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Response to: Hydrogen Storage Business Model: Market Engagement on the First Allocation Round

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Düsseldorf-based Uniper is an international energy company with activities in more than 40 countries. The company and its roughly 7,000 employees make an important contribution to supply security in Europe, particularly in its core markets of Germany, the United Kingdom, Sweden, and the Netherlands.

Uniper's operations encompass power generation in Europe, global energy trading, and a broad gas portfolio. Uniper procures gas—including liquefied natural gas (LNG)—and other energy sources on global markets. The company owns and operates gas storage facilities with a total capacity of more than 7 billion cubic meters.

Uniper intends to be completely carbon-neutral by 2040. Uniper aims for its installed power generating capacity to be more than 80% zero-carbon by 2030. To achieve this, the company is transforming its power plants and facilities and investing in flexible, dispatchable power generating units. Uniper is already one of Europe's largest operators of hydropower plants and is helping further expand solar and wind power, which are essential for a more sustainable and secure future. The company is progressively expanding its gas portfolio to include green gases like hydrogen and biomethane and aims to convert to these gases over the long term.

Uniper is a reliable partner for communities, municipal utilities, and industrial enterprises for planning and implementing innovative, lower-carbon solutions on their decarbonisation journey. Uniper is a hydrogen pioneer, is active worldwide along the entire hydrogen value chain, and is conducting projects to make hydrogen a mainstay of the energy supply,.

In the UK, Uniper owns and operates a flexible generation portfolio of seven power stations and a fast-cycle gas storage facility.

Krummhörn Hydrogen Storage Pilot

Uniper is testing underground hydrogen storage in caverns with the HPC Krummhörn project. This project aims to test the construction and operation of a 100% hydrogen storage facility under real conditions. For this purpose, we are using our salt cavern

storage facility in Krummhörn in northern Germany, which has not been used commercially since 2017. We are constructing a new salt cavern with a geometric volume of about 3,000 m³ using an existing drilling. We are focusing on the evaluation of new caverns in order to avoid restrictions from the previous use with natural gas.

During the test operation, we will check equipment, materials and substances for H2 compatibility and gather experience regarding technology and operation in the storage of hydrogen. The demonstration plant is scheduled to go into operation this year. We are investing around €10 million in this green future project with a storage volume of minimum 200,000 m3 of hydrogen.

Consultation Response

A number of factors will be critical to bringing forward hydrogen storage infrastructure, and Government must therefore, take into account a strategic view of hydrogen storage needs in designing evaluation criteria; take on some of the DEVEX risk ahead of contract award; and be prepared to address those barriers to infrastructure development that are largely outside of developers' control.

1. Timescales and pace

We welcome the ambition and pace of the proposed allocation process timeline, particularly for assessment of proposals and negotiation of contracts. We urge government to adequately resource the HSBM AR1 process in order to achieve this timeline.

It is unlikely that the envisaged 3-6 years between contract award and COD is achievable unless government addresses key barriers such as consenting and permitting. Currently, new infrastructure, such as salt cavern storage, may take 6-8 years to get through planning alone.

Implementing measures to streamline this process will be critical, such as clear statements in the NPSs, government support with DCOs, and providing significant support to planning and permitting authorities for resourcing and upskilling to develop rules for hydrogen infrastructure and efficiently process applications. Our experience is that it takes around 30 weeks for a completed environmental permitting application to be allocated to an officer for review.

There are a number of other elements that are largely outside of developers' control, which will mean that FOAK projects may take longer than 3-6 years to reach COD. These include:

- Co-development of HSE best practice and standards for geological hydrogen storage;
- Procuring materials and equipment, and securing appropriately skilled workforce; and
- Timely production and procurement of adequate volumes of hydrogen for cushion gas.

To build on the ambition of this first HSBM allocation round, we need clear signals about when we might expect the second. This will ensure a pipeline of proposals, which will support the rapid and robust growth of the low carbon hydrogen market.

2. Project value

We are concerned that the proposed assessment criteria do not evaluate the value of the product offered. A better value test than cost per unit is needed to support development of the range of storage services that meet the hydrogen market needs.

A small, newbuild, rapid-cycle facility will serve different customers than a large, slow-cycle, repurposed facility – but the former will cost more per unit of capacity than the latter, so the assessment criteria as proposed might only support the latter. This would slow market growth and might prevent certain activities coming to market – hydrogen to power plant, for example, are likely to rely on rapid-cycle storage.

In addition, the location of proposals will affect their strategic value.

Government should develop a more detailed strategic view of storage needs in the early-medium term hydrogen market to ensure that the HSBM brings forward the right products. Our own assessment of hydrogen market storage needs suggests that flexible, rapid-cycle products are needed first, with larger, slower-cycle products following to provide further security of supply once hydrogen production has scaled up. The government's Hydrogen Transport and Storage Networks Pathway[1] mentions "intra-day, inter-day, and inter-seasonal" products: the assessment criteria should ensure that each of these different types of product can be supported.

3. Treatment of DEVEX

We welcome the proposal to allow projects to recover DEVEX, but note that as it can only be recovered once projects are operational any DEVEX undertaken ahead of contract award is done so at developers' risk. As the early DEVEX for geological hydrogen storage can run into tens of millions of pounds, it is likely that developers will postpone it until after contract award. This will be another factor that slows projects down and makes the 4-6 year COD requirement unlikely to be deliverable.

Government should ringfence some funding for DEVEX, as it has done for electrolytic hydrogen production projects, to support the initiation of development activity ahead of contract award. This would enable developers to submit more robust proposals and reduce the risk of proposals securing contract award but then being unable to proceed to COD due to issues discovered under DEVEX expenditure. This could run in parallel to the HSBM allocation process, so as not to cause delay.

4. Eligibility and assessment criteria

The eligibility and assessment criteria need further work. In particular:

- The meaning of "geological tests" needs to be clearly defined;
- What kind of evidence is government looking for to demonstrate "realistic plans to secure cushion gas"? Given the quantities of gas that will be needed, we are

[1] Hydrogen transport and storage networks pathway - GOV.UK (www.gov.uk)

concerned that this will be a difficult condition for developers to fulfil at the point of application;

- It is not clear whether TRL7 applies to all of the constituent parts of a facility in isolation, or whether it applies to a pilot facility in operation. If the latter, we are concerned about applicability: there are few pilot salt cavern hydrogen storage facilities in operation, and there are limits to the technical read across from one storage project to another; and

- The precise application and duration of third party access (TPA) needs to be defined. For instance, if only part of a facility was supported by government funding, would only a proportion or all of the asset have to provide TPA? Would there be any additional commercial controls where a storage asset is owned or operated by the same organisation as one or more of its customers?