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APPLiA Input following Consultation Forum on Water Heaters of 28 September 2021

APPLiA supports the decarbonisation objectives of the Green Deal and therefore appreciates the need for an ambitious package of policy measures. Nevertheless, the current proposals risk missing the goal. In this paper we explain what should be modified or improved.

In particular, we would like to stress that product differentiation is required to drive consumers to buy the most efficient products that suit their needs. This aspect must be addressed apporting the necessary modifications to the working documents.

In the paper we also highlight how electric water heaters can contribute to decarbonisation thanks to fair, meaningful, realistic and implementable ecodesign requirements.

1. Looking at decarbonisation

The current labelling proposal does not factor in some of the efficiency saving potential offered by hot water technologies. The future label should be able to show it, granting consumers a unique purchasing decision tool that would facilitate the transition toward lower CO2 emissions and decarbonisation of the sector.

- The water heater stock in Europe is often characterised by predefined installation conditions and energy sources. In many cases, units are therefore replaced by new appliances belonging to the same technology. When replacing a unit, both the most efficient technology of the product category should be recognisable by the customer and the most efficient technology available among different product groups;
- Improved transparency on efficiency and actual energy consumption enables the customer to make the right appliance choice. Without the presentation of efficiency differences in daily use, the main decision criterion is only the price;

- The planned rescaling downgrades conventional electricity-based water heaters significantly, even if these technologies have further efficiency potential. Especially, the combination with renewable heating systems offer great energy advantages and opportunities;
- The downgrading and clustering of efficient technologies that can make their contribution to the Green Deal presents risks. In order to address them, the efficiency potentials of each technology group (best available technology) shall be considered, especially if there is no alternative solution in the corresponding load profile (not yet available technology).

2. Differentiation within product technologies is key

Since the current energy label system does not provide the sufficient differentiation to grant the right visibility to modern hot water technologies, we propose a different approach.

2.1 Electric Instantaneous Water Heaters (EIWH) Tapping 3XS-S

The primary energy factor (PEF) should correspond to the average lifetime of the appliances. A PEF of 1.5 might be appropriate for Europe for all electric appliances. If instead a 2.1 must be used, the resulting disadvantage for electric-based solution, including electric instantaneous water heaters (EIWH) in the tapping profile XS-S that must be balanced taking into account efficiency factors.

The energy label should place "Best Available Technology" (BAT) in the highest possible class (B). EIWH (3XS-S) with modern bare-wire heating system achieve a final energy efficiency of almost 100%. With the defined primary energy factor of 2.1, a maximum of 47.6%1 primary energy efficiency can theoretically be achieved.

Since electric and other energy carriers instant water heaters, with differing markets and regional focus areas, need to be considered in profile XS-S, class B of the XS-S

tapping profiles must be defined so widely that all technologies receive an appropriate rating.

-> An adjustment of the efficiency boundaries in the tapping profiles 3XS-S is therefore necessary. We suggest the following, based on the current proposal.

Energy label class	Declared tap	
	3XS-XXS	XS-S
A	$\eta wh \geq 50$	**$\eta wh \geq 77$**
B	**$45 \leq \eta wh < 50$**	**$45 \leq \eta wh < 77$**
C	**$42 \leq \eta wh < 45$**	**$42 \leq \eta wh < 45$**
D	$39 \leq \eta wh < 42$	**$39 \leq \eta wh < 42$**
E	$\eta wh < 39$	**$\eta wh < 39$**
F	-	-
G	-	-

Moreover, to provide differentiation between the different types of instantaneous water heaters, a factor Fctrl should be used, equal to 1.0 for hydraulic instantaneous water heaters and 1.3 for electronically controlled instantaneous water heaters.

We would also like to remind you some of the benefits of modern electronically controlled EIWH belong to the highest energy efficiency classes for tapping 3XS-S. Within the technology of EIWH there are enormous efficiency potentials (facilitated by electronics and flow regulation) which can now be realised and are currently not shown in the energy label:

- The efficiency potentials within the different instantaneous water heater classes and technologies are not taken into account. This means that EU-wide savings potentials of 1.926.000 tons of CO2 per year are not realised;
- Tapping 3XS-S are exclusively decentralised electrical systems that cannot be compared with and replaced efficiently by centralized systems because of disproportional high distribution losses;
- Electric controlled instantaneous water heaters with high efficiency and market success – a technology without any alternative in tapping profiles XS and S – is significantly devaluated due to PEF. We see both appliance technologies – BAT for gas as well as electric – in efficiency class B, as neither can be easily substituted. Moreover, there are several separate minimum requirements requested for each technology;
- Precise temperature setting (no mixing cold water to reduce the temperature as with a mixer tap) and dynamic flow rate regulation at appliance level enable further energy saving that can be influenced by the user at the point and time of use;
- User behaviour adaptation through energy efficiency/consumption monitoring is possible: e.g. ECO function, energy saving indication, definable user "saving targets". Smart monitoring as defined in Annex I of the energy label working document;
- EIWHs always produce the hot water that is actually needed, have no standby, energy start-up and no distribution losses and are able to offer smart features that should be rewarded.

2.2 Electric Storage Water Heaters (ESWH) and Heat Pump Water Heaters (HPWH)

Several of the benefits presented in the previous section can be also attributed to electric storage water heater ESWH for tapping ≤ S, in particular due to the decentralised installation.

Storage and heat pump appliances are a key asset for transition of the energy system towards more renewable electricity in the electricity grid and also in real use.

The following benefits on the grid and the energy saving are not visible in the energy label proposal:

1. ESWH and HPWH are installed with low electric power demand, avoiding peaks for weak electric grids, which cannot be replaced easily in current building installations;
2. Storage temperature could be set by the end-user and smart products could analyse the use of hot water. The information of hot water consumption and active feedback to the end-user could change its behavior and reduce the whole energy consumption;
3. ESWH and HPWH can work as green batteries: they can be charged with available energy of the grid, especially coming from intermittent renewable sources, with:
    a. Complementary level of set-point to increase their energy storage, equivalent to hot water content, on demand;
    b. Adapt to self-consumption by heating when local energy is available;
    c. Delay or anticipate heating on demand, to help grid regulation;
    d. Modulate their power, to make the best use of current available renewable energy.

-> For this reason, it is important to promote the uptake of HPWH in the appropriate load profiles whenever possible.

-> We should also ensure that ESWH remain in the market and continue to contribute to decarbonisation exploiting the above mentioned characteristics. Incentives shall be provided for further technological developments.

3. Minimum efficiency requirements

In the past, APPLiA requested energy dependent efficiency limits, therefore we appreciate that this approach has been taken into account. This is the right way to push every appliance to the best possible efficiency. For various technologies, including for HPWH, the proposed values are very demanding. It should be avoided that already highly efficient systems will become more expensive which would make it less convenient for end consumers to choose such a system. An assessment is needed to show that the additional investment cost for these products will have return on investment.

-> We are convinced that ambitious limits were already set for conventional electric water heaters in the current regulation and we do not support any change which would ban products without any feasible solution capable to replace them in existing buildings.

-> The thresholds below correspond to the values of the existing regulation with the introduction of the 2.1 PEF value, for EIWH and ESWH.

-> In addition, the limit proposed for HP tapping profile L is not feasible, we therefore propose a new value, as already flagged in our previous position papers.

Water heating energy efficiency per tapping profile	EIWH	ESWH	HPWH
3XS-XXS-XS-S tapping profiles	38.1%	38.1%	...
M tapping profile	42.8%	42.8%	...
L tapping profile	44.1%	44.1%	95%
XL tapping profile	45.2%	45.2%	...
XXL tapping profile	45.2%	45.2%	...
3XL-4XL	45.2%	45.2%	...

In the future, we expect the development of water heating solutions that combine ESWH with small compressors, creating products not belonging to any of the existing product categories. These appliances, belonging neither to the ESWH nor HPWH category, but appropriate for some specific markets, should be safeguarded. The lack of an appropriate category would impede the development of such products, which would likely be considered HPWH, and therefore unable to meet the HPWH ambitious requirements.

-> We invite the Commission to develop a proposal that would not hamper these future developments. We remain available to further elaborate on this concept.

4. Secondary scale

We would like to stress once again that the rescaled label should grant the product differentiation required to drive consumers to buy the most efficient products that suit their needs.

The current scale squeeze in one or two classes products of the same technology also when they have very significant differences in efficiency and saving potential. The main consequences could be following:

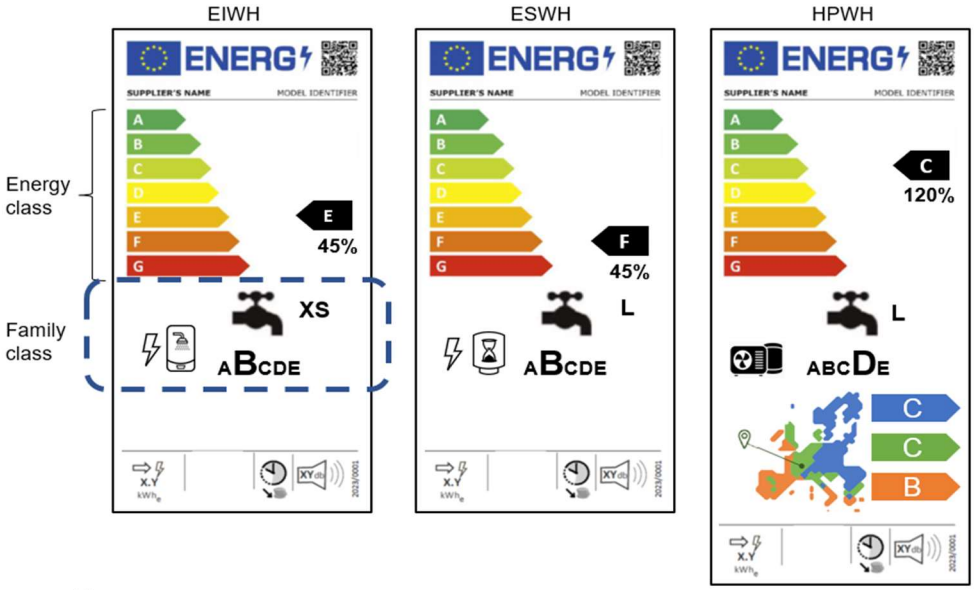
- consumers that in most cases have limited possibility to change water heater type, often due to installation requirements and purchasing power, finding all the accessible products in one class, with no visible information on which one is the most efficient, will buy the cheapest;

- manufacturers that even when improving the efficiency of the product see no possibility to move to the higher energy efficiency class will stop competing on efficiency and only compete on price, reducing the average efficiency of that technology.

The overall result will be a poorer market, both in terms of price and efficiency, exactly the opposite of what the COM is aiming at.

-> The solution to address this important drawback is to provide on the energy label a very simple information that points consumers to the most efficient product among technologies and within the technology.

-> Next to the efficiency indication on label differentiation could be provided adding an additional secondary scale, specific for each product technology next to the main scale based on primary energy. The one below should be considered as a possible solution.



5. Peak temperature for HPWH (Request of lowering Tpeak not supported by ZVEI)

Although we understand and support the approach to create a level playing field across products covered by Lot 2 and apply such requirement for all products, the regulation needs to take into account the different specificities of each technology, whether it is on setting technology specific minimum efficiency, method of calculation (which is already the case today) or testing.

While it is not particularly the case for other heat generators, operating temperatures have a big influence on thermodynamic generators efficiency. Thus, such conditions should be carefully chosen and justified to help achieve the optimum energy savings while fulfilling customer needs.

In this regard, we do not believe the required peak temperature of 55°C on average for the tapping is needed. Tpeak at 55°C is not linked to particular customer needs or real-life usage. In fact, the majority of today's domestic hot water usages are around 40°C (kitchen 45 °C and 40 °C for other comfort applications). Furthermore, some HSE regulation recommends not to exceed a 45°C water outlet to avoid scalding and 50°C at point of use to avoid burning. In conclusion, the requirement to maintain an average temperature of 55°C during the tapping is not needed and would be detrimental to consumers, as they would need to pay for additional energy used while they do not require 55°C application in their everyday pattern usage.

However, it was reminded during the Consultation Forum that the load profiles were defined some decades ago and were the fruit of long discussions. We will only recall that the two draw-offs at 12:45 and 20:30 with a peak temperature at 55°C were thus described as dedicated for dishwashing, and that nowadays, manual dishwashing is more and more replaced by household appliances.

Requiring hot water storage at higher temperature than 55°C in order to achieve the tapping requirement (which will become the default setting value for the HP) will result in higher standby losses and lower efficiency, which will reflect on the end user energy costs and CO2 emissions. Setting a mandatory and physically reached Tpeak at 55°C will be detrimental to reaching the energy savings required by the EU's ambitious climate agenda.

Furthermore, for combi-HPWH the situation becomes even more complicated as these systems use an intermediary water circuit to exchange between the refrigerant and the tank. Requiring a Tpeak of 55°C for those systems will particularly affect their potential efficiency and capability to achieve the MEPS and could be at the limit of recommended operation of some refrigerants.

-> Nevertheless, following the recent discussions that took place during the Consultation Forum meeting, APPLiA would like to make a concrete compromise proposal for HPWH.

We believe that a step of 50°C would be sufficient to grant consumer comfort without the risk of needless increase in the overall energy consumption, for this reason we propose the following scheme, where different penalties are proposed for different loads:

Tpeakmin (TP_{min}) (no virtual backup heater)	**Load S, M**	**Load L, XL**	**Load ≥ 2XL**
$TP_{min} \geq 55°C$	0pts	0pts	0pts
$54°C \leq TP_{min} < 55°C$	-1pts	-1pts	-1pts
$53°C \leq TP_{min} < 54°C$	-1pts	-2pts	-2pts
$52°C \leq TP_{min} < 53°C$	-2pts	-3pts	-3pts
$51°C \leq TP_{min} < 52°C$	-2pts	-3pts	-4pts
$50°C \leq TP_{min} < 51°C$	-3pts	-4pts	-5pts

6. Timing

It should not be forgotten that in addition to a label change (visual and scale), several other important modifications will be introduced by the rules proposed in the working documents; in particular the rating conditions and test procedures.
Manufacturers can start investing for the implementation of the changes only when there is certainty about the date since when these new obligations will apply.

-> APPLiA requests at least two years between publication of the regulations and the application of the requirements.

7. Resource efficiency requirements

The working documents proposed that the entire set of components of water heaters should be available as spare parts for a period of 10 years.

Manufactures of water heaters are not always also responsible for production the spare parts (e.g. in case of OEMs). Therefore, long lists of spare parts might impede agreements between manufacturers of the final appliance, who need to be compliant with these ecodesign requirements and e.g. the OEMs, component manufacturers, who as sellers have no legal responsibility.

Any possible wrong estimation of the spare parts to make available would lead to non-compliance in case of underestimation, and severe material waste in case of overestimation.

In addition, there is no guarantee that the spare parts that are stored in warehouses today, can still be sold in e.g. 10 or 8 years' time, since the new legislations can prohibit the use of certain substances making the spare parts obsolete, again with severe material waste as a result.

-> For these reasons we propose to follow the approach of other ecodesign regulations and suggest that the 10 years availability requirements apply only to the following components:

Sealing gaskets for domestic hot water tanks,

Pumps,

Expansion vessels,

Hydraulic valves,

Mechanic and electronic thermostats and sensors,

Additional protection against corrosion for domestic hot water tanks,

Printed circuit boards.

In addition, for monobloc HPWH:

Fan motors,

Back-up heating element,

for split HPWH:

Fan motors,

Compressors,

Evaporators,

Safety related parts (such as over pressure switch),

Back-up heating elements,

for ESWH:

Heating elements,

for EIWH:

Heating body,

Safety related parts (such as over pressure switch).

Professional repairers

The legislator should also include a provision that excludes from this obligation those spare parts that have been banned by other regulations, directly or indirectly through legislations prohibiting the use of certain substances.

Finally, no spare part should be made available to final users for safety reasons. Trying to repair water heating equipment can be extremely harmful if not sufficiently well trained. Consequently,

only professional repairers should have access to spare parts. Therefore, repair information requirements should be available uniquely to professionals.

Repair information

Water heaters require technical training and installers/repairers need to have specific certification (mandatory) to be able to intervene on these products, especially due to the flammability of some of their parts and basically because of the electrical safety. The manufacturer should have the right to dismiss the request where operators requesting repair information cannot provide

evidence of this. Furthermore, it should be clearly prescribed that information shared with the repairer cannot be shared with a third party or used for any other purpose than the one mentioned in the legislation, due to proprietary information and safety reasons.

For the acceptance or refusal of the professional repairer manufacturers should be given 10 working days. For access to the information and at least 5 working days.

Delivery of spare parts

As already stated in previous occasions, we have concerns on potential non-compliance for spare parts not arriving within the 15 working days due to possible extraordinary consequences or post/shipping services failure or failure not caused by the manufacturer. During the Consultation Forum related to air conditioners it was requested that the obligation to deliver spare parts could be further clarified when it comes to its verification by market surveillance authorities. So far we have received no clarification.

8. Standards in regulations

The working documents include a non-exhaustive overview of test and calculation methods that might be required to assess compliance with the requirements. Reference to the test standard in the regulation will significantly reduce the role of standardisation which in some cases might become redundant. From APPLiA's side, we have been always advocating to keep the NLF principles: essential requirements in the law and technical details on how to meet them in the European Standards. This unique and well established system should not be modified by secondary legislation.