POLICIES FOR A CARBON-NEUTRAL INDUSTRY IN THE NETHERLANDS

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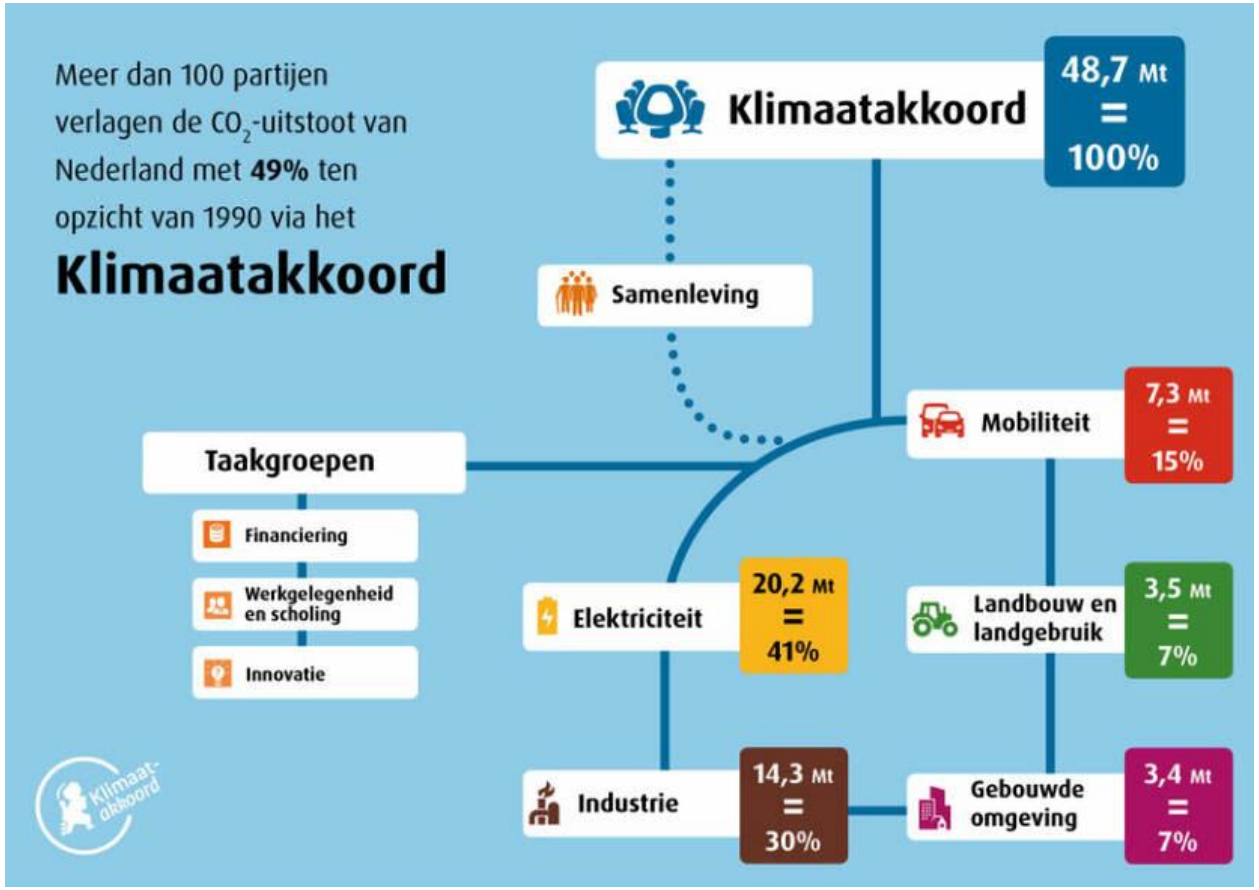
An ambitious climate agenda for the Netherlands

- **National Climate Agreement**
  - 49% GHG emissions reduction in 2030 compared to 1990
  - Could be upgraded to 55% following new EU target
- **The long term ambition:** carbon neutrality by 2050 in the industry
- **Industry-specific target**: 59% reduction by 2030 (14.3 MtCO2-eq)

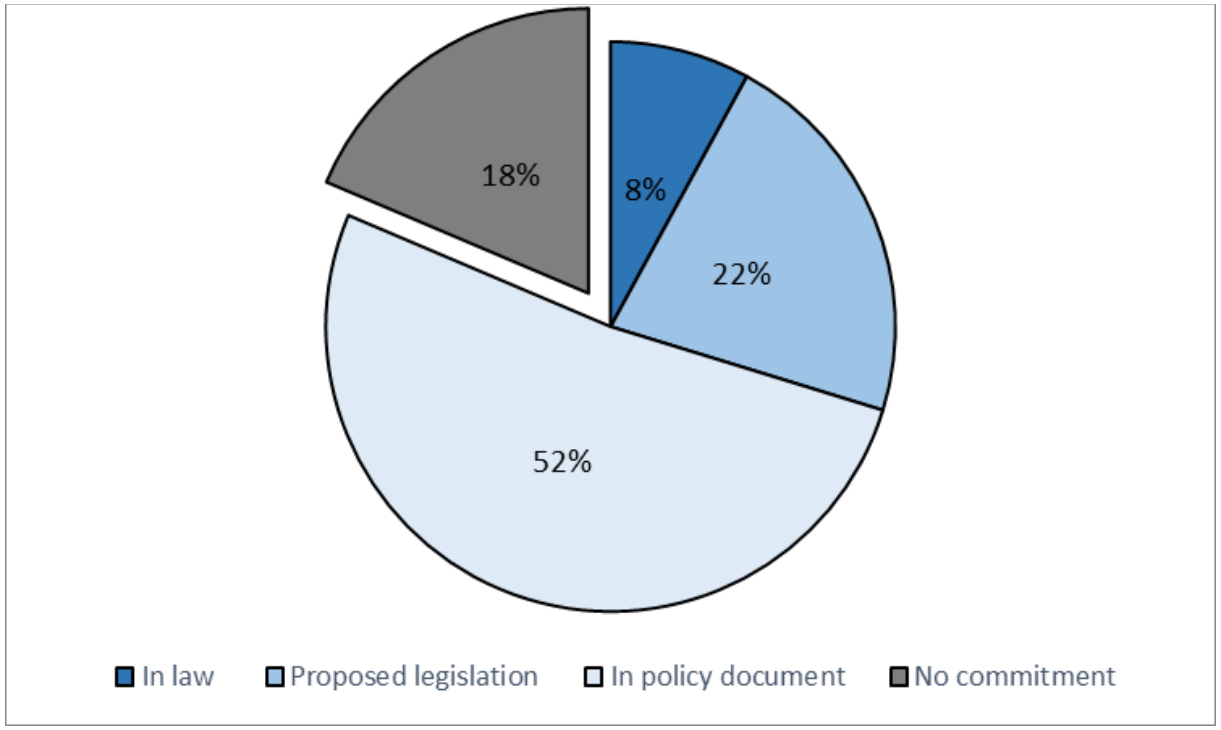


Source: EZK

An ambitious climate agenda across OECD and non-OECD countries

- Over 80% of the world's economy has adopted carbon neutrality goals by 2050
- New EU target: -55% in 2030 (wrt 1990), Green Deal
- Green recovery plans

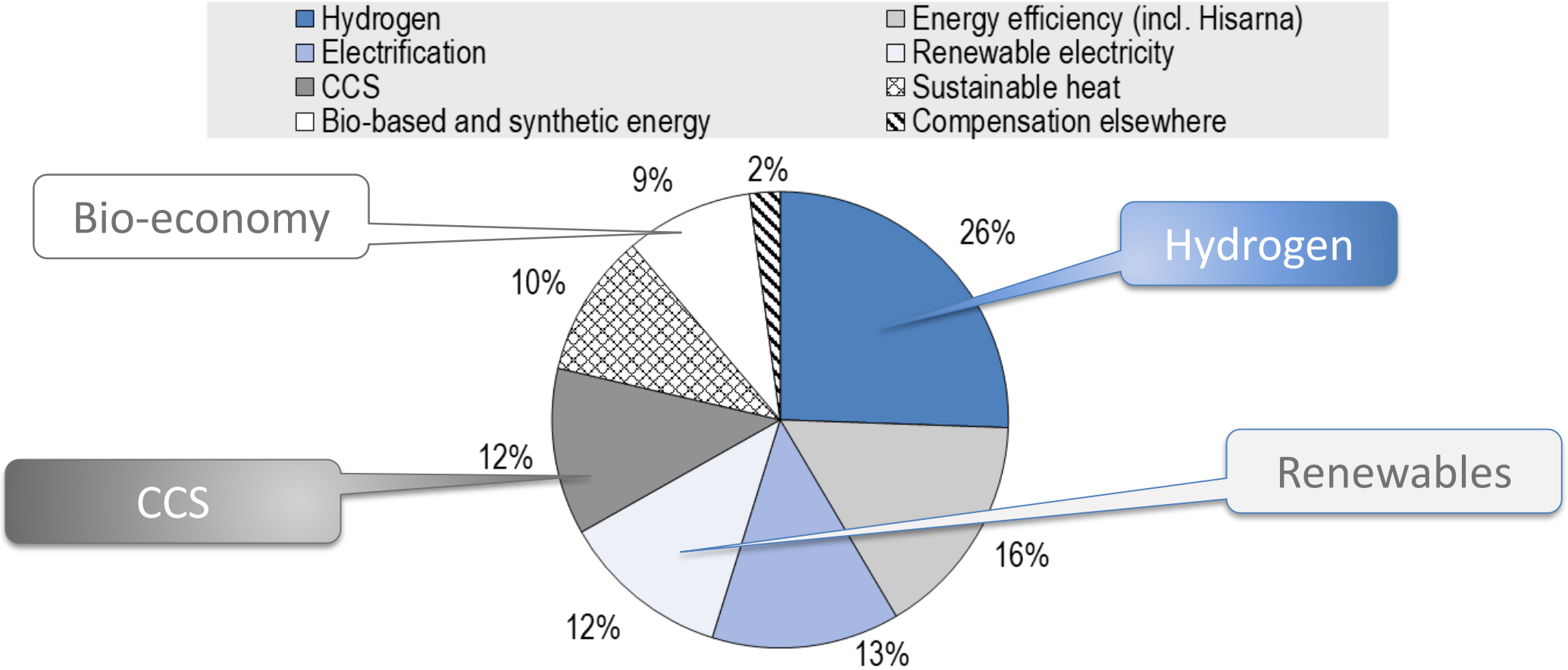
Share of global economy that announced net-zero CO_2 or GHG emissions by mid-century



Note: In law: Sweden, United Kingdom, France, Denmark, New Zealand and Hungary. Proposed legislation: European Union (part of the EU that does not yet commit to net zero in law, including the Netherlands), Canada, South Korea, Chile and Fiji. In policy document: US, China (by 2060). South Africa, Japan, Germany, Switzerland, Norway, Costa Rica, Iceland and Marshall Islands.
Source: Own calculations based on the share of global GDP represented by the countries that commit according to the Net Zero Tracker (https://eciu.net/netzerotracker). Share of global GDP is calculated based on GDP in 2017 taken from World Bank national accounts data and OECD National Accounts data (2021).

A major technological transformation

Contribution of different technologies in Scope 1 and 2 emission reduction until 2050



Note: scenario covers chemical sector, metallurgy, refineries and food-processing. Contribution of "Renewable electricity" corresponds to the abatement of the 2015 Scope 2 emissions, which would be overturned by completely shifting to renewable electricity sources by 2050. Contribution of "Electrification" corresponds to additional electricity needed to reach the carbon neutrality objective in 2050, assuming that this additional electricity is also renewable and carbon-neutral.
Source: OECD based on Berenschot (2020).

Is the Dutch policy package fit for purpose?

- Review of 51 relevant policy instruments based on **local policy expertise** (CE Delft)

- **A two-pillar strategy** based on carbon pricing and technology support, including 2 new policy instruments geared at achieving the 2030 target:
  - **Carbon Levy**, to incentivize low-carbon investment while limiting the impact on short-term competitiveness
  - **SDE++**, to accelerate deployment of low-carbon technologies at the least cost for society

- Is the package **cost-efficient** for reaching the 2030 objective?
- Is this package **enough for carbon neutrality in 2050?**

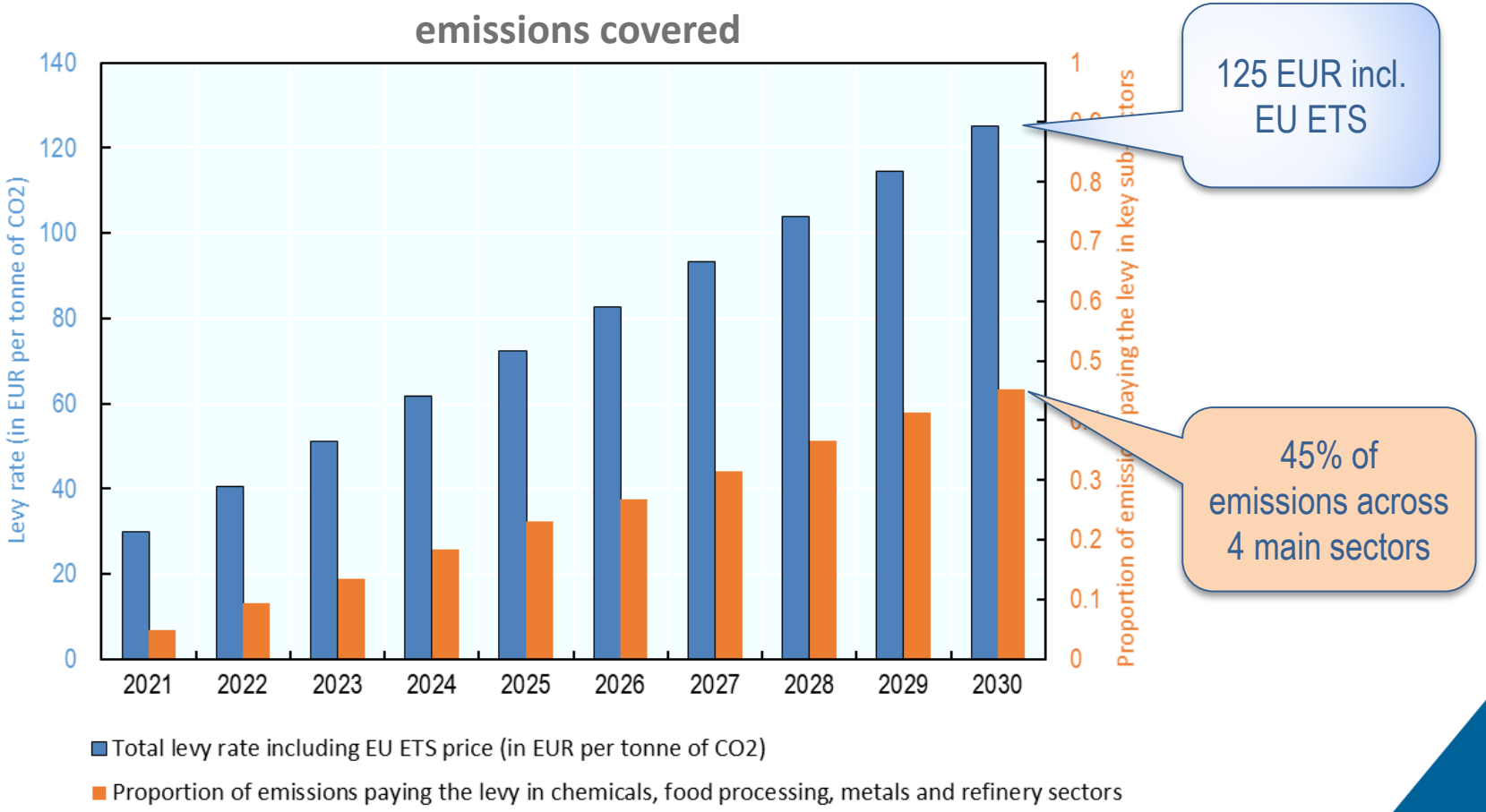
- What are the messages for other countries' green industrial strategy?

PILLAR 1:
CARBON PRICING

A gradual, yet strong signal to incentivise decarbonisation

- A strong medium-term signal
- Provides certainty
- Kicks-in gradually

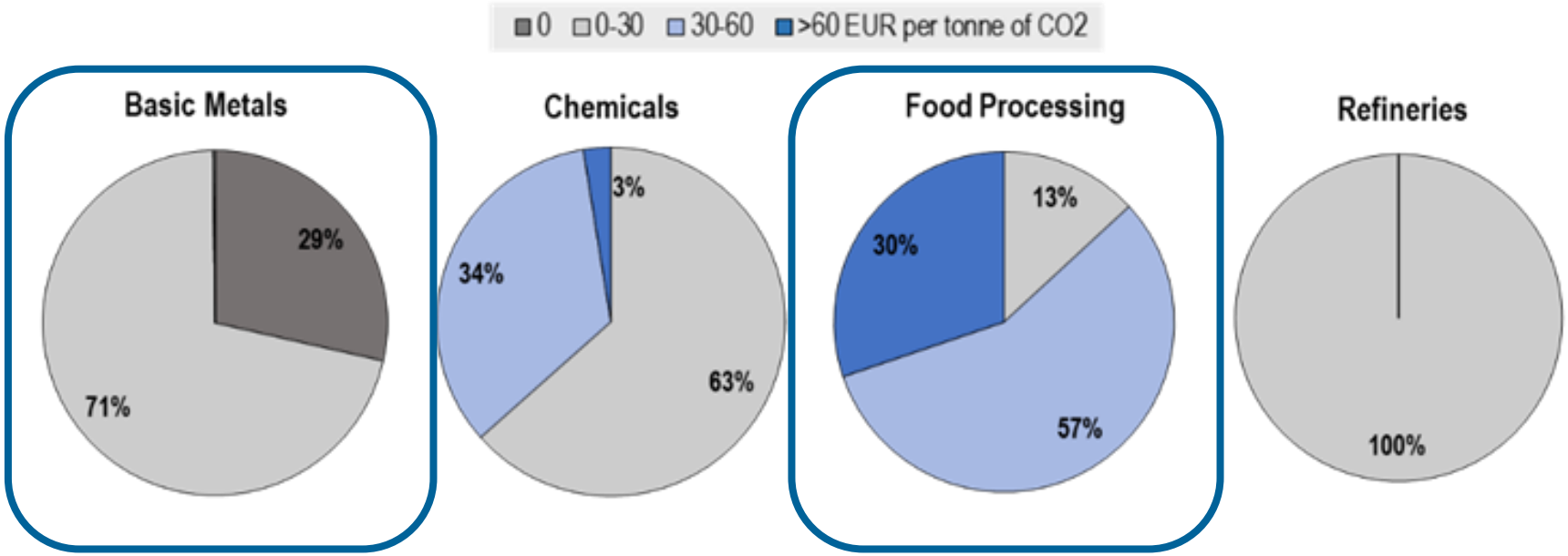
Figure. Levy rate 2021-2030 and estimated proportion of emissions covered



Note: The levy rate includes the floating national contribution and the EU ETS price. The estimated proportion of emissions paying the levy covers only the chemicals, food processing, metals and refinery sectors. It assumes benchmark values follow the draft revision of the EU ETS benchmarks published in December 2020. No behavioural adjustments in the emissions base, i.e. no technological shifts, no energy efficiency improvements or rebound effects compared to 2021 are assumed.
Source: CE Delft (2021)

Accounting for energy taxes and EU ETS, a very heterogeneous carbon pricing across firms and sectors

Proportion of CO2 emissions from fossil fuel energy use in industry in 2021 at different price intervals



Note: Figures are based on OECD Taxing Energy Use and Effective Carbon Rates methodology (OECD, 2018 & 2019). They include price signals from energy tax and ODE on natural gas (net of exemptions) and the EU ETS permit prices (independently of whether an allowance was allocated for free or not). The national component of the carbon levy is set to zero for 2021 because of the large amount of excess dispensation rights in 2021. CO2 emissions are calculated based on fossil fuel energy use data adapted from IEA World Energy Statistics and Balances (2020). Source: OECD calculations.

- **Inefficiencies**
- **Inequality**

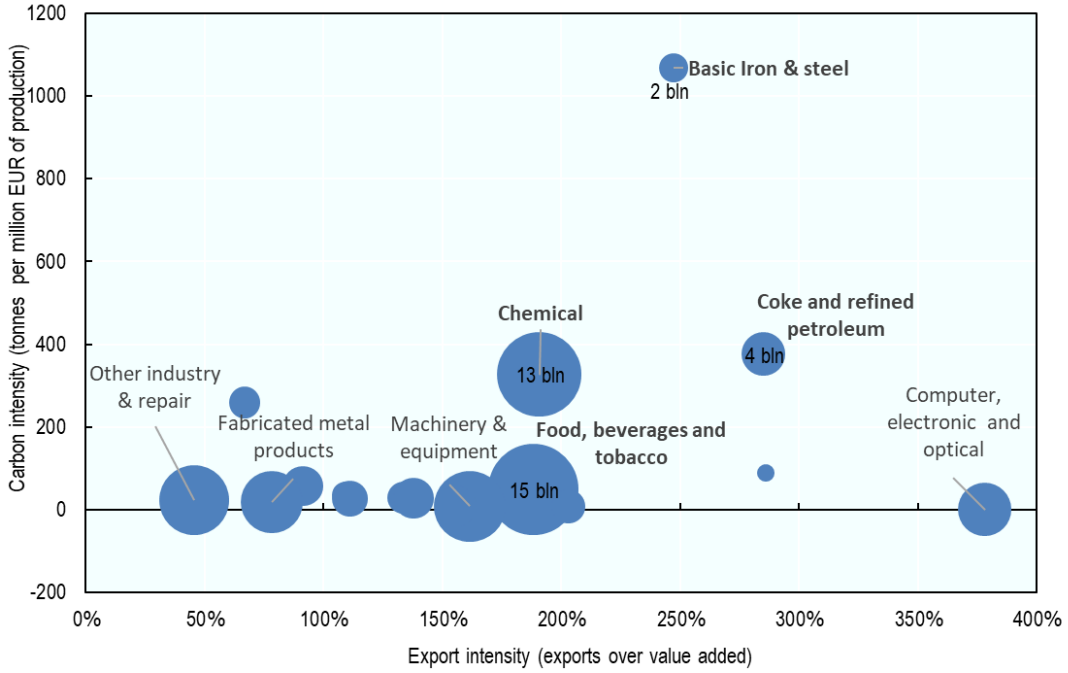
Exemptions driven by competitiveness concerns linked with trade exposure

- **Dutch industry highly export-intensive**
  - 4 sectors = 11% of output but **23% of exports**
  - Germany: 9% of output, 16% of exports

➢ Concerns over **ability to compete in international markets**

➢ Recent developments reduce competitiveness concerns

Carbon intensity and export intensity of manufacturing sectors in the Netherlands in 2015



Note: circle size represents industry value added.
Sources: OECD Air Emission Accounts and IEA CO2 Emissions from Fuel Combustion (CO2 emissions); OECD' Inter-Country Input-Out (ICIO) 2018 Database (value added and exports).

PILLAR 2:
TECHNOLOGY SUPPORT

Many instruments and a focus on deployment

- Domestic **R&D support mostly horizontal** (R&D tax credits)
- **Demonstration funding small** compared with typical projects
- **SDE++** as main support instrument

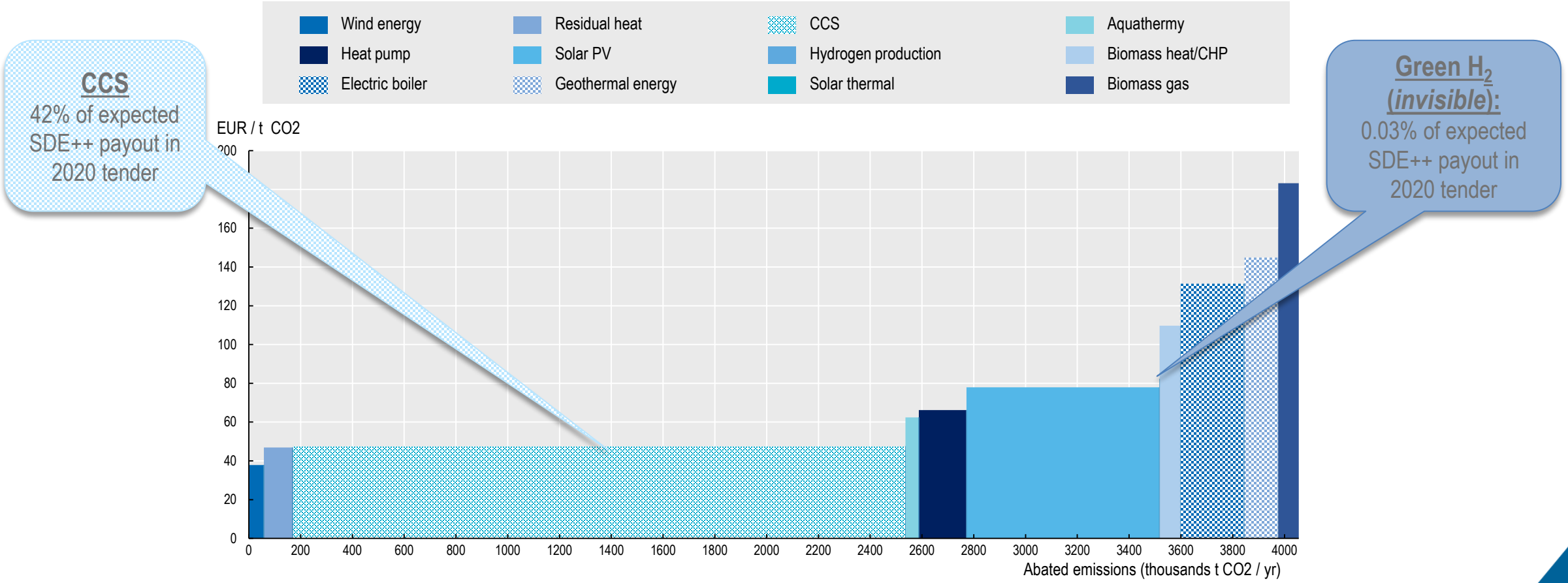
Estimated amounts of annual public funding for technology support by stage (in million EUR)

Research <100M€	Development 100-200 M€	Demonstration <300 M€	Deployment >400 M€
H2020 (70) WBSO (15) NWO (11)	MOOI (36) Innov. Box (30) WBSO (15) NGF? (≈100)	DEI+ (130) Innov. Fund (100) HER+ (30) Others (<20)	SDE++ (300) EIA (75) VEKI (28) Others (≈20)

Source: OECD calculation based on legislative documents and CE Delft (2021)

SDE++ is designed for least-cost abatement

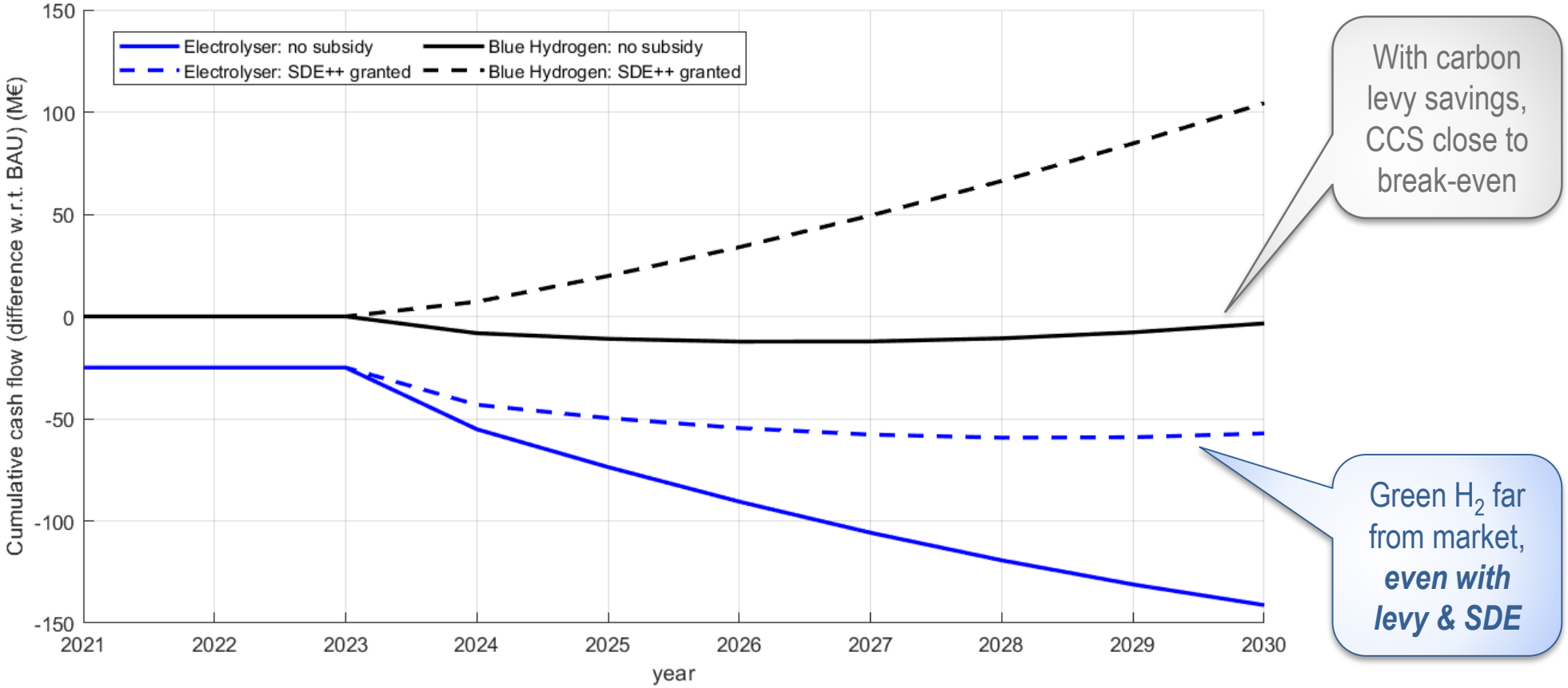
SDE++ subsidy demand curve in first tender (2020)



Note: areas represent the expected subsidy payment based on RVO's long-term prices; actual pay-out will depend on market prices and RVO's grant decision. Category CCS includes "blue hydrogen"; category hydrogen production is "green hydrogen". Amount tendered to categories hydrogen production and solar thermal barely visible.
Average subsidy per ton CO2 at the technology category level and cumulated abated emissions calculated based on RVO data.
Source: OECD calculations based on RVO data.

CCS requires less support than green hydrogen

Cumulative net cash flows for a CCS and green hydrogen projects, with and without SDE++ support



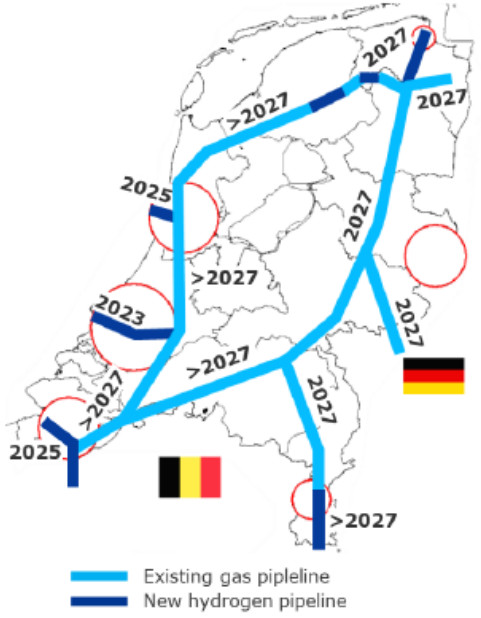
Note: high electricity prices scenario. Carbon transportation costs are taken as the mean of the PBL estimate and the Gasunie/EBN estimate. Feasibility study cost incurred in 2021. Capital investment incurred in 2024. Savings from the carbon levy account for dispensation rights based on EU benchmarks and counterfactual (BAU) projects' emission intensity.
Source: OECD calculations based on inputs by Cornelis Zandt (Radboud University).

BEYOND THE TWO PILLARS: COMPLEMENTARY POLICIES & FRAMEWORK CONDITIONS

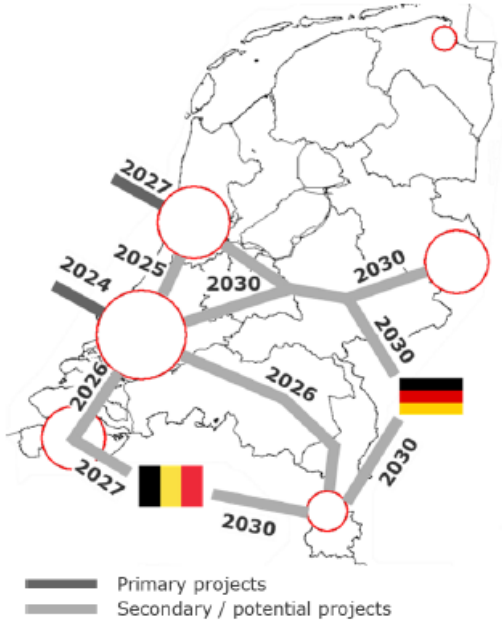
The critical role of infrastructure

- Necessary **infrastructure** for major technologies:
  - Hydrogen, CCS and renewable electricity
- **Regulatory instruments**:
  - CCS: liabilities for carbon leaks
  - Hydrogen: standards on origin
  - Circular economy & bio-based economy: Facilitate use of scrap metal, content requirements to create markets
- **Framework instruments**
  - Competition and entrepreneurship policies
  - “Green” skills

Hydrogen backbone



CCS transport



CONCLUSION

Summing up

- The **Dutch strategy** (rising CO2 prices & technology support) is targeted at **a cost-efficient transition** to a low-CO2 industry, but:
  - **Heterogeneous CO2 prices** are inefficient
  - Trade-off between short-term emissions cuts and longer-term technology shifts

➢ Reform of **energy taxes** and gradual phasing out of **exemptions**

➢ More support is required for **emerging technologies**

  - Changes in SDE++, and/or direct support for RD&D

➢ **Complementary policies are crucial,** especially **infrastructure investments** and standards

  - **Supra-national coordination and investments** at the European level can help

What can we learn from the Dutch experience?

1. The necessity of combining **ambitious technology support** with a **strong commitment to raising carbon pricing**
2. The fundamental trade-off between **short-run cost-efficiency** and the need to **switch to radically new technologies**, such as green hydrogen, in the longer run
3. The **pervasiveness of competitiveness provisions** related to carbon pricing and energy taxation instruments
4. The value added of **supra-national coordination and investments**, for infrastructure and demonstration projects
5. The need to align policy frameworks well **beyond carbon pricing and technology support**

THANK YOU

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