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27 October 2022

Letter of invitation for proposals

Decarbonising heating is essential to delivering net zero. Heating in buildings accounts for over 20% of national carbon emissions. The Government believes that low carbon hydrogen could potentially be an important option for decarbonising heat in buildings. However, unlike other technologies, such as heat pumps and heat networks, 100% hydrogen for heat is not yet an established option. Further work is required to assess the feasibility, costs and benefits. That is why we are working with industry, regulators and others to deliver a range of research, development and trials projects to provide the necessary evidence.

As you know, informed by the results of these research, development and trials projects, the Government intends to make decisions in 2026 on the strategic role of hydrogen for heating. Any decisions on implementation of a pilot hydrogen town will, therefore, be subject to those strategic decisions. However, further planning work now is important to better understand how the early stages of any deployment would be best organised; and to be in a position to progress to implementation as quickly as possible through the latter half of this decade.

As stated in the Heat and Buildings Strategy, the Government wishes to support the development of plans for a pilot hydrogen town which could potentially be implemented before the end of this decade, subject to the strategic decisions in 2026. I am writing now to you as the Gas Distribution Network Operators (GDNs) to invite you to propose outline planning projects for areas, including possible pilot hydrogen town(s), within your networks which appear to you to be most suitable for conversion to enable early deployment of hydrogen heating at scale. BEIS considers that the GDNs will be best placed to develop these plans initially because of your experience of operating and maintaining the network infrastructure and the knowledge gained from this licensed activity that will be vital for any network conversion.

BEIS is prepared to contribute towards the cost of developing plans that meet the requirements detailed below. This letter and attachments set out the purpose and scope of outline planning projects we will consider supporting and other considerations for submitting project proposals. Proposals seeking support are invited by **20 January 2023**.

Essentially, we are looking to support Outline Plans identifying the main energy system and supply chain requirements involved in deployment of hydrogen for heating at scale in specific parts of your networks, and a high-level assessment of the range of potential technical

solutions. We envisage that these outline plans will provide an informed basis for further stakeholder discussion, and for more detailed design and planning work which Government may subsequently wish to support. We therefore request that these outline planning projects are completed by March 2024.

This is an important part of the programme of work investigating and preparing for hydrogen heating, and BEIS looks forward to receiving your proposals.

David Capper
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Department for Business, Energy & Industrial Strategy (BEIS)

Planning for a possible pilot hydrogen town and other early deployment of hydrogen heating: guidance for GDNs on submitting proposals for outline planning projects covering suitable areas of their networks

1. This document provides guidance to GDNs seeking to submit proposals for outline planning projects for areas of their networks with potential to be suitable for conversion to enable early deployment of hydrogen heating at scale.

2. The government has a stated objective to deliver plans by 2025 for a possible pilot hydrogen town by the end of this decade.[1] We envisage that the Outline Plans prepared by the GDNs in accordance with this guidance will be an important step towards this milestone.

3. Further planning and design work is likely to be required in subsequent stages. However, the Outline Plans will provide important initial analysis and information on priorities for more detailed design and planning work which the GDNs and/or other parties might subsequently look to undertake, and which government may wish to support.

4. We also consider it important for the outline planning work to assess how conversion of potential pilot towns would fit with conversion of surrounding networks to best support efficient and effective wider deployment in the early stages of any roll out of hydrogen heating.

5. This document sets out objectives, principles and funding arrangements for outline planning projects. We will continue to work with the GDNs and other stakeholders to develop our view of the priorities and delivery routes for subsequent stages of planning and design.

6. The final timetable for outline planning work and subsequent project development stages will be confirmed before grant funding is awarded and will be informed by the plans proposed by the GDNs in their project proposals. However, our current expectation is that the Outline Plans will be completed by March 2024.

Overall purpose

7. The government intends to take strategic decisions in 2026 on the role of hydrogen in decarbonising heating. The government's 2021 Net Zero Strategy document outlined high, medium and low scenarios to help illustrate the range of potential outcomes.[2] In scenarios where it is determined hydrogen plays a significant role in heating, it will be important to take the necessary steps to realise the carbon savings and other benefits in timely, efficient and effective ways. In the higher scenarios in particular, hydrogen is assumed to make a substantial contribution to carbon emissions savings by Carbon Budget 6. This implies substantial deployments commencing by the end of the decade and ramping up significantly during the early 2030s.

8. To keep open the possibility of such early deployment, BEIS is seeking to develop necessary planning for early-stage deployment ahead of strategic decisions. Overall, this planning work should enable government and stakeholders to:

[1] 'The Ten Point Plan for a Green Industrial Revolution', November 2020. Accessed 12 October 2022
[2] 'Net Zero Strategy: Build Back Greener', October 2021. Accessed 12 October 2022

- understand the best available approaches to commencing deployment of hydrogen heating together with the changes and timescales required

- identify potentially suitable areas of the gas networks in different regions to commence conversion to hydrogen heating at scale in timely, effective and efficient ways

- identify the steps needed to achieve early scale deployment in suitable areas, and potential preparatory steps

Scope and purpose of Outline Plans

9. Outline planning projects should contribute towards the overall objectives identified above. In particular, projects should:

    - identify areas of their networks which have the potential to be suitable areas to commence early deployment of hydrogen heating until the mid 2030s, taking into account the effect on consumers, cost effectiveness in the short and longer terms, and benefits, including rate of carbon emissions savings

    - outline the local sequencing and timescales involved in deploying hydrogen heating in ways which are cost effective, reflect the needs of different consumers and the readiness of supply chains, and provide timely benefits

    - at least for the areas of the network identified for conversion over the first 1-2 years, define the steps and timescales required for conversion in significant detail

    - provide an objective, rigorous assessment of the energy system requirements involved, assuming appropriate security of supply to consumers

    - assess the range of strategic technical infrastructure options which might plausibly be available for meeting these requirements in the relevant areas, for example, in relation to production, storage and transmission/distribution

    - assess the demands on supply chains for goods and services required, and significant challenges involved

10. GDNs should identify the extent of network area and patterns of conversion which appear most suitable for these purposes. However, to demonstrate pathways to delivering substantial and timely carbon savings we expect plans to centre on built-up areas with concentrated demand.

11. We expect projects to concentrate in particular on delivering a pilot hydrogen town before the end of this decade. The scale and character of the pilot town should enable learnings which can be leveraged to improve the efficiency and effectiveness of subsequent conversions.

12. Our understanding is that a scale of at least 10,000 meter points is likely to be appropriate for the first pilot town. This scale should allow the pilot to generate evidence of rollout methods and conversion processes, and to produce representative findings from a diverse range of participants and building types.

13. **Annex A** sets out, in more detail, a suggested range of activities for outline planning projects.

Applications for funding to develop outline planning projects

14. The following paragraphs outlines significant principles which GDNs should adhere to in submitting project proposals.

15. We expect individual GDNs to submit a **single** application which sets out their proposal for outline planning projects. However, that proposal may identify multiple projects covering different geographical areas.

Eligibility criteria

16. To qualify for support, all project proposals will need:
    - a plan for a grid-conversion hydrogen heating pilot within England, Scotland or Wales
    - a licensed GDN to lead outline planning activities, taking overall responsibility for the delivery of comprehensive Outline Plans

Co-operation between GDNs

17. GDNs will be expected to work together where appropriate to support value for money by avoiding unnecessary duplication of work across separate projects.

18. It is also open to GDNs to work together to propose planning projects which encompass gas networks in more than one licensed GDN region. GDNs will be expected to work closely with National Grid in considering the requirements and options for gas transmission at the higher-pressure tiers.

Consultation and collaboration with other organisations

19. Project proposals should explain how GDNs plan to involve other organisations in the development of their outline planning projects, through consultation, partnership building and/or collaboration as appropriate. These are likely to include:
    - production and storage providers
    - local government, other local representative bodies and civil society organisations
    - National Grid
    - independent gas transporters
    - electricity distribution networks
    - heat network operators
    - consumer representatives, including commercial and industrial

    We recognise that the GDNs will need to engage with and gather information and views from a wide range of organisations. It will be important that the judgements and supporting analyses which the GDNs make in developing their Outline Plans are based as far as practicable on objective evidence and assessments, independent of private interests.

20. Project proposals should also explain what engagement has already been carried out and how this has influenced the choice and design of outline planning projects.

Submission of project proposals

21. **Annex B** sets out the completion requirements for funding applications to develop outline planning projects.

22. The deadline for receiving proposals is **20 January 2023**.

23. Following receipt of applications, BEIS will review project proposals and may propose amendments as appropriate to enhance the overall value for money the projects expect to achieve.

24. Ofgem has confirmed that GDNs may consider utilising the Net Zero and Re-opener Development Fund use it or lose it allowance (NZARD UIOLI) to contribute to their costs in preparing project proposals. This is subject to GDNs satisfying themselves that this work is compliant with the appropriate Ofgem governance documents. Should GDNs wish to use alternative Ofgem RIIO mechanisms for this purpose they should consult Ofgem.

Funding for outline planning projects

25. BEIS is prepared to provide grant funding to contribute towards GDNs' costs in completing outline planning projects. The maximum proportion of the cost of developing plans which BEIS will consider paying will be 50% (further details will be provided shortly on the process for submitting applications for grant funding and how BEIS will allocate its available budget). BEIS is planning to contribute up to £6million to support outline planning projects.

26. Applications for funding to develop outline planning projects will need to include the information identified in **Annex B**. BEIS will assess the quality of proposals against the completion requirements and seek to award funding to plans of sufficient quality.

27. BEIS also reserves the right to select between different project proposals if the total funding requested exceeds the available budget. In doing so we will have regard to the completion requirements in **Annex B** and diversity of plans as a whole.

28. BEIS will take the relevant funding decision(s). Conditions may also be attached to the funding which will be discussed with project developers and relevant stakeholders.

ANNEX A: outline planning activities

GDNs should refer to the guidance provided on the scope and purpose of Outline Plans. We expect projects to contribute towards the objectives for outline planning work as identified in this guidance.

GDNs are expected to consider the most appropriate approach to developing outline planning projects for their network areas. This annex provides an indicative, not exhaustive, range of suggested outline planning activities and possible considerations.

Outline Plans should explore the technical requirements for conversion of a given location and seek to identify strategic options around meeting those requirements.

Some of the activities identified may not be unique to a specific area and may require a wider regional or national perspective. We expect GDNs to work together to avoid unnecessary duplication of work across separate projects.

To deliver some of the activities identified GDNs will be expected to work with other stakeholders, for example, National Grid, EDNOs, independent gas transporters, hydrogen production or storage companies, local authorities, suppliers and appliance manufacturers.

Outline Plans will need to go into varying levels of detail depending on the activity and how it relates to the area(s) of network identified as most suitable for conversion to enable early deployment of hydrogen heating at scale and/or the town-scale pilot area(s) within those wider areas.

1. Defining the area(s) of the network considered suitable for conversion and, within that, the initial town-scale pilot area(s) to start conversion

- Items may include (but will not be limited to):
  - identification of areas within each network which would be converted at different stages
  - identification and description of the consumer base in these areas, including population, the number and range of gas consumers, and building/premises types

2. Hydrogen fuel source, supply and resilience (including storage)

Understanding the requirements for providing a resilient supply of hydrogen and outlining strategic options for how these requirements can be fulfilled.

- analysis and modelling of hydrogen fuel requirement. Considerations may include (but will not be limited to):
  - provisional daily and peak demand modelling, based on meeting appropriately defined resilience standards
  - provisional intraday demand profile and associated intraday gas storage requirement
  - provisional inter-seasonal demand profiles and associated inter-seasonal storage requirements
  - provisional total annual gas demand and associated production/supply requirement

- analysis of hydrogen production sources, storage capacity and transport infrastructure. Considerations may include (but will not be limited to):
  - identification of different combinations of production, storage and other sources of flexibility to meet identified demand

- different types of production and anticipated reliability or supply variation expected across the year
- potential sources of production, with estimated capacity, potential competition for demand, timelines for operation, final investment decisions, numbers of producers and pipeline lengths
- potential linkages to other schemes
- expected operating pressure, length and volume of infrastructure, relating to energy storage capacity of the network

- analysis of options for ensuring system resilience, through production, storage and balancing response plans. Considerations may include (but will not be limited to):
  - definition of resilience metric(s)
  - optionality around wider solutions, such as supply flexibility
  - likely requirements for plans for initial emergency or balancing response in the event of a lack of supply

- assessment of the strategy and timelines for the design, procurement, construction and/or adaptation of production, storage and transport infrastructure required. Considerations may include (but will not be limited to):
  - expected technology readiness levels and supporting business models
  - estimated delivery timelines and interdependencies with other projects
  - planning timelines for consents, environmental notifications and other factors

3. Configuration of existing gas distribution network

- analysis and modelling of the configuration of the existing gas distribution network. Considerations may include (but will not be limited to):
  - identification of existing assets and infrastructure across all pressure tiers
  - likely network reconfiguration and reinforcement required to run a phased conversion – assets to be repurposed and any new assets; potential new route corridors; planning and environmental constraints; risk assessment
  - provisional conversion plan – sectorisation and sequencing of network conversion; potential isolation points; proposed approach to purging remaining natural gas ahead of conversion
  - expected decommissioning works required for networks and installations and associated cost estimates
  - initial cost estimates of equipment required for conversion, covering any costs involved in repurposing and costs of new assets
  - interaction of other ongoing programmes, for example, the Iron Mains replacement Programme, with timelines around delivery of a town pilot
  - provisional assessment of workforce capacity and training requirements
  - identification of required updates to standards and procedures

4. Transmission system

- analysis of the requirements for a hydrogen transmission system (LTS and NTS) and associated pipeline infrastructure, potentially with different strategic options to support different means of providing resilience. Considerations may include (but will not be limited to):
  - identification of existing assets and infrastructure on the transmission system.
  - likely network reconfiguration and reinforcement required to run a phased conversion – assets to be repurposed and any new assets; potential route corridors for new H2

transmission pipelines; planning and environmental constraints; risk assessment; delivery timelines and early works
- expected decommissioning works required for networks and installations and associated cost estimates
- initial cost estimates of equipment required for conversion, covering any costs involved in repurposing and costs of new assets
- provisional assessment of workforce capacity and training requirements.
- identification of required updates to standards and procedures

5. Buildings / end users

- analysis of variations in building types, level of commercial and industrial sites and end user activities. Considerations may include (but will not be limited to):
  - proportion of domestic, commercial and industrial building types
  - building styles, ages, construction type, building condition and EPC ratings in domestic buildings
  - the influence of commercial and industrial users on overall demand and the likely availability of suitable H2 compatible equipment for all end users
  - likely end user works required (downstream of ECV) in preparation for conversion and associated cost estimates
  - provisional assessment of workforce capacity and training requirements
  - identification of required updates to standards and procedures

6. Demographics

- analysis of the socio-demographic profile of the domestic end user population, including vulnerable consumers. Considerations may include (but will not be limited to):
  - likelihood of uptake from different end user groups
  - needs of vulnerable consumers, including those experiencing fuel poverty.
  - potential interactions with electrical distribution networks, for example, in relation to the proportion of end users opting to convert to electricity as their primary energy supply
  - potential compatibility of network conversion activities with identification of sites suitable for heat networks
  - initial proposals for managing end users opting out of hydrogen

7. Appliance Supply chain

- analysis of the likely numbers and types of appliances and the feasibility of running a rolling installation programme. Considerations may include (but will not be limited to):
  - estimation of number of different appliances, meters and any other necessary installations, requiring procurement
  - identification of any specific equipment requirements for larger users
  - potential further new technology/product development work required
  - initial view of long-term maintenance activities that will be required post-conversion
  - provisional assessment of workforce capacity and training requirements
  - identification of required updates to standards and procedures

8. Legislative and regulatory frameworks, and industry systems

- analysis of regulatory barriers and industry systems that would need to change to support a pilot hydrogen town. Considerations may include (but will not be limited to):

- identification of any industry systems that would need to change (or new systems that would be required), for example, systems associated with gas trading, which either (1) have not already been addressed through the village trial or (2) require different solutions to the village trial
- identification of any specific regulatory barriers, for example, in legislation and regulations, licence conditions and energy codes, which either (1) have not already been addressed through the village trial or (2) require different solutions to the village trial

Alongside this, GDNs will be expected to participate in BEIS and Ofgem-led informal and formal consultations on the overall legislative, regulatory and market framework for a pilot hydrogen town.

9. Project planning

- developing the plan, timetable and scope of work for subsequent project stages. Project planning activities may include (but will not be limited to):
  - provisional workplan for detailed planning stage, with deliverables and milestones
  - initial cost estimates and profile of expenditure for detailed planning activities
  - potential priorities and funding requirements for detailed planning activities
  - assessment of possible risks to project delivery caused by long lead items and other issues
  - high-level indicative plan and schedule for all other stages of the project, through to operationalising the town pilot, identifying potential scope of work, deliverables and milestones

ANNEX B: completion requirements for funding applications

We expect individual GDNs to submit a **single** application which sets out their proposal for outline planning projects. However, that proposal may identify multiple projects covering different geographical areas, including projects that are joint between different GDNs.

In assessing project proposals, BEIS will consider, inter alia:

- the clarity and rigour of the rationale presented for the choice of plan area(s) – that is why the area(s) of the network and the communities and other consumer centres included in the plan area(s) have the potential to be suitable for conversion to enable early deployment of hydrogen heating at scale
- the quality of the workplan for delivering outline planning projects and delivering the identified benefits by mid-2024
- value for money in relation to the short-term delivery of Outline Plans in mid-2024; as well as long-term value for money considerations being taken into account in the choice of locations
- evidence of engagement with local stakeholders and others who will need to be involved during the outline planning project stage

Applications are expected to include the following information:

1. Identification of area(s) within each network to be included within the Outline Plans, including:
   - a description of the consumer base in the area(s), covering population and the number and range of gas consumers and building types
   - within the area(s), identification of potential options for initial town-scale pilot(s) to start conversion of the gas network

2. Rationale for choice of area(s), including*:*
   - explanation of why the area(s) appear to have the potential to be a practicable and cost-effective locations to commence conversion of the gas network, taking into account relevant infrastructure and supply chain considerations
   - explanation of why the area(s) are suitable for achieving the objectives of the town pilot project and delivering an operational town pilot by the end of the decade. Particular consideration should be given to:
     - achieving an efficient, cost-effective and timely rollout
     - potential benefits for UK industry and local communities and influence on carbon emissions
   - rationale for prioritisation of these area(s) of the network relative to others

3. High-level assessment of likely potential options for ensuring system resilience for the chosen area(s), including:
   - identification of a range of potential production, storage and transport solutions

Project delivery

4. A full plan for the outline planning stage, including:
   - detailed timetable, action plan, deliverables and milestones

5. Risk register, including:
   - identification of delivery risks for Outline Plans with associated mitigation measures

Stakeholder engagement

6. Stakeholder engagement/partnership working strategy, including:
    - plan for engaging stakeholders and partners who would be involved in outline planning, including: hydrogen producers and storage facilities, National Grid/transmission, electricity networks, independent gas transporters, manufacturers of hydrogen-ready equipment and appliances, large commercial and industrial sites, local authorities and other local representation
    - information about stakeholder engagement carried out to date, in preparation of the project proposals

Project financing

7. Cost estimates for outline planning, including:
    - the expected costs for the outline planning stage, broken down by appropriate expenditure items, with estimates of risks, uncertainties and ranges
    - confirmation of funding contribution that the GDN will provide
    - statement of the GDN's funding requirements for the outline planning stage