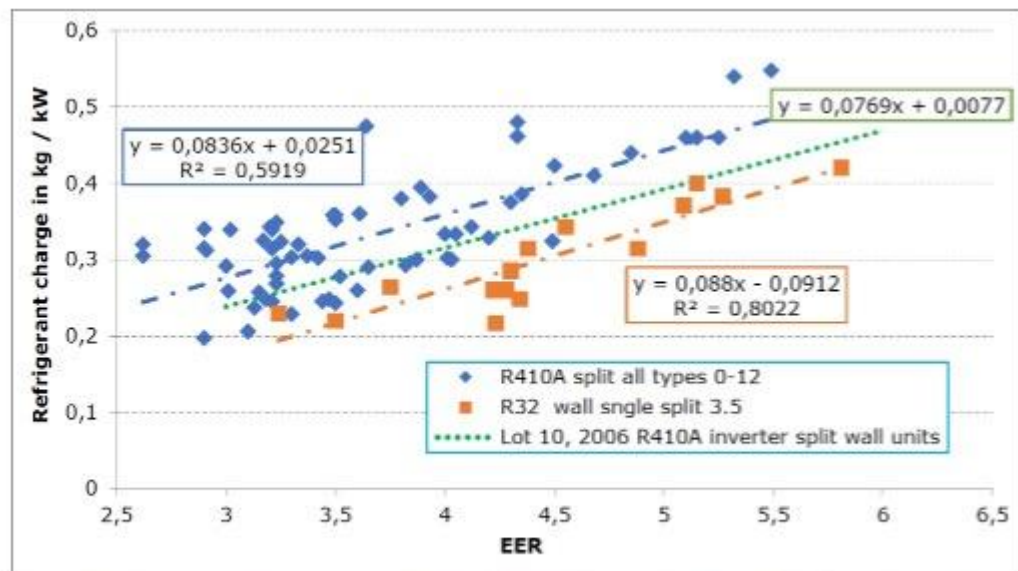


Figure 9 EER versus specific refrigerant charge in kg/kW (capacity and EER at T1 condition), 5 m piping length

According to this Figure (extracted from the Lot 10 review study), the refrigerant charge per kW of R410A to comply with the new MEPS should be around 0.4 kg/kW and up to 0.5kg for the most efficient units. **Safety requirements accompanying highly flammable refrigerants** consequently limit the

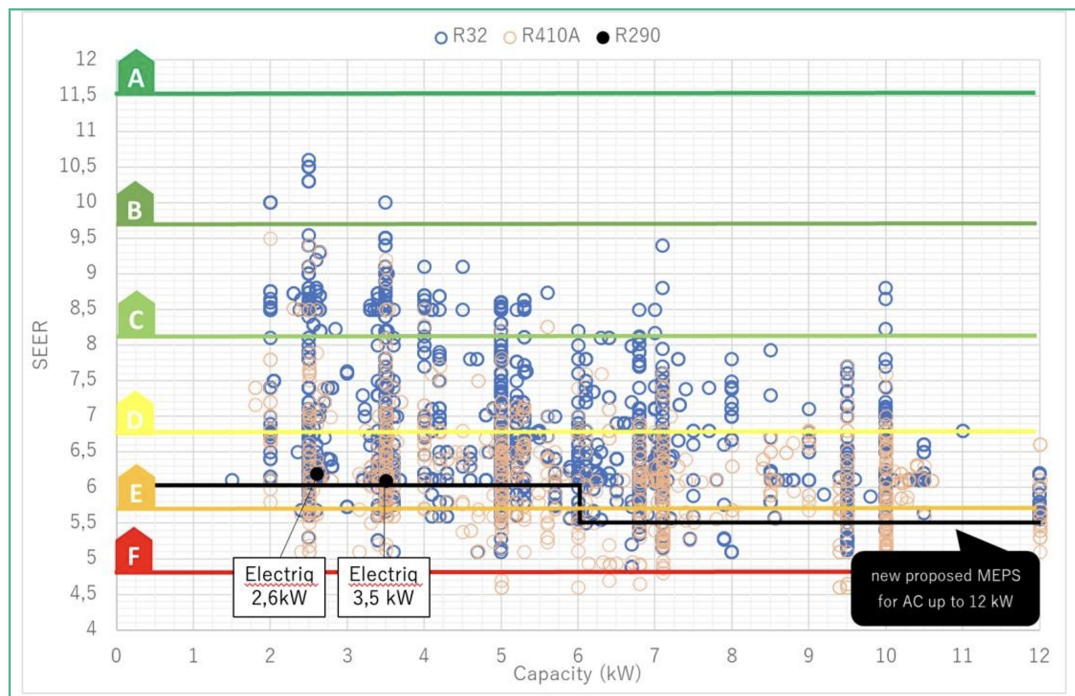
⁸ RTOC, 2018 Report Refrigerations, Air Conditioning and Heat Pump Technical Options Committee, 2019.

⁹ Status Quo of the Air-Conditioning Market in Europe: Assessment of the Building Stock, Simon Pezzutto, Matteo De Felice, Reza Fazeli, Lukas Kranzi and Stefano Zambotti, 2017.

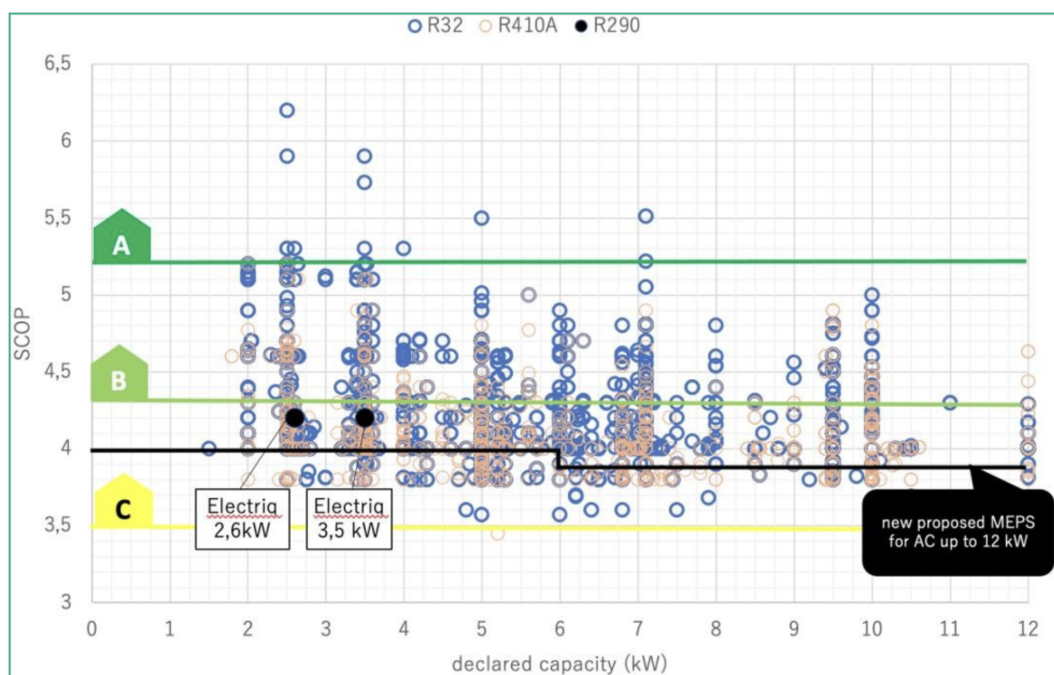


equipment in achieving an equivalent energy-efficiency as compared to those using non-flammable, or slightly flammable refrigerants. For this reason, it is unlikely that systems using these highly flammable refrigerants would be able to provide an equivalent efficient system with a capacity higher than 3kW with the current state of art component technology and the necessary piping lengths for installations in Europe.

- The reversibility of the system also limits the possibility to use charge reduction measures that are possible for "cooling only" systems. Introducing lower efficiency systems (due to the restriction of charge, or the properties of an ultra-low GWP refrigerant) would be counterproductive, as most emissions are generated by electricity consumption during the use phase of the equipment. Last but not least, it should not be forgotten that the energy efficiency minimum requirements and best in class for cooling are forecasted to become 30% stricter in the next years, as the ErP and EL legislations for those products are currently in the last phases of review. Thus, with **limitations linked to charge, installations (room area), new energy efficiency targets, and piping lengths**, it is unlikely that such system would be able to reach the highest (and feasible) efficiency levels. The graphs herein below provide a visualisation of this paragraph.



SEER = Seasonal Energy Efficiency Ratio for cooling.



SCOP = Seasonal Coefficient of Performance for heating.

The graphs show a mapping of the current split air-conditioning landscape. The values of such graphs have been taken from the Eurovent certification database, and they would be further visible in the EPREL database. The Electriq unit (only R290 unit on the market in Europe to our knowledge – online sales only) has been added to the graphs. As seen, models currently have an A++/A+ label for cooling/heating. In the new energy labels, they would be label E/C. Regarding the SCOP-graph, we would like to highlight that the R290 units shown in the diagram would not meet the future MEPS level, as well as some R32 and R410 models.

- There is a current **low level of training of service personnel and certification for A3 refrigerants**, such as for R290. Thorough training on A3 refrigerants, such as R290 is not yet part of any EU certification scheme with regards to installers and service companies, since the refrigerant does not fall under the requirements of the F-Gas Regulation and Regulation (EU) 2067/2015. As such, a considerable safety-risk currently exists when considering using R290 as a refrigerant in fixed air-conditioners with a cooling capacity below 12kW in the EU. Therefore, *“trainings on flammable refrigerant use for installers and service companies”* is an essential measure to implement, further, establishing an EU-wide qualification/verification program for such alternatives is equally as essential, i.e. R290 needs a certification scheme for installers and service companies at the EU-level, prior it is considered as being a “real” alternative by the competent authorities. Safety of use, installation, servicing, maintenance of equipment using A3 can currently not be guaranteed. Further, using R290 needs specific technical and legal requirements to be fulfilled, such as safety-classified stores (i.e. warehouses) to stock the



charged units with the refrigerant, strict transport-measures, etc. All the points should be considered whenever discussing R290 as an alternative to R32 for use in fixed air-conditioners with a cooling capacity below 12kW.

We would like to highlight that the choice of a refrigerant by a manufacturer relies on several aspects, such as (i) technical feasibility, (ii) safety, (iii) energy-efficiency (and further improvements potential of such refrigerant), (iv) cost-effectiveness, etc. Therefore, considering and identifying a refrigerant as a "real" alternative for fixed air-conditioners with a cooling capacity below 12kW should not be solely based on the fact that it would be technically possible to build-up an appliance to use such gas in such equipment.

In addition to the choice of refrigerants (and their related GWP impact), reducing their charge in equipment, avoiding leakage, and increasing their recovery and reuse will also contribute to mitigating climate change and reaching the (reduced) CO₂ emissions targets.

APPLiA - Home Appliance Europe represents home appliance manufacturers from across Europe. By promoting innovative, sustainable policies and solutions for EU homes, APPLiA has helped build the sector into an economic powerhouse, with an annual turnover of EUR 53 billion, investing over EUR 1.6 billion in R&D activities and creating nearly 1 million jobs.

