BHC Baltic Sea Hydrogen Collector

Enabling a Resilient European Hydrogen Economy: EU-level De-risking Tools for European Hydrogen Transport Infrastructure

Baltic Sea Hydrogen Collector

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Regulatory Whitepaper

EXECUTIVE SUMMARY

Energy security, affordability, and industrial competitiveness have returned to the center of Europe's energy agenda. To meet these challenges while delivering on climate targets, Europe must accelerate the development of a cost-efficient and resilient energy system – one that better integrates renewables via hydrogen, further strengthens internal energy supply, and reduces dependence on fossil fuels. Green and low-carbon hydrogen produced via electrolysis will play a central role. It supports grid flexibility, enables large-scale energy storage, and provides a viable solution for decarbonizing hard-to-abate sectors. Producing hydrogen where renewable energy is most cost-effective and transporting it via cross-border pipelines to demand would unlock these benefits at scale and at the lowest cost. Development of cross-border hydrogen infrastructure plays a crucial role in creating access to low-cost renewables, enabling the emergence of local industrial ecosystems and value chains, and providing the flexibility and resilience needed for a decarbonized energy system. By ensuring predictable transport capacity and connecting regional markets, such infrastructure supports both competitiveness and the integration of renewable energy sources across the EU.

Scaling the hydrogen economy is contingent on the build-out of a pan-European hydrogen transmission network. The Baltic Sea Hydrogen Collector (BHC) is an example of a cross-border hydrogen pipeline. With a length of 966 km and its 120 TWh capacity, this offshore pipeline is designed to connect Finland with Germany, and, at a later stage, Sweden and other markets (e.g. Poland, Denmark and the Baltic States). By efficiently linking hydrogen production and consumption across borders, the project strengthens EU energy sovereignty, improves access to cost-competitive green and low-carbon electrolytic hydrogen, and reduces exposure to external supply risks. Through its substantial transport capacity connecting key supply and demand regions, the pipeline furthermore supports the scale-up of the hydrogen sector, enabling synergies that lower production costs and enhance market integration.

However, the early-stage nature of the hydrogen market poses significant investment risks, particularly around the timing of market ramp-up and initial pipeline utilization. These risks cannot be carried by private investors alone, especially as hydrogen infrastructure competes for capital with lower-risk investments such as power grids. Without targeted de-risking mechanisms, the build-out of hydrogen transmission will stall. While national governments may carry risk for domestic projects, cross-border infrastructure like BHC calls for a shared EU-level approach. The benefits – market integration, decarbonization and energy supply resilience – are union-wide, and so too should be the financial responsibility. This white paper presents a proposal for an EU-level de-risking framework based on an intertemporal cost allocation (ITCA) model. The mechanism combines an EU-backed budget guarantee possibly rooted within the Connecting Europe Facility (CEF) and the European Competitiveness Fund (ECF), with an amortization account, which we propose is centrally managed by an EU-level financial institution. Given its mandate, expertise, and existing role in EU investment instruments, the European Investment Bank (EIB) would be well-positioned to take on this task should the legislators choose such a model. The approach provides upfront financial support during the low-utilization ramp-up phase, with repayments structured through future tariff revenues as the market matures.

The proposed model aims to ensure cost-reflective tariffs and investor confidence while maintaining regulatory transparency. It is essential that the legal basis for this mechanism is clarified and integrated within relevant, upcoming legislative initiatives, and reflected in the ongoing negotiations on the EU Multiannual Financial Framework. Adequate resources and a clear mandate for an implementing partner, such as the EIB, is essential. A coordinated EU-level effort can play a vital role in enabling the hydrogen backbone to develop in line with Europe's climate, competitiveness, and energy security goals.

ADDITIONAL DE-RISKING TOOLS ARE NEEDED TO ENABLE CROSS-BORDER PROJECTS

Establishing transmission pipelines at an early stage is critical to send a clear market signal to enable the development of projects along the value chain and to unlock financing for both green and low-carbon hydrogen production and end-use demand. Yet, high upfront investment costs combined with low initial flows push network tariffs above what first movers will accept. This not only creates a tariff–volume gap but also exposes infrastructure developers and investors to significant financial risk, as they must commit vast amount of capital long before demand has fully materialized. By making anticipatory investments and implementing pan-European de-risking and financing models that are specifically designed for a market that is still in its infancy, Europe can enable the build-out of the needed infrastructure while ensuring competitive tariffs throughout the ramp-up phase.

While hydrogen transmission projects are progressing in countries like Denmark, the Netherlands, and Germany as a result of comprehensive state support, most cross-border projects continue to face substantial investment risks that must be mitigated to attract private capital. Direct support through increased funding under the Connecting Europe Facility (CEF) marks an important step forward; the proposed increase in the CEF Energy budget to €29.9 billion in the next MFF is therefore welcomed. While CEF funding provides a solid foundation for supporting energy infrastructure, complementary and innovative EU level de-risking tools are essential, given the significant investment needs of EU energy infrastructure, estimated to be at over €1.3 trillion until 2040 for electricity alone [1], and the limited accessibility for individual projects. Other risk sharing tools available at EU level, such as the Cross-Border Cost Allocation framework, fall short of meeting the specific needs and high uncertainty of a nascent hydrogen market.

To overcome these barriers, hydrogen-specific de-risking mechanisms are therefore needed to secure attractive financing that moves beyond simple cost shifting. Future mechanisms should allow for the gradual recovery of costs over time and distribute them more widely as markets mature. Importantly, the design of a de-risking mechanism should account for the unique risk profile of cross-border and offshore hydrogen infrastructure.

[1] European Commission: Directorate-General for Energy, Artelys, LBST, Trinomics, Finesso, A. et al. (2025), Investment needs of European energy infrastructure to enable a decarbonised economy – Final report, Publications Office of the European Union. Online access: https://op.europa.eu/en/publication-detail/-/publication/864c619c-e386-11ef-be2a-01aa75ed71a1/language-en

These projects typically face greater coordination and financing challenges than purely national projects. They are also less likely to secure sufficient state aid, making the case for an EU-level de-risking instrument strong. Combining CEF-support with an EU-wide amortization account backed by EU guarantees would thus fill a critical gap, offering targeted, repayable support that helps solve the fundamental chicken-and-egg problem while avoiding long-term market distortion.

PROPOSING A EUROPEAN DE-RISKING FRAMEWORK TO MEET THE INVESTMENT CHALLENGE

Establishing EU-level amortization accounts and an intertemporal cost allocation mechanism could significantly de-risk cross-border hydrogen infrastructure, offering clear advantages over fragmented national approaches. Building on models already in use in Member States like Germany, this proposed EU-wide framework would enable institutions like the EU Investment Bank (EIB) to provide operational loans. These loans would allow covering regulated costs and cap tariffs during market ramp-up, with repayments drawn from future tariff revenues as the market matures. To mitigate financial risks in case of market failure, complementary EU-level guarantee schemes would play a key role to unlock investment capital and enable project realization. Pursuing a solution on EU level offers strategic advantages: it fosters political alignment, strengthens commitment to projects of European interest, and streamlines legal and regulatory compliance. By pooling EU guarantees and harmonizing tariff mechanisms, it enables economies of scale and regulatory consistency across hydrogen corridors. Standardized rules and centralized guarantees reduce project risks and boost investor confidence. As hydrogen corridors integrate energy markets, they lower system-wide prices and enhance competitiveness, even beyond directly connected regions. A centralized mechanism can also safeguard supply security and ensure a level playing field, enabling the most cost-effective projects to be realized across the Union. Realizing this potential will require further analysis and legislative action, particularly to empower a centralized implementing partner, such as the EIB, to manage the instrument and issue loans to the amortization account directly or via other implementing partners. Adequate resources in the next Multiannual Financial Framework (MFF) would also be needed. Currently, European H2 pipeline infrastructure investments needs are estimated at €63–106 billion between 2028 and 2040[2]. In addition, EU-level guarantee schemes should be clearly defined and agreed upon with Member States.

To aid policymakers, the following section outlines the potential structure, key components, and regulatory framework of the proposed European approach, highlighting its core elements – the amortization account, intertemporal cost allocation model and EU budget guarantees.

2 European Commission: Directorate-General for Energy, Artelys, LBST, Trinomics, Finesso, A. et al. (2025), Investment needs of European energy infrastructure to enable a decarbonised economy – Final report, Publications Office of the European Union. Online access: https://op.europa.eu/en/publication-detail/-/publication/864c619c-e386-11ef-be2a-01aa75ed71a1/language-en

Amortization Account: At the core of the model stands the EU amortization account, provided with EU-guaranteed operational loans to allow HTNOs to cover revenue shortfalls during the early operational years. We propose the amortization account to be a centrally managed financial instrument overseen by a centralized implementing partner such as the EIB, with clear roles and responsibilities defined for involved institutions as presented in Figure 1.

Eligible cross-border hydrogen infrastructure projects should access support from the EU-wide amortization account through transparent, EU-level open calls coordinated by the European Commission and CINEA. Under the proposed model, projects would be eligible for tailored support based on a set of predefined criteria, such as cross-border relevance, advanced maturity, regulatory alignment, and financial need. Project selection should be coordinated with TEN-E and relevant EU instruments such as the Connecting Europe Facility (CEF), InvestEU, and the European Competitiveness Fund (ECF). The ECF is particularly designed to facilitate blended financing via grants, guarantees, and loans, thereby enabling scalable funding structures suited to hydrogen market development. In a broader context, the use of ETS- and CBAM-related revenues could be explored as a complementary element within such an EU-level financing framework.

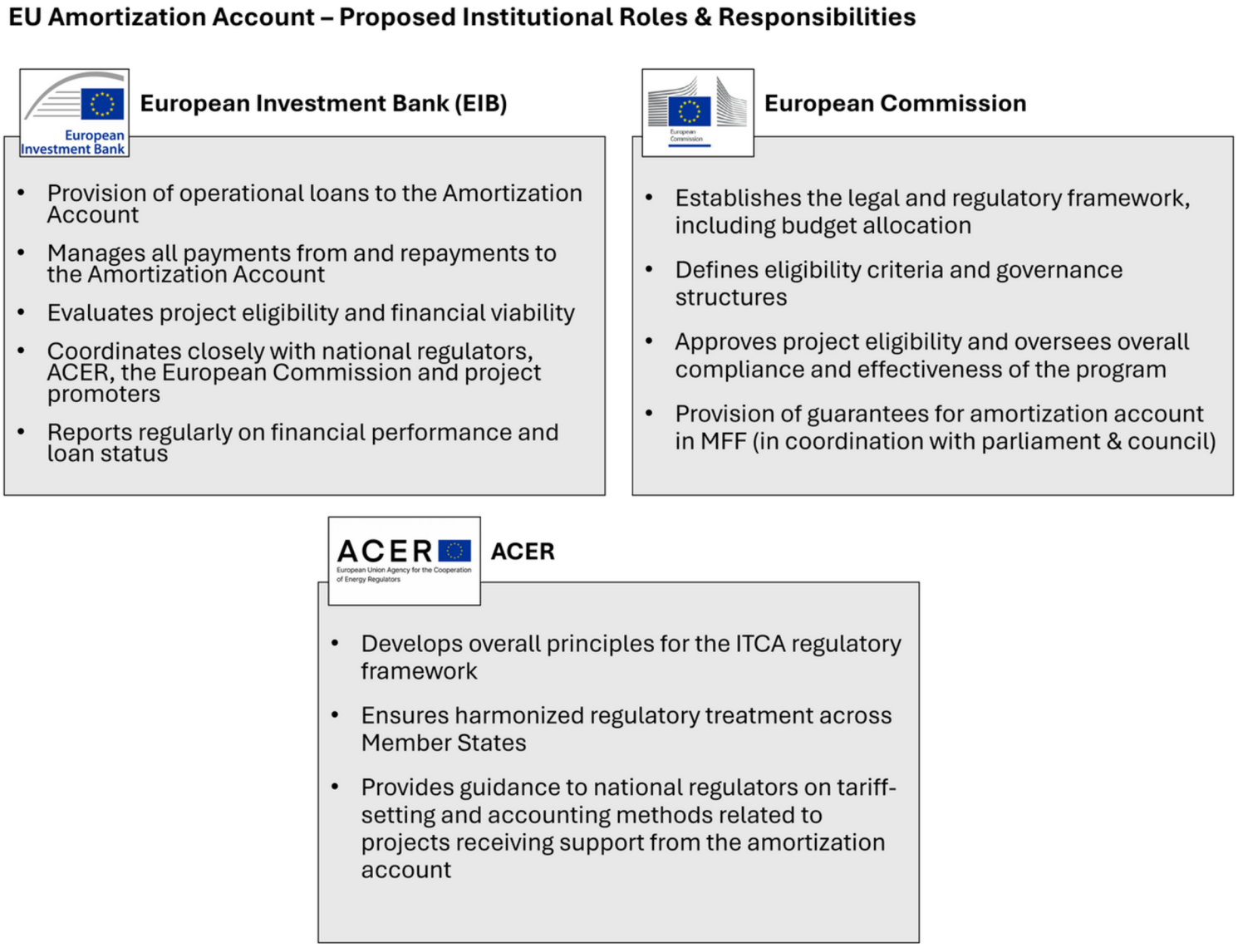


Figure 1: Possible Institutional Roles & Responsibilities for an EU Amortization Account.

On the proposed model, operational loans provided by the EIB would be calculated based on the gap between allowed and realized revenue, serving as temporary financial support rather than subsidies. They would not affect the regulated asset base or allowed revenue, preserving regulatory integrity. Repayments would be facilitated through regulated tariffs, aligned with national structures and the ITCA repayment schedule for the asset. To maintain tariff stability, national regulators would adjust tariffs periodically, while asset owners balance the amortization account to allow the repayment of loans with interest.

If market growth falls short of projections, the ITCA schedule allows for flexible adjustments based on revised forecasts. Only after all safeguards are exhausted would the EIB activate the EU-level guarantee to cover outstanding repayments, ensuring investor confidence and preserving the credibility of the mechanism.

The deployment of EU level amortization accounts as derisking and financing tools for cross border hydrogen infrastructure requires a clear and robust legal basis at Union level and recognition of resource needs in the next Multiannual Financial Framework. This includes defining budgetary allocations, eligibility criteria, and governance structures. Moreover, it should potentially be linked to TEN-E and PCI frameworks and clarify the roles of key implementing partners such as the European Investment Bank and ACER. Drawing on precedents like InvestEU, the legal framework should ensure compliance with the EU Financial Regulation.

Targeted amendments to existing and forthcoming legislative frameworks, such as the TEN-E, CEF and the ECF Regulation, may therefore be necessary to anchor amortization accounts and to integrate mechanisms such as ITCAs into EU financial instruments. In this context, the BHC welcomes the European Commission's acknowledgment of the need for a stronger role of the EU budget in derisking private investment in the recently published Grids Package and the accompanying announcement of a Clean Investment Strategy. However, these initiatives fall short of providing a concrete and enforceable framework for derisking. What is now urgently needed is concrete legislative action in the form of tailored and explicit legal provisions. These provisions should establish a clear mandate and necessary legal foundation for the development and implementation of EU-level derisking mechanisms.

Intertemporal Cost Allocation (ITCA): The ITCA regulatory model should ensure consistent treatment of EU amortization account loans and repayments across hydrogen infrastructure projects. Regulators should be able to transparently account for both initial EU-level financial support and subsequent repayments via tariff revenues.

At the same time, a coherent financing model should allow national funding schemes to coexist with European approaches for cross-border infrastructure, ensuring fair revenue allocation among member states. To support this, we propose that ACER could develop a standardized ITCA methodology for EU level amortization accounts, including criteria for tariff adjustments in response to evolving market conditions. This framework would enhance repayment transparency, ensure regulatory consistency, and strengthen investor confidence across the EU.

EU Budget Guarantee: The amortization account should be backed by EU budgetary guarantees, following a model similar to InvestEU. The required level of EU financial guarantees and the achievable leverage potential are, however, strongly dependent on the specific risk profile and bankability of projects as well as the development of the hydrogen market. Consequently, determining the appropriate guarantee amount and leverage will require ongoing and close engagement with relevant stakeholders from the financial sector, particularly with institutions such as the EIB.

Under the proposed Multiannual Financial Framework (2028–2034), the Commission plans to allocate €70 billion in guarantees to de-risk high-risk investments and unlock private capital. Implementing partners such as the EIB or national banks could tailor this instrument to offer low-interest loans, with predictable repayments through tariff revenues. This guarantee mechanism would significantly boost investor confidence and accelerate early-stage project development.

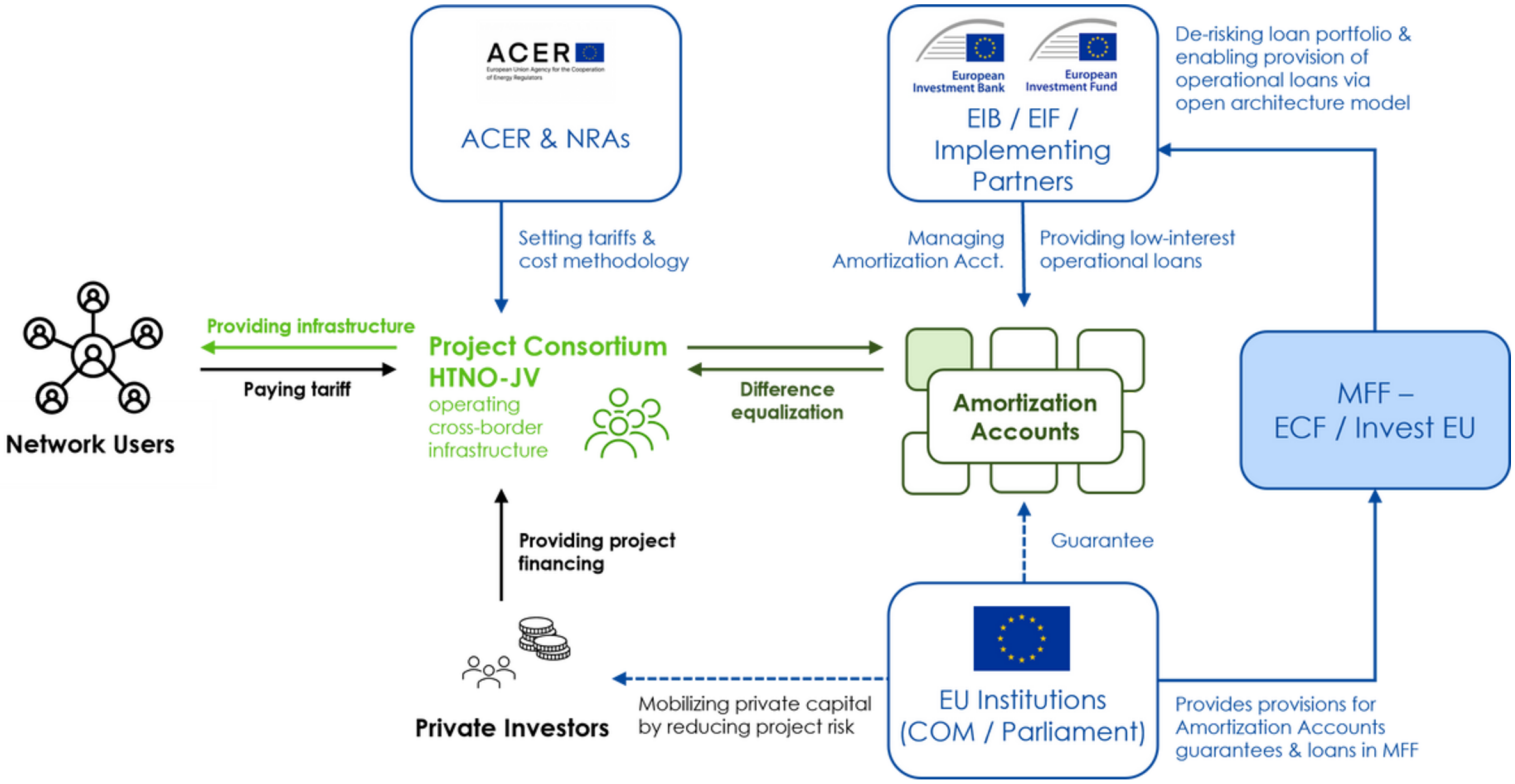


Figure 2: Overview of the proposed de-risking model, delineating institutional roles and responsibilities.

RECOMMENDATIONS & NEXT STEPS

Cross-border hydrogen infrastructure provides access to low-cost renewable resources, strengthens local industrial ecosystems, and enhances the flexibility and resilience of the European energy system. By supporting the timely development of such strategic assets, EU-level de-risking tools can help the Union meet its broader climate, competitiveness, and energy security objectives. Building on these benefits, we recommend the following next steps to support the practical implementation of the proposed mechanisms.

- **Ensure legal basis & provide necessary mandates:** A clear legal foundation, in particular through TEN-E, CEF and ECF, together with appropriate institutional mandates (in particular the EIB), is needed to enable the implementation of ITCA-based derisking mechanisms on EU level. Such clarity will also send positive signals to project promoters, reassuring them to advance projects from the drawing board toward FID so that cross-border hydrogen pipeline networks can be ready when required in the early 2030s.

- **Earmark future budgetary provisions under the next MFF:** Future spending regulations in the upcoming Multiannual Financial Framework should include dedicated provisions that enable the EU to operationalize the mechanism. Such earmarking would allow the EU, for example through an implementing decision, to allocate resources and ensure the financial capacity required to support the de-risking framework.

- **Establish a coordinated roadmap:** A structured pathway under the coordination of the European Commission should be established to clarify the steps, actions, and governance needed to implement an ITCA-based EU-level de-risking mechanism and advance the EU amortization account model.

- **Define the EU-level amortization account model:** A dedicated EU task force (Commission, EIB, ACER, ENNOH) should define the detailed design of the amortization account mechanism, including its financial mechanics, budgetary guarantees, funding envelope, and eligibility rules (e.g. PCI).

APPENDIX

A – Case Study: Exemplary analysis for an archetypal large-scale cross-border H2 pipeline

- The CAPEX cost of €7.5 bn for an archetypal pipeline project is based on publicly available data and is not representative of the BHC project.
- Transport unit costs are capped at 0.3 EUR/kg/h2, which means costs need to be intertemporally shifted in early years
- Pipeline throughput is assumed to initially be at 10% of technical capacity, with steady annual growth during the first 15 years of operation (market ramp-up phase).

48" offshore pipeline 900km with Q1 2033 COD

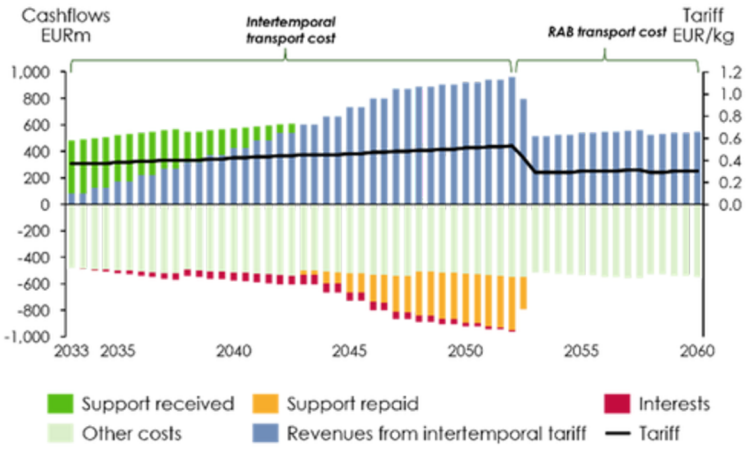
CAPEX (European Hydrogen Backbone)	7.5 EURbn (nom)
OPEX (European Hydrogen Backbone)	432 EURm (nom) 1st year
Funding	• No CEF funding for CAPEX included.
Regulation	• Intertemporal cost allocation • Amortization account with financial guarantee
Transport costs	• Intertemporal transport cost fixed at 0.3 EUR/kg/h2 ~ 9 EUR/MWh (real 2023) (Assumed competitive level)
Throughput	• 15 TWh at COD (10 % utilization) • 120 TWh by year 15 (80 % utilization)

Estimated support Levels required

Modelling results:

- Amount of support: 5.0 EURbn, nom
- Interest paid[3]: 1.8 EURb, nom
- Amortization account rebalanced after: 22 years

Cashflows and tariff to 2033-2060



Notes: 1) Cost data used from European Hydrogen Backbone Study – 2023; 2) Over operational period, assuming 60% gearing; 3) Interest costs reimbursed through tariff revenues;

Figure 3: Quantitative analysis of an archetypal large-scale H2 pipeline project to illustrate the overall range of support levels and repayment periods. It should be noted that model assumptions are not representative of the BHC project.

To provide an understanding of the overall range of necessary support levels for hydrogen infrastructure, financial modelling was conducted for an archetypal large-scale hydrogen pipeline project. Due to the early stage of market development, significant uncertainty remains regarding key parameters and outcomes. It should be noted that depicted model assumptions are not representative of the BHC project.

The results indicate that the support level required in the form of loans for such projects could be in the range of €5.0 billion (nominal). The level of nessesary EU financial guarantees and the achievable leverage potential are, however, strongly dependent on the specific risk profile and bankability of projects as well as the development of the hydrogen market. Consequently, determining the appropriate guarantee amount and leverage will require ongoing and close engagement with relevant stakeholders from the financial sector, particularly with institutions such as the EIB.

In the scenario modelled, the amortization account would be rebalanced after 22 years, with €1.8 billion nominal interest paid. Sensitivity analyses on CAPEX, pipeline utilization, and the level of direct support via CEF grants further highlight the strong uncertainty of current estimates, affecting both the necessary support and the duration of the repayment period.

B – Overview of the European Framework as the preferred solution for cross-border H2 infrastructure & comparison with national or regional approaches

		Preferred Model for Cross-Border Projects	Suitable for National Assets
		A **European** amortization account + EU guarantees	**B** (Joint) amortization account on **member state level** + state guarantees
Concept	Mechanism	• At regulated cost with initial tariff set to recover costs at pre-defined pay-back date → Late profits offset initial deficits	• Same as A
Concept	Core Element	• Initial, adjustable network charge	• Same as A
Concept	Duration	• Depreciation period with early cancelation option by EU	• Depreciation period with early cancelation option by involved MS
Institutional Design		• **Loans** provided to amortization account through **European development bank (EIB)** or other implementing partners • Amortization account via **EIB** • **EU guarantees**	• **Loans** provided to **amortization account** through **national development facilities of MS** • Amortization account managed by **national development facility** • **State guarantees**
Requirements		• **Recovery** of deficit by future H2 network users	• Same as A
		• New EIB mandate for establishing European amortization account & provision of loans • Eu guarantees • Overall recognition within EU MFF	• Requires national legislative frameworks in each MS for setting up national development facilities • Political agreement for joint amortization account
Evaluation for Cross-Border Projects		+ **Universal applicability across corridors** + Utilizing existing institutions such as EIB + Ensuring level playing & market competitiveness, thus minimizing H2 cots across EU + One-stop-shop reducing administrative burden & reducing perceived risk through increased regulatory consistency. + Enhancement of financial plannability and reduced investment risk.	– **Fragmented approach with lower transferability,** based on stand-alone solutions for individual corridors & state agreements. – Often limited national capacity and potential lack of robust funding institutions, in particular for smaller MS – Requires new legislation in each MS & complex assessments under state aid law

Note that presented concept assumes that corridor project is integrated into one regulatory asset base under a joint legal structure.

BHC Baltic Sea Hydrogen Collector

The Baltic Sea Hydrogen Collector (BHC) is a ground-breaking cross-border project that will secure the supply of green hydrogen in the Nordics and Central Europe. The project is developed by a group of leading infrastructure and energy industry companies, consisting of Gasgrid Finland, Gascade, and Copenhagen Infrastructure Partners, who have joined forces to create an infrastructure for green hydrogen collection and transportation.

The Baltic Sea Hydrogen Collector project) is co-funded by the European Union (11.3-FIDE-S-M-24-BHC CEF Study. The scope of the European Union co-funding covers the technical pre-FEED study and permitting preparation for Section A and the commercial and regulatory maturation of both Section A and Section B.

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