Briefing for Director-General Juul Jørgensen

EUROPEAN CLEAN HYDROGEN ALLIANCE, CEO MEETING

Request (ENER/ 6812)

Contact Points: [redacted] (ENER C2), [redacted] (ENER C2), [redacted] (ENER C4), [redacted] (ENER B5)

SCENE SETTER

Who	ENTSOG CEO Meeting for Hydrogen Roundtable
When	29 September, 15hrs
Where	Teams
Why	• **Your role**: Speaker and panel guest • **Invitation from**: ENTSO-G, Clean Hydrogen Alliance • **Purpose of attendance**: Exchange on hydrogen proposals under Repower EU. Speakings are organised on the basis of topics for discussion as shared with us prior to the meeting.
How (Choreography)	• Chatham House rules. • You will share a slot with EVP Timmermans. Each of you will have 5 minutes. There will be 50 minutes reserved for a Q&A. • EVP **Timmermans** is likely speak about the **hydrogen bank**. • **CEOs** will present **projects/technologies/corridors** and explain their **benefits** and **bottlenecks**.
Topics	• COM vision on the **Clean Hydrogen Alliance**; • REPowerEU: **H2** and related **infrastructure**; • COM '**mapping**' of H2 infrastructure; • Address uncertainty: **motivate CEOs to invest** in H2 infrastructure in line with COM's vision.

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TALKING POINTS

TOPIC: Address the uncertainty: motivate CEOs to invest in H2 infrastructure in line with COM's vision

Main Message: COM has taken **major policy and financial steps to incentivise investments needed for the (renewable) H2 value chain**. eg:

- Proposal to scale up production and consumption of renewable H2 in hard-to-decarbonise sectors under RED-II revision
    - Proposed **ambitious targets for renewable hydrogen consumption by industry by 2030 (50% of total hydrogen consumption) and transport (2.6% of total fuel consumption).**
    - EP and Council adopted their positions; **trilogues start soon.**
- H2 **and gas markets decarbonisation package:**
    - Updates EU gas market rules towards renewable gases eg H2.
    - Creates **clear rules on how to own, operate and finance H2 infrastructure**. Encourages gas and electricity grid operators to invest in the H2 network.

- New **H2 network planning** rules. Ensures hydrogen system is constructed based on **realistic, forward-looking demand projections**.

- COM **assessment of first two waves of Hydrogen IPCEIs**.
  - In July, COM approved IPCEI Hy2Tech with **EUR 5.4 bn** for **15 MS**, covering **41 project**s. Expected to **unlock EUR 8.8 bn** in private investments.
  - COM just approved IPCEI Hy2USE with **EUR 5.2 bn** for **13 MS**, covering **35 projects**. Expected to **unlock EUR 7 bln** in private investments.
- **RRF** = **EUR 9.3 bn** for H2 projects.
- **Clean Hydrogen Partnership** (EUR 2 billion for 7 years) and **CEF**.
- **EU Hydrogen Bank** to include further measures **to move the H2 economy from niche to scale.**

TOPIC: H2 and related infrastructure under REPowerEU

<u>Main Message</u>: Need to speed up H2 infrastructure to produce, import and transport 20 mln tonnes of H2 by 2030.

TOPIC: Identifying hydrogen infrastructure priorities

[redacted]

- Estimated investment needs for key H2 **infrastructure** to support domestic and international production: **EUR28-38 billion for EU-internal pipelines and EUR 6-11 billion EUR for storage.**

- **Not all demand can be met by domestic production.** COM will also step up international engagement on H2. **Green Hydrogen Partnerships** to help imports of green H2 while supporting decarbonisation in partner countries.

- H2 imports to the EU are **most cost-effective via pipelines from EU neighbourhood.** COM will help develop **3 major hydrogen import corridors:** via the **Mediterranean,** the **North Sea** area and from **Ukraine** (as soon as conditions allow).

- **Import of H2 as ammonia and in liquid form** is another promising way of connecting renewable hotspots around the world to future users of renewable H2 and its derivatives.

- Important to take into account infrastructure needs to cater for the import of H2 carriers and derivatives - also in future planning of the most cost-effective H2 network.

<u>Main Message</u>: TEN-E offers an effective European way of identifying H2 infrastructure priorities.

- Kick-started H2 infrastructure development - included in revised TEN-E Regulation in June.

- COM + ENTSOG + other key partners will start to identify priority H2 needs and projects on 6th PCI list and projects of mutual interest (under rev TEN-E Regulation).

- These PCIs (EU-internal) and projects of mutual interest (with a neighbouring non-EU country) will help identify **where trans-European energy priorities lie**. Would benefit from priority treatment at national level and may receive CEF support.

- COM will map preliminary H2 infrastructure needs **by March 2023 (based on the TEN-E Regulation),** with MS + national regulatory authorities + ACER + ENTSOG + project promoters + others.

- 3 regional groups will start their work in **October.**

- **European Hydrogen Backbone,** analyses supply, demand and resulting infrastructure priorities in 5 European corridors**.**

- Given short time until 2030 + limited financial and manufacturing resources, **I'd be interested in hearing from EHB members what the top priority infrastructure are?**

TOPIC: Commission vision for the clean hydrogen alliance

Note: DG GROW leads the Alliance, ENER was in touch at short notice

<u>Main Message</u>: Value working closely with Alliance to feed into COM's policy work.

- **Clean Hydrogen Alliance** = good example of partnering up industry+ innovation → instrumental in cooperation eg for:
    - Identifying **bankable pipelines of projects** possibly suitable for investors; *(DG GROW estimates current pipeline of projects at ca. **68 GW of electrolysers** to produce H2 if implemented by 2030)*
    - **Addressing legislative challenges, eg permitting**.
    - Joining forces on **innovation** and **scaling up** EU manufacturing of **electrolysis** to **increase ten-fold** the manufacturing electrolyser capacity in Europe **by 2030**. **(**following the Industry Summit, May 2022)
- Appreciate working closely with the **Alliance to feed into COM policy work** eg on emerging technical issues as standards for H2 infrastructure, and identifying challenges.
- Look forward to discuss Alliance's Standardisation Roadmap.

Key elements of the H2 economy = completing necessary standards for safely + securely operating emerging H2 networks and infrastructure. (Report/Roadmap publication expected in December 2022 at the Hydrogen Forum).

MEMORY JOGGER

Main Message: Substitute RU fossil fuels with renewable H2.

- Based on REPowerEU, renewable H2 can substitute **27 bcm** of imported **RU natural gas, 4.7 bcm** of imported **RU oil, and coking coal imports** (156 kT).

Main Message: Need to finance H2 measures of REpowerEU:

- REPowerEU objectives = **produce** 10 MT of renewable hydrogen in the EU.
- Requires **ca. EUR 335 - 471 bn of funding**, with **EUR 200-300 billion** needed to produce additional **renewable electricity** and ca. **EUR 50-75 bn** for **electrolysers**.
- Investment needs for key hydrogen **infrastructure** categories for both domestic and international production: ca. **EUR 28-38 bn for EU-internal pipelines** and **EUR 6-11 bn for storage.**

Main Message:

- To move away from RU fossil fuels, **need to replace more natural gas with renewable H2** - in ammonia production and in refineries - **by 2030.** The **steel industry** should see the start of the shift from coking coal to hydrogen.
- **Another opportunity** to replace RU fossil fuels = **more H2 consumption** in hard-to-decarbonise areas of **transport** esp. **heavy duty trucks** and sustainable fuels for **aviation** and **waterborne** sectors.
- COM invites the EP + Council to increase sub-targets for renewable fuels of non-biological origin under the RED for **industry** (from 50% to 75% of hydrogen consumption) and **transport** (from 2.6% to 5% of energy consumption).

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DEFENSIVES

New European Network of Network Operators for Hydrogen (ENNOH) in H2 and gas markets decarbonisation package

Why did COM propose ENNOH? Why not give ENTSOG responsibility for cooperation with H2 network operators?

- Future market and infrastructure for hydrogen will not be a copy of the current natural gas system.
- Eg, major industry and transport hubs will be the main consumers for hydrogen, whilst natural gas is delivered to hundreds of millions of households, businesses and electricity and heat producers.
- The future rules for hydrogen need dedicated reflections and cannot simply copy current market rules and infrastructure for natural gas.
- We create ENNOH as the governance of the hydrogen network also requires a dedicated approach.
- Creating a new, separate body for EU-wide coordination of H2 network operators reflects our message on the role of hydrogen and on the priority of using it in its pure form transported in dedicated hydrogen networks to use in hard-to-decarbonise sectors.
- The exclusive focus on hydrogen allows ENNOH to better tailor development of hydrogen networks to the real needs of the hydrogen markets (demand calculation in H2 TYNDP, end-use in hard-to-decarbonise sectors). Gas TSOs can be biased towards less efficient use of hydrogen (e.g. blending) and to over-investment to prolong the lifetime of natural gas assets. Gas TSOs are strongly interested in blending hydrogen into the existing gas network. They have a different concept of market and infrastructure development for hydrogen.
- ENNOH is better placed to focus on the development of hydrogen valleys and can support the longer-term vision towards the hydrogen backbone concept.
- At the same time, the sector integration approach is ensured by aligning tasks under the TEN-E Regulation and by introducing cooperation obligations for the EU-level entities: ENTSO-E, ENTSOG and ENNOH. We are pleased that ENTSOG has good cooperation with ENTSO-E on network planning = excellent basis for future cooperationwith ENNOH.

Proposed unbundling rules for the dedicated hydrogen market under the hydrogen and gas markets decarbonisation package

Vertical unbundling (= separation production and transport) – Why didn't the Commission offer more flexibility on unbundling rules for the future (dedicated) hydrogen market?

- The proposed **unbundling rules for dedicated hydrogen markets are often perceived stricter than they actually are**.
- As for natural gas and electricity markets, our proposal for hydrogen network regulation is based on the principle of ownership unbundling. This protects competition and prevents market abuse by vertically integrated hydrogen companies.
- The proposed exceptions to this principle (i.e. use of alternative unbundling models ISO and ITO; exemptions for existing networks) are aligned with the current and expected hydrogen market structure. **Compared to gas and electricity networks in 2009, there are currently very few vertically integrated hydrogen networks.**
- Unbundling of hydrogen network operators under **the vertically integrated ITO regime** is therefore envisaged **only as a transitional measure during the market start-up phase until 2030**.
- However, **vertically integrated gas network operators under the ITO regime and other vertically integrated undertakings can retain ownership of hydrogen networks after 2030 and accordingly reap the economic benefits of this ownership if they delegate the operation of those networks to an independent hydrogen network operator.**

Vertical unbundling - Why is there no distinction between hydrogen transmission and distribution, and no privileged treatment of "hydrogen DSOs" in terms of unbundling (as for gas and electricity)?

- Firstly, the proposal does not distinguish between transmission and distribution for hydrogen. **All hydrogen networks will be subject to the same regulatory requirements.**
- This is due to the difference in current market structures: **hydrogen will be used mainly in hard-to-abate industries and certain transport modes (e.g. buses, trucks, ships)**. A widespread switch of households (and thus, a switch of gas distribution networks) to hydrogen for heating and cooking = not the most effective approach to decarbonisation and value generation.
- Secondly, **the market structure for hydrogen will differ from gas. For hydrogen, small decentralised production from electrolysers will play a significant role. Therefore, safeguarding competition and a level playing field – including through strict unbundling – is also important within distribution-level networks.**
- **However, gas DSOs that are part of a vertically integrated undertaking can still become active in hydrogen transport by repurposing parts of their networks** (notably to supply connected industrial customers):
    - Until 2030, they can benefit from a derogation from unbundling for geographically confined networks (Article 48 Gas Directive proposal).
    - After 2030, they can retain ownership of their hydrogen networks if they delegate the operation to an Independent Hydrogen Network Operator (equivalent to ISO unbundling model in gas and electricity).

Horizontal unbundling - Why does the Commission proposal envisage stricter horizontal unbundling between hydrogen networks and gas/electricity networks?

- Also here, the **rules are often perceived stricter than they are.**
- In the hydrogen and gas markets decarbonisation package, **operators of gas and electricity grids will be allowed to pursue hydrogen network activities, provided they create a separate legal entity(legal unbundling).**
- Our choice for a legal horizontal unbundling regime should safeguard the separation of accounts.
- Our **key aim is to uphold the principle of cost-reflectivity of tariffs for the use of natural gas networks and hydrogen networks** (i.e. no cross-subsidies between networks).
- However, we are well aware that flexibility might be needed in the ramp-up phase of the hydrogen network. That is why it will be possible to partially cross-finance the development of hydrogen networks with money levied from users of natural gas networks.
- This possibility is however restricted in time, subject to regulatory approval and the additional charges on network users can only be levied at internal points of a Member States' gas network.

<u>Hydrogen infrastructure mapping</u> [an initiative developed by industry in the context of the Madrid Forum]

Is there an on-going infrastructure mapping of hydrogen infrastructure projects?

- This is an activity of natural gas infrastructure industry (ENTSOG, EHB, GIE, CEDEC, Eurogas, GEODE, GD4S) to map all hydrogen infrastructure projects collected under different existing processes.
- It is important that this mapping assesses the costs/benefits of projects and consultats all stakeholders.

<u>Hydrogen infrastructure under the TEN-E</u>

Is there scope for constructing hydrogen-ready pipelines, using them for natural gas in the beginning and switching later (and get PCI-status under TEN-E)?

- Dedicated hydrogen pipelines - both repurposed from natural gas to hydrogen as well as newly constructed ones, or a combination of both - are eligible to apply for the 1st PCI list under the revised TEN-E Regulation.
- The revised -E Regulation (Art. 31) includes an exemption where dedicated hydrogen assets might be used for a predefined blend of hydrogen and natural gas for a transitional period until 2029.
- However, this transitional period applies only to dedicated hydrogen assets converted from natural gas assets, i.e. existing natural gas assets, hence a new hydrogen pipeline used for natural gas would not fulfil these conditions.

- Therefore, any pipeline which is not yet constructed could apply for PCI status only if it can prove it will be used as a dedicated H2 asset from the very start of operation.

Can a hydrogen liquefaction (export) terminal get a PCI status under the TEN-E? [Portugal might raise the Sines terminal for exporting to Rotterdam]

- TEN-E (Annex II) only mentions reception, storage, regasification, decompression.

Delegated act additionality/defining renewable hydrogen

Will the Commission go ahead with the presentation of the delegated act on additionality/renewable hydrogen after the EP vote on this delegated act?

- **We respect the position of the EP, and we will take it into account as we continue to prepare these delegated acts.**
- We are assessing the implication of the vote and what it means more broadly forf hydrogen. Commissioner Simson intends to discuss this with MEPs.
- In any event, **we all should understand that project developers are concerned that discussions on the criteria during the legislative process could last several months. Implementation of the criteria could even take several years.** The resulting uncertainty about the future regulatory framework would cause delays in the ramp-up of renewable hydrogen production.

Hydrogen bank [Lead to be taken most likely by EVP Timmermans]

- The EU Hydrogen Bank, announced by the President during SOTEU, will include **more measures to move the hydrogen economy from niche to scale, on top of our proposed regulatory framework**, the work on hydrogen infrastructure under TEN-E and the Clean Hydrogen Alliance.
- DG CLIMA has been working on developing Contracts for Difference (CfD) for H2 production and Carbon Contracts for Difference (CCfD) for H2 applications in industry, e.g. steel and chemicals, under the Innovation Fund. **CfD auctions for hydrogen production, funded and executed by the Innovation Fund, will form the core of scaling up the domestic production side of the Hydrogen Bank.**
- This instrument would de-risk and create bankability of hydrogen projects, whilst ensuring EU-level competition and avoiding over-subsidising projects.
- The bank should **include an international dimension to cater for renewable hydrogen imports**. We are **reflecting on the set-up** of this international part.

Blending hydrogen in the existing natural gas grid

- Blending hydrogen in the natural gas network is **not a long-term solution**. It reduces the value of hydrogen and changes the quality of the gas consumed in Europe. This can affect consumers and fragment the internal market.

- Therefore, the hydrogen and gas markets decarbonisation package does **not set blending requirements at domestic level**.
- However, we are aware that some **blending is likely to take place** in MS, **when not enough dedicated hydrogen infrastructure is available.**
- Member States can decide whether, and to what extent, they want to allow blending hydrogen **in their domestic networks.**
- The proposal also introduces **a 5% hydrogen blending cap for cross-border flows** and which operators must accept to **safeguard a well-functioning internal market.**
- [if needed:]: We do **not** introduce **a blending obligation.**

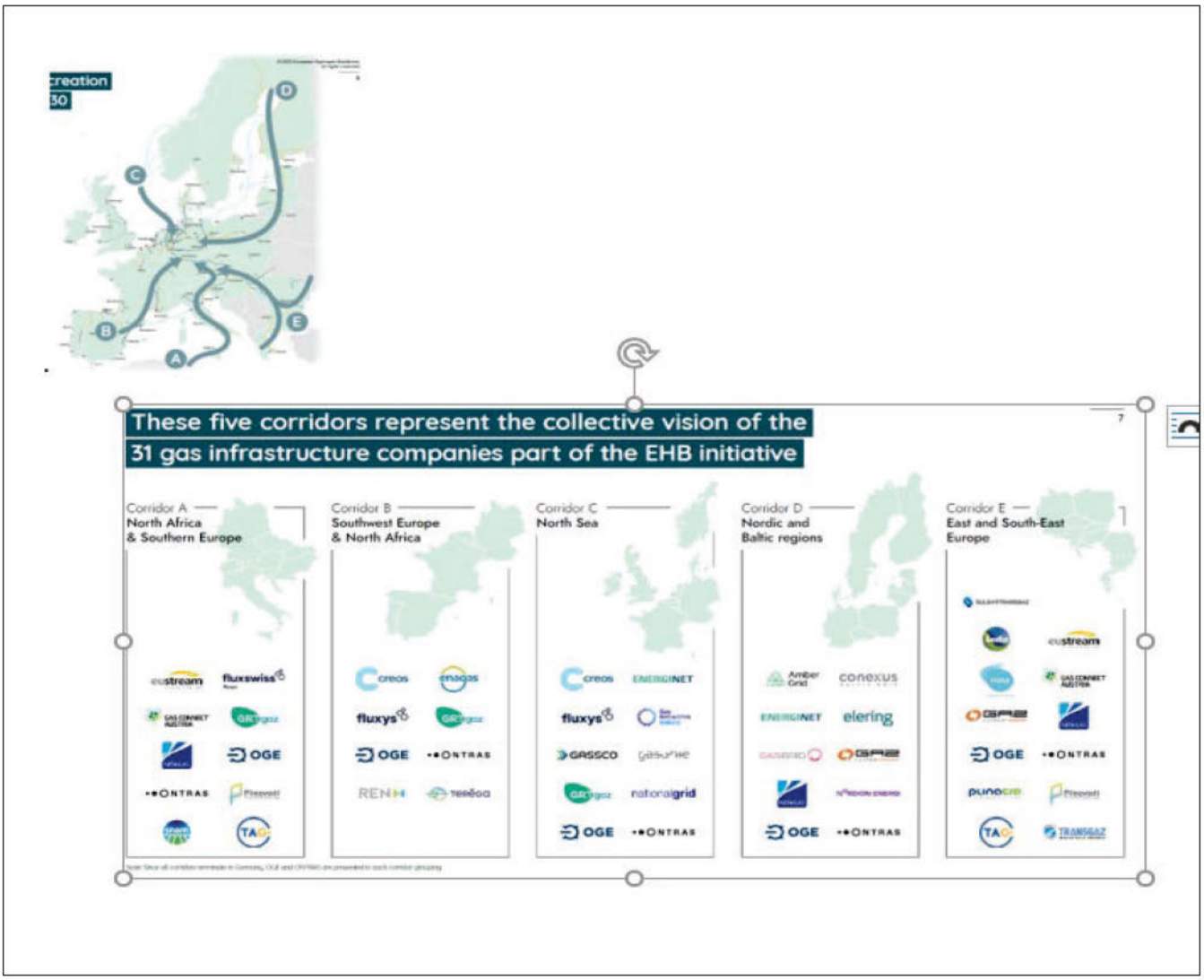
BACKGROUND

31 European gas TSOs are pushing the hydrogen backbone (HBB) initiative, which foresees ambitious hydrogen infrastructure development in view of achieving the REPower EU ambition.

There is a risk that gas TSOs use this as an opportunity to 'save' large shares of their existing natural gas grid (with potential over-dimensioning of the future H2 grid):

[redacted]

Nevertheless, the HBB appears to be an initiative worth engaging with a view to COM's identification of hydrogen infrastructure PCIs under TEN-E and the Commission's commitment to identifying3 hydrogen import corridors in REPowerEU. The HBB distinguishes 5 pipeline corridors (see map below).



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TEN-E key content

- The TEN-E regulation sets out clear criteria assessing candidate projects of common and mutual interest in the 3 regional groups for hydrogen (Western Europe, Central Eastern and South Eastern Europe, Baltic Market).
- The final (6th) Union list will be established by consensus between the MS and COM. Com expects to adopt it as a delegated act in November 2023.
- Categories of hydrogen infrastructure under TEN-E: pipelines (new and repurposed); storage facilities; reception, storage and regasification/decompression facilities (pure or H2 embedded in other substances); other essential equipment such as compressor stations; any equipment to allow use in the transport sector within the TEN-T core network; electrolysers with at least 50 MW capacity (and fulfilling other sustainability/network-related criteria).

TEN-E key process

- Call for candidate projects: mid October-mid December
- Public consultation on projects: January-March 2023
- Establishment of needs assessment: by March 2023
- Project assessment in regional groups: until June 2023
- Adoption of final list: November 2023.