First proposal of Emission Limit Values according to the three options to revise the TAs for stationary sources

Developed by the TFTEI Techno-scientific Board

- Informal meeting, 7th October 2025 -

Introduction

The ELVs are categorised by three levels of ambition:

A. **Moderate level of ambition**: Limit values consistent with current limit values of TAs in the AGP; these limit values still imply an improvement in emission reduction for Non-Parties as compared to their own current implementation capacity.

B. **Higher level of ambition**: Limit values in line with the draft revised Guidance Document on Stationary Sources (use of BAT-AEL ranges: lower and upper emission level, depending on production processes and available abatement measure), and/or, in absence of data from the Guidance Document, other BAT sources are used or other TFTEI documents

C. **Tailored level of ambition: not tailored on single countries.** Limit values adapted, to the extent possible, to the capabilities of Non-Parties, **considering only relevant selected sources, on the basis of the works presented in the following slide**.

A distinction between existing and new installations is proposed by focussing more on setting ELVs for new installations (more stringent ELVs, where appropriate), along with the ELVs also for existing installations

As outlined in the TFTEI's "Draft informal document on potential options to revise the technical Annexes to the AGP", updated in September 2025

Method to determine ELVs for industrial processes and large combustion plants

Sources of information for defining new ELVs

- Informal document : TFTEI background informal technical document for the Review of the Gothenburg Protocol for Industrial Processes Annexes IV, V, VI, X and XI, 2022
- Official document: Draft revised guidance document on control techniques for emissions of sulfur, nitrogen oxides, volatile organic compounds and particulate matter (including PM_{10}, $PM_{2.5}$ and black carbon) from stationary sources + Informal document: Appendix with up-to-date BAT and BAT-AELs, 2025
- Informal complementary document on control techniques for emissions of sulphur, nitrogen oxides, volatile organic compounds and particulate matter (including PM_{10}, $PM_{2.5}$ and black carbon), 2025
- Informal document: Technological pathways towards the ratification of the amended Gothenburg Protocol in Serbia, Georgia, Kazakhstan, Moldova, Montenegro and Armenia, TFTEI Techno-Scientific Board, 2024

+ other relevant documents

Method to determine ELVs for industrial processes and large combustion plants

Rationale behind the proposal of ELVs across the three options

Option A:

- ELVs based on the current TAs of the AGP
- Do not cover all the activities proposed for the new TA on stationary sources

Option B:

- **ELVs are based on the upper levels of BAT-AELs** presented in the *Appendix of the Guidance Document on control techniques for emissions of sulphur, nitrogen oxides, volatile organic compounds and particulate matter (including PM_{10}, $PM_{2.5}$ and black carbon) from stationary sources*, and in *the complementary informal documents*
- BAT-AELs in these documents are often based on BAT Conclusions published by the EU for different activities and other relevant information
- Proposed ELVs are expressed as daily and/or monthly averages for LCPs

Method to determine ELVs for industrial processes and large combustion plants

Rationale behind the proposal of ELVs across the three options

Option C:

- Based on the available information from BREF development processes in the Russian Federation and Kazakhstan.
- Given that Kazakhstan has recently adopted BREFs closely aligned with the EU BAT conclusions, including explicit BAT-AEL ranges and averaging periods, TFTEI proposes to base Option C of the revision of AGP Technical Annexes on the Kazakhstan BREF values.
- Russia's ITS set fixed technological indicators that serve as a basis for national permits, but do not include any ranges or averaging rules, making them less suitable as a reference for international ELVs.

While Russia's values can provide useful benchmarks for achievable outcomes, Kazakhstan's BREF provides a more solid basis for the harmonization of the technical annexes of the Gothenburg Protocol across EECCA

Proposed ELVs in selected activities

Combustion installations equal to, or larger than 50 MWth, consisting of unit larger than 15 MWth

Combustion of coal, lignite and other solid (fossil) fuels

Option A:

The ELVs of SO_2, NOx and dust emissions for the combustion of solid fuels except biomass in large combustion plants, from Annexes IV, V and X of AGP (monthly averages)

Size of combustion plants in MWth (Total rated thermal input)	SO_2	NOx	Dust
	mg/Nm^3 at 6% O_2		
Combustion plant with a total rated thermal input ≥ 50 and < 100 MWth			
New plants	400	300	20
If pulverized lignite	400	450	20
Existing plants	400	300	30
If pulverized lignite	400	450	30
Combustion plant with a total rated thermal input ≥ 100 and < 300 MWth			
New plants	200	200	20
Existing plants	250	200	25
Combustion plant with a total rated thermal input ≥ 300 MWth			
New plants	150	150	10
If FBC	200	150	10
If pulverized lignite	150	200	10
Existing plants	200	200	20

Proposed ELVs in selected activities

Combustion installations equal to, or larger than 50 MWth, consisting of unit larger than 15 MWth

Combustion of coal, lignite and other solid (fossil) fuels

Option B:

Proposed ELVs of SO_2, NOx and dust emissions for the combustion of solid fuels except biomass in large combustion plants (monthly averages) – Option B in this case introduces stricter limit values than option A

Size of combustion plants in MWth (Total rated thermal input)	SO_2	NOx	Dust
	mg/Nm^3 at 6% O_2		
Combustion plant with a total rated thermal input ≥ 50 and < 100 MWth			
New plants	209	173	10
If pulverized lignite	209	173	10
Existing plants	378	297	20 (3)
If pulverized lignite	378	297	20 (3)
Combustion plant with a total rated thermal input ≥ 100 and < 300 MWth			
New plants	173	114	10
Existing plants	209 (0)	194	18 (4)
Combustion plant with a total rated thermal input ≥ 300 MWth			
New plants	91	103	7
If FBC	91	103	7
If pulverized lignite	91	103	7
Existing plants	146 if PC	157 (1) if PC	10 (5)
	198 if FBC	157 (2) if FBC	10 (5)

(0) 250 mg/Nm3 as daily average if put into operation no later than Jan. 2014 or 223 mg/Nm3 in monthly average

(1) 200 mg/Nm3 as daily average if put into operation no later than Jan. 2014 or 171 mg/Nm3 in monthly average

(2) 220 mg/Nm3 if put into operation no later than Jan. 2014 to be translated in monthly average

(3) 28 mg/Nm3 if put into operation no later than Jan. 2014 to be translated in monthly average

(4) 25 mg/Nm3 if put into operation no later than Jan. 2014 to be translated in monthly average

Proposed ELVs in selected activities

Combustion installations equal to, or larger than 50 MWth, consisting of unit larger than 15 MWth

Combustion of coal, lignite and other solid (fossil) fuels

Option C:

The ELVs of SO_2, NOx and dust emissions for the combustion of solid fuels except biomass in large combustion plants (monthly averages) (in green colour: equal ELVs as option B, purple less stringent ELVs than option B)

Size of combustion plants in MWth (Total rated thermal input)	SO_2	NOx	Dust
	mg/Nm^3 at 6% O_2		
Combustion plant with a total rated thermal input ≥ 50 and < 100 MWth			
New plants	209	173	55
If pulverized lignite	209	173	55
Existing plants	378	431	189
If pulverized lignite	378	431	189
Combustion plant with a total rated thermal input ≥ 100 and < 300 MWth			
New plants	173	114	55
Existing plants	234	239	189
Combustion plant with a total rated thermal input ≥ 300 MWth			
New plants	91	103	65
If FBC	91	103	65
If pulverized lignite	91	103	65
Existing plants	234	239	189

Synthesis of options B and C for LCPs

<u>For new plants</u>, ***the ELVs under Options B and C are usually the same for all three pollutants*, except in a few cases where the ELVs are less stringent under Option C:**

- **Dust**: in combustion plants using coal, lignite, and other solid (fossil) fuels, ELVs may differ and be less stringent due to the high ash content of domestic coal
- **SO_2**: in combustion plants using heavy fuel oil and gas oil in boilers, differences likely stem from the high sulphur content in heavy fuel oil. Using more deeply desulphurised fuels could achieve lower concentrations.
- **NOx**: In gas turbines combusting gas oil and natural gas, the ELVs may also differ and be less stringent.

<u>For existing plants</u>, ***the ELVs in Option C are generally significantly less stringent*** than those in Option B for all three pollutants. This reflects the consensus among experts that upgrading existing plants can be more challenging and costly, and that therefore higher ELVs can be justified to reduce the burden of retrofitting.

Synthesis of option B and C for LCPs

Both Options B and C cover the same range of combustion plant types as in the current AGP. However, neither option includes the use of other gases in gas turbines. While this may simplify the approach, it should be noted that the ELVs in both options are defined more precisely by turbine type.

Option C does not cover the use of biomass**,** since this fuel is not yet widely used in Kazakhstan. For new large combustion plants (LCPs) using biomass, the ELVs proposed under Option B could be applied, since comparisons show that the ELVs in Options B and C are often the same for new plants.

Synthesis of option B and C for LCPs

Additional information for the sulphur content of heavy fuel oil in Kazakhstan

Dual regulatory framework for liquid fuels.

- **Small boilers** (medium and small combustion plants):

  According to the Eurasian Economic Commission's technical regulation TS 013/2011 and Board Decision No. 114 of 15 August 2023, the sulphur content of distillate fuels (gasoil / дизельное топливо) placed on the market is limited to 0.10% (1,000 mg/kg). Consistent with AGP

- **Large combustion plants** such as CHPPs and industrial boilers mainly operate on residual heavy fuel oil (mazut / топочный мазут), which continues to be produced and supplied in line with the national GOST 305-82 standard, allowing sulphur contents of up to 2% by weight.

As a result, despite the gradual convergence of Kazakhstan's legal framework with stricter Eurasian Economic Union (EAEU) fuel standards, the sulphur content of liquid fuels actually used in large plants can vary widely depending on the supplier and crude oil origin.

Proposed ELVs in selected activities

Iron and steel production

Option A:

The ELVs of dust emission for iron and steel production from Annex X of AGP (daily averages mg/Nm^3)

Installation	SO_2	NOx	Dust
	mg/Nm^3		
Sinter plants	No ELVs	No ELVs	50
Pelletization plants	No ELVs	No ELVs	20 for crushing, grinding and drying 15 for all other process steps
Blast furnace: Hot stoves (>2.5 t/hour)	No ELVs	No ELVs	10
Basic oxygen steelmaking and casting (>2.5 t/hour)	No ELVs	No ELVs	30
Electric steelmaking and casting (>2.5 t/hour)	No ELVs	No ELVs	5 (new) 15 (existing)

Proposed ELVs in selected activities

Iron and steel production

Option B: The ELVs SO_2, NOx and dust emission for iron and steel production, based on daily averages (in not stated differently)

Installation	SO_2	NOx	Dust
	mg/Nm^3		
Sinter plants	500	500	40 Primary emissions 30 Secondary emissions
Pelletization plants	50		20 Crushing, grinding and drying 15 All other process steps
Blast furnaces			
Hot stoves	200 (at 3% O_2)	100 (at 3% O_2)	10 (at 3% O_2)
Diffuse emissions from tap holes, runners, torpedo ladles charging points, skimmers			15
Loading from the storage bunkers of the coal injection unit			20
Basic oxygen steelmaking and casting ***Oxygen converter gas recovery*** ***Oxygen blowing for complete combustion*** ***New plants*** ***Existing plants***			 30 50
Secondary removal of emissions from the pig iron decanting, torpedo ladle, pig iron pre-treatment, oxygen converter processes, secondary metallurgy and continuous casting			20
Electric steelmaking and casting **On-site slag processing**			20

Proposed ELVs in selected activities

Iron and steel production

Option C: The ELVs of SO_2, NOx and dust emission for iron and steel production, based on daily averages

Installation	SO_2		NOx	Dust
	mg/Nm^3			
Sinter plants	500 New installations 500 Existing installations 1000)	500	20 For existing plants in processes related to crushing and classification (screening) 100 mg/Nm^3	
Pelletization plants	50 For existing installations using sulphur-containing iron ore raw materials 1250 mg/Nm^3	When using one or a combination of the above techniques, the quantitative emission value must comply with the established sanitary-hygienic, environmental quality standard and environmental quality targets. If there are different values defined by the legal acts the most stringent requirements set for NOx apply.	20 (not specified) crushing, grinding and drying processes and all other process steps (This value is equal to option B for sources such as Crushing, grinding and drying, but less stringent for other sources) For existing installations when using ESP 50 mg/Nm^3	
Blast furnaces				
Hot stoves	200 (% O_2 not specified)	100 (% O_2 not specified)	10 (Daily average or average for a sampling period, % O_2 not specified)	
Charge preparation and cast house			20	
Blast furnace gas during loading			10	
Basic oxygen steelmaking and casting			50 Equal for exiting plants, less stringent for other plants	
Processes of liquid pig iron pretreatment			20 Equal when ESPs are considered but less stringent in case of bag filters	
Electric steelmaking and casting			20	
On-site slag processing			20	

Synthesis of option B and C for iron and steel plants

The ELVs under options B and C are generally the same for all three pollutants, with only a few exceptions where option C allows less stringent ELVs. In few cases, Option C is more stringent.

For this activity, it may be possible to establish ELVs for a wide range of processes and emission sources (e.g., dust stack and diffuse emissions). However, to simplify and increase flexibility, it is proposed that ELVs are defined only for the sub-processes covered in the AGP and not to for diffuse dust emissions.

Proposed ELVs in selected activities

Small solid fuel combustion installations with a rated thermal input < 500 kW (including domestic heating appliances)

While technical advancements are essential to reducing emissions from small appliances introduced to the market, they remain insufficient on their own, as **overall pollutant emissions are the result of both technological standards and user combustion best practices**

The principles guiding public policies for reducing emissions of small solid fuel combustion installations, the largest source of dust emissions in the UNECE region, may be summarised as follows:

- **Avoid**: reduce energy demand (e.g. by thermal insulation of buildings, or energy efficient combustion technologies and efficient heat distribution system within the building),
- **Relocate**: transition to district heating (which can centralize energy production and reduce local emissions) or heat pumps, photovoltaics, solar boilers,
- **Improve**: use modern heating technologies (e.g. low-emission pellet stoves and boilers) which can be certified or eco-designed and best burning practices.

Proposed ELVs in selected activities

Small solid fuel combustion installations with a rated thermal input < 500 kW (including domestic heating appliances)

Sources of information for defining new ELVs or approaches (but not only)

Technical characteristics of most advanced appliances:

- Informal document : TFTEI background informal technical document for the Review of the Gothenburg Protocol for Industrial Processes Annexes IV, V, VI, X and XI, 2022
- Official document: Draft revised guidance document on control techniques for emissions of sulfur, nitrogen oxides, volatile organic compounds and particulate matter (including PM_{10}, $PM_{2.5}$ and black carbon) from stationary sources + Informal document: Appendix with up-to-date BAT and BAT-AELs, 2025
- Informal complementary document on control techniques for emissions of sulphur, nitrogen oxides, volatile organic compounds and particulate matter (including PM_{10}, $PM_{2.5}$ and black carbon), 2025

Good burning practices:

- UNECE. Code of good practice for wood-burning and small combustion installations, 2021

Non-technical measures:

- UNECE. Draft guidance document on non-technical measures, 2025

State of play in some non-Parties and barriers for AGP ratification

- Informal document: Technological pathways towards the ratification of the amended Gothenburg Protocol in Serbia, Georgia, Kazakhstan, Moldova, Montenegro and Armenia, TFTEI Techno-Scientific Board, 2024
- …

Proposed ELVs in selected activities

Small solid fuel combustion installations with a rated thermal input < 500 kW (including domestic heating appliances)

Current annex X for these installations

The current Annex X of the AGP for combustion installations with a rated thermal input < 500 MWth combines both

- technical measures (standards for new equipment),
- promotion of best practices for efficient combustion (public information and awareness raising programmes)

and

- non-technical measures

Only recommended values and approach

For new residential combustion installations:

- The use of product standards or eco-labels is recommended.
- Limit values for dust emissions released from new solid fuel combustion installations with a rated thermal input < 500 kWth to be used with product standards are also recommended.

For existing residential combustion installations, the measures recommended are:

- Public information, awareness raising programmes
- Establishing a programme to promote the replacement of the oldest existing boilers and stoves by modern appliances
- Establishing an obligation to exchange or retrofit old appliances

Proposed ELVs in selected activities

Small solid fuel combustion installations with a rated thermal input < 500 kW (including domestic heating appliances): Rationale for option A – B and C

Option A

Takes in account unchanged recommended measures of the current Annex X of the AGP for this sector. ELVs for new appliances just focus on dust emissions.

Option B

For new appliances

- Introduce product ELVs for new appliances put on the market, based on regulations adopted in the EU in the scope of the Eco-design Directive

These standards are already adopted by few non-Parties

Introducing stricter ELVs based on most advanced techniques described in the draft guidance document would introduce additional barriers for non-Parties already engaged in implementing this approach

For existing appliances

Introduce measures such as:

- Public information, awareness raising programmes
- Establishing a programme to promote the replacement of the oldest existing boilers and stoves by modern appliances

Proposed ELVs in selected activities

Small solid fuel combustion installations with a rated thermal input < 500 kW (including domestic heating appliances) – Rationale for option A – B and C

Option C

Intended for non-Parties that do not yet appear to have established specific programmes for reducing pollutant emissions from this source

International standards (ELVs) may be difficult to implement, as they may not be well-suited to the current characteristics of appliances produced and used in these countries.

Introducing national standards to limit emissions from small domestic heating appliances may also be challenging due to a combination of technical, economic, and institutional barriers.

In an effort to facilitate the ratification of the AGP, Option C does not set ELVs for new stoves ad boilers. Instead, **it introduces a requirement to prepare for their possible future implementation. This would involve conducting preliminary studies to assess the technical, economic, and institutional feasibility of applying minimum emission standards for heating appliances placed on the market, with the long-term goal of developing and enforcing dust emission limits**

Proposed ELVs in selected activities

Small solid fuel combustion installations with a rated thermal input < 500 kW (including domestic heating appliances) – Rationale for option A – B and C

Option C (1)

These studies could provide both the strategic insights and technical evidence required to inform effective policymaking and ensure practical, context-appropriate implementation.

The scope of these studies could include the following key elements as example:

- Measurement of pollutant emissions from representative appliance types, to establish a baseline and allow comparison with emission factors in other countries that have adopted standards.
- Detailed mapping of the existing appliance stock, including data on appliance types, fuel sources, age distribution, efficiency levels, and combustion technologies.
- Assessment of local manufacturing capacity, particularly the ability of producers to adapt and innovate toward lower-emission technologies in response to future regulatory requirements.
- Review of appliance import regulations, including the legal responsibilities of importers and their potential role in ensuring compliance with emissions standards.
- Evaluation of technical infrastructure, such as laboratory testing capacity, availability of standardized testing protocols, and staff expertise needed to support compliance verification.

Proposed ELVs in selected activities

Small solid fuel combustion installations with a rated thermal input < 500 kW (including domestic heating appliances) – Rationale for option A – B and C

Option C (2)

The scope of these studies should include the following key elements as example:

- Institutional analysis, clarifying the roles and coordination mechanisms among key ministries and agencies (e.g., environment, energy, trade) for standard setting, enforcement, and market oversight.
- Development of market surveillance strategies, including mechanisms for product certification, post-market compliance checks, and enforcement procedures.
- Cost-benefit analysis, examining the economic impact on manufacturers, importers, and end-users, as well as the administrative and capacity-building costs for implementing agencies.

Proposed ELVs in selected activities

Small solid fuel combustion installations with a rated thermal input < 500 kW (including domestic heating appliances) - Proposed options

Option A

Copy paste of the existing paragraph for these installations of Annex X for dust emissions

Recommended ELVs for dust in new appliances	Dust (mg/m³) O_2 reference content: 13%
Open/closed fireplaces and stoves using wood	75
Log wood boilers (with heat storage tank)	40
Pellet stoves and boilers	50
Stoves and boilers using other solid fuels than wood	50
Automatic combustion installations	50

Proposed ELVs in selected activities

Small solid fuel combustion installations with a rated thermal input < 500 kW (including domestic heating appliances) - Proposed options

Option B : Example of ELVs for new for stoves and cookers put on the market

Appliances	Efficiency	TSP or dust	VOC	NOx
	%	at 13% O_2		
		mg/m3	mg Ceq /m^3	**mg/m^3**
Stoves and cookers using solid fuel other than compressed wood in the form of pellets	65	40	120	200
Stoves using compressed wood in form of pellets	**79**	20	60	200

Proposed ELVs in selected activities

Small solid fuel combustion installations with a rated thermal input < 500 kW (including domestic heating appliances) - Proposed options

Option B :

For existing appliances

a. Public information and awareness-raising programmes regarding:
   i. The proper operation of stoves and boilers;
   ii. The use of untreated wood only
   iii. The correct seasoning of wood for moisture content.
   …

b. Establishing a programme to promote the replacement of the oldest existing boilers and stoves by modern appliances

Proposed ELVs in selected activities

Small solid fuel combustion installations with a rated thermal input < 500 kW (including domestic heating appliances) - Proposed options

Option C :

For new appliances:

- Conducting preliminary studies to assess the technical, economic, and institutional feasibility of applying minimum emission standards for heating appliances placed on the market, with the long-term goal of developing and enforcing dust emission limits

For existing installations:

- Develop a guidance on best practices for burning fuels adapted to the national circumstances and develop public information and awareness-raising programmes
- Develop pilot programmes to promote the replacement of the oldest existing boilers and stoves by modern appliances in most polluted areas

Next steps

Options B and C for other activities proposed will be developed after EB decision:

1. Medium combustion plants (1 to 50 MWth): SO_2, NOx, PM
2. Mineral oil and gas refineries (boilers, FCC, SRU and other key sources)
3. Cement production: NOx, PM
4. Glass production: NOx, PM
5. Iron foundries: SO_2, NOx, PM
6. Non-ferrous metals production and processing (zinc, lead, copper, aluminium): SO_2, NOx, PM
7. Activities using solvents

Thanks for your attention

Questions?

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