Subsidy Advice Unit Report on the proposed Hydrogen Production Business Model subsidy scheme

Referred by the Department for Energy Security and Net Zero

01 November 2023

Subsidy Advice Unit

Part of the Competition and Markets Authority

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1. Introduction

1.1 This report is an evaluation prepared by the Subsidy Advice Unit (SAU), part of the Competition and Markets Authority, under section 59 of the Subsidy Control Act 2022 (the Act).

1.2 The SAU has evaluated the assessment of compliance from the Department for Energy Security and Net Zero (DESNZ) of the Hydrogen Production Business Model (HPBM) scheme with the requirements of Chapters 1 and 2 of Part 2 of the Act (the Assessment).[1]

1.3 This report is based on the information provided to the SAU by DESNZ in its Assessment and evidence submitted relevant to that Assessment.

1.4 This report is provided as non-binding advice to DESNZ. The purpose of the SAU's report is not to make a recommendation on whether the scheme should be implemented, or directly assess whether it complies with the subsidy control requirements. DESNZ is ultimately responsible for making the scheme, based on its own assessment, having the benefit of the SAU's evaluation.

1.5 A summary of our observations is set out at section 2 of this report.

The referred scheme[2]

1.6 The HPBM scheme is designed to incentivise the production and use of low carbon hydrogen. The HPBM will be delivered via the Low Carbon Hydrogen Agreement (LCHA), a contract signed between a government counterparty and a low carbon hydrogen producer. The HPBM will provide support payments to a low carbon hydrogen producer, over a 15-year contract term, towards the costs of hydrogen production and a return on capital invested. DESNZ aims to award the first contracts to electrolytic hydrogen projects in Q4 2023 and to hydrogen projects enabled with Carbon Capture, Usage and Storage (CCUS-enabled) in 2024.

1.7 The key design features of the scheme include:

(a) Beneficiaries must be a UK registered business of any size. The first allocation rounds are limited to CCUS-enabled projects, where a hydrogen production facility deploys CO2 capture technology when producing hydrogen from natural gas, and electrolytic projects that use low or zero-

[1] Chapter 1 of Part 2 of the Act requires a public authority to consider the subsidy control principles and energy and environment principles before deciding to give a subsidy. The public authority must not award the subsidy unless it is of the view that it is consistent with those principles. Chapter 2 of Part 2 of the Act prohibits the giving of certain kinds of subsidies and, in relation to certain other categories of subsidy creates a number of requirements with which public authorities must comply.
[2] Referral of Hydrogen Production Business Model Scheme by the Department for Energy Security and Net Zero

carbon electricity to split water to produce hydrogen and oxygen. Subject to limited exceptions, only new build low carbon hydrogen projects including new capacity added to an existing facility will be eligible.[3]

(b) Separate allocation processes are used for CCUS-enabled and electrolytic projects. These include checking projects against eligibility criteria and ranking them according to pre-determined evaluation criteria. Subsequently, projects must pass due diligence before being able to commence LCHA negotiations with DESNZ.

(c) The HPBM will only subsidise qualifying volumes, ie volumes sold to qualifying offtakers[4] and that meet the required standards setting a maximum threshold for the amount of greenhouse gas emissions allowed in the production process. Producers can sell non-qualifying volumes but they will generally not be subsidised for them. Exports are non-qualifying for the HPBM.

(d) The subsidy will be paid out through three separate cashflows, with two additional cashflows applying only to CCUS-enabled projects:

(i) Cashflow 1: the variable premium aims at protecting against price risk, ie the risk that the price the producer achieves for selling hydrogen does not cover the cost of producing it. It covers the difference between the Strike Price and the Reference Price. The Strike Price is intended to represent the price of a unit of hydrogen a producer needs to achieve to cover hydrogen production costs, including financing costs. It will be negotiated on a project-by-project basis and will be based on eligible costs and internal rate of return. The Reference Price is intended to reflect the hydrogen market price and, in the absence of a market benchmark, is based on the Achieved Sales Price, with a floor at the natural gas price. If the Achieved Sales Price exceeds the Strike Price, the producer must pay the counterparty the difference.

(ii) Cashflow 2: the Price Discovery Incentive is aimed at incentivising sales at higher price, thus minimising the size of the overall subsidy. It is a bonus payment to producers for raising their Achieved Sales Price above the floor price, providing producers 10% of the value that the producer has sold at above the Reference Price, representing 10% of the reduction in the subsidy.

(iii) Cashflow 3: the Sliding Scale Top Up Amount provides higher payments per unit of hydrogen if offtake volumes unexpectedly fall. This

[3] Full eligibility criteria are set out in Referral of Hydrogen Production Business Model Scheme by the Department for Energy Security and Net Zero. - GOV.UK (www.gov.uk)
[4] The party who buys the product being produced by the project or uses the services being sold by the project.

payment provides a protection against volume risk, ie the risk that the producer is unable to sell enough volumes of hydrogen to cover their costs, and only covers unexpected demand drops. DESNZ explained that if sales volume falls to zero, no subsidy will be received, and DESNZ has purposely not introduced an availability payment[5] as this would reduce the incentive for the producer to grow its customer base and would expose taxpayers/consumers to paying a producer for not delivering a product.

(iv) Cashflow 4 (only applicable for CCUS-enabled projects): this cashflow will provide CCUS-enabled producers a protection to mitigate CO2 transport and storage (T&S) risk. The payment in lieu of hydrogen sales provides producers with a reduced Strike Price in case of a T&S outage event. Carbon Cost Protection (CCP) allows time limited protection to producers that require support to cover increased UK Emissions Trading Scheme (ETS) liability costs during an outage period to fulfil their offtaker's demand for hydrogen.

(v) Cashflow 5 (only applicable for CCUS-enabled projects): the HPBM will cover the CO2 T&S costs charged to CCUS-enabled producers for use of the CO2 network. CO2 T&S charges linked to both qualifying and non-qualifying volumes will be covered but not exported hydrogen volumes.

1.8 Electrolytic projects can jointly apply to the HPBM and to CAPEX grant funding from the Net Zero Hydrogen Fund.[6]

SAU referral process

1.9 On 15 September 2023, DESNZ requested a report from the SAU in relation to the HPBM scheme.

1.10 DESNZ explained[7] that the HPBM is a scheme of Particular Interest because it allows for the provision of one or more Subsidies of Particular Interest to be given.[8] In particular, under the HPBM scheme, a single beneficiary may receive more than the SOPI threshold of £10 million.

[5] A payment based on a hydrogen production facility's production capacity regardless of sales.
[6] A £240m fund to support the upfront costs of developing and building low carbon hydrogen production projects. Referral of Net Zero Hydrogen Fund Scheme by the Department for Energy Security and Net Zero - GOV.UK (www.gov.uk)
[7] In the information provided under section 52(2) of the Act.
[8] Within the meaning of regulation 3 of The Subsidy Control (Subsidies and Schemes of Interest or Particular Interest) Regulations 2022 which sets out the conditions under which a subsidy or scheme is considered to be of particular interest.

1.11 The SAU notified DESNZ on 21 September 2023 that it would prepare and publish a report within 30 working days (ie on or before 1 November 2023).[9] The SAU published details of the referral on 21 September 2023.[10]

[9] Sections 53(1) and 53(2) of the Act.
[10] Referral of Hydrogen Production Business Model Scheme by the Department for Energy Security and Net Zero. - GOV.UK (www.gov.uk)

2. Summary of the SAU's observations

2.1 The Assessment is drafted in line with the four-step process described in the Statutory Guidance for the United Kingdom Subsidy Control Regime (the Statutory Guidance) and as reflected in the SAU's Guidance on the operation of the subsidy control functions of the Subsidy Advice Unit (the SAU Guidance).

We consider that DESNZ has conducted a good quality Assessment and has appropriately considered the scheme's compliance with the subsidy control principles. In particular, we found that the Assessment reflects the following positive features:

(a) It follows closely the steps set out in the Statutory Guidance. Notably, it considers the impact of the scheme on competition and investment in detail, including all aspects in Annex 2 of the Statutory Guidance that provides public authorities methods to consider distortive impacts of subsidies. It also largely covers the points set out in the analytical chapter of the SAU Guidance (chapter 4);

(b) It explains the policy options that DESNZ considered when designing the scheme, sets out the benefits and limitations for each option, and explains the reasons for choosing specific options over others, including why the scheme has been designed in separate strands and how it sets out certain criteria for eligible projects;

(c) It also engages well with negative feedback received from stakeholders, explaining how it was taken into account when designing the scheme. Finally, it recognises that DESNZ will learn through experience and will keep certain options under review;

(d) It positions the scheme well within wider government policies to support hydrogen production, and it sets out the scale of expected deployment through the scheme compared to the overall hydrogen and Net Zero targets, and;

(e) It references supporting evidence well and clearly, helping the SAU to evaluate the extent to which DESNZ's statements were supported by evidence.

2.2 We found that the Assessment could however have benefited from a more detailed explanation of how the CCP complies with Principle B of the energy and environment principles including by outlining the legal framework underpinning the ETS and providing more explanation as to why hydrogen producers would not be able to manage the financial burden of increased ETS payments through their

commercial arrangements, as well as the relevance of the CCP to the delivery of the policy objective.

2.3 Our report is advisory only and does not directly assess whether the scheme complies with the subsidy control requirements. The report does not constitute a recommendation on whether the scheme should be implemented by DESNZ. We have not considered it necessary to provide any advice about how the proposed scheme may be modified to ensure compliance with the subsidy control requirements.[11]

[11] Section 59(3)(b) of the Act.

3. The SAU's evaluation

3.1 This section sets out our evaluation of the Assessment, following the four-step framework structure used by DESNZ.

Step 1: Identifying the policy objective, ensuring it addresses a market failure or equity concern, and determining whether a subsidy is the right tool to use

3.2 The first step involves an evaluation of the Assessment against:

(a) Principle A: Subsidies should pursue a specific policy objective in order to (a) remedy an identified market failure or (b) address an equity rationale (such as local or regional disadvantage, social difficulties or distributional concerns); and

(b) Principle E: Subsidies should be an appropriate policy instrument for achieving their specific policy objective and that objective cannot be achieved through other, less distortive, means.[12]

Policy objectives

3.3 The Assessment states that the policy objective of the HPBM is to incentivise the production and use of low carbon hydrogen through the provision of time limited revenue support to assist with achieving the UK's legally binding 2050 Net Zero target.

3.4 Our view is that the policy objective is focussed, relevant, and has been clearly set out and explained. DESNZ has used relevant evidence to support its conclusion that low carbon hydrogen will be essential for meeting the Net Zero target, including the Climate Change Committee's (CCC) Carbon Budget 6 (CB6) advice[13] and the Hydrogen Analytical Annex to the UK Hydrogen Strategy.[14]

Market failure

3.5 The Statutory Guidance explains that market failure occurs where market forces alone do not produce an efficient outcome. The most common cases of market failure which are relevant to subsidy control occur when at least one of the

[12] Further information about the Principles A and E can be found in the Statutory Guidance (paragraphs 3.18 to 3.42) and the SAU Guidance (paragraphs 4.7 to 4.11).
[13] Sixth Carbon Budget - Climate Change Committee
[14] Hydrogen analytical annex (Department for Business, Energy & Industrial Strategy)

following features is present: the existence of externalities; the involvement of public goods; or imperfect or asymmetric information.[15]

3.6 The Assessment identifies the following market failures:

(a) Coordination failures, whereby investment and supply are suppressed in the absence of demand, which DESNZ argues will remain low unless supply (availability) increases and hydrogen prices (in relation to alternative fuels) fall. The scheme aims to overcome this issue by reducing the price gap between hydrogen and natural gas, encouraging consumers to switch to hydrogen, stimulating demand and a viable market that will encourage investment by producers.

(b) Investment uncertainty whereby 'first movers' in the production and consumption sides of the market bear significant learning costs and risks, which may benefit future producers and consumers. As a result, the Assessment argues, these first movers may not capture the full benefits of their investment. Investments by first movers may therefore result in positive externalities for later entrants to the market for which the HPBM aims to compensate.

(c) Negative externalities. The Assessment argues that low carbon fuels, including hydrogen, are at a competitive disadvantage due to the social cost of emissions (a negative externality) not being captured in the market price for high carbon fuels.

3.7 We consider that the Assessment sets out and explains well a range of market failures preventing the production and use of low carbon hydrogen at scale, providing relevant detail and evidence.

Consideration of alternative policy options and why the scheme is the most appropriate and least distortive instrument

3.8 In order to comply with Principle E, public authorities should consider why the decision to give a subsidy is the most appropriate instrument for addressing the identified policy objective, and why other means are not appropriate for achieving the identified policy objective.[16]

3.9 The Assessment sets out several existing or alternative policy options that were considered. These options were (i) utilising and amending existing funds (ii) tax incentives aimed at encouraging investment (iii) higher carbon prices and an

[15] Statutory Guidance, paragraphs 3.21-3.32.
[16] Statutory Guidance, paragraphs 3.40-3.41.

extension of the UK ETS[17], and (iv) improving existing technologies and assets. The Assessment concludes that these options would not efficiently address market barriers related to hydrogen deployment.

3.10 The Assessment then sets out why the HPBM was deemed the most effective means to achieve the policy objective, detailing that it provides sufficient revenue certainty to producers, enables the size of the subsidy to adjust as the market evolves, provides more flexibility than other approaches and bears similarities to the Contracts-for-Difference,[18] which was used to incentivise investment in renewables energy.

3.11 The Assessment also considers other forms of business model that were considered and the reasons they were considered less effective at achieving the policy objective. These include an alternative offtaker-led model and alternative options to the contractual approach, setting the reference price and providing price support and volume support. The alternative forms considered are further discussed in Step 3 of the Assessment.

3.12 In our view, the Assessment demonstrates that several policy options for achieving the policy objective were considered and the arguments in favour of the chosen model are well-reasoned. DESNZ provided relevant evidence in support of its conclusions, including an independent report which examined the ability of several policy options to achieve the policy objective and the outcome of a consultation which gathered market feedback on the design of the scheme.

Step 2: Ensuring that the subsidy is designed to create the right incentives for the beneficiary and bring about a change

3.13 The second step involves an evaluation of the assessment against:

(a) Principle C: First, subsidies should be designed to bring about a change of economic behaviour of the beneficiary. Second, that change, in relation to a subsidy, should be conducive to achieving its specific policy objective, and something that would not happen without the subsidy; and

(b) Principle D: Subsidies should not normally compensate for the costs the beneficiary would have funded in the absence of any subsidy.[19]

[17] The UK Emissions Trading Scheme (ETS) is a cap-and-trade system which caps the total level of greenhouse gas emissions, creating a carbon market with a carbon price signal to incentivise decarbonisation. Participants in the scheme are required to obtain and surrender allowances to cover their annual greenhouse gas emissions.
[18] A Contract for Difference, as set out in the Energy Act 2013, is a contract between a generator and a counterparty to encourage the generation of low carbon electricity whereby the counterparty will pay an electricity generator the difference between the CfD reference price and the CfD strike price.
[19] Further information about the Principles C and D can be found in the Statutory Guidance (paragraphs 3.43 to 3.57) and the SAU Guidance (paragraphs 4.12 to 4.14).

Counterfactual assessment

3.14 In assessing the counterfactual, the Statutory Guidance explains that public authorities should assess any change against a baseline of what would happen in the absence of the subsidy (the 'do nothing' scenario').[20] This baseline would not necessarily be the current 'as is' situation (the 'status quo') but what would likely happen in the future – over both the long and short term – if no subsidy were awarded.

3.15 The Assessment argues that a 'do nothing' scenario would be the continued use of fossil fuels, which has the lowest costs to currently produce high carbon (grey) hydrogen. This scenario would not result in decarbonisation and therefore would not help the UK to achieve its legally binding Net Zero targets.

3.16 The Assessment also considered a 'do minimum' scenario to decarbonise based on electrification, importing hydrogen and CCUS technology. Electrification was deemed as the best Net Zero option next to low carbon hydrogen but relying on external analysis, the Assessment sets out that electrification would not deliver the same benefits in terms of carbon reduction and air quality impact compared to hydrogen, thus not sufficient to meet Net Zero targets.

3.17 DESNZ satisfactorily explained why they chose the counterfactuals, as ones that exclude subsidy but considers how the market could develop in the absence of subsidising the production of low carbon hydrogen, while still pursuing the UK Government's obligations to achieve Net Zero. However, in the counterfactual, DESNZ has not considered that some existing producers of hydrogen may begin to produce low carbon hydrogen to compete, as the market develops to one based on low carbon hydrogen. In doing so, DESNZ might have been able to estimate the additional amount of hydrogen that would have been produced as a result of the subsidy.

Changes in economic behaviour of the beneficiary

3.18 The Statutory Guidance sets out that subsidies must bring about something that would not have occurred without the subsidy.[21] In demonstrating this, public authorities should consider the likely change or additional net benefit.

3.19 The Assessment notes that the purpose of the HPBM is to make low carbon hydrogen cost competitive and affordable to incentivise offtakers to switch from high carbon alternative fuels. The Assessment recognises that there are market barriers to a change in economic behaviour, notably because producing and selling low carbon hydrogen is currently more expensive than for high carbon fuel

[20] Statutory Guidance, paragraphs 3.46-3.47.
[21] Statutory Guidance, paragraph 3.50.

alternatives. Consequently, in the absence of government intervention via a subsidy, it is unlikely that hydrogen producers would choose to invest in new low carbon hydrogen production facilities.

3.20 The Assessment clearly sets out the expected change in economic behaviour of the HBPM beneficiaries. It relies on a financial model which, although based on preliminary projections that are subject to change, demonstrates that the impact of future high carbon prices and the incentive provided by the HPBM subsidy should influence a change in behaviour of producers; to shift their current revenue generating activities to low carbon hydrogen, as the UK hydrogen market becomes increasingly prominent as an energy source from 2028 when the UK Government expects CCUS technology to be deployed.

3.21 The Assessment also notes that successful projects will contribute to the Government's ambition of up to 2GW of hydrogen capacity in construction or operation by 2025, the 2030 10GW ambition, and the 2050 Net Zero target. It also provides some evidence of estimated costs for projects and associated hydrogen volumes sold. In our view, whilst this evidence gives only part of the picture, it partly explains how the size of the scheme is sufficient to attract projects that may otherwise not happen, and the extent to which this change of behaviour will contribute to achieving the policy objectives.

Additionality assessment

3.22 According to the Statutory Guidance, 'additionality' means that subsidies should not be used to finance a project or activity that the beneficiary would have undertaken in a similar form, manner, and timeframe without the subsidy.[22] For schemes, public authorities should also, where possible and reasonable, ensure that the scheme's design can identify in advance and exclude those beneficiaries which it can be reasonably determined would likely proceed without subsidy.[23]

3.23 The Assessment explains that the HPBM will only finance new-build hydrogen production facilities or new capacity added to an existing facility. The Assessment further states that, during negotiations, projects are required to submit extensive data and evidence to support the level of subsidy that they are requesting, and that effective selection criteria embedded within the selection process ensure that contracts are providing additionality and that the crowding out of private investment is minimised.

3.24 In our view, the evaluation criteria in the Annexes provided are extensive and would be sufficient to assess additionality and to demonstrate that the HPBM will

[22] Statutory Guidance, paragraphs 3.49-3.53.
[23] Statutory Guidance, paragraph 3.55

not finance a project or activity that would have been undertaken in a similar form, manner and timeframe without a subsidy.

3.25 DESNZ further explained that, whilst the scheme will support certain capital expenditure costs engaged prior to the giving of the subsidy, it was necessary to provide these additional elements to stimulate investment and to allow projects to be operational in time with the scheme's schedule. The Assessment explains that projects would spend this at their own risk, to avoid delays, expecting a high likelihood that the subsidy would be forthcoming. The Assessment also explains that the scheme will cover certain operating spend associated with storage infrastructure, but that these costs are not associated with the day to day running of the business (such as wages or rents) and that storage is an intrinsic part of the production process.

3.26 We consider that DESNZ has clearly demonstrated and evidenced that these features are significant factors in making the investment decision and therefore comply with additionality.

3.27 The Assessment also explains that, while certain projects will receive support through both the Net Zero Hydrogen Fund and the HPBM, the HPBM scheme has been designed not to cover costs already covered under the NZHF, and therefore avoid double compensation.

Step 3: Considering the distortive impacts that the subsidy may have and keeping them as low as possible

3.28 The third step involves an evaluation of the assessment against:

(a) Principle B: Subsidies should be proportionate to their specific policy objective and limited to what is necessary to achieve it; and

(b) Principle F: Subsidies should be designed to achieve their specific policy objective while minimising any negative effects on competition or investment within the United Kingdom.[24]

The nature of the instrument

3.29 The Assessment covers alternatives to revenue support payments for hydrogen producers, including revenue support to hydrogen users and obligations on fuel suppliers or offtakers to supply or consume a certain quantity of hydrogen. Referencing supporting evidence, the Assessment concludes that these

[24] Further information about the Principles B and F can be found in the Statutory Guidance (paragraphs 3.58 to 3.93) and the SAU Guidance (paragraphs 4.15 to 4.19).

alternatives would be more complex and unlikely to provide sufficient confidence to invest compared to producer-focussed revenue support.

3.30 The Assessment submits that alternative ways of designing revenue support for hydrogen producers were considered, including alternative delivery mechanisms and alternative commercial designs for the HPBM. Referencing supporting evidence, the Assessment concludes that the chosen delivery mechanism and commercial design would be more likely to achieve the desired objectives.

3.31 Importantly, whilst the majority of respondents to the HPBM consultation support the proposed design, the Assessment submits that some stakeholders disagreed and recognises that measures beyond the business model will be needed to support hydrogen deployment. However, to achieve the policy objective of incentivising the production and use of hydrogen, DESNZ considers 'the HPBM to be the most appropriate and least distortive form of instrument.'

The breadth of beneficiaries and the selection process

3.32 The Assessment outlines that beneficiaries will be chosen through an allocation process, made up of various stages. The Assessment notes that a price-based competition was ruled out due to, among other things, the nascency of the sector. However, the Assessment submits that Government is aiming to move to a price competitive allocation process in future.

3.33 The Assessment describes in detail the separate allocation processes for electrolytic and CCUS-enabled hydrogen producers, including eligibility and evaluation criteria for projects. In order to create competitive tension and further reduce cost to government, DESNZ is short listing more projects than will be awarded a HPBM contract. The Assessment further submits that DESNZ is considering expanding the eligibility criteria of future rounds to potentially include other production technologies.

The size of the subsidy

3.34 The Assessment outlines in considerable detail the individual cashflows of the HPBM, showing how these were designed with the aim of keeping the subsidy to the minimum necessary and proportionate (see Introduction). These include the Variable Premium design (see Cashflow 1 in the Introduction) and the Price Discovery Incentive (see Cashflow 2 in the Introduction) alongside several other mechanisms that, amongst other things, also have the aim of protecting Government from overcompensation.

The timespan over which the subsidy is given

3.35 The Assessment submits that alternative durations were considered, but that various factors including consultation responses, precedent from similar schemes (eg Contracts-for-Difference) and wider objectives led DESNZ to choose a 15-year timeframe. The Assessment clarifies that adjustments to future contract lengths may be made to reflect the expected reduced reliance of the market on the HPBM.

The nature of the costs being covered

3.36 Whilst not explicitly discussed under Step 3, the Assessment includes material that covers the section of the Statutory Guidance dealing with the nature of the costs being covered. DESNZ has submitted that HPBM has been designed as a revenue support scheme to reduce the cost of hydrogen to bring it more in line with high carbon alternatives (see Introduction), with the aim of encouraging users to switch to hydrogen.

The performance criteria/monitoring and evaluation

3.37 The Assessment states that the LCHA includes several monitoring, reporting and verification undertakings with respect to all volumes produced and sold to verify compliance with key obligations under the agreement and ensure accurate payment. Producers also must provide evidence on the development status of their production facility with the aim of ensuring that subsidies are paid out to producers that are fit for operation.

3.38 The Assessment also outlines longer term plans to establish a monitoring and evaluation framework for the hydrogen policy space that will track the implementation and impact of the scheme.

Ringfencing

3.39 The Assessment did not expressly refer to this point in the Statutory Guidance. Whilst the Assessment could have considered any relevant contractual conditions in this regard and/or considered whether the potential for the subsidy to ‘leak’ into and cross-subsidise activities in other product markets exists, we consider that given the subsidy size is closely linked to hydrogen production (see Introduction), the risk of cross-subsidisation is low.

International trade and investment

3.40 The Assessment raises potential consequences for the domestic UK market and markets in other jurisdictions from not subsidising exports. It discusses potential impacts of not restricting the export of hydrogen-derived products through the LCHA. The Assessment also outlines impacts of the HPBM on investment, with

the expectation that the scheme will crowd-in investment. The Assessment further submits that other countries are offering competing subsidy schemes, reflecting growing pace of international competition for hydrogen investment.

Impact on markets

3.41 The Assessment covers impacts on several areas including (i) on energy inputs, (ii) on existing hydrogen producers, (iii) on low carbon technologies not supported through the HPBM and (iv) on offtakers.

3.42 Whilst not included in Step 3, the Assessment covers additional competitive impacts in Step 4, providing further detail on the impact of the HPBM on the gas market and offtakers, as well as potential competitive impacts arising from the geographical concentration of CCUS-enabled producers and mitigations thereto.

3.43 Recognising that DESNZ has provided some detail on market impacts of the scheme, the Assessment could be improved by a more targeted discussion of potential competitive impacts and/or market distortions in some areas already identified by the Assessment. For example, outlining in more detail potential competition distortions of choosing to support certain technological pathways over others.

Conclusion on Step 3

3.44 We consider that the Assessment appropriately considers compliance with Principles B and F, and systematically engages with Step 3 of the Statutory Guidance in its evaluation of the HPBM. It discusses most points raised in the Statutory Guidance in turn, providing clearly structured answers and referencing supporting evidence, including consultation documents, stakeholder responses and third-party analysis reports. The Assessment engages both with aspects of the scheme's design that have the aim of reducing impacts on competition and investment as well as market impacts that may arise from the HPBM (Annex 2 of the Statutory Guidance) thereby also showing how the scheme is proportionate to its policy objectives.

Step 4: Carrying out the balancing exercise

3.45 The fourth step involves an evaluation of the assessment against subsidy control Principle G: subsidies' beneficial effects (in terms of achieving their specific policy objective) should outweigh any negative effects, including in particular negative effects on: (a) competition or investment within the United Kingdom; (b) international trade or investment.[25]

[25] See Statutory Guidance (paragraphs 3.96 to 3.98) and SAU Guidance (paragraphs 4.20 to 4.22) for further detail.

3.46 The Assessment lists a number of positive effects in terms of achieving the policy objectives, including incentivising the production and use of low carbon hydrogen, which is expected to lead to a decrease in the cost of hydrogen production and an increase in consumer acceptance, and a reduction of carbon emissions.

3.47 The Assessment lists a number of negative impacts:

(a) Missed opportunities for hydrogen market development, because the initial allocation rounds exclude the sale of HPBM subsidised volumes to certain offtakers (notably blending into the gas grid and exports). DESNZ notes it will keep eligible offtake routes under review.

(b) The displacement of the use of natural gas in the UK with hydrogen, affecting the contribution of UK's natural gas sector to the economy. According to DESNZ, the negative impact is outweighed by the wider benefits, principally increasing energy resilience and helping to meet the Net Zero targets. Furthermore CCUS-enabled hydrogen will still utilise natural gas as an input, limiting the impact on the sector.

(c) There is a risk of emissions from CCUS-enabled subsidised production if the CO2 T&S network does not perform as intended. However, the support is time-limited and necessary to enable investment in this new technology.

3.48 In conclusion, the Assessment finds that the benefits presented by the HPBM outweigh any potential negative impacts, and that the HPBM scheme will play a direct role in reducing emissions as one of a range of government interventions intended to facilitate the deployment of hydrogen projects. This strategy is in line with recent modelling and advice.

3.49 In our view, the Assessment clearly sets out the positive effects of the scheme in relation to the policy objectives, the geographical impacts of the scheme, as well as potential negative impacts, and conducts a high level balancing exercise between them, in line with the Statutory Guidance. To improve the Assessment further, DESNZ could have further attempted to quantify the overall scale of the negative effects, or to provide some qualitative assessments.

Energy and Environment Principles

3.50 This step involves an evaluation of the Assessment with regard to compliance with the energy and environment principles, where these are applicable to the scheme.[26]

[26] See Schedule 2 to the Act.

3.51 The Statutory Guidance summarises the scope of the different energy and environment principles that apply to different types of subsidies.[27] DESNZ has conducted an assessment of the scheme against Principles A, B, C, and E. We are satisfied that the other energy and environment principles are not applicable to this scheme.

Principle A: Aim of subsidies in relation to energy and environment

3.52 The assessment against Principle A should show how the subsidy is consistent with delivering a secure, affordable and sustainable energy system and a well-functioning and competitive energy market, or increasing the level of environmental protection compared to the level that would be achieved in the absence of the subsidy. If a subsidy is in relation to both energy and environment, it should meet both of these limbs.[28]

3.53 The Assessment sets out that the HPBM helps to deliver a secure, affordable and sustainable energy system and a well-functioning and competitive (hydrogen) market including by overcoming the market failures (specifically coordination failures) that are currently limiting hydrogen deployment.

3.54 The Assessment also explains that the HPBM will help to increase the level of environmental protection compared to the level that would be achieved in the absence of the subsidy, through a reduction in emissions. In support of this, DESNZ cites the CCC's CB6 advice (see paragraph 3.4) which suggests that hydrogen will be essential for meeting Net Zero. We note that the Statutory Guidance sets out that subsidies and schemes with a specific policy objective of promoting net zero will tend to be consistent with Principle A of the energy and environment principles.[29]

3.55 We consider that DESNZ has clearly explained and evidenced how the HPBM complies with this energy and environment principle.

Principle B: Subsidies not to relieve beneficiaries from liabilities as a polluter

3.56 The assessment against Principle B should explain clearly how the proposed subsidy or scheme does not relieve the beneficiary from liabilities arising from its

[27] Principles A and B apply to all subsidies in relation to energy and environment. Principle C applies for subsidies for electricity generation adequacy, renewable energy or cogeneration. Principle D applies to subsidies for electricity generation only. Principle E applies to subsidies for renewable energy or cogeneration. Principle F applies to subsidies in the form of partial exemptions from energy related taxes and levies. Principle G applies to subsidies that compensate electricity intensive users for increases in electricity costs, Principle H relates to subsidies for decarbonisation of industrial emissions. Principle I relates to subsidies for improving energy efficiency of industrial activities.
[28] Statutory Guidance, paragraphs 4.19-4.28.
[29] Statutory Guidance, paragraph 4.27.

responsibilities as a polluter under the law of England and Wales, Scotland, or Northern Ireland.[30]

3.57 The Assessment sets out that all beneficiaries are required to comply with the Low Carbon Hydrogen Standard[31] in order to receive funding, and that the LCHA sets out provisions in respect of monitoring, verifying and enforcing compliance with that threshold for the amount of greenhouse gas emissions allowed in the production process. It further states that the LCHA contains no provisions that will relieve beneficiaries from liabilities arising from their responsibilities as a polluter.

3.58 DESNZ acknowledges that the CO2 emissions of some beneficiaries may increase for a 'short period' because of a failure in the (third party) CO2 transport T&S network (ie the HPBM beneficiaries may be forced to vent into the atmosphere CO2 resulting from hydrogen production during CO2 T&S 'outage events'). If operating during outage events, DESNZ states that the HPBM beneficiaries would incur increased UK ETS liability during these events, for which the HPBM provides time-limited compensation through the CCP (see paragraph 1.7(d)(iv)). The Assessment explains that substantial engagement with offtakers and producers has indicated that producers are unable to manage the full additional ETS cost resulting from CO2 T&S outages, as this cannot be passed on to their offtakers.

3.59 DESNZ argues that the CCP does not relieve the HPBM beneficiaries from their liabilities as a polluter. Beneficiaries remain liable under the ETS and may only receive time-limited protection. DESNZ further argues that the CCP provides the necessary level of support for risks that are outside the beneficiaries' control and compensates for costs that cannot be managed in full by producers for emissions that are not their fault.

3.60 Whilst we consider it to be apparent from the Assessment that most of the HPBM does not raise issues under Principle B, the Assessment would have benefited from a more detailed explanation of how the CCP complies with this principle read in conjunction with the Statutory Guidance,[32] including by:

(a) Outlining the legal framework underpinning the ETS and how that framework would give rise to liabilities for hydrogen producers in the event of an outage in the third party's T&S network.

[30] Statutory Guidance, paragraphs 4.29-4.35.
[31] The Low Carbon Hydrogen Standard defines what constitutes 'low carbon hydrogen' at the point of production and sets a maximum threshold for the amount of greenhouse gas emissions allowed in the production process for hydrogen to be considered 'low carbon hydrogen'. The standard sets out in detail the methodology for calculating the emissions associated with hydrogen production and the requirements producers are expected to meet to prove that the hydrogen they produce is compliant.
[32] Statutory Guidance, paragraphs 4.29-4.35.

(b) Explaining more clearly why hydrogen producers would not be able to manage the financial burden of increased ETS payments through their commercial arrangements.

(c) Explaining in more detail the relevance of the CCP to the delivery of the policy objective, in particular how the CCP supports the establishment of the hydrogen economy leading to an overall reduction in emissions.

Principle C: Subsidies for electricity generation adequacy, renewable energy, or cogeneration

3.61 Subsidies for electricity generation adequacy, renewable energy, or cogeneration, should be assessed against Principle C. DESNZ has indicated that in its view, electrolytic hydrogen produced from fully renewable sources such as wind, or solar, would be a form of renewable energy, and has therefore provided an assessment against Principle C.

3.62 According to the Statutory Guidance, subsidies or subsidy schemes should not undermine the UK's ability to meet its obligations under Article 304 of the UK-EU Trade and Co-operation Agreement (requiring the UK to ensure that wholesale electricity and natural gas prices reflect actual supply and demand).[33] Subsidies must not have the effect of introducing significant distortions, price controls, or significantly impede the transparent operation of the wholesale electricity and natural gas markets.[34]

3.63 DESNZ indicates in its Assessment that recipients of the HPBM will be participating in the electricity and natural gas markets as electricity customers at commercial rates and therefore these markets will continue to operate in a transparent, efficient, and secure manner without the introduction of price controls or distortions.

3.64 The Assessment should also show how the subsidy has been determined by means of a transparent, non-discriminatory and effective competitive process, or, alternatively, an explanation should be provided as to why a competitive process was not required.[35] DESNZ indicates in its Assessment that the HPBM involves separate competitive allocation processes for CCUS-enabled and electrolytic projects based on clearly defined transparent eligibility and evaluation criteria.

3.65 We consider that DESNZ has clearly explained and evidenced how the HPBM complies with this energy and environment principle.

[33] Statutory Guidance, paragraph 4.37.
[34] Statutory Guidance, paragraph 4.38.
[35] Statutory Guidance, paragraphs 4.36-4.45.

Principle E: Subsidies for renewable energy or cogeneration shall not affect beneficiaries' obligations or opportunities to participate in electricity markets

3.66 Under Principle E, subsidies for renewable energy or cogeneration shall not affect beneficiaries' obligations or opportunities to participate in electricity markets. According to the Statutory Guidance, a statement that nothing in the terms of the scheme relieves a recipient of the obligation or ability to participate in electrical markets is sufficient to ensure compliance with this principle.[36]

3.67 The Assessment explains that, through Strike Price indexation, the scheme incentivises, but does not require, hydrogen producers to fix their electricity input costs for as long as possible. The scheme also incentivises hydrogen producers to participate in electricity balancing markets and adopt sourcing strategies which minimise emissions and negative impacts on the electricity grid. As such, DESNZ concludes that the HPBM does not limit the ability of hydrogen producers to participate in electricity markets, nor does it relieve recipients either directly or indirectly of any obligations they may have to participate in electricity markets.

3.68 We consider that DESNZ has clearly explained and evidenced how the HPBM complies with this energy and environment principle.

Other requirements of the Act

3.69 DESNZ confirmed that no other requirements or prohibitions set out in Chapter 2 of Part 2 of the Act applies to the scheme.

[36] Statutory Guidance, paragraphs 4.49-4.52.