BRIEFING FOR HOC STEFANO GRASSI

MEETING WITH SHELL

21 October 2021, 16:00

SCENE SETTER

You will be meeting with Shell VP Hydrogen Paul Bogers and [redacted] at their request to discuss Shell's position on the reform of the gas and hydrogen market.

LINES TO TAKE

General messages

- The Commission appreciates Shell's new power progress strategy, and the central goal of achieving net-zero emission and hydrogen therein.
- The agreement on a 55% greenhouse gas emission reduction in 2030, as well as the climate law, provides certainty to Shell and its stakeholders of the EU's climate ambitions in the short- and long-term.
- The European Green Deal package is our proposal on how to achieve these targets, whilst creating new opportunities across the society.
- Shell will be a central stakeholder in achieving the EU's targets.
- We appreciate the participation of Shell in the global energy transition, and we encourage the pro-active role that oil and gas companies can play in this transition.
- Likewise, the Commission welcomes Shell's pioneering role in clean hydrogen.

- The Commission's targets of 6 GW of installed electrolyser capacity by 2024, and 40 GW of installed electrolyser capacity by 2030 are very ambitious, and we need equally ambitious companies.

Hydrogen in the European Green Deal summer package

- The European Green Deal package provides overall support for the production of renewable and low-carbon hydrogen through the proposed Energy Taxation Directive and the revision of the European Emissions Trading Scheme.
- At the same time, the Renewable Energy Directive is proposing to set specific end-use targets for renewable hydrogen consumption in the two lead markets: industry and transport.
    - For industry, we propose that at least half of the hydrogen consumed is renewable in 2030.
    - In the transport sector, renewable hydrogen should reach at least 2.6% of energy consumption in 2030.
- Deployment of renewable and low-carbon hydrogen in the transport sector will also be supported by the Alternative Fuels Infrastructure Regulation, and the FuelEU initiatives for the maritime and aviation sector.
- Industrial applications and certain types of transport are also the 'hard-to-decarbonise sectors' where hydrogen can be used in a pure form. This is why our EU Hydrogen Strategy privileges the direct use of hydrogen instead of blending it with natural gas.
- In parallel, we will continue to support the upscaling of hydrogen production through the different financial instruments, including the EU

Innovation Fund, the Clean Hydrogen Partnership, our Horizon Europe programme and our cohesion funds.

Hydrogen and gas markets decarbonisation package

- After the release of the summer package, the Commission is now fully engaged in the work on the Hydrogen and Gas Market Decarbonisation Package, the main topic for discussion today.
- Natural gas, which is not accompanied by the abatement of its emissions, will need to play a decreasing role in the energy mix of Member States. It must be increasingly replaced by renewable and low-carbon gases, in line with technological developments.
- We see, however, a role for a coal-to-gas switch in some regions of Europe, especially in the heating sector. Gas will play a transition role here in the next years. However, it is important to avoid lock-in effects into this technology.
- Energy infrastructure shall progressively reflect synergies between the gas and electricity sectors. We need a more holistic approach to the energy system, covering electricity, heat and renewable energy production, as well as transmission and distribution networks.
- We expect that biogas, biomethane, hydrogen and e-gases will provide sustainable options for decarbonisation across a wide range of sectors.
- It is in this context that we are carrying out the work on the Hydrogen and Gas Markets Decarbonisation Package.
- The main aim of the package is twofold:

    - First, facilitating the integration of renewable and low-carbon gases in the existing gas grid. This concerns biomethane injected at distribution level, gas quality in the existing networks, access of renewable gases to LNG terminals, and topics around integration of network planning between electricity, gas and hydrogen networks.
    - Second, enabling a hydrogen market in a dedicated infrastructure, allowing hydrogen to become a key component of the energy sector.
- A lot of discussions have already taken place, including the open public consultation to which Shell provided input. This helps us shape our future legislative proposals.

DEFENSIVE POINTS

I. Hydrogen in RED II revision

What is the Commission proposing on hydrogen in the RED II revision?

- With the launched proposal, we are implementing the EU hydrogen strategy that we adopted summer last year.
- The Renewables Directive focuses on targets for renewable hydrogen, sending investors a strong signal that green fuels are needed to lead the industry and transport sectors towards climate neutrality. We propose to extend the existing rules to the promotion of renewable fuels of non-biological origin: for industry with a binding target of 50% for hydrogen consumption in 2030, and for the transport sector with a target of 2.6% of energy consumption in 2030.
- The proposal maintains the criteria for additionality, which should be applied for all hydrogen uses, which will be developed as part of a delegated act before the end of the year.
- The proposal also changes the way renewable hydrogen counts towards the national contribution by Member States to the revised RED-targets. Instead of counting the electricity that was *used to produce* renewable hydrogen, the current proposal counts the volume of renewable hydrogen *that is being consumed*. As such, there is now consistency across all renewable fuels.
- Finally, the proposal extends the certification framework and the associated database used for certifying and enabling the tracing of liquid and gaseous transport fuels to all renewable fuels, including renewable hydrogen.
- The proposals on hydrogen in the Renewables Directive need to be considered together with the proposals for renewable and low-carbon hydrogen under the EU ETS, the ETD, the AFID and the FuelEU initiatives on the maritime and aviation sector.

The proposed criteria to account hydrogen under the renewable energy target for the transport sector are too strict.

- The Commission is requested under RED II to set out methodologies ensuring that the use of renewable fuels of non-biological origin (RFNBOs) is contributing the decarbonisation effort. This concerns in particular rules for the production of renewable hydrogen from grid electricity as well as a methodology to determine emissions savings.
- The delegated act is specific for renewable hydrogen counted towards renewables target in the transport sector under REDII, and will need to consider how to implement additionality requirements, including requirements for temporal and geographical correlation, and the fact that the electrolyser needs to be built ahead of any renewable power capacity used to power the electrolysers.
- We are aware of the importance of this topic for the uptake of the renewable hydrogen market. And we are looking at it in a way that supports the achievement of the goals of the EU Hydrogen Strategy which gives a key role for renewable hydrogen to achieve climate neutrality.
- This delegated act is part of the existing legislation, and therefore needs to be implemented. At the same time, however, there is an ongoing revision of the renewable energy directive. Irrespectively of the outcome of the revision of the renewable energy directive, the delegated act is important because it will determine at least the next 3 years until a revision of REDII is in place.
- We are making sure that the revision of REDII will be in line with the delegated act, as well as principles outlined in ESI and hydrogen strategy. Policy stability is key.

The COM is inconsistent: supporting hydrogen, but at the same time placing strict criteria on the "additionality" of renewable hydrogen production.

- The 'additionality' requirement for the production of renewable hydrogen for use in the transport sector is already part of the existing renewables directive.

- Its aim is precisely to ensure the promotion of renewable energy. In this way, the increased demand of electricity to produce hydrogen leads to additional renewable electricity production and not to additional fossil-based electricity production.
- The additionality criteria will be made operational in a delegated act that we plan to publish later this year.

How will you make sure there will be sufficient renewables to produce renewable hydrogen?

- The EU hydrogen strategy aims to reach the production of 10 million tonnes of renewable hydrogen by 2030. To produce such a volume of hydrogen, we would need to connect to the electrolysers some 80-120 GW of solar and wind energy production installations and invest €220-340 billions.
- We know it will be a challenge, but with today's proposals and the further hydrogen and gas markets decarbonisation package scheduled for adoption by the end of the year, we are putting in place a fully-fledged legislative framework to achieve this goal.
- The proposal of revised Renewables Directive puts in place upgraded targets and regulatory instruments to ensure the fast development of renewable energy in the EU, bring new technologies to the market and ultimately drive down the costs.
- In addition, the EU has the financial means to underpin the necessary investments in renewable energies and hydrogen production. The EU's recovery instrument NextGenerationEU, alongside the MFF, provides an unprecedented volume of resources. A very significant part of these funds (at least 37% of RFF, 30% of MFF) will be channelled to climate and energy investments, including on renewable and hydrogen projects.
- The Commission has also proposed further measures to facilitate investments: a revised energy taxation directive providing for reduced tax

rates for hydrogen consumption and a delegated act on taxonomy to support the development of renewable hydrogen.

- Finally, the Commission is also revising its energy state aid guidelines to enable Member States to finance electrolysers and other hydrogen infrastructure.

Carbon Contracts for Difference (CCD)

- Carbon contracts for difference for renewable and low-carbon hydrogen could provide initial support for early deployment in various sectors until they have become sufficiently mature and cost-competitive in their own right.
- In general, Carbon Contracts for Difference are an important element to trigger emission reductions in industry, offering the EU the opportunity to guarantee investors in innovative climate-friendly technologies a fixed price that rewards CO2 emission reductions above the current price levels in the EU ETS.
- The revision of the EU ETS extends the use of the Innovation Fund to allow it to provide support to projects through competitive tendering mechanisms such as European-wide carbon contracts for difference.
- In the framework of the revision of the energy state aid guidelines, the Commission is also looking into allowing Member States to use national resources to grant contracts for difference to decarbonisation projects.

II. Hydrogen and gas markets decarbonisation package

What are the main aims of the Hydrogen and Decarbonisation of the gas markets Package?

- While natural gas will have a role to play in the transition, the gas sector will need to be decarbonised to reach climate-neutrality by 2050.
- Natural gas, which is not accompanied by the abatement of its emissions, will need to play a decreasing role in the energy mix of Member States and

will be increasingly replaced by decarbonised and renewable gases in line with technological developments.

- The right framework should be put in place so that biogas, biomethane, hydrogen and e-gases can provide sustainable options for decarbonisation across a wide range of sectors.
- The main aims of the Hydrogen and Gas Market Decarbonisation Package are to:
    - First, facilitate the integration of renewable and low-carbon gases in the existing gas grid. Here the issues concern in particular how to integrate into the gas market biomethane injected at distribution level, issues around gas quality in the existing networks, access of renewable gases to LNG terminals and topics around integration of network planning between electricity, gas and hydrogen networks;
    - Second, enable a hydrogen market with a dedicated infrastructure, allowing hydrogen to become a key component of the energy sector.
- Gas and electricity consumers should not be treated differently as regards their consumer rights. If they continue consuming gas they should be able to choose renewable gases. They should also be well informed about the CO2 content of the gases they consume.
- This is why, for the revision of the Gas Directive, the Commission is keen to ensure equal treatment between gas and electricity consumers and mirror most of the consumer rights provisions of the recast Electricity Directive (EU) 2019/944, including provisions on price regulation, universal service, energy poverty and vulnerable customers, energy communities, switching, billing, data management and smart meters, price comparison tools and dispute settlement.
- The proposal on the Hydrogen and Gas Markets Decarbonisation Package is planned for adoption in the fourth quarter of 2021.

What are the main elements of the reform of the gas market that will help to inject more renewable gases to the existing natural gas network?

- Current gas market rules focus on fossil gas being imported via big pipelines with underlying long-term contracts.
- The emergence of renewable gases and hydrogen requires that we re-think these rules to ensure that these gases produced with new technologies enjoy equal access to the network as natural gas and thus can play their role in the green transition. As regards our aim to enable the development of a hydrogen market in a dedicated infrastructure, we identified the following key problem areas:
    - Existing natural gas networks can be partially repurposed for the transport of hydrogen, with significant cost savings compared to new-build infrastructure. However, there are no rules on the ownership, operation and financing of repurposed natural gas networks for hydrogen transport. This could hinder investments and accordingly the development of a pure hydrogen market.
    - Although our key aim is to incentivize the uptake of renewable hydrogen, low-carbon hydrogen ('LCH') and low carbon fuels ('LCFs') have a potential for playing a bigger role for decarbonisation and can be expected to initiate the development of hydrogen transport structure. However, they lack a definition which risks to hamper cross-border trade since it would create uncertainty about the GHG footprint of such solutions.
- With regard to the aim to integrate renewable and low carbon gases in the existing gas grid, we identified three problem areas:
    - Production of biomethane can be connected both at transmission and distribution level. When connected at distribution level, access to the wholesale market and transmission network is often not ensured, for instance, if there are no reverse flows between the transmission and distribution levels.
    - Biogas has to adapt to the quality of fossil methane before injection into the network. It then becomes biomethane. This has extra costs. The existing standard that governs the quality of gas today is governed by fossil gas and is not applied in a coordinated or binding

manner. It also does not apply to hydrogen. Differences in the quality of gases can negatively impact cross-border trade.

  - The access for new gases to LNG terminals does not exist on a large scale and the terminals may not grant access to new entries efficiently. This is a problem as Member States expect to import hydrogen, ammonia, biomethane, synthetic methane or other clean gases from third countries.

- At national level, the electricity, methane and potential hydrogen networks are not necessarily seen as complementary and in an integrated energy system. Distribution System Operators are also not explicitly included in the planning in case of methane network. This can negatively impact synergies and efficient system integration
- These issues were addressed in the Roadmap and the Initial Impact Assessment and the Public Consultation. We see that we got broad support to the problems identified and to many solutions we were consulting on. We are completing currently the Impact Assessment that will accompany and explain our proposals end of this year.

Will you propose a separate legal act for hydrogen networks and markets or will you integrate it into the existing legal acts for natural gas?

- Several factors play a role here. We have to strike the right balance between the usability and reader-friendliness for addressees of the new rules and conveying the right political message on the future of gaseous energy carriers
- Alongside hydrogen there are also biomethane related improvements envisaged for the existing legislation. We should not only focus on hydrogen in isolation.
- Accordingly, it seems most logical to integrate all proposals into the existing legal acts for methane gas.

What's your view on the role of low-carbon hydrogen in the future energy system?

- The Hydrogen strategy recognises that in a transitional period low-carbon hydrogen is needed, primarily to rapidly reduce emissions from existing hydrogen production and to support the parallel and future uptake of renewable hydrogen.
- Therefore, the revision of the European emissions trading scheme as well as the proposed Energy Taxation Directive provide generic support for both renewable and low-carbon hydrogen to replace fossil-based hydrogen.
- The projects collected under the European Clean Hydrogen Alliance show that the majority of projects (85%) are pursuing the production of renewable hydrogen, with 15% coming from low-carbon hydrogen produced from natural gas.

You promised a certification system for low carbon hydrogen as well?

- Our definition of low-carbon hydrogen will be based on life-cycle GHG-savings, so any upstream emission related to the production of the gas will be counted in.
- The proposal on the revision of the RED II extends the certification regime and the associated database to all renewable fuels. This includes renewable hydrogen
- As low carbon hydrogen is not a renewable fuel, its certification will be addressed in the hydrogen and gas markets decarbonisation package.

BACKGROUND

Main elements Shell's reply to Open Public Consultation on 'Hydrogen and Gas markets decarbonisation package'

- Shell supports the target to achieve climate neutrality in the EU by 2050. This will require significant (renewable) electrification and energy efficiency. Decarbonised and renewable gases will play a key role in hard-to-abate sectors like chemicals, aviation, shipping, steel, heavy-duty trucking, and replacing coal with gas in electricity generation. While clean hydrogen and biomethane production needs to be ramped up, the EU will still require substantial gas imports.
- **Extend the existing gas legislative framework to renewable & low carbon gases, including H2**, covering rules on unbundling, TPA, tariff transparency, non- discrimination & efficient cost reflectivity to all gaseous energy carriers. Adaptation of the rules to allow for blending of renewable & low carbon gases in the existing gas network as well as development of a dedicated H2 infrastructure.
- Decarbonisation of the gas sector may imply a change in network utilisation and flow patterns, which could lead to a **risk of stranded assets**, **retrofitting** should be explored to lower costs of H2 network development. The impact of possible **stranded assets should be addressed in the regulation** to avoid possible loss of market efficiency e.g. inflated tariffs to compensate for reduced use & include more explicit measures against cross subsidization by spreading de-commissioning costs over time.
- **Extension of the GO system to all gaseous fuels** would provide consumers proof of origin of the energy consumed even if there's no direct connect to the production site. Inclusion of GHG emissions in the GOs would enable consumers to choose on the basis of their environmental impact. Tailoring regulatory requirements to the ability & willingness of different classes of consumer to engage in the market will ensure proportionality.
- The development of renewable and low-carbon gases could leverage the benefits of the existing liquid gas market. The **existing tariff design** for interconnection points is **not a barrier for the cross-border trade in natural gas** and hence should not restrict the physical flow of renewable and low-carbon gases across borders. Changes to the tariff design, if any, should be evaluated and justified for all gases that use the system on an equal basis.

H2

- Establish a **clear EU framework, which sets out the core regulatory principles for hydrogen infrastructure and markets** will indicate what network codes will be needed. The network codes can then be developed afterwards to deal with more complex regulatory issues.

- Where the regulatory rules in Third Countries do not mirror the rules in the EU, developing cross-border hydrogen infrastructure and trade could be impeded. **Whilst recognising full international harmonisation is largely unachievable, recognition of common principles and parties, for example in the trade and certification of GOs, can serve to overcome this barrier.**
- To ensure timely implementation of core regulatory principles to facilitate the H2 economy, **main focus should be at transmission level**. **However, there may be merit in exploring specific issues at distribution level, which are advantageous to address at an earlier stage**. For example, if H2 is injected at distribution level, this could be virtually available at transmission level and therefore, available to trade in the wholesale market, thereby contributing to the creation of a liquid H2 market.
- **Cross-subsidies** between methane and hydrogen network users **should not be allowed**. Other measures should be made available to lower initial hydrogen network tariffs (such as public grants or subsidies to network users or network operators).
- **Positive** about the potential role of **hydrogen blending** for the offtake of hydrogen.

PREVIOUS MEETING SHELL DG-ENER, May 2021

In May 2021, DG ENER staff met with Shell to discuss the upcoming delegated act.

Participants: [redacted]

Key take aways:

- Overview of existing projects
    - 2 July 2021, official opening of Refhyne, Cologne
        - Scale up of Refhyne to 100 MW, together with Linde
    - 5-10 MW of Emmen, test centre
    - 100 MW electrolyser in Hamburg, with Vattenfall and Mitsubishi
    - 200 MW electrolyser in Rotterdam, 340mln euro in investments
    - GW-scale projects NortH2, together with Aquaventus
- Investment subsidies are needed to reduce initial costs, but still operational support is needed to ensure a positive cashflow
    - REDII is crucial as it allows for market premium
    - Ability to use hydrogen in refineries
- Key issues with delegated act:
    - Time window. The building of the gas pipeline is a crucial factor. Gasunie cannot produce it with the right time frame, so more than 12 months is needed.
    - Renewables that have previously received support, should be allowed to be counted as ‘unsupported’

        - Here, Shell specifically refers to repowering. If repowering is included already, this needs to be clarified
    - Aggregators should be allowed to facilitate bilateral power purchase agreements between electricity producer and hydrogen producer
    - Temporal correlation should be at an hourly basis, since electrolysers take 5min to ramp-up and ramp-down
        - Matching of 70% GHG savings on a monthly basis. The reason is that wind power can fluctuate unexpectedly, and electrolysers would have to be turned off.

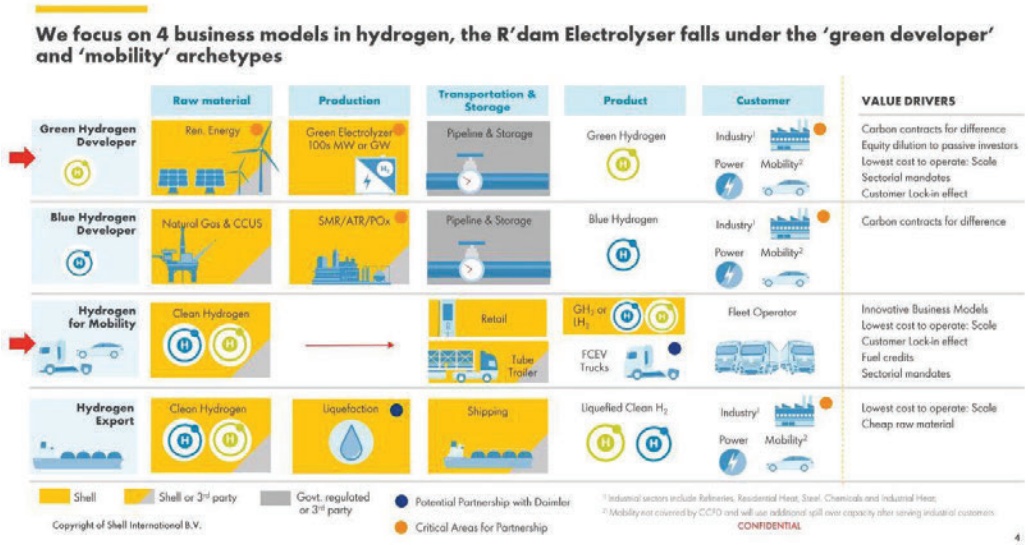
Shells' Power Progress' strategy

- The Powering Progress was published in Feb. 2021 and has four main goals:
    - General value for shareholders to transform to clean energy
    - Achieving net-zero emissions
    - Powering lives with products and activities
    - Respecting nature by protecting the environment, reducing waste, and promote biodiversity
- Under its 'net-zero emissions' activities, Shell has proposed:
    - Become a net-zero emissions energy business by 2050 (operations & energy products)
    - Set 'Net Carbon Footprint' targets for its products, with 6-8% in 2023, 20% in 2030, and 100% in 2050 (compared to 2016).
    - On average, invest $2-3 bln/yr in renewable and energy solutions.
    - a methane emissions intensity of <2% in 2025, and an additional 25 Mt of CO2 storage by 2035
    - By 2030, provide renewable electricity to 50mln households
    - By 2030, operate 2.5 mln charging points on electric vehicles
    - By 2030, increase the share of renewable and low-carbon fuels from 3% to 10%.
- Under its 'respecting nature' activities, Shell has proposed:
    - Use 30% of recycled plastics in its packaging by 2030
    - Use only reusable or recyclable plastics by 2030
    - Invest in conservation

Shells' hydrogen projects

- Shell is building a portfolio of hydrogen projects
  - As a producer of solar and wind power, Shell will produce, transport and store renewable hydrogen
  - As a natural gas developer, Shell will produce, transport and store low-carbon hydrogen, including the capture and storage of CO2
  - Shell is developing hydrogen tube trailers and hydrogen refuelling stations, including associated business models to fuel vehicle fleets.
  - Shell is developing hydrogen export technologies, including through liquefaction and shipping options for hydrogen[1].
- Shell has an existing and rapidly growing portfolio of electrolysers
  - The Refhyne project is a 10 MW electrolyser at their refinery in Cologne, visited by Commissioner Simson. In February, Shell announced the expansion to a 100 MW electrolyser.
  - Other project in the pipeline include the 10 MW electrolyser at the Emmen refinery (2022), a 200 MW electrolyser at Rotterdam refinery (2023), and 4000 MW electrolyser in Groningen (2027).
  - The 200 MW electrolyser in Rotterdam refinery (Pernis) is expected to become the largest of its size, with investment decisions taken this year.

Figure 1. Overview of Shell's business models in hydrogen



[1] On 21 April, Shell announced trial with hydrogen fuel cell ships in Singapore

Figure 2. Overview of Shell's pipeline of electrolyser projects