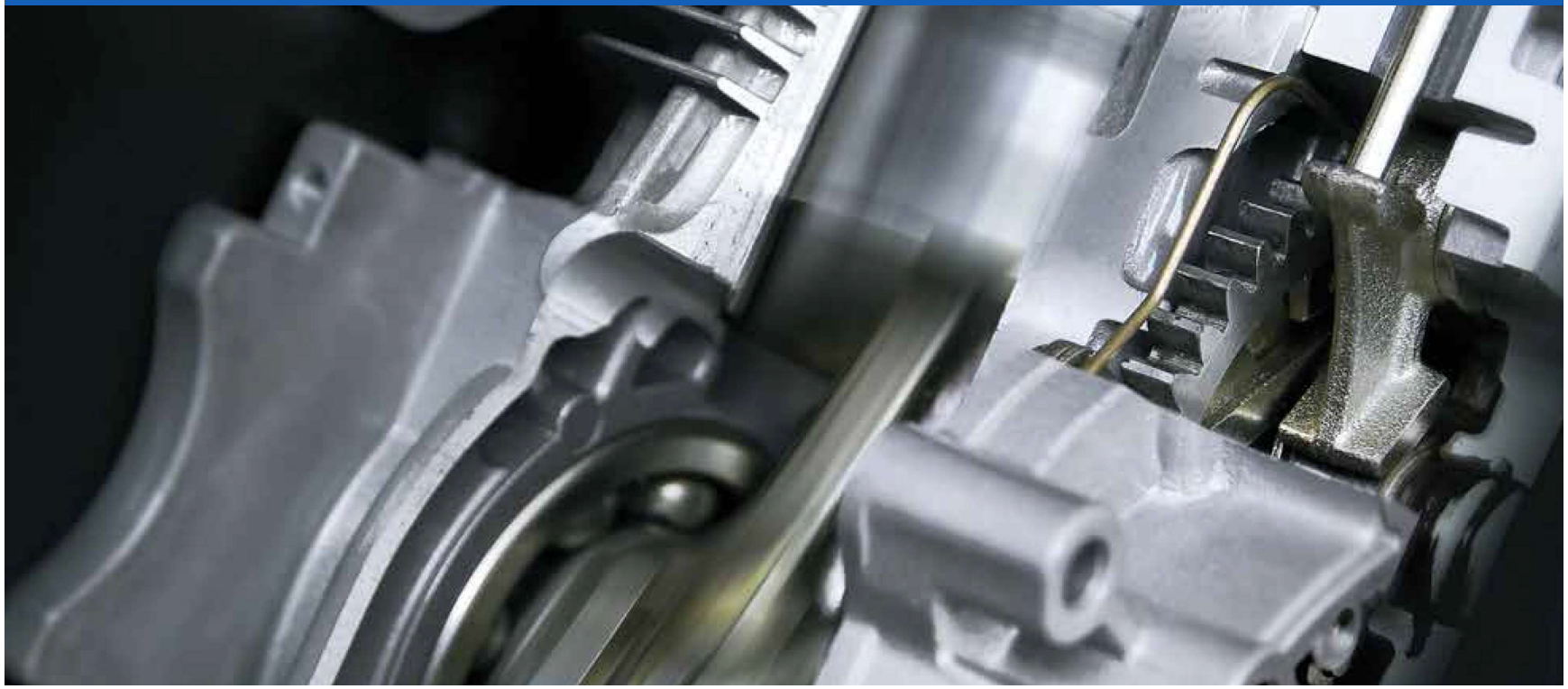
資料３２－７

CIMAC

THE INTERNATIONAL COUNCIL ON COMBUSTION ENGINES

64th CIMAC WG 5 - Reports on Regulary Developments – Stationary Power Plants

Friedrichhafen/ Germany



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Abbrevations (1/2):

AHG	Ad Hoc Group
BREF	Best available Reference Techniques Reference document
CAG	Chair Advicory Group
CEN	European Committee for Standardisation
EN	(European standard)
EU	European Union
GCV	Gross Calorific Value
GQ	Gas Quality
H-Gas	High Calorific Gas
HFO	Heavy Fuel Oil
JRC	Joint Reasearch Centre
LCP	Large Combustion Plant

Abbrevations (2/2):

LNG	Liquid Natural Gas
MF	Madrid Forum
MCPD	Medium Combustion Plant Directive
MIS	Micro Isolated Systems
MN	Methane Number
SF Gas	SectorForum Gas
SIS	Small Isolated Systems
TF	Task Force
TC	Technical Committ
TWG	Technical Working Group
WI	Wobbe Index
WG	Working Group

EU MCPD (Medium Combustion Plant Directive) 2015/2193

≥ 1 …. < 50 MWth plant

Reference point for engines 15 vol-% O_2

http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015L2193&from=EN

Introduction

MCPD 2015/2193 was published in the EU Official Journal 28.11 **2015**

EU Member States **to transpose** MCPD 2015/2193 into national law **by** 19.12 2017..

"**Review**" Article 12:

1. By 1 January 2020, the Commission shall review progress in relation to the **energy efficiency** of medium combustion plants and assess the benefits of setting minimum energy efficiency standards in line with best available techniques.

2. By 1 January 2023, the Commission shall assess the need to review the provisions concerning **plants which are part of SIS or MIS, as well as Part 2 of Annex II**, on the basis of state-of-the-art technologies. ("Annex II part 2" = new plant emission limits.)

As part of this review, the Commission shall also assess whether for certain or all types of medium combustion plants there **is a need to regulate CO emissions**.

MCPD Information exchange process (January 2018 – June ? 2019)

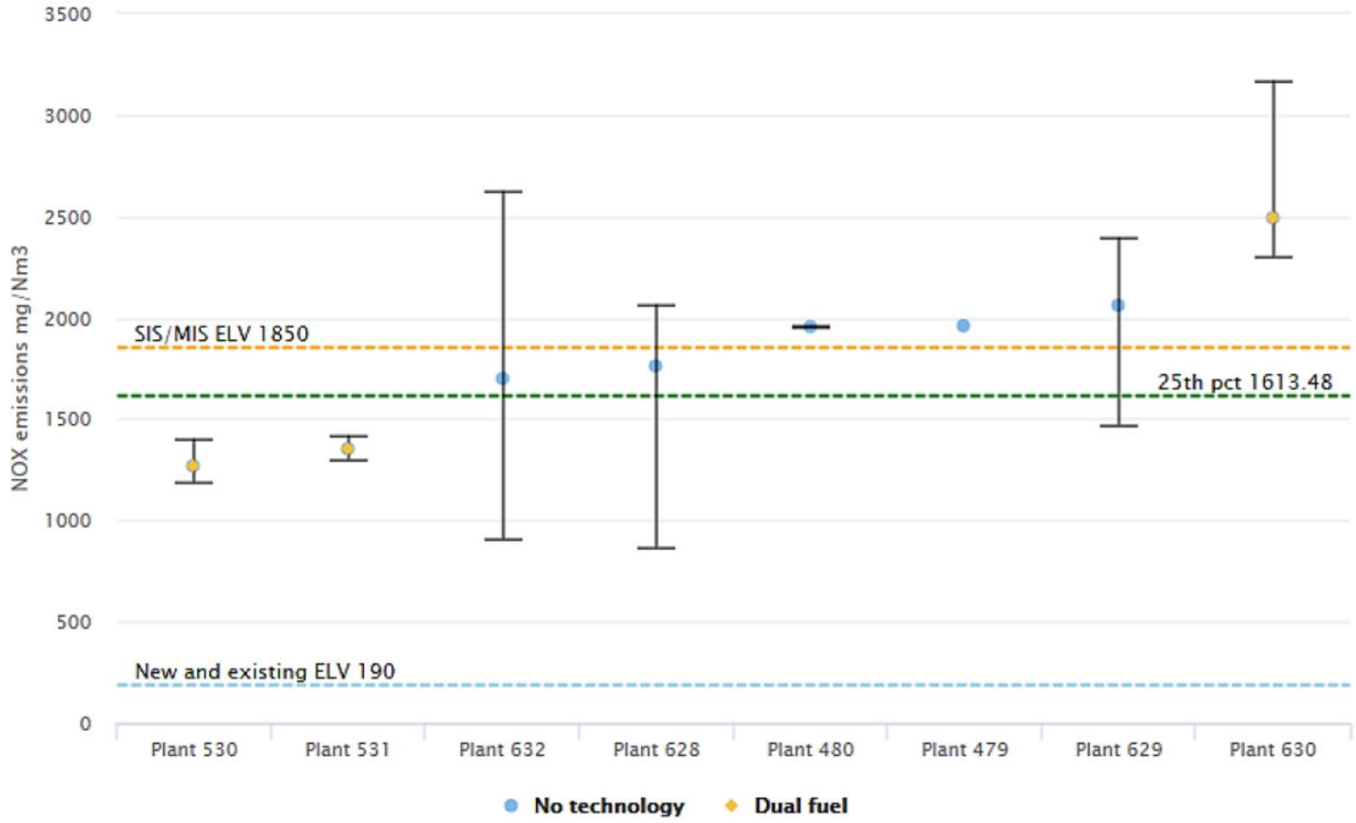
- Ricardo nominated as consultant
- TWG (Technical Working Group), activation January, kick-off webinar March 2018
- Reference Plant Data (28 oil, 48 gas engine ”plants” participated) and other information from equipment manufacturers to be sent by 15.08 2018 to Ricardo
- Draft report 12th April – deadline for feedback 08.05 2019 , Ricardo received in total > 700 (745) comments.

- Final meeting (web) 23rd May. Final report *was planned* be submitted to TWG 12.06 2019

Draft Report (12.04-19) examples 1/7

15 % O_2

Figure 3-16 NO_x emissions from other liquid fuel engines



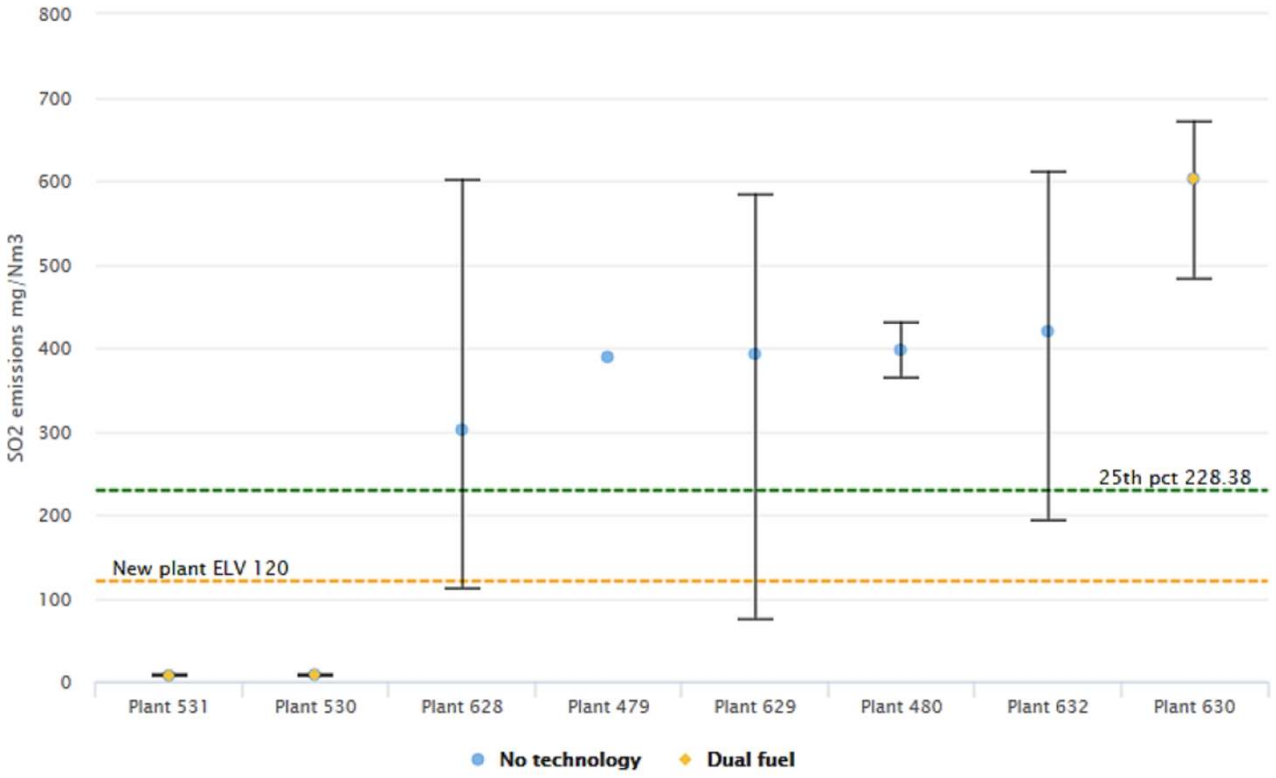
High-, medium-, low-speed engines in same graph.

Note 530, 531: high speed operating on liquid bio oil; others engines firing HFO or mix LFO or HFO !

Draft Report (12.04-19) examples 2/7

15 % O_2

Figure 3-18 SO_2 emissions from other liquid fuel engines

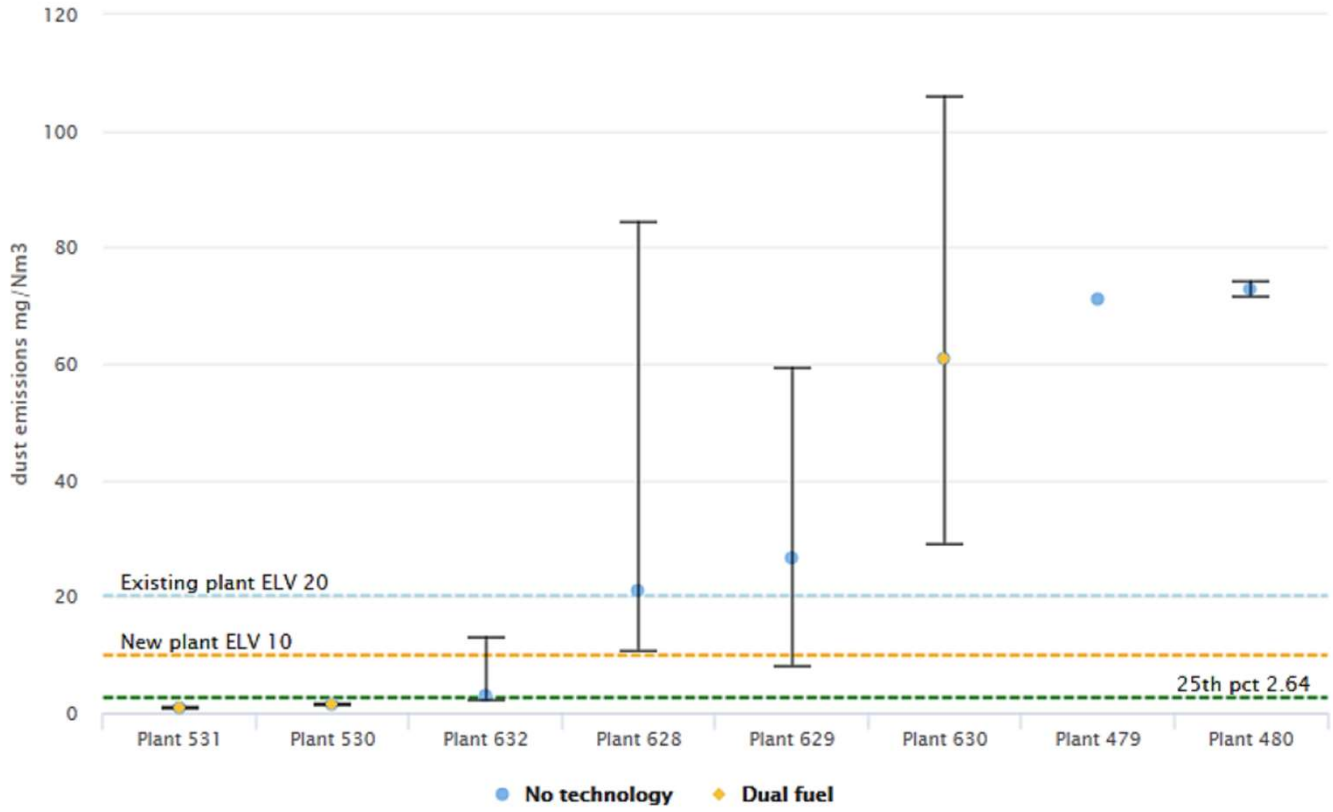


Note 530, 531: high speed operating on liquid bio oil; other engines operating on HFO or mix LFO or HFO !

Draft Report (12.04-19) examples 3/7

15 % O_2

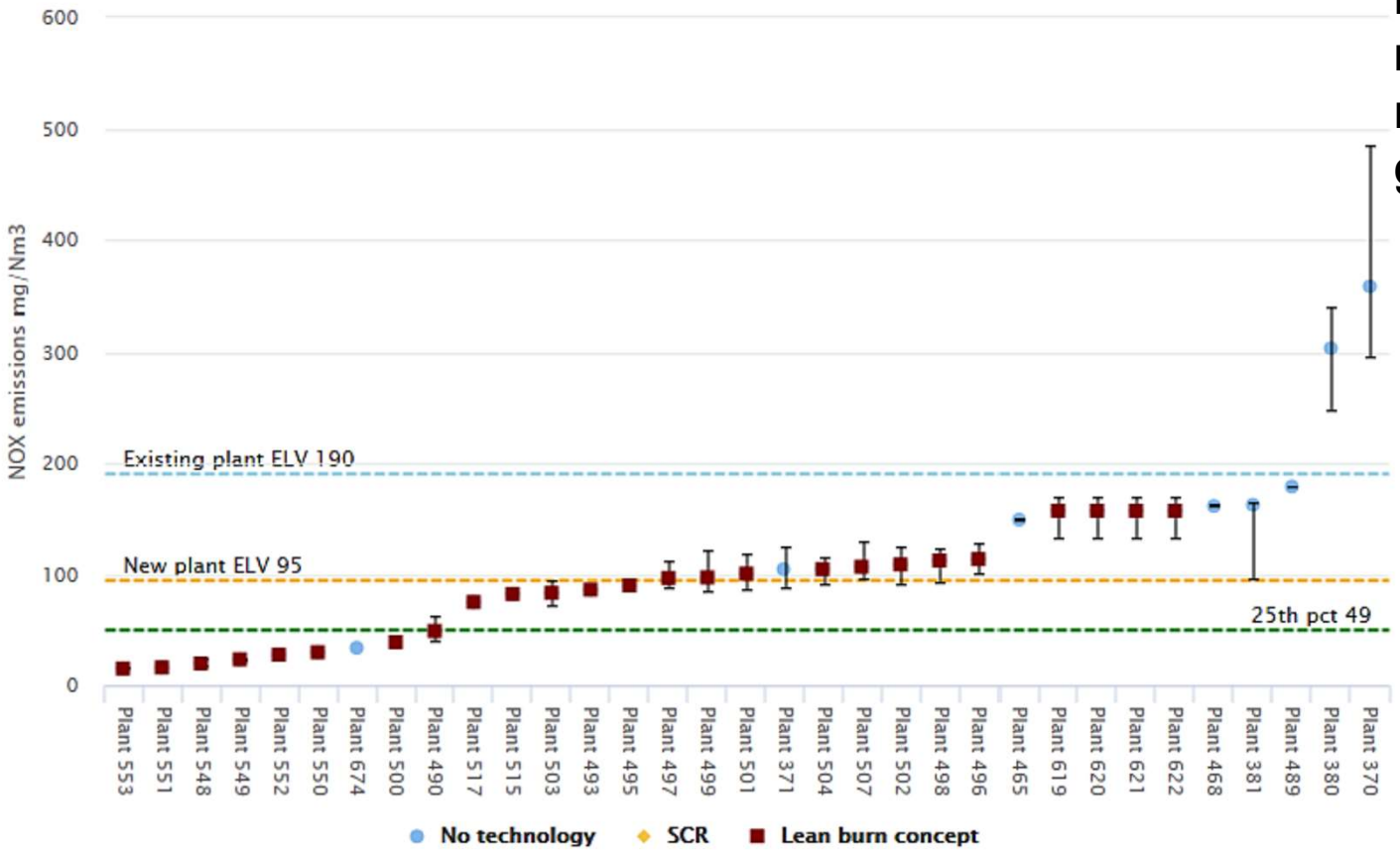
Figure 3-19 Dust emissions from other liquid fuel engines



Note 530, 531: high speed operating on liquid bio oil, other engines firing HFO or mix LFO or HFO !

Draft Report (12.04-19) examples 4/7

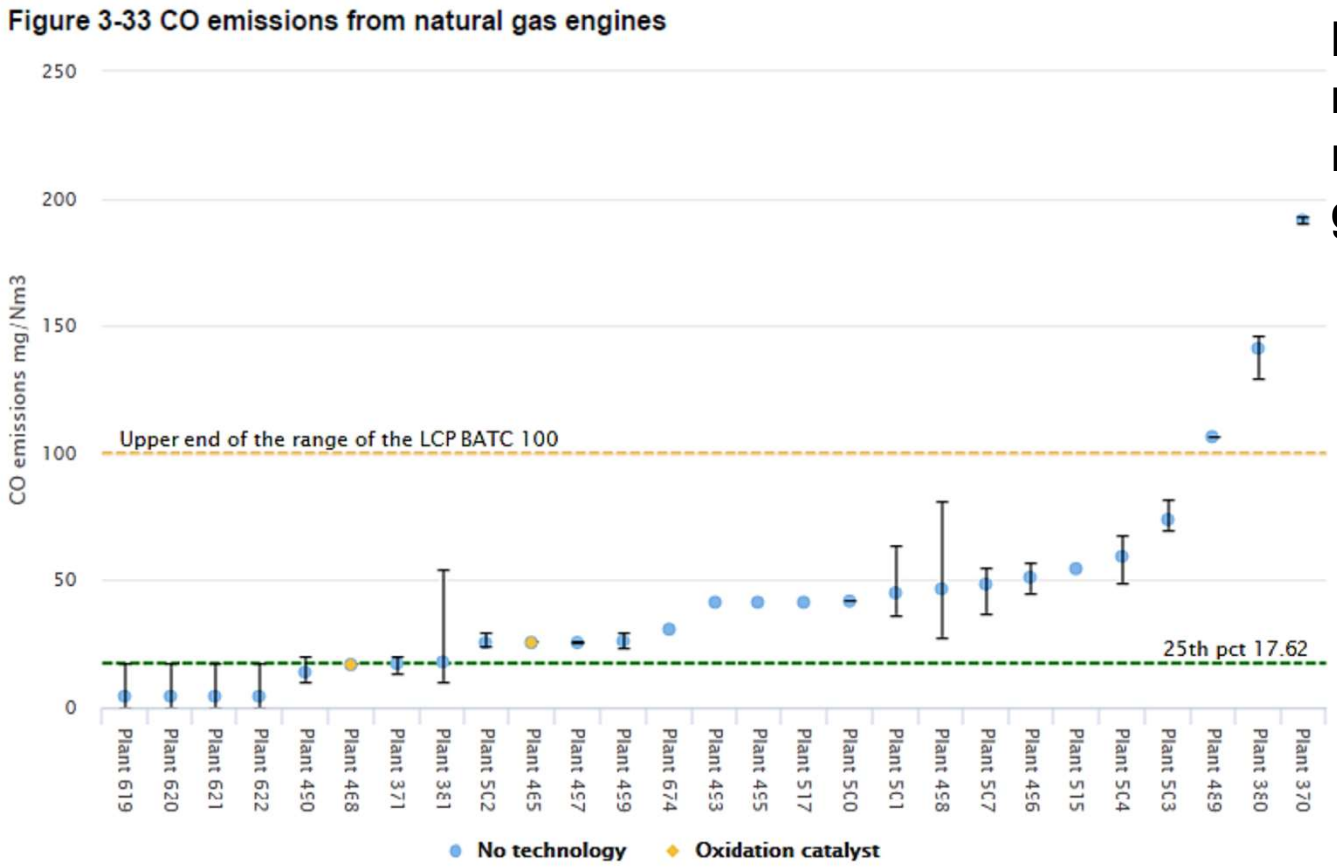
Figure 3-31 NO_x emissions from natural gas engines



Many SCR references not marked in graph !

15 % O_2

Draft Report (12.04-19) examples 5/7

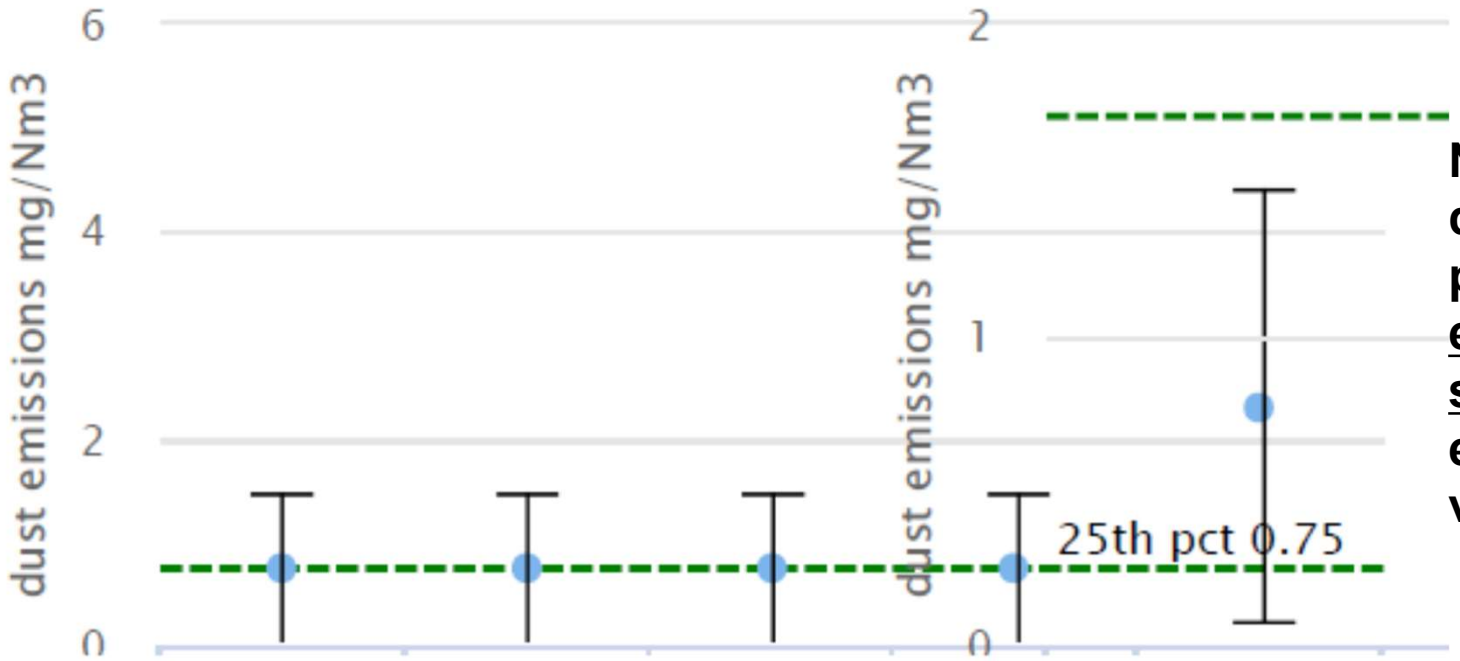


Many oxicat references not marked in graph!

15 % O_2

Draft Report (12.04-19) examples 6/7

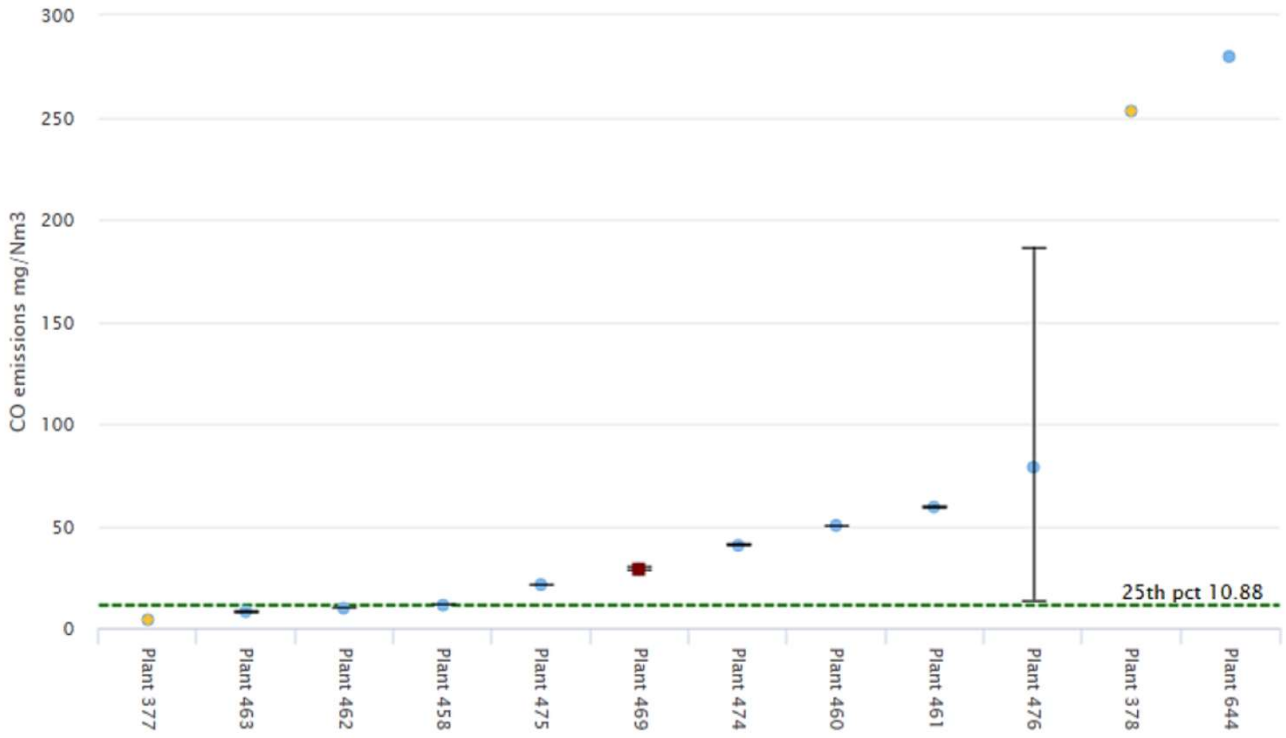
15 % O_2



NG engine dust, note 4 plants have <u>exactly the same</u> emission value !

Draft Report (12.04-19) examples 7/7

Figure 3-40 CO emissions from other gaseous fuel engines



Many oxicat references not marked in graph !

15 % O_2

CEN – EN 16726 Wobbe Index Amendment Process

Main Source: "Madrid Forum, 5 + 6 June 2019
CEN SFGas Pre-normative study of H-gas quality parameters
CEN/TC 234 Gas infrastructure »; link: https://ec.europa.eu/info/sites/info/files/02.a.01_mf32_presentations_-_cen_-_gas_quality_-_de_wit.pdf

ENERGINET DS DANSK STANDARD DGC

What should be the harmonised range of variations?

As narrow as possible?

As wide as possible?

Should appliances be able to cope with a wide band or should the band be narrow?

Souce:
https://www.dgc.dk/sites/default/files/filer/dokumenter/Gas_quality_harmonisation_Webinar.pdf

Dansk Gasteknisk Center a/s

CEN – EN 16726 (H-Gas) Wobbe Index Amendment Process

- CEN – EN 16726 published 1. December 2015 - WI, WI change speed parameters absent
- Working Group WG 'Pre-normative study of H-gas quality parameter' under the CEN Sector for a Gas Infrastructure and Utilisation (CEN SFGas GQS WG) was instituted in **May 2016.** This WG has the task to study and **evaluate possible WI ranges** for distributed H-gas in view of the future revision of EN 16726:2015.
- The SFGas WG on Gas Quality has the **following sub-groups:**
  - Chair Advisory Group (CAG)
  - Task Force 1 'Wobbe Index' (TF1)
  - Task Force 2 'National/Sectorial Situations' (TF2)
  - Ad-hoc Group 'Units and Definitions' (AhG)
- "Current" Phase: Madrid Forum June 2019 - CEN SFGas Pre-normative study of H-gas quality parameters CEN/TC 234 Gas Infrastructure Presentation

CEN SFGas pre-normative study
Timeline

- Definition WI Scenarios (TF1: range, fluctuations..)
- **Data enquiries (TF2: national/sectorial GQ data…)**
- Common understanding (AhG + TF 1: units and definitions incl. safety and reliability)

- Application of the WI scenario using:
  – the enquired data and
  – data from sectorial/national studies
- **Further data enquiries, if needed**

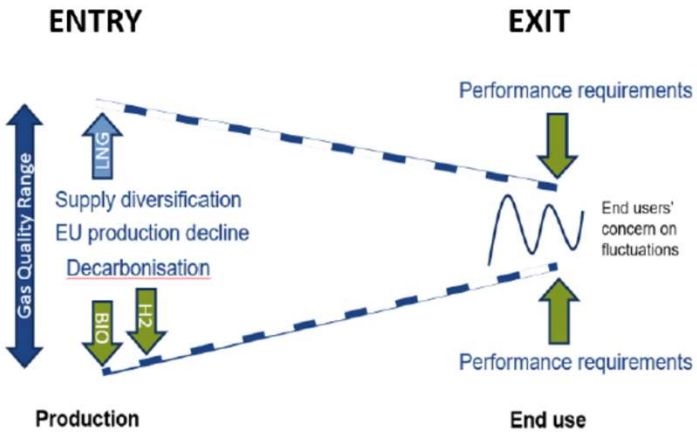
- Objective analysis of the assessment results
- Deducing consensus based recommendations for standardisation in normative phase

- Revision according to CEN Rules

Source:
https://www.entsog.eu/sites/default/files/files-old-website/publications/Events/2017/2%2020170928_CEN%20SFGas%20GQS_KDW.pdf

Madrid Forum 5 – 6 June 2019 (1/4)

Why a EU GQ standard?
Current challenges



a. Discrepancy between WI values of currently locally distributed gases and their legal limits.
b. Intrinsic conflict between ensuring end use performance and diversification/decarbonisation of gas supplies.
c. LNG asks for high WI values, biomethane and H_2 for low, indigenous production to very low WI values in some countries.
d. End use applications are often tuned and adjusted to the local gas quality → generally, without knowing the real-time value of the WI.
e. For most gas end uses relative changes of the WI matters more than absolute values.
f. Gas quality is not only a matter of WI (range and rate of change), but also of GCV, MN, composition…
g. No EU-harmonised criteria for safety, maintenance and emissions at in-use level.

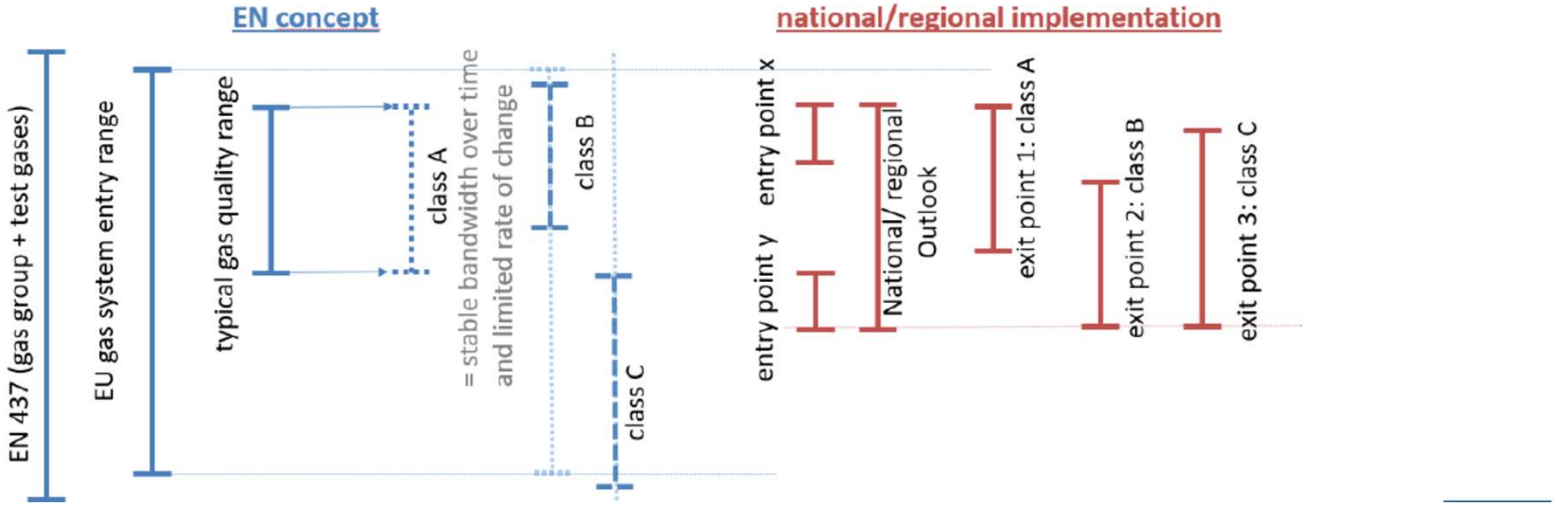
Madrid Forum 5 – 6 June 2019 (2/4)

A classification of end-use exit points - Example
Basis of current SFGas GQS discussion

Values and details on approach are in discussion in SFGas GQS

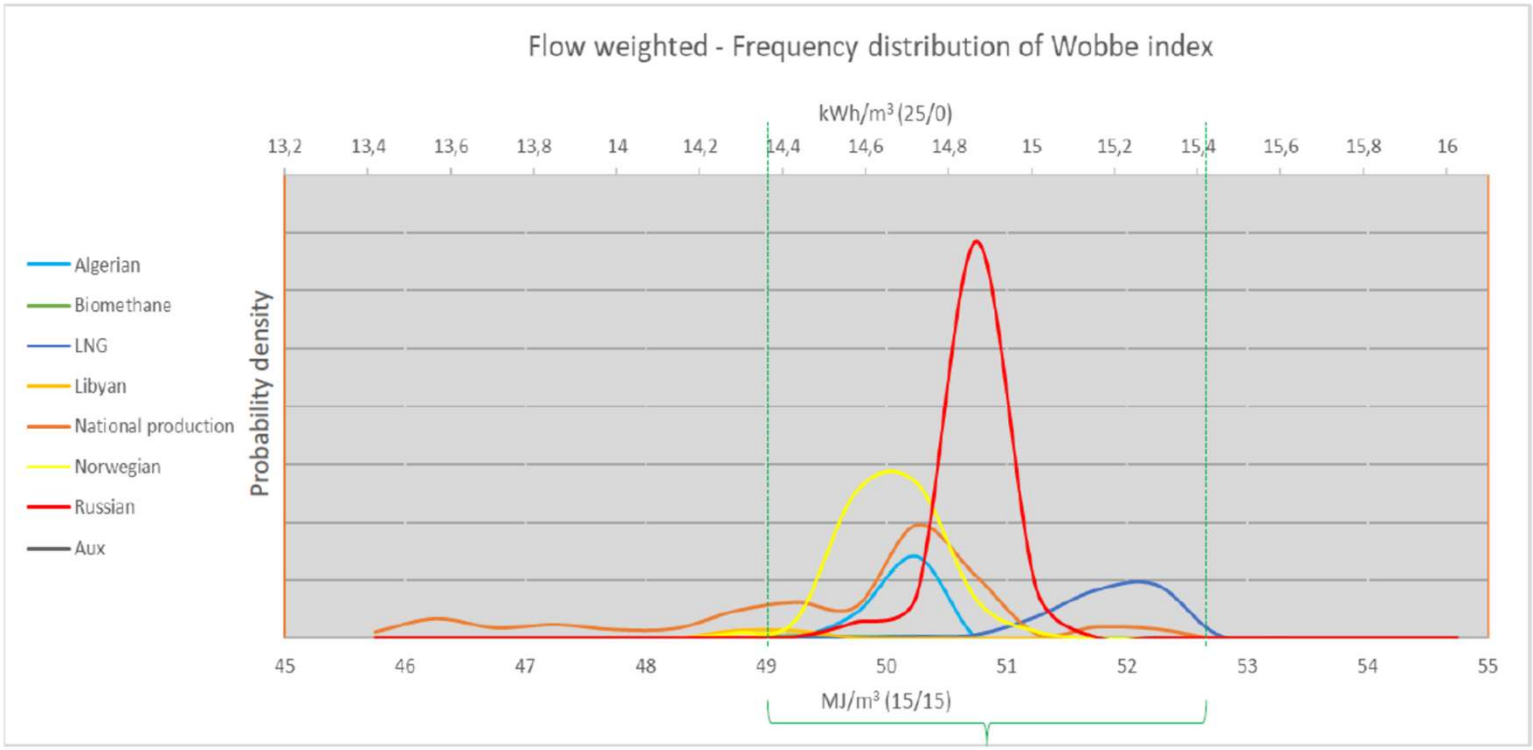
- **Classes A and B** will be defined by local WI ranges and their long-term stability.
- **Class C** will cover any situation that is not covered by Classes A and B.

➢ **Different proposals are being discussed.**



Madrid Forum 5 – 6 June 2019 (3/4)

What WI values do we see? (aggregated distributed gases)



Source : Survey 2 data 2015-2016, TYNDP, SSAS and further elaboration by AhG

49.0 – 52.7 MJ/m³
covers ~ 92 % of entry supplied gases

Madrid Forum 5 – 6 June 2019 (4/4)

Timeline

When can the final results of the **SFGas WG Pre-normative study** be exected?

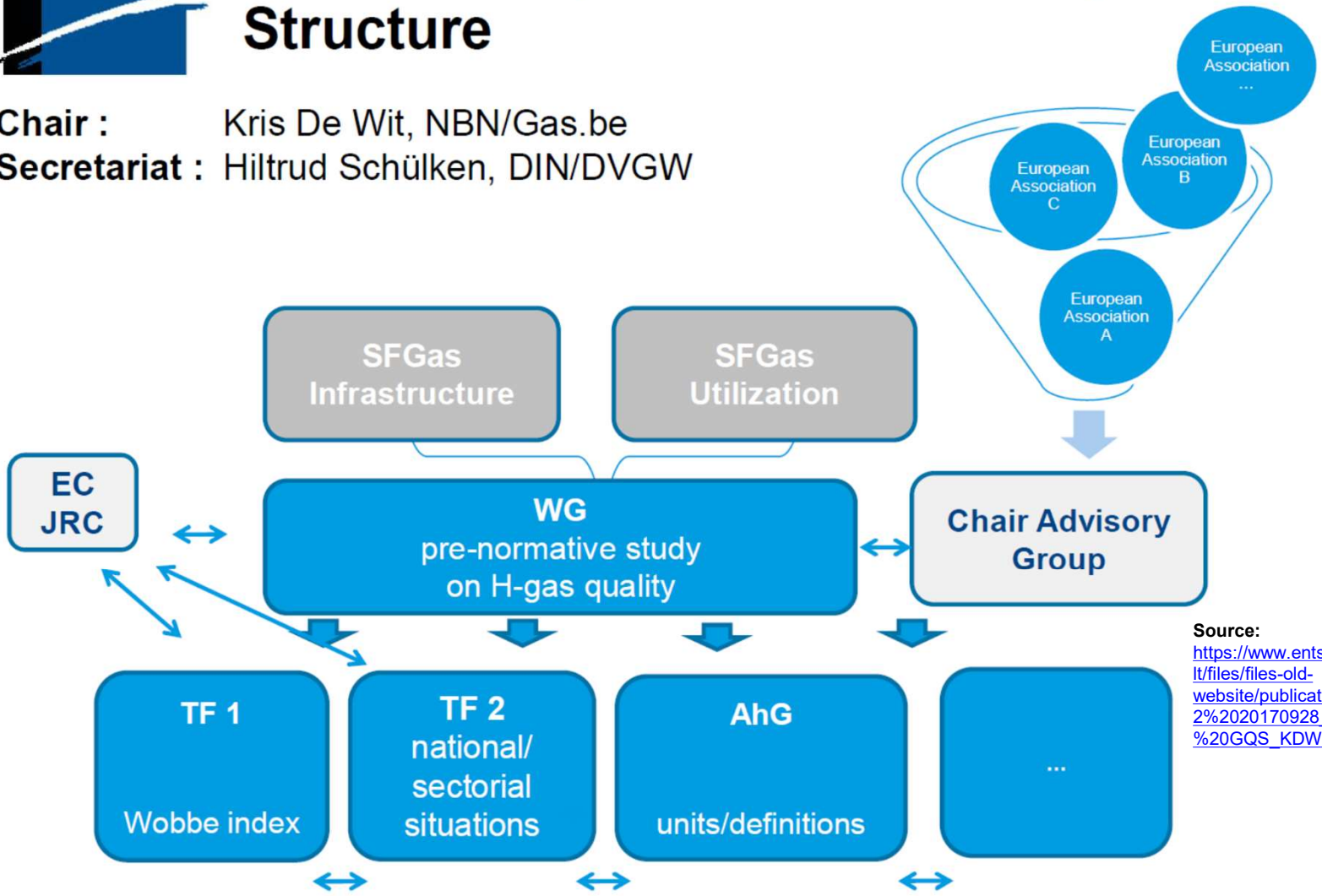
- 2019-06-05/06 MF32
  Presentation Integrated WI Scenario Proposal
- 2019 summer/autumn –
  Public consultation workshop – Validation of proposal
- 2019-10 MF 33
  Presentation of outcome
  (2019-12) Delivery of final report
- As soon as possible
  Amendment of EN 16726:2015 for WI (separated from all other revision issues)

Parallel SFGas GQS TF 3 on Oxygen

APPENDICES

CEN SFGas pre-normative study
Structure

Chair : Kris De Wit, NBN/Gas.be
Secretariat : Hiltrud Schülken, DIN/DVGW



Source:
https://www.entsog.eu/sites/default/files/files-old-website/publications/Events/2017/2%2020170928_CEN%20SFGas%20GQS_KDW.pdf

Task Force 1 proposal April 2019

- A typical Wobbe Index range of 49.0 – 52.7 MJ/m^3 (class A, covering approximately 92% of the gas supplied in Europe);

- A WI range deviating from class A with a maximum width of 3.7 MJ/m^3 (class B, covering approximately 5% of the gas supplied in Europe);

- Special solutions for special situations not covered by class A and B (class C: case-by-case solutions, particularly for “sensitive” users);

- A maximum rate of change in the WI of 1%/minute.

Disclaimer

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