

## **De Minimis Assessment**

<b>Title of Measure</b>	Consultation on a UK low carbon hydrogen certification scheme
<b>Estimated Net Present Value (NPV)</b>	<b>-£4,300,000</b>
<b>Equivalent Annual Net Direct Costs to Business (EANDCB)</b>	<b>£749,000</b>

### **Policy Overview**

Low-carbon hydrogen is expected to play a significant role in the UK's transition to being a Net Zero economy. Currently, there is no reliable way for end users to consistently and independently verify the embodied emissions of the hydrogen they are using. The low-carbon hydrogen certification scheme is intended to correct this by connecting producers and end users through providing a method of verifying and tracing the emissions of low carbon hydrogen use, so end users can have confidence in the low-carbon credentials of their hydrogen.

The scheme is intended to be introduced in 2025 and may need to evolve over time as the hydrogen market develops. This assessment considers two options for the form the scheme could take, based on the potential chains of custody: mass balance (where certificates and physical hydrogen are bundled together through the supply chain) and book-and-claim (where certificates and physical hydrogen are traded separately). Other chain of custody options were discounted before this assessment was conducted as they did not meet the strategic objectives of the scheme, being overly burdensome. The minded-to position is mass balance.

### **Direct Costs to Business**

We estimate the EANDCB to be £749,000 over the appraisal period of 2025-2030 for the minded-to position in the consultation. The costs to businesses begin in 2025. For simplicity, this assessment assumes that the scheme is unchanged after introduction in 2025 through to 2030.

These costs estimates are indicative, based on assumptions about the hydrogen market which does not currently exist, limiting analytical possibilities. Accordingly, there is considerable uncertainty about the true nature of costs. These estimates reflect a scenario where hydrogen production increases in line with Government ambitions of 2GW in 2025 and 10GW in 2030 and assumes an equal split between electrolytic and CCUS-enabled production. For simplicity, we also assume a load factor of 100% for both production methods, which is an overestimate and consequently means we are overestimating the volume of certificates in circulation and, by extension, the costs to business. We therefore expect, overall, these costs to be an overestimate of the costs to business.

Separately, likewise for simplicity, we did not consider international trade in this analysis, as the international hydrogen market does not yet exist, and it is not likely to be of significant size by 2030.

Also, for this assessment, we assumed that the scheme does not change (or at least, in a way significant for this analysis) throughout the assessment period.

To begin with, we assumed that all hydrogen producers would be participating in the scheme. We then made assumptions about the total proportion of hydrogen production that would utilise the scheme (i.e. seek to be certified) under each chain of custody, in order to estimate the volume of certificates that would be in circulation. We assumed that mass balance has an initial utilisation of 10% versus 5% for book-and-claim, reflecting the potential for mass balance certificates to be interoperable for other schemes, unlike book-and-claim, and therefore being more useful in the immediate term. We then assumed a linear increase to 2030 to a participation rate of 75% for both chains of custody to represent the hydrogen market being more mature and certification increasingly becoming the norm in the market.

**Table 1: proportion of hydrogen production utilising the scheme (i.e. being certified)**

Chain of custody	2025	2026	2027	2028	2029	2030
Mass balance	10%	23%	36%	49%	62%	75%
Book-and-claim	5%	19%	33%	47%	61%	75%

We then estimated costs to business, which come from three sources:

- Familiarisation with the scheme;
- Audit of production plants; and
- Registering the transactions of certificates.

Familiarisation entails the time spent for a new business in the scheme to understand its rules and requirements; audit costs reflect the annual requirement for plants to have a third party verify their compliance with the scheme; and registering certification transactions captures the need for each change of ownership of batches of certificates to be logged in the certificate registry.

Familiarisation costs are assumed to only apply to new business joining the scheme; so, each year, it is only new businesses which incur this cost. Audit costs apply only to hydrogen production plants while the costs of registering certificate transactions would apply to all businesses in the scheme.

**Table 2: costs facing different businesses**

Type of business	Familiarisation	Audit	Registering certificate transactions
Hydrogen producers	✓	✓	✓
Hydrogen transporters	✓	✗	✓
Hydrogen end users	✓	✗	✓

These were all considered as labour costs, requiring an employee to complete a given activity. We assumed these each required a certain number of FTE equivalent hours on all occasions and for

all businesses, and then an average labour cost of £25.60 per hour, per the ONS ASHE tables<sup>1</sup>. We have asked for feedback on these assumptions in the consultation. This gives a cost per incidence for each activity:

**Table 3: nominal cost per incidence by activity for business**

Activity	FTE equivalent hours	Explanation	Cost per incidence
Familiarisation	16	1 FTE for two days (8hrs per day).	£409.60
Audit	32	2 FTEs for two days (8hrs per day).	£819.20
Registering certificate transactions	0.02 per batch	1 FTE spending 0.02hrs per batch of certificates.	£0.51

We expect these per incidence costs to be the same across both chains of custody as: a) the two potential schemes would be very similar, so little meaningful difference in familiarisation; b) all enrolled production plants would have to be audited, and the same number of plants are enrolled under both options; and c) registering a certificate transaction would be the same process under both chains of custody.

From this point we considered two scenarios: our minded-to position of a mass balance chain of custody, and an alternative option of a book-and-claim chain of custody. This issue determines whether certificates would be bundled with the hydrogen or not. Mass balance gives bundled certificates and hydrogen, whereby certificates would follow their physical hydrogen through the supply chain until retirement. In contrast, book-and-claim gives unbundled certificates and hydrogen, meaning that the two could be traded separately and independently; certificates could be sold to a different user than the hydrogen.

We then estimated the incidents of each activity per year. The method taken for each activity varied, depending on which businesses it applies to and the nature of the cost, per Table 4:

**Table 4: methods for estimating number of incidences by activity per year**

Activity	Method
Familiarisation	Estimated number of new businesses enrolling in the scheme each year.
Audit	Estimated number of enrolled production plants each year multiplied by the number of audits per year (one).
Registering certificate transactions	Estimated number of batches of certificates issued per year multiplied by the number of transactions per certificate.

The estimated number of businesses, enrolled production plants and batches of certificates vary according to the chain of custody (mass balance or book-and-claim) in consideration, as below:

**Table 5: number of business and production plants enrolled, and batches of certificates, mass balance**

Activity	2025	2026	2027	2028	2029	2030
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<sup>1</sup> Mean Hourly pay for 'Professional, Scientific and Technical Activities, Business, Media and Public Service Professionals', ASHE Table 25a, ONS, 2021.

Number of businesses	46	98	164	243	335	440
Enrolled production plants	40	72	104	136	168	200
Number of batches of certificates	35,750	148,050	334,650	595,700	931,050	1,340,800

*Note: these figures are based off of underlying assumptions; the hydrogen market may, in practice, be quite different.*

**Table 6: number of business and production plants enrolled, and batches of certificates, book-and-claim**

<b>Activity</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>
Total enrolled businesses	45	104	185	286	409	553
Enrolled production plants	40	72	104	136	168	200
Number of batches of certificates	17,900	122,300	306,800	571,350	916,050	1,340,800

*Note: these figures are based off of underlying assumptions; the hydrogen market may, in practice, be quite different.*

As we assumed a higher utilisation of the scheme under mass balance up to 2030, it correspondingly sees larger numbers of batches of certificates for 2025-29. There are more businesses enrolled in the scheme under book-and-claim due to an underlying assumption that there are 50% more enrolled end users under it than mass balance. The logic for this is the relative simplicity of book-and-claim for end users compared to mass balance, with them only needing to buy certificates to badge their hydrogen as low-carbon. We do not anticipate the chain of custody decision will impact the number of production plants enrolling in the scheme.

With these estimates, we hence in turn estimated the annual costs per activity under mass balance (Table 7) and book-and-claim (Table 8) in nominal terms:

**Table 7: annual costs (nominal) to business by activity under mass balance (£000s)**

<b>Activity</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>
Familiarisation	19.0	21.3	26.8	32.2	37.7	43.1
Audit	3.3	13.6	30.7	54.6	85.3	122.9
Registering certificate transactions	54.9	227.5	514.3	915.4	1,430.9	2,060.6
<b>Total</b>	<b>77.2</b>	<b>262.4</b>	<b>571.8</b>	<b>1,002.3</b>	<b>1,553.9</b>	<b>2,226.6</b>

**Table 8: annual costs (nominal) to business by activity under book-and-claim (£000s)**

<b>Activity</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>
Familiarisation	18.3	24.3	33.0	41.6	50.2	58.8
Audit	1.6	11.2	28.1	52.4	84.0	122.9
Registering certificate transactions	18.3	125.3	314.3	585.4	938.5	1,373.7
<b>Total</b>	<b>38.3</b>	<b>160.8</b>	<b>375.4</b>	<b>679.3</b>	<b>1,072.7</b>	<b>1,555.4</b>

Familiarisation costs are higher under book-and-claim because, per Tables 5 and 6 above, there are more new businesses enrolling in the scheme per year than under mass balance. Audit costs are the same as the same number of production plants are participating in the scheme in both scenarios. The difference in certificate transaction costs is caused by two factors: the larger number of certificates under mass balance (per Tables 5 and 6 above) and the need to register all transactions under mass balance. Each transfer of ownership of the hydrogen (e.g. producer to transporter to end user) must be registered, whereas under book-and-claim only two registrations are required (producer and end user). This is inherent to mass balance.

These costs were then summed, converted into present value terms, annualised and discounted at a rate of 3.5% to give the EANDCB in 2020 prices:

- For **mass balance**, £749,000; and
- For **book-and-claim**, £510,000.

It should be noted that the actual costs to business will vary by size of the business, with larger hydrogen traders (producers, transporters or end users) incurring higher costs than smaller ones overall as they have to register significantly more certificate transactions, the main cost to business. In addition, as the hydrogen market grows larger into the 2030s, we would expect costs to business to increase, also driven primarily by the need to register more certificate transactions.

We see that the projected EANDCB of a book-and-claim system is lower than that of mass balance. Mass balance remains our preferred option, however, because it better fulfils the objectives of the measure by creating a means for end users to truly verify the emissions content of their hydrogen. A book-and-claim system does not do this, as the certificates are separated from the hydrogen and therefore the specific emissions content of a given hydrogen MWh cannot be verified.

## **Wider Impacts and Transfers**

### **Costs to government**

Costs will also be incurred by government in setting up and administering the certification scheme. The estimates given here make no assumptions about the delivery partner and administration of the scheme, which may in practice change the costs to government.

Setup costs will be one-off and consist of designing the certification scheme, creating the necessary digital infrastructure (e.g. a certificate registry) for it to operate, and overheads. These costs are the same under both chain of custody models. Design costs are estimated to be £612,000 and digital infrastructure costs £1.82m, while overheads are assumed as 12.5% of the total of those two costs, amounting to £304,000. These are based on published figures for analogous EU schemes<sup>2</sup>, giving total setup costs of an estimated £2.7m in nominal terms.

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<sup>2</sup> [Benchmark of International low-carbon and green H2 certification mechanisms](#), World Bank, 2021, pg. 34. CertifHy has a total budget through its implementation of €2.11m, which equates to £1.82m using HMRC's average 2021 exchange rate of €0.8626 equalling £1.

Ongoing costs to government will consist of processing enrolment applications, issuing certificates, and overheads. The former two were taken as labour costs, at a rate of £22.43 per hour per the ONS ASHE tables<sup>3</sup>, similar to our approach for costs to business above, while overheads were assumed at a constant rate of 12.5% of the sum of the former two per year.

**Table 9: nominal cost per incidence by activity for government**

Activity	FTE equivalent hours	Explanation	Cost per incidence
Processing applications	16	1 FTE for two days (8hrs per day).	£358.88
Issuing certificates	6	1 FTE for six hours.	£134.58

We then estimated the incidences per activity per year for each chain of custody, per Table 10 below.

**Table 10: methods for estimating number of incidences by activity per year**

Activity	Method
Processing applications	Estimated number of businesses participating in the scheme each year for each chain of custody.
Issuing certificates	Estimated number of batches of certificates issued per year for each chain of custody.

These both vary according to the chain of custody in question, per Tables 5 and 6 above.

With these estimates, we then estimated the total annual costs to government for each activity for both mass balance (Table 11) and book-and-claim (Table 12) in nominal terms:

**Table 11: annual costs (nominal) to government by activity under mass balance (£000s)**

Activity	2025	2026	2027	2028	2029	2030
Processing applications	16.7	35.3	58.8	87.1	120.1	157.9
Issuing certificates	6.5	26.7	60.4	107.6	168.2	242.2
Overheads	2.9	7.8	14.9	24.3	36.0	50.0
<b>Total</b>	<b>26.0</b>	<b>69.9</b>	<b>134.2</b>	<b>219.0</b>	<b>324.4</b>	<b>450.2</b>

**Table 12: annual costs (nominal) to government by activity under book-and-claim (£000s)**

Activity	2025	2026	2027	2028	2029	2030
Processing applications	16.0	37.4	66.3	102.7	146.7	198.3
Issuing certificates	3.2	22.1	55.4	103.2	165.5	242.2
Overheads	2.4	7.4	15.2	25.7	39.0	55.1
<b>Total</b>	<b>21.7</b>	<b>66.9</b>	<b>136.9</b>	<b>231.7</b>	<b>351.2</b>	<b>495.6</b>

<sup>3</sup> Mean Hourly pay for 'Public Administration and Defence; Compulsory Social Security, Professional Occupations', ASHE Table 25a, ONS, 2021.

These costs were then summed, converted into present value terms, annualised and discounted at a rate of 3.5% to give the equivalent annual discounted costs in 2020 prices:

- For **mass balance**, £162,000; and
- For **book-and-claim**, £172,000.

We therefore expect a book-and-claim system to have marginally higher annual costs to government than a mass balance system. This is driven by government having to process more enrolment applications under book-and-claim due to there being more projected end users over time (see Table 6 above). Consequently, there would be more enrolment applications for government to process, generating higher costs. This then feeds through into higher overheads.

### **Benefits to business**

Separately, we expect the certification scheme to yield significant monetary benefit to hydrogen producers by increasing the value of their hydrogen as they sell it, through generation of green premia. This increased value would in turn generate greater revenue for producers, to their benefit. It would, however, interact with the Hydrogen Production Business Model (HPBM) funding system, which uses a reference price to determine the degree of revenue support, and we expect the great majority of producers accessing the certification scheme to be HPBM-funded. Changes to the value of the hydrogen as a result of a producer being certified may in turn affect the reference price and, therefore, the amount of support provided to businesses. This would commensurately reduce the cost to government of the HPBM.

As there is ongoing policy work to determine how and to what extent the certification scheme and the HPBM will interact, we have not monetised benefits to business in this assessment. The NPV estimate on the front page above does not include any benefits, as they have not been monetised.

### **Impacts on International Trade and Investment**

The size and nature of trade in hydrogen is also highly uncertain given the present immaturity of the market, though it seems unlikely that there will be significant international hydrogen trade before 2030 given infrastructure lead-in times and technical barriers. Therefore, on grounds of simplicity and proportionality, we did not monetise trade and investment impacts of the scheme.

That said, a longer-term aim of the certification will be to facilitate trade through the certification of imports and exports, though the approach to this has not yet been decided and is not part of this consultation.

### **Impacts on Small Businesses**

We do not expect disproportionate costs on small businesses. Given cost, scale and technical barriers, we anticipate that producers, transporters and end users of hydrogen during the appraisal period will be relatively larger businesses rather than smaller ones. We expect this will continue to be the case for some time beyond the appraisal period as well. Moreover, as above, we expect the

principal costs to businesses participating in the scheme to be registering changes of ownership in certificates; these costs increase as a business is trading more hydrogen, so larger businesses are likely to in fact incur higher costs than smaller ones.

### **Family Test**

We do not expect any impacts on families, as this measure is focused on businesses rather than individuals and households. Households will not participate in the certification scheme and will not directly interact with those businesses who are participants; therefore, households and families will not be affected by this measure.

### **Public Sector Equality Duty (PSED) Test**

We do not expect any impacts on those with protected characteristics. This measure impacts directly on businesses rather than individuals and is focused on production and use of a good (hydrogen) which will not be consumed by individuals.

### **Review Provision**

We expect the hydrogen market to evolve over the 2020s, both in terms of production scale and end use cases; it may therefore be that the scheme as designed and launched in 2025 does not support the hydrogen market post-2030 and accordingly need to be reviewed. We will take the learnings from the first phase and update the scheme to a more permanent form. We will also conduct monitoring and evaluation of the scheme to inform the review and any potential changes to the scheme.

Statutory Review Provision	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Non-Statutory Review Provision	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Ministerial Statement	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Review period (if applicable)	<b>5 Years 0 months</b>	