

UKPIA RESPONSE TO PRICE-BASED COMPETITIVE ALLOCATION FOR LOW CARBON HYDROGEN: CALL FOR EVIDENCE

Chapter 2 questions:

Overarching:

1. What should be the strategic objectives of future hydrogen allocation rounds beyond HAR2? Do you agree with the descriptions of the primary objectives and broader outcomes as set out in Chapter 2?

UKPIA broadly agrees with the primary objectives and broader outcomes set out in Chapter 2.

The descriptions of the primary objectives and broader outcomes are consistent with a more nuanced approach to hydrogen capacity build-out and seem reasonable.

There are several strategic elements to be considered in the delivery of a resilient and cost-effective Low Carbon Hydrogen (LCH) supply chain in the UK. Simply focusing on one particular element such as the lowest cost, or the most resilient projects is therefore unlikely to deliver this,

There are significant differences between competitions to supply into an existing demand and distribution system (such as electricity), with visible pricing, versus supplying stand-alone point demands without wider demand and distribution options (such as hydrogen). Without hydrogen being able to find a similar distribution price discovery mechanism, such as blending into the UK natural gas system, open price competition for hydrogen projects is going to be extremely challenging.

There is inherent tension in the timeframe being considered between lowest levelized cost provided by large scale continuous operation for industrial supply and flexibility of supply and using renewable electricity when available and cheap. The potential costs and opportunities of hydrogen storage also need to be considered.

While the objectives are focused on capacity build-out, the lack of consideration for the demand side of the hydrogen value chain is major concern.

This includes identification of major low carbon hydrogen users, and their location, to ensure that production facilities leverage and support the UK's industrial clusters. Similarly, a coherent transport strategy should be developed including major LCH users such as major ports for marine use or vehicle fleets, although we recognise that this could be challenging to deliver. A failure to take end users into account may lead to stranded LCH production assets or large LCH transportation requirements which may incur GHG emissions.

As has been highlighted by Jane Toogood (UK Hydrogen Champion) the number of ready and credible hydrogen demand lags the proposed production projects. Therefore, to deliver on it's Hydrogen Strategy, the UK needs to leverage those industries which are ready to be at the forefront of hydrogen usage. The Downstream industry in the UK is the largest producer and consumer of hydrogen and has decades of experience the safe handling and associated COMAH implications.

2. To what extent, and how, should a hydrogen allocation mechanism be designed to support the primary objectives and broader outcomes as set out in Chapter 2?

UKPIA strongly agrees that a hydrogen allocation mechanism should be designed to support the primary objectives and broader outcomes as outlined in the call for evidence.

As discussed in our response to Q1, this requirement should also include the identification and support of LCH users.

3. How would introducing a price-based competition in 2025 for electrolytic projects, and potentially other non-CCUS low carbon hydrogen projects, impact projects investment decisions?

This is a commercial matter for companies and UKPIA cannot comment on this question in detail.

However prudent financial considerations would suggest that a price-based competition may make some projects less attractive to investors, and so negatively impact the final investment decisions.

This may lead to a smaller pipeline of projects being available, albeit with less financially attractive projects being supported.

Harnessing electricity system benefits:

4. Under what arrangements will electrolytic projects purchase electricity? How would introducing a price-based competition in 2025 impact this, and are these arrangements likely to change over time?

This is a commercial matter for companies and UKPIA cannot comment on this question in detail.

Electrolytic projects may change the arrangements which they use to purchase electricity over time, as the low carbon electricity market develops, and new suppliers come on-stream. This could, for example, include new wind or solar farms, nuclear power stations or new technologies such as tidal power.

The grid carbon intensity has an impact on the project finances, particularly industrial projects which require a rateable supply. The grid intensity can change over time, and the impact of this should be considered in a price-based competition.

Therefore, sufficient flexibility needs to be built into the price-based competitions so that any changes to electricity arrangements can be accounted to ensure that the LCH suppliers continue to be appropriately incentivised while minimising support costs to the government.

5. Which current and future electricity markets do electrolytic projects seek to participate in? How could changes to electricity markets or signals impact this?

This is a commercial matter for companies and UKPIA cannot comment on this question in detail.

6. How could electrolytic projects look to configure themselves and operate to deliver 'harnessing electricity system benefits' as set out in Chapter 2? Do you think these configurations/operating models could be feasible and commercially viable, and if not, why?

This is a commercial matter for companies and UKPIA cannot comment on this question in detail.

UKPIA also does not have sufficient knowledge of these projects to be able to comment on this question in detail.

7. Do you have evidence on potential demand for low carbon hydrogen production in locations in the UK that are optimal from an electricity system benefits perspective? Please refer to the map in Chapter 2 ('Figure 1').

As we discuss in our response to Question 7 of the recent "Market engagement on the second hydrogen allocation round" consultation, UKPIA questions the practicalities of incentivising hydrogen production in the locations ranked in Figure 1.

We note that the areas with the most positive impact on the electricity network are in the north of Scotland, with the next tier in the Scottish Central Belt.

This has a strong inverse correlation to population density, with these areas having a lower population density and so lower demand for low carbon hydrogen.

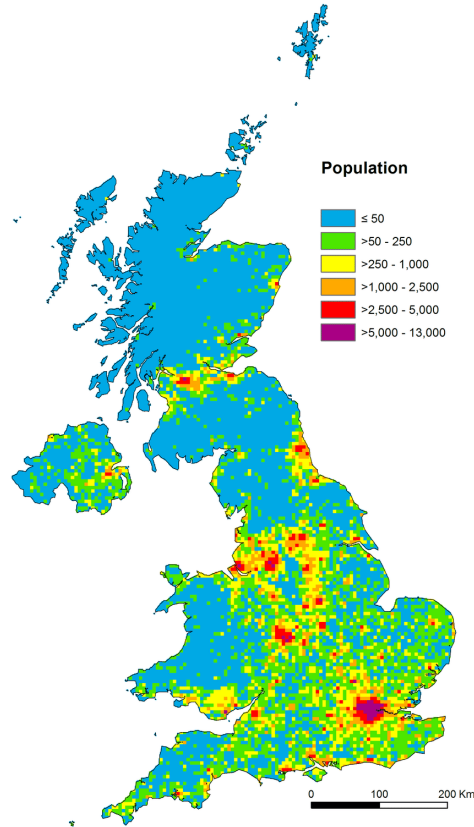


Figure 1: UK Indicative Population Density 1

Incentivising LCH production in areas of low population density is therefore likely to incentivise areas with lower demand, leading to either stranded low carbon hydrogen production assets or the need to transport the same from remote areas. This potentially increases GHG emissions from road haulage or requiring significant investment in hydrogen transport infrastructure such as pipelines.

Appropriate investment in the National Grid infrastructure would enable electrolytic hydrogen to be manufactured close to areas of demand. The current extended delivery times for grid connections for new low carbon electricity production² are extremely concerning and need to be urgently addressed.

It is worth noting that the overwhelming majority of UK industry operates on a 24 hr 7 day a week basis. Therefore, in order to ensure the UK's energy transition, hydrogen ultimately needs to be like any other utility (e.g., power and water) – consistently available, at sufficient supply levels and at the right quality to match demand. To enable this, the UK will need a strategy to invest in shared hydrogen logistics including storage and distribution; these costs are too large to be managed within individual hydrogen supply projects.

¹ https://www.researchgate.net/figure/Gridded-UK-population-density-based-on-the-UK-census-at-the-5-km-5-km-grid-spatial_fig8_281137363

² <https://www.theguardian.com/business/2023/may/16/grid-connection-delays-low-carbon-projects-ofgem-energy>

Economic benefits and supply chain development:

8. How would introducing a price-based competition in 2025 for electrolytic projects, and potentially other non-CCUS low carbon hydrogen projects, impact economic benefits and supply chain development?

This is a commercial matter for companies and UKPIA cannot comment on this question in detail.

However prudent financial considerations would suggest that a price-based competition may make some projects less attractive to investors, and so negatively impact the final investment decisions. There are concerns that the supply chain may not be mature enough by 2025 for large scale electrolyser projects to effectively compete for price-based allocation.

This may lead to a smaller pipeline of projects being available, albeit with less financially attractive projects being supported. This could have also have a negative impact on the supply chains concerned.

9. How should economic benefits and supply chain development be measured and how could this be incorporated into price-based competitive allocation?

The evaluation of economic benefits has been part of the negotiation process for HAR1 and so far, appears to have operated effectively to date. This methodology should be continued, offering a consistent and demonstrable approach for LCH projects. The methodology should be reviewed at routine intervals to ensure that it remains fit for purpose as the market matures and develops.

Supply chain development is very important, although given the nature of the LCH market at present it is difficult to propose a suitable metric that should be used.

We would recommend that the identification of credible off-takers be included as an acceptance criterion for LCH projects in the same way or included in the deliverability aspect of the assessment (as off-takers are an essential element of the project deliverability). This is a critical failure risk which is not fully addressed in the current methodology.

10. How would introducing price-based competition affect developers' decisions on where and how to invest in supply chains?

This is a commercial matter for companies and UKPIA cannot comment on this question in detail.

However prudent financial considerations would suggest that a price-based competition may make some projects less attractive to investors, and so negatively impact the final investment decisions.

For international companies, options for investment will not be solely confined to UK options. Competition for investment will be influenced by LCH incentive schemes such as the US Inflation Reduction Act (IRA) or ReFuel EU.

This may lead to a smaller pipeline of projects being available, albeit with less financially attractive projects being supported.

Security of supply of hydrogen:

11. In a price-based competition, how could pots be designed to best support the 'security of supply of hydrogen'?

Under HAR1, applications which met the eligibility criteria, and the minimum deliverability score were assessed and scored against a set of defined evaluation criteria including, amongst others costs and economic benefits.

It may be possible to include a category of "security of supply of hydrogen" in this assessment and security process.

Chapter 3 questions:

12. What market conditions need to be in place for introducing price-based competitive allocation? Do you think these market conditions will be in place by 2025?

It is unlikely that conditions for low carbon electricity supply (grid) and the supply chain will have matured sufficiently to support price-based allocation for large scale LCH projects.

These factors should be kept under review through 2024 and into 2025 to confirm what market exists and whether the transition to a price-based competitive allocation is appropriate.

In the meantime, the system appears to be functioning appropriately and should be retained to enable the LCH technology and projects to develop.

13. When considering market conditions and the primary objectives/broader outcomes as set out in Chapter 2, what would be the impacts and likely outcomes of introducing a price-based competition in 2025?

This is a commercial matter for companies and UKPIA cannot comment on this question in detail.

However prudent financial considerations would suggest that a price-based competition may make some projects less attractive to investors, and so negatively impact the final investment decisions.

Options for investment may not be solely confined to UK options, and competition for investment can be influenced by LCH incentive schemes such as the US Inflation Reduction Act (IRA) or ReFuel EU.

This may lead to a smaller pipeline of projects being available, albeit with less financially attractive projects being supported.

14. If market conditions are not in place by 2025 for price-based competitive allocation, how should further allocation rounds beyond HAR2 be designed?

It is unclear what the rationale would be to change the system at this point.

The methodology currently being used for allocation appears to be functioning appropriately and should be retained to enable the LCH technology and projects to develop. Participants are also familiar with the existing scheme and unnecessary changes may cause confusion and disincentive projects from entering the pipeline.

Chapter 4 questions

15. Do you have views on how the design considerations as set out in Chapter 4 should evolve beyond HAR2? Are there any missing?

Given the state of the current LCH project delivery from HAR1 and the nascent nature of the market it is difficult to propose any additional design considerations at this stage.

In time, as LCH implementation develops, there will be a better opportunity to understand where any gaps are and to inform additional considerations (or to remove existing considerations)

16. In a price-based competition, how would you design and value non-price factors to support any of the above objectives and broader outcomes as set out in Chapter 2, noting the above non-price factor design principles in Chapter 4?

The approach being used for HAR1 and HAR2 appears to be functioning appropriately and should be retained to enable the LCH technology and projects to develop.

We note the developments that have taken place so far including changes to the rules on operational dates which came about as experience on LCH project delivery develops.

Careful consideration needs to be given to the practicality of certain eligibility criteria. For example, having an eligibility criteria for deliverability that includes having obtained planning permission could be prohibitive to large-scale projects, as it is unlikely that projects will have been sufficiently advanced to achieve this prior to submission of application into the allocation round.

The proposed deliverability criteria discuss assessing eligibility by having planning permission. However, it is unlikely that large scale projects would be sufficiently developed to be able to demonstrate this eligibility criteria under a competitive allocation process. By 2025 there is still sufficient risk and uncertainty in the project development, and projects won't have been sufficiently advanced to achieve planning permission, without having achieved a certain level of progress through the allocation round (in other words this is unlikely to be on 'on application').

Further time is recommended to allow the initial phase of LCH project delivery to be concluded and the projects to be commissioned before wholesale changes to the approach can be considered, considering the experience that this process provides.

Rushing to change the process without considering this experience risks creating a process that is not fit for purpose and does not consider the elements needed to develop a robust UK LCH production system. This has the potential to prevent the use of LCH occurring at the scale required for the energy transition.

17. Are there other more appropriate approaches for supporting these objectives and broader outcomes than through implementing non-price factors?

The approach being used for HAR1 and HAR2 appears to be functioning appropriately and should be retained to enable the LCH technology and projects to develop.

We note the developments that have taken place so far including changes to the rules on operational dates which came about as experience on LCH project delivery develops.

Further time is recommended to allow the initial phase of LCH project delivery to be concluded and the projects to be commissioned before wholesale changes to the approach can be considered, considering the experience that this process provides.

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production system. This has the potential to prevent the use of LCH occurring at the scale required for the energy transition.

18. From the mid-20s, what types of companies do electrolytic projects, and potentially other non-CCUS projects, expect to have as potential end users? Do you expect them to be geographically fixed, or flexible?

In order to achieve the UK's 2030 hydrogen targets, the projects delivered in the second half of the 2020s will need to focus on major industrial facilities, which have the ability to transition to hydrogen at world-scale volumes. These end users will be geographically fixed locations such as refineries, chemicals manufacture and steel production.

As we outline in our future of mobility report, there may be some use of hydrogen in marine or aviation applications from fixed points such as airports or large docks.

The use of hydrogen directly in transport may be limited, given the DfT approach to the banning of Internal Combustion vehicles from 2030 onwards, starting with passenger cars. Hydrogen for heavy goods vehicles has been successfully rolled out in several EU countries. If the UK policy were sufficient to support this, then we may see hydrogen demand for mobility by the mid-2020s. Hydrogen demand for mobility is expected to be a scale smaller than industrial volumes.

The production of hydrogen in large scale quantities for industry could provide a stepping stone for growth in hydrogen supply for mobility. This is particularly the case for industrial clusters, which are often located near ports and large-scale vehicle fleets for distribution.

The location of LCH production and the credibility of the offtaker needs to be carefully considered to avoid stranded production assets or the transport of LCH over large distances, which may incur significant GHG emissions.

19. For selecting an allocation body to administer price-based competitive allocation, do you agree that these are the right factors to be included in the Secretary of State's decision?

UKPA agrees that these are the right factors to be included in the Secretary of State's decision.

We would also add identification of end-users as a criterion in the deliverability of the projects as projects are unlikely to be viable without an appropriate off taker.

20. If a price competitive process adopted the concept of 'Delivery Years', similar to the CfD regime, how should we approach designing Delivery Years for non-CCUS low carbon hydrogen projects? Please set out, with evidence, if certain types of projects might require longer lead-in times?

UKPIA does not have any specific expertise in LCH project delivery and is unable to comment on this question in detail.

However, as a general principle we would support longer timeframes for large-scale hydrogen projects, as this was a considerable risk to the point of being a barrier for HAR1. A range of delivery years also offers a flexibility to the roll-out of projects.

21. For HAR1, there was a minimum size eligibility threshold for projects of 5MW. Do you think this threshold should increase for allocation rounds launching from the mid-20s, and if so, to what value? Should the same threshold apply to all non-CCUS enabled production technologies?

UKPIA does not have any specific expertise in LCH project delivery and is unable to comment on this question in detail.

However, as a general principle, a competitive allocation process would be more suitable to smaller scale projects. There should be consideration given to running parallel allocation rounds for small scale and large-scale projects and discussions with industry on potential thresholds for these.