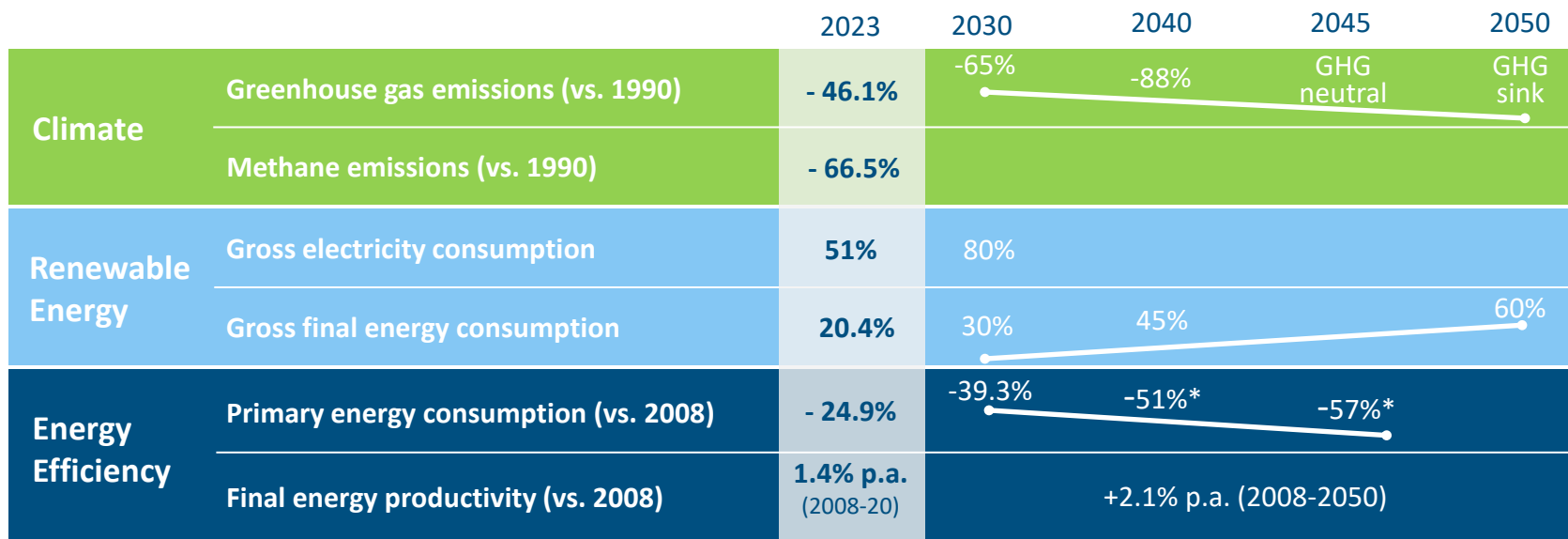


German Energy Transition

28.11.2024

Renewable Energy Institute Webinar Series:
“Strengthening Security on Climate, Economics and Society
Green Energy Transition Today”

The energy transition is Germany's long-term energy and climate strategy



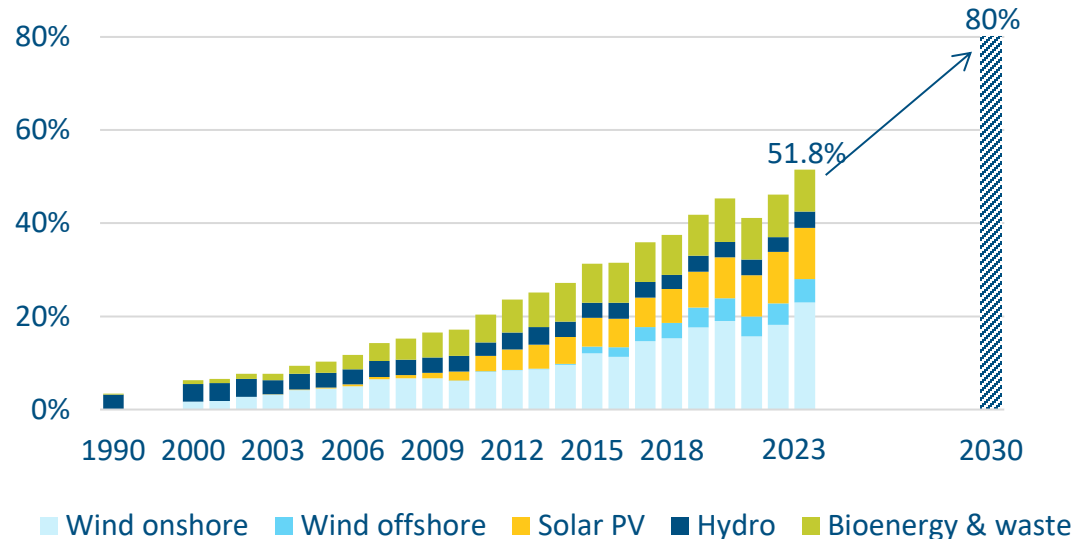
*Intended targets, yet to be approved in 2027

Germany adopts ambitious climate measures to achieve climate neutrality by 2045

Energy efficiency and renewable energies are the required way forward	All sectors must be considered	Power grid as backbone of the energy transition	Taxes & financial incentives to decrease CO₂ emissions
Energy Efficiency Act (EnEfG) Reduction of end user energy by 26.5% & primary energy consumption by 39.3 % until 2030 compared to 2008.	Heating Strategy By 2030, 50% of total heat is to be generated in a climate-neutral way.	Power Grid Expansion 18.000 km power grid need to be built or improved in the next years.	Carbon Contracts for Difference (CCfDs) offset additional costs of climate-friendly production technologies.
Renewable Energy Act (EEG) 80% renewable electricity consumption by 2030, almost 100% by 2035.	Building Strategy From 2025, all new buildings are to comply with efficiency house 40 standard.	Power Station Strategy increase of flexible & sustainable generation capacity in preparation of a coal phase-out by 2030.	National ETS National carbon price for the transport and heat sector. (Currently 45€/ton).

80% of gross electricity consumption in 2030 will be covered by renewable energy sources

Share of renewables in gross electricity consumption and target



2023 Stocktake:



Capacity additions of **14.9 GW**, exceeded the target of 9 GW (215 GW by 2030)



Capacity additions of **3.03 GW** stayed below the annual target of 10 GW (115 GW by 2030)

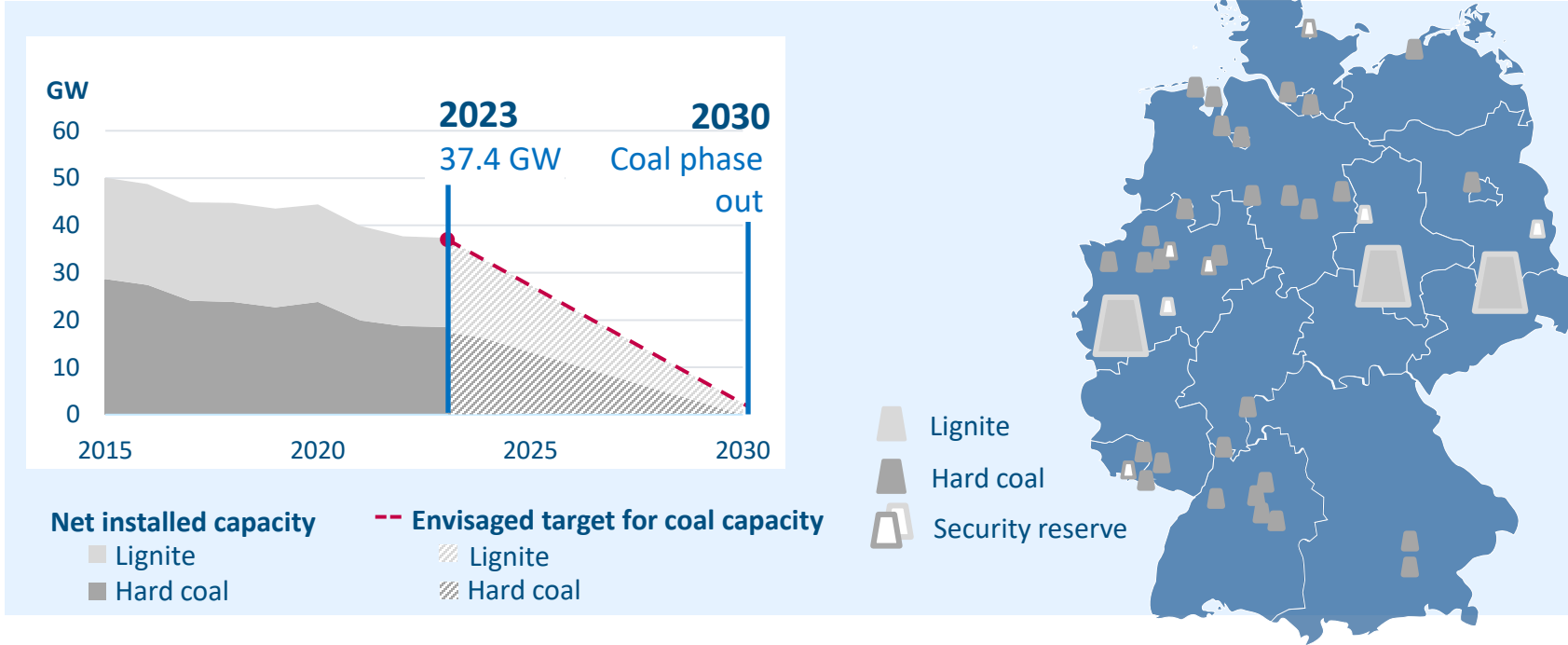


Capacity additions for offshore wind of **0.26 GW** stayed well below the annual target of 8-9 GW (30 GW by 2030)



Capacity additions of **0.5 GW**, biomass well underway to reach 2030 target of 8.4 GW

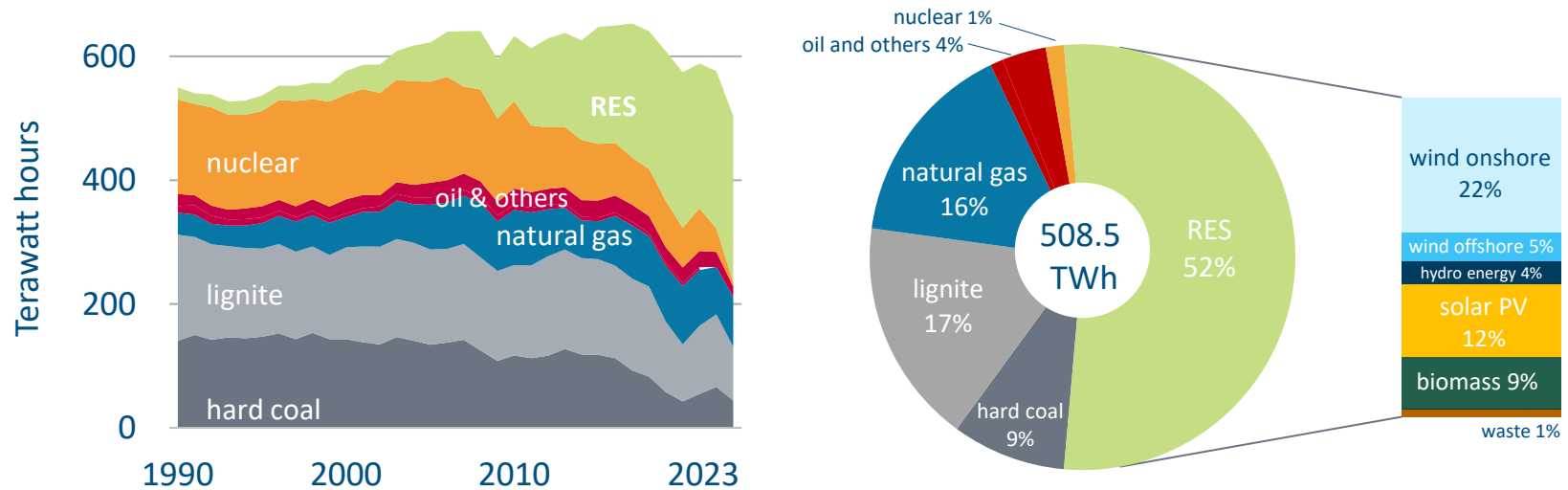
Germany has phased out nuclear since 2023 and will phase out coal ideally by 2030



Source: Guidehouse, March 2024, based on Fraunhofer ISI 2024 & BMU 2020

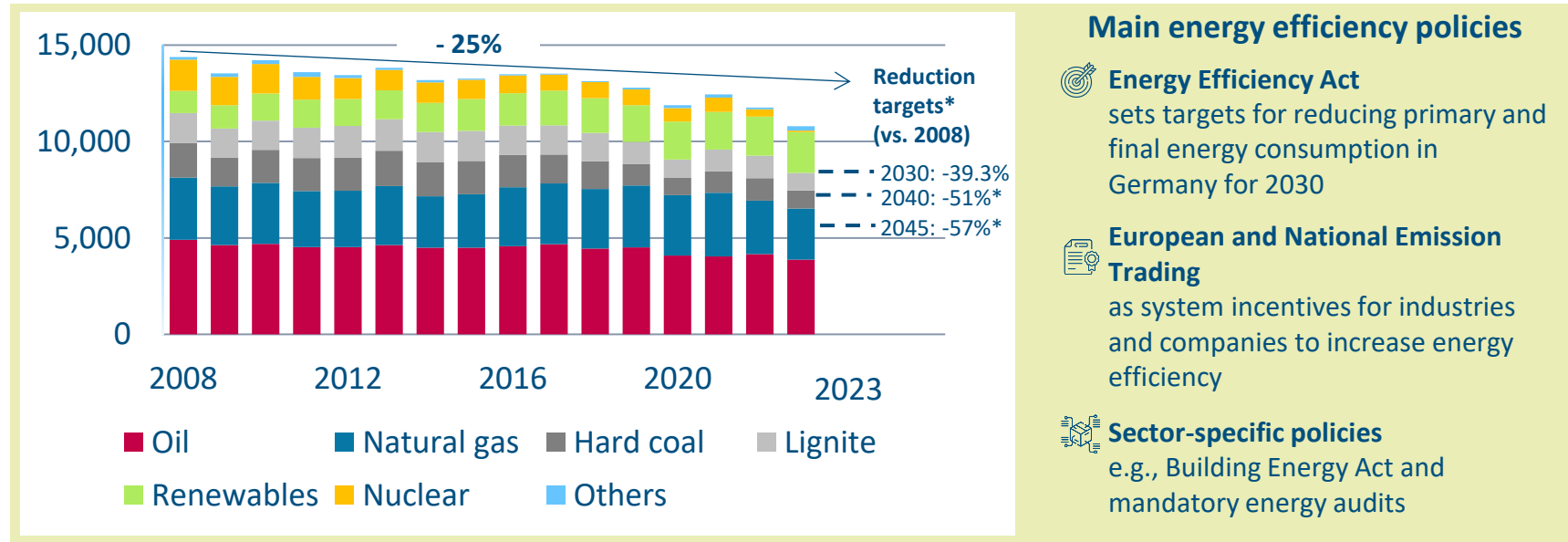
While having very high renewable shares, Germany's electricity supply is one of the most reliable

Development and status quo of gross electricity generation by sources in Germany in 2023



Energy consumption is declining but additional measures are needed to meet reduction targets

Primary energy consumption and reduction targets in Germany



Source: Guidehouse, June 2024, based on AGEB 2022 & BMWK 2022

The planned grid expansion enables the integration of renewables at a low cost

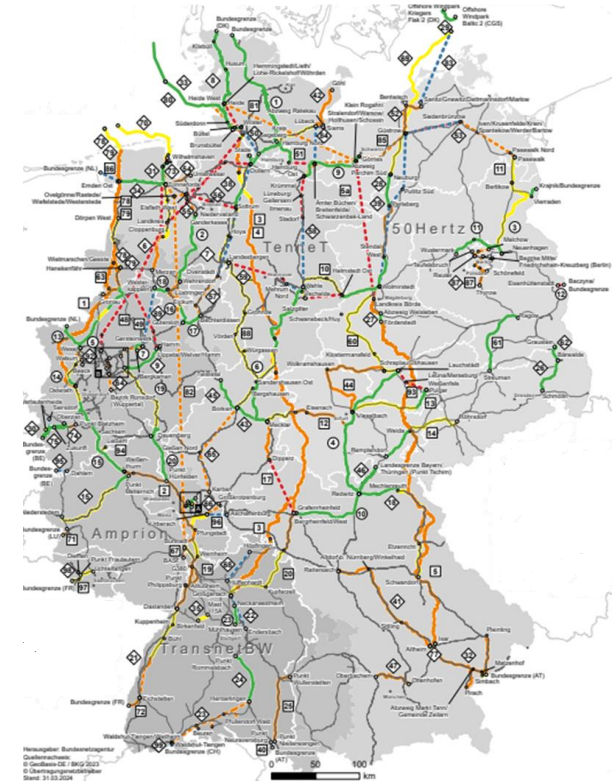
Germany is currently developing 119 grid expansion projects

→ 14,002 km of priority lines planned

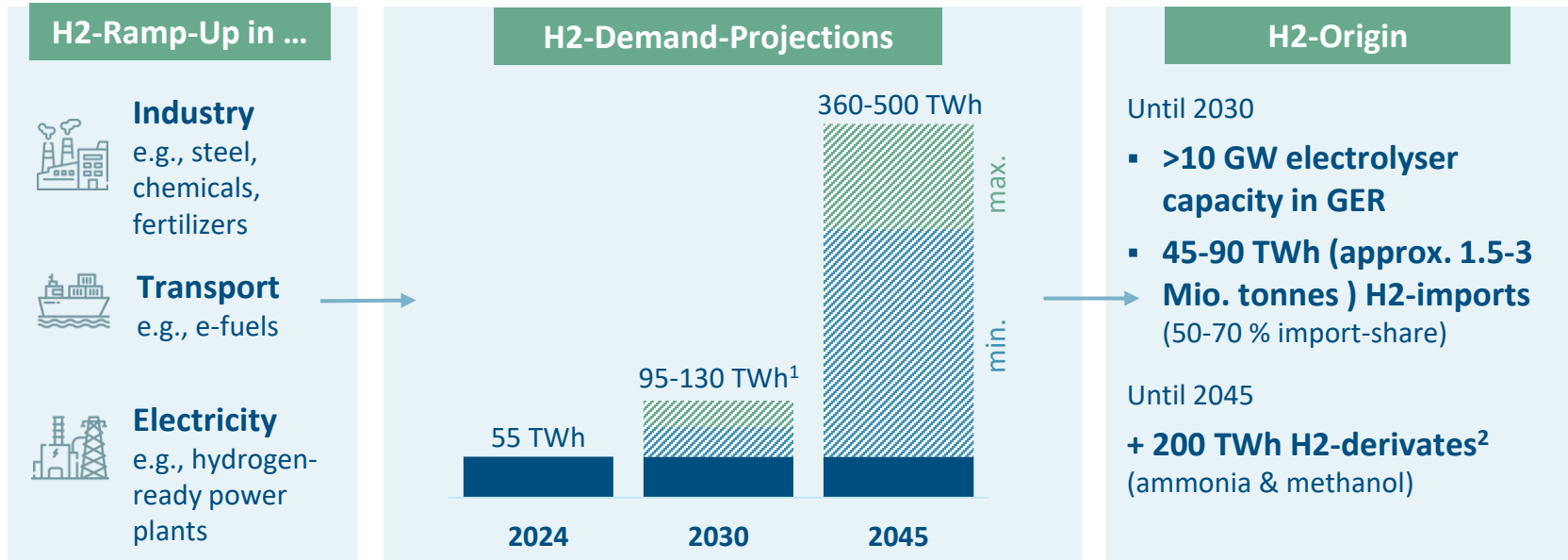
→ 2,912 km realized

→ 2,263 km approved

-  In operation
-  Approved or in construction
-  Project pending/undergoing planning approval procedure
-  Project undergoing regional planning procedure or federal planning procedure
-  Project not yet undergoing approval procedure



Germany's annual hydrogen (H₂) demand projected to increase to 360-500 TWh by 2045



Source: GIZ based on BMWK 2023 & BMWK 2024;
Graphic: flaticon.com

With the National Hydrogen Strategy and its update in July 2023, the H₂ market ramp-up becomes the focus

Hydrogen (H₂) production & imports

- 10 GW electrolyser capacity by 2030
- 45-90 TWh imported H₂ by 2030



Traffic

- H₂ applications stimulated in heavy vehicles
- E-fuels as an alternative with focus on maritime and aviation

Electricity & Heat

- Grid-bound H₂ as important energy storage and transport

Research, education and innovation

- Promotion of R&D and training of specialists
 - Technology and innovation roadmap

International cooperation

- Hydrogen partnerships, e.g. with Canada, Chile, Namibia, Egypt, and Morocco
- European cooperation on imports

Industry

- Ramp-up of hydrogen applications through IPCEI projects and Carbon Contracts for Difference

Infrastructure & supply

- European Hydrogen Backbone and national hydrogen core network

Certification & approval

- Simplification and acceleration in H₂ generation, transport and infrastructure



Federal Ministry
for Economic Affairs
and Climate Action

Thank you for your attention!

Contact details

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Germany has introduced a national carbon price for the transport and heat sector

The national ETS aims to create a level playing field between fossil and renewable energy sources



National emissions trading scheme for sectors not yet covered by the European emissions trading scheme (ETS)



Covers **fuels causing carbon emissions in combustion**

- since 2021: diesel, petrol, gas, fuel oil, and biomass
- as of 2023: coal
- as of 2024: waste



Regular **monitoring** by the Federal Government



When the annual emissions budget is exceeded, **EU flexibility mechanism** will be applied



Germany is currently developing a Carbon Management Strategy (CMS)

Key considerations in the CMS



Up to 73 Mt CO₂ CCS capacity is needed each year by 2045 in Germany



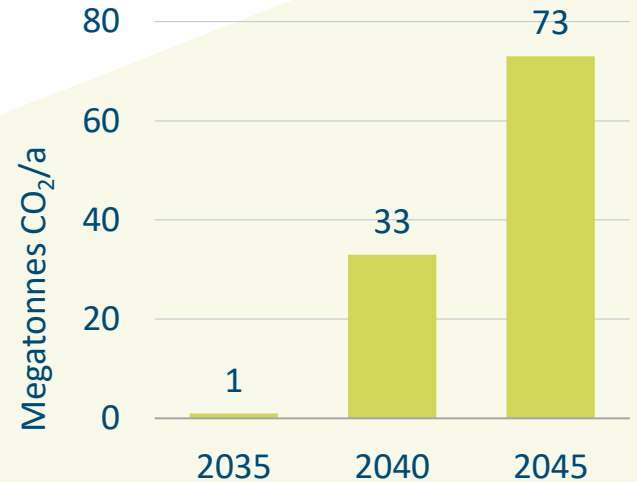
Key sectors: hard-to-abate emissions in the industry (especially cement, lime, chemicals) and waste sectors – no finance for energy sector



Characteristics:

- Creation of CO₂ infrastructure
- Storage sites (onshore/offshore)
- Transparent and robust monitoring
- Development of CCU/S clusters

One possible scenario for CCS capacity in Germany until 2045



Germany aims to increased energy efficiency through a variety of policy instruments

Regulation



Ecodesign – EU legislation on energy labels and ecodesign helps improve the energy efficiency of products on the EU market.



Energy audits and energy management in companies to identify energy-saving potential

Carbon pricing



Since January 1, 2021, Germany has introduced a **national CO2 price** for the heat and transport sectors. It runs in parallel with the EU ETS and will be merged with the EU ETS in 2027.



CO2-pricing - Fuel taxation and CO2-based vehicle tax

Incentives



Financial support programs in the buildings and transport sector – for instance for heat pumps.



Grants and KfW credits and loans in the industry and business sector

The National Hydrogen Strategy outlines key hydrogen applications

Hydrogen will play the most important role in the hard-to-abate industry sectors

Industry



- **Priorities:** Replacement of fossil raw materials in applications and hydrogen use for process heat (primary in steel and metal as well as chemical industry)
- **Measures:** IPCEI hydrogen and climate protection treaties, Decarbonisation in Industry (DDI) funding programme, Green lead markets

Transport



- **Priorities:** Emission reductions in transport through H₂ (in addition to electrification), E-fuels as an alternative in the maritime and aviation sector
- **Measures:** Sub-quotes for RFNBOs (RED III), IPCEI transport projects, further funding programmes incl. for tank infrastructure (NIP and Hy2Move)

Electricity and storage



- **Priorities:** Hydrogen and derivatives becoming an important long-term electricity storage and transport option.
- **Measures:** Tenders for hydrogen power plants, Power Plant Strategy, Electricity Storage Strategy, Platform Climate Neutral Electricity Systems (PKNS) for analyzing financing necessities, publishing of Hydrogen Storage Strategy