Climate Neutrality 2050: What Industry Needs From Policymakers Now

Results of a dialogue with industrial enterprises

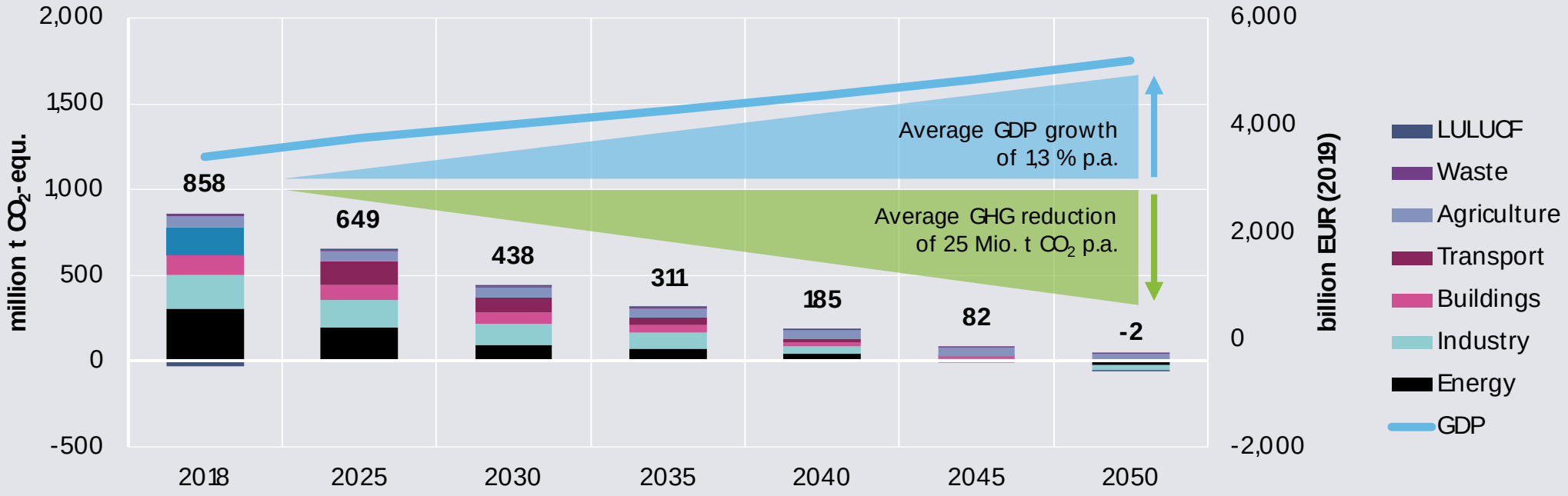
English Summary of Findings

MARCH 2021

Starting point: Towards a climate-neutral Germany 2050

The clean industry pathway:
Establishing a climate neutral Germany while at the same time experiencing economic growth (+1.3% p.a.) and modernizing the industrial base

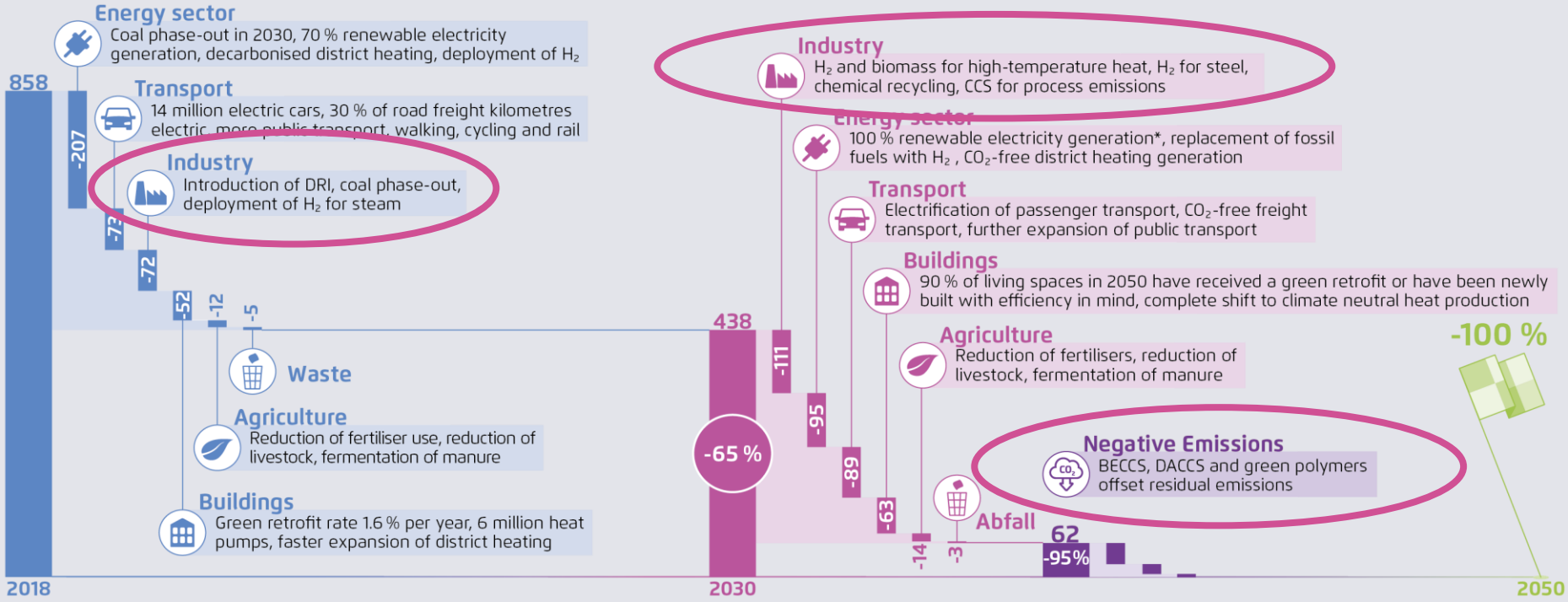
GDP and GHG emissions in the scenario “Climate Neutral Germany 2050”



Agora Energiewende, Agora Verkehrswende and Stiftung Klimaneutralität (2020)

From today to net zero greenhouse gas emissions in 3 steps:
A climate neutral industrial sector is – next to energy, transport and buildings – a key component of a climate neutral Germany strategy

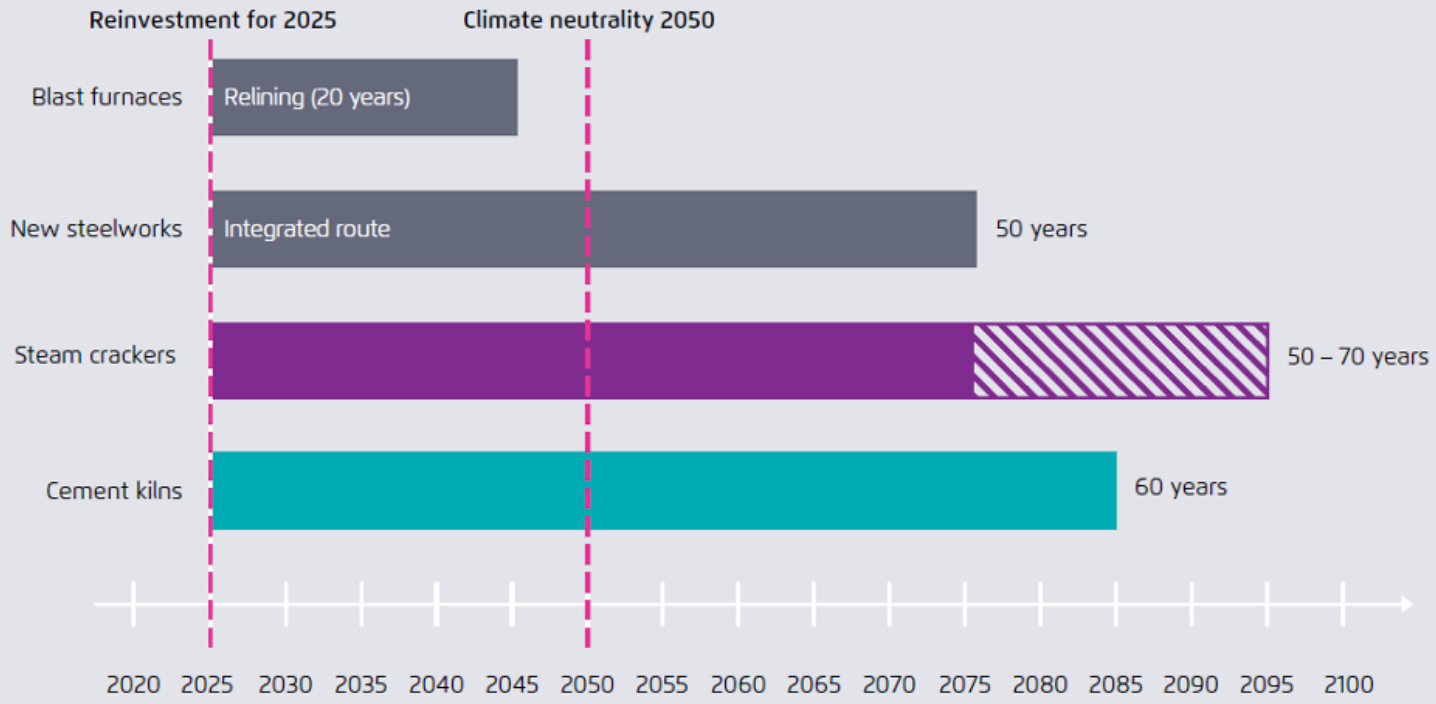
Measures included in the Climate Neutral 2050 Scenario (KN2050) (GHG Emissions in Mt CO_2-eq.)



Prognos, Öko-Institute, Wuppertal Institute (2020)

The problem: Industry is currently caught in a catch 22 situation – investments in conventional technologies end up as stranded assets, new innovative technologies do not have a business case

Technical service life of primary production plants in the steel, chemical, and cement sectors with reinvestment in 2025



Agora Energiewende and Wuppertal Institute (2020)

Project overview & key results of the industry dialogue

“Climate Neutrality 2050: What Industry Needs From Policymakers Now” – Policy paper by Agora Energiewende, Foundation 2°, and Roland Berger based on a dialogue with key industrial players

Full text in German

- Project partners: Agora Energiewende, Foundation 2°, and Roland Berger
- Published: 22.02.2021
- Multi-month dialogue (September to December 2020) with representatives of leading industrial enterprises
- Aim: Identify the legal and policy framework that will enable industry to become climate neutral by 2050 at the latest AND to compete internationally at the same time.
- Participants in the dialogue included:

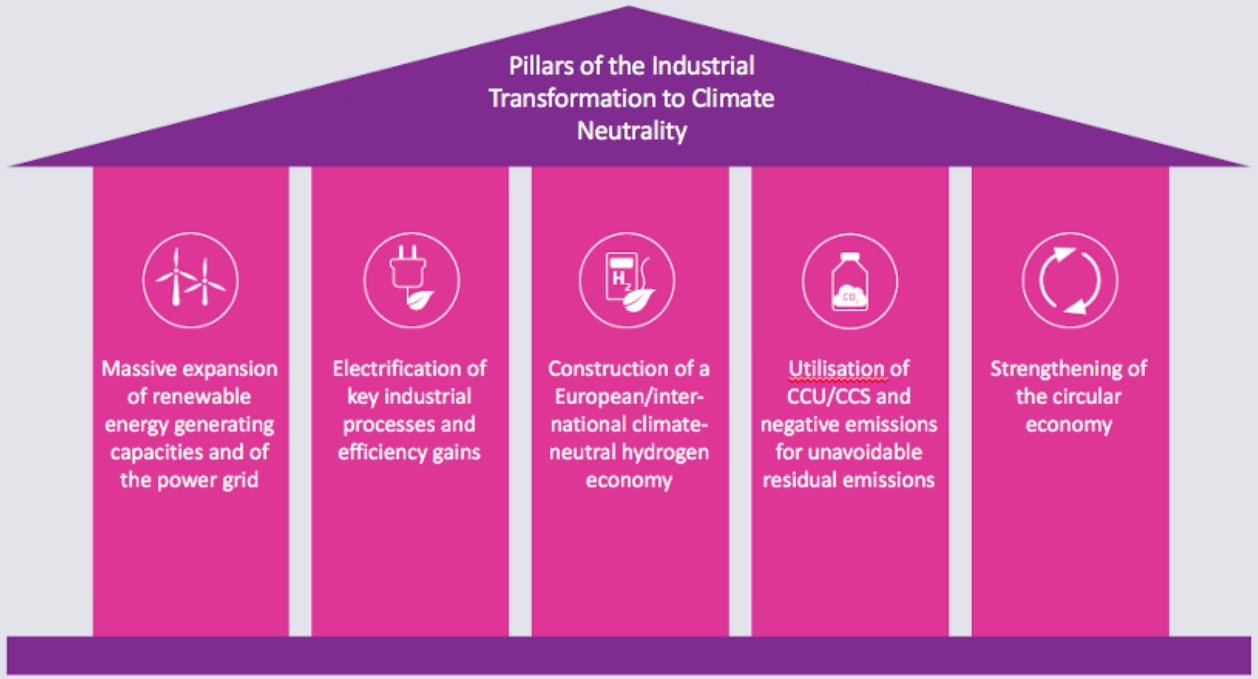
Aurubis AG, BASF SE, Bayer AG, BP Europa SE, Covestro AG, HeidelbergCement AG, Lanxess AG, OTTO FUCHS KG, Papier- u. Kartonfabrik Varel GmbH & Co. KG, Salzgitter AG, Schott AG, Siemens Energy AG, Sunfire GmbH, thyssenkrupp Steel Europe AG, VINCI S.A., Wacker Chemie AG, Worlée-Chemie GmbH

Key Findings at a glance

1	**For industry, the path to climate neutrality is not a walk in the park, but rather a massive transformational project.** In order to play a leading role in the race for international technology leadership, a *reliable industry framework* is needed as soon as possible that allows worthwhile investments to be made.
2	**A climate neutral industry requires a mix of policy instruments along the entire industrial value chain.** This incentivises the transformation upstream, midstream and downstream, while simultaneously ensuring the competitiveness of the industrial sector.
3	**The course towards climate neutrality must be set as quickly as possible**. Measures must be taken before the end of this legislative period (e.g. amendments to the EEG). The transformation towards climate neutrality must be significantly accelerated right from the start of the next legislative period with an immediate climate action programme.

The technological transformation of industry towards climate neutrality fundamentally rests on five pillars

Pillars of the industry transformation towards climate neutrality



Agora Energiewende, Foundation 2°, Roland Berger (2021)

1. **Massive expansion of renewable energy generating capacities and of the power grid**, as electricity demand increases due to electrification, sectoral coupling, and compensation of coal and nuclear power plants.
2. **Electrification of key industrial processes and efficiency gains.** Electricity-based heat and steam production and electrification of industrial production processes.
3. **Construction of a European/international climate-neutral hydrogen economy.**
4. **Utilisation of CCU/CCS and negative emissions for unavoidable residual emissions**, especially in the cement and chemicals industries.
5. **Strengthening of the circular economy.**

Overarching goals for an industrial policy framework to achieve climate neutrality by 2050 at the latest

1. **Ensure the competitiveness of the industrial sector:**
   Secure prosperity and jobs in Germany/Europe, avoid carbon leakage.
2. **Create long-term planning and investment security for the industrial sector**: Overcome the wait-and-see attitude to investment and create certainty on infrastructure investments, funding instruments, and the EU legal framework.
3. **Enable rapid implementation by businesses:**
   Ensure compatibility with EU state aid law, speed up approval procedures, and fundamentally modernise bureaucracies and regulations.
4. **Push large-scale development and application of key technologies :**
   Bring key technologies from the demonstration phase to large-scale application.

Roland Berger

Stiftung 2°

Agora Energiewende

Twelve recommendations for action to federal policymakers

The result of the industry dialog is a set of twelve recommendations to federal policymakers that cover the entire industrial value chain

A mix of instruments along the entire industrial value chain

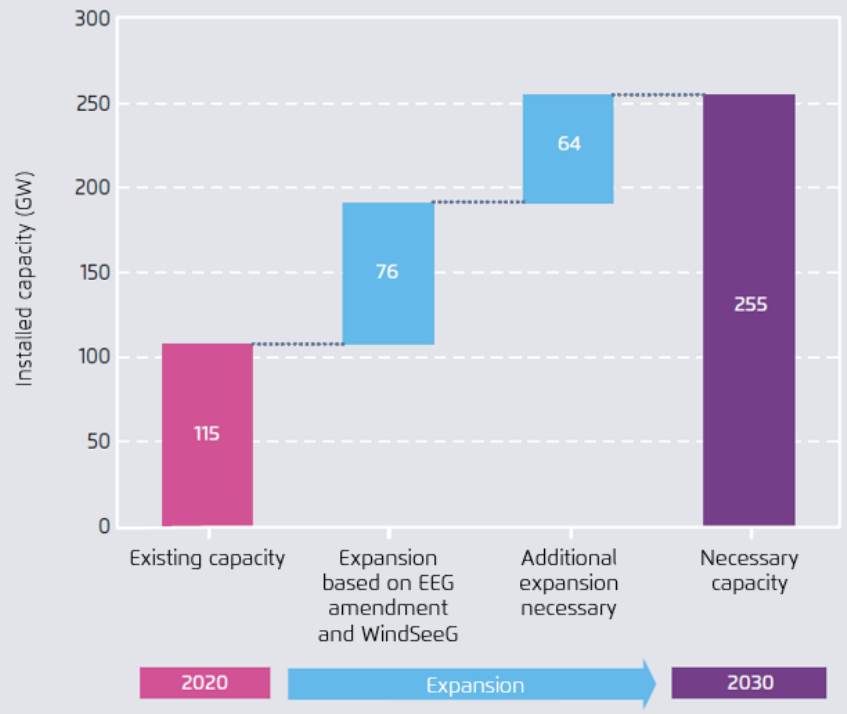
Energy, raw materials & infrastructure (*upstream*)	**Production** (*midstream*)	**Sales** (*downstream*)
1. Expansion of **renewable energy** 2. Competitive **electricity costs** 3. Constructing an **H_2-economy** **4. Circular economy** **5. CCU/CCS/negative emissions**	6. Introduction of **carbon contracts for difference** (compensation for added costs of key low-carbon technologies) 7. Promoting **research & innovation** and **efficiency technologies**	8. Increasing **demand** for climate-neutral technologies/products through **incentives and regulatory specifications**

9. Further development of **carbon pricing** and **protection against carbon leakage**
10. Creation of a **level playing field for SMEs**
11. Capture of **export markets** through early development and marketing of **key technologies**
12. Establishing climate neutrality as a **core aspect** of government action & **modernising cross-departmental steering**

up-, mid- or downstream overarching

1. Create sufficient and reliable supply of renewable energies

Necessary expansion of renewable energies (wind and solar) through 2030



Agora Energiewende, Foundation 2°, Roland Berger (2021)

- Climate neutrality means **using 100 percent renewable electricity** by 2050 with significantly increased energy demand.
- The basis for expansion goals must be a **realistic scenario for electricity consumption** in 2030 (min. 650 TWh).
- EEG tender volumes must be increased: **At least 140 GW additional installed capacity (wind and solar) by 2030.**
- **Planning and approval procedures** for generating capacities must be sped up.
- Expansion and modernisation of more than 7,500 kilometres of **transmission grid** and more than 130,000 kilometres of **distribution grid** are necessary.

2. Ensure internationally competitive electricity costs for the German industrial sector

- For many industries, electricity costs represent a **large share of their operating costs** – the significance of electricity costs will increase further as electrification advances, becoming a central aspect of international competitiveness.
- So as not to endanger prosperity and jobs within the industrial and export sectors in Germany on the way towards climate neutrality, the German industrial sector needs **long-term, internationally competitive electricity costs**.
- For companies in international competition, a **mechanism for dynamically adjusting the state-controllable share of energy costs** would make sense. Orientation via suitable indicators, e.g. a **dynamic benchmark of international industrial sites**.
- In the medium-term, a **fundamental reform of the system of taxes, levies and charges on energy is necessary**, which is oriented towards the carbon intensity of the energy sources. As a central component of this, the **EEG levy should be abolished** and financed elsewhere.

3. Drive forward the development of a national and European hydrogen economy

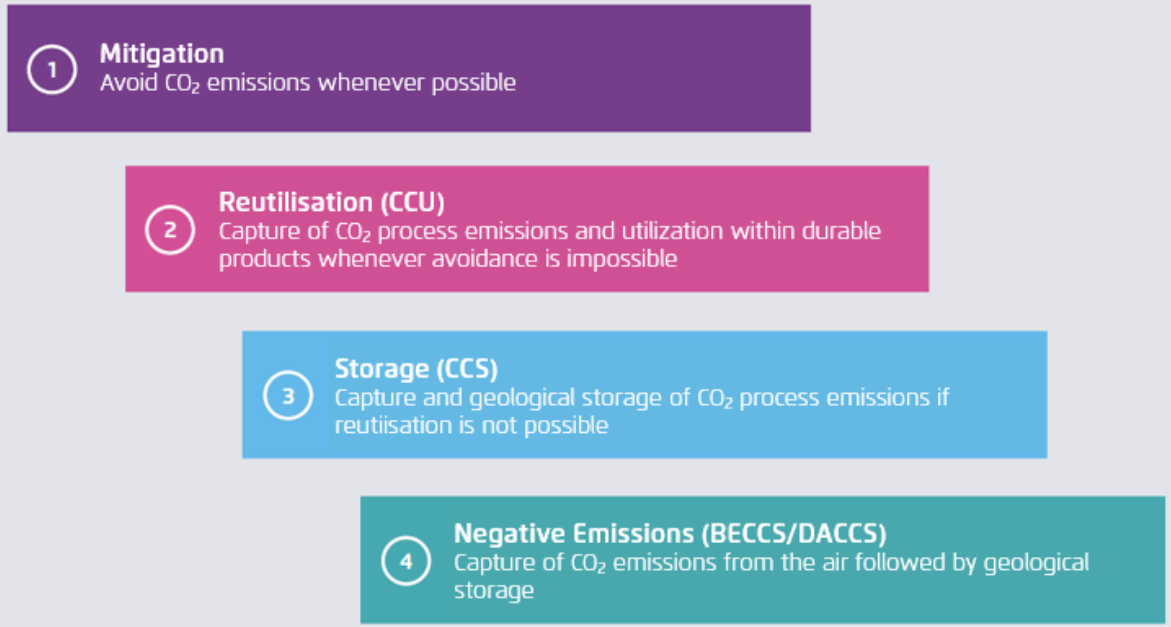
- The use of **climate-neutral hydrogen** contributes significantly to greenhouse gas emissions reductions in the primary industry. In the short to medium term, **blue and turquoise hydrogen** can contribute to accelerating the market ramp-up alongside **green hydrogen**.
- Since green hydrogen can be produced most cost-efficiently in regions with good conditions for renewable energies (for example, the North Sea, Southern Europe, North Africa), a corresponding **hydrogen infrastructure must be built**. This includes the construction of dedicated hydrogen pipelines and the retrofitting of the gas grids.
- Hydrogen should be used as a priority in sectors and for key technologies in which **no efficient climate-friendly alternatives (especially electrification) are available.**
- In order to promote the development of the hydrogen economy, the **increased operating costs** must be taken into account in addition to support for **additional investment costs**. To this end, the design of **Carbon Contracts for Difference** (CfD) for hydrogen-based key technologies is important and must be implemented as quickly as possible within the framework of the announced pilot programmes.

4. Accelerate the development of a circular economy internationally

- The gradual transformation of our linear economic system to a **circular economy** is a crucial step on the way to a climate-neutral industrial sector by 2050.
- The **downcycling** of products must be prevented wherever possible so that recycled raw materials can be used for equivalent applications. To this end, **fiscal incentives** and **regulatory requirements** must be introduced or adapted.
- Internationally, the central regulatory instruments are the **common industrial norms and product standards**, at European level the **Eco-Design Directive**, as well as national regulations, such as **building standards**.
- In addition, the greater use of secondary raw materials must be ensured through **targets for recycled materials**, with **chemical recycling** recognised as recycling within the target schemes.
- Strengthening exchange among actors through **cross-sectoral initiatives and international platforms** is also important.

5. Increase acceptance of CCS technologies, construct a CO_2 infrastructure and push a European move to utilise negative emissions

Deployment of CCU and CCS

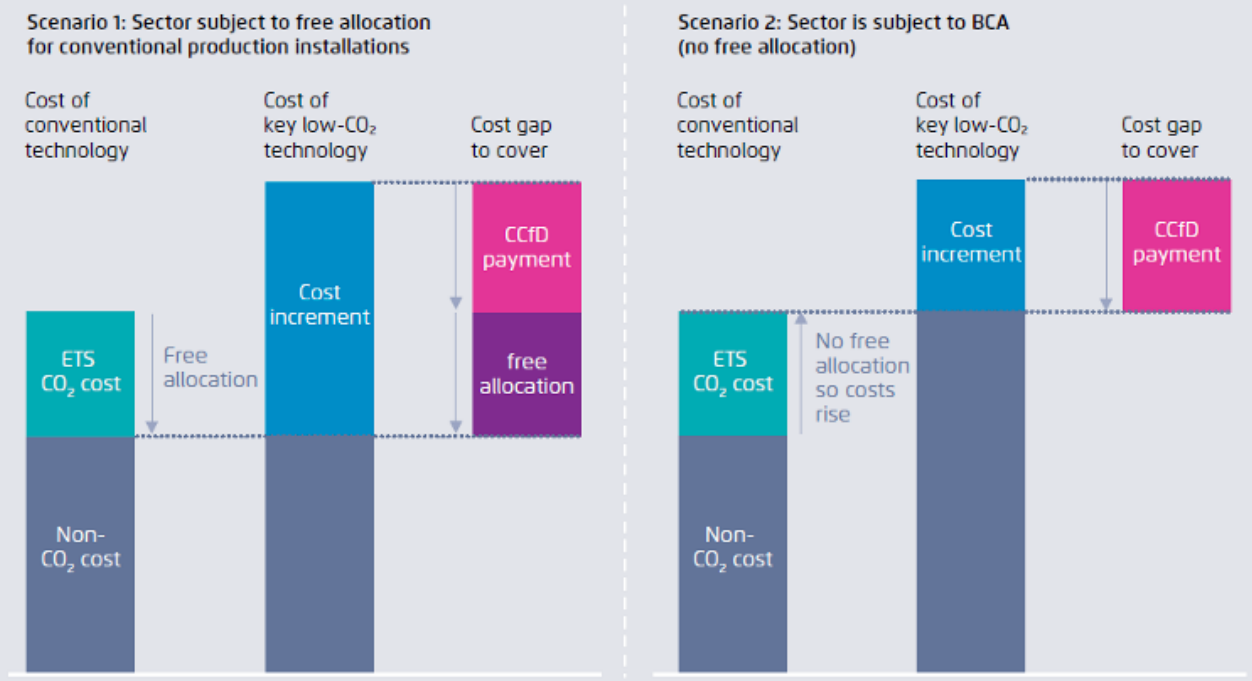


Agora Energiewende, Foundation 2°, Roland Berger (2021)

- For **unavoidable emissions**, the aim is to close carbon cycles as much as possible and to utilise the carbon in climate-neutral, especially durable, products **(CCU)**.
- Carbon capture and geological storage **(CCS)** is only an option for unavoidable residual emissions.
- For CCU/S, the development of a **national and European CO_2 infrastructure** is urgently important for industry. A **network development plan** should be drawn up for this purpose.
- In addition, a **broad-based public debate** should be relaunched to ensure acceptance for CCU/S among the public.

6. Advance the broad application of key low-carbon technologies through Carbon Contracts for Difference (CCfDs)

The CCfD mechanism with two anti-leakage policies



Agora Energiewende (2020)

- The broad and rapid introduction of **Carbon Contracts for Difference** (CCfDs) should make **avoidance costs** (especially OPEX) plannable for industry and balance them out in the long term.
- CCfDs should be used in a first step for production processes with **high CO_2 savings potential and simultaneously high CO_2 avoidance costs**. This includes, for example, direct iron reduction in the steel industry, hydrogen-based ammonia production in the chemicals industry, and the use of CCS in the cement industry.
- The advantages and disadvantages of **different design options** (e.g. tenders, auctions or project-based awards) must be rapidly assessed.

7. Accelerate targeted promotion of research and innovation as well as efficiency technologies in industry

- Key technologies with a high technology readiness level (TRL) already exist for many industrial sectors. However, **basic research** is still needed in some areas to promote the development of further promising processes.
- Alongside basic research, it is also important to **accelerate innovation cycles for existing, specific key technology concepts and efficient cross-cutting technologies**. In the early stages of technology development (TRL 1-3) this can be accomplished through **innovation grants**. From the demonstration stage (TRL 6-7), funding support can be **gradually replaced by other instruments like CCfDs or special depreciations** to ensure a broad market introduction of the technologies.
- These technologies include for instance new catalysts, innovative biomass-based processes and e-crackers, cement recycling, electricity-based high-temperature generation, and direct-air capture processes across sectors.

8. Boost demand for climate-neutral products through incentives and regulation

- The introduction of **EU-wide green product labels** that account for the carbon intensity of the materials used can be a meaningful building block within the mix of instruments.
- **State incentives**, e.g. premiums, can help boost the use of climate-neutral materials in selected climate-neutral end products. In the medium term, a **levy on end products** based on the CO_2 content of the materials used could offset the cost disadvantage of low-carbon products, thus creating purchasing incentives.
- Consistently **sustainable procurement by the public sector** promotes the development of a lead market for sustainable products in Germany. Considerations of carbon intensity, resource and material efficiency, as well as circularity should become part of the award requirements.
- Adjustments to **construction and product norms** and **design guidelines** for increased recyclability of products can increase demand for low-carbon and circular materials. **Quotas for low-carbon materials** in selected industries could prove to be an effective instrument.

9. Further develop effective carbon pricing and carbon leakage protection instruments

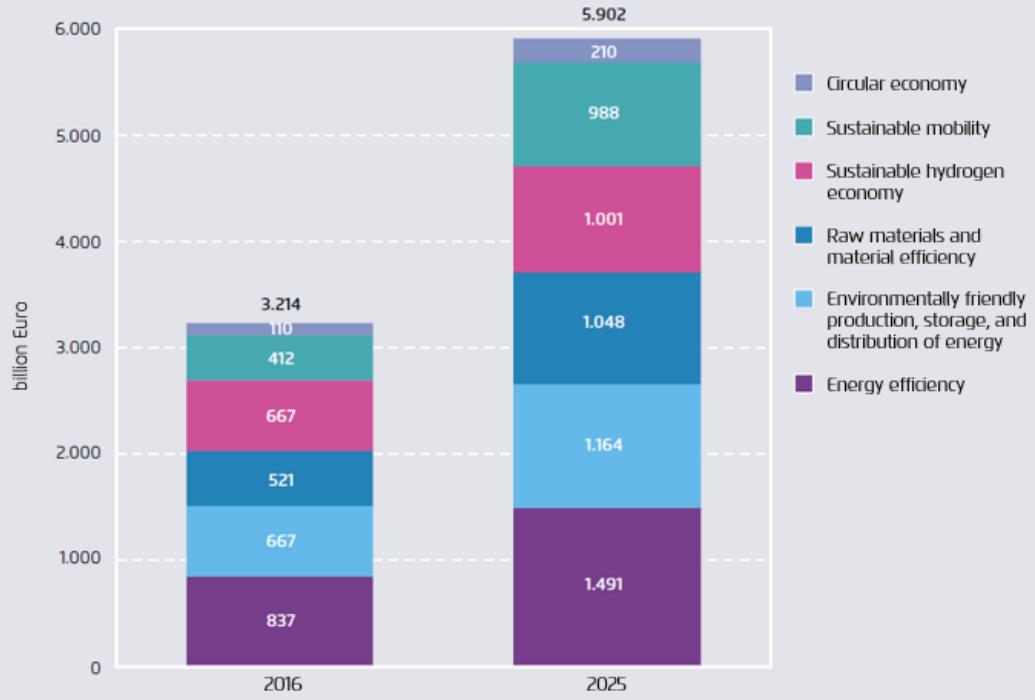
- The **national emissions trading scheme** should be transitioned into an EU-wide system as soon as possible (possibly separate EU-system for transport and buildings).
- At the European level, the ETS reform should be developed further. Existing **carbon leakage protection instruments** for conventional facilities, e.g. free allocation of certificates and CO_2 electricity cost compensation, **should be developed effectively and with planning certainty**, as long as this is required to ensure the competitiveness of the affected industries.
- **Carbon border adjustment mechanisms** are currently being discussed as an alternative form of protection, but they are the subject of **extremely controversial** debate in the industry. Before being introduced, they must be examined for conformity with WTO rules, reactions of international trading partners, administrative effort (including with regard to CO_2 tracking), and for the question of securing the competitiveness of climate-neutral export products.
- Existing protection instruments should continue during a **testing and piloting phase** of any carbon border adjustment mechanism in order to avoid carbon leakage.

10. Ensure a level playing field for small and medium-sized enterprises

- Germany is a country of **small and medium-sized enterprises** (SMEs) – they generate around 35 percent of the turnover of all German companies and provide more than half of all jobs in Germany.
- The basic prerequisite for a **level playing field** is equal **access to compensation instruments** that make it possible to operate facilities profitably. These must therefore be **adapted to the particular characteristics of SMEs**.
- Both European and national compensation instruments should be considered, for example in the medium term via a **complete reduction in EEG levies for SMEs** or **the distribution of free EU-ETS certificates** for enterprises of **all size classes** that are put at risk by carbon leakage.
- The sometimes substantial investments in climate-neutral key technologies must be made possible for SMEs, especially those with limited access to finance for venture capital investments, through **simplified access to financing instruments**.

11. Seize opportunities of transformation – develop export markets in a targeted manner

Global market volume of individual climate action markets



BMU and Roland Berger (2017)

- The German industrial sector is characterised by a traditionally high **export orientation**. The early development and marketing of climate-neutral key technologies and end products at home and abroad creates future sales markets.
- With the commitment of major economies such as the USA, China, Japan, South Korea, the United Kingdom to climate neutrality by 2050/2060, the **race for global technology leadership** has begun.
- Ensuring the balance between effective **carbon leakage protection** while **reducing trade barriers** is crucial in the promotion of climate-neutral exports.
- **International collaborations** with potential import countries of key technologies can strengthen German export markets.

12. Put climate neutrality at the heart of government action and modernise political steering

- The move towards climate neutrality by 2050 at the latest can succeed if policymakers see it as **central to modernising our economy**. To this end, politics must put **climate policy at the heart of government action.**
- Economic, budgetary, transport, construction, environmental, research, and labour market policies must put the **objectives of climate action, jobs security, and international competitiveness** at the centre of their actions to successfully combine these three objectives.
- In the short run, transparent **modernisation of cross-departmental political steering** is needed**.** For example, the **climate cabinet** must assign itself a working programme directed towards meeting climate goals and use its monthly meetings to progressively work through this programme.
- In order to proactively respond to the changes to our working world that accompany the path to climate neutrality, the federal government should **develop suitable solutions in collaboration with businesses, trade unions, and associations**. This includes, for example, publicly funded **continuing education and training opportunities** in industries impacted by the transformation.

Thank you for your attention!

Further questions or comments?
Then please contact us:

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