Liquid Gas Europe's Response to the European Commission's Consultation on Ecodesign Regulation for space heaters

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Introduction

Achieving climate neutrality by 2050 will require leveraging all available solutions: in particular, LGE emphasizes the vital contribution of renewable liquid gases (rLGs) – such as bioLPG (biopropane) and renewable dimethyl ether (rDME) – to delivering decarbonised, affordable heating for Europe's citizens, especially in rural and off-grid areas. These sustainable fuels are drop-in alternatives to conventional LPG that can cut lifecycle greenhouse gas emissions by over 80% while using existing distribution infrastructure. They offer an immediate pathway to decarbonise heating in homes and businesses that are beyond the gas grid or where electrification is prohibitively costly, all while aligning with the EU's climate targets, energy security aims, and air quality objectives. The electrical grid cost is highly impacted due to the need for a complete upgrade to increase electrical power. With the right policy framework in place, Europe's rLG supply could scale up significantly – studies indicate bioLPG alone could meet ~40% of EU LPG demand by 2040 (and potentially 100% by 2050) given supportive conditions – thereby contributing to a resilient, decarbonised heating sector that leaves no community behind. LPG and rLG also present typically much lower particulate matter, NOx and SOx emissions than liquid fuels and biomass for the same energy output.

The Ecodesign regulation should treat all technologies on a level-playing field and take into account the diversity of real-life situations and constraints while guaranteeing technology neutrality, avoiding products and technologies bans, respecting consumers' choice and promote non-discriminatory access to heating technologies, especially for the most remote and rural areas. This is particularly important since these areas possess specific heating characteristics that can often be only matched with some specific technologies (see below for more details).

Liquid Gas Europe

1. Re-analysing the impacts of measures which could imply boiler bans for 3 product families

It should be noted that our analysis points towards a potential ban for 3 family of boilers with a considerable impact:

As for other highly efficient boiler technologies, these have the potential to be fully decarbonised through the use of renewable gases. It is important to not ban these systems to allow the decarbonisation of dwellings where the installation of different technologies is not economically or technically viable.

NOTE: For fuel boiler >70kW, $\eta 1$ and $\eta 4$ should be read in the reverse order, as higher efficiencies (95%) are typically reached at lower temperatures ($\eta 1$)

- **Boilers with a capacity exceeding 70 kW:** The efficiency requirements of 92% at $\eta 4$ mentioned in the texts will be impossible to be met even by the most technologically advances boilers.
- **Low temperature boilers:** The efficiency threshold for the fuel boiler heater other than indicated in rows 1-3, for which fuel is declared as the main space-heating energy source has been fixed at 92%. This equipment would eventually fail to meet the new ambitious threshold.
- **Instantaneous or micro-accumulated hot water boilers:** According to the draft, the double service (combination heaters) would now have to adhere to the V40 requirements. This methodology is only suitable for storage water heater and is not compatible with "instantaneous" or "micro-accumulated" hot water boilers and would result in the ban of such equipment. For water-heating efficiencies, the efficiency limits for gas boilers are close to physical values. Average efficiency should not be taken as minimum efficiency requirement.

On the top of it, the new testing regime for seasonal space heating mandates a flow temperature for space heaters < 70kW of 50°C for the part-load regime, which is a new requirement under the regulation that can have serious consequences on the efficiency calculation of boilers.

➩ **Ask:**

On Annex II, table 1:

- Lower η_4 for fuel boiler heater with a standard-rated heat output of more than 70 kW to 86%
- Lower η_1 for fuel boiler heater with a standard-rated heat output of more than 70 kW to 94%
- lower $\eta_{s,h}$ for fuel boiler heater other than indicated in rows 1-3, for which fuel is declared as the main space-heating energy source to 91%

- On Annex II, point 2.2, table 2, change row No. 3 into: "45-70-70-75-80-83-83"
- On Annex II, point 2.3, delete 2.3. Modify the text into : “The minimum amount of mixed water at 40 °C that can be provided by a combination heater equipped with a hot water storage tank shall not fall below the values indicated in Table 3.” Additionally, the values indicated are too high. There has been no assessment on this topic. If the requirement is deemed necessary for combination heaters equipped with storage tank, reduce the minimum values adequately. M:60; L: 110; XL:160; XXL:210. Delete 3XL and 4XL because the reference standard (EN 13203-1) does not cover such sizes.

- On Annex II, table 1, clarify explicitly the reference test conditions as follows:

“Efficiency shall be measured and calculated according to EN 15502”

- On Annex IV-point 1 : In row 4 - column 2 of the table modify 3.1.6.2 as follows, according to the true definition of EN 15502-1:2021+A1:2023: " nominal condensing output declared useful output in kW, corresponding to the operation of the boiler in a condensing (like 50 °C/30 °C) water temperature regime".
- In row 4 column 3 of the table delete the last sentence : “Feed temperature of 50 °C for condensing boiler heaters is to be applied”
- Modify the entire text in row 4 column 3 of the table as follows:
- "Tests are carried out at 30 % of nominal heat input, at test return temperatures 30± 0.5 °C (condensing boiler), 37± 1 °C (low-temperature boiler) or 47 ± 1 °C (standard boiler) or 50 ± 1 °C (other boiler).
- Tests are carried out accordingly with the standard conditions for range rated boilers or non-range rated boilers.”

2. Different measurement methodologies can lead to misinterpretation in efficiencies between different technologies

LPG boilers must not be judged on the same apparent "efficiency scale" as heat pumps because $\eta_{s,h}$ is produced by fundamentally different test methods and temperature assumptions **(reference Annex III, page 43).** This leads to discriminate combustion technologies (including LPG boilers) vs. heat pumps. The detailed seasonal efficiency requirements are presented in annex.

- For fuel boilers (including LPG), seasonal space heating efficiency ($\eta_{s,h}$) is calculated from:
  – partially full-load efficiency at 60/80 °C (η_4),
  – mostly 30 % load efficiency at 30/50 °C (η_1),
  – minimum-load efficiency (η_0),
  – minus penalties F(1)–F(3) for basic controls (−3 pts), auxiliary electricity and standby losses.
- For heat pumps, seasonal performance is based on bin-wise COP/FUE at 35/55/65 °C outlet temperatures, climate bins, cycling losses and the new electricity conversion coefficient CC = 1.9.

⇨ **Ask:** Recognise in the recitals and Annex III that η_s,h for boilers and η_s,h / SCOP for heat pumps are *methodologically different* and should not be interpreted as a simple "like-for-like" technology ranking in the off-grid, high-temperature context.

3. Turndown and test stringency must reflect LPG burner realities

Turndown, minimum-load efficiency and auxiliary-power penalties must reflect LPG burner realities (Annex II, page 16);

- The new Ecodesign drafts introduce a mandatory minimum turndown ratio, with η_0 (minimum-load efficiency) and auxiliary power at P_0 explicitly entering η_s,h.
- Very deep turndown can be technically challenging for LPG burners while controlling NOx and stability, especially on small domestic units, and is less critical on simple high-temperature radiator systems.

⇨ **Ask:** Set LPG-specific, realistic turndown requirements (or exempt small LPG boilers < X kW) rather than aligning them with high-end condensing natural-gas units serving fully modulating, low-temperature systems.

ANNEXES: standards and minimal requirements

Seasonal space-heating efficiency (old Ecodesign vs new draft)

Key changes

Category	Old 813/2013	New Draft	Change
Fuel boilers ≤70 kW	$\eta_s \geq$ **86%**	$\eta_s \geq$ **92%**	**+6 points** (major tightening)
B1 boilers small sizes	75%	76%	Minor tightening
Boilers >70 kW η_1	≥94%	≥92%	Easier
Boilers >70 kW η_4	≥86%	≥95%	**Very significant tightening (+9 points)**
Condensing emphasis	Not explicit	Full-load condensing efficiency required	Stronger push to condensing
LPG (G31) NOx	No LPG-specific correction	1.20 correction factor	Helps LPG boilers meet NOx

Minimum seasonal space-heating efficiency (from **new draft**)

Table 1

Minimal seasonal space-heating efficiency

No.	Heater type	$\eta_{s,h}$ (%)
1.	B1 fuel boiler space-heater with a standard-rated heat output of 10 kW or less	76
2.	B1 fuel boiler combination heater with a standard-rated heat output of 30 kW or less	76
3.	Fuel boiler heater with a standard-rated heat output of more than 70 kW (η1 and η4)	92 ($\eta 1$) 95 ($\eta 4$)
4.	Fuel boiler heater other than indicated in rows 1-3, for which fuel is declared as the main space-heating energy source	92
5.	Electric boiler heater	48
6.	Others*	100

Additionally, the 2025 draft introduces explicit technology categories (EIWH, ESWH, FIWH, FSWH, HPWH, etc.) for water heaters. LPG heaters fall into FIWH and FSWH (“fuel instantaneous / fuel storage water heaters”)

This means specific minimum efficiency and NOx thresholds now apply by technology class.

Load Profile	2013 Minimum (typical)*	2025 Minimum for FIWH / FSWH
S	~30–32%	**45%**
M	~30–36%	**70%**
L	~30–36%	**75%**
XL	~30–36%	**80%**
XXL	~32–38%	**83%**
3XL–4XL	not specifically defined	**88%**

Maximum emissions of nitrogen oxides (new draft)

Maximum emissions of nitrogen oxides

Heater type	Maximum NOx emissions in mg/kWh fuel input
Fuel boiler heaters using gaseous fuels	56
Fuel boiler heaters using liquid fuels	92
Cogeneration space-heaters with external combustion using gaseous fuels	70
Cogeneration space-heaters with external combustion using liquid fuels	92
Cogeneration space-heaters with internal combustion engine using gaseous fuels	240
Cogeneration space-heaters with internal combustion engine using liquid fuels	392
Fuel heat-pump heaters equipped with external combustion engine using gaseous fuels	70
Fuel heat-pump heaters equipped with external combustion engine using liquid fuels	92
Fuel heat-pump heaters equipped with an internal combustion engine using gaseous fuels	240
Fuel heat-pump heaters equipped with an internal combustion engine using liquid fuels	392