

TFTEI

Under the Convention on Long Range Transboundary Air Pollution

Task Force on Techno-Economic Issues

*“Review of the Technical Annexes  
to the Gothenburg Protocol and its associated  
Guidance Documents”*

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# *TFTEI review work*



## *Premise*

This presentation illustrates the review, carried out by TFTEI in 2021, of the Annexes to the Gothenburg Protocol and its associated Guidance Documents.

The data sources, the methodology adopted, the potential updates and the summary conclusions are illustrated

# *Review of the Technical Annexes to AGP and its associated Guidance Documents*



The review started at the beginning of 2021, and was concluded in November 2021, with the aim of providing background information to answer questions in Annex I of the document “preparation for the Review” (ECE/EB.AIR/WG.5/2020/3).

Particular attention to questions in section 1.6. Other questions (4.2.d, 4.2.e on black carbon, 6.3.a,b on methane), answered on the basis of TFTEI background technical documents for WGSR\_58.

Extended report on the TFTEI review available, among the informal docs for WGSR\_60.

Main conclusions in TFTEI co-chairs report and paras 49-50 of the GPG report on Review.

# *Review of the Technical Annexes to AGP and its associated Guidance Documents*



## *What information is available*

For each of the technical annexes, the rationale behind the proposals of potential updating of the limit values is provided

- Annex IV (limit values for emissions of sulphur from stationary sources),
- Annex V (limit values for emissions of NO<sub>x</sub> from stationary sources),
- Annex VI (limit values for emissions of VOC from stationary sources),
- Annex X (limit values for emissions of particulate matter from stationary sources)
- Annex XI (solvents in products)
- Annex VIII (limit values for mobile sources)

An “Update Index” (1-3), has been defined to express the level of update which can be potentially introduced in the technical annexes, according to the results of the research carried out by the TFTEI Technical Scientific Secretariat, on the available technologies :

1 is high level of update, 3 means no update available/possible

# *Review of the Technical Annexes to AGP and its associated Guidance Documents*



## *Type of information used*

### **For large industrial processes:**

- Best Available reference documents developed by the EU and the BAT Conclusions providing the BAT Associated Emission levels (BAT AELs)
- Information provided by manufacturers of reduction techniques
- Some scientific publications on reduction techniques applied in some specific sectors
- ELVs implemented in some countries, stricter than commonly observed

### **For mobile sources:**

- ELVs implemented by recent EU Directives not yet considered in the current annex VIII
- Literature survey on recent development of reduction techniques

### **For PM emissions from small combustion sources (former recommended ELVs)**

- Literature survey on developments of reduction techniques and BAT
  - Regulations implemented in Member states
  - Literature survey on measurement techniques of PM (filterable, condensable) and Black carbon
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## *Example*

**For large industrial processes:**

In most of the cases, an index 1 was determined for potential update.

NO<sub>x</sub> emission from Large Combustion Plants using fossil solid fuels: mg/Nm<sup>3</sup> at 6% O<sub>2</sub>

Thermal capacity	Current Annex V	BAT AEL (EU decision on LCP)		BAT AEL (EU decision on LCP)		Update Index
	Monthly average	Daily average		Monthly average (calculation by TFTEI for comparison)		
> 300 MW	300	80	125	64	103	1

The most stringent ELVs in China: ELVs of 50 mg/Nm<sup>3</sup> at 6% O<sub>2</sub> (no information on the averaging period)

# *Review of the Technical Annexes to AGP and its associated Guidance Documents*



*Potential update of limit values for solid particles (dust) for appliances to be introduced on the market  $\leq 50$  kWth*

No values in the current GP

Closed fronted solid fuel local space heaters using solid fuel other than compressed wood in the form of pellets and cookers:

**15** mg/m<sup>3</sup> dust (from the new Blue Angel label) to **40** mg/m<sup>3</sup> dust (current Commission regulation 2015/1185 of 24 April 2015) at 13% O<sub>2</sub> with an **update index of 1**

Closed fronted solid fuel local space heaters using compressed wood in form of pellets:

**5** mg/m<sup>3</sup> dust (best performing appliances according to a study of Vito on BAT for domestic appliances) to **20** mg/m<sup>3</sup> dust (current Commission regulation 2015/1185 of 24 April 2015) at 13% O<sub>2</sub> with an **update index of 1**

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# Review of the Technical Annexes to AGP and its associated Guidance Documents



*Potential updates of limit values for solid particles (dust) for appliances  $\leq 50$  kWth (with inspections programme by chimney sweepers every 3 or 4 years as current practices in Germany (and Switzerland for boilers) – Update index 1*

Appliance	Current limit values for new appliances with a rated thermal input < 500 kW [1]	Updated lower limit values (from German regulation)	Updated upper limit values (from the current GP ELVs)
		mg/m <sup>3</sup> at 13% O <sub>2</sub>	
Open fireplaces	75	Programmes for replacing this type of appliance or installation of additional equipment with inset (front glass door)	
Closed fireplaces and stoves using wood	75	40	75
Log wood boilers (with heat storage tank)	40	No proposal	40
Pellet stoves	50	20-30	50
Pellet boilers	50	30	50
Stoves and boilers using other solid fuels than wood	50	40	50
Automatic combustion installations	50	40	50



# *Review of the Technical Annexes to AGP and its associated Guidance Documents*



*Implementation of limit values for PM emissions including condensable from small domestic appliance ?*  
Still difficult, lack of measurement data, the current process of standardisation will not include condensables

The Commission regulation 2015/1185 for Ecodesign requirements for solid fuel local space heater enables the use of three measurement techniques: the solid particles method, the dilution tunnel method and a dilution tunnel/electrofilter method (used in the UK)

- The use of the dilution tunnel is a common practice in Nordic countries for standardisation of appliances (including condensables)
- Most of countries uses the solid particle method with the heated filter (not able to consider condensables)

The new standard EN 16510-1 Residential solid fuel burning appliances - Part 1: General requirements and test methods, 2018 (replacing older standards) included two measurement methodologies: the heated filter and a variant of the dilution tunnel methodology

The EN-PME method has been recently adopted and will be included in a revised EN 16510 standard

- The revised standard EN16510-1 should be published in 2022.
- The EN-PME method is based on an improved solid particles sampling with a new probe associated with the measurement of VOC by FID. The new EN standard 16810-1 will be fully operational for the revision of the Eco design directive (scheduled by 2024).

In the near future, the control of PM emissions in the scope of the Ecodesign Directive will be based on the EN PME method which is not a method for measuring condensables but this method will become the unique method in the standard.

# Main conclusions on the review of TAs and GDs



The main conclusions of the TAs and GDs review, provide answers to the related Annex I questions, and can be summarized as :

- From a technologic point of view, potential new ELVs have been identified, as technically feasible/consistent with the new/upgraded technologies, now available, which would allow significant emission reductions, in many of the sectors concerned in the TA.
- In annex VIII, some tables are now obsolete and ELVs are potentially eligible to be updated, taking into account the performances of the newest vehicle generation.
- In Annex V, the addition of a set of industrial processes and combustion plants, (< 50 MWth) is suggested.

# Main conclusions on the review of TAs and GDs (cont'd)



- In Annex X. potential updates in limit values are identified for filterable (solid) PM in small domestic appliances allowing also for significant emission reductions of both black carbon and condensable part of PM. Condensable issue still under discussion.
- For Annex XI, no significant new information has been found.
- The informal extended report on the review of TAs and GDs (169 pages) is a considerable source of information for possible updating of the Guidance Document on Stationary Sources. Similar document on mobile sources will follow quickly.
- Possible adaptations for EECCAs are mainly related to the flexibility mechanism.

## *TFTEI Annual Meeting 2022 and contacts*



TFTEI Annual meeting 2022, in Rome, 6-7 October, preferably in person (on line option available).

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