POSITION PAPER

COMMENTS ON THE ECODESIGN AND ENERGY LABELLING DRAFT WORKING DOCUMENTS FOR SOLID FUEL HEATING

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INTRODUCTION

We welcome the revisions of the ecodesign and energy labelling measures for **solid fuel boilers** (EC 2015/1189 and EC 2015/1187) and ecodesign regulation of **solid fuel local space heaters** (EC 2015/1185) that are long overdue. Considering that solid fuel combustion for residential heating is a major source of air pollution in Europe, and that 80 to 90 million EU households use solid fuel for heating purposes, it is indeed key to use ecodesign requirements to address the threats that solid fuel heating can pose to human health and the environment, specifically via air pollution to both ambient air and indoor air, as well as its contributions to climate change, biodiversity loss and forest resource use.

AIR POLLUTION AND BIOMASS BURNING

Residential burning of wood and coal in small stoves and boilers is the predominant source of health-hazardous and climate-damaging pollutants in the EU: these appliances emit particles very small in size and they are responsible for **62% of fine particulate matter ($PM_{2.5}$), 36% of black carbon (soot, BC), and 91% of benzo(a)pyrene (BaP)**. The latter is carcinogenic and has several other negative effects on human health.

Black carbon is a component of particulate matter, and it is the most relevant short-lived climate pollutant. Black carbon from wood burning is as toxic as the black carbon emitted from diesel cars. According to the IPCC, black carbon's global warming potential for 100 years (GWP_{100}) is 900 $CO_{2eq.}$ and even higher short-term impact, as GWP_{20} is 3,200. The BC is estimated to be up to 55% in solid particles for new stoves, thus, it is of utmost importance to limit such pollutants and to address them via new ecodesign requirements.

Recent studies show that $PM_{2.5}$ emissions by the residential sector are almost completely due to biomass burning. This is relevant both in rural areas and cities. The European Environmental Agency estimated that over **95% of the urban population is exposed to $PM_{2.5}$** levels above the World Health Organization (WHO) guidelines, causing 259,000 annual premature deaths in the EU. In addition, newer studies suggest that stoves can pollute the indoor air quality to substantially higher particle levels than emissions measured close to polluted streets during rush hours. The smoke from residential burning is composed of the same harmful pollutants - particles and polycyclic aromatic hydrocarbons (PAHs) - as tobacco smoke, which increases the risk of cancer, blood clots, cardiovascular diseases, asthma, bronchitis and other illnesses. Thus, residential biomass burning contributes significantly to morbidity and premature mortality in the EU, being an expensive burden to society.

Central and Eastern European countries are affected the most, as concluded by a European Parliament Pilot Project. The research highlights also that burning waste in biomass appliances is a common practice in households during winter months, which causes the release of hazardous pollutants , such as high quantities of PAHs leading to BaP toxicity equivalent of a factor up to 4100 times higher than wood combustion.

Many Member States rely on biomass to switch to renewable heat. Thus, consistency of the three pillars of the EU's clean air policy is crucial and needs to be ensured with appropriate legislation at the EU and national level. For instance, inconsistencies were found between the additional air pollution caused by residential biomass and the German National Air Pollution Control Programme (NAPCP), as judged by the Berlin-Brandenburg higher administrative court.

The revision of the Ecodesign regulations for stoves and boilers represents a key opportunity to cut emissions from the EU's main air pollution source. This will improve public health, mitigate near-term climate change and help prevent irreversible melting of the Arctic ice due to the deposition of black carbon. It also supports policy goals in the UNECE Gothenburg Protocol, WHO air quality guidelines and other pertinent EU legislation such as the National Emission Reduction Commitments Directive, the Ambient Air Quality Directive and the overarching Zero Pollution Ambition.

ECONOMICS

Biomass use in homes caused massive health costs for EU national governments: for heating and cooking purposes, wood burning costs 12.6B€ in health-related expenditures. Reducing the impact of solid fuel heaters will have a tremendous economic benefit for Member States. In order to avoid the risk of increasing costs for new appliances from implementing ambitious requirements for air pollutants, it is important to take into account that these products have a lifetime of around 20 to 30 years. Thus, the long timespan must be taken into account in the cost calculation, looking at the whole process of purchasing, owning and disposing to adequately show how the improvements outperform such risk.

Additionally, a substantial price reduction is expected for precipitators and catalytic converters when produced in larger quantities. For instance, a *cost reduction of at least 50% is expected for precipitators*.

Households affected by energy poverty, particularly in Eastern European countries, are relying on these appliances. We therefore propose the following measures be implemented alongside the ecodesign requirements to leave no one behind: 1) hardship provisions, 2) targeted funding of clean(er) individual heating technologies alternatives, and 3) supply of inexpensive and green district heating.

Lastly, the abovementioned expected savings from the public health budget can be diverted to mitigate the potential impact on energy poverty.

COMMON REQUIREMENTS

While this document addresses separately the two product lots, solid fuel local space heaters and solid fuel boilers, below are some elements that are common to the two types of appliances and that should be therefore tackled in both legislative pieces:

- As part of the transition away from fossil fuels, we call for the **phase-out of coal-based appliances from the EU market** within this revision. As shown in the presentation of the Consultation Forum in 2023, coal stoves stock counts only 36000 products, mostly in Belgium, representing only 0.1% of the market. Coal is the most unsustainable energy source, thus it will be important to move away from new installations to achieve the long-term climate neutrality targets in the EU. Additionally, a JRC study shows that coal boilers will be '*nearly fully phased out from direct usage in the building sector*' by 2030.
- We regret to see the **lack of emissions thresholds for BC and BaP**: they are harmful pollutants addressed in the Ambient Air Quality Directive (AAQD) and the NEC Directive.

- Recurring **measurements in real-life operations** by professional inspectors commissioned by authorities (e.g. chimney sweeps) with a focus on Particle Number (PN) or BC emissions should be included, as already conducted in the vehicle sector. This ensures that emission thresholds are met in real-life use and that the emission reduction techniques are working effectively.
- Poor **fuel quality** causes even more air pollution and climate impacts; hence, setting ecodesign requirements should be further explored, completed with information in the energy labels, to promote cleaner fuels over polluting sources.
- We welcome the inclusion of **non-woody biomass in the product scope** as some of these products have high emissions, partly due to the lack of regulation, closing a loophole: manufacturers can claim that the intended use of their products would be with this source, circumventing product policy requirements. Additionally, dedicated thresholds should be included as emissions from these products are substantially higher than those from woody biomass.
- The articles on **circumvention and software updates** are proposed to be removed from the draft Ecodesign regulation. As Art. 10 of the EU 2024/1781, we call to include the same provision to prevent circumvention and worsening of performance.
- We support the important requirement of **3rd-party verification**, as proposed in the draft. It will avoid unrealistic self-declaration and help market surveillance. As detailed in Annex II of EC/768/2008, this module specifies testing of one unit or analysis of the technical documentation, we recommend the former for the conformity assessment requirements.
- It is important that all the **information channels** – such as manuals, free websites, etc. – contain the information on Annex II, 4(1) and 4(2) and that they should be available on free access websites for 20 years after the last placing on the market.
- Given the lifetime of the heaters, **spare parts** should be available for at least 20 years after the last unit is placed on the market.
- We firmly believe that **no change to the energy content of wood shall be made** in the energy efficiency methodology.

For the next review of the regulation: In the medium term, new solid fuel appliances need to fulfil the same **emission thresholds as EURO VI trucks** (PM, PN and NO_x) sold in the EU after 2014.

SOLID FUEL LOCAL SPACE HEATER - ECODESIGN

REQUIREMENTS FOR ENERGY EFFICIENCY (ANNEX II, SECTION 1)

We support that efficiency and emission limits are also included for *part load requirements*. Consumers often use these products in part load operation, as the space heaters are designed to heat rooms during the coldest day of the year, while during most of the heating season, the heat demand is much lower.

REQUIREMENTS FOR EMISSIONS (ANNEX II, SECTION 2)

A reduction of the *emission thresholds* is foreseen in the revision. In particular, the proposed stricter limit values for Carbon Monoxide (CO) and Organic Gaseous Compound (OGC) are useful to promote technical solutions such as a catalytic converter for less gaseous pollutants. However, the proposed thresholds for particle emissions lack ambition. Hence, emission thresholds need to be reduced even further to effectively require and foster the application of the Best Available Technologies (BAT), now commercially available.

Based on comprehensive studies, the Technical University of Aachen (Germany) clearly states: "*With catalytic converters and electrostatic precipitators, there are effective and, above all, commercially available reduction technologies for wood-burning stoves which, in combination, remove both the acutely toxicologically relevant (VOC) as well as the predominantly chronically harmful solid-particulate pollutants (PM/UFP) and adhering organic substances (including PAHs). Both technologies should be combined.*"

We propose, as a first step, to effectively use the measurement methods (in Annex III) with the following aims:

- to reduce **PM emission thresholds**, currently not following the BAT (2025) available in the market and not aligning air quality standards processed in the adopted AAQD in 2024, which cut the allowed limit values by more than half (old thresholds are yet not met in many EU cities and biomass is the main contributor):
    - to 15 mg/Nm^3 for heaters using solid fuel other than compressed wood in the form of pellets; with this limit being further reduced to less than 10 mg/Nm^3 in the next revision.
    - to 10 mg/Nm^3 for heaters using compressed wood in the form of pellets.
- to reduce **OGC emission thresholds**:
    - to 60 mg/Nm^3 for heaters using solid fuel other than compressed wood in the form of pellets.
    - to 10 mg/Nm^3 for heaters using compressed wood in the form of pellets.
- to reduce **CO emission thresholds** (as foreseen in the proposal)
    - to 500 mg/Nm^3 for heaters using solid fuel other than compressed wood in the form of pellets.
    - to 240 mg/Nm^3 (nominal load) and 475 mg/Nm^3 (partial load) for heaters using compressed wood in the form of pellets.
- to reduce **NO_x emissions** to 200 mg/m^3 for solid fuel local space heaters using fossil solid fuel, in line with our proposal to phase out coal heaters, and align all the products under the common requirements.

As more than 90% of particles emitted from biomass appliances have a size of less than 1µm, we welcome the introduction of the measurement of **particle number** (PN). However, a strict particle number threshold that ensures the application of electrostatic precipitators is missing. Thus, we propose to set a limit of 2 million particles/cm^3 in the same direction as the requirements set in the German Blaue Engel's Basic Award Criteria. It is a crucial initial step as, for comparison, new trucks have a PN emission below 5,000 particles/cm^3 (and often <1,000).
For particle emission requirements, we propose maintaining the option to test stoves using the Norwegian standard (Nordic Swan) with a particle threshold of 1 g/kg dry fuel[1], requiring the precipitator's use.

TECHNICAL REQUIREMENTS (ANNEX II, SECTION 3)

We support the introduction of mandatory **automatic combustion control** in solid fuel heaters, as these products have the risk of very high emissions if the air in the combustion chamber is not adequate. This is also one reason for the mismatch between real-life operations and test results in labs. Thanks to an automated regulation of the airflow, the combustion process will be optimized, and operating errors will

[1] To be converted in mg/m^3 for coherence with other emission thresholds in the text

be reduced, leading also to improved energy efficiency and decreased emissions. Mandatory automated combustion control is a regulatory measure already implemented in the German Blaue Engel ecolabel, and it enables supplementary emission reduction technologies (catalytic converter and electrostatic precipitator - ESP) to work more efficiently. With the DIN/TS 18843-1 and DIN/TS 18843-3, technical standards for automatic combustion controls are available, and they have already been considered by the German Government/States (Länder) Working Group for emission control.

Future stoves launched in the EU single market need to be equipped with an internal or external ESP and electronic combustion control. Specifically for appliances with an external ESP, a counter of operating hours is strongly recommended to ensure that they are used continuously when burning solid fuels.

We regret to see **the lack of requirements on the tightness around the combustion chamber** to reduce indoor air pollution. They should aim at keeping $PM_{2.5}$ and PN in line with WHO recommendations as they are already included in the German Blaue Engel ecolabel.

PRODUCT INFORMATION REQUIREMENTS (ANNEX II, SECTION 4)

We propose that the product information sheet and the user guide shall be available for 20 years on free access websites from the last placing on the market of the given model. Moreover, PN measurements should be included in the technical information for Table 1. We also support that this information is provided with a comparison with other PN sources, such as EURO6 diesel cars, to give the consumer a clear picture of the pollution the product can bring if not properly used.
Furthermore, we believe that information on controls should be more prominent and user-friendly in Table 3. We welcome the requirement to provide a quick user guide.

RESOURCE EFFICIENCY REQUIREMENTS (ANNEX II, SECTION 5)

Besides remote controls, *spare parts available* to the end users shall include removable parts, such as grids, removable ash chambers and other parts easily removable without tools.

MEASUREMENTS AND TRANSITIONAL METHODS (ANNEX III + IV)

We welcome the proposed general method for measuring emissions as it brings testing conditions closer to real-life operations. In this respect, the draft proposal takes up the science-based recommendations from the comprehensive research project beReal, the elaboration of the Blue Angel eco-label for stoves and the ongoing REAL-LIFE Emissions project. These research projects clearly emphasized that current conditions for emission testing are far from real life. Even worse, today's emission testing in the laboratory is not only inappropriate to reflect real-life performance but also fails to rank appliances with regard to their actual emission performance. Thus, we welcome the foreseen introduction of the following requirements:

- Consideration of ignition phase (with natural draft)
- Consideration of partial heat output phase
- Measurement during six burn cycles in total, which must be carried out immediately after each other
- Continuous measurement of emissions
- PN measurement

Particle number (PN) measurement is strongly recommended: at the moment, particulate emissions from stoves and boilers are only measured as total particle mass. This means that size and composition are

not considered. Measurement and emission limit values for PN were introduced in the vehicle sector over a decade ago. Although adaptations are necessary for use in the heating sector, the DBFZ's investigations in the course of the elaboration of the Blue Angel eco-label for stoves have shown that particle counting is also useful and technically feasible for solid biomass appliances. A validation project commissioned by the German Federal Environment Agency came to the same conclusion.

Additionally, we propose:

- As in the Norwegian standard NS3058/59, the *operation with a high load* is included in the regulation, either with the introduction of a high load/overload test procedure or with loading according to the size of the combustion chamber.
- The test should be accomplished with fuel that is commonly used (e.g. with bark).
- Following NS3058/59, we propose to maintain the testing with condensed particles as an alternative particle test.

VERIFICATION PROCEDURE FOR MARKET SURVEILLANCE (ANNEX VI)

The *verification tolerance* has been set to 50% for PM emission, however, we believe that a lower tolerance can be set, down to 25%.

SOLID FUEL BOILER - ECODESIGN

SCOPE (ART. 1)

We welcome the **scope extension to 1MW** so that all boilers for space heating or similar purposes are covered for energy efficiency and air pollution requirements in the EU.

REQUIREMENTS FOR EFFICIENCY AND EMISSIONS (ANNEX II, SECTION 1/2)

We welcome the increase in the requirements for **energy efficiency to 82%** measured with the Gross Caloric Value (GCV) of the fuel, as well as the **PM emission threshold of 3 mg/Nm³**. This limit should be equally applied to non-woody biomass.

As the limit decreases, boilers will require electrostatic precipitators, and a quite wide range of boilers in the market already offer such technology, having the PM emissions well below the threshold of 2.5 mg/Nm^3 (nominal load) of the German funding scheme BEG (bonus for low-emission appliances).

We welcome the **reduction of the OGC emission** threshold; however, we propose to have it set to 3 mg/Nm^3, rather than the current 10/15 mg/Nm^3 in the draft.
We support the introduction of the **PN measurement**, and we propose to set a limit of 2 million particles/cm^3, as proposed for solid fuel local heaters.

ADDITIONAL TECHNICAL REQUIREMENTS

Low-emission solid fuel boilers are usually equipped with an either internal or external **electrostatic precipitator**. ESPs for boilers should include automatic cleaning and external ESPs need to be equipped with a counter of operating hours. Both requirements are recommended to ensure the efficiency and continuous operation of emission reduction technology.

A **mandatory buffer tank** requirement should be introduced, to reduce operation in partial load conditions, in line with the specifications of the current German funding scheme BEG: buffer tank volume of, at least, 30 litres per kW of nominal heat output.

PRODUCT INFORMATION REQUIREMENTS (ANNEX II, SECTION 4)

We propose that the product information sheet and the user guide shall be available for 20 years on free access websites from the last placing on the market of the given model. Moreover, PN measurements should be included in the technical information for Table 1, it is an important information for urban environmental authorities to set out the use of which specific fuels are allowed in city districts, as some civil society organisations are calling on municipalities to take steps in the right direction.
We also support that this information is provided with a comparison with other PN sources, such as EURO6 diesel cars, to give the consumer a clear picture of the pollution the product can bring if not properly used.

RESOURCE EFFICIENCY REQUIREMENTS (ANNEX II, SECTION 5)

Spare parts available for users should include remote controls for all models where they are used. Besides remote controls, *spare parts available* to the end users shall include removable parts, e.g. parts easily removable without tools.

MEASUREMENT AND TRANSITIONAL METHODS (ANNEX III + IV)

We welcome **PN measurement** as solid fuel boilers emit large numbers of ultrafine particles, and these emissions are best assessed with a combination of particle number and particle mass measurements.

We propose a change to the PM testing methodology for a more realistic test procedure: **using the dilution tunnel**, a method that includes condensed particles, compared to the current EN-PME.

VERIFICATION PROCEDURE FOR MARKET SURVEILLANCE (ANNEX VI)

In the draft, the verification tolerance for particle emissions is set at 10 mg/Nm^3. As the proposed limit is 3 mg/Nm^3, accordingly, the verification tolerance should not be less than the limit itself; thus, we propose to reduce it to not higher than 2 mg/Nm^3.

BENCHMARKS (ANNEX VII)

The specific indicative benchmark, that identifies the BAT of the products in the market, is set to 5 mg/Nm^3 for PM. However, with the use of electrostatic precipitators, this could be set down to 1mg/Nm^3 (nominal load), which is our proposal to be introduced in the text, as many boilers have already emission well below such limit (see list of low-emission boilers provided by German BAFA).

SOLID FUEL BOILER – ENERGY LABELLING

SCOPE (ART.1)

We propose to work on the possibility of merging the energy labelling of solid fuel boilers (EC 2015/1187) with space and combination heater labels (EC 2013/811). It will unleash the fullest potential of the energy label, as consumers would be able to finally compare all the appliances that can serve the same purpose (heating households). Given that the energy labels are quite similar for the two product groups, we request this possibility to be explored.

ENERGY CLASSES (ANNEX II)

We support rescaling of the label to make the energy classes equal for all boilers and hydronic space heaters, as they reflect the market evolution for energy efficiency of such products.

We propose that the label scale proposed in the draft energy label regulation be refined to follow the label scale in the label regulation for boilers and combination heaters, along with adjusting the different testing conditions.

We support the **introduction of an air pollution indication**, based on PM emissions, similar to the water use indication within the washing machine energy label; additionally, we recommend showing the PN measurement as well or a combined icon for both PM and PN measurements.

We support a clear indication on the label that the expected efficiency and emissions levels are to be associated with the type of fuels used in test methods.

VERIFICATION PROCEDURE (ANNEX VIII)

We recommend decreasing the verification tolerance for energy efficiency from 6% to 4%, aligning the tolerances between energy labelling and ecodesign, and providing clear guidance to manufacturers and market authorities.

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