Response ID ANON-WRPC-DF5B-W

Submitted to Hydrogen to Power: Consultation on the Need, and Design, for a Hydrogen to Power Market Intervention
Submitted on 2024-02-22 14:40:03

About you

What is your name?

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What is your organisation?

Organisation:
EUGINE – The European Engine Power Plants Association

We usually publish a summary of all responses, but sometimes we are asked to publish the individual responses too. Would you be happy for your response to be published in full?

Yes

How did you hear about this consultation?

How did you hear about this consultation?:
Email from elsewhere

Other (please specify):

Consultation Questions

Q1 What are your views on the vision we have set out for hydrogen to power?

Please respond here:

EUGINE fully supports the UK government's view that, in a decarbonised power system, hydrogen power plants will provide key low carbon flexible generation capacity and be a pathway for existing unabated gas power plants to decarbonise.

In our hydrogen-readiness definition, published in 2021, we defined different "hydrogen-readiness" levels for new power plants, ranging from "level A" plants able to run on 100% hydrogen either with an upgrade or directly, to level B and C plants, ready to run with blends. We also defined that upgrading costs for hydrogen-ready plants should not exceed 30% of the overall plant building costs.
For existing plants, EUGINE published a checklist to provide interested parties with an overview of the potential impact of switching an existing engine power plant, built for the use with natural gas, to hydrogen:
https://www.eugine.eu/h2-ready/existing-plants-2/

Since then, our members have started putting the commitments into action and most already provide the possibility to buy a hydrogen power plant. A non-exhaustive list of product portfolios and pilot projects can be found here/on our website:
https://www.eugine.eu/h2-ready/h2-readiness-in-action/

Q2 In your view, what role should hydrogen to power plants be playing in the power system? Please provide details and an explanation of your reasoning.

Please respond here:

EUGINE fully seconds the view that multiple roles and applications for H2P will exist. Hydrogen power plants will be key to ensuring grid stability and covering the residual load in times of low wind and solar PV generation (mostly in winter) or during demand peaks. When running as CHPs, they will also help cover the peak seasonal heat needs.

In a recent study carried out for EUGINE and EUTurbines, Frontier Economics finds that, in 2050, 350 GW of flexible, dispatchable power capacity will be needed in the European Union to cover residual load, especially in winter. This can include all different types of hydrogen-to-power plants, including engine-driven hydrogen power plants. The study can be accessed on our webpage:
https://www.eugine.eu/wp-content/uploads/2023/06/Frontier-Economics-Study-Clean-flexibility-for-Europes-electricity-system-03.06.2023.pdf

Q3 Do you agree with our assessment that less CAPEX-intensive plants and/or plants with ready access to low carbon hydrogen fuel could deploy in the short term without bespoke support? Please provide an explanation of your reasoning.

Please respond here:

While we do consider that bespoke support is necessary for hydrogen-to-power, we would however strongly question the general approach of separating between CAPEX-intensive and other plants - an approach that can be found in the consultation and the consultants' report.

Regarding specifically the technological assumptions, we would like to underline that the HHV efficiency level used for recips (32%) applies for certain small engines but leaves out the benefits of state-of-the-art modern engines. The efficiency of these gas engines would instead be in the range of 41 to 44% (HHV). We do have similar issues with the efficiency level taken for CHPs, which have total efficiencies ranging from 70% to 95%.

In contrast, it appears that the efficiency levels for the other technologies considered are in the upper range of their technical capabilities. In our view, it would be wrong to take a political and financial decision based on such mistaken and apparently biased assumptions.

More generally, CAPEX can indeed be a limiting factor, but it is not the main factor that will have an investment decision go forward or be blocked. Instead, our experience tells us that the main blocking factors for investments in H2P are the very large uncertainties and risks linked to the nascent hydrogen market. These risks can relate to both the physical access to hydrogen (existence of a pipeline or storage) and to the uncertainties related to the price of hydrogen. Support is therefore needed today to de-risk H2P investments for all plants, independently of their CAPEX-intensity.

Q4 What are your views on our proposal to enable hydrogen to power plants to compete in the Capacity Market as soon as practical?

Please respond here:

We agree that H2P should have access to the capacity market as soon as possible and that a bespoke market intervention such as a DPA-style mechanism should be used as a step towards this goal.
It should however be noted that not all capacity is equally available and flexible. H2P plants will help balance electricity supply and demand over different timeframes, from minutes to several consecutive weeks. Therefore, an excessively simple design that would select capacity without taking into account the specific system needs would, in our view, not be efficient. The requirements for capacity mechanisms should include the capability to serve different flexibility timeframes.

Q5 Are there any additional changes to existing markets which could support the deployment of hydrogen to power? Please provide details and an explanation of your reasoning.

Please respond here:

Q6 Do you agree with the risks and barriers to hydrogen to power deployment that we have identified? Please provide an explanation of your reasoning.

Please respond here:

As already stated in our reply to Q3, we are of the view that the main risk is the dependence on nascent critical enabling infrastructure, notably hydrogen fuel supply risks and potentially high costs of available low carbon hydrogen, and not so much the risks linked to the technology itself.

While uncertainty from H2P being a First of a Kind (FOAK) technology exists, it is low. Engine power plants have since long been able to run on hydrogen and can do so with limited upgrades to the existing natural gas plant. While some additional costs exist due to additional or increased requirements linked to using hydrogen as a fuel, the price differences between natural gas and hydrogen plants will quickly even out as H2P orders increase and economies of scale are reached.

We can therefore only agree that, for H2P to be effective in supporting power sector decarbonisation, security of supply, and to bring down technology costs, it is key for H2P to be deployed as quickly as possible.

Q7 In your view, what should industry's role be in addressing the barriers that we have identified? Please provide details and an explanation of your reasoning.

Please respond here:

Q8 Are there any other potential risks and barriers that we should be considering? If so, which ones? Please provide details and an explanation of your reasoning.

Please respond here:

Q9 Do you agree with our assessment that bespoke hydrogen to power market intervention is required to mitigate our identified deployment barriers and accelerate the deployment of hydrogen to power plants, likely those which are more CAPEX-intensive? Please provide an explanation of your reasoning.

Please respond here:

We fully agree that bespoke hydrogen to power market intervention is required to mitigate deployment barriers and accelerate the deployment of hydrogen to power plants, without any difference when it comes to CAPEX-intensity. As already stated, the main risks come from the nascent hydrogen

market. Those risks are the same for any kind of technology and application and independently of the CAPEX-level.

For an efficient and competitive market to develop, we therefore strongly advise to design the market intervention is such a way that a level playing field exists between different "technology archetypes".

Q10 Have we considered all credible market intervention options for hydrogen to power? Please provide details of any design options you think we may have missed and explain your reasoning.

Please respond here:

Q11 Do you agree with our shortlisted three market intervention design options? Please provide an explanation of your reasoning.

Please respond here:

Q12 Have we accurately identified the benefits and risks of a DPA-style mechanism? If not, are there any further benefits and risks to consider? Please provide details and an explanation of your reasoning.

Please respond here:

Q13 Do you agree with government's assessment that a mechanism based on the Dispatchable Power Agreement is the most suitable option for bespoke hydrogen to power market intervention to support the accelerated deployment of hydrogen to power? Please provide an explanation of your reasoning.

Please respond here:

We understand and support the reasons why a mechanism based on the "Dispatchable Power Agreement" (DPA) is preferred. We agree that, for the technology to develop, an availability payment and a variable payment are needed. As hydrogen becomes available and competitive, the variable payment could be phased out and the plants could compete in the capacity market.

For the allocation of contracts, we would however strongly recommend starting with a price-based competitive allocation right away and only fall back on bilateral negotiation if not enough projects are presented to cover capacity needs.

As regards the scope of the mechanism, we strongly encourage the UK government to take a technology neutral approach. Limiting the planned support to "CAPEX-intensive" plants only will not lead to an efficient outcome, neither from an energy-system nor from a financial point of view.

Q14 What are your views on the need for a Variable Payment? Please provide details and an explanation of your reasoning.

Please respond here:

As long as hydrogen does not become competitive with other fossil fuels, a variable payment is needed to bring H2P down in the merit order.

Q15 Have we accurately identified the benefits and risks of a Split CM? If not, are there any further benefits and risks to consider? Please provide details and an explanation of your reasoning.

Please respond here:

Q16 Do you agree with our proposal to discount the Split CM as an option for bespoke hydrogen to power market intervention to support the accelerated deployment of hydrogen to power? Please provide an explanation of your reasoning.

Please respond here:

We agree that a split CM would be less effective at supporting FOAK H2P plants, due to the expected high clearing prices making it challenging for plants to compete against more mature technologies. In the longer run, once the fuel and cost risks are addressed, our preference would however go for H2P participating in the capacity market, potentially split in auctions according to different capabilities (for example, the capacity to provide both short and long-term flexibility and other ancillary services).

Q17 Have we accurately identified the benefits and risks of a Revenue Cap and Floor? If not, are there any further benefits and risks to consider? Please provide details and an explanation of your reasoning.

Please respond here:

Q18 Do you agree with our proposal to discount the Revenue Cap and Floor as an option for bespoke hydrogen to power market intervention to support the accelerated deployment of hydrogen to power? Please provide an explanation of your reasoning.

Please respond here:

Q19 What is your view on the need for price-based competitive allocation within/between bespoke business models versus moving assets straight to a technology-wide competitive market? Please provide an explanation of your reasoning.

Please respond here:

We are convinced that price-based competitive allocation within bespoke business is the right way to cost-efficiently de-risk investments in H2P, especially when the technology has reached a technology readiness level (TRL) beyond demonstration – as it is the case with hydrogen-to-power plants.

Q20 How should a bespoke hydrogen to power business model be evolved to promote competition between low carbon flexible technologies? Please provide details and an explanation of your reasoning.

Please respond here:

Competition in a same market brings efficient outcomes if the product or service provided is the same. If different services are needed, it could make sense to split the market, while still allowing a same supplier to apply in different tenders. The capacity of H2P plants to provide flexibility in different timeframes should be used and rewarded accordingly.

Q21 What are your views on the alignment of hydrogen support and policies needed to enable the deployment of hydrogen to power capacity. Please provide details and an explanation of your reasoning.

Please respond here:

Q22 Do you have any reflections on the feasibility of hydrogen producers, or qualifying offtakers, to facilitate the volume of storage required for hydrogen to power – for example, regarding sourcing finance/capital? Please provide details.

Please respond here:

Q23 What are your views on the feasibility of developing commercial arrangements between hydrogen producers, storage providers, and electricity generators that meet the Hydrogen Production Business Model (HPBM) requirements relating to Risk Taking Intermediaries (RTIs)?

Please respond here: