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1 February 2024.

Sent by email to [hydrogenstoragebusinessmodel@energysecurity.gov.uk](mailto:hydrogenstoragebusinessmodel@energysecurity.gov.uk)

Dear Sir or Madam,

## **Hydrogen Storage Business Model: Market Engagement on the First Allocation Round**

Thank you for the opportunity to provide feedback on the Government's approach to the first allocation round for the hydrogen storage business model (HSBM). This is a non-confidential response on behalf of the Centrica Group.

We welcome the early engagement ahead of the launch of the first allocation round. We also welcome the decision to launch the allocation round in parallel to finalising the HSBM support contract, which should facilitate hydrogen storage facilities being commissioned into operation earlier than would be possible if the activities are sequenced.

The *Second National Infrastructure Assessment* (the Assessment), published in October 2023, contains recommendations about the capacity of hydrogen-fired generation and storage capacity that should be in operation by 2035.<sup>1</sup> We consider that, although the Government's ambition to build up to 10GW of hydrogen production capacity by 2030 appears to be on realistic trajectory to satisfy the expected demand in 2035, the ambition for development of storage capacity is not. This, in turn, may impede the UK achieving the interim decarbonisation targets by the Sixth Carbon Budget in 2035. To place the development of hydrogen storage capacity on a realistic trajectory to meet the 2035 target, we recommend that the Government takes the following steps:

- **The eligibility criteria should be revised.**
- **Funding for the in-field trialling of 'first of a kind' projects should be made available.**
- **The timing of and procurement ambition for future allocation rounds that support the 2035 hydrogen storage capacity target being met should be published.**

We explain our recommendations below.

Although it is not directly related to the details of the first allocation round, the comment on the Government leading the strategic planning of hydrogen infrastructure in the interim until the

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<sup>1</sup> See: <https://nic.org.uk/app/uploads/Final-NIA-2-Full-Document.pdf>.  
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Future System Operator takes on the role in 2026.<sup>2</sup> We fully support the Government's interim role and agree that strategic planning is necessary to stimulate the hydrogen economy and should not be delayed.

There are benefits to the Government being more directional at this stage, to accelerate the development of the hydrogen economy. Industrial clusters such as the Hynet and East Coast (Teesside and Humber combined) clusters are being formed. These clusters will comprise producers, industrial users of hydrogen and hydrogen-fired power generation assets. Geological characteristics in these areas are already known. We think it would be efficient for the Government to target and support the development of transportation and storage infrastructure in these areas in the first instance. Early decision-making in this respect represents a 'no regrets' approach and is likely to de-risk future storage, transportation and production projects.

**The eligibility criteria should be revised:**

The eligibility criteria for the first allocation round are too tightly defined and, therefore, limit the number of projects and storage capacity that may be awarded contracts. We believe that revising the eligibility criteria will better enable the Government to achieve its strategic objectives that guide the roll-out of transport and storage infrastructure.<sup>3</sup> We recommend:

1. the minimum Technology Readiness Level criterion should be relaxed;
2. the exclusion of existing natural gas storage facilities should be reconsidered; and
3. the need for 'strategic reserve' storage should be explicitly considered.

1. The minimum Technology Readiness Level criterion should be relaxed:

The Government proposes to impose a minimum Technology Readiness Level (TRL) of 7 to, in part, "...reduce applications from projects using low TRL technologies which do not currently have a commercially viable business case".<sup>4</sup> We understand why the Government views a minimum TRL as being desirable but we disagree.

All large-scale geological hydrogen storage projects by their nature are currently 'first of a kind' (FOAK) projects. This means it will generally be difficult for developers of large-scale geological storage projects to demonstrate how projects fully comply with or exceed the TRL 7 requirements (e.g. pre-commercial demonstration: "solution working in expected conditions"). We note that pilot projects that have been developed into operational storage capacity are often on a much smaller scale and are not located in areas with geological characteristics that are similar enough to the characteristics of those areas in the UK where projects could be developed.<sup>5</sup> We also note that, according to the International Energy Agency, no geological storage technology currently meets the minimum TRL 7 requirement at 100% hydrogen purity, scale and operational envelope required by this allocation process.<sup>6</sup>

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<sup>2</sup> "Hydrogen Transport and Storage Pathways", page 4. The Future System Operator has now been named "National Energy System Operator".

<sup>3</sup> Page 7 of the Market Engagement document.

<sup>4</sup> Page 13 of the Market Engagement document.

<sup>5</sup> For example, depleted field hydrogen blend projects Argentina and Austria: TRL5; 100% hydrogen pilot being developed in Austria: TRL3-4; fast cycle pilots in the Netherlands and France: TRL5-6 (according to the International Energy Agency).

<sup>6</sup> "Energy Technology Perspectives 2020: Special Report on Clean Energy Innovation - Accelerating Technology Progress for a Sustainable future".

We believe that the minimum TRL 7 criterion unnecessarily filters out potential projects from consideration for a HSBM contract and does not reflect current technological developments. This criterion should be relaxed. Instead, the technical readiness and risks of each project could be assessed on a case-by-case basis and additional requirements could be placed on developers to provide supporting evidence and technical due diligence. The assessment could be conducted by DESNZ's hydrogen technical advisors, as outlined in the application assessment process in the Market Engagement document.

The eligibility criteria already require developers to satisfy risk mitigations requirements or provide evidence of risk mitigation measures (e.g. developers must supply evidence that the geotechnical risk has been mitigated for the project's use case(s)<sup>7</sup>. Similarly, developers are separately required to satisfy operational criteria such as proving the theoretical total energy value of working gas and corresponding cushion gas volume<sup>8</sup>. These requirements can be further developed if necessary to support case-by-case assessments.

2. The exclusion of existing natural gas storage facilities should be reconsidered:

The Government proposes that existing natural gas storage facilities will not be eligible for the first allocation round, to ensure security of natural gas supply. We understand the rationale for the proposal but it does not recognise that, in some cases, excluding existing natural gas storage facilities from consideration can negatively affect security of natural gas supply.

As an example, our long-term aspiration for Centrica's Rough facility is that it will continue be used for long duration energy storage. This would involve the facility continuing to store natural gas in the short- to medium -term while also simultaneously being made hydrogen-ready. Our plan would see the increase in natural gas storage capacity from 54bcf to a minimum of 120bcf in the short to medium term, prior to switching to full hydrogen operation. Failure to be flexible on this criterion risks the UK's leadership opportunity to secure large-scale energy storage as well as blocking Centrica's £2bn investment. Existing natural gas facilities should be considered for HSBM contracts on a case-by-case basis.

3. The need for 'strategic reserve' storage should be explicitly considered:

The proposed criteria do not differentiate between storage purposes e.g. between fast cycling facilities for near-term production and consumption or 'strategic reserve' capacity. Both types of facilities will be needed. The NIC has also recommended that 25TWhrs of 'strategic reserve' will be needed by 2040 to bolster resilience.<sup>9</sup>

FOAK projects, such as making the Rough facility hydrogen-ready, could incorporate 'strategic reserve' as per the National Infrastructure Commission's (NIC's) recommendation. The Government will need to decide quickly how the recommended resilience can be achieved given the long lead times needed to develop large-scale hydrogen storage capacity. Storage facilities that hold 'strategic reserve' are likely to have different cost profiles compared to fast cycling facilities. The Government should ensure that the HSBM is designed to accommodate different types of storage facilities.

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<sup>7</sup> Page 13 of the Market Engagement document.

<sup>8</sup> Page 14 of the Market Engagement document.

<sup>9</sup> 'The Second National Infrastructure Assessment', page 47.

**Funding for the in-field trialling of ‘first of a kind’ projects should be made available:**

We welcome the Government’s recognition of the high barriers to delivering hydrogen storage capacity such long lead times and the high costs of constructing storage facilities and securing planning and regulatory permissions. We, therefore, welcome the proposal lower some of the barriers by allowing development funding (devex) included as an allowable cost in the HSBM contract.<sup>10</sup> The proposal necessarily means that only those projects that have been awarded HSBM contracts can recover devex funding.

Developers also face the barrier of not being able to access devex to support the in-field testing of hydrogen storage. The lack of access to innovation funding acts a significant drag on the development of storage capacity. Developers cannot demonstrate that potential projects satisfy the ‘proven’ eligibility criterion without first conducting pilot projects because hydrogen storage projects and technologies are generally FOAK. However, developers may be reluctant to commit the large amount of investment needed to support in-field trials because there is not a guarantee that the funding can be recovered.

We continue to stress the need for funding to support the in-field testing of FOAK projects to be made available. The Government should confirm as soon as possible the timeline for, the purpose(s) of and the mechanisms by which funding can be made available.

**The timing of and procurement ambition for future allocation rounds that support the 2035 hydrogen storage capacity target being met should be published:**

In the Assessment, the NIC recommends that at least eight TWh of large-scale hydrogen storage should be in operation by 2035.<sup>11</sup> However, the Government proposes to support up to only two hydrogen storage projects in the first allocation round. Additionally, the typical capacities of projects that could be awarded HSBM contracts in the first allocation round are relatively small. For example, salt cavern storage tends to be of several orders of magnitude smaller than the 2035 target: they tend to be GWh-scale instead of TWh-scale facilities. These factors suggests that the Government will fall significantly short of the eight-TWh target by 2035.

The construction of new facilities or the re-purposing of existing facilities for hydrogen storage requires long development periods. The NIC emphasises the criticality of taking steps as soon as possible ensure the timely delivery of the necessary hydrogen storage capacity:

“The UK has thousands of TWh of theoretical storage capacity in the form of salt caverns and depleted oil and gas reserves. However, there is less than one TWh of hydrogen storage in the UK today. The lead times for developing hydrogen storage can be up to ten years so action is needed now to meet the level the system needs...”.<sup>12</sup>

The Government also recognises that the development of hydrogen storage facilities requires long lead times and, therefore, has accelerated the HSBM timelines.<sup>13</sup> This is a step in right direction but, in isolation, is unlikely to provide the certainty around Government support that developers need to attract investment. Developers also require clarity on the timing of and the procurement ambition for future allocation rounds. We recommend that the Government:

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<sup>10</sup> Page 26 of the Market Engagement document.

<sup>11</sup> ‘The Second National Infrastructure Assessment’, page 43.

<sup>12</sup> ‘The Second National Infrastructure Assessment’, page 43.

<sup>13</sup> Page 9 of the Market Engagement document.

- provides realistic schedules for future allocation rounds (that accommodate the long development lead times and that are likely to facilitate delivery by 2035) as soon as possible; and
- shapes the procurement ambition for those future allocation rounds so that at least eight-TWh of hydrogen storage capacity will be in operation by 2035.

We hope you find these comments helpful. Please do not hesitate to contact me if you would like to discuss this response.

Yours sincerely,

Gregory Edwards  
Network Regulation Manager  
**Centrica**