The Wobbe Index in the H-gas standard and how to include renewable gases in the gas quality standardisation – CEN presentation

Madrid Forum, 5 + 6 June 2019

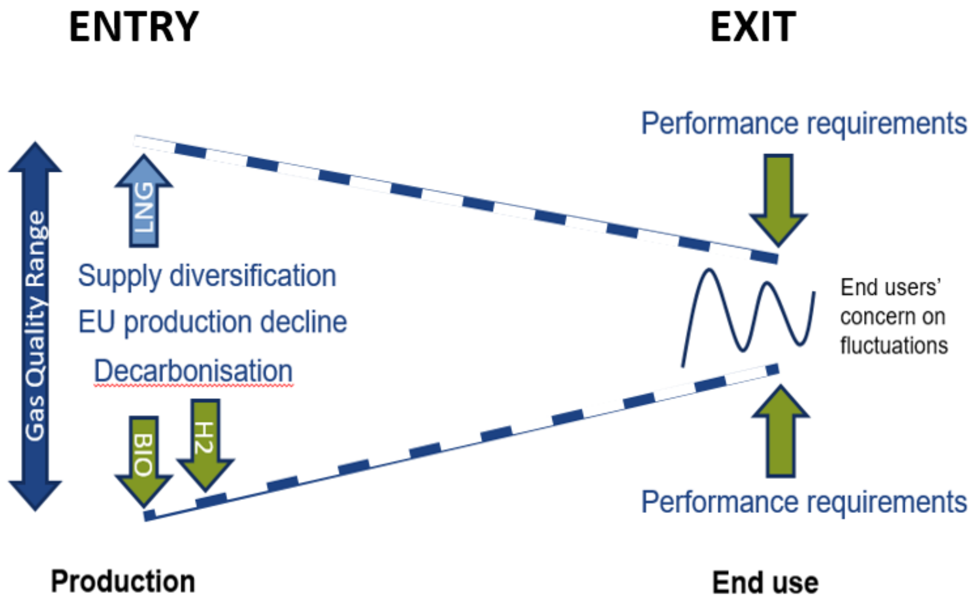
CEN SFGas Pre-normative study of H-gas quality parameters

CEN/TC 234 Gas infrastructure

Contents

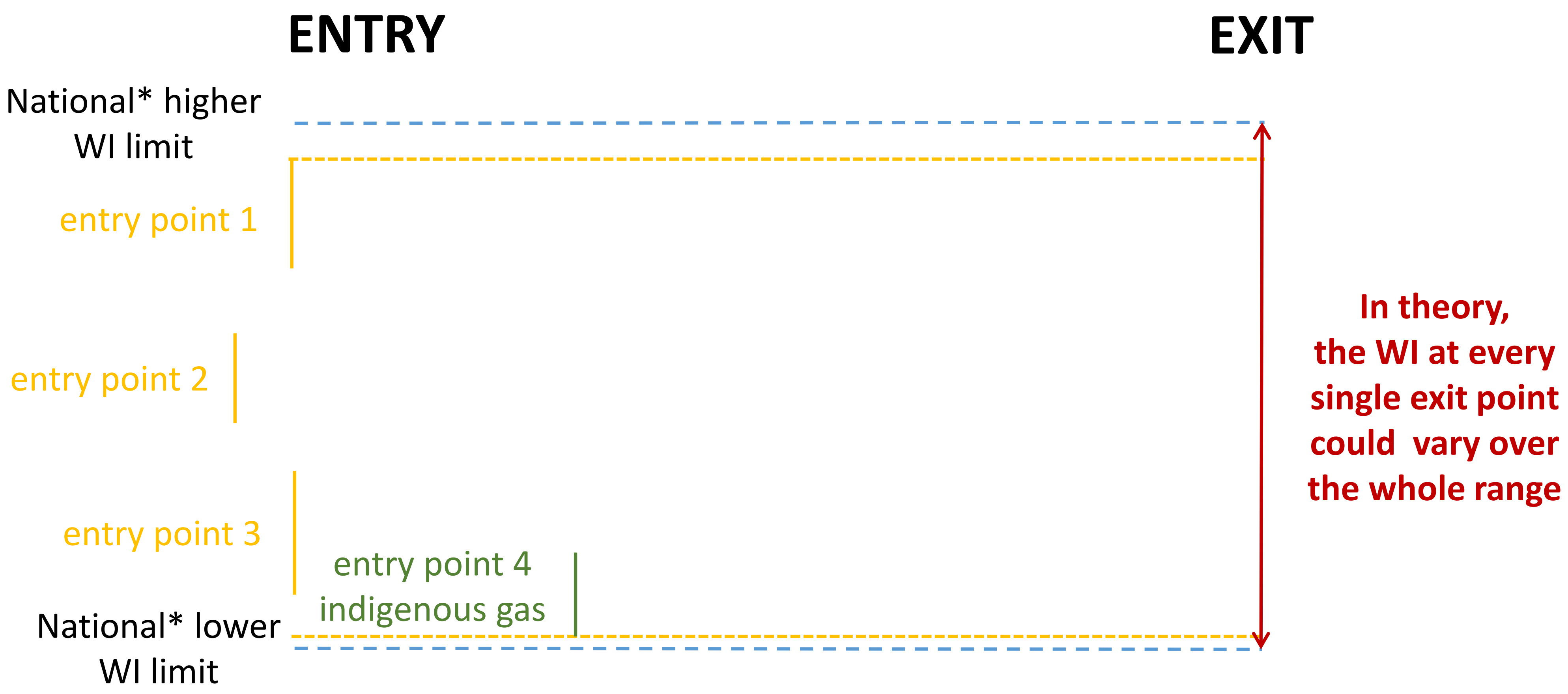
1. Why a EU GQ standard? Current challenges
2. What could be put in the standard? The approach in current evaluation
3. What goes along with the classification approach? Need of holistic approach including legal EU and national framework
4. How to include renewable gases in gas quality?

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.

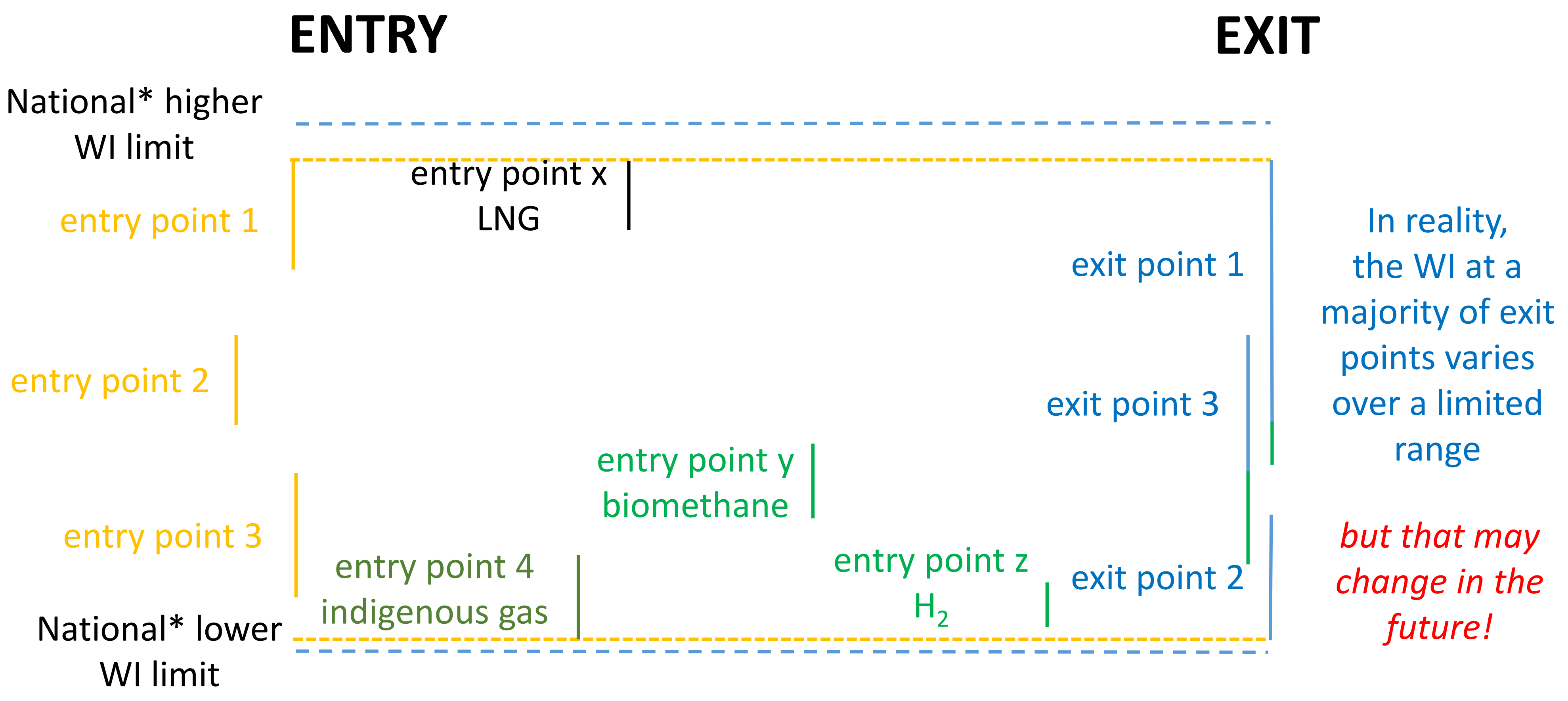
National Wobbe index situation - Example



* *A limit that is defined by legislation or the technical framework, e.g. standards or technical rules*

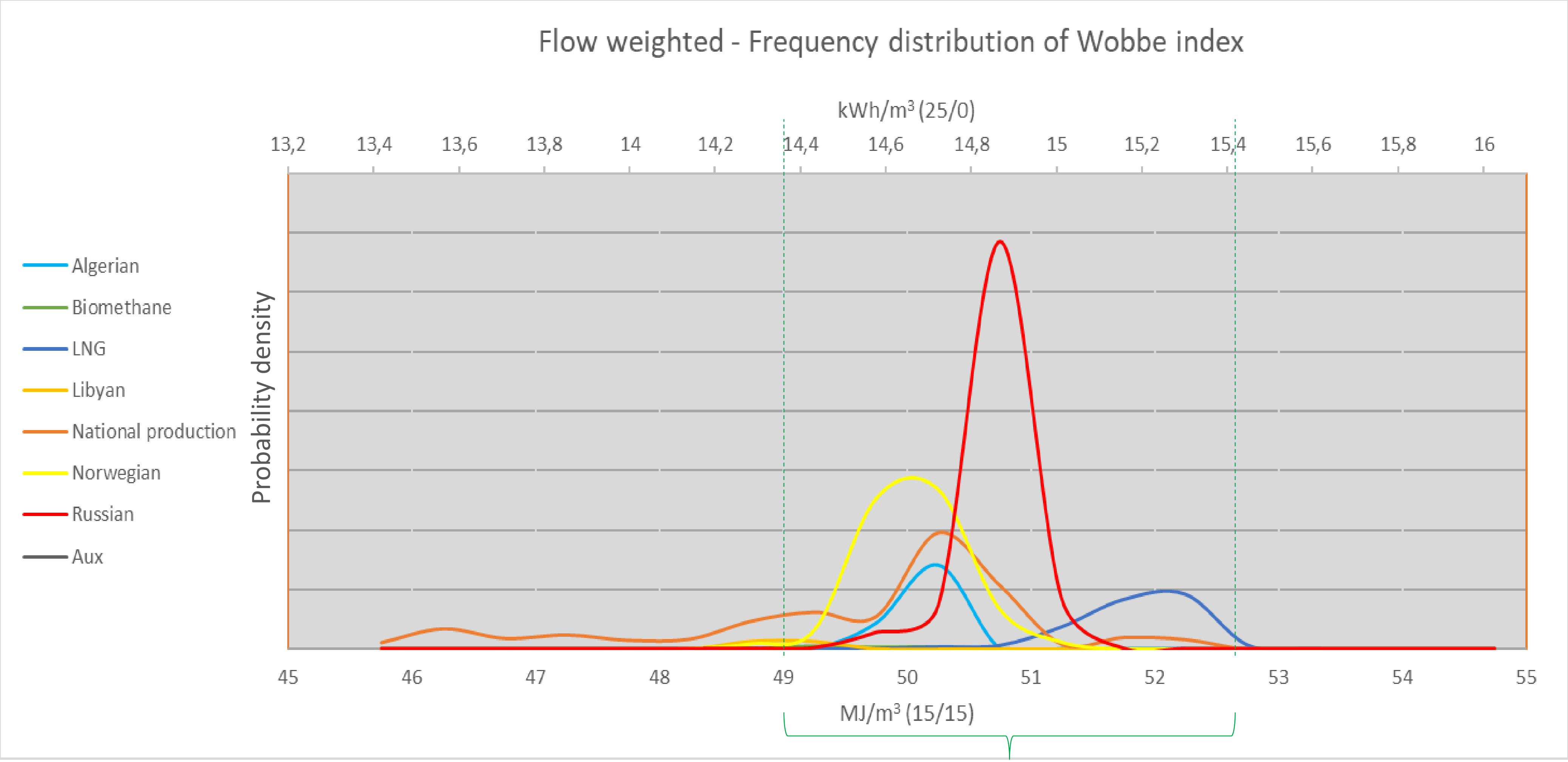
National Wobbe index situation - Example

The same principles apply to a **European Situation** with more entry and exit points



* *A limit that is defined by legislation or the technical framework, e.g. standards or technical rules*

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

What could be put in the standard?
The approach in current evaluation

Values and details on approach are in discussion in SFGas GQS

1. A **EU-wide WI range at entry points** of the gas system, taking into account the current and future gases (including renewable/low carbon gases, LNG, indigenous sources)

2. A **classification** of **WI exit points** for end-use purpose
   - including stability criteria (WI range, rate of change)
   - ensuring the appropriate local WI information

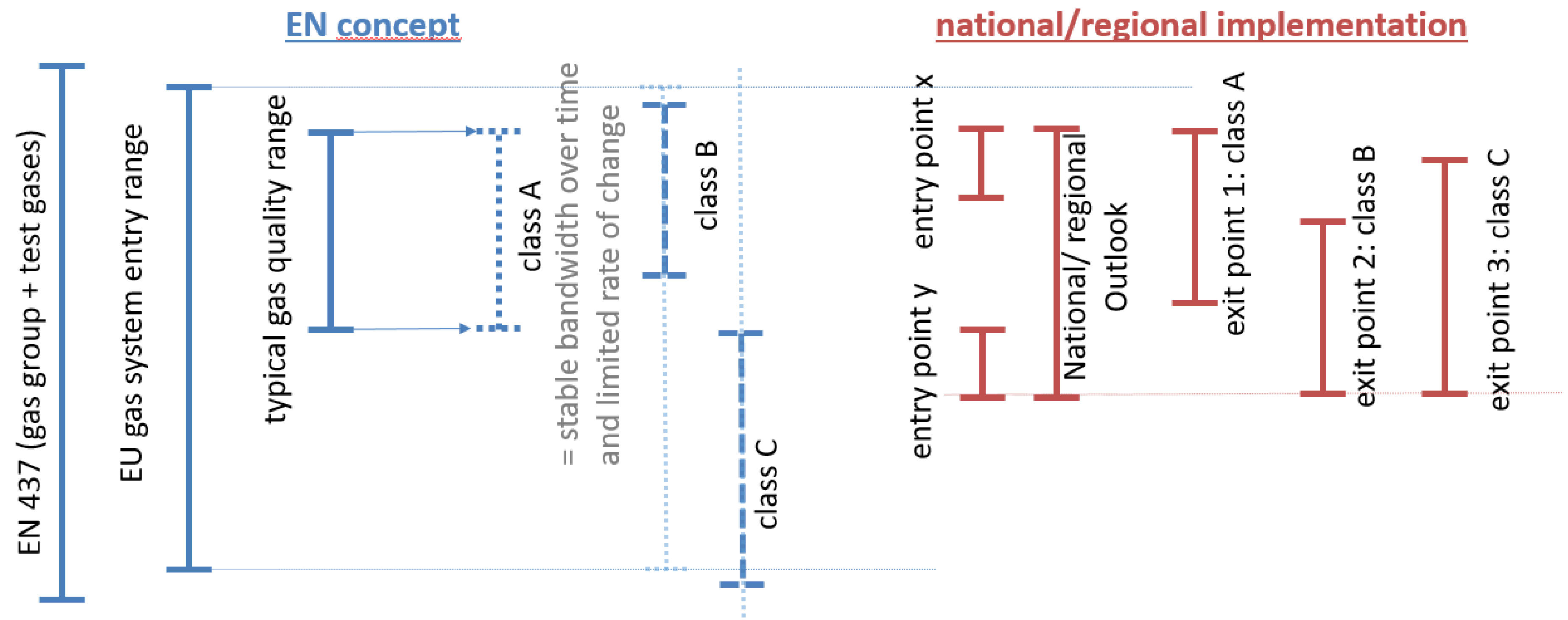
A classification of end-use exit points - Example

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.**



What goes along with the classification system of exit points - Regulatory framework

- **Information provision along the value chain with long-term perspective** (e.g. every 3 years)
  - national WI and GCV ranges based on historical and expected values
  - regional/supply corridor-based WI (and GCV) bands from historical and expected values
  - classification of exit points according defined criteria

- For **Class C requiring a case by case consideration** (number is not insignificant),
  - assessment of the presence of sensitive users, if so, a range of solutions should be considered locally and on a case by case basis:
    - end use adaptation and mitigation
    - gas grid management measures
    - gas treatment
  - national competent authorities (NRA, ministries) need to be involved to decide how to allocate costs between parties

- **Information provision with short-term perspective** in the framework of INT NC Article 17

How to approach the solution?
Standardisation, legal EU and national framework

- A **holistic approach** :
  - a revision of **EN standard**;
  - an adaptation of the **European and national regulatory framework**, including roles and responsibilities of all parties along the gas value chain.

- Probably a **step-by-step implementation** of the complementing regulatory framework.

On-going work and main remaining issues

Standard related

- Definition of (binding?) **EU wide entry range**? If binding, what about indigenous production outside the EU wide ranges?
- **Definition of classes**? Classification system purely informative? Informative and with guarantee of respecting the limits over a fraction of time (100%, 99%, 95%, …)
- Relation between **renewable gases** (esp. H2) and the new WI classification.
- **Reality check** of the proposed approach (JRC gas quality survey/support, TYNDP and others).
- Definitions of entry and exit points? And what about interconnection?

Regulatory framework (interaction with competent EU and national authorities)

- **Roles and responsibilites** along the gas value (and information) chain
- How to fairly allocate the **costs of mitigating measures**?
- Criteria and process for **switching the classification** of an exit point?
- How to ensure that classification system does not create barriers for the injection of renewables?
- Does the **regulatory framework** for gas appliances/applications (cf. GAR) need to take into account future gas supplies as the **lifetime of appliances/applications** may create lock-ins?

How to include renewable gases in gas quality (2)
Interaction of Wobbe Index classes and renewable gases

Generally, the classes system seems to provide a sufficiently flexible approach for renewable gas.

Biomethane:

- Biomethane (acc EN 16723-1) or synthetic methane are fully interchangeable with natural gas.
- Assessment needed how these may affect local gas quality variability (in a few cases may lead to class C).

Hydrogen:

- Gas infrastructure elements and end use applications will have different tolerances for hydrogen (under investigation by TC 234, TC 109, etc.)
- Next to that, (intermittent) hydrogen acceptability will depend on the base natural gas quality and its variability.
- Hydrogen concentrations of **2 Vol%** will most likely not affect the class of an exit point.
- For **5 Vol%**, a reassessment of the class of the point needs to be done, leading to a possible migration from class A to class B, or a range shift within class B.
- For **10 or 20 Vol%,** gas quality variability is significantly affected. Hence, the point class may often go from class A or B down to C.

  Note: Relative density + other properties need additional consideration in this context.

How to include renewable gases in gas quality (3)

- The potential H2 concentration in the gas, depends on the base composition of gas
- Gas Quality is finally defined by the requirements and abilities of gas applications and gas infrastructure (CEN findings in process)
- Relevance of Gas Appliance Regulation (GAR): No appliance category for H2NG can be defined, as the GAR requests national indication of current gases but not the indication of future gases.

How to include renewable gases in gas quality (2)

Further relevant parameters (*Basis of all consideration refer to injection of pure H_2 without any trace component)

PARAMETER IN EN 16726:2015	CURRENT FINDINGS related to H_2*
Carbon dioxide	No issue
Contaminants	No issue
Hydrocarbon dew point	**Change of phase behaviour; not considered as major effect**
Methane number (MN)	**H_2 lowers MN; considered as major effect**
Oxygen	**Evaluation in process** (SFGas GQS)
Relative density	**Lower limit restricts H_2 addition: deletion of parameter from the standard is technically possible** (in discussion)
Total sulfur without odorant Hydrogen sulfide + Carbonyl sulfide (as sulfur) Mercaptan sulfur without odorant (as sulfur)	No issue
Water dew point	**With injection of H_2, the dew point decreases; considered as positive effect** (in verification)

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

Contact

Hiltrud Schülken,
Secretary CEN SFGas GQS WG

+49 228 9188 905
schuelken@dvgw.de

Uwe Klaas,
Secretary CEN/TC 234 WG 11 Gas quality

+49 228 9188 821
klaas@dvgw.de

Kris De Wit
Chair CEN SFGas GQS WG

+32 478 97 93 84
kris.dewit@gas.be

Frank Heimlich
Convenor CEN/TC 234 WG 11 Gas quality

+49 231 91291 2426

frank.heimlich@thyssengas.com