UNECE Convention on Long-range Transboundary Air Pollution
Subgroup on Small Combustion Installations
under EGTEI

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Draft options for limit values for emissions of dust from small combustion installations

1. At its 45th meeting the Working Group on Strategies and Review (WGSR) invited the Expert Group on Techno-economic Issues (EGTEI) to explore the possibility of establishing emission limit values (ELVs) for PM for small combustion installations (SCI), i.e. installations with a thermal input < 50 MW. At its 16th meeting EGTEI has delegated this task to a subgroup on SCI.
2. The following tables contain draft suggestions for options for emission limit values (ELV) for dust for small combustion installations as discussed at the 1st meeting of the subgroup on SCI in Zurich on 3rd February 2010 (with some comments from the subgroup added in red), according to the terminology defined in the draft technical annexes to the revised Gothenburg protocol as adopted by EGTEI for other source categories:
   - Option 1: ELV1 is a demanding but technically feasible option with the objective of achieving a high level of reduction. The ELV1 is based on a value between the lower and upper BAT AEL[1], (where it is available),
   - Option 2: ELV2, while technically demanding, pays greater attention to the costs of the measures for achieving reduction. The ELV2 is a value based on the upper BAT AEL (where it is available),
   - Option 3: ELV3 represents current [good] practices based on the legislation of a number of Parties to the Convention.
3. Since no official BAT reference documents (BREF) have been published for SCI, information on BAT and BAT AEL as available in the technical literature and expertise of the participants of the subgroup will be compiled in a background report[2]. While defining BAT and BAT AEL consideration was given to the fact that relevant technological progress concerning biomass combustion is to be expected during the time horizon for putting into practice new regulations under a revised Gothenburg protocol, i.e after 2014/2015.
4. Categories of SCI have been defined according to thermal input. Table 1 includes installations < [50] [70] kW, which are supposed to be regulated by type approval standards. Table 2 includes installations from [50] [70] kW - 1 MW, with a cutpoint at [350] [400] kW. Installations from [50] [70] – [350] [400] kW could be regulated by type approval standards or ELVs. Table 3 includes installations from 1 – 50 MW, with possible cutpoints at 5, 10 or 20 MW.
5. Solid fuels (wood, other biomass, coal, lignite etc.) contribute mostly to PM emissions and are considered a first priority. Should we also include liquid and gaseous fuels? Do we need a definition or quality specification for wood / biomass fuels?
6. Another open question to be discussed concerns compliance testing and monitoring, especially about how to how to deal with national differences in particle sampling methodologies.

[1] BAT AEL = BAT associated emission level

[2] T. Nussbaumer, Small combustion installations – overview on technologies, emissions and emission control (draft title), prepared for subgroup SCI under EGTEI (work in progress)

Table 1: Suggested options for limit values for dust emissions released from small combustion installations with a thermal input < [50] [70] kW

Fuel specific type approval recommended to countries (including energy efficiency criteria); i.e. **new** installations may only be put on the market with a demonstrated evidence of conformity with type approval standards

Heat storage tank required for manually fed boilers (with specifications to be defined)

O_2 reference concentration: wood, solid biomass (with definition): 13%
coal: 6%

	Suggested ELV for dust (mg/m_n^3)							
	Option 1			Option 2			Option 3	
	ELV1[3]	Lower BAT AEL	Techniques	ELV2[4]	Upper BAT AEL	Techniques	ELV3	Legislation[5]
Closed fireplace and insert	40	< 40		75	75		150	40-150
Log wood stove, coal stove	40	< 40		75	75		150	40-150
Pellet stove	20	< 20		40	40		150	20-150
Cooker and Hearth for solid fuels	40 / ?	< 40 / 80		90	90		150	40-150
Log wood boiler, coal boiler	20	< 20	ventilator	50	50	ventilator	150	20-150
Automatic pellet boiler	20	< 20	ventilator	40	40	ventilator	150	20-150
Automatic wood ~~chip~~ boiler[6]	20 / ?	< 20 / 70	ventilator	60	60	ventilator	150	20-150
Other installations?	20	–		40	–		150	–

[3] ELVs according to German 1. BImSchV (step 2 > 2014)
[4] ELVs according to type approval standards of Swiss Ordinance on Air Pollution Control (step 2 > 1.1.2011)
[5] lower value according to German 1. BImSchV (step 2 > 2014); upper value according to CEN 303-5 class 3
[6] An emission level < 20 mg/m3 is OK for pellets, but seems to be unrealistic for chips without secondary dust abatement, depending on wood quality. Can anybody comment on that?

Table 2: Suggested options for limit values for dust emissions released from boilers [and process heaters] with a thermal input of [50] [70] kW – 1 MW

Installations with a thermal input from [50] [70] – [350] [400] kW could be regulated by type approval standards (in which case ELVs for existing installations are obsolete) or ELVs

O_2 reference concentration: wood, solid biomass (with definition): 13% (11% for thermal input > [350] [400] kW ?)
coal: 6%

Fuel type	Thermal input (MWth)	Suggested ELV for dust (mg/m_n^3)							
		Option 1			Option 2			Option 3	
		ELV1	Lower BAT AEL	Techniques	ELV2	Upper BAT AEL	Techniques	ELV3	Legislation
Solid fuels	[50] [70] - [350] [400] kW	New plants: 20[7]	< 20 50	ESP ? multicyclone ?	New plants: 100	100	multicyclone ?	New plants: 100	20-150
		Ex. plants: 50	< 20 / 50 50	ESP ? multicyclone ?	Ex. plants: 150	120	multiyclone ?	Ex. plants: 150	
	[350] [400] kW – 1MW	New plants: 20	< 20 50	ESP or FF multicyclone ?	New plants: 20	20 100	ESP or FF multicyclone ?	New plants: 50	20-150
		Ex. plants: 50	< 20 50	ESP or FF multicyclone ?	Ex. plants: 30	30 120	ESP or FF multicyclone ?	Ex. plants: 150	

[7] A general ELV = 20 mg/m3 is very strict for installations < [350] [400] kW. Can be reached by pellet boilers, but seems to be unrealistic for chips without secondary dust abatement, depending on wood quality. Can anybody comment on that?

Table 3: Suggested options for limit values for dust emissions released from boilers [and process heaters] with a thermal input of 1– 50 MW [8]

O_2 reference concentration: wood, peat and other solid biomass (with definition): [11%] [6%] -> if 6%, then ELVs need to be recalculated
coal, lignite: 6%, liquid and gaseous fuels, including biofuels: 3% (delete gaseous fuels because irrelevant?)

Alternate table design for solid fuels: 1 – 5 MW, 5 – 50 MW or else 1 -10 MW, 10 - 50 MW

Fuel type	Thermal input (MWth)	Suggested ELV for dust (mg/m_n^3)							
		Option 1			Option 2			Option 3	
		ELV1	Lower BAT AEL	Techniques	ELV2	Upper BAT AEL	Techniques	ELV3	Legislation
Solid fuels	1–5 MW	New plants: 10	< 5 / < 10 50	ESP or FF ? multicyclone?	New plants: 20	10 100	ESP or FF ? multicyclone?	New plants: 50	20 - 200
		Ex. plants: 20	< 5 / < 10 50	ESP or FF ? multicyclone?	Ex. plants: 30	30 120	ESP or FF ? multicyclone?	Ex. plants: 150	
	5–10	New plants: 10	<5 / <10	ESP or FF	New plants: 20	20	ESP or FF	New plants: 50	20 - 70
		Ex. plants: 20	<5 / <10	ESP or FF	Ex. plants: 30	30	ESP or FF	Ex. plants: 50	
	10–20	New plants: 10	<5	ESP or FF	New plants: 20	20	ESP or FF	New plants: 50	10 - 50
		Ex. plants: 20	<5	ESP or FF	Ex. plants: 30	30	ESP or FF	Ex. plants: 50	
	20–50	New plants: 10	<5	ESP or FF	New plants: 20	20	ESP or FF	New plants: 50	10 - 50
		Ex. plants: 20	<5	ESP or FF	Ex. plants: 30	30	ESP or FF	Ex. plants: 50	
Liquid fuels Differentiate fossil fuels and biofuels?	1–5	New plants: 10	< 5 ? 50	ESP or FF ? multicyclone?	New plants: 20	10 – 30 ? 100	ESP or FF ? multicyclone?	New plants: 50	D: 50 CH: 50-80
		Ex. Plants: 20	< 5 ? 50	ESP or FF ? multicyclone?	Ex. Plants: 50	30 100	ESP or FF ? multicyclone?	Ex. Plants: 50	
	5–50	New plants: 10	< 5 ?	ESP or FF ?	New plants: 20	20	ESP or FF ?	New plants: 50	
		Ex. plants: 20	< 5 ?	ESP or FF ?	Ex. plants: 30	30	ESP or FF ?	Ex. plants: 50	
Natural gas (delete?)	1–50	New plants: 5	<5		New plants: 5	5		New plants: 10	D: 5-10
		Ex. plants: 5	<5		Ex. plants: 10	10		Ex. plants: 20	
Other gaseous fuels (delete?)	1–50	New plants: 10	<10		New plants: 10	10		New plants: 10	
		Ex. plants: 10	<10		Ex. plants: 10	10		Ex. plants: 20	

[8] This table was originally inspired from former draft version no.3 of Guidance Document, chapter 7.2, but adapted to be coherent with ELVs for large combustion plants (with thermal input > 50 MW) as suggested in draft Technical Annex VII to the revised Gothenburg Protocol