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Hydrogen and Gas markets Decarbonisation Package

Response

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About the Initiative Erdgasspeicher e.V.

INES is an association of German gas storage system operators and is based in Berlin. With currently 13 Members, INES represents more than 90% of the German gas storage capacities. Hence, INES Members also operate almost 25% of all gas storage capacities in the EU.

1. Background

On February 10, 2021, the European Commission (DG ENER) published a combined evaluation of the "Hydrogen and Gas market Decarbonisation Package". The European Commission published with this consultation document a "roadmap" and an "Inception Impact Assessment" and made them available for consultation until March 10, 2021.

In the following, INES responses to the consultation document.

2. Introduction

The EU aligns its actions to the achieving of a greenhouse gas-neutral economy. Therefore, it is not only about saving greenhouse gases emissions in the energy supply but far beyond that. The issue of resource efficiency and circular economy is becoming increasingly significant in the context of a sustainable economy.

The goal of greenhouse gas-neutrality can only be achieved by using greenhouse gas-neutral energies (clean energy). Currently the European Energy supply is largely based on fossil energy carriers.

The energy transition will require an extensive use of renewable electricity. However, greenhouse gas-neutral gases such as hydrogen will be needed as a decarbonisation option, especially for the transport and industrial sectors.

Greenhous gas-neutral gases can be stored in hydrogen and gas storage systems and thus compensate the volatile production of renewable energies even over a longer period of time. Greenhous gas-neutral gases thus offer a flexibility and storage option, which is essential for the completion of the energy transition in all consumption sectors.

The use of greenhouse gas-neutral gases can reduce the need of electricity grid expansion and the need of back-up power plants for example to secure the electricity supply for heat pumps during a period of time where the solar and wind energy production is not sufficient.

It is difficult to predict the scope and the mix of the future use of greenhouse gas-neutral gases as well as the transformation pathways leading from today's gas economy towards a greenhouse gas-neutral energy supply. In order to ensure a cost-efficient transformation and thus an optimal energy system of the future, frameworks need to be set politically. **The discussion initiated by the EU Commission on a**

"Hydrogen and Gas markets Decarbonisation Package" is therefore of great importance for the energy transition as a whole.

3. Hydrogen Market

Hydrogen and Certification

For a longer period of time political decision-makers have been engaged in a debate about the usability of different hydrogen "types" or "colours". Often, green, blue, and turquoise hydrogen are at the centre of this discussion. It has to be welcomed that policy makers want to create a market framework in which the usage criteria and therefore usage perspectives of energy carriers are clearly defined.

In order to evaluate the applicability of different types of hydrogen, a fact-based evaluation of these gases should be carried out in a certification system. The EU Commission already announced a certification system (also with regard to the CO_2-emissions associated with the types of hydrogen) in the European Hydrogen Strategy. Based on this and against the background of CO_2-reduction targets, market players will be able to assess the usage perspectives of the hydrogen types themselves. **However, a mere certification of green electricity and hydrogen is not sufficient.** Even an extension of the existing system by certifications of greenhouse gas-neutral gases would not be sufficient. Instead, a comprehensive certification of all energies is needed in order to create a fact-based transparency about their possible use and the associated consumption of resources. Only this will provide a complete picture and a basis for policy makers and market players who have to ensure the achievement of the climate targets through a synchronized behaviour.

Therefore, INES recommends introducing a comprehensive system for energy certification with an "Energy Certification Directive". This system should:

- Include all energy carriers and
- Evaluate those with regard to all relevant climate and environmental externalities.
- The assessment should cover the entire life cycle.

Electricity grid-supporting subsidies of electrolysers

Greenhous gas-neutral hydrogen is the only option to completely achieve the climate targets in industrial and transport sectors. Furthermore, hydrogen can be stored in hydrogen storage systems in large quantities over longer periods of time. Only this storage capability enables the achievement of future greenhouse gas-neutrality.

As a part of the European Hydrogen Strategy, the European Commission sets itself the goal of supporting electrolysers as an important technology option in the market ramp-up and thus advancing the energy transition. Specifically, the strategy's measures aim at installing an electrolysis capacity of at least 40 gigawatts between 2025 and 2030.

Billions of subsidies will be available to achieve the build-up target. These subsidies are crucial to effectively avoid "Carbon Leakage" because they reduce the technology costs and thus create affordable decarbonisation options for the sectors concerned.

However, an uncontrolled promotion of electrolyser capacities involves the danger of causing significant costs for the expansion of the electricity grid. **INES therefore recommends keeping the electricity grid infrastructures in mind when promoting electrolysers.** Through an integrated tendering of system services on one side and a quantity-based subsidizing on the other side, the development of electricity grid infrastructures can be optimized and thus costs can be reduced.

4. Hydrogen Grids

In order to connect future supply and demand on a hydrogen market, a grid infrastructure has to be developed. The design of the regulatory framework for hydrogen grids should serve the goal of a successful development of the hydrogen market.

Introduction of an Access Regulation and a Tariff Regulation

In contrast to the existing and widely developed electricity and gas markets, hydrogen markets are still in early stages of development. Therefore, a tailored regulatory approach for hydrogen markets is needed. An unadjusted adoption of the complex natural gas grid regulation burdens the development of hydrogen markets with significant transaction costs and thus hampers a successful market development.

Regulatory intervention in the hydrogen market should be aligned with market development or market maturity (adaptive regulatory approach). The development of hydrogen markets can be viewed in a structured manner in three stages (development stages):

1. At the present time (stage 1 or status quo), there is no need to introduce an access regulation or a tariff regulation for hydrogen markets. Regulatory intervention in a basically market-oriented system can only be justified if there is a reason to fear abusive behaviour of an operator of a neutral monopoly and

thus, in perspective of a hydrogen grid. The current hydrogen markets (cluster), however, are in equilibrium.

2. The political use of subsidies for the hydrogen production will lead to the hydrogen market becoming a demand-driven market in the next few years. Production facilities which are located further away will be connected to clusters via transport pipelines. A demand-side-market is defined by the fact that supply exceeds demand. Buyers or consumers can thus choose from several suppliers creating competitive pressure. At this level of market maturity, vertically integrated companies may attempt to eliminate competition by denying network access. "Cluster network operators with a transport responsibilities" should therefore become subject to access regulation at this stage of development (stage 2) to protect competition. Due to the fact that the development of transport pipelines takes it time, the hydrogen market will not reach this maturity or stage prior to 2025.
3. A tariff regulation should not be complement the access regulation prior to the third development stage (stage 3). This market stage is defined by the fact that clusters are connected through the further development of the hydrogen markets and a comprehensive (or meshed) infrastructure has emerged. Since the coalescence of clusters eliminates competition between previously isolated clusters, competition must be simulated in regulatory terms in order to continue to ensure efficient grid fees. In line with the current considerations on a "hydrogen backbone", it can be assumed that a comprehensive infrastructure probably will not be achieved before 2030.

In summary, INES recommends pursuing an adaptive regulatory approach. Initially hydrogen grids should be developed in a market-based framework. An access regulation should only be introduced with the formation of a demand-driven market (approximately 2025). The emergence of a comprehensive hydrogen grid (approximately 2030) will require a tariff regulation at first.

Grid Tariff System and Use of Subsidies

INES recommends building cause-related grid fees for hydrogen grids. While the formation of cause-related grid tariffs appears to be difficult in closely mashed grids and against the background of the Network Code Tariffication, the conception of such fees can be carried out without any problems in the current developed hydrogen grids. This offers the following advantage for the cost-effective development of hydrogen grids: market players can take into account the logistic costs, they actually induce, into their business decisions. Economic decisions thus ensure an economically efficient expansion of the hydrogen grid (see also section 7 on grid tariffs).

In the initial ramp-up phase of the hydrogen markets cause-related grid tariffs can lead to prohibitive prices. Prohibitive prices particularly arise for example when entire pipeline sections are converted from natural gas to hydrogen, but the created

capacity is not yet matched by sufficient network demand or network users. With regard to the further market development, it may be right to carry out the conversion with foresight, however, the first consumers cannot bear the entire refinancing. **In order to avoid the problem of prohibitive and therefore development hampering tariffs, subsidies should be used for grid developments.**

5. Hydrogen Storage Systems

In a greenhouse gas-neutral energy system it is one central function of hydrogen to provide flexibility. Renewable energies are predominantly available in a form of electricity (from wind and solar), which can only be produced in an uncontrolled or intermittent manner and can be stored in the electricity system only in negligible quantities. However, clean energies can only meet the demand when there is a possibility to store this electricity in large quantities over a longer period of time. This contribution to a greenhouse gas-neutral energy system can be provided by hydrogen and gas storage systems. Clean or greenhouse gas-neutral energies in combination with storage systems thus cover the demand also in periods of low production.

In addition to providing flexibility, hydrogen and gas storage systems have the ability to bridge bottlenecks in the energy grid by providing high energetic output close to consumption (system value). Upstream grids can be designed for a lower capacity based on distributed storage reserves. As a result, investments in energy grids are limited to an efficient level.

These substantial contributions of the hydrogen and gas storage systems to a greenhouse gas-neutral energy system will result in a greater need for storage in the future than needed today. Therefore, they need to be taken into account from the very beginning of the development of the regulatory framework.

<u>Introduction of an Access Regulation</u>

For hydrogen storage, analogous to hydrogen grids, market maturity is the decisive factor in determining which regulatory interventions are appropriate. The interventions can accordingly be described on the basis of the same development stages (see section 4 “hydrogen/introduction of an access regulation and a regulation of fees”):

1. Regulation of gas storage system is not necessary at the current time, as it is neither a supply-driven market nor a demand-driven market. The current hydrogen markets are in equilibrium. An abusive behaviour by vertically integrated companies is therefore just as unlikely as in the grid sector.
   In the current phase of the market development an access regulation may

even hampers the development of hydrogen storage systems, because they could not be developed as part of a fully integrated value chain. As a result, access to subsidies could be denied.

2. With the promotion of hydrogen production, a demand-driven market can be expected in the second stage. Analogous to the current gas storage systems the introduction of an access regulation is understandable. Unbundling and tariff regulation can principally be dispensed with, based on the competitive relation between the storage sites/storage locations (analogous to the isolated hydrogen clusters).

In summary, INES recommends introducing an access regulation for hydrogen storage systems only when the hydrogen market has been developed into a demand-driven market.

Use of Subsidies

Today's gas storage systems generally have very large capacities, which cannot be converted in small steps. If the first customers had to finance the conversion of gas storage facilities completely, prohibitive prices would result. Prohibitive prices prevent a market-driven conversion of gas storage facilities and thus interfere the ramp-up of the hydrogen markets.

INES recommends to accompany not only the development of hydrogen markets but the conversions of gas storage systems by subsidizing in the initial phase of the market development, to avoid prohibitive prices and thus enable initial conversion of gas storage facilities.

The current revision of the EU Regulation for Trans-European Energy Infrastructures (TEN-E) may create a suitable framework for defining the conversion of gas storage systems to hydrogen as a "Project of Common Interest" (PCI) and thus also be eligible for subsidies as an "Important Project of Common European Interest" (IPCEI) in compliance with state aid law.

6. Gas Market and Gas Infrastructures

The current discussions focus strongly on hydrogen as the promising future energy carrier. Nevertheless, the discussion should keep gas (in the sense of greenhouse gas neutral methane) in mind as an energy carrier.

The transformation of today's gas economy into a greenhouse-gas neutral world will, even with rapidly increasing hydrogen use, still involve gas-based infrastructures for longer periods of time. For example, the use of hydrogen produced from natural gas still enables the use of gas infrastructures, because natural gas or biomethane could

be converted to hydrogen close to the consumer. Moreover, with the usage of biomethane, there is a pathway for using existing gas infrastructure even in the context of a completely greenhouse-gas neutral energy supply.

With regard to storage facilities, which do not have the prerequisites to accommodate pure hydrogen in the future, this is an important utilization path. In view of the two-thirds lower calorific value of hydrogen compared to gas (methane), the storage of methane also offers advantages in terms of stored energy volumes. Therefore, hydrogen and "methane" (gas) storage systems will both be important in meeting the enormous storage requirements of a renewable energy system. This should not get out of sight when implementing subsidies. In addition of flanking the conversion of todays' gas storage systems into pure hydrogen, the eligibility of adapting gas storage systems to future greenhouse gas-neutral gas mixtures should also be considered.

INES therefore recommends that in addition to the use of pure hydrogen, the energy potential of storing for example biomethane in gas storage facilities is kept in mind and the transformation is accompanied by subsidies.

7. Sector Integration

Grid Tariffs for Gas, Electricity, and Hydrogen

Renewable electricity and greenhouse gas-neutral gases will be the foundation of the future energy supply. Electricity, gas, and hydrogen grids will be needed to transport or distribute those clean energies.

Until now transport costs or transmission system costs have been socialized to strengthen competition. However, due to socialization, market players did not receive any signals from the grid whether a transport or distribution request leads to high or low grid costs. As a result, investment costs in grid infrastructures (especially in the area of electricity grids) increased excessively (for example through the uncontrolled extension of renewable generation capacities). In case of further mergers of market areas in the sense of an integrated European internal market this problem will be further aggravated.

The further development of the European framework should therefore be aimed at cause-related tariffs for each sector (electricity, gas, and hydrogen) individually. Cause-related tariffs ensure that market players take into account the costs of grid expansion into their market decisions. Therefore, grid use is also efficient from the network development point of view. They also ensure that the grid use is efficient even across all sector boundaries because the sector transition does not automatically lead to full involvement of the corresponding sector-specific grid costs.

Only cause-related grid fees will lead to a stronger integration of the sectors (electricity, gas and hydrogen).

Scenario Framework and Network Development Plans

If the behavior of market players is adjusted in a grid-serving manner by cause-related grid tariffs in each sector, integrated scenario frameworks will subsequently provide an efficient planning basis for further grid development. Under the condition of integrated scenario frameworks, network development plans can still be designed separately or individually for each sector (electricity, gas, and hydrogen).

Level-Playing-Field for Flexibility Technologies

In a greenhouse gas-neutral energy system, which is characterized by an enhanced sector integration, storage options will increasingly enter into a cross-sector competition. This is beneficial for the cost efficiency of the energy supply. However, at the same time this cross-sector competition imposes special requirements on the design of the framework.

Up to now, the legal frameworks have normally been developed just with the focus of the sector in question. Against the background of increasing sector integration this is not sufficient anymore. In the future it will be important to avoid discrimination not only against individual technologies but also against entire sectors because of different framework conditions. Levies and fees must be considered and designed against the background of a competition across all sector boundaries in order to create a comprehensive level playing field. This is also necessary with regard to relief measures. **INES recommends ensuring an undistorted competition between flexibility technologies (especially regarding levies and fees) across sectors.**

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