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EEX Comment on BNetzA H2 Consultation

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Preliminary Remark

The European Energy Exchange (EEX) thanks the Federal Network Agency (BNetzA) for the opportunity to comment on the regulation of hydrogen networks in the framework of the market consultation.

Liquid trading markets for hydrogen and corresponding certificates or guarantees of origin for green, blue and turquoise hydrogen can support the market ramp-up, even in the short run. They safeguard access to hydrogen for varied players from all sectors and, therefore, they should be integrated into the development of the hydrogen market early on. In principle, sufficient generation and transport infrastructure and non-discriminatory access are indispensable for the development of trading markets for grid-bound energy carriers. Therefore, EEX welcomes the BNetzA initiative to determine the market participants' positions regarding the grid-bound transport of hydrogen using this consultation.

For two decades, the EEX Group has offered trading and settlement of the grid-bound energy carriers power and natural gas – initially in Germany, but later on also in other European markets and even (at the present) worldwide. After a possible adjustment in regulation, EEX wishes to encourage and support BNetzA in using the experience gathered with the success models of power and natural gas for hydrogen maket regulation. This requires a clear definition of the market roles and the development of a liquid hydrogen market with clear and reliable market price signals.

EEX has answered the BNetzA consultation questions on the basis of its comprehensive experience. Below, we provide an overview of the most important positions of EEX.

1. EEX, in principle, advocates the development of a hydrogen infrastructure which is separate from the natural gas grid and can fulfil the specific requirements of hydrogen consumers. Especially during the ramp-up period of the hydrogen market (as the hydrogen infrastructure has not yet been fully established), in consultation with the participants, hydrogen should also be admixed to the natural-gas grid.[1]
2. EEX supports the ideas detailed below for the European standardisation and harmonisation of the hydrogen industry in order to facilitate a fast market ramp-up with a large number of trading participants:
    - Clear standards and definitions of terms for hydrogen in pure hydrogen networks and as an admixture in natural gas grids
    - Trading and pricing of hydrogen which should be uniform in €/MWh
    - Non-discriminatory regulated grid access with uniform balancing rules
    - Immediate introduction of one or a few regional virtual trading point/s (VTP) for hydrogen which – as in the case of natural gas - can be managed by a national German market area manager (MAM) for balancing and settlement of trading transactions across networks. On the VTP, the MAM can trade via the exchange and therefore market based balancing energy (hydrogen), and, as a result, build liquidity in the hydrogen market right away.

[1] For the sake of ease of reading, the term "natural gas" is used. As seen from the perspective of EEX, the natural gas grid will also be used to transport a significant share of biomethane.

- Separate trading of hydrogen as a commodity and its production methods (guarantee of origin) via continuous order book and/or auction trading, such as in the case of natural gas and power.
- European grid development and expansion which should be effected on a coordinated basis for gas and power in order to permit cross-sectoral, congestion-free trading with the existing highly developed gas and power markets - as fast as possible
- Technology neutrality in the grid injection of green, blue and turquoise hydrogen in order to speedily build sufficient supply volumes for a functioning network, to cover the demand and to establish a competitive hydrogen market
- Sector neutrality in using hydrogen, in particular, including the heating market to support the market ramp-up based on demand.

3. EEX advocates the use of price signals which are to be established based on supply and demand at virtual trading points, initially, on a regional, cluster or valley basis and, later on, a market area basis. Market price signals create investment incentives and, right from the outset, they form benchmarks as a result of exchange trading and supervision mechanisms.

About EEX:

EEX is the leading European energy exchange developing and connecting secure, liquid and transparent trading markets for energy and other commodities. EEX is the biggest power exchange, the second-biggest CO_2 and the third biggest natural gas exchange worldwide.

EEX is part of EEX Group, a group of companies offering services regarding international exchange trading in commodities and raw materials. We facilitate trading in power, natural gas and CO_2 emission allowances - as well as of freight rates and agriculturals.

EEX also provides registers for guarantees of origin for green power on behalf of the French government, amongst other things. Moreover, we carry out auctions for French guarantees of origin.

Grexel Systems, which is also part of EEX Group, offers services around the operation of registers of guarantees of origin and, at present, it is actively involved in the CertifHy project, Europe's first register of guarantees of origin for green and decarbonised hydrogen.

1. Rules regarding the Admixing of Hydrogen

1. **In your opinion, is a pure hydrogen network likely to evolve and exist in parallel with the current gas network or is it more likely that hydrogen will increasingly be admixed with the natural gas network? What is your view on this with regard to the period until 2030, 2040 and 2050?**
   Depending on the market ramp-up phase and the geographical distribution of supply and demand, admixing into existing natural gas networks and pure hydrogen networks should coexist. In addition to pure hydrogen networks, admixing up to maximum level possible for technological reasons is helpful to facilitate a fast market ramp-up wherever this is technically possible. This should be driven by the demand side and carried out using an intensive dialogue with the connected users.

2. **Do you think an increase in the admixture rate would be sensible? If yes, up to which amount? What are the pros and cons of such an increase in your opinion?**
   Admixing of hydrogen within natural gas networks is sensible. However, it should only be effected in close coordination between network operators and consumers. Stable mixing ratios as well as the harmonisation of admixing rates throughout Europe are indispensable in order to protect sensitive consumption systems and enable the development of a European hydrogen market.

3. **Should additional rules be introduced, e.g. in order to protect sensitive consumers in the event of higher admixing rates? If yes, which rules should be introduced?**
   The interests of sensitive consumers should be considered in order not to jeopardise the market ramp-up. Individual technical solutions for the physical separation between hydrogen and natural gas should be discussed with the consumers concerned and introduced promptly in order to permit admixing.

4. **Do you consider the existing rules regarding the feed-in of hydrogen into the natural gas network (e.g. the analogy to biogas) as being sufficient and sensible or do you think a new provision is needed? Which rules should be adjusted and how? Do the technical rules and regulations have to be changed?**
   With a view to transporting of hydrogen within own networks as well as the admixing of natural gas over and above the current threshold, an expansion/adjustment of section 3 no. 5, section 3 no. 9 and section 3 no. 19 of the German Energy Industry Law (EnWG) to a broad definition of gas should be effected as soon as possible. Moreover, the definition of hydrogen in section 3 no. 10c and 19a EnWG should be technology neutral so that blue and turquoise hydrogen are also covered. These forms of generation are necessary in order to ramp up the hydrogen market as fast as possible, to generate a significant supply volume of greenhouse gas-low hydrogen and, as a result, offer potential hydrogen users and investors planning reliability. The requirements regarding network access, the distribution of market roles and balancing for hydrogen should be based on natural gas regulation and be integrated with it in as far as possible. This permits trading of natural gas and hydrogen without any congestion in accordance with uniform rules in line with sector coupling and integration.

2. Expansion of the Hydrogen Use in the Economy

1. **Which of the following infrastructure scenarios do you consider as being conceivable or realistic in future and during which period of time? If possible, give reasons for your response based on concrete data/figures. Please also consider the following questions in your statement of reasons: What are the individual driving factors for the future hydrogen demand and hydrogen generation? In your opinion, what demand for natural gas will persist in which sectors? In your opinion, will the hydrogen demand outweigh the hydrogen supply or vice versa and how should the two be interlinked – also with a view to the development of infrastructure?**
   Scenario I: Local island grids, consumption and generation of hydrogen on the basis of the local agglomeration of regional demands
   Scenario II: Local island grids with individual long transport lines connecting various local island grids or hydrogen production sites or permiting imports of hydrogen from abroad
   Scenario III: Close-knit distribution networks with individual long transport lines connecting comprehensive distribution networks because of the significant increase in hydrogen consumption in various sectors, such as e.g. the transport sector
   As seen from the perspective of EEX, the scenarios outlined, in part, illustrate a parallel development and should also be supplemented by admixing of hydrogen in the natural gas network. Scenario I and II each describe the transition to a mature hydrogen market with an overarching transport infrastructure. The development of a comprehensive, border-crossing hydrogen network at the transport level with extensive distribution networks by 2030 is realistic. The planning and implementation should begin as soon as possible.
   The question of whether scenario III will materialise in the form outlined depends on whether the heating sector will use hydrogen - this resulting in the need for close-knit distribution networks for pure hydrogen in future.
   The development of the hydrogen network structure will be determined to a significant degree by the increase in demand. Local island grids (scenario I) have to be connected via transport lines (scenario II) as early on as possible. Connected networks form the precondition for the development of extensive liquid trading markets. As a result, the demand for hydrogen can be covered on a market price and competitive basis. The early phases of the market ramp-up, in particular, should be technology- and sector-neutral. The conversion and expansion of the natural gas network to include higher shares of hydrogen as well as the development of a specific hydrogen network infrastructure should be communicated quickly with clear and binding timelines, as well as clear responsibilities, creating clear framework conditions for investors.

2. **In your opinion, which tasks will transport and long-distance lines have for pure hydrogen transport and which tasks will the distribution networks have? Do you think there will also be pure hydrogen lines at the distribution network level?**
   As seen from the perspective of EEX, compared with the gas and power market, there will not be any material changes in the roles of transmission and distribution networks at the hydrogen level. Moreover, this should not be aimed at in order to facilitate the integration of hydrogen in the gas market and the interoperability between the natural gas, hydrogen and power market. Depending

on the market development, trading at the level of the hydrogen distribution network level might also be sensible.

3. **How do you assess the border-crossing transport of hydrogen? Will there be border-crossing hydrogen networks? If yes, which scenarios do you consider as being realistic?**
   The development of a network of hydrogen transport and hydrogen distribution networks is indispensable for the successful market ramp-up. This network should be border-crossing, e.g., in international clusters and based on physical demand as well as market conditions (supply and demand). This approach permits the development of liquid trading markets via which the economic costs of decarbonisation can be reduced, synergies can be created and sufficient sources of supply, including sources outside Europe, can be connected. European standards for hydrogen quality and the development of a European guarantee-of-origin scheme for green, blue and turquoise hydrogen are indispensable for this. CertifHy, the first European register for guarantees of origin for hydrogen, has already paved the way in this respect. As one of the project partners, Grexel, which is part of EEX Group and a service provider for the operation of registers of guarantees of origin, holds a significant stake in CertifHy.

4. **In your view, which players will become active in the scenarios you consider most likely (e.g. distribution network operators, long-distance network operators, PtG plant operators, consumers and others)? Which specific roles will the different players have? Which player will drive hydrogen transport in the scenario you consider most likely (feed-in of H2, such as PtG plant operators or consumers of H2)?**
   Compared with the natural gas market, EEX does not see any changed tasks for the players listed in their market roles. On the hydrogen market, energy trading will bundle the players' supply and demand and balance these and it will facilitate balancing energy trading for MAM via the exchange.
   As on the gas market, EEX expects that an MAM or another central player with clear responsibility be appointed to balance the different hydrogen networks on the VTP on a market basis via an exchange balancing energy market and, as a result, to facilitate and revive short-term trading in hydrogen.

5. **What is your assessment of the competition between the natural gas and hydrogen products? In the case of the hydrogen offering, there are different generation technologies (e.g. PtG via renewable energies and natural gas reform). How will the competition evolve in the hydrogen supply?**
   To achieve the aim of decarbonisation the CO2 footprint of the energy carrier is more relevant than the generation technology. The CO2 price and the respective CO2 footprint provide the relevant impulses in this respect. As long as decarbonised hydrogen is not yet available to a sufficient degree and natural gas is still used, we need to be open to various technologies in the different types of hydrogen production.

3. Introduction of Regulation for Pure Hydrogen Networks

1. **In order to evaluate the need to regulate hydrogen networks we have to assess whether there might be a possible abuse of market power or discrimination on the "transport" market now or in future. As seen from an economic perspective, intervention by the government would only be appropriate in this case in order to prevent an inefficient market result. Do you share this view?**
   In principle, EEX is of the opinion that the regulation of networks prevents market abuse and discrimination. Non-discriminatory access to the network infrastructure forms a necessary condition ensuring that liquid trading markets for grid-bound energy carriers evolve.
   However, to safeguard the success of the hydrogen market ramp-up, hydrogen networks also have to be regulated for the following reasons:
   - The development of a European market is based on integrated and harmonised grid development and planning throughout Europe between the power, gas and hydrogen networks. This requires comparable regulation.
   - Planed regulation of pure hydrogen networks which will largely be based on a conversion of current natural gas pipelines creating transparent and non-discriminatory conditions of use which are predictable for all market participants. On this basis, investment decisions for hydrogen production, transport and use can be taken, while the trading market can be developed.
   - Against the backdrop of pending investment decisions, a binding legal and regulatory framework has to be introduced quickly. Over time, this framework can be adjusted to the development of the hydrogen market and to create a consistent investment climate.

2. **Do you consider the introduction of a hydrogen network regulation as being expedient? If yes, where do you think there are opportunities for market abuse or discrimination without regulation?**
   a. Access regulation might be necessary wherever it is likely that transit might be refused or that third parties might refuse to take off hydrogen. Do you consider this likely? Do you see other problems at the level of the distribution networks than at the level of the long-distance transmission networks?
   b. Fee regulation might be necessary wherever there is, e.g., a threat of inefficient pricing for hydrogen transport and the network operators might skim off monopoly rents. Do you consider this likely? Do you see other problems at the level of the distribution networks than at the level of the long-distance transmission networks?
   As outlined in question 3.1., hydrogen network regulation does not only prevent discrimination and market abuse but also offers the players in the evolving hydrogen industry secure framework conditions for trading and investment.

3. **Are there any current - or potential future - obstacles to the development of, or access to, a hydrogen infrastructure which could be overcome by regulation? Please give reasons for your reply also in comparison to the current regulated infrastructures (power and gas) and unregulated infrastructures (e.g. distant heating and mineral oil networks).**

The aim of a European and national hydrogen industry can only be reached if corresponding hydrogen volumes for both the demand and supply side reach the market, are traded at the VTP and are distributed via the networks as soon as possible. This requires reliable regulatory framework conditions which are adequate to the level of the market ramp-up.

4. **Which further advantages and/or disadvantages of the regulation of the currently unregulated pure hydrogen infrastructure do you perceive, in particular, with regard to the existing hydrogen networks?**
   No reply.

4. Scope of Regulation for Pure Hydrogen Networks

1. **Upon the introduction of a regulation regime for hydrogen networks, we have to examine the question of the extent to which this is necessary. The introduction of consistent access and fee regulation for hydrogen networks – without any extensive unbundling of these networks - might be sufficient. On the other hand, consistent unbundling might permit less stringent access and fee regulation. Please comment on this and give reasons for your opinion.**
   Equivalent regulation of hydrogen networks is necessary to permit integrated network planning between the power, natural gas and hydrogen networks. It forms one of the preconditions for using synergetic effects from coupling of power, natural gas as well as hydrogen markets and networks. Therefore, EEX considers the integrated regulation of hydrogen and gas networks as being equivalent in principle with natural gas network regulation (including its unbundling requirements) - which provides a good framework for this. It creates reliability and predictability for the market participants and can be adapted to hydrogen relatively quickly.
   All in all, EEX advocates a flexible regulation regime. Should it turn out during the hydrogen market ramp-up that detailed provisions have to be adjusted to hydrogen, this should be effected in close consultation with the market.

2. **Do you think the differentiation between the introduction of regulation for the long-distance transmission and distribution network level is appropriate or should separate regulation for the hydrogen networks in general be introduced?**
   We make reference to our reply regarding questions 3.1. and 4.1. The current regulatory framework already provides for differences between the long-distance transmission and distribution network level. In case the market ramp-up is accelerated by the use of hydrogen in the heating sector as a replacement or admixture to natural gas, this is primarily effected via the distribution grid level and, as a result, the future regulation should take account of this fact.

3. **Do you consider the introduction of one network operator to operate both natural gas and hydrogen networks (e.g. combined network operator) as being appropriate?**
   EEX does not have any preferences since both separate and combined network operators can, in principle, facilitate the development of the hydrogen industry. However, EEX would like to point out again that experiences gathered on the power and gas markets should be used. As in the case of the natural gas market, the role of an MAM is beneficial for the development of hydrogen trading. This central point of contact assumes balancing and the settlement of trading at the VTP of the respective hydrogen market and also supports market liquidity through balancing energy trading on the exchange.

4. **Possible regulation provisions could be introduced through the adjustment of existing provisions in the German Energy Industry Law (EnWG) or corresponding regulations (such as the Gas Network Access Regulation (GasNZV), the Regulation regarding Fees for Access to the Gas Supply Networks (GasNEV), etc.), e.g. by expanding the definition of the gas term or in a separate section of EnWG or even in a separate law. Which version would you consider more sensible?**

For EEX, the content of the provisions is more important than where they are established. Adjustments in EnWG and the corresponding provisions would involve the advantage that downstream standards build on existing provisions and that, as an energy carrier, hydrogen is regulated together with power and natural gas.

5. **As of when should the regulation provisions be effectively applied? Which parameters (e.g. consumption, generation, supplier and consumer structure, network structure) should this step be dependent on? Could a gradual introduction of regulatory documents be sensible during the start-up phase? If yes, which should these be? And during which period should they be introduced?**
   As seen from the perspective of EEX, faster access to hydrogen networks and clear framework conditions are necessary for a comprehensive market ramp-up. Moreover, a reliable network expansion path is necessary to provide stable regulatory framework conditions for investments in networks, generation infrastructure and application. Therefore, regulatory provisions should, in principle, apply as soon as possible; they should be carefully monitored, and, if applicable, improved in detail at a later date.

6. **Are transition rules conceivable for existing hydrogen networks? What should these look like specifically? What timeframe is acceptable, at maximum, for these transition rules?**
   Historically established constellations, existing contracts and the protection of legitimate expectations can be reasons for transition rules. These should refer to detailed questions of regulation, while not obstructing non-discriminatory access for third parties. Transition rules should not be applied for longer than is absolutely necessary in order to avoid the danger of parallel line construction which might turn out to be inefficient in retrospect and lead to higher costs for society overall.

7. **In your opinion, are rules regarding the transition from natural gas networks to pure hydrogen networks necessary? Which provisions are necessary in your opinion and for which reasons?**
   The transition to hydrogen networks requires technical adjustments of the infrastructure since hydrogen has different physical characteristics when compared to natural gas. Some adjustments are already needed for admixing of hydrogen in existing natural gas networks, while other measures will only be needed upon the transition to the transport of pure hydrogen. Network operation as well as network users and, in particular, sensitive final consumers require planning reliability during the conversion process. The development of a European hydrogen market requires European coordination with harmonised standards and rules.

5. Rules on the Network Connection, Access and Expansion of Hydrogen Networks

1. **Should the provisions regarding network connection and access of hydrogen generation plants provide for priority feed-in depending on the type of generation (e.g. “green” or “blue” hydrogen)? If yes, which criteria should this be based on?**
   The priority feed-in for renewable energies in the power sector constitutes a congestion management instrument. However, in particular, during the early phases of the market ramp-up, the challenge to be met with hydrogen lines will be the provision of the required volume. Possible suitable congestion management instruments can be discussed again at a later date when sufficient physical hydrogen is available. In the opinion of EEX, incentives for individual technologies should be provided overall via a market-based CO2 price signal and corresponding prices for guarantees of origin and – provided this is politically desired and required – via support measures that do not distort the market price signal.

2. **Should a priority feed-in for certain generation types of hydrogen be created for the existing industrial hydrogen lines? Or should there be exceptions here?**
   Reference is made to the reply to question 5.1.

3. **Are further differentiating rules regarding the privileged treatment of different types of hydrogen required? If yes, based on which criteria?**
   Reference is made to the reply to question 5.1.

4. **Is a capacity model required for hydrogen transport? If yes, what should be its design? Should the network use and fee models be based on those for natural gas or power networks?**
   The models for capacity provision used for natural gas should initially also be used for hydrogen in order to provide an established framework for action as fast as possible. The capacity model permits fast European interconnection of hydrogen network regulations and, as a result, it offers a pragmatic approach to the speedy development of the hydrogen industry. In the medium to long term, an integrated fee model might be required to facilitate coupling between hydrogen, power and natural gas.

5. **Which balancing rules should be applied to hydrogen? Would a separate hydrogen balancing group have to be introduced? Are separate balancing groups required for each type of hydrogen (“green” and “blue” hydrogen, etc.) necessary as in the case of bio-gas balancing groups and EEG balancing groups? What can a control and balancing energy system look like?**
   EEX advocates the introduction of specific balancing groups for hydrogen. Balancing groups form the connecting link between physical energy and trading and constitute a basic precondition for the development of hydrogen trading markets. In its intrinsic properties, hydrogen is somewhat different to natural gas, so that the introduction of hydrogen balancing groups is also physically justified.

The production form or “colour” of the balanced hydrogen should be proven via corresponding certificates or guarantees of origin. However, EEX rejects specific balancing groups for green, blue and turquoise hydrogen: These would significantly obstruct or even prevent the development of liquid trading markets.

For the purpose of balancing hydrogen balancing groups and for the development of hydrogen trading, the role of an MAM has to be introduced, as in the case of the natural gas market. As a central contact for the trading participants, the MAM assumes balancing and settlement of trading at the VTP of the respective hydrogen market and supports the increase in liquidity in hydrogen trading through balancing energy trading at the exchange. Balancing rules should be uniform and harmonised throughout Europe in order to facilitate the border-crossing development of liquid hydrogen trading markets.
In order to improve tradability throughout Europe and to improve the market integration/coupling with natural gas and power, EEX urgently advocates Europe-wide trading and balancing of hydrogen in EUR per megawatt hour (€/MWh).

6. **Is a virtual trading point for hydrogen needed?**
   Trading of pure hydrogen requires the immediate introduction of one or a few VTPs, which are managed across the hydrogen networks through a national German MAM for the development, balancing and settlement of trading transactions. Since, at the beginning of the market ramp-up, there will not yet be a national German or European hydrogen network, hydrogen trading can initially be settled via one or several regional VTPs, such as, e.g., at the cluster or valley level. Moreover, trading in guarantees of origin or certificates will take place at the VTP separately from hydrogen trading.

7. **Does the determination of the necessary hydrogen infrastructure network require a separate hydrogen network development plan? Which specific interfaces are appropriate for the power and natural gas network development plan? Should a hydrogen NDP comprise both the distribution and long-distance transmission system operator level?**
   Integrated network development between the power, natural gas and hydrogen networks is necessary in order to prevent the development of parallel infrastructures in as far as possible, to use the existing structure and adjust it to the transport of hydrogen. In this respect, a separate hydrogen network development plan is needed.

8. **Which role does the allocation of plants for the production or consumption of hydrogen play in such a plan? Should, e.g., H2 production plants near the power generation plants (renewable energies) or near industrial hydrogen consumers be allocated volumes? In your opinion, what are the effects of such decisions on the power and/or gas infrastructure?**
   The selection of the site should be left to the market in principle. Possible allocation incentives should exclude any market distortion in access to the network.

9. **Do you consider an active allocation incentive for the establishment of, e.g., electrolysers in areas with a lot of renewable power appropriate? Could these allocation incentives also include the establishment of new hydrogen consumers (filling stations and industries,**

etc.)? If yes, which specific allocation incentives are conceivable? Please describe the type and manner of the design in detail and indicate to which market participants these incentives should apply.
Reference is made to the reply to question 5.8.

10. **Which role do hydrogen stores play in the hydrogen infrastructure and how should they be treated in terms of regulation?**
    Both the stores for natural gas with admixing of hydrogen and those for pure hydrogen are very important for the decarbonisation of the energy sector. The use of the existing stores permits balancing of fluctuations in generation and consumption over time and, hence, they form an important source of flexibility for a system which will increasingly be based on renewable energies in future. To ensure that these potentials can be used optimally also in future, technical retrofitting of the stores for pure hydrogen storage is required. It has to be examined whether the regulatory framework has to be adjusted appropriately.

6. Possible Financing Versions for Hydrogen Networks

EEX has not formed a comprehensive opinion on this set of questions.

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