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Hydrogen in Germany
Recent developments

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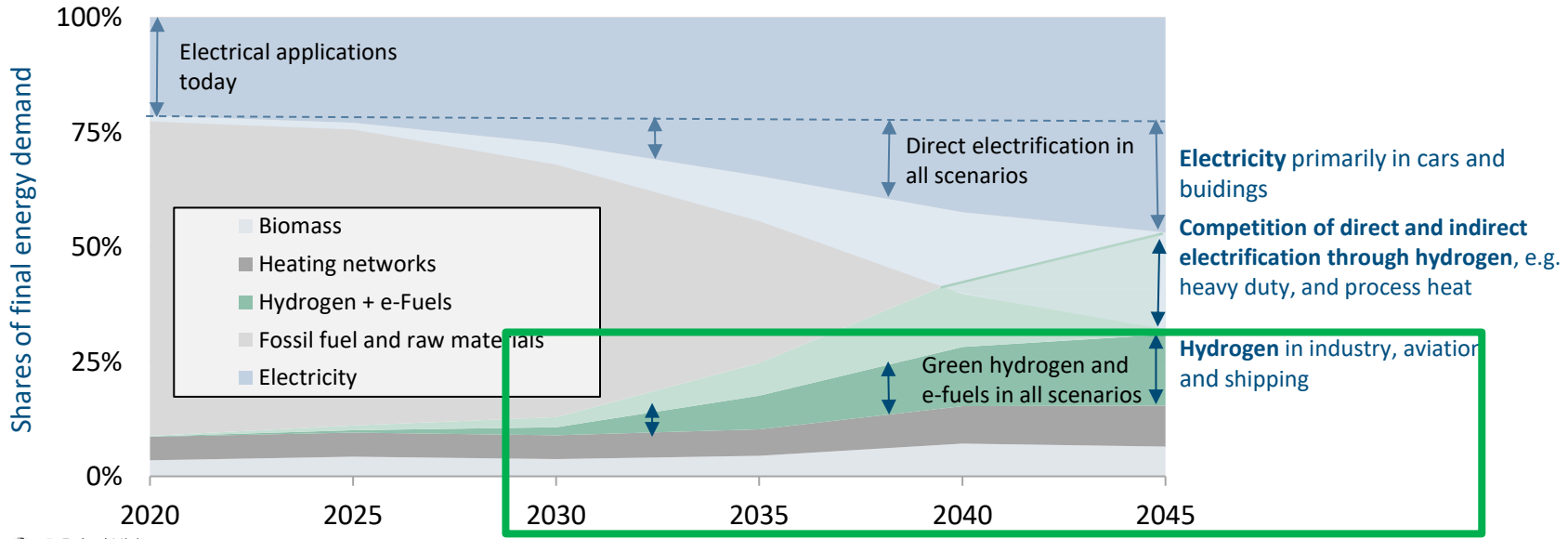
Hydrogen demand is expected to increase until mid-century, up tp 700 TWh/yr & Import Strategy in place

Possible development of total final energy consumption in Germany by 2045 displays **hydrogen demand of up to 700 TWh in 2050**



Source: Guidehouse, June 2024, based on Ariadne-Project 2021

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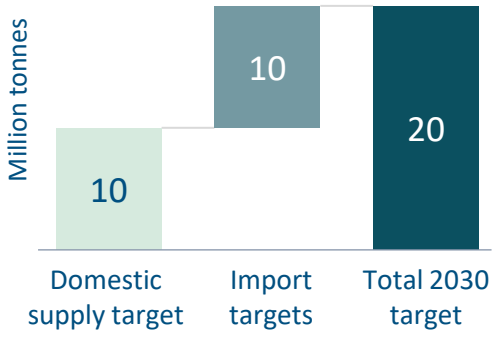
Hydrogen import through five corridors, and shipping

Around 60% of EU's hydrogen import demand is expected in Belgium, Germany and the Netherlands

EU's renewable hydrogen target for 2030:



The five possible future hydrogen supply corridors* are:

A: **North Africa & Southern Europe**
SoutH2 Corridor

B: **Southwest Europe & North Africa**
H2Med

C: **North Sea**

D: **Nordic and Baltic regions**

E: **East and South-East Europe**
Central European Hydrogen Corridor (CEHC)

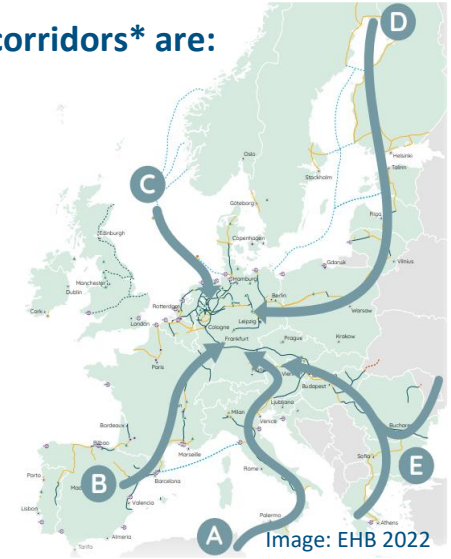


Image: EHB 2022

*The illustration of the corridors is a rough approximation.

Source: Guidehouse, 03.2024 based on EHB 2023 & EHB 2022

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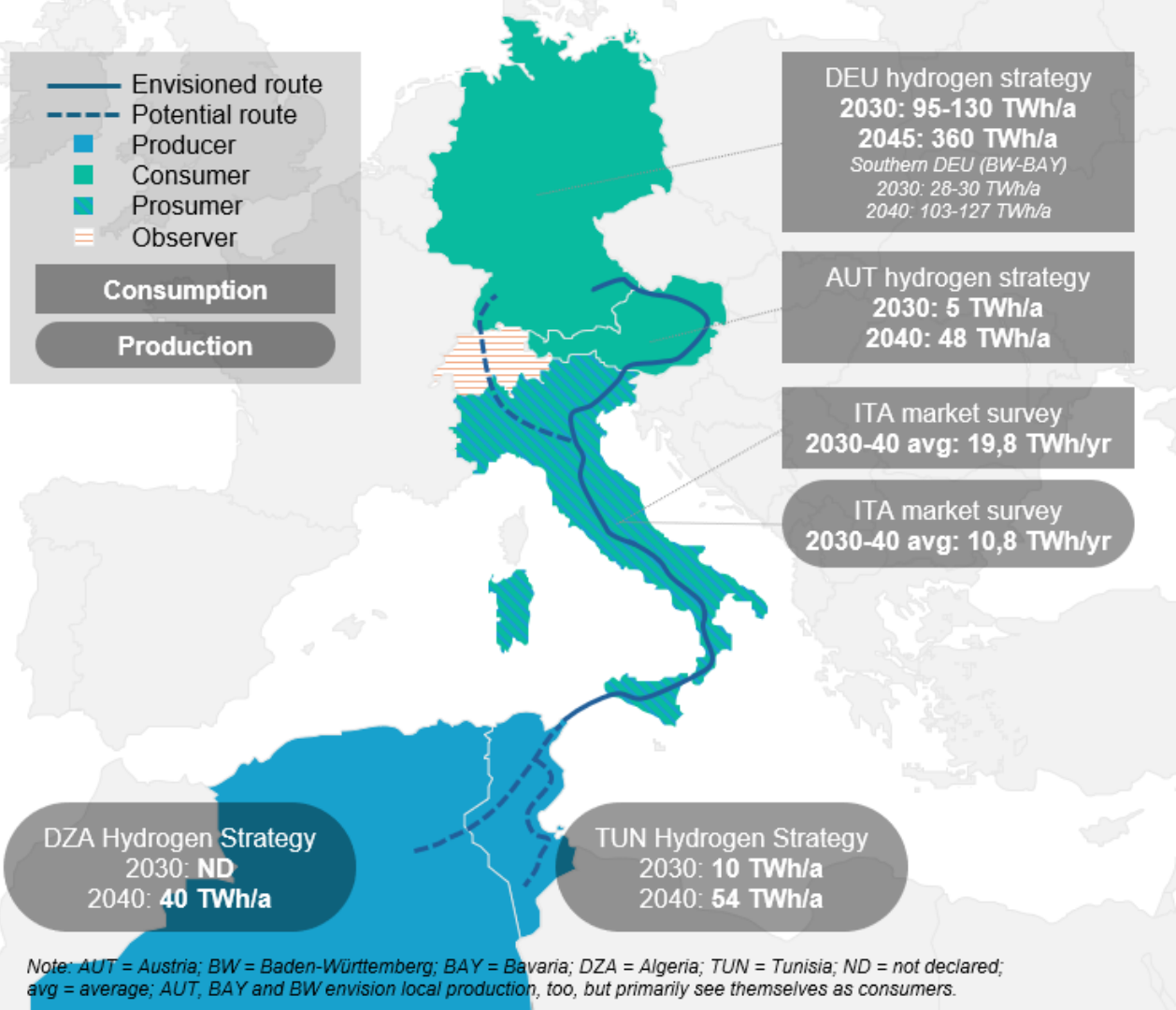
Total demand ITA, AUT, and DEU is expected at:

> 440 TWh in 2040

> 100 TWh in 2030



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Recent developments

- **First pentalateral Ministerial Conference** between DZA, TUN, ITA, AUT, DEU
- **Pentalateral JDoI** signed between DZA, TUN, ITA, AUT, DEU
- **Trilateral JDoI** signed between ITA, AUT, DEU
- First **workshop on financing hydrogen production** projects in Tunisia concluded with DZA, TUN, ITA, AUT, DEU, EU Commission
- **CEF funding** allocated by EC to TSOs for in-depth technical pipeline assessment and engineering studies
- SouthH2 Project awarded **Global Gateway Status**

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State of play in Tunisia and Algeria

Project development

10 MoUs on green hydrogen signed between several companies and the Tunisian government

- ACWA Power: up to 600,000 t/a
- TE H2 and Verbund, H2-Notos project: approx. 200,000 t/a, with a future potential to scale up to 1,000,000 t/a
- **AboEnergy:** up to 50,000 t/a
- **Tunur in Cooperation with Aker Horizons and Verbund:** approx. 200,000 t/a
- **Others** with Savannah Energy, Hydrogen of France (DEME Hyport), Alliance of Amarenco and H2 Global Energy and more

GW-project in the works in Algeria including companies from DEU, AUT, ITA, DZA

State of play in Tunisia and Algeria

Challenges and solutions for project development:

- Allocation of **exclusive land rights**
- Privately owned land: **Standardized procedure and improved access to ownership data**
- **Streamlining and transparency in permitting procedures**, incl. a coordinator for hydrogen permitting, clear guidelines on requirements, and transparent justification for objections
- **Longer time frames for concession regimes** to have more flexibility over the project cycle
- **Alignment of infrastructure/network planning with COD/FID** of hydrogen projects
- **State guarantee for network development** with dedicated action plan
- Developing **risk-sharing mechanisms** to address the scope of needed public intervention, e.g. through a task force of IFIs, public authorities, project developers and development organizations
- Developing **DEVEX support mechanisms**, potentially with EU bodies

State of play for TSOs

Pipeline development, challenges and steps ahead

- Allocated **CEF funding allows in-depth engineering studies required for FID**
- **Confirmed PCI status** and **PMI application under evaluation**
- Next regulatory milestone foresees **transposition of EU Hydrogen and Decarbonized Gas Directive transposed into national legislation**
- National regulatory decisions on network access, capacity allocation, and tariffs must be made, including considerations of **Inter-Temporal cost allocation and Cross-Border cost allocation**
- **Financing/de-risking framework** for pipelines must be developed for reaching FID, e.g. considering dedicated EU infrastructure funding

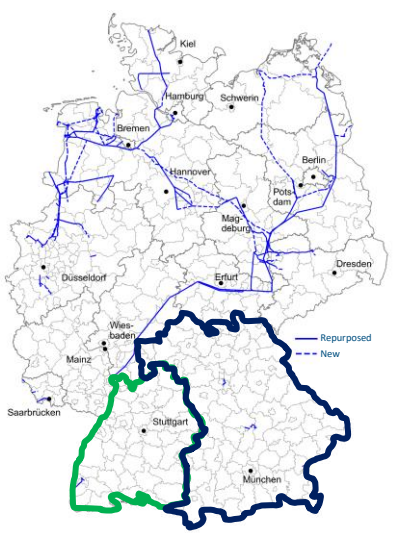
State of play for Offtakers

Offtake development, challenges and steps ahead

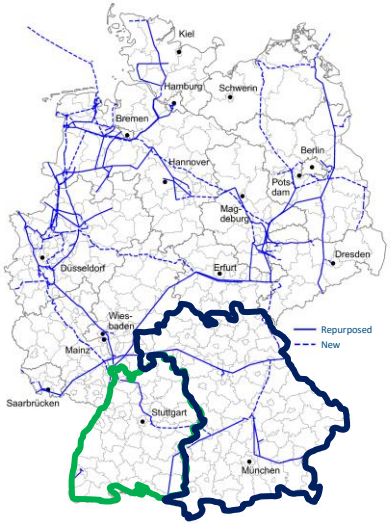
- Strong **demand** forecast for **ITA, AUT, DEU at over 440 TWh in 2040 and over 100 TWh in 2030**
- **500,000,000 € H2Global window dedicated** to Southern Corridor **announced**
- **Import alliances** formed **in Austria and southern Germany** signal offtakers commitment
- Market tests conducted
- **Support to Offtake Letters of Intent** foreseen

Germany's core hydrogen network is set to become fully operational by 2032

- Goal of the core network is to connect hydrogen production, import, and demand centers
- Approx. **9.040 km hydrogen pipelines to go operational between 2025 and 2032**
- The German hydrogen network will be **strongly interlinked with neighboring EU countries.**

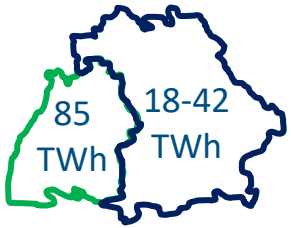


2029



2032

Hydrogen demand 2040 by regional strategies



Baden-Württernberg

Bavaria

Source: FNB Gas e.V., 15 November 2023, regional strategies

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Funding instruments support domestic offtake, and production within and outside Germany

International H2 funding schemes

- H2Global: Auction-based promotion of international green hydrogen projects
- PtX Development Fund (supported by KfW group)
- Individual project funding (e.g., grants for projects in Saudi-Arabia and Chile in Dec. 2020)
- Guarantee Instruments: Export Credit Guarantees and Investment Guarantees
- EIB Green Hydrogen Fund: Providing investment grants for H2 production in developing countries
- H2Uppp: supports SMEs in the identification, preparation and implementation of pilot projects

Source: Guidehouse, June 2024, based on BMWK 2022 & BMWK 2023; Icons by flaticon.com

Funding instruments support domestic offtake, and production within and outside Germany

National H2 funding schemes

- CCfDs: Incentivize fuel switch for actors falling within ETS scope
- Power Plant Strategy to provide CAPEX subsidies and possibly OPEX subsidies as CfDs.
- Important Projects of Common European Interest (IPCEI) allow projects being subsidized by national funds
- Hydrogen Core Grid financially supported by dedicated amortization account
- Use of EHB domestic leg
- Hydrogen Lead Projects funding (BMVI) for flagship research and demonstration projects

Source: Guidehouse, June 2024, based on BMWK 2022 & BMWK 2023; Icons by flaticon.com

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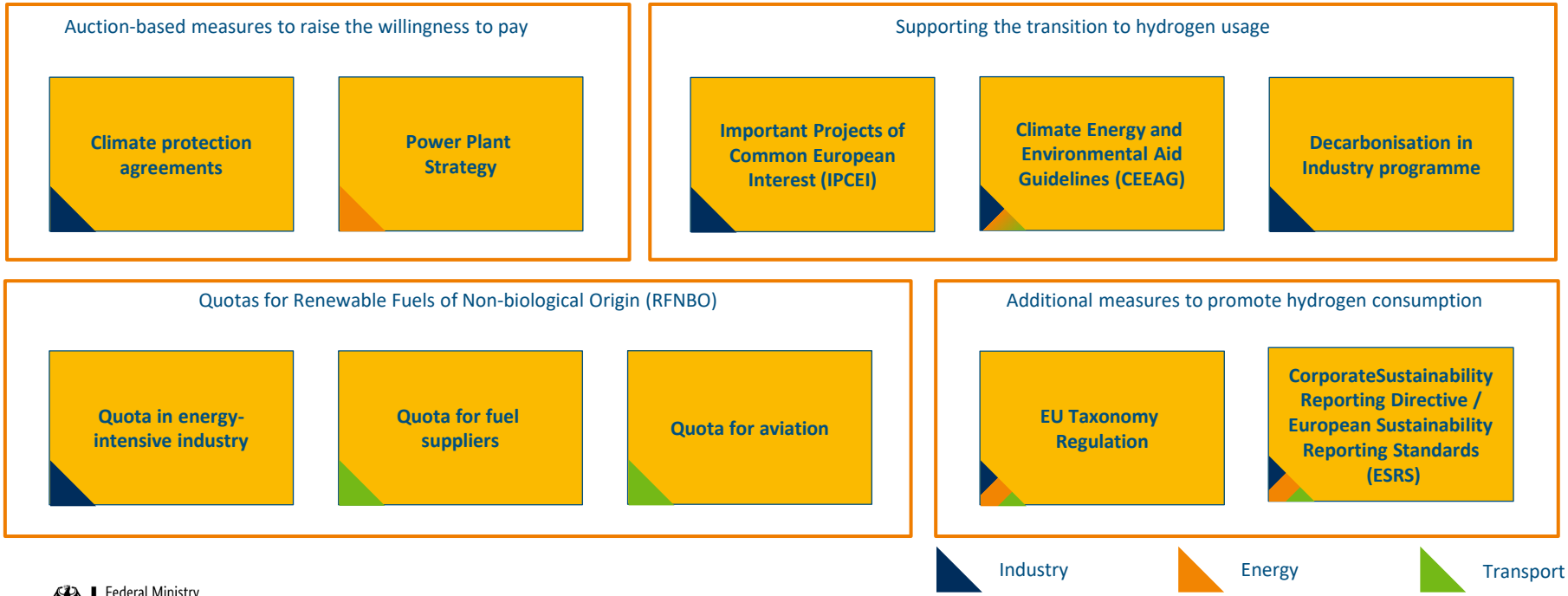
Funding instruments support domestic offtake, and production within and outside Germany



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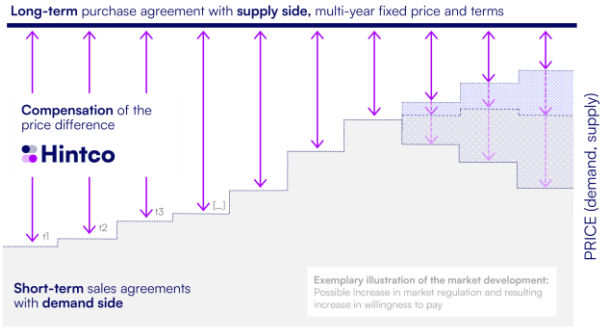
Results of first H2Global auction published & second auction round open

Structure:

- Tool for hydrogen purchasing
- Competitive bidding process; **double-sided auction** mechnism; **subsidy covers price gap**

Current status:

- Results of **1st auction** round (**€ 900 mio.**) published; **Lot 1** attracted bids from 22 firms, winning bid by **Fertiglobe (€ 397 mio.** for up to **397,000 t** renewable ammonia delivered between **2027-2033)**
- **2nd auction round** (**€ 3,5 bln.** for 2026-2036) launched
- **Cooperation agreements** with **NDL, CAN, AUS**



Hint.co auction design. Source: Hint.co GmbH.

Timeline of the Fertiglobe. Source: H2Global.

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Results of first H2Global auction published & second auction round open

Eligibility and funding of the second auction round:

- European-produced green hydrogen will become eligible for funding in the second H2Global auction round
- €1 Bln. for pipeline infrastructure under discussion

Latest Developments:

- **Dec 18:** The **European Commission approved** the **German-Dutch window with a €3 billion budget** (DEU €2.7 billion, NLD €300 million)
- **Jan 13: Germany pledged up to €588 million** for two auctions to import green hydrogen **from Canada and Australia** under the bilateral H2Global program. EU state aid approval is pending.
- **Jan 21:** Hintco presented a **draft framework contract for hydrogen sales under H2Global. Hintco** will facilitate buying from producers and selling to buyers via auctions, and will not handle the physical trade.

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Thank you
for your attention!

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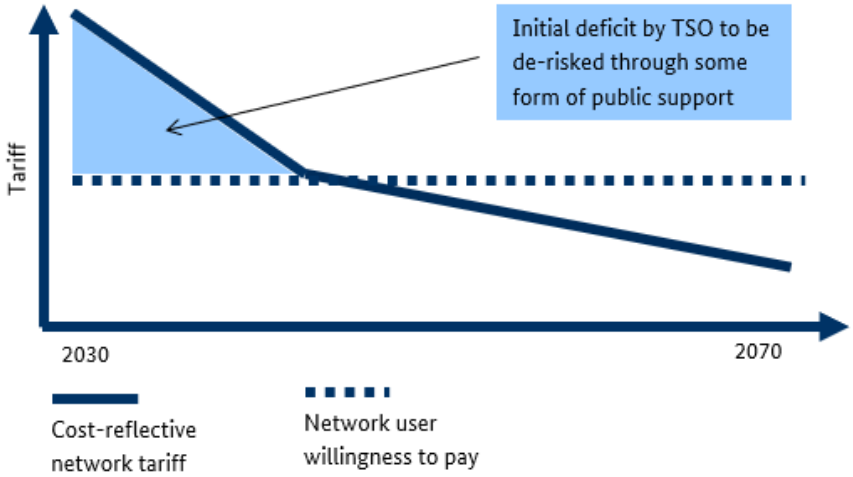
Financial Instruments for Green Hydrogen with extra-EU coverage

- **H2Global and EU Hydrogen Bank**: Cover cost gap between offtaker willingness to pay and green hydrogen price.
- **Global Gateway**: investments for strategic projects, including hydrogen, globally
- **European Commission (DG MENA) and EIB:** European Fund for Sustainable Development Plus (ESFD+): ***Blended finance***: grant funding supporting investments; ***Guarantee for sovereign lending*** (26.7 bn EUR globally); ***Guarantees for private sector investments*** (13 bn EUR globally)
- **PtX Development Fund** by KfW and **Green Hydrogen Fund** by EIB
- **European Bank of Reconstruction and Development (EBRD)**: financing for private sector projects either in the form of loans (up to 250 Mil. EUR) or equity (up to 35% total project)
- **Public equity investments** by EU or member states could also be considered

Inter-temporal cost allocation (ICA) could provide a framework for de-risking EU pipeline infrastructure



- Network tariffs are capped to enable market ramp-up
- Resulting deficit by TSO is de-risked through public support

Public support mechanisms for ICA can take on various forms:

- Amortization account (applied in DE)
- Capacity guarantees (considered in AT)
- Public capacity bookings
- Direct subsidy covers deficit (applied in NL, considered in AT)

Together with other MS and EU COM we want to explore ways of jointly deploying intertemporal cost allocation mechanisms for cross-border projects.

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