



Low carbon hydrogen production business model heads of terms update – useful but still much to do

The UK government published a revised version of the Heads of Terms ("**HoTs**") for the Low Carbon Hydrogen Production Business Model on 16 December 2022. While these HoTs remain in draft form, they are significantly more detailed than the preliminary and indicative draft terms that were published earlier in the year.

So what are the key features?

- More tightening of the support given to producers
- Potentially more risk for offtakers
- Sizing of the facility will be crucial
- Close constraint on volumes of hydrogen that can be produced
- No incentive on the producer to produce Non-Qualifying Volumes
- An offtaker paying under a traditional take or pay may not be enough – it needs to take

As perhaps was inevitable, these HoTs represent a tightening of the support they are giving to the producers and so in turn increase the risk to offtakers. While many in the sector thought that giving producers both price and volume support might be a little too good to be true, it looks as if the government is looking to row back a bit through adding increasing constraints to the HoTs.

In this article, we comment on some of the more important points that have been brought out in the revised HoTs and how they may affect future hydrogen production in the UK. We are concentrating on electrolyser-based projects here; the HoTs have also included additional terms for carbon capture projects but we will cover those in a separate article.

As expected, it has been confirmed that the Low Carbon Hydrogen Agreement ("**LCHA**") will follow the same contract structure as for the Contracts for Difference for Allocation Round 4 ("**AR4 CfD**"). The AR4 CfD runs to well over 500 pages and so a degree of fortitude will no doubt be required when navigating the final form LCHA. This complexity also has an impact on the likely transaction costs for projects, particularly smaller projects, where the transaction costs would be a higher percentage of the overall project costs than would be the case for more expensive facilities.

Timescales

The government expects the timescales to produce the full draft LCHA will be:

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| Q1 2023 | Engagement with HoTs |
| Q2 2023 | Engagement with draft full form LCHA |
| Q3 2023 | Publication of final LCHA |

The allocation of the initial LCHAs is still (somewhat heroically) intended to be in 2023, so producers and offtakers can expect what might euphemistically be called a very busy second half of the year gearing up to enter into these agreements.

How long will the government support low carbon hydrogen for?

The LCHA will now have a contract term of 15 years. This will be the case for all eligible technologies and project sizes. This represents a firming up of the position in the preliminary HoTs, where it was suggested that the contract term could be between 10 and 15 years.

The term will commence on the earlier of the start date and the last day of a target commissioning window (a 12 month window, although this may be extended for force majeure). This means that the LCHA term will commence at the latest by the end of the target commissioning window, whether or not the facility is operational at that time.

If, for some reason, the facility is not operational by that long stop date, the project will start to lose some of its period of government support. This is because payments under the LCHA will not start until the Start Date (which is subject to the completion of certain operational conditions precedent) has occurred. In other words, the term will have started but payments will not be made during this period.

Price support

Strike price and reference price

The strike price and the reference price are together the key to the price support mechanism. There is an inherent assumption in the hydrogen production business model that it is very likely that it will cost the producer more to produce hydrogen than an offtaker is prepared to pay for it. That payment gap is what is being filled by the LCHA.

The **strike price** is the price per unit of hydrogen that a producer needs to enable it to recover its costs of producing the hydrogen and make a return on its investment. The reader will not be surprised to

learn that the government will be taking a keen interest in the level of costs as well as the return that will be allowed to be included in the strike price. The final strike price will be negotiated on a project by project basis.

The **reference price** is the higher of:

- the price at which the producer sells its hydrogen; and
- the price of natural gas.

The LCHA counterparty (now confirmed as the Low Carbon Contracts Company Ltd ("**LCCC**")) will pay the producer, for each unit of Qualifying Volume, the difference between the strike price and the reference price, where the strike price is higher.

Conversely, if the producer is able to sell hydrogen for more than the strike price, it will be making more profit than was bargained for with the government when agreeing the strike price (as the strike price contains an agreed profit element). Therefore, where the strike price is lower than the reference price, the difference will be payable by the producer back to the LCCC. This is the quid pro quo for the support when times are not so good for the producer.

Payments are monthly and prices are indexed at CPI. This follows the usual structure as for a contract for difference and will be of no surprise to producers who are familiar with that model, although producers will no doubt observe that in the current environment many costs are rising faster than CPI.

Price discovery mechanism

With the basic price mechanism, a producer could always receive the strike price so long as it sold hydrogen for at least the gas price (the reference price). This means that there is a concern that there is little incentive on the producer to attempt to sell hydrogen for higher prices. This is particularly so given that the way the basic price mechanism works is that selling hydrogen for more than the gas price means that the producer receives less support – it does not make a higher return. This does not help develop a functioning hydrogen market.

To solve this, the indicative HoTs included a price discovery mechanism. In essence, this was intended to give a producer a bonus payment if it sold for more than the gas price, encouraging the producer to seek the highest price possible and reducing the support that government needs to provide.

The latest HoTs provide more detail as to how this is to work. In short, if producers achieve sales prices for their Qualifying Volumes above the gas price, they will also receive:

- 10% of the difference between the sales price and gas price (when the sales price is equal to or lower than the strike price); or
- 10% of the difference between the strike price and the gas price (when the sales price is higher than the strike price).

Although this appears to be a sensible approach from the government's perspective, its success does depend on offtakers being persuaded to buy hydrogen for more than they currently pay for gas, while at the same time being aware that government is prepared to support the hydrogen market on the basis that offtakers are only expected to pay the gas price.

Volume support

Qualifying volumes

As George Orwell might have written, had he been interested in hydrogen as a fuel, some volumes of hydrogen are more equal than others. Not all hydrogen production will be entitled to receive support from the LCCC - the producer must produce and sell Qualifying Volumes of hydrogen.

Qualifying Volumes are volumes of hydrogen that:

- have been purchased by a Qualifying Offtaker; and
- comply with the Low Carbon Hydrogen Standard ("**LCHS**"),

while **Non-Qualifying Volumes** are those that:

- have been purchased by a Non-Qualifying Offtaker;
- do not meet the LCHS; or
- are volumes where a Renewable Transport Fuel ("**RTF**") Certificate has already been claimed.

Non-Qualifying Offtakers are:

- "Risk-Taking Intermediaries" (effectively a market player who takes ownership of the hydrogen before selling it on to the end user);
- offtakers who export the hydrogen outside the UK; or
- offtakers who blend it with natural gas in a gas transmission system.

The government's approach to offtakers makes it clear that the current priority is self-contained projects in the UK market. In addition, blending still seems to be off the government's agenda.

Qualifying Offtakers are offtakers who are not Non-Qualifying Offtakers and are confirmed as being

qualifying by the LCHA Counterparty. The government is currently developing the confirmation process.

The LCHS sets out in detail the methodology for calculating the emissions associated with hydrogen production and the steps producers are expected to take to prove that the hydrogen they produce is compliant. The requirements of the latest LCHS applicable at the time of signing will be adopted for the particular project – there is no obligation to comply with future versions of the LCHS.

While government support is not being offered for Non-Qualifying Volumes, they still could affect the price support available. Any Non-Qualifying Volumes will be taken into account in calculating the amounts payable under the LCHA. If the price for Non-Qualifying Volumes is above the strike price, the "excess" for the Non-Qualifying Volumes will be set off against (and so will reduce) payments due to the producer. If the reference price is higher than the strike price, the excess forms part of the amount payable to the LCCC. This will encourage producers to keep Non-Qualifying Volumes to a minimum (to maximise the support available) and so in turn increases the producer's reliance on Qualifying Volumes.

We would expect that many producers will seek to enter into normal "Take or Pay" contracts with offtakers. Under these contracts, offtakers would still be required to pay for the hydrogen that they have contracted to accept, even if they ultimately do not accept it (for example, if their end industrial facilities are closed). These arrangements are much less effective here because it seems that any volumes of hydrogen not accepted by the offtaker (even if they are paid for under a take or pay arrangement) will not attract government support because they are not Qualifying Volumes. This appears to suggest that the producer would then only receive the payment from the offtaker. As this might only be the equivalent of the reference price (ie the price of natural gas), it could present a serious issue for the producer. In this scenario, the producer may well not be able to cover its costs of operation unless either:

- the producer is able to sell that hydrogen to a third party; or
- the offtaker is prepared to pay an additional sum to the producer to keep the producer whole.

This is unlikely to be particularly appealing to an offtaker who is not used to paying similar sums to its current fuel suppliers.

Capacity

A hydrogen facility has to have a commissioned capacity of at least 95% of the capacity that the producer originally estimated would be installed (the "**Installed Capacity Estimate**"). If it does not achieve this capacity, then the LCCC is able to terminate the LCHA, or deem the installed capacity to be 80% of the Installed Capacity Estimate.

This is important because the Final Installed Capacity forms part of the calculation for the LCHA Production Cap. A facility is not permitted to exceed the LCHA Production Cap over the term of the LCHA.

For example, a facility may be able to produce 90% of its Installed Capacity Estimate. The LCCC then has a choice either to:

- a) terminate the LCHA; or
- b) reduce the volume that the facility can produce over the term, by recalculating the LCHA Production Cap on the basis that the facility is deemed to be able to produce 80% of the Installed Capacity Estimate.

In this example, the producer is being "punished" for not producing 95% of the estimate by being forced to cap at 80%. In other words, it does not get the benefit of the 90% capacity it is actually capable of producing. Again, this is an additional constraint on the producer and will also have an impact on the agreement with the offtaker.

Adjusting the estimated capacity

It is clearly, therefore, in the producer's interests to put forward a genuine estimate of the facility's likely capacity. There may, however, be circumstances where the initial estimate proves to be incorrect. A producer can mitigate this risk to a degree as it is permitted to reduce its Installed Capacity Estimate by up to 10% prior to the Milestone Delivery Date (this means within the first 12 months of the term). This may only be done once for each project and is irrevocable.

Production cap

The LCHA imposes limits on the volume of hydrogen that a facility can produce. It does this in two ways:

- as mentioned above, there will be a LCHA Production Cap volume that cannot be exceeded over the term of the LCHA; and
- there will be a Permitted Annual Volume Cap, which will be set at 125% of 1/15th of the LCHA Production Cap. There is a 'floor' of 75% of the annual cap. If the amount of hydrogen produced is below 75% of the annual cap in a given year,

the production is deemed to be 75% for these calculations. In other words, the producer will have some production flexibility – it is not limited to a rigid "straight line" of hydrogen production which is 1/15th of the total LCHA Production Cap every year for each of the 15 years. Instead, the producer can produce up to 25% more or less hydrogen in any given year so long as the overall output over the term comes within the LCHA Production Cap. If, in any year, the facility produces less hydrogen than 75% of the 1/15th number, the volume below 75% is effectively lost and cannot be caught up in subsequent years.

If the annual cap is breached, then any volume of hydrogen above the cap ("**Excess Volumes**") will be a Non-Qualifying Volume and so will not be eligible for price support. In addition, the Excess Volumes will still count towards the total aggregate volume at a ratchet of 150% of the volume produced, meaning that the LCHA Production Cap will be reached more quickly. All of this means that the producer will need to keep an extremely close eye on exactly what the facility is producing each year.

When the total aggregate volume reaches the LCHA Production Cap, it appears that the LCHA will automatically terminate on a no liability basis.

Termination

Events of default

The LCHA can be terminated in the event of a default. These include the typical events we would expect to see:

- insolvency;
- breach of key obligations relating to ownership of the facility, no assignment and fraud;
- breach of key obligations relating to metering;
- credit support default; and
- non-payment which is not rectified within a specified cure period.

In addition, the LCHA HoTs also introduce more specific low carbon hydrogen events of default. These include:

- failure to be ready to produce hydrogen to the LCHA by an agreed longstop date;
- breaching the obligations only to supply hydrogen to qualifying offtakers;
- claiming RTF Certificates as well as LCHA support for the same volume of hydrogen; and
- breaching the annual volume cap in two or more years.

These extra termination events will make sure producers consider their offtake contracts carefully. For example, we can well imagine that producers will want to include restrictions in offtake contracts to prevent offtakers from carrying out activities that could make them Non-Qualifying Offtakers. One obvious point that needs to be worked through is that offtakers often want the ability to sell on excess product under a take or pay contract – this would not be possible if even de minimis selling on meant that an offtaker was caught by the definition of Risk-Taking Intermediary.

In addition, the government is also considering whether to add an additional termination event where the producer fails to sell any hydrogen for two years. If this is included, then producers will want to make sure that this risk is passed down to the offtaker.

Compensation on termination

If the LCHA is terminated for a producer default, the producer would be required to pay a Default Termination Payment. This is calculated by multiplying [£2] per MWh by the Annual Volume Cap for the facility. This payment appears to apply on a blanket basis across all the default scenarios and so would seem to apply even if the LCCC had not actually incurred a loss. On the other hand, the fact that the sum is liquidated and therefore certain will help on the financing side.

Volume support

More detail has been given on the sliding scale volume support mechanism. This is intended to help out a producer if its hydrogen offtake sales volume falls. This will effectively give the producer the equivalent of a higher strike price for the low volumes of hydrogen sold.

This support will only be available if the volume of sales falls below 50% of the annual volume cap. The 50% figure is still to be confirmed. There is, however, a sting in the tail: if there are no sales, then the support does not apply.

The volume support may not therefore provide as much support to producers as the market may perhaps first have thought. Again, this tends to place more emphasis on the producer getting its protection from its offtaker agreements rather than through the LCHA itself.

Conclusion

There is still significant detail to be worked through within an ever decreasing period of time if the first LCHAs are to be entered into this year.

Having said that, it is possible to draw out some overarching themes from the various discrete positions set out in the HoTs:

- The government is targeting its support at Qualifying Volumes. If a producer produces Non-Qualifying Volumes, these will eat up the producer's annual production cap and are not subsidised under the LHCA. If, however, the producer is able to sell these Non-Qualifying Volumes for more than the strike price, the producer is required to pay the difference back to the LCCC. If Non-Qualifying Volumes do not attract a subsidy and the producer is not permitted to keep revenue above the strike price, then it is a clear signal that producers should think very carefully before producing Non-Qualifying Volumes.
- Sizing facilities is going to be very difficult. Exceeding the permitted volumes in any two years (which do not need to be consecutive) could result in termination, and at the least the excess counts as 150% for the purpose of working out the total aggregate volume. On the other side of coin, if a producer sells less than 75% of the volume, it is deemed to have sold 75%. In other words, a producer can lose support both by going over and by going under the 75%-125% band of permitted volume.

From the government's perspective, putting boundaries on what facilities can do would seem to be very sensible, but this will of course need to translate to workable arrangements on the ground. Producers and offtakers will need to satisfy themselves that working within these bands are achievable, which may well be a constraint that offtakers have not worked with historically when purchasing gas.

- There is a right of termination if the producer does not sell any of the hydrogen produced for a period of two years. It appears that having the offtaker pay for (but not take) the hydrogen will not be sufficient to meet this obligation. In most financing situations, a financier would be quite happy to accept offtakers entering into take or pay contracts because the producer's cashflows are protected. Here, however, the government is concerned about decarbonisation itself and so is prioritising selling the hydrogen and putting it to a good use. This is another point that will need to be recognised in the offtake agreements because the offtaker simply agreeing to pay for hydrogen it is not taking is not enough for the producer to meet its obligations to the LCCC. This will, in turn be the subject of close scrutiny from the lenders.

- The sliding scale volume support is quite constrained given that it only operates where volumes fall below a fairly low level (in the HoTs the suggestion is 50%). At this level, the producer is also losing volumes from the LCHA Production Cap. This means that regardless of the volume support the producer will be losing the ability to produce and sell certain volumes of hydrogen. Producers and financiers will no doubt be looking for both (i) offtakers to pick up some of the financial consequences of low volumes if caused by a refusal to accept hydrogen, and (ii) equipment manufacturers and EPC contractors to take the pain if low production is caused by poorly performing equipment or their works.

As you can see, there are a number of positions in the HoTs where the government is not prepared to support producers. It is likely that financiers will equally not be prepared to allow producers to take these risks, and so they will, in turn, look to offtakers to close the circle. One issue that is yet to be resolved is that there is an assumption being made that offtakers will be prepared to do that. While offtakers will no doubt be prepared to accept some worsening of their position as compared with their current energy arrangements, reflecting the benefits (both in terms of carbon pricing and wider corporate ESG) of moving to lower carbon energy suppliers, the proposed transactions will need to make sense to the offtakers in a tightening economic landscape.

In the current market, we would expect offtakers to be looking for:

- energy supplies that are (at a minimum) no more expensive than the sources being replaced;
- flexibility of supply to reflect the demands of their own plants (including periods of over/under supply to reflect maintenance and unplanned outages); and
- confidence in the availability of hydrogen.

This last point is one of the more important for offtakers switching from gas as they will be used to a robust gas supply. They may well therefore need either the ability to switch back to gas if hydrogen is unavailable or full compensation for the period the plant is unavailable.

Given that offtakers themselves have to be creditworthy, it is likely that they will be experienced negotiators with significant bargaining strength. Therefore, we can well envisage some difficult conversations as offtakers are asked to take much more risk than they are likely to be comfortable with or indeed are taking with their current

arrangements. Indeed, one option that could be open to offtakers for later rounds of the low carbon hydrogen competition is for larger industrial offtakers to bring the production of hydrogen in house – own consumption is only touched on in the HoTs, but it may well be a realistic option for the future and it would allow offtakers to take a more proactive approach to managing the risks to their own business.

As with so many things currently, with hydrogen we certainly do live in interesting times!

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