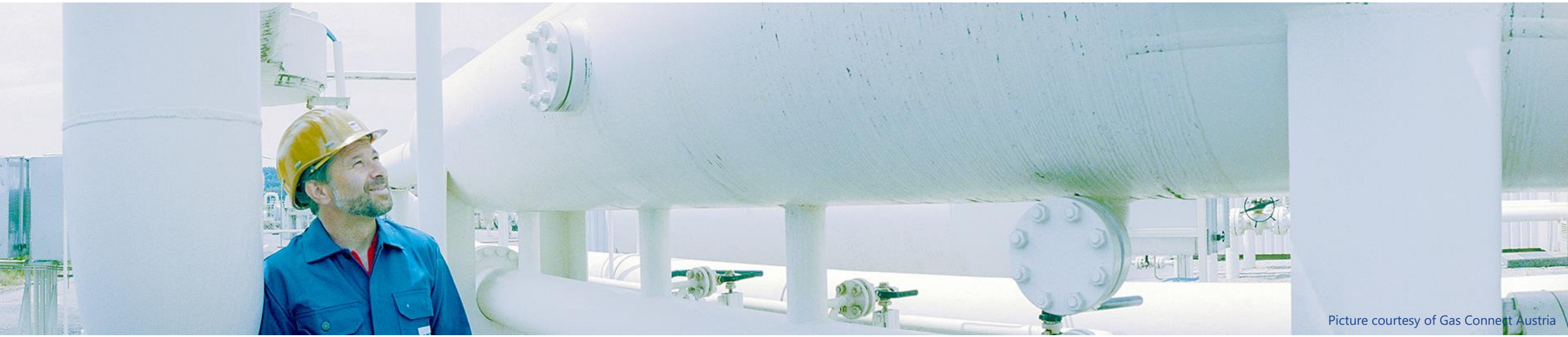


Picture courtesy of Gas Connect Austria

Prime movers' group on Gas Quality and H_2 handling

#7 meeting, 23rd March 2021 (09:30 – 13:00 CET)

Online

Disclaimer

The information included in this presentation is subject to changes. The proposals are presented for informative purposes only since the work is still in progress.

The organisation is not liable for any consequence resulting from the reliance and/or the use of any information hereby provided.

Agenda

Agenda

Topic	Time
1. Welcome and agreement on agenda	09:30 – 09:35
2. Updates on ‘Hydrogen and Gas markets Decarbonisation Package’	09:35 – 10:00
3. Progress and next steps in sub-group 1) WI framework	10:00 – 11:20
Break	11:20 – 11:30
4. Re-launching survey 1B “Regulatory framework and common practices on end-uses” within SG1	11:30 – 11:50
5. Debrief on sub-group 2) kick-off meeting	11:50 – 12:20
6. Review of goals & deliverables for 2021	12:20 – 12:25
7. A.O.B. & next steps for PMG	12:25 – 13:00

Updates on ‘Hydrogen and Gas markets Decarbonisation Package’

Gas networks - revision of EU rules on market access

In preparation

Roadmap

Feedback period

10 February 2021 - 10 March 2021

FEEDBACK: CLOSED

UPCOMING

Public consultation

Consultation period

Second quarter 2021

FEEDBACK: UPCOMING

Commission adoption

Planned for

Fourth quarter 2021

FEEDBACK: UPCOMING

- 10th February to 10th March: Inception impact assessment (i.e., roadmap) received 140 answers
- A 12-week public consultation is expected to start end March/beginning April
- A large stakeholder workshop will be organised open to all stakeholders to contribute to the impact assessment (approx. by May?)
- Commission adoption expected by Oct/Nov 2021

Progress and next steps in sub-group 1) WI framework

CEN SFGas WG GQS - WI proposal

CEN SFGas WG GQS: Recommendations and considerations on Wobbe index aspects related to H-gas

EC Mandate M/400 for harmonization of Gas Quality (2007)

Publication of EN 16726 (2015) without any combustion parameter

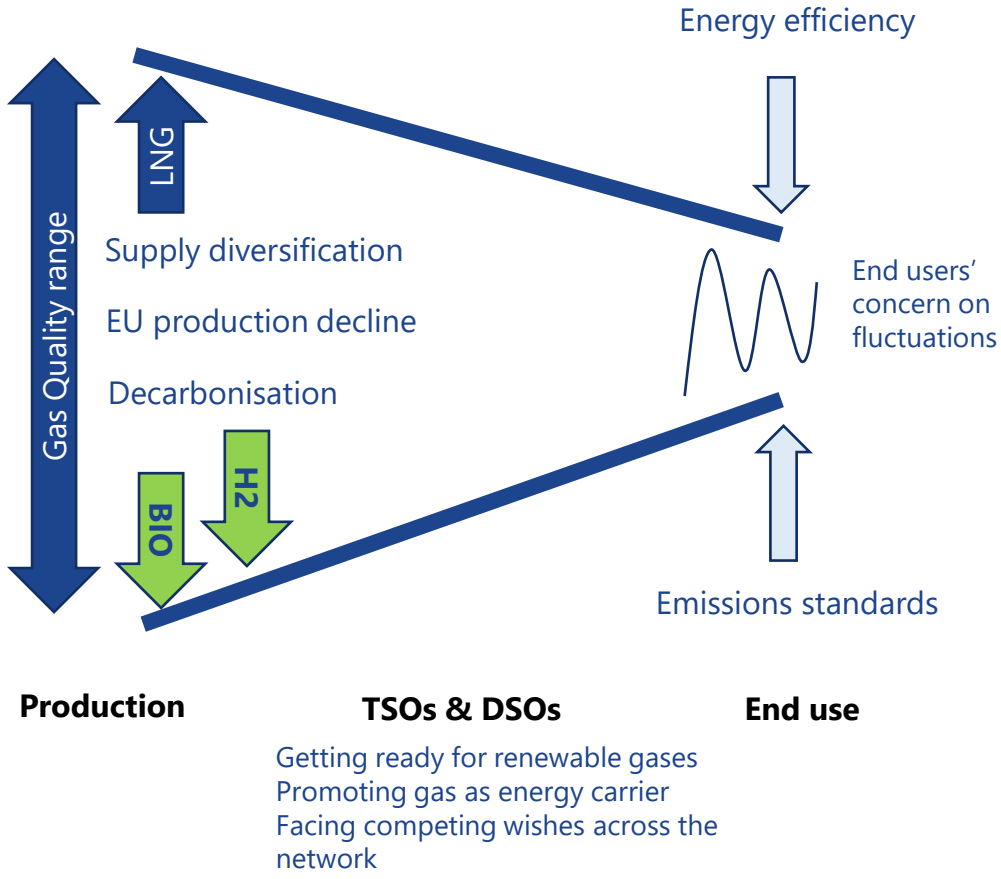
29th Madrid Forum – Oct. 2016:

- The Madrid Forum during its meeting of October 2016 encouraged CEN "to carry on the work on **finding an agreement on a band for the Wobbe Index,** elaborating on the possibility of regional bands, **to be included in an updated CEN standard [EN 16726]** […]"
- "The Commission will reconsider further harmonisation activities in light of the outcome of the CEN revision work."

31st Madrid Forum conclusions – Oct. 2018:

- Invitation to CEN to **integrate renewable and low-carbon gases** in European standard for H-gas quality

Conflicting objectives & requirements over the whole gas value chain



CEN SFGas WG GQS proposal on Wobbe index (2020-12-10)

Prenormative work hosted in CEN from 2017 to 2021

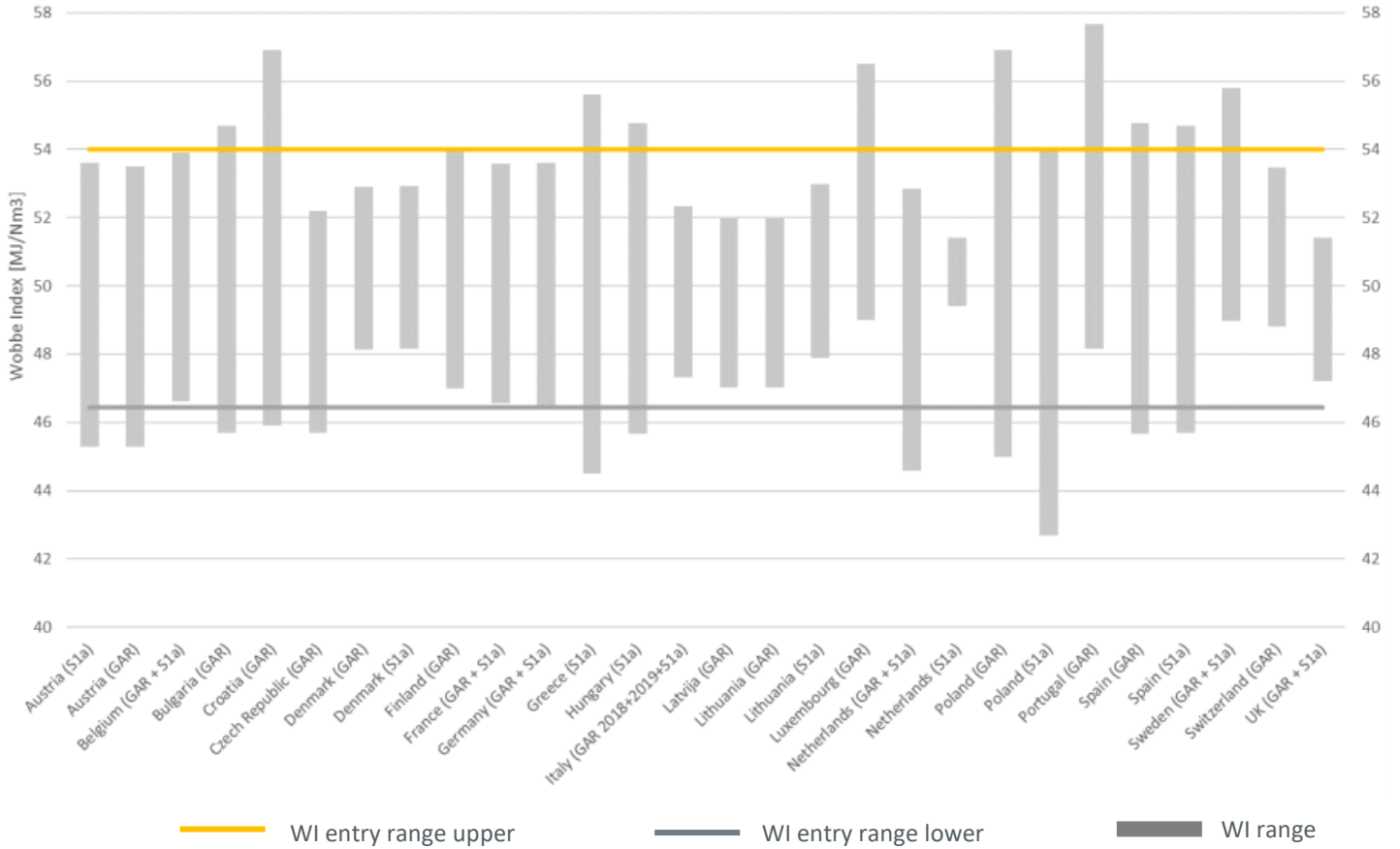
Recommendation for entry range

The WI entry range should be within 46,44 and 54,00 MJ/M³ [15°C/15°] *(phrased as recommendation according CEN/CENELEC rules)*

minimum WI ***[15°C/15°; MJ/m³]*** *[25°C/0°C kWh/m³]*	***maximum WI*** ***[15°C/15°; MJ/m³]*** *[25°C/0°C;kWh/m³]*
46.44 MJ/m³ *[13,59 kWh/m³]*	*54.00 MJ/m³* *[15,8 kWh/m³]*

Enables flexibility to use renewable and decarbonised gases

WI national specifications according to GAR Annex II and SFGas GQS survey 1A



CEN SFGas WG GQS proposal on Wobbe index (2020-12-10)

Requirement for implementation of classification system at exit points based on WI of distributed gases

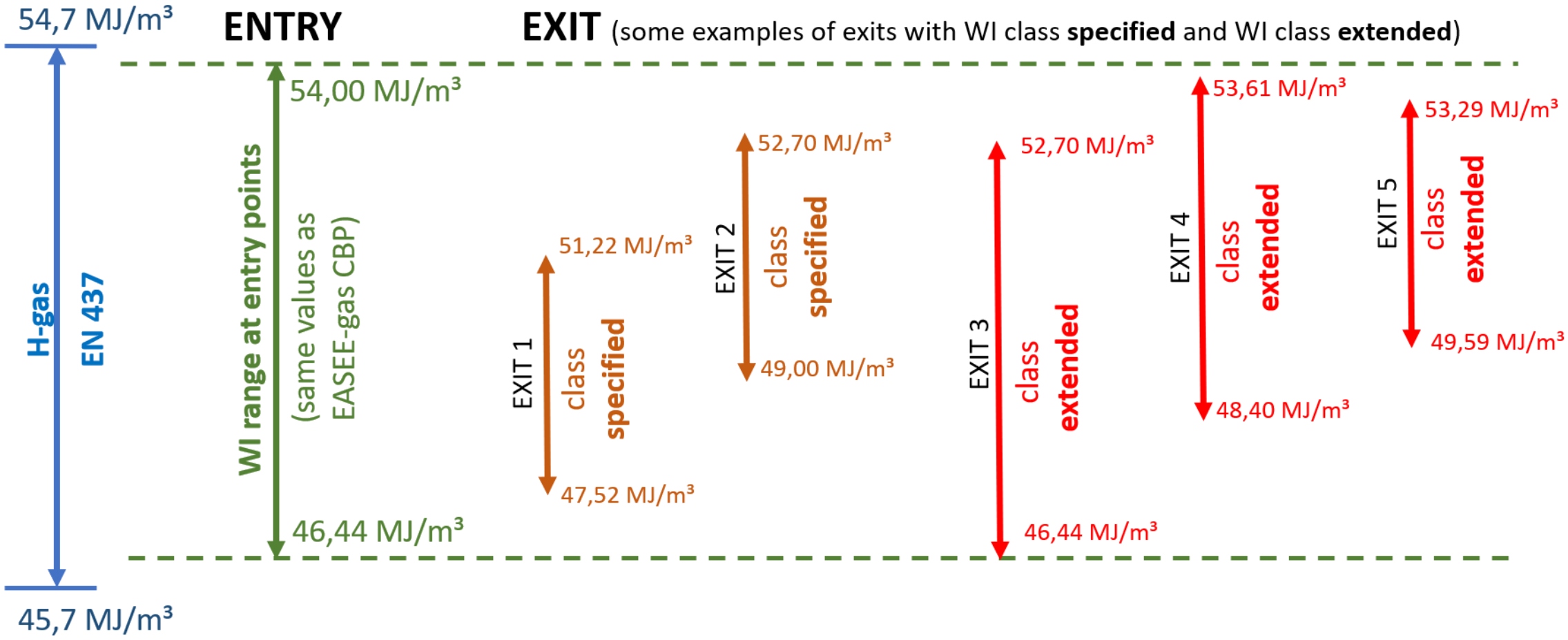
- *more **information*** and **certainty** for end-users
- acknowledgement of *specific steady **regional situations*** (e.g. LNG, national production)

Aspects of the classes and processus to be further defined in the framework discussion → PMG SG1 « WI Framework »

Class	***Indicated WI range*** *[MJ/m³, 15/15]* *(Grey values 25°C/0°C)*	***Bandwidth of WI of distributed gases at the exit point*** *[MJ/m³, 15/15]* *(Grey values 25°C/0°C)*	***Deviation (in percentage)*** *(= Conclusion on percentiles)*
*Class **specified***	*Lower and upper limit values defined per exit point with an interval of 3,7 MJ/m³ [1,08 kWh/m³]* *based on the distributed gas, within the WI range.*	***The WI of the distributed gases is ≤ 3,7 MJ/m³*** *[1,08 kWh/m³]* *within the WI range of* ***46,44 MJ/m³ to 53 MJ/m³*** *[13,59 kWh/ m³ to 15,52 kWh/m³]*	*The WI of the distributed gas can fall **below** the lower WI limit value of the range for a maximum of **1%** of the duration of the class specification and **above** the upper WI limit value of the range for another **1%** of the time* *Clarification of the extent/intensity of deviation and the time distribution of the '1 % deviation' in the framework discussion is required.*
*Class **extended***	*Lower and upper limit values defined per exit point,* *based on the distributed gas, within the WI range.* *Note: This class requires an assessment (due diligence principle) of the presence of sensitive users downstream of the concerned exit point and, if any, the implementation of appropriate mitigating measures.*	***Any other situation of WI bandwidth and/or of the WI range*** ***Steady/experienced situations in class extended*** *could be considered similar to a class specified (e.g. after an initial assessment) and should be part of the framework discussion (need to be addressed in clause 6, framework discussion)*	*The WI of the distributed gas can fall **below** the lower WI limit value of the range for a maximum of **1%** of the duration of the class specification and **above** the upper WI limit value of the range for another **1%** of the time* *Clarification of the extent/intensity of deviation and the time distribution of the '1 % deviation' in the framework discussion is required.*

The distributed gases shall be classified according to Table 2 *(phrased as requirement according to CEN/CENELEC rules)*

Example of exit classes with the proposed classification system



European legal/regulatory framework needed for the implementation fo the classification system at exit points (aspects listed in SFGas WG GQS draft report – Clause 6)

Key points of CEN SFGas GQS TF1 proposal

1. The recommendation of a WI entry range:
   - **gives freedom to the current regional Wobbe index situations**, and the **future diversification of sources** including renewable and decarbonised gases, without compromising the needs of the end-users
   - leaves the **stipulation of the national WI entry range in the competence of the EU Member States** (as it is currently legal situation)

2. The implementation of a requirement for the WI classification system proposal at exit points:
   - gives more **certainty to the end-users**, especially with view to the increased diversification of gases including renewable and decarbonised gases in future.

   But in order for it to work, it needs:

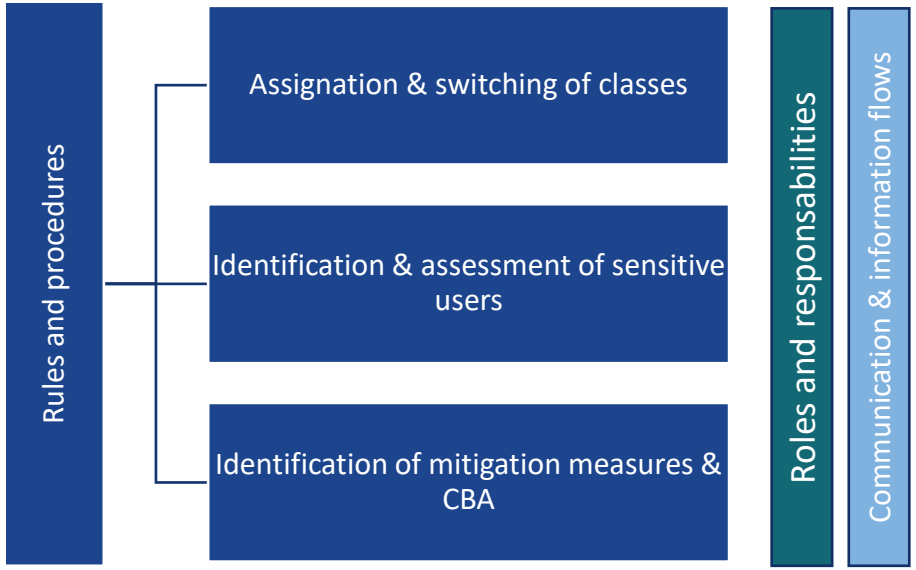
   - a strengthened **communication** between the different stakeholders (producers, suppliers, network operators and end-users) and increased **information flows**
   - the definition of **transparent methodology/framework** at EU level
   - a **neutral party** to ensure the correct implementation of the process

PMG Sub-group 1 work on WI regulatory framework

Goal and scope of Sub-group 1 “WI Framework”

Based on CEN SFGas GQS proposal, different processes were investigated:

1. Assignation + Switching of classes
2. Identification + assessment of sensitives users
3. Identification of mitigation measures + cost/benefit analysis (CBA)



For each process, the following has been discussed and documented:

- **How** is the process defined? *(list of aspects that defines the process, verification of common understanding, **definitions**)*
- **When and why** is the process carried out? *(situation that triggers the process)*
- **Who** is involved in the process? *(interfaces, **roles, responsibility**, liability)*
- **How** is the process technically and operationally implemented? *(**Communication + information flows**, procedures and methodology used, step-by-step approach)*
- For which aspects a European/national framework is needed?

Progress in Sub-group 1: pre-requisites identified

What is needed for the first assignation of classes?

Before being able to properly carry out the assignation of classes, the following items were identified as key resources:

- Tools for forecast and network modelling
- Data on GQ (e.g., prognosis of producers, real time GQ data from the grid)
- Historical data on supply and demand
- Data on future developments (e.g., information on infrastructure planning; when and where new injection points?)
- List of connected end-user points

– Other pre-requisites identified :

- The implementation of a transparent process and a framework where the assignation of responsibilities and liabilities is clear

work in progress

Progress: Identification and analysis of mitigation measures

Last PMG meeting (24/02) was dedicated to mitigation measures to WI/GCV & H2. SG1 gathered a non-exhaustive list of them

Topic	Specific mitigation measure
GQ measurement and Data sharing	Sharing of GQ data of the gas grid
	Measurement of GQ of the gas distributed to the end-consumer
Monitoring of GQ fluctuations	short term monitoring of GQ variations
	Forecasting of GQ
Combustion control systems	On-site fuel conditioning
	Combustion control via local GQ measurement and excess oxygen
	reduction of compression ratio or specific load (gas engines)
	Combustion control via excess oxygen measurements
	Combustion system re-design
	Fuel gas preheating
	dynamics / knocking measurement and feedback loop control
	Combustion control by flame ionization
Gas treatment	In producer site
	Removal of higher hydrocarbons at the liquefaction train (LNG)
	Further upgrading of biomethane
	Gas blending - Addition of LPG to bioCH4
	Gas blending - Ballast of gas with N2
	Separation technologies
	At exit points

Topic	Specific mitigation measure
Conversion between H2 and NG grids	Methanation
Grid management (flows)	Co-mingling (continuous blending two gas flows with different GQ)
	Static gradient splitter
	Parallel pipelines
	Swaping of flows
	Spreading of flow variatations at IPs or at production sites
	Connecting different networks to : - change flow patterns or - increase blending/mixing or - allow for injection in DSO network instead of TSO network
	Reverse flows
	Optimisation of flows in one pipeline
Market mitigation measures	Gas quality constraints
	Refusing new injection points at that specific location
	Delay new injection points at that specific location
	Reduce flexibility for renominations
	Demand response/balancing
	No delivery of gas at exit point

Others such as: On-site adjustment of the gas appliance/application; modification/adaptation of the process; Replace/ Renew; Legal framework

work in progress

Progress: Potential role for the regulator/authority

- The processes described include a **potential role for the regulator/authority**
  - As the party in **charge of 'validating'** processes and methodologies used to ensure an appropriate reliability and transparency of the processes (e.g., method used by network operators to assign the classes to the exit points, to review how the processes are put in place, to validate the updated list of 'sensitive'* users to WI changes, etc)
  - As the party that **reviews the proposed mitigation measures/solutions** by the network operator and end-user in order to properly allocate costs and responsibilities
  - As a **'conflict resolution'** party between network operator and end-user when no solution is found between them

- **Who** could take this role? NRAs? Other national authorities?
- The risk of not having this role fulfilled → how to ensure the well-implementation of the process? **Transparency**? And **trust** between parties?

**Sensitivity depends on the application/appliances. Criteria for identification of sensitive users for this process is being developed*

work in progress

Progress: What are the 'principles' that would need EU regulation?

- To implement the necessary **pre-requisites** → how to ensure the appropriate tools are in place? [e.g., 'smart gas grids' category under TEN-E?]
- To ensure **transparency** on the gas quality data and methodology used to assign the classes: trust between parties → authority/regulator role?
- For the **process and for the parties** involved: Roles and responsibilities → how can they be "enforced"?
- Ensure a **level playing field** among MSs → how to ensure that all MS follow the same procedures and rules?

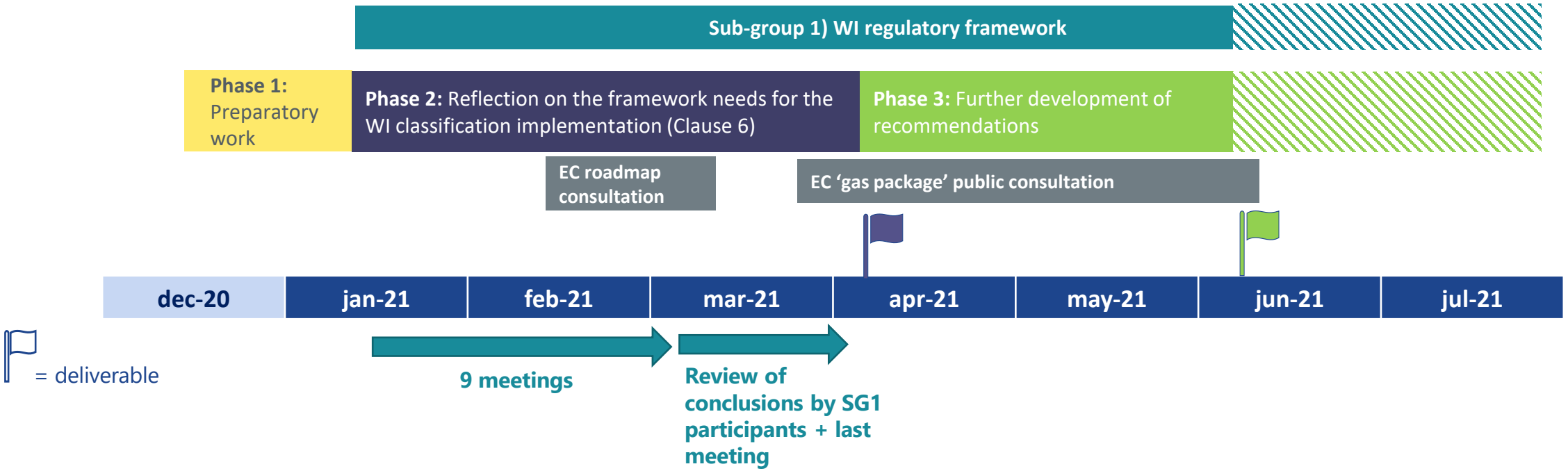
work in progress

Progress: Open questions

- Simulations with real data are needed in order to define the '1% deviation': in intensity (MJ/m3) and frequency (days/yr). Otherwise, no agreement expected → further steps?
- Some '**How to**..'
  - implement the process for residential and commercial consumers
  - involve producers in assessing mitigation measures
  - define 'reasonable' times for the communication between parties, and the assessment of mitigation measures (CBA process)
- Some '**what if**…'
  - Information provided is wrong
  - 1% deviation is not respected
  - No agreement is found between parties
  - The implementation of the process leads to 'too many restrictions' or boundaries for the deployment of renewable gases
  - MSs apply it differently and it leads to a non-level playing field for injections and appliances
  - …

work in progress

Next steps for sub-group 1



- **First deliverable in April 2021**
- Communication at next Madrid Forum (April 2021) expected
- Further steps to be discussed → second deliverable could be developed by mid-June 2021

Re-launching survey 1B “Regulatory framework and common practices on end-uses” within SG1

Survey 1B “Regulatory framework and common practices on end-uses”

Scope & goal

- SFGas launched survey 1b in 2018: “National situations regarding the regulatory framework on environmental in-use requirements for gas application and maintenance practices”
- Aimed at providing an **overview of relevant legislation** for Emission, Efficiency, Safety and Maintenance of different applications using natural gas in different European regions or member states.

Rational for the re-launch

- To find the appropriate solutions and framework setting for the WI process, it is important to understand the different national situations and to facilitate the **identification of areas where adaptations in the European and national legislation/regulation could be needed** to move forward the decarbonization of the whole gas value chain
- When the survey was carried out in SFGas GQS it was probably a premature discussion which led to few answers from the different stakeholders, therefore TF1 did not follow through with this specific survey. Meanwhile, the **context has changed and with this the awareness of the stakeholders has increased**

work in progress

Survey 1B "Regulatory framework and common practices on end-uses"

- For the re-launch it is proposed to:
  1. focus the scope on **a pre-defined set of applications/appliances** → especially those ones that may need "more work" for the decarbonisation (e.g., adaptations, replacements, mitigation measures, etc etc)
  2. Still focus on **efficiency, emissions, safety and maintenance**
  3. Include the **population** of appliances and **"age"**
- Proposed set of appliances:
  - For residential/commercial:
    - Forced draught burner (small size)
    - Premix (including all condensing boilers)
  - For industrial:
    - Gas Turbines
    - Glass melting furnaces

Expected contribution to the WI process

- ✓ The final deliverable will depend on the quantity and quality of the answers received. Ideally, the analysis of the results should lead to a **better understanding of MS policies and requirements** (in terms of efficiency, GHG, etc).

- ✓ Illustrative material (e.g., maps, tables) summarizing the main inputs received per country and sector could help achieving this objective.

- ✓ SG1 participants will use this information to draw conclusions about the **possibilities of implementing the proposed WI classification system in the different sectors** (especially for the residential one).

Proposed work structure

- ✓ Definition of sub-set of appliances
- Definition of survey requirements
- JRC will support the work by implementing it in the EU survey tool in an efficient way for further analysis of the results
- Engagement with targeted audience prior to survey launch
- Survey to be launched around April/May 2021
- Results expected for June 2021

Debrief on Sub-group 2 kick-off meeting

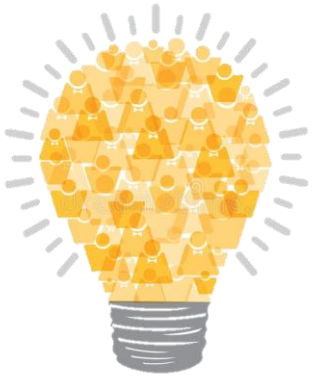
Kick-off meeting

- 43 participants

Topic	Time
Welcome and agreement on agenda	15:00 – 15:05
Context and background of subgroup 2/3	15:05 – 15:15
Marcogaz presentation: H2 TF work	15:15 – 15:30
GERG presentation: R&D roadmap & PNR with CEN	15:30 – 15:50
Update SG1) WI framework discussion	15:50 – 16:00
Discussion about expectations and possibilities for SG2/3	16:00 – 16:30
Call of chairs and co-chairs	16:30 – 16:45
Wrap-up & next steps	16:45 – 17:00

Proposals for sub-group 2

- **Scope & goal**
  - Provide conclusions that could be inputs to future Commission proposals on gas market design
  - Facilitate **knowledge sharing and exchange** about the commonly faced **challenges related to gas quality and H2 handling**, as well as best practices and lessons learned on how to overcome them
  - Identification and **assessment of the possibilities** for implementing gas quality & H2 management tools at different interfaces and check the **feasibility of interlinking** them for decarbonised systems based on identified solutions



- **Deliverable**
  - **Common & co-developed roadmap from the whole gas value chain based on recommendations, best practices or lessons learnt** about existing and potential gas quality and hydrogen handling options and tools and how to implement them along the different gas value chain interfaces
  - Seek to sketch out a cost-efficient **'step-by-step' approach** to connect each individual sector or area within a future 'decarbonized' gas system. Assess what can be done in the short/medium and long-term, by trying to subdivide by end-user category what tools exist and the time horizon to implement them

- **Timeline**
  - Key findings and potential recommendations by **Q3 2021**

Starting point…

– **What projects exist on this front?** Proposal: Attempt at providing a consolidated understanding of what is being done – **deliverable for input**

– **In parallel** – prioritize the list of potential topics that came up during previous discussion in PMG meetings, considering:

1. the most urgent needs and requirements
2. upcoming Commission proposals
3. knowledge gaps compared to existing initiatives

Proposal to feed into a deliverable showing European projects – highlight issues that are being dealt with

First deliverable proposal

- Map out ongoing, finished or about to start **projects/initiatives/associations work** related to GQ and H2 handling, ideally within the **categories/topics** defined:

1. Blending/ Deblending
2. Digitalisation & smart gas grids (e.g., intelligent monitoring and metering equipment, forecast tools, sensors, etc)
3. H2 odorisation/de-odorisation
4. H2 purity
5. H2 readiness
6. H2 safety
7. Mitigation measures for GQ variation
8. Repurposing/retrofitting
9. Reverse flows
10. Standards development
11. Others

First deliverable proposal

- Fields to be filled:
  1. Project name
  2. Stakeholders involved
  3. Status (Ongoing, finished, to be started)
  4. Domain (private, public, PPP)
  5. Timeline
  6. First key results expected by
  7. Location
  8. Main topic
  9. H2NG?
  10. Brief description: goal, added value to PMG, etc. (2 to 3 lines)
  11. Link to website or relevant material
  12. Additional information (e.g., how PMG could contribute or vice versa, gaps that would need further work)

Some questions remain to be answered…

1. Does the issue exist or is it "upcoming"? - if the latter, when is it expected to become an issue?
2. Which stakeholders are impacted? Are they impacted differently?
3. Is there any project/initiative/solutions already addressing this issue? When is an outcome expected? Is the solution widely applicable or will separate solutions be required for separate interfaces?

More important questions that need to be answered instead?

Call for chair and co-chairs

- The call of interest for chair & co-chairs was open until 19th March
- No special requirements were asked. Only **willingness to make things happen and help structure the work.** Their tasks would be:
  - Channel discussion
  - Help structure work
  - Facilitate stakeholder involvement and engagement
- The chair and co-chairs will **always** be supported by PMG facilitators (ENTSOG & DSOs)
- Expressions of interest received:

Gas Distributors GD4S For Sustainability

Ruggero Bimbatti

EASEE-gas Streamlining the gas business

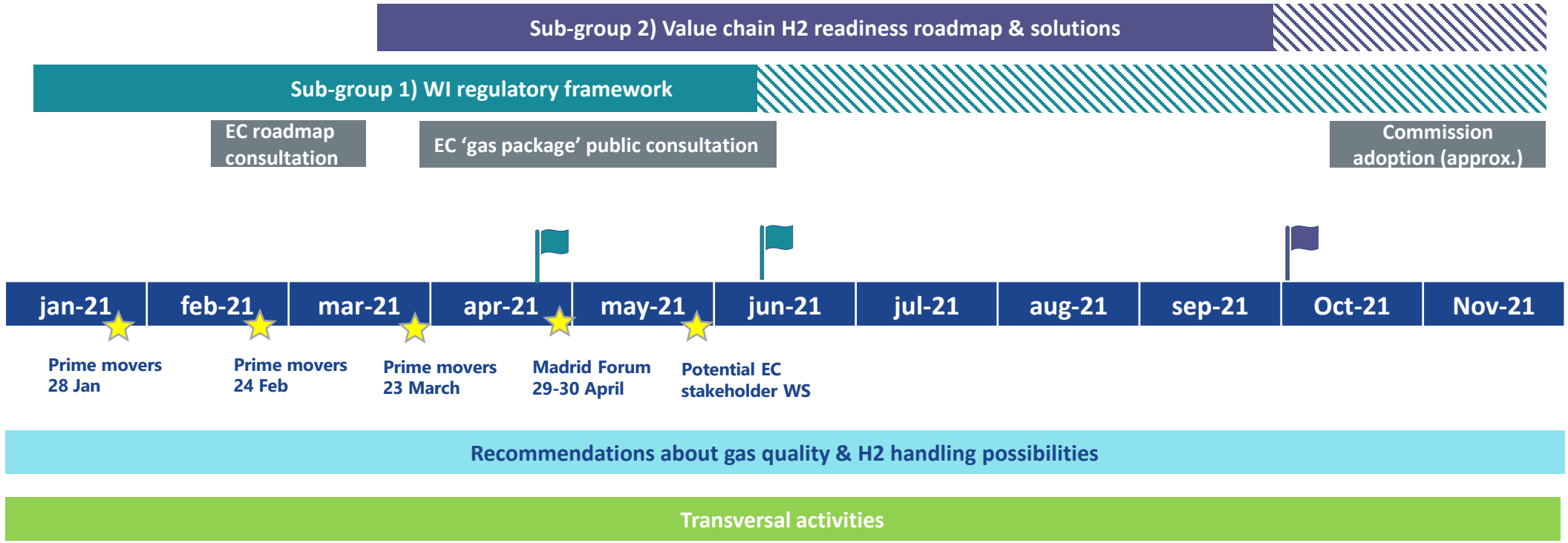
Peter van Wesenbeeck

Review of goals & deliverables for 2021

2021 goal & deliverables proposed

- **Goal**: Provide inputs that need to be tackled by future Commission proposals in 'gas market design'
- **Expected deliverables**:
  - **Sub-group 1** (Q1 and potentially Q2 2021):
    - Recommendations for implementing the proposed WI classification system at exit points practically and in a regulatory framework
  - **Sub-group 2** (Q3 2021):
    - Common & co-developed 'step-by-step' H2 readiness roadmap for the whole gas value chain based on what could be done in the short/medium (e.g., 2025 – 2030) and long-term (e.g., 2050) for different end-user categories or interfaces in order to connect them in a cost-efficient way within the future 'decarbonized' gas system. This will involve the assessment of existing and potential gas quality and hydrogen handling options/tools, as well as the identification of requirements and time needed to implement them
- **Transversal activities**:
  - Promote ongoing work and engage with stakeholders outside the prime movers' group
  - Ensure a regular exchange on latest gas quality and H2 handling practices and projects (e.g., metering, safety, H2-ready equipment and devices, etc.)
  - Coordination and alignment with other associations or WGs work on the topics

2021 timeline reviewed



= deliverable

Note: Timelines subject to changes

A.O.B. & next steps

Overview of next steps – Wrap up

Sub-group 1) WI framework

- First deliverable will be sent to SG1 for comments until mid-April
- Meeting scheduled to review comments received
- Send out to EC [DG ENER] by end April
- Further steps and work to be discussed with SG1 members and EC

Sub-group 2) Value chain H2 readiness roadmap & solutions

- Next meeting on 15th April
- SG2 participants to work on filling in the ‘initiatives & organizations work’ collection template
- Co-chairs will be appointed by SG2 participants by email
- Work structure and definition to be started with co-chairs

Thank you for your attention

For further questions, please contact:

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