



Department for
Energy Security
& Net Zero

Decarbonisation Readiness

Government Response to Consultation

October 2024



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Executive Summary

In March 2023, the previous government published a consultation¹ on proposals to expand the Carbon Capture Readiness (CCR) requirements². Building on both the 2021 call for evidence³ and subsequent stakeholder engagement, the proposals sought to maximise the decarbonisation potential of new build and substantially refurbishing combustion power plants, and ensure the requirements keep pace with the emergence of new decarbonisation technologies.

The clean energy transition represents a huge opportunity to generate growth, tackle the cost-of-living crisis and make Britain energy independent once again. That is why the government has committed to decarbonise the power sector by 2030.

Making Britain a Clean Energy Superpower is one of the Prime Minister's five defining missions. There are two parts to this mission: delivering clean power by 2030 and accelerating delivery of net zero. Whilst we move forward at pace to deliver this mission, electricity demand is expected to increase, driven by heating and transport electrification. To meet this demand, renewables must be complemented by generation sources which can deliver power irrespective of calm or dull weather conditions. This includes flexible supply sources that can scale up or down instantaneously to meet peak demand and which, in contrast to short-duration flexibility such as batteries, can run for extended periods of low renewable production.

To support the transition to clean power, we will continue to rely on existing mature technologies as we urgently scale up low carbon alternatives. In the short term, this will include unabated gas capacity. We expect gas to run less and less, moving to a backup status as we transition to clean energy by 2030.

Following the 2023 consultation, we received responses from a range of stakeholders, including plant operators, original equipment manufacturers (OEMs) and trade associations. 29 responses were received in total with the proposals outlined in the consultation seeing broad support from respondents and support towards their implementation. We welcome the feedback received and will introduce the Decarbonisation Readiness (DR) requirements. DR will mean that any new gas generation needed to maintain security of supply must be built net zero ready. This means the plant operator must have a credible pathway to decarbonise by ensuring their plant is built in such a way that it can easily convert to either hydrogen-firing or retrofit carbon capture technology, within the plant's lifetime.

This government response summarises the responses received and sets out the government's final positions on the DR requirements. We will soon lay an affirmative statutory instrument in Parliament to amend the Environmental Permitting (England and Wales) Regulations 2016

¹ <https://www.gov.uk/government/consultations/decarbonisation-readiness-updates-to-the-2009-carbon-capture-readiness-requirements>

² <https://www.gov.uk/government/publications/carbon-capture-readiness-ccr-a-guide-on-consent-applications>

³ <https://www.gov.uk/government/consultations/decarbonisation-readiness-call-for-evidence-on-the-expansion-of-the-2009-carbon-capture-readiness-requirements>

(EPR)⁴. The requirements will come into effect for environmental permit applications submitted after 28 February 2026. Before this date, the Environment Agency (EA) will consult on and publish further guidance on how plant operators can demonstrate that the requirements have been met.

In summary, we will be legislating to:

1. Remove the 300 MW minimum capacity threshold at which the CCR requirements currently apply. This will remove the market distortion caused by the threshold and support the rapid decarbonisation of the electricity system by significantly widening the scope of the policy to ensure more combustion power plants have viable decarbonisation routes.
2. Move the requirements from the planning consent process to environmental permitting, which will be assessed by the EA. The environmental permitting regime provides greater flexibility for the requirements to be updated and amended more readily to reflect the rapidly developing technologies of hydrogen and CCUS. Furthermore, As the EA are already involved in the assessment of CCR requirements through offering views to the Planning Inspectorate, they have the technical expertise to assess the demonstration of DR.

By moving the requirements to the environmental permitting regime, we will also prevent the creation of a loophole whereby plant operators could avoid the requirements by returning to projects which have already been through planning consent but have since been abandoned – of which there are a large number. This would have the potential to significantly reduce the decarbonisation impact of the policy and create distortions in the market.

The scope of DR has been broadly aligned with the existing scope of environmental permitting for combustion power plants. Therefore, if a new or substantially refurbishing combustion power plant requires an environmental permit then it will most likely be required to meet DR requirements. Specific exemptions have been applied where it would not be proportionate to apply the requirements. These are detailed in the response below.

Enable combustion power plants to demonstrate DR through conversion to hydrogen firing, as well as power Carbon Capture Usage and Storage (CCUS) retrofit. To maximise the decarbonisation opportunities, plant operators will have the ability to choose which decarbonisation pathway best suits their individual circumstances. Four assessments for demonstrating Hydrogen Conversion Readiness (HCR) will be introduced which broadly reflect those for CCR. Plant operators will also be able to amend their chosen decarbonisation route.

3. Introduce HCR and CCR assessments which are proportionate to the developing nature of both Hydrogen to Power (H2P) and power CCUS and their necessary infrastructure, whilst ensuring all eligible combustion power plants have viable decarbonisation plans.

⁴ <https://www.legislation.gov.uk/uksi/2016/1154/contents>

Therefore, the economic feasibility assessment for both CCUS and hydrogen and the hydrogen fuel access and CO₂ transport and storage assessments will initially be self-certified.

4. Expand the generation technologies in scope of the DR requirements to include biomass, energy from waste (EfW) and combined heat and power plants (CHP). This will ensure alignment with broader decarbonisation policies for these technologies. Specific exemptions have been applied where it would not be proportionate to apply the requirements, and these are detailed in the response.
5. Include both new build and substantially refurbishing combustion power plant in scope and enable existing combustion power plants to voluntarily apply for a DR permit. We will align the definition of 'substantially refurbished' with that used in paragraph 1 of Schedule 24 to the EPR, with a minor change for the purposes of DR to ensure the 50% calculation only reflects investments in the combustion plant.
6. Introduce the requirements for permit applications for eligible combustion plant submitted after 28 February 2026. This will provide an opportunity for combustion power plants to secure appropriate environmental permits without policy change where investment decisions have already been taken. It will also enable the EA to consult on the permitting guidance and ensure industry have sufficient time to prepare before the statutory instrument comes into force.
7. Require plant operators to undertake a light touch review of their DR report every two years. This continues the plant operator review requirements in the CCR requirements and will support the rapid decarbonisation of the power sector by ensuring plant operators are regularly assessing the decarbonisation opportunities of their plant.
8. Include a regular government review of the DR requirements, to be undertaken at intervals not exceeding five years. This will ensure the requirements are meeting the government's power sector decarbonisation objectives and are fit for purpose. It will also enable the requirements to be updated to reflect the rapidly changing nature of the technologies which they cover.
9. Update the current tests and guidance for demonstrating CCR in line with technical and policy developments.

The Welsh Government will issue a separate response to the original 2021 Call for Evidence and outline next steps in respect of Wales. The positions and legislative changes outlined in this government response apply to England only. The current CCR requirements will continue to apply in Scotland and Wales.

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1 Introduction

1.1 Background

In July 2021, the UK Government and Welsh Government published a joint call for evidence seeking initial views on expanding the Carbon Capture Readiness (CCR) requirements⁵ to ensure all new build combustion power plants have a viable route to decarbonisation; make the requirements more flexible and simpler; provide a clear decarbonisation pathway for combustion power plants and keep pace with the evolving nature of decarbonisation technologies, in particular low carbon hydrogen. To reflect this update, it was proposed to rename CCR to “Decarbonisation Readiness” (DR).

In March 2023, the UK Government published a consultation⁶ based on the feedback from the call for evidence and further stakeholder engagement, in which it was proposed updated DR requirements. Two technical studies commissioned by government on “Hydrogen Readiness” and “Carbon Capture Readiness” were also published alongside the consultation⁷. This government response summarises the feedback received to the DR consultation and our final positions on the DR requirements.

1.2 Power System Decarbonisation

A clean, affordable and secure power system is essential for enabling economic growth and unlocking the path to net zero across transport, industry, and heating buildings.

The transition to a decarbonised power system presents huge opportunities for the UK, including creating thousands of new green jobs and bringing benefits for our security of supply by reducing our dependence on volatile global gas markets. However, it also presents new challenges as we move towards a more renewables dominated system, alongside an increase in electricity demand. Where system stress events were previously driven largely by events and outages which were independent of each other, in a future system, the nature of system stress is likely to become more complex and dependent on more volatile weather patterns (for example, extended periods of low wind and solar generation during cold winter days). This means that we are likely to see an increased risk of extended periods of system stress and larger reductions in output from these sources that will need to be balanced by others.

Providing the flexibility required to balance a predominantly renewables-based system will require a mix of flexible solutions to effectively balance supply and demand over short-duration and long-duration timeframes. Long duration flexible low carbon technologies such as Power

⁵ <https://www.gov.uk/government/publications/carbon-capture-readiness-ccr-a-guide-on-consent-applications>

⁶ <https://www.gov.uk/government/consultations/decarbonisation-readiness-updates-to-the-2009-carbon-capture-readiness-requirements>

⁷ <https://www.gov.uk/government/publications/decarbonisation-readiness-of-electricity-generators-technical-studies>

Carbon Capture Usage and Storage (Power CCUS), Hydrogen to Power (H2P) and Large Scale Long Duration Electricity Storage (LDES) will be essential for ensuring stability and security of electricity supplies during longer periods where renewable generation is not able to meet demand.

While LDES requires scaling up, other low carbon flexible technologies such as Power CCUS and H2P are relatively immature. It will take time for the technology readiness levels to increase, and the enabling hydrogen and CO₂ transport and storage infrastructure to deploy. Government has proposals and policies to support these technologies. These include the consultation on need and design for H2P market intervention⁸, which government will respond to this year. Alongside continuation of the Dispatchable Power Agreement (DPA) for Power CCUS⁹, and a design consultation for a LDES Cap and Floor support scheme¹⁰. However, deployment of low carbon long duration flexible technologies will take time and until it is complete we will continue to rely on unabated gas generating capacity, which will move to a backup role to maintain security of supply.

DR requirements are a key part of this transition and will ensure that plant operators have identified clear, no barriers decarbonisation routes for their new and substantially refurbishing combustion power plants to transition to low carbon alternatives - acting as a critical bridge between the high carbon combustion we need for the system in the short term and the decarbonised power system of the future.

The requirements for DR outlined in this document are intended to strike a balance between ensuring that new build and substantially refurbishing combustion power plants are built ready to take advantage of future decarbonisation opportunities, whilst recognising the nascent state of hydrogen and CCUS technologies and their enabling infrastructure. We expect DR to evolve in line with technological developments and government policies and is intended to act a signal to facilitate investment in, and the deployment of low carbon generation. This will minimise the risk of high carbon combustion power plants becoming stranded assets by ensuring they have plans to operate economically in a future power system. We intend to use the regular reviews of DR under Regulation 80 of the Environmental Permitting Regulations (EPRs) to assess the impact of DR and the case for strengthening the requirements at intervals not exceeding five years.

⁸ <https://www.gov.uk/government/consultations/hydrogen-to-power-market-intervention-need-and-design>

⁹ <https://www.gov.uk/government/publications/carbon-capture-usage-and-storage-CCUS-business-models>

¹⁰ <https://www.gov.uk/government/consultations/long-duration-electricity-storage-proposals-to-enable-investment>

1.4 Summary of responses to the consultation and changes to be implemented

We would like to thank everyone who responded to the consultation. In total, 29 responses were received from a range of stakeholders, including plant operators, original equipment manufacturers, and trade associations. The proposals were broadly supported by respondents.

Using the feedback received through the consultation, alongside further policy development, we have refined and finalised the proposals for the implementation of DR. This response summarises the feedback received and outlines the action government is taking.

We will lay a statutory instrument in Parliament to amend the EPRs. The requirements will come into effect for all eligible environmental permit applications submitted after 28 February 2026.

2 Scope of Decarbonisation Readiness

2.1 Defining Decarbonisation Readiness

Question 1

Do you agree with Government's proposal for the definition of "fully decarbonised"?

Question 2

What are your views on our proposals that eligible combustion power plants would be subject to Decarbonisation Readiness requirements unless they can demonstrate they have met the definition of being "fully decarbonised"?

2.1.1 Summary of responses

There were 23 responses to Question One, with the majority of respondents (13) supporting the government's proposed definition of "fully decarbonised". Six respondents disagreed with the proposed definition with several citing it was too narrow with a focus on hydrogen and CCUS, and that it excluded some potential forms of low carbon technologies such as ammonia-firing or a combination of low carbon technologies.

The main feedback provided by respondents was a request for greater clarity of what the government means by "fully decarbonised". Several respondents noted the term "fully decarbonised" risked appearing as 'greenwashing' as some plants would not strictly be fully decarbonised. For example, a 90% capture rate would still have residual CO₂ emissions. Several respondents also noted that the phrase "fully decarbonised" may not account for Power CCUS plant's emissions during start up. One respondent noted that some plants could utilise a number of technologies to achieve full decarbonisation which the proposed definition would not allow.

A number of EfW respondents questioned whether the definition for “fully decarbonised” would distinguish biogenic CO₂, noting that biogenic CO₂ should be considered low carbon.

2.1.2 Government response

The government recognises stakeholder feedback on the need for clarity in defining which plants are in scope of the DR requirements. Taking into consideration the feedback received through the consultation, we no longer intend to use the defined term ‘fully decarbonised’. As a result, we are not yet defining the point at which plants are considered to be decarbonised and therefore all eligible plants will not yet have an exit route out of the requirements.

For both HCR and CCR we are concerned that seeking to define the point at which a plant has ‘decarbonised’ whilst both sectors are still maturing may cause unintended consequences and distort the market by introducing inefficient incentives.

For example, we are aware that some forms of hydrogen generation equipment may currently, or in the near future, not be able to operate solely on hydrogen fuel and may require methane for aspects of the equipment’s operation. Therefore, defining 100% hydrogen firing at this stage of the technology’s development could limit the ability of plant operators to comply with the requirements. It could also risk introducing a new market distortion whereby plant operators may be incentivised to utilise less efficient generation equipment which is already capable of burning 100% hydrogen to avoid the DR requirements. This could limit the development of more efficient or larger generation equipment. Maximising the decarbonisation potential of hydrogen-firing will be important in reaching our power sector decarbonisation commitments we will continue to work closely with industry to transition to 100% hydrogen firing and develop a suitable definition.

Similarly, in regard to CCUS, creating a robust definition of what it means to be fully decarbonised is challenging and there is a risk that any definition might also allow for partial decarbonisation. Since the technology hasn’t been deployed and the First of a Kind (FOAK) Power CCUS plant is not yet operational, it’s premature to grasp the full implications of “fully decarbonised.” We intend to craft a precise definition once we’ve gained more expertise in the technology’s functionality.

In practice, plant operators will be required to continue to provide two-yearly reviews to the EA. We have committed to review the DR requirements up to every five years and we retain the option to review at any point within the five-year period. The definition to determine whether a plant is in scope of the requirements can be reviewed through this process and we will consider further a definition that reflects the real world operation of a hydrogen or CCUS plant to ensure its effectiveness as low carbon technologies mature. We believe that this is not an overly onerous requirement, and on balance that it is important to ensure the DR requirements don’t introduce unintended market distortions.

Regarding blends of hydrogen, ammonia and other defined low carbon fuel and methane, plants firing or intending to fire these fuels will remain in scope of DR requirements. Likewise, we are not minded to distinguish between fossil and biogenic CO₂. Government believes that whilst these options may be helpful in reducing some CO₂ emissions as the hydrogen and CCUS

infrastructure develops, allowing plant operators to demonstrate DR via these means, could mean that plant operators are not incentivised to maximise decarbonisation opportunities.

2.2 Objectives of Decarbonisation Readiness

Question 3

Do you agree with the three proposed objectives of the Decarbonisation Requirements?

2.2.1 Summary of responses

22 responses were received for Question Three with an additional six providing no comment. 13 respondents agreed with the objectives proposed, seven provided qualified support, and two respondents opposed.

A number of respondents noted that the question referenced three objectives with only two described in the consultation. Four respondents suggested an exemption from DR requirements be introduced for small scale combustion power plants running with low load factors.

A couple of respondents challenged whether the objectives to require all eligible combustion power plants to be built decarbonisation ready would result in conversions to low carbon operation. These respondents were concerned that the additional costs of compliance with DR requirements could not be passed through and may distort competition with plants built without DR requirements.

Several respondents requested that the “clear pathway” in the definition be aligned with the DR ‘no barriers’ approach.

2.2.2 Government response

We welcome the broadly positive feedback from respondents and acknowledge the miscommunication of there being three objectives referred to in Question Three. There are only two proposed objectives for DR.

Following consideration of the feedback, we will retain the two objectives for DR. However, we will make a slight adjustment to the first objective to ensure the wording aligns with the ‘no known barriers’ approach. Rather than ‘*provide plant operators with a clear pathway to decarbonise*’, the first objective will now be updated as follows:

1. To provide plant operators within scope of DR with the ability to demonstrate that there are ‘no known barriers’ to decarbonisation.

‘No known barriers’ will have the same meaning as it did in the CCR guidance¹¹. It means that applicants will be asked to demonstrate that there are no known technical or economic barriers which would prevent the installation and operation of their chosen CCUS or hydrogen

¹¹ <https://www.gov.uk/government/publications/carbon-capture-readiness-ccr-a-guide-on-consent-applications>

technologies. We do not intend to prescribe the detail of how technology is applied in individual cases but do expect that applicants will follow best practice as far as this knowledge is available and provide a reasoned justification of their choices. In doing so, DR is intended to require plant operators to carefully consider their future decarbonisation pathway.

The second objective as described in the consultation will be retained without amendment:

2. To minimise the risk of high carbon combustion power plants from becoming ‘stranded assets’, i.e. prematurely unable to operate economically because those plants were not adequately prepared for decarbonisation.

Furthermore, government will no longer seek to legislate for these objectives. Following further consideration, we believe retaining flexibility for the potential future evolution of the policy will be beneficial in a rapidly changing technical landscape. The objectives of DR will be considered as part of the statutory government review process outlined in section 3.2.

We are not minded to introduce exemptions for small plants running a limited number of hours per year. Introducing exemptions for plants operating on limited number of hours could introduce market distortions and gaming risks similar to the original 300 MW threshold for CCR. This could be a particular concern in future, where increasing renewable penetration is expected to result in lower load factors for flexible technologies¹² and would therefore be at odds with the power sector decarbonisation-driving objective of the DR requirements. As outlined in section 2.6, there are exclusions in place where government believes it would be disproportionate to apply the requirements, e.g. for plants operating for the purposes of back-up generation.

Government recognises that the DR requirements will place an additional burden on plant operators, however, we are satisfied these burdens are proportionate to the objectives of DR. They are also supported by a majority of consultation respondents.

2.3 The 300 MW threshold

Question 4

Do you agree with our proposal to remove the 300 MW threshold and to align the scope of decarbonisation readiness with the existing scope of environmental permitting for combustion power plants?

2.3.1 Summary of responses

There were 25 responses to Question Four. A majority of respondents were supportive of the removal of the 300 MW threshold and the alignment of the scope of DR with the existing scope of environmental permitting for combustion power plants. Many respondents stated that the 300 MW threshold was having a distortionary effect, and that any other threshold would cause the same issue, so it would be most effective to remove the threshold completely. A few respondents were concerned that removing the threshold entirely could create a disproportionate burden for

¹² <https://www.gov.uk/government/consultations/review-of-electricity-market-arrangements>

small scale energy projects. Some alternative suggestions were made, such as a lower threshold (e.g. 50 MW or 100 MW) or exemptions for certain technology or project types, such as those with a low environmental impact.

A number of respondents were concerned about the proposals only being implemented in England, and the risk of distortions being introduced due to misalignment with policies in Scotland and Wales.

2.3.2 Government response

In line with the majority view of stakeholders, we will remove the 300 MW threshold. We have noted the concerns about the proportionality of applying DR requirements to smaller plants. Smaller plants will be able to comply with the requirements in a less burdensome way, especially where standard rules permits are applicable. This will be covered in the EA's guidance and further details will be provided by the EA as part of their consultation on guidance for complying with the DR requirements, which will be held before the requirements come into effect on 28 February 2026.

Regarding alignment between England and Scotland, the Scottish Government acknowledges the responses to this consultation and will take these into account when considering devolved policy in this area. The draft Energy Strategy and Just Transition Plan¹³ sets out that the Scottish Government is opposed to the continued use of unabated fossil fuels to generate electricity in Scotland.

Regarding alignment between England and Wales, the Welsh Government is carefully considering the responses to the 2021 joint call for evidence on decarbonisation readiness. They will be issuing a response in due course, in line with the decarbonisation ambitions set out in their Net Zero Strategic Plan¹⁴.

The UK Government will continue to engage regularly with the devolved governments to understand the alignment between the respective policies and work to minimise any distortions.

2.4 New and refurbishing combustion power plants

Question 5

Do you agree with our proposals to include both new build and substantially refurbishing plant within scope of DR? What are your views on using the definition of “substantially refurbishing” from the environmental permitting legislation in the context of DR?

¹³ <https://www.gov.scot/publications/draft-energy-strategy-transition-plan/>

¹⁴ <https://www.gov.wales/welsh-government-net-zero-strategic-plan>

2.4.1 Summary of responses

There were 24 responses to Question Five. A large majority agreed with the proposals. A few requests were made for more details on exactly how the definition of ‘substantially refurbished’ would be applied.

2.4.2 Government response

In line with the majority view of respondents, we will take forward this proposal. However, following further consideration we will use an amended definition of Paragraph 1, Schedule 24 of the EPR to ensure that plants operators are not disincentivised to invest in low carbon technologies that are not directly related to electricity generation.

Paragraph 1 of Schedule 24 to the EPRs defines “substantially refurbished” as a *‘refurbishment the cost of which exceeds 50% of the investment cost for a new comparable energy plant.’* For DR we will use the definition:

‘a generator is “substantially refurbished” if the cost of refurbishing any of the combustion plant exceeds 50% of the investment cost for comparable new combustion plant.’

This approach reduces the risk that plant operators can avoid the DR requirement by gradually refurbishing individual parts of a plant and ensure that other related investments, such as the investment of an onsite hydrogen production plant are not inadvertently caught within this calculation.

In line with the ‘no barriers’ approach for DR, we have also included a derogation mechanism within the legislation to allow the EA to take a proportionate approach to existing combustion plant that cannot meet DR requirements. We envisage this only being needed for existing plants who meet the substantially refurbished threshold but have physical barriers to installing either hydrogen or CCUS equipment. This is important to ensure that plants which provide a critical service are not prevented from making refurbishments, particularly where they can make efficiency improvements and thereby reduce overall carbon emissions.

In all cases, the plant operator will be responsible for identifying the need for derogation to be considered and provide a reasoned justification. The justification would need to make clear why the plant cannot decarbonise with specific reference to:

- the location of the generator, or
- the technical characteristics of the generator.

Plant operators who wish to make changes to their combustion plant should agree whether it will constitute a substantial refurbishment with the EA at the permit pre-application stage.

2.5 Voluntary Decarbonisation Readiness

Question 6

Do you agree with enabling existing plants to voluntarily submit a DR report?

2.5.1 Summary of responses

There were 26 responses to Question Six. A large majority agreed that existing plants should be able to voluntarily submit a DR report. Respondents stated that it would be beneficial for companies to prove they satisfy all DR requirements, and it could help inform investors and plant operators of who is looking to access infrastructure in the future. One respondent said a voluntary report would encourage decarbonisation progress and provide the government with visibility of delivery.

There was some concern among respondents, including those who agreed with the proposal, that the EA would not have the resources to manage the additional workload. These respondents were concerned that the obligation to review voluntary reports may delay the EA's review of existing permit applications and requested that projects needed for energy security and net zero be prioritised.

2.5.2 Government response

As part of government's approach outlined in the Capacity Market (CM) Consultation¹⁵ on proposals to maintain security of supply and enable flexible capacity to decarbonise, published alongside this government response, the government is committed to developing clear decarbonisation pathways for unabated gas generation. We will allow existing plants to be able to voluntarily submit a DR report. This will be assessed by the EA, who will issue a DR permit to the plant operator if the tests are satisfactorily met.

The EA will assess a voluntary DR report as a 'variation of permit'. To support the EA in preparing their systems and capacity, DESNZ will provide transitional funding support to prepare their systems and capacity ahead of 28 February 2026. From this time the EA will charge an appropriate permitting fee to the plant operator in accordance with EA policies. This will ensure they have the necessary resources to regulate the additional applications.

Government views plant operators voluntarily applying for DR permits as a means of demonstrating the decarbonisation potential of their plant. This may be in support of an application to wider government support schemes and may potentially be incorporated into the proposals for managed exits from long-term CM agreements set out in the CM Consultation¹⁶ published alongside this government response, subject to wider security of supply considerations being met.

The conditions of a DR permit voluntarily entered into will not vary from a permit issued as part of a new build plant's development, and as such the plant operator will be subject to the same

¹⁵ <https://www.gov.uk/government/consultations/capacity-market-proposals-to-maintain-security-of-supply-and-enable-flexible-capacity-to-decarbonise>

¹⁶ <https://www.gov.uk/government/consultations/capacity-market-proposals-to-maintain-security-of-supply-and-enable-flexible-capacity-to-decarbonise>

requirements. Plant operators should, therefore, consider their need for, and future compliance with, the requirements of a DR permit prior to submitting a voluntary DR report.

2.6 Types of power plants covered by Decarbonisation Readiness

Question 7

Do you agree with our proposals to include biomass, EfW and CHP in DR?

Question 8

What are your views on including heat generation in DR at a later date?

2.6.1 Summary of responses

There were 25 responses to Question Seven. The majority of respondents agreed that biomass, EfW and CHP should be included in DR. However, there were some that disagreed. Those that disagreed had the following concerns:

- Several respondents pointed out that these technologies may have additional locational and spatial factors to consider, which could make it harder to comply with DR requirements. They cited the fact that CHP is often embedded in industrial areas, and EfW plants are located close to sources of waste.
- A few respondents noted that biomass and EfW have fewer decarbonisation options than other technologies as they cannot use alternative fuels and so are very reliant on CCUS technologies and business models being developed.
- A few respondents thought that it was not necessary to include these technologies as they were already relatively low in environmental impact, particularly sustainable biomass.
- Several respondents sought clarity on whether biofuels such as hydrotreated vegetable oil (HVO) and other liquid biofuels would be included or not.

There were 23 responses to Question eight. A large majority supported the inclusion of heat in DR, with several respondents asking for it to be included immediately. There were some concerns that including CHP in DR without similar requirements existing for heat plants would create a market distortion.

2.6.2 Government response

In line with the majority view of respondents, we will include CHP, EfW and biomass within the scope of DR requirements.

Regarding biomass, in the medium term, government will look to facilitate a transition away from unabated uses of biomass where possible to uses such as bioenergy with carbon capture and storage (BECCS). Including biomass in DR will help to support this.

The EfW sector is also preparing for rapid decarbonisation, and with the recently announced expansion of the UK Emissions Trading Scheme (UK-ETS) to waste incineration and EfW from 2028¹⁷, and the development of the Waste Industrial Carbon Capture Business Model, we believe EfW is a natural fit to be included in DR. We have engaged with DEFRA, who are supportive of the proposals and believe that they are consistent with the direction of travel for waste management policy and EfW.

Although overall waste-sector greenhouse gas emissions have declined in recent decades as waste has been diverted away from landfill, emissions from EfW have grown. There is a need to address EfW emissions as they are expected to form a significant portion of residual emissions within the power sector¹⁸. DEFRA have set a statutory target¹⁹ to ensure that the total mass of residual waste (excluding major mineral wastes) for 2042 does not exceed 287 kg per person. This is the equivalent of a 50% reduction from 2019 levels. This will ultimately limit the volume of potential waste feedstocks available for EfW. We are confident that the spatial DR requirements, will not affect the siting of certain applications of EfW or CCUS.

DR will apply to all combustion power plants that generate electricity and would already require an environmental permit. This covers all fuels, including biomass and biofuels such as HVO. There are a limited number of specific exemptions which are outlined in section 2.7 below. The scope of the technologies and fuels within the DR requirement is consistent with government's commitment to decarbonise the power system.

In line with the majority view on whether to include heat generation in DR at a later date, we are assessing the merits of expanding the DR proposals to also cover combustion plants that are used solely for the purpose of generating heat. To help make this assessment DESNZ has commissioned a technical economic study on whether to expand the scope of DR to include heat plants, which is considering options for electrification, hydrogen, carbon capture and biomass readiness. If this proposal is taken forward it may form the basis of another consultation as we look to support the decarbonisation of heat.

2.7 Exemptions from the Decarbonisation Readiness requirements and transitional arrangements

Question 9

Do you agree with our proposed approach to exemptions from DR requirements?

Question 10

Do you agree with our proposed approach to transitional arrangements for DR requirements?

¹⁷ <https://www.gov.uk/government/publications/uk-emissions-trading-scheme-long-term-pathway/the-long-term-pathway-for-the-uk-emissions-trading-scheme#we-will-explore-expanding-the-uk-ets-to-more-sectors-of-the-economy>

¹⁸ <https://www.gov.uk/government/publications/net-zero-strategy>

¹⁹ <https://www.legislation.gov.uk/uksi/2023/92/contents/made>

2.7.1 Summary of responses

There were 23 responses to Question Nine. The majority were supportive of the proposals, but some disagreed with certain exemptions, as follows:

- Several respondents disagreed with the proposal to exempt small waste incinerators (SWIPS), as this could be distortive i.e. create incentives for incinerators to reduce their size in order to avoid the DR requirements.
- A couple of respondents thought that all hazardous and clinical waste incinerators should be exempt.
- Several respondents noted the need to ensure that black start plants are exempt.
- One respondent thought that back-up plants at nuclear sites sized over 50 MW should be exempt (if these plants are sized below 50 MW, then they are already exempt from environmental permitting).
- One respondent was concerned with the proposed exemption of Anaerobic Digestion (AD) biogas plants that treat any wastes that are not farm wastes, as they thought there were already too many exemptions in this area.
- One respondent noted the need for specific exemptions for EfW research & development sites to prevent DR from creating a barrier to research and development.
- A couple of respondents noted that it could be helpful to be flexible and allow applications to be made to the EA for specific exemptions if it could be shown to be disproportionate to apply DR to a certain site.

There were 22 responses to Question 10. A majority of respondents were supportive of the proposal not to apply the DR requirements to new and refurbishing plants which have already been awarded CM agreements. However, many thought that the arrangements did not go far enough to cover all plants that have passed financial close, will be under construction at the time that the requirements are brought in, and that additional transitional arrangements would be required. Several noted that not all EfW plants under construction will have CM agreements. Similarly, others noted that plants built under National Grid contracts (such as black start) may not have CM agreements either. It was also pointed out that some sites may make a commercial decision to enter the CM after construction or operate on an ongoing merchant basis without a CM agreement.

Many respondents noted the long wait times for grid connections and the effect that this was having on construction timelines.

Several respondents provided suggestions on how to expand the transitional arrangements. These included linking the arrangements to whether a project had passed financial close, or reached a certain construction milestone, rather than to the CM.

2.7.2 Government response

Following consideration of the feedback received and further analysis of the exemptions within the EPR, we have made minor updates to the list of facilities which will be exempt from the DR requirements. This is to ensure that the requirements are applied proportionately and are in line with our energy security and net zero objectives.

The following specific full exemptions from DR (i.e. none of the DR requirements will be applied) will be implemented:

- All power plants firing only landfill gas. As set out in the consultation, we do not expect many or any new landfill gas plants to be built going forward, as biodegradable waste sent to landfill is expected to be nearly eliminated in the coming years, reducing landfill gas creation. Nonetheless, the exemption will ensure that DR does not create a barrier to such engines being newly constructed or substantially refurbished where it is viable to do so, in order to manage fugitive methane emissions.
- Power plants over 50MW (including multiple units aggregated over 50 MW) with a nuclear safety role. We agree with the respondent that these plants should be exempted from DR, as such plants that are below 50 MW are already exempt from environmental permitting.
- Anchor Plants (formerly known as Black start plants). Anchor plants play a unique and critical role in ensuring that the electricity system can recover from a total or partial shutdown of the national electricity transmission system. We agree with the respondents that it would not be proportionate to require anchor plants to be subject to the DR requirements.
- Small Waste Incinerators (SWIPS) that generate electricity. We will maintain the exemption for SWIPS, as proposed in the consultation. This is because the exemption is broadly consistent with the small emitter's threshold for the UK ETS (<25,000TCO₂epa)²⁰ and will ensure that burdens on local authorities are minimised. However, as part of the regular government reviews (section 3.2) we will review the impact of the SWIP exemption on the development of the sector and will consider bringing SWIPs within the DR requirements in future.
- Those used for back-up²¹ that are operated for the purpose of supplying power in the event of an on-site emergency and are tested for no more than 50 hours per year. These plants are not subject to any other environmental restrictions, so it would not be proportionate to apply DR to them.

Hazardous and clinical waste incinerators that generate electricity, will be included in DR. This will ensure alignment across our decarbonisation policies. The one exception is SWIPS, as they will fall under the SWIPS exemption. Exemptions for specific sites will not be considered as this

²⁰ [Developing the UK Emissions Trading Scheme: main government response \(publishing.service.gov.uk\)](https://publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/100000/developing-the-uk-emissions-trading-scheme-main-government-response.pdf)

²¹ A generator operated for the sole purpose of maintaining power supply at a site during an on-site emergency.

would be too burdensome for the EA, given the need to ensure that DR assessments are quick and efficient.

It should be noted that combustion power plants which are already exempt from environmental permitting will also be automatically exempt from DR. These are as follows:

- Those sized below 50 MW installed on an offshore platform, or a gas storage or unloading platform (Schedule 25A, Part 1, paragraph 2(1) and Schedule 25B, paragraph 2(2)).
- Those that are sized below 50 MW that are mobile, except where they are connected to electricity transmission or distribution networks (Schedule 25A, Part 1, paragraph 2(1) and Schedule 25B, paragraph 2(2)).
- Those sized below 1 MW that do not have a CM agreement or an agreement to provide balancing services (Schedule 25B, paragraph 2(1)) unless forming part of an aggregated specified Generator (Schedule 25B, paragraph 2(1)(c)).
- Those operating with a defined nuclear safety role under a nuclear site licence issued by the Office for Nuclear Regulation (Schedule 25B, paragraph 2(2) and Schedule 25A).
- Small anaerobic digestion biogas plants used to treat waste, under the T24 and T25 waste exemptions.

Regarding transitional arrangements, we recognise that the currently proposed arrangements do not go far enough to capture all plants under construction that have passed financial close. To ensure fairness across all technology and contract types, instead of basing the implementation date for DR on the date that a plant was 'put into operation' and putting in place a transitional arrangement for the CM, we will change the implementation date for DR for all plants to be based on the date that the plant's permit application was made.

This will be set as 28 February 2026, i.e. DR will apply to all permit applications made for eligible new and substantially refurbishing plants after this date. This will ensure that there is time for plants which have passed financial close to make their applications before the deadline, thus preserving investor confidence. It will also provide time for EA to consult with stakeholders and produce guidance before any DR applications are required. This will achieve greater fairness across all plant and contract types as compared to the previous approach. We have consulted with the EA about a potential increase in applications around the cutoff date. They are confident that they will be able to manage any increase in applications that may arise.

2.8 Environmental permitting and planning

Question 11

Do you have any comments on our proposal to move the DR requirements to the environmental permitting regime?

Question 12

How do you see the proposed changes impacting the planning system (Nationally Significant Infrastructure Projects (NSIP) and/or Town and Country Planning Act (TCPA) regimes), including decision, and plan-making?

2.8.1 Summary of responses

There were 23 responses to Question 11. Overall, there were mixed views on implementing DR through environmental permitting. Many respondents recognised the benefits that implementing through the environmental permitting regime would bring, including a reduced burden on local authorities, and the ability to update and review the requirements more easily. However, many respondents were also concerned about the EA's resourcing and backlog of environmental permitting work. Some requested that the EA make a commitment on how long DR reviews will take.

There were concerns raised about the risk of misalignments and confusion or duplication between the environmental permitting regime and planning, as DR requirements will need to be accounted for in planning applications, which can't always be obtained in parallel to environmental permits. Several respondents requested clarity on how the EA would work with local planners and DESNZ to ensure alignment between planning and permitting processes. Respondents also requested clear and early guidance from the EA on DR requirements, to reduce risk of misalignment.

Some respondents were concerned about the potential for DR requirements to change retroactively through permit reviews. Several respondents requested that the requirements be guaranteed after the initial approval.

There were 15 responses to Question 12. Respondents highlighted the risk that introducing DR into environmental permitting could result in misalignment, duplication or delays between environmental permitting and planning, particularly if not sought in parallel. Some thought that a greater level of co-ordination would be needed between local planners or DESNZ and the EA going forward, to manage DR, as well as clear guidance from the EA.

2.8.2 Government response

We welcome comments from stakeholders on the implementation route for DR. We will implement the policy through environmental permitting and align the scope of DR with the existing scope of environmental permitting. This will mean that plants which would already require an environmental permit will be required to meet DR requirements (subject to exemptions, as set out in section 2.6).

Moving the requirements from planning to the environmental permitting regime will allow the EA to update and amend the requirements more readily, as technology and policy develops. It will also prevent the creation of a loophole in which plant operators could avoid the requirements by returning to previously abandoned projects that have already received planning consent. This could diminish the impacts of DR and distort the market for developers.

Regarding resourcing, DESNZ has agreed to provide the EA with transitional funding support to prepare their systems and capacity ahead of 28 February 2026. From this time the EA will be funded through the standard permitting regime. Moreover, as set out in Section 2.2, the EA will implement the DR assessments in a proportionate manner. For example, DR assessments will be less burdensome for smaller plants, especially where standard rules permits are in place.

Regarding alignment between planning and permitting, plant operators should reflect relevant permitting policy in their planning or development consent applications to identify and address potential planning issues arising from decarbonisation considerations. They should also ensure they follow relevant consultation procedures.

To support plant operators in this process, the EA will produce clear guidance and will engage closely with planners during the planning and permitting application processes to minimise the risk of misalignment. We note that there are already considerations which cut across both regimes e.g., stack height, and that these are already managed by operators, planners and the EA.

2.9 Appeals process

Question 13

Do you agree with our proposed approach to DR appeals?

2.9.1 Summary of responses

There were 18 responses to Question 13. A large majority agreed with our proposed approach to DR appeals. However, there were some concerns over additional resourcing pressures it could add to the EA.

Two respondents suggested that appeals need to be handled in a timely way to avoid delay to projects. Two responses suggested the approach to appeals should be kept under review, particularly in the early stages and in case there are a significant number of appeals or delays.

One respondent said government should consider potential impacts of divergence in the application of EPR as it could complicate the application process and reduce investor confidence. Another respondent raised concern that it may result in market distortions between devolved authorities.

2.9.2 Government response

To minimise the introduction of additional regulations, we will not introduce further appeals processes beyond those outlined in Chapter 5 of Part 2 of the EPR 2016. The existing appeals process for the EPR has shown to be effective and we believe should be sufficient for DR.

We will also be able to review the appeals process through the government review of the DR requirements to ensure they remain fit for purpose (see Section 3.2).

3 Reviewing Decarbonisation Readiness

3.1 Regular reviews of Decarbonisation Readiness permits

Question 14

Do you agree with the proposal for developers of eligible plants to submit update reports every two years from the start of their combustion power plant's operations? What are your views on what the report should cover?

3.1.1 Summary of responses

There were 22 responses to Question 14. Some agreed with the proposal, but the majority disagreed. Ten respondents said the review period was too frequent with suggestions that a three or four-year timescale would be more appropriate. Five-year intervals were also suggested.

A number of respondents agreed that two years would be manageable and would help inform the government's decision making on hydrogen and CCUS but suggested ways of ensuring that it did not become too burdensome. Three respondents suggested that a streamlined review process be developed to minimise administrative burden and to ensure reviews are done quickly and efficiently. One respondent suggested reporting by exception, for example, if conditions for the plant had changed instead would minimise the regulatory burden. Similarly, another respondent suggested that the report should be non-compulsory if it is just an update to understand how the market is changing.

Recommendations on what the report should cover were:

- Measures that the best available technology has been incorporated in the plan
- Assessment of any changes to development near the project since the last report
- Commercial assessment of implementing technology such as feasibility study or preliminary Front-End Engineering Design pre-FEED
- Technical and economic feasibility
- Stage of project with actual performance in terms of carbon to date against initial/previous projection and a projection for the coming two- and four-year periods
- Changes in technical and economic conditions since the previous review
- Operating conditions that influence the carbon performance of the plant and individual proposals to support decarbonisation
- For CCUS – a review of chosen transport and storage options based on developments in networks
- For hydrogen – a review of the developing hydrogen producing market and associated transport and storage infrastructure

- Proof of engagement or discussion with regional infrastructure providers and relevant authorities
- A technology review based on BAT guidance
- An update of economic test based on relevant authority publications

3.1.2 Government response

We welcome the feedback from respondents. As outlined in the CM consultation²² published alongside this government response, government is committed to creating pathways to ensure unabated gas plants can decarbonise as and when the enabling low carbon infrastructure expands to support the transition to a decarbonised power system.

Regular reviews to reevaluate the decarbonisation potential of high carbon plants will be valuable in supporting plant operators to regularly assess and identify decarbonisation opportunities and in delivering the transition. Government recognises the administrative burden that regular reviews place on both operators and the EA, so our approach strikes a balance between managing additional burden and incentivising decarbonisation. We will continue with the current CCR requirements of a light touch assessment by plant operators of their plant's decarbonisation potential every two years after the start of the plant's operation.

The plant operator's review will assess the plant's decarbonisation potential, and the suitability and effectiveness of the plant operator's chosen decarbonisation pathway. It will also assess whether any new barriers to decarbonisation have been identified, or whether any alternative decarbonisation pathway may be more appropriate. Government will work with the EA to develop the guidance as to what the review should cover and to ensure the requirements and charges are proportionate.

The effectiveness of the regular reviews by plant operators can be considered as part of the reviews by government of the DR requirements.

3.2 Government review of Decarbonisation Readiness policy

Question 15

Do you agree with our proposal for a regular review of Decarbonisation Readiness requirements as part of any review carried out and report published under regulation 80 of the Environmental Permitting Regulations 2016?

²² <https://www.gov.uk/government/consultations/capacity-market-proposals-to-maintain-security-of-supply-and-enable-flexible-capacity-to-decarbonise>

3.2.1 Summary of responses

25 responses were received for Question 15, with a further four respondents providing no comments. The overwhelming majority of respondents (20) were in favour of the approach, with one opposed, and four expressing support conditional on changes to the review timeframes.

Several respondents felt that five years was too large a gap between reviews and encouraged shorter review periods of between two and three years. Respondents also expressed support for the requirement for government to review the DR requirements to be legislative in order to provide confidence to industry.

3.2.2 Government response

Government welcomes the supportive feedback to the proposals, and we recognise the need for regular reviews to reflect the rapidly developing technology and economics of H2P and Power CCUS, as well as the rapid policy development necessary to fully decarbonise the power sector.

We will introduce a regular review mechanism to the DR requirements through regulation 80 of the EPR. Regulation 80 provides that reviews should be taken at intervals not exceeding five years.

We believe this timeline should provide enough time for the first permits to be issued and lessons to be learnt. This approach also allows for flexibility within the reviews to enable government to respond effectively to a rapidly evolving landscape. Government expects that the late 2020s to be formative in the rapid technological development of H2P and Power CCUS technology and when initial deployment of these plants is expected.

Government anticipates that the first review will cover the following considerations, but we expect that the review will evolve to reflect additional considerations as the policy is implemented.

- How has DR performed against its objectives?
- Do the DR objectives remain appropriate?
- Does the legislation remain appropriate?
- Should the economic tests for hydrogen and/or CCUS readiness be assessed by the EA?
- Should the hydrogen fuel access test be assessed by the EA?
- Should the CO₂ Transport and Storage test be assessed by the EA?
- The costs of implementing the policy, as compared to the forecasted costs.
- Whether additional pathways to demonstrate decarbonisation readiness should be introduced alongside HCR and CCR.

The EA will also review their guidance on an ongoing basis to ensure that it remains up to date and reflects the latest technological developments.

4. Hydrogen Conversion Readiness

This section summarises responses to Questions 16 to 21 of the consultation, which covered our proposal for the demonstration of HCR.

4.1 Hydrogen Space Requirements

Question 16

Do you agree with our proposed outline for a hydrogen readiness space requirement test?

4.1.1 Summary of responses

We received 18 direct responses to Question 16. Nine respondents explicitly agreed with the proposal for plants to set aside space for their chosen decarbonisation route, as opposed to the route requiring a larger amount of space. Respondents supported our proposed position that decarbonisation using carbon capture requires more space than would be needed for hydrogen conversion.

Respondents highlighted that if a plant is not designed for hydrogen from the start, it can result in significant outage time. One respondent also commented that the regulatory guidance needs to be published to provide clarity on what space requirements will look like.

Four respondents referred to the uncertainty around the technological advancements in hydrogen and therefore uncertainty regarding the specific additional equipment that will be required for different generating plants. One respondent also noted that it is not clear if the space required will be needed to be scaled by plant size.

4.1.2 Government response

We welcome the positive response and will introduce a hydrogen space assessment as part of DR. Projects selecting the HCR route will be required to demonstrate that they have set aside suitable space to facilitate future conversion to hydrogen firing. Plant operators will be required to set aside adequate space for additional equipment needed for hydrogen combustion, both internally and externally, to accommodate their chosen hydrogen technology. The space set aside should also align with the plant's plans for accessing hydrogen. For example, if a plant operator is planning to store and/or produce hydrogen on site, the plans should demonstrate space has been set aside to meet this need. Alternatively, if plants are expecting to access hydrogen through a network, then space will need to be set aside for relevant pipework.

We are mindful that space requirements will vary from plant to plant. As outlined in section 2.2, we will be taking a 'no barriers' approach in which applicants will be asked to demonstrate that there are no known barriers which might prevent installation or operation of their chosen

technology. This provides plant operators with the flexibility to utilise the best information available at the time and provide a reasoned justification for their choices and conclusions.

The EA will set out more detail on what information should be included in an applicant's assessment within their guidance. We intend for this information to be reviewed as part of the proposed DR reviews to ensure it keeps pace with technological development and remains helpful for developers and assessors.

4.2 Hydrogen technical feasibility

Question 17

Do you agree with our proposed outline for a hydrogen technical feasibility assessment?

4.2.1 Summary of responses

We received 21 direct responses to Question 17. 12 respondents agreed with the approach set out. Three respondents noted explicitly the need for certainty on requirements for demonstrating the test. One respondent raised that this is particularly important given the proposed move to the permitting regime and the fact that DR requirements need to be considered at the initial stages of a project, and therefore if this is not clear, could lead to risk of planning applications having to be revisited. Seven respondents raised the need for or welcomed industry engagement in developing the technical checklists which will be used for demonstrating the test. One respondent mentioned that the technical checklist developed by the EA should include Health and Safety requirements that burning hydrogen as a fuel will introduce, including on-site production, off-site supply, transport and storage.

4.2.2 Government response

We welcome the positive response and will introduce a hydrogen technical feasibility test as part of the proposals. We think it is important that eligible new build and substantially refurbishing combustion power plants are configured in such a way that future technical works to convert to hydrogen firing are as straightforward as possible and that there are no known technical barriers.

The EA will set out a technical checklist covering what is necessary to satisfy this requirement. The checklist will be informed by our hydrogen readiness technical study²³. We don't intend for the EA's guidance to include health and safety requirements. Plant operators should give consideration to any regulatory requirements regarding health and safety. For example, hydrogen storage of more than five tonnes is covered by the Control of Major Accident Hazards Regulations 2015²⁴ (COMAH).

²³ <https://www.gov.uk/government/publications/decarbonisation-readiness-of-electricity-generators-technical-studies>

²⁴ <https://www.legislation.gov.uk/ukxi/2015/483/contents/made>

4.3 Hydrogen fuel access

Question 18

Do you agree with our proposed outline for a hydrogen fuel access assessment, and our proposal to make it non-mandatory to pass in the short-term?

4.3.1 Summary of responses

We received 22 direct responses to Question 18. 17 respondents either supported or partly supported the proposal. Four respondents raised that whilst they understand that passing a fully comprehensive fuel access test would have significant barriers, there should be high level pass criteria as plans for fuel access could provide learnings to underpin and assist the development of hydrogen infrastructure.

Two respondents raised that the fuel access test will be tied to or duplicated by the economic feasibility test because production, transport and storage of fuel will impact cost and economic feasibility. Two respondents also noted the lack of certainty on whether hydrogen infrastructure will reach certain locations, due to the fact that the development and route of future hydrogen networks is out of the generators control in many cases. They noted that by awarding “decarbonisation ready” status to these plants which may not end up accessing hydrogen in the future, there is a risk of continuing to lock in fossil fuels.

One respondent noted that future reviews of this access assessment are appropriate, although any future mandate applying retrospectively to existing plants will not be appropriate. Two respondents disagreed with the proposal that the HCR Transport & Storage (T&S) test would be non-mandatory whilst the Carbon Capture Readiness T&S test is mandatory, as this provides a perverse incentive, and that there are similar uncertainties in both H2 and CO2 infrastructure.

4.3.2 Government response

We welcome feedback on Question 18, including points on the potential value of a high level pass criteria. Following feedback from stakeholders through the consultation, and further policy development, we have reconsidered the delivery of our policy for the hydrogen fuel access test. We have done so in line with our no barriers approach and in recognition of the short-term uncertainty of locations and rollout of low carbon hydrogen transport and storage infrastructure.

Our updated approach is that the EA will no longer assess the hydrogen fuel access test. When submitting their permit application, plant operators who choose the HCR decarbonisation route will be required to include a ‘hydrogen fuel readiness certification’ statement as part of their decarbonisation readiness report. This will be a statement that the operator has reasonable grounds to believe that it will be possible, during the lifetime of the relevant plant to ensure access to a sufficient supply of hydrogen. This reflects the nascency of the current hydrogen infrastructure and the likelihood of significant changes in the growth of the market in the coming years.

However, government encourages plant operators to consider how they will ensure sufficient supply of hydrogen that meets the Low Carbon Hydrogen Standard (LCHS)²⁵ as part of the hydrogen fuel access assessment. For example, plant operators should consider whether the plant would be located sufficiently close to a low carbon hydrogen supply cluster or production site.

As part of their guidance, the EA will provide more detail on what applicants should consider as part of their hydrogen fuel readiness certification. We would expect plant operators to consider issues such as the planned route for hydrogen access, including whether they propose to use pipeline or non-pipeline transport methods or whether they would seek to produce hydrogen on-site. Similarly, the hydrogen fuel readiness certification statement should align with the regulated requirements regarding space and technical feasibility.

We believe this approach strikes the correct balance between ensuring plant operators have thought about how they are able to access hydrogen in their siting decisions, whilst not preventing viable projects from coming forward due to uncertainty in current market conditions. We will review this position at the next statutory review. We will not retrospectively alter the requirements for those plants which already hold a DR permit.

4.4 Hydrogen economic feasibility

Question 19

Do you agree with our proposed outline for a hydrogen economic feasibility assessment, and our proposal to make it non-mandatory to pass in the short-term?

4.4.1 Summary of responses

There were 20 direct responses to Question 19. 14 respondents supported our proposals, and one partly supported. Two respondents noted that the economics of a plant can vary between periods of time due to different market conditions, power prices and running hours. It was also raised by one respondent that an economic feasibility study may prove challenging in the absence of a market price for hydrogen and that the development of a successful, full-length value chain will be critical in ensuring conversion to hydrogen is economically feasible. Two respondents raised the importance of criteria or trigger points for when these non-mandatory tests will become mandatory would be valuable, as it would provide stability and improve investability for plant operators.

4.4.2 Government response

Following feedback from stakeholders through the consultation, and our ongoing work with the EA, we have reconsidered the delivery of our policy for the economic feasibility test. We have

²⁵ <https://www.gov.uk/government/publications/uk-low-carbon-hydrogen-standard-emissions-reporting-and-sustainability-criteria>

done so in line with our no barriers approach and in recognition of the uncertainty of future technology costs.

In line with the approach for the hydrogen fuel access test, the economic feasibility test will also not initially be assessed by the EA. When submitting their permit application, plant operators who choose the HCR decarbonisation route will be required to include a hydrogen economic feasibility self-certification statement. This will be a statement that the operator has reasonable grounds to believe that it will be economically feasible for the relevant generator to —

- (a) be converted to the use of hydrogen as the primary source of fuel during the lifetime of the relevant generator, and
- (b) use primarily that fuel.

The EA will include further details on the factors that plant operators should consider when making their economic feasibility statement as part of their guidance. We expect to review whether the requirement should be assessed as part of the statutory reviews of DR.

4.5 Hydrogen firing capability

4.5.1 Summary of responses

Question 20

Do you agree with Government's proposal to require all eligible new build or substantially refurbishing combustion power plants which opt to meet DR requirements through hydrogen conversion to also have to demonstrate capability of burning 100% hydrogen if they are put into operation after 1 Jan 2030?

There were 20 direct responses to Question 20. 11 respondents were supportive of the proposals. Two stated that the 2030 date should be earlier. One respondent stated it should be later as there are significant activities and timelines prior to putting a plant into operation - project development, procurement, obtaining investment decisions, gaining planning & permitting permissions as well as construction time. These steps can easily span several years and therefore the proposal effectively sets a deadline much earlier than 2030.

Four respondents noted that it is premature to set a date as no proven 100% hydrogen firing technology is available on the market. Two respondents requested further clarity on what is meant by 'demonstrate capability', e.g., whether this capability could be demonstrated by the Original Equipment Manufacturer (OEM) as opposed to the operator.

It was also raised by one respondent that any 100% hydrogen turbines that are available in the run up to 2030 will be First of a Kind (FOAK) and carry a significant cost premium over a competitive Combined Cycle Gas Turbine (CCGT) plant. One respondent noted that the phrase 'put into operation' is both open to gaming and seemingly impractical, on the basis it may be difficult to take action if a plant states it will be put into operation before 1st January 2030 and then ultimately cannot begin operations before that date. It was also raised by one respondent

that it should be a mandatory requirement to demonstrate CCUS-retrofit capability as an optional way to decarbonise these plants in order to protect consumer and taxpayer interests and to guard against CO₂-emission-lock-in.

Question 21

Do you agree with Government's position of not requiring demonstration of plants' capability of burning a blend of hydrogen?

There were 18 responses to Question 21, of which 16 were supportive of the proposal. One respondent noted that before considering this proposal, a decision needs to be taken by government on blending hydrogen into the gas grid as this could impact if you need plants to demonstrate capability of burning a blend.

4.5.2 Government response

We welcome the responses we received to Questions 20 and 21. Following consideration of the feedback received alongside further policy development and stakeholder engagement, we will not proceed with either of the proposals.

In the consultation, we acknowledged the need for any new requirement to be in line with when hydrogen combustion units are likely to be available from manufacturers. Based on the latest evidence and feedback from the consultation, it is unclear when a wide range of hydrogen combustion units capable of burning 100% hydrogen will be readily available. As such, government is concerned that continuing with this requirement could risk preventing new combustion power plants from coming forward after 2030. Moreover, it may also risk introducing market distortions limiting the development of a range of hydrogen combustion units and potentially incentivising plant operators to build smaller, less efficient plants, in order to meet the 100% hydrogen-firing requirement.

Government still believes that 100% hydrogen firing combustion units will be needed in order to maximise the decarbonisation of the power sector, and we expect technology readiness levels for hydrogen to power to develop at a rapid pace over the coming years. To ensure the requirements keep pace with the development of the market, we will review this position at intervals not exceeding five years and consider whether introducing a similar requirement would support the development of the hydrogen to power market.

In regard to blending, government does not believe it would be helpful to require plants to demonstrate hydrogen blend capability from the initial point of operation. Whilst some plant operators may choose to utilise a blend of hydrogen with natural gas as a stepping stone to eventually switch to 100% hydrogen firing, government is committed to ensuring plant operators transition to 100% firing where possible. To that aim, government believes it is more appropriate to allow plant operators to choose their own decarbonisation route as the hydrogen economy develops.

Blending hydrogen into the gas grid is a separate consideration. Government has taken a strategic policy decision to support blending of up to 20% hydrogen by volume into GB gas

distribution networks in certain circumstances, should blending be enabled²⁶. Government will consider safety evidence from industry trials and assess whether blending can be used safely in the GB gas distribution networks. Government is also assessing separately whether to support blending into the GB gas transmission networks. Power plant owners and developers will need to consider the potential impact of this and future blending policy separately to DR.

5 Carbon Capture Readiness

This section summarises responses to Questions 22 and 23 of the consultation, which covered our proposal for the demonstration of CCR. The consultation sought views on the four tests we have developed to demonstrate CCR, which includes updates from the existing 2009 Carbon Capture Readiness requirements.

5.1 Overall proposals for CCR

Question 22

Do you agree with our overall proposals for CCR? In your answer please also outline whether you agree with the proposed changes to the technical feasibility test, economic feasibility test, and the space requirement?

5.1.1 Summary of responses

Question 22

There were 20 responses to Question 22. 16 respondents agreed with the proposals for CCR. Two respondents stated no overall opinion and two respondents stated their disagreement with the proposals. Responses in agreement included statements that overall, the CCR proposals are proportionate, and broadly sensible, but multiple respondents requested minor changes or further clarity on specific elements.

Many respondents requested that the guidance documents supplied by the EA should be developed in close collaboration with industry and any other relevant stakeholders. Some respondents noted that clear guidance is needed on the level of detail required to complete the economic feasibility test, and that this test should still be meaningful while still non-mandatory to pass.

Many respondents said that Capture as a Service (CaaS) should either: be included as an option with DR; be included as a bespoke option on a case by case basis; be included for retrofitting EfW plants that have insufficient space; and that government should set out a pathway and

²⁶ <https://assets.publishing.service.gov.uk/media/657a0a82254aaa0010050cde/hydrogen-blending-strategic-policy-decision.pdf>

timelines for its inclusion. Some of these respondents noted the challenges of including CaaS with EPR.

Multiple respondents stated their support for the flexible approach to the space requirement, whereby plant operators can demonstrate reasoned justification for deviating from the reference space information in the guidance documents. They also said that the reference information will need to be updated as the technology develops. A couple of respondents requested clarity in the case of developing a small plant on the site of a bigger plant that has already demonstrated CCR.

A range of responses were received in relation to the proposed capture rate limit for the CCR technical feasibility test. Further information is included in the summary of responses to Question one.

Of the respondents that disagreed with our proposed updates to CCR, one respondent stated that they are too simple, and do not guarantee that assessed plants will later be able to retrofit carbon capture technology. They said that plant operators should be required to do a carbon capture retrofit engineering feasibility study. The other respondent in disagreement said that they were not robust enough to prevent underperformance of the plant against the 90% carbon capture rate threshold.

5.1.2 Government response

We welcome the support for the proposed updates as outlined in our consultation and continue to believe that the updated requirements are meaningful and proportionate. We will work with the EA to ensure stakeholders are engaged productively throughout the development of DR guidance.

Following feedback from stakeholders through the consultation, and our ongoing work with the EA, we have reconsidered the delivery of our policy for the economic feasibility and transport and storage tests. We have done so in line with our no barriers approach and in recognition of the uncertainty of future technology. Plant operators will now be required to include an economic feasibility certification statement and a storage feasibility certification statement as part of their application. In line with the approach for HCR, these tests will now be self-certified. We believe that this strikes the right balance between ensuring plant operators are required to consider and actively plan their future decarbonisation pathway, whilst not prohibiting new projects due to uncertainty in current market conditions. We intend to review this position at the next review of DR.

We have considered Capture as a Service²⁷ within DR but will not specifically provide for it at this stage. The provision of CaaS presents significant challenges to the application of the space requirement, as well as other parts of DR policy and its function in EPR. If the developer is the 'lead emitter', or if the developer proposing a CaaS solution can meet the requirements by setting

²⁷ A CaaS solution is the provision of one capture plant, operated by a CaaS Group, third party or potentially a lead emitter, for abatement of CO₂ from multiple emitters in one area.

aside suitable space, then this may form a permissible solution under DR. Where a site does not have suitable space set aside, but instead relies upon space set aside by a different party, this would not meet the requirements. This approach will avoid projects breaching their permit if the space were to be 'set aside' but then repurposed by another party during the lifetime of the plant. We recognise that CaaS may represent a desirable decarbonisation option in certain circumstances, including for small emitters, and so will review this position at the next review of DR.

We will maintain our policy of allowing developers to demonstrate evidenced variation from the reference space information provided by the EA, as guided by our technical study. Finally, we believe that new unabated plants on the same site of abated plants can meet the requirements by demonstrating extra capacity for transport of CO₂ or space set aside for capture plant expansion.

5.2 Transport and storage test

Question 23

Do you agree with our proposed updates to the transport and storage test?

5.2.1 Summary of responses

There were 20 responses to Question 23. Respondents generally engaged on specific areas of the test rather than discussing the main addition of the second route by demonstrating connection to a CO₂ T&S network. 11 respondents said that they either agree or partially agree with the proposed updates, and two respondents said they disagreed before citing specific parts of the policy they did not agree with.

Many respondents disagreed that road and rail remained excluded from the updated transport and storage test. These respondents said that: information on road, and specifically rail, is sufficiently mature that it be assessable; industry are already developing proposals for rail transport; and excluding road and rail creates a barrier to certain projects in urban areas or remote sites. Respondents also asked what information the EA required in order to be able to assess road and rail, requested a forward timeline for inclusion if it would not be taken forward, and another respondent said that the omission created a perverse incentive to opt for the hydrogen readiness route. A few respondents also proposed that road and rail be included on a case-by-case basis, and another stated that it should be an option when a regional T&S network is not available. In contrast, one stakeholder did explicitly state their agreement with the proposed position on non-pipeline transport and the proposals to review this position as the sector develops.

Multiple respondents requested that usage, including for permanent storage should be an option within DR. A few respondents requested that international storage of CO₂ should be eligible. A

few respondents requested a transparent review of the re-use potential of onshore pipeline assets. One respondent said the T&S test should be non-mandatory to pass.

Of the two respondents in general disagreement, one stated that they did not agree with the proposals because of the lack of inclusion of road and rail as a transport option. The other said that the test represents a box ticking exercise without a more detailed study, and that once more storage areas and networks are available then the exercise would be more appropriate.

5.2.1 Government response

We welcome the support for the proposed updates to include a second route in the transport and storage test, whereby developers can identify a suitable CO₂ transport and storage network to connect with.

Government recognises the importance of remote emitters being able to access CO₂ transport and storage networks. We consider that the capacity for T&S networks to be able to accept CO₂ from dispersed or distant sites and international sources by non-pipeline transport (NPT) will be important for achieving our long-term decarbonisation objectives. We are continuing to engage with industry in order to understand the arrangements necessary to enable non-pipeline transport of CO₂. For DR, we will not specify the mode of transport in the regulations, as is consistent with the approach taken in the CCR.

Shipping is included in existing guidance, and we expect the EA to update this information in consultation with stakeholders and with reference to our completed technical study²⁸. We recognise the views of stakeholders and will support the EA to develop a checklist of content that plant operators should consider, including forms of non-pipeline transport (including road and rail) where shipping or pipeline transport is not feasible and/or sensible.

5.3 Carbon Capture Readiness final proposals

This section recaps our final proposals for CCR. Taking on board the feedback received through Questions 22 and 23 we will introduce a Carbon Capture Readiness route as part of the Decarbonisation Readiness requirements consisting of four tests (technical feasibility, space requirement, CO₂ transport and storage, and economic feasibility). Plant operators will need to complete all four tests.

We do not intend to make provision for CO₂ usage in the legislation or guidance at this stage and our position remains the same as in our consultation. Usage that does not result in the permanent storage of CO₂ is not compatible with the objectives of DR at this time. Usage that results in permanent storage has been considered, but we are not taking this forward as an option at this stage. This decision was taken due its impact on the T&S test, the relative lack of technological development and research of alternative forms of permanent storage where a

²⁸ <https://www.gov.uk/government/publications/decarbonisation-readiness-of-electricity-generators-technical-studies>

product is created from CO₂ for use, and specifically the lack of information on the monitoring of these uses to ensure that this CO₂ storage remains permanent.

We believe that CO₂ usage (that results in permanent storage) generally aligns with the principles of DR and may be an economic option in the future, particularly where facilities are not located in a CCUS Cluster or have access to a NPT network. We therefore intend to evaluate this position at the next review of DR. Any future proposal would also need to carefully consider how meaningful any submitted solution would be, given that it may nullify many of the requirements of the currently proposed T&S test.

Government is aware of the quickly evolving opportunities that CO₂ usage may present a range of sectors. It should be clear that the requirements of the CCR route will ensure plants have no known barriers for CO₂ permanent storage, rather than mandating any particular decarbonisation route or preventing deployment of innovative CO₂ usage solutions that may offer decarbonisation and wider benefits in the future.

Test 1 – Technical feasibility test

Capture plant proposals where 'best available techniques' (BAT) applies will be required to be capable of achieving BAT to pass. For example, a gas plant using post-combustion carbon capture (PCC) using amine-based technology should be designed to achieve a CO₂ capture rate of at least 95%, during normal operating conditions²⁹. Where alternative CO₂ capture technologies are proposed, developers would follow the relevant BAT reference document (BREF) note and where available, the technical guidance for activities that don't have BAT conclusions. Any proposals below 90% capture rate of CO₂ generated by the facility would not pass the test.

Expanded guidance will be provided by the EA on what information is required to satisfy this requirement for different plants, including smaller projects. Our technical study has informed the revision of a technical checklist that the regulator will use to develop guidance to aid assessment of submissions.

Test 2 – Space requirement test

Plant operators will be required to demonstrate that they have set aside suitable space to facilitate the retrofit of a carbon capture plant that can achieve capture rates defined in the technical feasibility test. The technical guidance will provide indicative space requirements, but applicants can provide reasoned justification for deviation based on their individual circumstances and chosen capture technology. As deployment of carbon capture technology accelerates, we expect applications would include stronger evidence to support their submitted space requirement if it differs significantly from the indicative information, especially in the case of larger projects.

²⁹ <https://www.gov.uk/guidance/post-combustion-carbon-dioxide-capture-best-available-techniques-bat>

Our technical study has provided information that will support the assessment of submissions. This study presented indicative data for plants using an amine-based capture technology. This indicative information will be reviewed under the regular review of DR to ensure it keeps pace with technological development and remains helpful for both developers and assessors.

Test 3 – CO₂ transport and storage test

The CO₂ transport and storage test will now initially not be assessed. When submitting their application, the plant operator must make a statement that they have reasonable grounds to believe that it will be technically feasible, during the lifetime of the relevant generator, for the relevant amount of CO₂ captured to be transported (including by way of non-pipeline transport methods) to a named storage site for disposal by way of permanent storage.

As part of their statement, plant operators should:

- (a) identify an North Sea Transition Authority (NSTA) licensed area for deep geological storage of captured CO₂ and demonstrate that a feasible route exists from the proposed power plant to the storage area, or
- (b) identify a suitable area of deep geological storage offshore for the storage of captured CO₂ from the proposed power plant and demonstrate that a feasible route exists from the site to the storage area, or
- (c) identify a suitable CO₂ transport and storage (T&S) network to connect with, to facilitate the onward transport and storage of CO₂ from the proposed power plant and demonstrate that a feasible route exists from the site to the T&S network.

To understand the technical feasibility of either T&S option, we expect developers to consider the technical operability of the chosen T&S solution, factoring in expected running patterns of the power plant.

In order to demonstrate identification of a suitable CO₂ transport and storage network to connect with, we expect developers to collate evidence of how they have communicated with, or endeavoured to communicate with, the respective T&S Company (T&SCo). In this communication, we expect developers and the T&SCo to investigate their connection, and the future potential for provision of storage capacity. A T&S network identified in option c) should be considered 'suitable' once the T&S network meets the requirements of option b), from the point of connection to store. This makes T&S networks at a relatively early stage of development eligible but ensures parity between the T&S pathways. By creating parity, this would avoid developers evidencing a direct route to store, when a T&S network under development has already completed more investigation of a suitable T&S solution and is therefore a more reasonable option.

We expect that as CO₂ transport and storage networks around the UK develop, identification of how a combustion power plant might connect to a T&S network may become a more appropriate approach for many plants in the future. Developers could update their chosen transport corridor

and/or destination if a more economically or technically efficient alternative transport and storage solution becomes available.

Test 4 – Economic feasibility test

The CO₂ economic feasibility test will now be self-certified. When submitting their application, the plant operator will be required to make a statement that the operator has reasonable grounds to believe that it will be economically feasible for the relevant generator to—

- (a) be connected to a qualifying complete CCUS system during the lifetime of the relevant generator, and
- (b) operate whilst connected to that system.

As this test is now self-certified it will not be assessed by the EA. However, the EA will include further details on the factors that plant operators should consider when making their economic feasibility statement as part of their guidance. We expect to review our position on this assessment as part of the statutory reviews of DR.

List of respondents to the consultation

The consultation received a total of 29 responses from a range of stakeholders, including plant operators, original equipment manufacturers, and trade associations. One response was from a member of the public.

Organisation
Association for Decentralised Energy (ADE)
BUUK Infrastructure
Centrica
American Coalition for Clean Coal Electricity (CCUSA)
EDF Energy
Energy UK
Enfinium Ltd
E.ON
ESA
Flexible Generation Group (FGG)
Forsa
General Electric Power
Hill Green Energy
Hydrogen UK (HUK)
MSC charitable foundation
NG transmission
North London Waste Authority
Offshore Energies UK (OEUK)
PYREG UK (as agent for Pyreg GmbH)
RWE Generation UK

Scottish Power
Sembcorp
Siemens Energy
SSE
Suez
The Association for Renewable Energy & Clean Technology
Uniper
Veolia

Glossary

Acronym	Meaning
AD	Anaerobic Digestion
BAT	Best Available Techniques
BECCUS	Bioenergy with Carbon Capture and Storage
BREFs	Best Available Techniques Reference Documents
CaaS	Capture as a Service
Capex	Capital Expenditure
CCGT	Combined Cycle Gas Turbine
CCR	Carbon Capture Readiness
CCUS	Carbon Capture Usage and Storage
CHP	Combined Heat and Power
CHPQA	Combined Heat and Power Quality Assurance Programme
CM	Capacity Market
CMU	Capacity Market Unit
CO ₂	Carbon Dioxide
COMAH	Control of Major Accident Hazards Regulation 2015
CPS	Carbon Price Support
DESNZ	Department for Energy Security and Net Zero
DEFRA	Department for Environment, Food and Rural Affairs
DPA	Dispatchable Power Agreement
DR	Decarbonisation Readiness
EA	Environment Agency
EfW	Energy from Waste

EPR	Environmental Permitting (England and Wales) Regulations 2016
ETS	Emissions Trading Scheme
FEED	Front End Engineering Design
FOAK	First of a Kind
H ₂	Hydrogen
H2P	Hydrogen to Power
HCR	Hydrogen Conversion Readiness
LDES	Large Scale Long-Duration Electricity Storage
LCHS	Low Carbon Hydrogen Standard
NPT	Non-Pipeline Transport
NSIP	Nationally Significant Infrastructure Projects
NSTA	North Sea Transition Authority
OEM	Original Equipment Manufacturer
PCC	Post-Combustion Carbon Capture
REMA	Review of Electricity Market Arrangements
SWIPs	Small Waste Incineration Plants
T&S	Transport and Storage
T&SCo	Transport and Storage Company
TCPA	Town and Country Planning Act

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