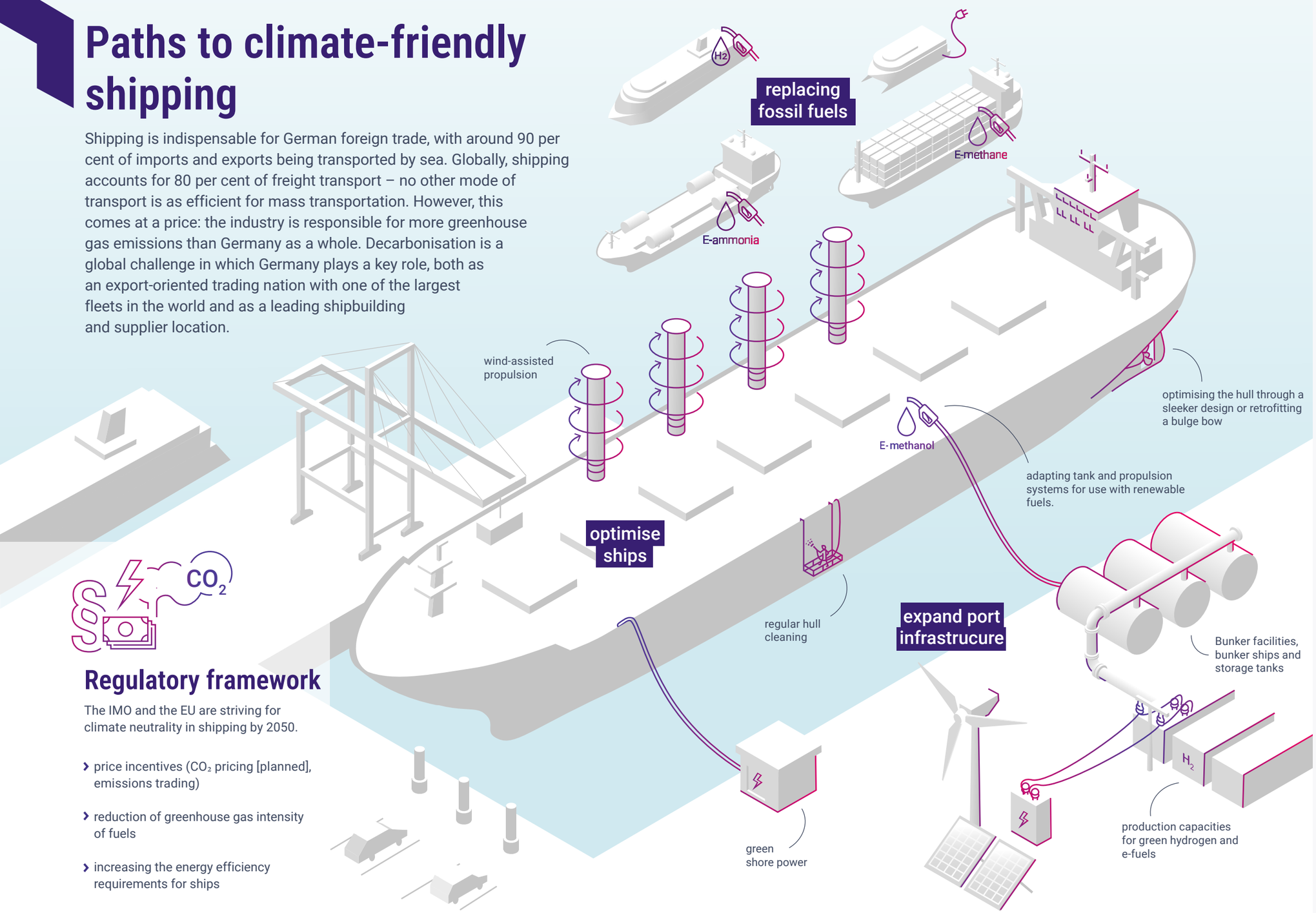
Paths to climate-friendly shipping

Shipping is indispensable for German foreign trade, with around 90 per cent of imports and exports being transported by sea. Globally, shipping accounts for 80 per cent of freight transport – no other mode of transport is as efficient for mass transportation. However, this comes at a price: the industry is responsible for more greenhouse gas emissions than Germany as a whole. Decarbonisation is a global challenge in which Germany plays a key role, both as an export-oriented trading nation with one of the largest fleets in the world and as a leading shipbuilding and supplier location.



Regulatory framework

The IMO and the EU are striving for climate neutrality in shipping by 2050.

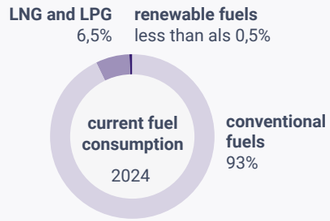
- price incentives (CO_2 pricing [planned], emissions trading)
- reduction of greenhouse gas intensity of fuels
- increasing the energy efficiency requirements for ships

Renewable fuels

E-fuels: Production using green hydrogen (hydrogen generated from renewable electricity) and CO_2 or nitrogen

B-fuels: Production from biomass (waste and residual materials)

E-fuels and b-fuels currently play a minor role in the fuel mix. In the long term, however, they must form the backbone of decarbonisation. Their scalability depends on green hydrogen and CO_2.



E-diesel
suitable as a drop-in fuel for marine diesel engines
highest production costs

E-methanol
favourable emissions balance
only minor adjustments to propulsion systems and infrastructure required
relatively expensive

E-methane
suitable as a drop-in fuel for liquefied natural gas (LNG)
methane emissions, relatively expensive

E-ammonia
cost effective
uncertainty regarding nitrous oxide emissions, toxic (high safety standards required)

Policy options

Further develop the regulatory framework, paying particular attention to life-cycle emissions and all greenhouse gases

Secure access to green hydrogen and e-fuels and increase domestic production capacity by ramping up renewable energy sources, electrolysis and direct air capture (DAC)

Expand the port's infrastructure, focusing on bunker facilities for renewable fuels and green shore power supply

Use innovative financing instruments to mobilise private capital.

Develop a coordinated, long-term funding strategy that covers the entire innovation cycle.

TAB infographic: Ways to achieve climate-friedly shipping (2025) Office of Technology Assessment at the German Bundestag (TAB) www.tab-beim-bundestag.de/climate-friendly-shipping
Weitere Informationen im TAB-Arbeitsbericht Nr. 216: Nachhaltige und sichere Konzepte für eine klimaverträgliche Schifffahrt (2026) Kehl, C.; Milchram C.; Jasper, F. doi:10.5445/IR/1000100010