EXPLANATORY MEMORANDUM

Revision of Commission regulations (EU) 813/2013 and (EU) 811/2013 on respectively Ecodesign and Energy Label of central hydronic space and combination heaters as well as (EU) 814/2013 and (EU) 812/2013 water heater and hot water storage tank regulations

Summary

The four working documents that are subject of this memorandum propose a revision of the Energy Labelling and Ecodesign commission (delegated) regulations of

- hydronic central space heaters and combination heaters (a.k.a. 'Lot 1'), repealing regulations (EU) 811/2013 and (EU) 813/2013, and
- dedicated water heaters and hot water storage tanks (a.k.a. 'Lot 2'), repealing regulations (EU) 812/2013 and (EU) 814/2013.

within the context of the Ecodesign Framework Directive 2009/125/EC and the Energy Labelling Framework Regulation (EU) 2017/1369 respectively, following the respective Review clauses in each of the existing regulations.

Space- and water heating appliances are the largest energy consumers in the residential and commercial sectors (excluding transport), responsible for almost half of the primary energy consumption. The hydronic space and combination heaters in scope, which excludes solid-fuel, local, air-based and district network heating, heat more than half of EU dwellings and a large share of commercial and public buildings. The combination-heaters and dedicated appliances in scope take care of over 80% of EU sanitary water heating.

The **Ecodesign** proposals bring together

- updated requirements for space heating energy efficiency, using the new primary energy factor (2.1), introducing new space heating categories like thermally driven heat pumps and hybrid (electric heat pump and gas) categories;
- up-to-date technology-specific requirements for dedicated water heaters in eight categories, instead of the current technology-neutral approach, thus allowing a more effective and tailor-made approach;
- an extension of the product scope from 400 kW to 1 MW for more reduction of NO_x emissions (differentiated by gas type) and more energy savings (up to 15%), filling in the gap between the scope of Ecodesign and the scope of the Medium Combustion Plant Directive;
- extended material resource efficiency requirement; minimum options and information requirements defining greening of the fuel mix to facilitate Member States setting their own policy-measures; revised heat pump sound power settings; new requirements for remote monitoring and reporting for space heating appliances in the scope;
- third party conformity assessment (TPCA) for the space heating efficiency of electric heat pumps to instil best confidence in test results, inter alia promoting and facilitating

the single market principle and avoiding additional test requirements from individual Member States;

- transitional methods now integrated in the regulations, creating a more robust legal framework;
- the latest state-of-the-art in definitions, test- and calculation methods for existing and new product groups (hybrids and new heat recovery devices) building on close to 40 EN (pre-)standards, many of which have been released in the last year by the European standardisation organisations, including the consideration of new methods under development like the 'compensation-method' [1] to make testing of heat pumps closer to real-life.

The **Energy Label** strategy is threefold:

(1) To make green heating technologies like heat pumps more accessible and affordable for low- and medium income households in existing dwellings and buildings,

- by setting space heating energy class limits that are challenging but achievable and affordable for radiator-equipped medium temperature heating systems;
- by introducing new transitional product categories like hybrids (heat pump and gas boilers) that are competing at almost half the costs of comparable heat pump systems and are also 'closer-to-home' for traditional installers;
- by introducing easy-to-use tools for consumers to judge the benefits of solar thermal panels for their home.

(2) To maximise energy efficiency and greenhouse gas abatement in new buildings and for higher income households in existing buildings,

- by setting energy class limits at the highest levels for floor heating low-temperature systems, requiring serious innovation to step up to the next energy class level in green technology;
- by offering an EU-wide harmonised energy class levels that allow Member State policy makers to set their own limits for new buildings and incentive levels for supporting innovation (for example 'A' and 'B');
- by extending the possibilities to combine green technologies like heat pumps, electric or thermally driven heat pumps, cogeneration, etc. in packages as well as introducing new heat recovery options for water heating for showers and passive flue heat recovery in combination boilers.

(3) To rescale from the current classes to the 'A' to 'G' scale, at a [date] to be decided by the Commission, within the boundaries of the Energy Labelling Framework Regulation (EU) 2017/1369 as regards amongst others that there should be no models in the 'A'

[1] This method uses the heat pump controls, rather than manufacturer prescriptions to set the conditions for heat pump test points. It is currently under development to test –amongst others—the reproducibility and practical implications.

class at the introduction of the measure. As regards the split in the remaining 6 energy classes some guiding principles are used:

– Class width should be large enough to avoid a two-class jump in energy classes (e.g. 'A' to 'C') still within the boundaries of the verification tolerances;

– The class width should be challenging (small) enough for most of the technologies to make it feasible, by innovation, to make the jump to the next energy class.

EXPLANATORY MEMORANDUM

Extended discussion of legal, political and procedural aspects

1. CONTEXT OF THE ACTS

Legal and political context of the proposal

Regulation (EU) 2017/1369 of the European Parliament and the Council ([2]) (Energy Labelling Framework Regulation) sets a framework of energy labelling for energy-related products at EU level. Energy labelling

Directive 2009/125/EC ([3]) sets a framework for introduction of ecodesign requirements for energy-related products at EU level.

Ecodesign requirements and Energy Labelling together are key EU policy instruments for regulating the environmental aspects of products and informing consumers about the energy efficiency requirements and other environmental aspects of energy-related products placed on the internal market. The energy label is recognised by 93% of Europeans and influences the purchase decisions of 79% of them. ([4]) . Compliance with Ecodesign requirements is required for access to the EU Single Market by means of CE marking.

Commission Regulation 814/2013 on Ecodesign requirements for water heaters and storage tanks ([5]) and Delegated Commission Regulation (EU) 812/2013 on Energy Labelling of water heaters and storage tanks ([6]) contain articles that call for a revision of these regulations five years after entry into force.

Preceded by a special review in 2016 concerning an assessment of the appropriateness of setting separate ecodesign requirements for different types of water heaters in the ecodesign regulation, the main review

[2] OJ L 198, 28.7.2017, p. 1, Regulation (EU) 2017/1369 of the European Parliament and of the council of 4 July 2017 setting a framework for energy labelling and repealing Directive 2010/30/EU
[3] OJ L 285, 31.10.2009, p. 10–35, Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products
[4] Study on the impact of the energy label –and potential changes to it –on consumer understanding and on purchase decisions ENER/C3/2013-428 FINAL REPORT, and Eurobarometer 492 2019.
[5] OJ L 239, 6.9.2013, p. 162–183, Commission Regulation (EU) No 814/2013 of 2 August 2013 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for water heaters and hot water storage tanks
[6] OJ L 239, 6.9.2013, p. 83–135, Commission Delegated Regulation (EU) No 812/2013 of 18 February 2013 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to the energy labelling of water heaters, hot water storage tanks and packages of water heater and solar device

study was initiated in 2017 and concluded in 2019, addressing the aspects considered relevant for review in the Articles 7 of both Regulations.

In addition, several new policy initiatives indicate that ecodesign and energy labelling policies are relevant in a broader political context. The main initiatives in question are:

- Commission Communication 'Fit for 55': delivering the EU's 2030 Climate Target on the way to climate neutrality', 14 July 2021.([7])
- Commission Communication "Hydrogen strategy for a climate-neutral Europe" of July 2020 ([8])
- Commission Communication for the strategy for energy system integration "Powering a climate-neutral economy" of July 2020 ([9]);
- Commission Communication "A Renovation Wave for Europe" for a faster and deeper renovation of the EU building stock, while creating jobs and improving lives, of October 2020 ([10])
- The "European Green Deal" Commission Communication and Roadmap which aims to boost the efficient use of resources by moving to a clean, circular economy, and restore biodiversity and cut pollution, of December 2019 ([11]);
- the Commission Communication on the long term energy strategy "A Clean Planet for All" of November 2018 ([12]);
- Communication from the Commission to the European Parliament and the Council COM(2014) 330 final ([13]) (energy security strategy), which aims to ensure a stable and abundant supply of energy.
- the Emissions Trading Scheme (ETS) ([14]) , intended to achieve cost-effective greenhouse gas (GHG) emissions reductions. GHG are indirectly affected by the energy consumption of the electricity using products in the scope of ecodesign and energy labelling policies;
- Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions COM(2015) 614 final ([15]) (circular economy action plan), which stresses the need to include reparability, recyclability and durability in ecodesign;
- the Gothenburg Protocol ([16]) , intended to control air pollution;
- the Paris Agreement ([17]) , which calls for a renewed effort in carbon emission abatement
- Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, the Committee of the Regions and the European Investment Bank COM(2015) 80 final ([18])(energy union framework strategy), which calls for a sustainable, low-carbon and climate-friendly economy;

[7] COM(2021) 550 final, Brussels, 14.7.2020
[8] COM(2020) 301 final, Brussels, 8.7.2020
[9] COM(2020) 299 final, Brussels, 8.7.2020.
[10] COM(2020) 662 final, Brussels 14.10.2020
[11] COM(2019) 640, Brussels 11.12.2019 final
[12] COM(2018) 773 final, Brussels, 28.11.2018.
[13] COM(2014) 330 final, Brussels, 28.5.2014
[14] The EU Emissions Trading System (EU ETS)
[15] COM(2015) 614 final, Brussels, 2.12.2015
[16] The Gothenburg Protocol
[17] UNFCCC / The Paris Agreement
[18] COM(2015) 80 final, Brussels, 25.02.2015

General context

The ecodesign together with the energy labelling legislative framework establish a push and pull market mechanism aiming at reducing the energy consumption by impacting on the choices that consumers have and make when purchasing energy consuming products.

The two policy frameworks help products placed on the EU market to perform the same job using less energy. By 2020, use of energy efficiency labels and ecodesign requirements is projected to lead to energy savings of around 165 Mtoe (million tonnes of oil equivalent) in the EU, roughly equivalent to the annual primary energy consumption of Italy. In relative terms, this represents a potential energy saving of approximately 9 % of the EU's total energy consumption and a potential 7 % reduction in carbon emissions. In 2030, savings are projected to grow to 15 % of the EU's total energy consumption and 11 % of its total carbon emissions.

The total primary energy consumption of households, commercial & public services (EU27, 2020) is about 6500 TWh, of which space heating is about 3200 TWh and water heating about 600 TWh [19]. Under ecodesign and energy labelling ~2517 TWh energy use of space heating and ~536 TWh energy use of water heating is regulated [20]. The rest of space- and water heating relates to space heat and hot water heated by district heating, process waste heat, large (steam) boilers >400 kW and large (>50 kW electric output) CHP installations, etc.. Note that the above figures do not include space heating of industrial and agricultural buildings, which might an extra 15-16% to the EU27 space heating total 4 ([21]).

The central hydronic space heating primary energy consumption regulated in (EU) 811/2013 and 813/2013 amounts to 1462 TWh/a or almost half of EU27-2020 space heating. The annual space heating load (average building heat loss at a standard indoor temperature) for the space heating systems, where the space heaters in scope are part of, is estimated at 954 TWh in EU27-2020.

The efficiency of the space heater measured according to test standards is significantly higher than space heating system-efficiency, but for the evaluation of real-life energy consumption of the space heater the trend in heat load has to be taken into account. The heat load for space heaters in scope in 2030 is estimated to be 14% lower[22] than in 2020, i.e. 832 TWh/a. Adding to that the effect of the current ecodesign and labelling efficiency measures, the energy consumption for the space heaters in scope is expected to decrease by 30% from 1462 TWh/a in 2020 to 1026 TWh/a in 2030.[23] [24]

The combination heaters in those regulations also consumed, besides for water heating, about 245 TWh for water heating, serving about half of EU27 dwellings in 2020. The dedicated water heaters regulated in (EU) 812/2013 and 814/2013 consumed 291 TWh/a for water heating, serving 37% of EU dwellings.

On average the 445 million EU27-citizens consumed 133 litres of water per capita per day, of which 60 litres (equivalent to 40 °C) is estimated to be used for heating purposes, mainly showers (34 litres), baths (6 litres), wash basin and sink uses (total 20 litres). The trend in (hot) water use is estimated to be stable.[25]

[19] source Eurostat Energy Balance 2021 edition, EU27, year 2019, primary energy per end-use sector calculated with primary energy factor 2,1 for electricity, 1 for biofuel, 0,7 for (district) heat for Net Calorific Value.
[20] source VHK Ecodesign Impact Accounting, 2021 edition for the EC (preliminary data) for EU27-2020, based on 2019 VHK review studies for ecodesign and energy labelling of space- and water heating for the EC
[21] VHK, Average EU building heat load for HVAC equipment, for EC, 2014.
[22] Estimated to be decreasing at 1.3% annually with current measures at EU and MS level.
[23] This implies that the space heating system efficiency has increased from 65% to 81% between 2020 and 2030
[24] With the proposed expansion of the scope to boilers up to a capacity of 1 MW (1000 kW instead of the current 400 kW), the energy consumption in scope would increase by more than 15%, i.e. about 1700 TWh in 2020.
[25] VHK, review study for ecodesign and energy labelling of water heating for the EC, 2019. Trend also confirmed by recent publication of Eureau (eureau.org)

With the current ecodesign and energy labelling measures it is estimated that the water heating energy consumption of combination heaters will decrease by 22% to 228 TWh/a in 2030 and of dedicated water heaters by 18% to 216 TWh.

Note that the energy context was chosen to demonstrate the importance of the products being regulated and because for these products the other environmental impacts such as climate change, NOx emissions and circular economy considerations are closely linked to energy consumption developments. It goes without saying that these other impacts will be subject to the impact assessment following the consultation forum.

Special subjects

The special review required in the Ecodesign regulation 814/2013 did not conclude that fuel specific requirements would lead to significantly higher savings and lower costs for consumers. Nonetheless, it was decided during the main review study that technology specific requirements should be considered as it would unlock a limited but present saving potential as requirements for fuel fired heaters and water heaters using renewable energy in particular could be increased. Another element contributing to this decision was that the present technology neutral approach eliminated water heaters of certain size and technology from the market and certain stakeholders sought to re-introduce them under technology specific requirements (these are electric storage water heaters in load profile class XXL and above). The stakeholder consultations during the review study and following into the impact assessment phase however, did not lead to the conclusion that a majority of stakeholders found the reintroduction of such water heaters desirable.

Another point discussed during the review study and explicitly subject to stakeholder consultation during the impact assessment phase was the rescaling of the existing energy label classes. The Energy Labelling Framework Regulation (EU) 2017/1396 ([26]) required in its Article 11.5(a) that the Commission shall:

(a) present reviews for the product groups covered by Delegated Regulations (EU) No 811/2013, ***(EU) No 812/2013*** *and (EU) 2015/1187 by 2 August 2025 with a view to rescaling them, and, where appropriate, shall, by 2 August 2026, adopt delegated acts pursuant to Article 16 of this Regulation in order to supplement this Regulation by introducing A to G rescaled labels.*

In any event, the delegated acts introducing A to G rescaled labels shall be adopted no later than 2 August 2030

This point has been extensively discussed with stakeholders, especially regarding the timing (rather sooner, for example by 2026, rather than by 2030) and the positioning of the class boundaries. The rescaling, combined with ecodesign measures providing a bottom limit of energy efficiency of products allowed on the market, means that products that were rated in the higher classes under the present regulations will be downscaled to much lower or even the bottom classes under a rescaled label. This is exacerbated by the wide variation of technologies involved and typical energy efficiency ranges to be expected.

Besides the technology specific requirements and the rescaling issue the review study also identified several other aspects that would require a redrafting of the present regulations in order to take them better into account. These aspects consider improvements in current definitions and test conditions to make them more consistent and logical and aligned with developments in test standards. Changes have been introduced to regulate hot water storage tanks that are better equipped to handle the use of renewable energy sources by having multiple heat exchangers, and/or that use phase-changing materials to provide more thermal capacity in a relatively smaller package with smaller standing losses. Shower

[26] reference to Labelling Framework Regulation (EU) 2017/1396

water heat recovery devices have been added as well to the proposed revised delegated regulation on water heaters and hot water storage tanks.

The design of the label is modified to consider the elements that have been changed and to align the label design with the more recent changes in label layout and design in other regulations.

The product information sheet of space- and water heaters is replaced by a simpler calculation of energy efficiency of space- and water heaters combined with solar devices and/or shower water heat recovery devices.

Therefore, the objectives of this proposal are to:

- introduce revised, technology specific, ecodesign requirements;
- introduce rescaled energy classes, removing the "+" classes;
- introduce a revised and re-designed energy label;
- introduce a calculation method, aligned across the ecodesign and energy label regulations for water heaters and associated products that is simpler to use;
- create incentives for producers to further develop and market energy efficient technology and products;
- generate cost savings for end users;
- reduce the average energy consumption of water heaters and associated products and additionally reduce GHG emissions which for water heaters and associated products are mainly related to energy consumption;
- contribute to the EU industry's competitiveness and its leading role in high-quality manufacturing;
- promote energy efficiency as a contribution to security of energy supply in the framework of the Union objective of saving 55% of the EU's energy consumption by 2030 by increasing the market take-up of energy-efficient water heaters and associated products through the introduction of a revised energy label (together with the proposed ecodesign requirements);
- introduce specific repair and end-of-life requirements to facilitate the repair and dismantling of water heaters and associated products and the fulfilment of the objectives of Directive 2012/19/EU of the European Parliament and of the Council (WEEE Directive).

Consistency with existing provisions in the policy area

As it is the case today, water heating is addressed in all four regulations discussed here. Regulations 811/2013 and 813/2013 regard, inter alia, water heating by hydronic combination heaters, i.e. combining space- and water heating functionality. Regulations 812/2013 and 813/2013 regard, inter alia, water heating by dedicated water heaters. The regulations on water heating requirements, label classes and their underlying definitions, test- and calculation methods, etc. are the same or as similar as possible, given the technologies involved. This is consistent and transparent for consumers and policy makers alike.

Consistency with other Union policies

No other EU legislation has been identified in the field of energy consumption (or other environmental aspects) as covered by Directive 2009/125/EC of space- and water heaters as intended. Other legislations with some relevance for water heaters and associated products on environmental aspects includes:

- The WEEE Directive set requirements on e.g. recovery and recycling of electrical and electronic equipment waste (WEEE) to reduce the negative environmental effects resulting from the generation and management of WEEE and from resource use. The WEEE Directive applies directly to water heaters and certain associated products. Ecodesign implementing measures can

complement the implementation of the WEEE Directive by including e.g. measures for material efficiency, thus contributing to waste reduction, instructions for correct assembly and disassembly, thus contributing to waste prevention and others;

- Directive 2011/65/EU of the European Parliament and of the Council ([27]) (RoHS Directive) restricts the use of six specific hazardous materials and four different phthalates found in electrical and electronic equipment (EEE). The RoHS Directive does not apply explicitly to water heaters and associated products, but the electronics in these appliances are expected to be in compliance with this Directive through the implementation of the Directive in the general product portfolio of suppliers. There is no overlapping requirement with this proposal;
- Regulation (EU) No 517/2014 of the European Parliament and of the Council ([28]) (F-gas Regulation) controls the emissions from fluorinated greenhouse gases (F-gases), including hydrofluorocarbons (HFCs). The F-gas Regulation applies to space- and water heaters, in particular to heat pumps as they use a refrigeration cycle. In this proposal it has been decided not to include requirements on refrigerant gasses, therefore, there will not be overlapping requirements;
- The Emissions Trading Scheme (ETS) ([29]) sets a cap on the total amount of certain greenhouse gasses that can be emitted by installations. This cap is being reduced over time, so that the total emissions fall. Within this cap companies receive or buy emission allowances which they can trade with one another as needed. They can also buy a limited number of international credits. So far, the ETS does not directly apply to space- and water heaters and associated building products , however, in order to support other building- and transport-related policy measures, the Commission has proposed a new EU-wide emissions trading system, to be introduced in 2026, which will put a price on emissions from the building and the road transport sectors in its FitFor55 package presented 14 July 2021[30]. The proposal, and a possible relation with ecodesign and/or energy labelling, will be subject to political discussions.

2. Legal Basis, Subsidiarity and proportionality

The proposed revised labelling Regulation is a delegated measure adopted pursuant to Regulation (EU) 2017/1369, in particular Articles 11 and 16 thereof. The proposed Ecodesign regulation is a Commission Regulation pursuant to Directive 2009/125/EC, in particular Articles 15, 18 and 19 thereof.

The legal basis for acting at EU level through the Ecodesign Framework Directive and the Energy Labelling Framework Regulation is Article 114 and Article 194 of the Treaty on the Functioning of the European Union (TFEU) ([31]). Article 114 relates to the 'the establishment and functioning of the internal market', while Article 194 gives, amongst others, the EU the objective 'in the context of the establishment and functioning of the internal market and with regard for the need to preserve and improve the environment' to 'ensure security of energy supply in the Union' and 'promote energy efficiency and energy saving and the development of new and renewable forms of energy'.

Subsidiarity (for non-exclusive competence)

The adoption of ecodesign requirements and/or energy labelling measures for space- and water heating products by individual Member States' legislation would lead to obstacles to the free movement of goods

[27] OJ L 174, 1.7.2011, p. 88–110
[28] OJ L 150, 20.5.2014, p. 195–230
[29] The EU Emissions Trading System (EU ETS) [https://ec.europa.eu/clima/policies/ets_en]
[30] https://ec.europa.eu/commission/presscorner/detail/en/qanda_21_3542
[31] OJ C 326, 26.10.2012, p. 47–390

within the Union. Such measures must therefore have the same content throughout the Union. In line with the principle of subsidiarity ([32]) , it is thus appropriate for the measure in question to be adopted at Union level. The EU will limit itself only to setting the legislative framework. As far as certain aspects of the implementation are concerned, i.e. market surveillance and monitoring, EU action is not necessary to achieve the objectives, as Member States assume these responsibilities under the Energy Labelling Framework Directive.

Proportionality

The Energy Labelling Framework Regulation includes a built-in proportionality and significance test in Article 16(2), which states that the delegated acts shall specify products that meet the following criteria:

a) the product group should have significant potential for saving energy and where relevant, other resources;
b) models with equivalent functionality should differ significantly in the relevant performance levels within the product group;
c) there should be no significant negative impact as regards the affordability and the life cycle cost of the product group;
d) the introduction of energy labelling requirements for a product group should not have a significant negative impact on the functionality of the product during use.

An assessment of the proposal in view of such requirements was carried out in the impact assessment. This concluded that the proposal fulfils the criteria, while achieving the objectives described in Section 1 of this Explanatory Memorandum. In accordance with the principle of proportionality, this measure does not go beyond what is necessary in order to achieve the objective, which is to set harmonised energy labelling requirements for space- and water heaters.

Summary of the proposed action

Ecodesign

The proposed revised ecodesign regulation combines revised minimum requirements, improved definitions and calculation methods and new sections such as material efficiency:

- Minimum requirements per space- and water heating technology have been introduced.

- Definitions and calculation methods have been improved and overall consistency between the measurement and calculation needs for ecodesign and energy labelling of water heaters and associated products has been maintained.

- Material efficiency is addressed in new requirements dealing with mainly repair and maintenance and end-of-life. Requirements relating to repair and maintenance aim to keep products functioning until the expected end-of-life, to avoid early replacement, thus reducing the overall material input for this function. The requirements have been worded to allow the drafting of product-specific standards for repair in accordance with the objective of the standardisation request M 543 (2015) on material efficiency[33]. This in particular relates to the identification of 'priority parts' for which repair during normal life is deemed likely or at least

[32] The principle of subsidiarity as is defined in Article 5 of the Treaty establishing the European Union intends to ensure that decisions are taken as closely as possible to the citizen; the Union should take action only in areas which fall within its exclusive competence and which do not lead to a more effective action if taken at national, regional or local level.
[33] M/543 COMMISSION IMPLEMENTING DECISION C(2015)9096 of 17.12.2015 on a standardisation request to the European standardisation organisations as regards ecodesign requirements on material efficiency aspects for energy-related products in support of the implementation of Directive 2009/125/EC of the European Parliament and of the Council

should be possible. The product-specific standards for repair that will be established taking into account this revised regulation will allow establishing an overall repair index.

The requirements also contain references to the WEEE Directive 2012/19/EU on waste electrical and electronic equipment so that the water heaters are better prepared for dismantling and/or other waste treatment operations, and ensure dismantling and treatment information to be more easily available for waste treatment operators.

Energy label

The 2013 regulation introduced for the first-time energy labelling for space- and combination heaters as well as water heaters and storage tanks. This label helped to make better visible the differences in energy efficiency of space- and combination heaters as well as water heaters and tanks while taking into account the capacities (as represented in load profiles with hot water draw-offs specified at given intervals for water heating).

The revised labelling regulations introduce a rescaled label, in line with the Framework Labelling Regulation 2017/1369, Article 11.5.a), applies measurement and calculation methods in line with those developed for the related ecodesign measure, a new calculation method for solar devices has been introduced, which will make the calculation of the combination of a water heater with solar devices much simpler,

These aspects are further discussed below:

- The rescaling of the energy label is proposed to enter into force from [date]. As required in the Framework Labelling Regulation 2017/1369, Article 11.8 the A-class should be set at such levels that no products are expected to fall into energy class A at the moment of introduction of the label. As the combination of different heating technologies, in particular heat pumps and solar devices, may make it possible to scale the energy efficiency, it is decided that only combinations of products ('packages') may end up in the A-class.

- The former calculation of efficiency of space- , combination- and dedicated water heaters combined with solar thermal devices, by way of a fiche containing calculations that could be completed by the dealer (often the solar-thermal installer). This latter function was however found too complicated and combined with a lack of enforcement the fiche was largely ignored by the target group of installers, according to a large survey conducted by the European association Solar Heat Europe.

The list of parameters to be entered in the product database for the energy label has been aligned with information required under the ecodesign regulation so that this information is easily accessible, both on supplier websites as in the EPREL database.

It is the intention of the Commission that this act should apply from the same date as the ecodesign act.

Spare parts

As in the most recent Ecodesign regulations, also the current proposals contain comprehensive material efficiency requirements, including those regarding the availability of spare parts for 10 years after the last unit has been produced. The existing regulations often specified the spare parts concerned.

However, compared to the products for which the existing regulations named spare parts, the space- and water heaters treated here, may contain hundreds of different parts and subassemblies serving the very different technologies involved. For that reason, and in second instance, it was thus decided to abandon a listing of possible important spare parts and adhere to the general principle that a professional installer or repair service should be able to repair the space- and water heaters in scope for at least 10 years after the last unit was produced. A spare part was defined not necessarily as an exact copy of what is mounted in the space- or water heater, but should be functionally and geometrically compatible. In case of failing to provide spare parts the MSA could decide to set a general rule that the product is replaced by a new product if a spare part, also after intervention of the supplier, cannot be found.

Nonetheless, and in case stakeholders would like to see what a (limited) list of the most important spare parts would entail, **Annex I** contains the spare part lists initially developed.

Test standard references

In the course of developing the proposal for the regulations about 50-60 test standards were consulted that related directly –or sometimes as a normative reference—to the test- and calculation methods being proposed and referenced. Overall, the proposal tried to build on, as much as possible, the definitions and methods that were developed under the Commission mandates for the current regulation by the European Standardisation Organisations over the past 7-8 years. Having said that, a new regulation will require - at least for some of the current standards -a new standardisation request to review the standards to match the new regulations. **Annex II** gives a non-exhaustive overview of test standards that might be candidates for such future action.

Self-monitoring and reporting

The effectiveness of ecodesign regulations depends largely on the degree of representativeness of the standardised test-procedures of the average real-world performance of appliances. Evidence from field studies in Germany suggests that there is a significant “gap” between certified and in-use efficiencies e.g. for gas-boilers and heat-pumps.

The monitoring of the actual input and output energy performed by each space heating appliance while in operation would allow the assessment and visualisation of its actual in-use performance. On an aggregated level, collecting and assessing such data would facilitate a better evaluation of the effectiveness of the regulations, streamlining of the underlying test procedures, and could facilitate determining the actual heating energy demand of buildings.

Inspired by the framework for on-board monitoring, collection and reporting of fuel and energy consumption data recently put in place for cars, self-monitoring and reporting requirements are being proposed for space heaters. At this stage, the collection and reporting requirements are being proposed for the devices which are already connected to the internet, and by maintaining the freedom of manufacturers to use the preferred or already implemented technologies, infrastructure and protocols.

3. Consultation of interested parties

Stakeholders have been consulted during the study for the review, which was combined with a similar exercise for space and combination heaters, and before the Consultation Forum meetings. External expert advice was also collected and analysed during the stakeholder consultation.

The preparatory studies followed the Methodology for Ecodesign of Energy related Products (MEErP) ([34]) . They ran from 2017 to 2019 and included a technical, environmental and economic analysis identifying the need to set requirements and policy options.

The preparatory study was developed in an open process, taking into account input from relevant stakeholders including manufacturers and their associations, environmental Non-governmental Organisations (NGOs), consumer organisations and Member State representatives.

To facilitate communication with stakeholders, a dedicated website[35] was set up for the review study on which the interim results and other relevant materials were published. During the course of this study, two open consultation meetings were held to discuss the study. These open consultation meetings were attended by a wide range of stakeholders, including industry, NGOs and Member States representatives.

In the period 2019-2021, in an extended study, several bilateral meetings were organised with industry and other stakeholders, plus individual experts to update the data and the requirements from the impact assessment.

Pursuant to Article 18 of Directive 2009/125/EC , Member State representatives and stakeholders will be formally consulted through the Ecodesign Consultation Forum. The first Consultation Forum on space and water heaters and associated products will take place on 27-28 September 2021.

[34] Kemna, R.B.J., Methodology for the Ecodesign of Energy-related Products (MEErP) – Part 2, VHK for the European Commission, 2011, available on: https://ec.europa.eu/growth/industry/sustainability/product-policy-and-ecodesign_en

[35] https://www.ecoboiler-review.eu/

ANNEX I: Illustrative spare part lists

Table 1

Illustrative listing of space- and combination heater spare parts: boilers

Boiler spare parts	***spare parts possibly including, but not limited to***	
	for fossil fuel boiler	***for electric boiler***
Energy supply	combustion fan, gas valve or oil pump,	Power supply and control
Heat generator	ignition, flame monitor, pre-mix chamber, burner bed	electric resistance heater(s)
Heat transfer to CH	[Heat exchangers: primary (sensible heat to CH water), secondary (flue latent heat to CH water), PFHRD (latent heat to cold sanitary water)]	[Instantaneous 'flow-through' heating or storage-type 'cylinder' with an anti-corrosion anode.]
WH circuit (if combination heater, applies to all heater-types hereafter)	instantaneous heat exchanger, or heating coil, storage tank, anode	Instantaneous (e.g. plate heat exchanger) or storage-type indirect cylinder and anode.
CH circuit components*	circulator, air vent, pressure vessel, valve to switch between CH and WH circuit	
WH circuit combination heater*	instantaneous heat exchanger, or heating coil, storage tank, anode	instantaneous heat exchanger or heating coil, storage tank, anode
Flue gas exhaust unit	exhaust fan, draught diverter, condensate drain	Not applicable
Central processing unit (cpu,)*	Power supply, PCBs, display, keyboard or separate keys/dials, protocols and connectors for room control(s), WiFi or BT	
Maintenance materials*	sensors, actuators, unit controls, electric wiring, gas-/air-/fuel-mix/flue gas ducts, heating water/sanitary water/condensate pipes, bespoke seals and connection means (special nuts, bolts, screws).	

**=applies in principle to all heater types*

Table 2

Illustrative listing of space- and combination heater spare parts: heat pumps and mchp

Heat pump spare parts	***heat pump spare parts possibly including, but not limited to***	
	for electric heat pumps	***for TDHP***
Energy supply	ambient air fan, soil or water heat exchangers, brine or water pumps, defrost system, electric power supply and drive (e.g. vsd)	ambient air fan, soil or water heat exchangers, brine or water pumps, defrost system; gas supply (modulating), combustion air supply (with fan), burner with ignition, flame monitor, pre-mix chamber
Energy generator	evaporator (ambient heat to refrigerant heat transfer), expansion valve (with bypass system), condenser (refrigerant heat transfer to CH water), compressor(s), buffers (e.g. phase change material)	absorption or adsorption circuits with refrigerant, evaporator, expansion valve, condenser and buffers sections as appropriate
Energy transfer	CH heat exchanger (condenser refrigerant heat transfer to CH water), CH to WH circuit heat exchanger	CH heat exchanger (condenser refrigerant heat transfer to CH water), CH to WH circuit heat exchanger

Table 3

Illustrative listing of micro-cogenerators spare parts

for mchp fuel cells (FC)	***for mchp internal combustion engine (ICE)***	***for mchp external combustion engine (ICE & ECE)***	***for mchp gas turbine***
gas supply unit, desulfurizer fuel processor (steam reformer gas to hydrogen, CO removal)	for ICE: air filter, fuel injection (carburettor), turbo charger;	for ECE: combustion air supply (fan), gas or oil supply.	air inlet, compressor
hydrogen air supply and excess hydrogen recycling at anode side, process air (oxygen) supply and excess air recycling at cathode side, stack of fuel cells with per cell anode/ electrolyte/ cathode/ diffuser	explosion engine block, cylinder(s), reciprocating pistons, valves, ignition, crankcase, drive axis (kinetic energy) plus heat from exhaust gases and process heat (from oil cooling circuit).	combustion unit with ignition, pre-mix chamber, flame monitor and burner to supply heat to reciprocating heat engine (e.g. Stirling or Rankine cycle)] with piston(s), valves and drive axis (kinetic energy) plus heat from exhaust gases and process heat.	heat recovery unit, combustion unit, turbine driving compressor and electricity generator

heat exchanger from process heat to CH and/or SWH circuit, heat storage tank, process water management and discharge.	For ICE: heat exchanger from process heat to CH and/or SWH circuit via oil cooling circuit with oil pump, oil carter.	For ECE: heat exchanger directly from process heat to CH and/or SWH circuit	heat exchanger from process heat to CH and/or SWH circuit, heat storage tank, process water management and discharge.
chemo-electric system output (from diffusers to total stack DC output, DC/AC inverter, power electronics, accumulators),	Drive axis from engine to electricity generator (‘dynamo’), DC/AC converter.power electronics		

Illustrative listing of water heater spare parts

i) gaskets, seals, grommets;

ii) electric heating elements and their controls;

iii) burners, heat exchangers;

iv) compressor parts, fans, pumps or circulators;

v) fuel valves (gaseous, liquid), water valves, pressure relief valves, one-way check valve;

vi) printed circuit boards;

vii) electronic displays;

viii) pressure switches;

ix) thermostats and temperature sensors;

x) software and firmware including reset software.

ANNEX II: List of referenced standards

Space- and combination heaters

Standards cited (bold) and their normative references as appropriate

Gas-fired heating boilers

FprEN 15502-1:2020 Gas-fired heating boilers - Part 1: General requirements and tests;

prEN 15502-2-12021 Gas-fired central heating boilers - Part 2-1: Specific standard for type C appliances and type B2, B3 and B5 appliances of a nominal heat input not exceeding 1 000 kW.

prEN 15502-2-2:2021. Gas-fired central heating boilers- Part 2-2. Specific standard for type B1 appliances

prEN 15502-2-3:2021 Gas-fired central heating boilers - Part 2-3: Specific standard for hybrid space heating appliances combining a gas fired appliances and heat pump in a product.

EN 15456:2008 Heating boilers - Electrical power consumption for heat generators - System boundaries – Measurements.

EN 15036 -1:2006 Heating boilers - Test regulations for airborne noise emissions from heat generators - Part 1: Airborne noise emissions from heat generators.

EN 437:2018, Test gases - Test pressures - Appliance categories.

EN 1749:2020, Classification of gas appliances according to the method of supplying combustion air and of evacuation of the combustion products.

EN 13611: 2019 on general requirements for safety and control devices for burners and appliances burning gaseous and/or liquid fuels [Clause 7.8 on data exchange in remote control]

Liquid fuel fired heating boilers

EN 304: 2017. Heating boilers — Test code for heating boilers for atomizing oil burners.

EN 303-1:2017. Heating boilers - Part 1: Heating boilers with forced draught burners –Terminology.

EN 303-2:2017. Heating boilers - Part 2: Heating boilers with forced draught burners -- Special requirements atomizing burners.

EN 303-1 and EN 303-2 relate to condensing boilers, but they refer to EN 304 for test- and calculation methods;

EN 267:2020 Forced draught burners for liquid fuels.

EN 267 describes the test conditions and methods for NOx emissions of liquid fuel boilers.

Cogeneration space heaters

EN 50465:2015. Gas appliances – Combined heat and power appliance of nominal heat input inferior or equal to 70 kW.

Electric heat pump space heaters

prEN 14825:2020. Air conditioners, liquid chilling packages and heat pumps, with electrically driven compressors, for space heating and cooling, commercial and process cooling — Testing and rating at part load conditions and calculation of seasonal performance.

EN 14511-1:2018. Air conditioners, liquid chilling packages and heat pumps for space heating and cooling and process chillers, with electrically driven compressors - Part 1: Terms and definitions.

prEN 14511-2:2021. Air conditioners, liquid chilling packages and heat pumps for space heating and cooling and process chillers, with electrically driven compressors - Part 2: Test conditions

prEN 14511-3:2021. Air conditioners, liquid chilling packages and heat pumps for space heating and cooling and process chillers, with electrically driven compressors - Part 3: Test methods

prEN 15879-1:2021, Testing and rating of direct exchange ground coupled heat pumps with electrically driven compressors for space heating and/or cooling — Part 1: Direct exchange-to-water heat pumps

prEN 12102-1:2021 Air conditioners, liquid chilling packages, heat pumps, process chillers and dehumidifiers with electrically driven compressors - Determination of the **sound power level** Part 1: Air conditioners, liquid chilling packages, heat pumps for space heating and cooling, dehumidifiers and process chillers

EN 12102-1 was the reference for heat pump power level but important changes will be made in the transitional method

Gas-fired sorption appliances for heating (Thermally Driven heat pumps)

prEN 12309-6:2021. Gas-fired sorption appliances for heating and/or cooling with a net heat input not exceeding 70 kW - Part 6: Calculation of seasonal performances.

EN 12309-1:2014. Gas-fired sorption appliances for heating and/or cooling with a net heat input not exceeding 70 kW - Part 1: Terms and definitions

EN 12309-2:2015. Gas-fired sorption appliances for heating and/or cooling with a net heat input not exceeding 70 kW. Part 2: Safety [includes NOx emissions]

EN 12309-4:2015. Gas-fired sorption appliances for heating and/or cooling with a net heat input not exceeding 70 kW - Part 4: Test methods.

EN 12309-7:2015. Gas-fired sorption appliances for heating and/or cooling with a net heat input not exceeding 70 kW - Part 7: Specific provisions for hybrid appliances.

Gas-fired endothermic engine driven heat pumps (Thermally Driven heat pumps)

EN 16905-5:2017. Gas-fired endothermic engine driven heat pumps - Part 5: Calculation of seasonal performance.

EN 16905-1:2017. Gas-fired endothermic engine driven heat pumps – Part 1: Terms and definitions

EN 16905-4:2017. Gas-fired endothermic engine driven heat pumps - Part 4: Test methods

Combination boilers

prEN 13203-2:2021. Gas-fired domestic appliances producing hot water - Part 2: Assessment of energy consumption.

EN 13203-1:2015. Gas fired domestic appliances producing hot water - Part 1: Assessment of performance of hot water deliveries.

prEN 13203-4:2021. Gas-fired domestic appliances producing hot water - Part 4: Assessment of energy consumption of gas combined heat and power appliances (**mCHP**) producing hot water and electricity

prEN 13203-5:2021. Gas-fired domestic appliances producing hot water - Part 5: Assessment of energy consumption of **gas-fired appliances combined with electrical heat pump**.

prEN 13203-6:2021. Gas-fired domestic appliances producing hot water - Part 6: Assessment of energy consumption of **adsorption and absorption heat pumps**.

prEN 13203-7:2021. Gas-fired domestic appliances producing hot water - Part 7: Assessment of energy consumption of combination boilers equipped with **a passive flue heat recovery device**.

EN 303-6:2019. Heating boilers - Part 6: Heating boilers with forced draught burners - Specific requirements for the domestic hot water operation and energy performance of water heaters and combination boilers with **atomizing oil burners** of nominal heat input not exceeding 70 kW

EN 16147:2017/FprA1:2020. **Heat pumps with electrically driven compressors** - Testing, performance rating and requirements for marking of domestic hot water units.

EN 50440:2015+A1:2020 Efficiency of domestic **electrical storage water heaters** and testing methods

EN 12897:2016+A1:2020. Water supply. Specification for **indirectly heated unvented (closed) storage water heaters.**

Water heaters, hot water storage tanks, solar devices and shower water heat recovery devices

Fuel fired water heaters

FprEN 26:2021 Gas-fired instantaneous water heaters for the production of domestic hot water

EN 89:2015 Gas-fired storage water heaters for the production of domestic hot water

prEN 13203-2:2021 Gas-fired domestic appliances producing hot water - Part 2: Assessment of energy consumption

EN 50465:2015+A1:2019 Gas appliances. Combined heat and power appliance of nominal heat input inferior or equal to 70 kW

prEN 303-6:2019 Heating boilers - Part 6: Heating boilers with forced draught burners - Specific requirements for the domestic hot water operation and energy performance of water heaters and combination boilers with atomizing oil burners of nominal heat input not exceeding 70 kW

EN 13203-1:2015, Gas fired domestic appliances producing hot water - Part 1: Assessment of performance of hot water deliveries

EN 13203-4:2016 Gas-fired domestic appliances producing hot water - Part 4: Assessment of energy consumption of gas combined heat and power appliances (mCHP) producing hot water and electricity

EN 13203-6:2020 Gas-fired domestic appliances producing hot water -Part 6: Assessment of energy consumption of adsorption and absorption heat pumps

EN 15502-1:2021, Gas-fired heating boilers - Part 1: General requirements and tests

EN 267:2020 Forced draught burners for liquid fuels

EN 298:2012, Automatic burner control systems for burners and appliances burning gaseous or liquid fuels

EN 303-1:2017, Heating boilers - Part 1: Heating boilers with forced draught burners - Terminology, general requirements, testing and marking

EN 303-2:2017, Heating boilers - Part 2: Heating boilers with forced draught burners - Special requirements for boilers with atomizing oil burners

EN 303-6:2019 (E) Heating boilers - Part 6: Heating boilers with forced draught burners - Specific requirements for the domestic hot water operation and energy performance of water heaters and combination boilers with atomizing oil burners of nominal heat input not exceeding 70 kW

EN 304:2017, Heating boilers - Test code for heating boilers for atomizing oil burners

EN 15035:2006, Heating boilers — Special requirements for oil fired room sealed units up to 70 kW

EN 676:2020 Forced draught burners for gaseous fuels

Electric water heaters

EN 50193-1:2016/A1:2020 Electric instantaneous water heaters. Methods for measuring the Performance. General requirements

EN 50193-2-1:2016+A1:2020 (E) Electric instantaneous water heaters - Part 2-1: Methods for measuring the performance - Multifunctional electric instantaneous water heaters

EN 50193-2-2:2016+A1:2020 Electric instantaneous water heaters - Part 2-2: Performance requirements - Single point of use electric instantaneous showers - Efficiency

EN 50440:2015+A1:2020 Efficiency of domestic electrical storage water heaters and testing methods

EN 60379:2004, Methods for measuring the performance of electric storage water-heaters for household purposes (IEC 60379:1987)

Electric heat pump water heaters

EN 16147:2017 Heat pumps with electrically driven compressors. Testing, performance rating and requirements for marking of domestic hot water units

EN 14511-1:2018, Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling - Part 1: Terms, definitions and classification

EN 14511-2:2018, Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling - Part 2: Test conditions

EN 14511-3:2018, Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling - Part 3: Test methods

Thermally driven heat pump water heaters

EN 12309-2:2015 Gas-fired sorption appliances for heating and/or cooling with a net heat input not exceeding 70 kW. Safety

Sound power of water heaters

EN 15036-1:2006, Heating boilers — Test regulations for airborne noise emissions from heat generators — Part 1: Airborne noise emissions from heat generators (multiple references)

EN 12102-2:2019 Air conditioners, liquid chilling packages, heat pumps, process chillers and dehumidifiers with electrically driven compressors - Determination of the sound power level - Part 2: Heat pump water heaters (multiple references)

EN ISO 5801, Industrial fans - Performance testing using standardized airways (ISO 5801)prEN 12102-2:2016 (E)

Hot water storage tanks

EN 15332:2019, Heating boilers — Energy assessment of hot water storage systems

EN 12897:2016+A1:2020 Water supply - Specification for indirectly heated unvented (closed) storage water heaters

EN 60730-2-9:2019/A1:2019/A2:2020, Automatic electrical controls for household and similar use — Part 2-9: Particular requirements for temperature sensing controls (IEC 60730-2-9)

Solar devices

EN ISO 9806:2017 Solar energy — Solar thermal collectors — Test methods

ScenoCalc v6.1, September 2019. Free calculation tool developed by RISE in the context of the European QUAIST project, accommodates test results from both EN 12975(legacy) and EN ISO 9806, used amongst others in Solar Keymark certification.

prEN 12975:2021 (E) Solar collectors — General requirements

EN 12975-1:2006+A1:2010, Thermal solar systems and components — Solar collectors — Part 1: General requirements

EN 12976-1:2016 (E) Thermal solar systems and components - Factory made systems - Part 1: General requirements

EN 12976-2:2016, Thermal solar systems and components — Factory made systems — Part 2: Test methods

EN 12977-2:2012, Thermal solar systems and components - Custom built systems - Part 2: Test methods for solar water heaters and combi systems [now replaced by ISO]

EN 12977-3:2018 Thermal solar systems and components. Custom built systems. Performance test methods for solar water heater stores

EN 12977-5:2018, Thermal solar systems and components — Custom built systems — Part 5: Performance test methods for control equipment

ISO 9459-2:1995 (CSTG) Solar heating - Domestic water heating systems - Part 2: Outdoor test methods for system performance characterization and yearly performance prediction of solar-only systems

ISO 9459-5:2007 (STB) Solar heating - Domestic water heating systems - Part 5: System performance characterization by means of whole-system tests and computer simulation

EN ISO 9488:1999, Solar energy - Vocabulary

Shower water heat recovery devices

NTA 8800:2020, Appendix U, Energy Performance of Buildings - Assessment methods (in Dutch)

CSTB Protocole RECADO 2015