EEB AND INFORSE - EUROPE COMMENTS TO THE GREEN PUBLIC PROCUREMENT PRODUCT SHEET FOR BOILERS (CRITERIA PROPOSAL OF MAY 2009)

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This paper presents the views of the European Environmental Bureau (EEB), the largest European federation of environmental citizen's organisations, and the International Network for Sustainable Energy (INFORSE)- Europe, the European network of NGOs working for sustainable energy, on the Green Public Procurement Product Sheet for boilers.

1. Need for guidelines based on a general system approach for heating

The current GPP criteria for boilers and other heating sources (micro CHP) follow a product based approach and set guidelines for individual heating sources. However, this approach is insufficient to ensure that the greenest approach for heating a building is considered by a public authority.

EEB and INFORSE Europe call for the preliminary integration of a system based approach which addresses the available alternatives, including possible renewable sources and energy efficiency in the building. In this regard, the ongoing Ecodesign of Energy-Using Products (EuP) work on boilers could be taken as example, as it gives a broader consideration to the choice of possible heating solutions. Even though the results of the Ecodesign process are not yet known, we consider that at least the options included in the Ecodesign work on boilers (minimum requirements and single energy labelling across technologies) should be analysed before finalising the GPP criteria for boilers, with the exception of heat pumps (which are not on comparable level of progress with the other heating sources regarding public procurement[1]).

In addition, to the choice of possible heating systems, two other aspects, not addressed by the Ecodesign work, need to be considered before deciding on the type of heating system that needs to be purchased. Firstly, it is fundamental to assess the possibilities of using heating sources from special local renewable energy resources (geothermal energy, landfill gas…) or waste that might be available in the neighbourhood of the building. Secondly, the energy performance of the building must be addressed as a prerequisite, as energy efficiency measures will affect the size of the boiler needed. Following the Energy Performance of Building's Directive (EPBD), public buildings must have an energy label with recommendations for cost-effective improvements. These recommendations should be considered in close relation to the purchase and installation of a new heating source.

The existing Green Public procurement (GPP) Product Sheet on Construction includes a system approach and integrates as well renovation. It can partly be used to cover the need for a system approach, if the construction product sheet is used together with the boiler product sheet.

1 Some heat pumps are included in the Ecodesign work on boilers; but the (draft) public procurement guidelines for heat pumps do not give information that allows comparison with other heating sources.

Nevertheless, the construction product sheet does not incorporate references to the building energy certificate, nor to the use of available renewable energy in the neighbourhood.

Therefore, we propose that the purchase of a new heating source for a public building starts with a selection of the optimal heating source(s) and with building improvements. The process must include the following steps:

1. Plan for energy efficiency improvements of the building to reduce the heat load, implementing recommendations from the building energy certificate, and using the GPP product sheet on construction
2. Plan for optimisation and improvements of the heating system to reduce losses, and distribute heating optimally (including options such as night set-back). This can include recommendations from the building energy certificate.
3. Evaluation of the use of localised renewable energy, including geothermal heat and landfill gas within a distance where a pipeline for such energy resources is feasible.
4. Evaluation of the use of waste heat from nearby industry or other heat source of sufficient temperature.
5. Evaluation of the use of micro CHP (combined heat and power) as part of the heating supply.
6. Evaluation of the use of solar heating, as part of the heating supply (including heating of hot water).
7. Evaluation of the choice of fuel. For green public procurement, heating systems using coal and peat should always be avoided due to their high climate impacts, and systems using oil should be avoided whenever there is a viable alternative.

Steps 1 and 2 are operationalising the EPBD approach, steps 3 and 4 integrate relevant green resources of the local area, steps 5 and 6 integrate aspects of the upcoming EU Ecodesign (EuP) Regulation for boilers, and step 7 integrates the necessity to drop coal, oil and peat in the EU energy mix for obvious CO_2 reasons.

Based on steps 1-7, the public purchaser should decide the heating source or combination of sources that give the best environmental and economic performance, including minimisation of greenhouse gases. Subsequently, the purchaser should use more specific GPP guidelines for CHP and/or boilers for the final purchase of the heating source(s) considered.

2. Need for updating the GPP guidelines

The validity period of the GPP guidelines is not stated clearly. For boilers, it is expected that the upcoming Ecodesign Regulation for boilers will introduce minimum criteria and energy labelling in 1 to 2 years. The EuP measure should be revised 5 years after. When the Ecodesign regulation for boilers is finally implemented, we propose that the GPP guidelines for boilers/heating solutions are revised to match the highest class in the Ecodesign labelling scheme that is achievable.

3. GPP solutions must be efficient: criteria must not favour anything below best condensing boilers

It is crucial that the requirements set for green public procurement lead public procurers to the best available technology with minimal energy consumption. As non-condensing oil and gas boilers cannot be considered as efficient technologies, due to their significantly higher energy consumption[2], EEB and INFORSE Europe call for their exclusion from the scope. The guidelines should only require energy efficiency levels of the best condensing boilers on the market and above (hybrid systems with renewables). They are available for gas as well as for oil.

[2] Condensing boilers are 10-15% more efficient than non-condensing, which is also concluded in the background report for the product sheet. As we argue in the comments to cost considerations -see below, we do not agree that condensing boilers are more expensive than non-condensing boilers over their lifetime.

4. Comments to the scope

While the scope initially refers to the Ecodesign preparatory study for heating sources (www.ecoboilers.org), which includes many heating solutions, it ultimately narrows the definition to oil, gas, and biomass-fired boilers. Other renewable energy sources than biomass are excluded, which is not consistent. EEB and INFORSE Europe call for enlargement of the scope to cover all environmentally sound options, such as efficient boilers assisted with solar energy. Additionally, it should be explained that the public procurement of a heating source should start by a proper overall selection as explained in point 1, while the present guidelines only address the purchase of specific type of boilers.

The scope is limited to 70 kW for gas condensing boilers and 120 kW for other gas and oil boilers. As public authorities often use larger boilers (for office buildings, schools etc.), we propose to increase the scope to at least 300 kW, similar to biomass boilers.

The Ecodesign measure is expected to limit the requirements for condensing boilers to boilers above 10 kW. Therefore it could be considered to limit the scope of this guideline to boilers above 10 kW. Probably public purchase of boilers below 10 kW is very limited.

5. Comments on the core criteria

Selection Criteria

The selection criteria should also require availability of information on the electricity demand, which in the current draft is only addressed within the award criteria.

Technical Specifications

Criterion 1. Energy Efficiency

Only the most energy efficient products should be included in the scope of Green Public Procurement. In the case of oil and gas boilers, only the best condensing boilers, ideally coupled with renewable energy, can satisfy this condition. Therefore, the guidelines should recommend the purchase of renewable-assisted efficient condensing oil and gas boilers. This can be done by setting the minimum efficiencies for gas boilers to the level proposed in the current draft of the guidelines for gas condensing boilers and by setting similar requirements for oil boilers, with a slightly lower level reflecting the lower efficiency of oil technologies. The requirements proposed in the current draft criteria for oil boilers will not deliver acceptable energy savings, as compared to the alternatives available on the market. We propose following these energy efficiency requirements:

-**oil fired boilers** should have minimum efficiencies of 95% for 10 kW boiler and 96% for a 70 kW at temperatures of 75/60°C. At temperatures of 40/30°C, the nominal utilisation ratio must not fall below 98 % for 10 kW and 99 % for 70kW. Output values between the above limits shall be linearly interpolated according to the formula:
"y = (1/60) x + 94.83" or "y = (1/60) x + 97.83", respectively.

This proposal improves the suggested requirements for oil boilers. The proposal is based on the fact that efficiencies of oil condensing boilers are usually about 5% below those of gas condensing boilers.

-**gas fired boilers** should have minimum efficiencies of 100% for 10 kW boiler and 101% for a 70 kW at temperatures of 75/60°C. At temperatures of 40/30°C, the nominal utilisation ratio must not fall below 103 % for 10 kW and 104 % for 70kW. Output values between the above limits shall be linearly interpolated according to the formula:
"y = (1/60) x + 99.83" or "y = (1/60) x + 102.83", respectively.
(as proposed by the current GPP criteria draft for condensing boilers)

Additionally, a more advanced approach should be considered with requirements based on seasonal efficiencies, which can be calculated on the basis of energy efficiencies measured at 100% (nominal) load and 30% load. The Ecodesign of Energy-Using Products Implementing Measure on boilers will probably include such a method, but simpler methods are also available[3].

Criterion 1.3. Energy efficiency for solid fuel biomass boilers

The criteria for solid fuel biomass boilers are based on the Nordic Swan criteria for automatic fed biomass boilers. However, they do not include the criteria "2" of the Nordic Swan set of requirements, which establishes that the part load efficiency should be as follows:
$\eta x \geq 86\%$; $\eta x = (\eta 20 + \eta 40 + \eta 60)/3$ (where $\eta 20$, $\eta 40$,$\eta 60$ stand for the measured efficiency at 20, 40 and 60% load).

Missing the part load efficiencies is a major weakness, because a boiler operates in part load most of the time. Unfortunately, very few manufacturers measure the part load efficiency at 20, 40 and 60%, so there is a risk that including the Nordic Swan criteria "2" severely limits the selection of boilers. As a solution, we propose to measure the part load according to the standard used by manufacturers (EN303-5), where one part load point is measured. This can be used to specify a part load criteria simply by requiring that an automatic feed boiler must fulfil the efficiency criteria ($\eta = 75 + 6 \log Q$,) both for Q = nominal output, and for Q = part load of the boiler not higher than a 30% load[4].

Criterion 2. Emissions to air

2.1. Emissions from gas (condensing) boilers

The allowed NOx emissions for gas boilers are higher than those proposed in the future Ecodesign Regulation (according to the current Ecodesign working documents on heating sources). The current draft of the GPP guidelines suggests 60 mg/kWh for condensing and 70 mg/kWh for non-condensing boilers, while the Ecodesign working documents propose 50 mg/kWh by 2013. A quick market survey shows that more than half of the boilers available already have lower emissions than 50 mg/kWh. Therefore, we propose that the GPP guideline sets 50 mg/kWh as the NOx limit for gas boilers.

2.4. Emissions from solid biofuel boilers

The proposed limits for particle emissions (40 mg/m^3 for automatic boilers and 70 mg/m^3 for manual fed boilers) are about half of the current average levels, but well above the best available technologies., specifically for biomass boilers using wood pellets which emits 4 mg/ m3 (according to the draft Ecodesign preparatory study on solid fuel small combustion installations - lot 15). Since particles are a local pollution problem, consideration should be given to setting criteria that reflect the local circumstances. For instance, when biomass boilers are used in built-up, urban areas, emissions of particles should be limited to e.g. below 10 mg/m3 [5].

Criterion 3. Other technical criteria

The switch from a non-condensing to a condensing boiler sometimes requires modifications to the chimney and flue gas ducts (because of the colder and relatively more humid flue gas emitted). This must be done together with the installation of the new boiler, in order for the high level of energy efficiency to be met. Therefore, we propose to add the following new

[3] See for instance www.dgc.dk/tekniker/doc/method.pdf for household boilers.
[4] The formula should be used twice, once with each value for Q (full load / part load).
[5] 10 mg/m3 is the reference for BAT automatic wood pellet fired boilers below 50 kW in the draft Ecodesign preparatory study on solid fuel small combustion installations (lot 15, task 6 report).

technical criteria:

> *If the new boiler is a condensing boiler replacing a non-condensing boiler, the flue gas duct and the chimney must be adapted to fit to the flue gas from a condensing boiler.*

Criterion 4 to 11. Hazardous substances

EEB and INFORSE Europe support the exclusion of phthalates and halogenated flame retardants.

- Regarding phthalates, we propose that the requirement follows the same approach as the EU Ecolabel for paints and varnishes and footwear, which addresses a more comprehensive list of R-phrases (including R50, R51, R52, R53, R50/53, R51/53 and R52/53, in addition to R60, R61 and R62), and additionally excludes the use of DNOP (di-n-octylphthalate), DINP (di-isononyl phthalate) and DIDP (di-isodecyl phthalate).
- Regarding halogenated flame retardants, the suggested requirement states that they could be used in the case "it can be documented that they are necessary for electrical or fire safety purposes (…)". It is incorrect to say that fire safety requirements could oblige the use of halogenated flame retardants, as they only address the levels of fire safety but are not prescriptive in how to achieve them. We suggest that this paragraph is purely deleted, or that it is completed by adding "and that non-halogenated alternatives are available to ensure compliance with legal requirements". This would restrict the use of halogenated flame retardants, which may lead to formation of highly toxic dioxins and furans.

Criteria for limiting the use of hazardous materials/substances and facilitating recycling are only addressed within the comprehensive criteria of the current product sheet draft. Given that the EuP policy process is unfortunately not addressing these aspects, we consider that it is fundamental that through Green Public Procurement more attention is paid to these key environmental aspects. We have not found any evidence in the cost-consideration analysis to the GPP guidelines for boilers justifying to only covering these aspects within the comprehensive set of requirements. EEB and INFORSE Europe call for integration of similar requirements within the core criteria as well.

Additionally, information regarding ceramic fibres must be clearly available, and necessary precautionary measures for use, maintenance etc. should be explained. High-temperature ceramic fibres used in some boilers are more harmful than normal fibres including normal mineral wool; although they are not as harmful as asbestos.

6. Comments to the comprehensive criteria

As efficiency and emission criteria are the same as for core criteria, all the comments given in section 5 also apply for the comprehensive criteria.

7. Comments to the cost considerations chapter

In the current product sheet and background document, it is stated that condensing boilers are more expensive in lifecycle costs than the less efficient non-condensing boilers. This conclusion is based on very low energy bills[6] and on a very high extra cost for condensing boilers (double price compared with standard boilers). This does not correspond to the reality in most EU countries.

A more convincing analysis is available in the Ecodesign of Energy-Using Products preparatory

[6] In table 1 of the product sheet, the column for detached houses presents an annual saving of 51.25 € with a condensing boiler out of a total heat bill of 495 €. While the relative reduction level is reasonable, the total heat bill is very low: a typical annual bill for a detached house is rather 1000 € or more in Northern Europe, where most of the boilers are used. The savings are then equally higher (€ 104 per year for a € 1,000 bill).

study on boilers (Lot 1), where condensing boilers are found to represent the least life-cycle cost options for most size classes and for larger systems when combined with solar heating (see www.ecoboiler.org). These findings have not been challenged by the stakeholders involved in the consultations.

Therefore, EEB and INFORSE Europe consider that the conclusion that condensing boilers are about 16% more expensive than non-condensing boilers is arbitrary, in no way valid throughout the EU, and inconsistent with other findings in official studies for the European Commission. Additionally, it does not consider the expected higher future fuel prices. Therefore, EEB and INFORSE Europe propose that the conclusion on the higher costs of condensing boilers is deleted and replaced by conclusions from the Ecodesign study on least-life cycle cost findings for heating systems. It could be added that the investment in the green option (a condensing boiler) is higher than for a non-condensing boiler, but that the running costs of the condensing boiler is lower (because of lower gas use). The exact saving of course depends on many local and national factors and on the building itself (in the cost of switching to a condensing boiler, the cost of improvements of the chimney should for example be considered)

With the expected increasing fossil fuel prices and carbon taxes, as predicted by the International Energy Agency (IEA), the condensing boiler will in the future, in an increasing number of cases, have the lowest lifecycle costs. Furthermore, as a result of the increased use of condensing boilers, the purchase price difference between non-condensing and condensing boilers is expected to decrease.

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