

Report: Design options for a European Hydrogen Bank (EHB)

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This report

Starting point of this report

- Announcement by Commission President von der Leyen in State of the Union address (Sep '22) to establish the European Hydrogen Bank as a flagship initiative
- Until the publication EC Communication on the European Hydrogen Bank of March '23 few design details and specific policy objectives were publicly available.

Objective of this report

- Outline potential high-level functions and objectives the European Hydrogen Bank could fulfil
- Describe and assess potential design choices for the European Hydrogen Bank
- Derive conclusions and recommendations on a suitable design choice for both the domestic and the imports pillar

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DESIGN OPTIONS FOR A BANK

REPORT FEBRUARY 2023

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Design options assessed for the European Hydrogen Bank



Double-sided auctions for supply and demand contracts



Supply- or demand-side auctions determining market premiums



Default guarantees for hydrogen producers

Double-sided auctions for supply & demand contracts

European Hydrogen Bank would

- 1. auction (long-term) purchase contracts to hydrogen or derivative producers (supply-side auction),
- 2. sell procured H2 or derivative volumes as (short-term) sales contracts to offtakers (demand-side auction),
- 3. allocate the public funds to cover the determined price gap between H2 costs and willingness to pay

Result: H2 contracts are awarded to lowest-cost suppliers and offtakers with the highest willingness to pay.



Double-sided auctions for supply & demand contracts



Double-sided auctions are **effective** in covering the cost cap of green H2, reducing investment risks and matching suppliers and offtakers.



They enable competitive price discovery, but the intermediary assumes **substantial marketing and price risks.**

Different contract durations on the demand and the supply side require support giver to reserve a **large budget** to ensure support payments throughout the support period.



Double-sided auctions are relatively **complex to design and implement** since intermediary would design and enter complex contracts.



Supply- or demand-side auctions with market premiums

Supply-side auctions address H2 producers, receiving (upon award) operational support for each unit of H2 produced.

Bidders requiring the lowest premium to fulfil a bilateral purchase contract of green H2 with a chosen offtaker are awarded.



Demand-side auctions address green H2 users, such as a steel plant, receiving (upon award) a premium for each unit of hydrogen consumed.

Offtakers requiring the lowest premium to close the gap between their willingness to pay & required offtake price for green H2 are awarded in the auction.



Supply- or demand-side auctions with market premiums



One-sided auctions are **effective** in closing the cost gap of green H2 but do not hedge against default and marketing risks and do not provide explicit matchmaking.



Auction-based allocation of premiums **minimize support € per kg of H2 secured** under the condition of sufficient competition.

Marketing and default risks are not assumed by support scheme; thus, no additional budget needs to be reserved to ensure support payments over time.



One-sided auctions do not require the support giver to enter complex and potentially novel contractual arrangements.



Default guarantees for hydrogen producers

Default guarantees hedge against difficult to estimate risks related to potential default events in H2 take-or-pay contracts that are outside the control of the hydrogen producer

This includes **risks** related to:

- completion of import or transport infrastructure (e.g., pipelines, terminals)
- transportation (e.g., by ship),
- default by the hydrogen offtaker (e.g., due to bankruptcy, delay in commissioning industrial installation, shutdown of project)

In case of a **default event**, the default guarantee allows the producer to be **compensated** for the loss of not being unable to sell the H2 produced or at a lower price than initially agreed.

Risks not covered (calculable business risk that can be efficiently assumed by the producer)

- Risk of production loss
- Price risk (e.g., fluctuating hydrogen offtake price)

Default guarantees for hydrogen producers



Default guarantees **reduce investment risks** but **do not close the funding gap** of green H2, thus need to be combined with other instruments to close the funding gap.



Default guarantees can **leverage the H2 scale-up** by reducing (unproductive) risks outside the control of the producer.

Design should ensure that actors are **not incentivized** to engage in risky transactions.



Default guarantees are relatively **straightforward in their design** (potentially drawing from established experience with export guarantees), but may require the build out of dedicated capacities to determine default cases and execute guarantees



Recommendations



For the domestic pillar, consider supply-side auctions allocating fixed premiums

- ✓ High support cost effectiveness, good market orientation and effectiveness.
- ✓ Relatively easy to implement and administer, especially if combined with fixed premiums
- ✓ They do not take away all market risks for domestic investors



For the imports pillar, consider double-sided auctions under certain circumstances

- ✓ May increase effectiveness for exporting countries with unreliable regulatory frameworks, or high political and delivery risks.
- ✓ Provides high incentives for making the required H2 or H2-based derivative volumes available



Recommendations



In most cases, consider supply- side auctions for the imports pillar as well

 ✓ Under most circumstances they may allow for a more efficient use of available public funds (limited available funding and high initial funding gaps)



Consider default guarantees as a risk-hedging instrument under the imports pillar to cover difficult to estimate default and delay risks for private HPAs

- ✓ Provide additional investment security and increase the effectiveness to secure imports
- ✓ Can help tapping into additional import potentials that would otherwise remain unused



Default guarantees can also serve as a parallel, stand-alone support instrument for H2 or derivative producers without funding needs.

✓ Can contribute to a parallel market-ramp up facilitating a self-sustaining H2 market





Backup

Summary

Objective	Double-sided auctions for supply and demand contracts	Supply- or demand-side auctions determining market premiums	Default guarantees
Effectiveness	+	0	-
Cost effectiveness	0	+	+
Market orientation	-	+	+
Low Complexity	-	0	0

EHB: Background & Objectives

Background

State of the Union address (Sep '22)

- Announcement to establish the European Hydrogen Bank as a flagship initiative for the upcoming year
- €3 billion from the Innovation Fund to guarantee purchase of hydrogen

COM communication on EHB (Mar '23)

- EHB to be operationalized until end of '23
- First pilot auctions to take place in autumn '23 and endowed with € 800 million from Innovation Fund.

Objectives

- Contribution to RePowerEU goals
 - 10 million tons of green hydrogen produced domestically (i.e., within the EU) by 2030,
 - 10 million tons of imports from outside the EU by 2030
- Cover the **initial funding gaps** between green hydrogen and fossil-based alternatives to
 - ensure sufficient availability of hydrogen and its derivatives across the EU
 - kick-start the market uptake of hydrogen production and applications in the EU
- Alignment with Green Deal Industrial Plan and Net Zero Industry Act (e.g., electrolyzer manufacturing, industry competitiveness, EU companies participating in international markets)

EHB: Envisaged set-up

At its core, two funding mechanisms for EU green hydrogen production and imports from third countries are envisaged



Source: European Commission Communication on the European Hydrogen Bank, 16.3.23, COM(2023) 156 final.

Domestic pillar

- Goal: Support the scale-up of domestic hydrogen production in EU
- Proposed option: Supply-side auctions allocating fixed premiums per kg H2 (auctions planned for autumn '23, executed by CINEA)
- Funding Source: Innovation Fund (€ 800 mn)
- Detailed auction design currently elaborated

Imports pillar

- Goal: Securing diversified import of hydrogen (derivatives) from outside the EU
- · Currently no detailed design and funding source

EHB: Policy objectives assessed

Policy instruments should help first movers address the cost gap between green H2 & fossil-based alternatives impeding a market- driven ramp-up

Ideally, EHB policy instruments should be

- 1. Effective
- ✓ Close funding gap
- ✓ Increase investment security
- ✓ Match suppliers and offtakers

2. Cost-effective

- ✓ Make efficient use of public funds
- ✓ Limit budget uncertainty for support giver

3. Market oriented

- ✓ Do not crowd out alternative marketing routes
- ✓ Incentivize a market that can operate without support in the mid- and long-term
- 4. Simple to design and implement for authorities and market participants



Double-sided auctions for supply & demand contracts



Double-sided auctions are effective

Cover the cost gap between green H2 and fossil-based alternatives, reduce investment risks and match suppliers and offtakers in the absence of a liquid market.

Especially in the initial market phase, the instrument creates high incentives for making H2 volumes available Double-sided auctions are not the most costeffective option and likely lead to limited volumes procured

Enable competitive price discovery on demand and supply-side & can adapt to shrinking price gap

High funding requirements, especially in the early market phases, since full funding gap is covered.

High risks and liabilities for the support giver to market the procured volumes Double-sided auctions demonstrate limited market orientation

Almost all marketing, price and default risks are largely taken over by the support giver (no direct contractual relationship between offtaker and producers)

Private risk hedging strategies and alternative marketing routes outside of the support scheme (e.g., bilateral HPAs) are not required.



Double-sided auctions are relatively complex to design and implement

Intermediary would design and enter complex contracts, which requires relevant expertise and capacities.

Supply- or demand-side auctions with market premiums



One-sided auctions are effective but do not hedge against certain (default) risks

Close the funding gap between cost of producing green H2 and willingness to pay by offtakers.

Bilateral HPA will be required to participate

Do not hedge market participants against default and marketing risks.

Does not provide an explicit matchmaking

One-sided auctions are a cost-effective option

Auction-based allocation of premiums minimize support € per kg of H2 secured (condition: sufficient competition)

Market participants need to enter bilateral HPA \rightarrow marketing and default risks not assumed by support scheme \rightarrow no additional budget needs to be reserved to ensure support payments over time.

One-sided auctions demonstrate high market orientation

Producers and offtakers remain responsible to negotiate and enter bilateral HPA and assume the resulting risks and liabilities resulting from these contracts.



One-sided auctions are relatively simple to design and implement (especially with fixed premiums)

Do not require the support giver to enter complex and potentially novel contractual arrangements.

Implies regular disbursement of support payments, but with fixed premiums design and implementation is straightforward.

Default guarantees for hydrogen producers



Default guarantees reduce investment risks but do not close the funding gap of green H2

Do not close the funding gap of green H2

Reduce investment risks that are outside the control of the producer.

Do not provide sufficient incentives to procure H2 volumes as a stand-alone instrument, thus would have to be combined with other instruments.

Default guarantees are a cost-effective option

Can leverage the H2 scaleup by reducing (unproductive) risks outside the control of the producer.

Little risk of overcompensation since payments only arise in case of actual default event

Design should ensure that actors are not incentivized to engage in risky transactions.



Default guarantees are compatible with a market-driven H2 uptake

Default guarantees are a de-risking instrument for bilateral contracts between market participants;

They do not provide subsidies or cover price risks, thus are less distortive than other support options. Default guarantees are relatively simple to design and implement

Relatively straightforward in their design (potentially drawing from established experience with export guarantees)

Do not require a regular disbursement of support

May require the build out of dedicated capacities to determine default cases and execute guarantees.