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Making State Aid Work for Europe's Decarbonisation

*State aid and industry decarbonisation
(Updated version: 21 January 2019)*

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Objectives of the project

- **Analyse** the Commission's decision-making practice on State aid cases relating to decarbonisation and the clean energy transition
 - Confront the decision-making practice with **realities** of the energy market and the necessary transition to a decarbonised European power system in line with **EU climate and energy targets**
 - Raise awareness of the **importance of State aid decisions for decarbonisation** and the need for **consistency**
 - Engage with **decision-makers** and **stakeholders** on how to provide that State aid decisions and market-forces work in support of decarbonisation and the clean energy transition
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Project events in Brussels

- Workshop #1 – Capacity Mechanisms (7 May 2019)
- Workshop #2 – Renewable Energy (22 October 2019)
- Conference – State Aid Perspectives on the ‘Coal to Clean Transition’ in Europe (14 November 2019)
- Workshop #3 – Industry Decarbonisation (3 December 2019)
- Workshop #4 – Energy Efficiency & District Heating (17 December 2019)

Project website



The screenshot shows the website header with logos for ClientEarth, Agora Energiewende, the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, and the European Climate Initiative (EUKI). The main title is "State aid for a Decarbonised Europe". A navigation menu includes "Introduction", "Case studies", "Latest news", "FAQs", "The team", "Contact", and "About this project". The "Introduction" section contains the following text:

EU State aid decisions have a major impact on how markets enable decarbonisation and the energy transition. The project analyses recent State aid decisions as to their consistency with decarbonisation objectives and the energy transition. Case studies are used to engage with decision-makers and stakeholders. Our objective is to raise awareness of the importance of State aid decisions for decarbonisation and the need for consistency to ensure that market forces work in support of decarbonisation and the energy transition.

The "Case studies" section begins with: "Our case studies are based on decisions made by the European Commission that authorise Member States' aid measures in the energy sector. We have selected the themes of renewable energy, capacity mechanisms, energy efficiency, carbon pricing and industry decarbonisation, either because of the perspective they provide due to a large number of cases since 2014, their controversial nature, or their..."

At the bottom right of the screenshot, there is a green button that says "Sign up for case study alerts →".

- We have just launched a project website, which will serve as an online repository with communication material on EU State aid decisions relevant for climate protection and the EU's energy transition.
- The website will provide transparent, reliable and well-documented case studies analyzing the track-record of past State aid decisions and guidelines in driving the energy transition and identify the critical steps and elements in State aid decisions that should be improved to align EU State aid decision-making with Europe's climate and energy targets.

Agenda - Topics selected for discussion

Morning (9:30-12:30)

- **Industry exemptions from renewable energy support**
- **Indirect cost compensation under the EU ETS**
- **Other industry exemptions**

Afternoon (13:30-15:30)

- **Carbon Contracts for Difference (CCfDs)**
 - **Carbon Capture, Utilisation and Storage (CCUS)**
 - **Green Hydrogen**
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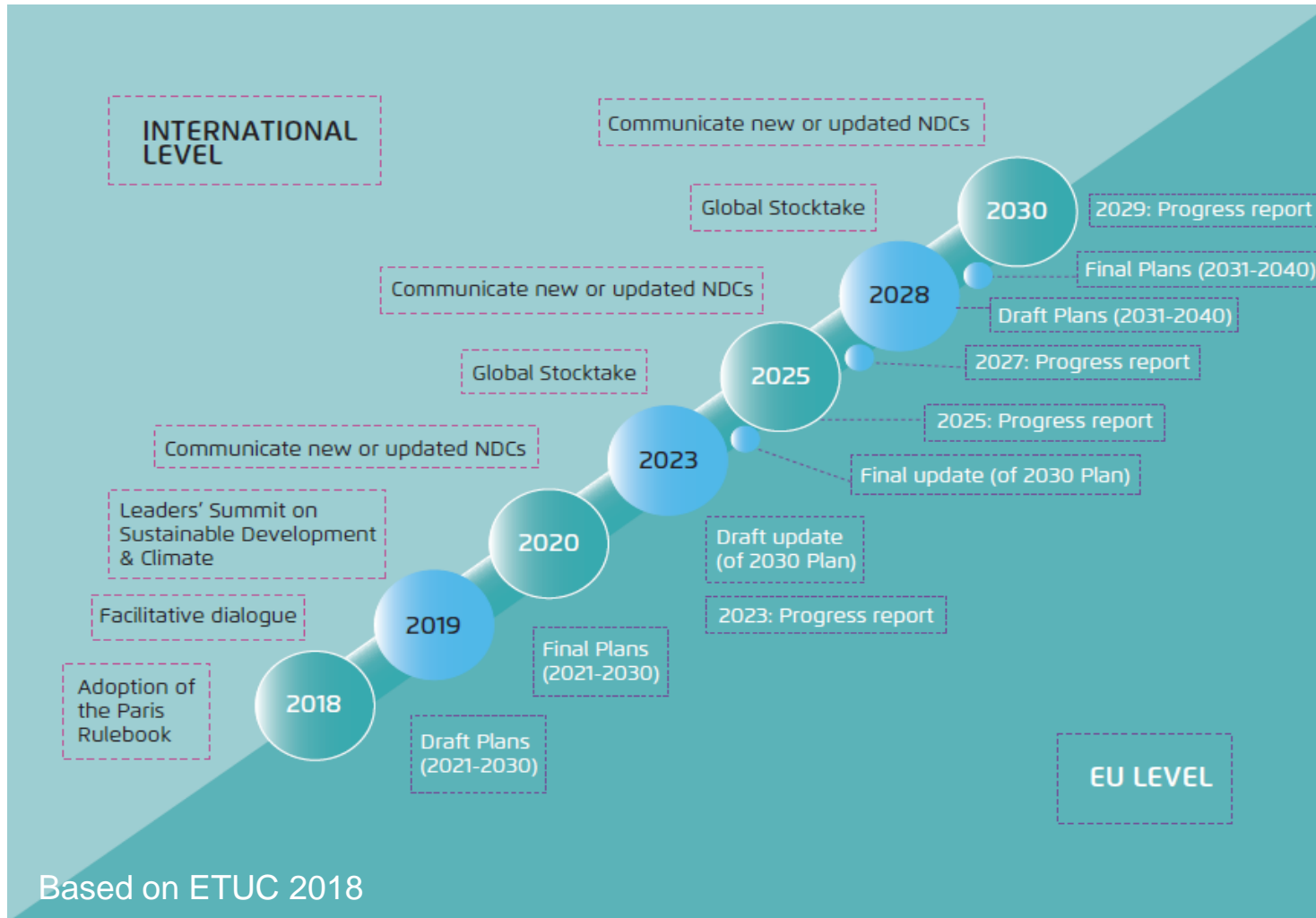
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Background



The new Commission plans to enshrine a 2050 GHG neutrality target into binding EU law and increase the 2030 target to -50%, possibly -55%.

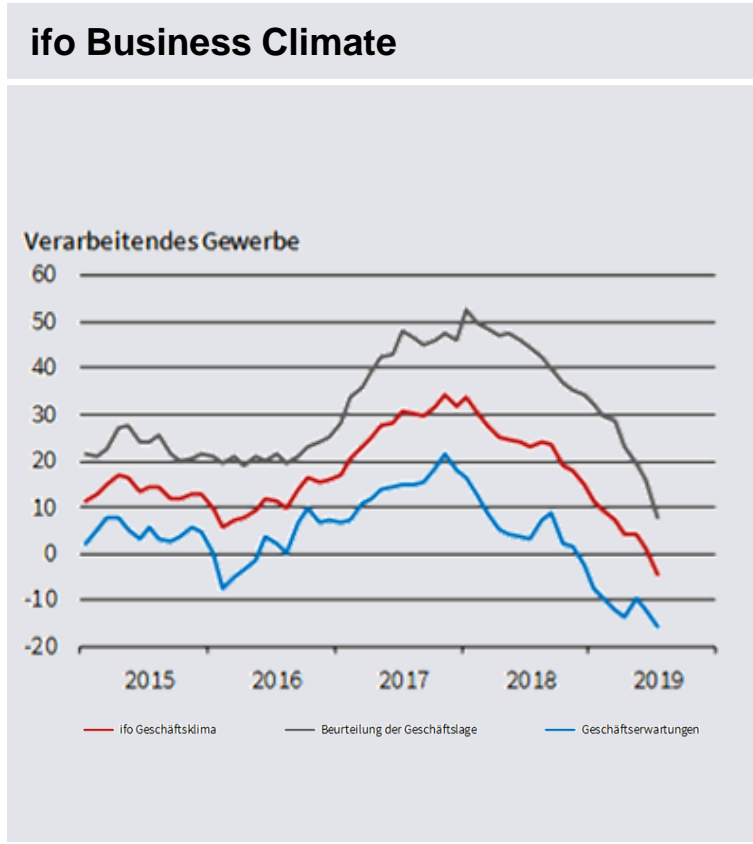


- The Paris Agreement is aiming at „well below 2 degrees“ global warming, but current targets sum up to much more than that.
- Global warming tipping points demand that the EU reduces greenhouse gas emissions to net zero by 2050.
- The first review and ratcheting-up process under the Paris Agreement in 2020 is a crucial moment for climate diplomacy.
- The question is not *whether* to increase the 2030 climate ambition but *how much*.

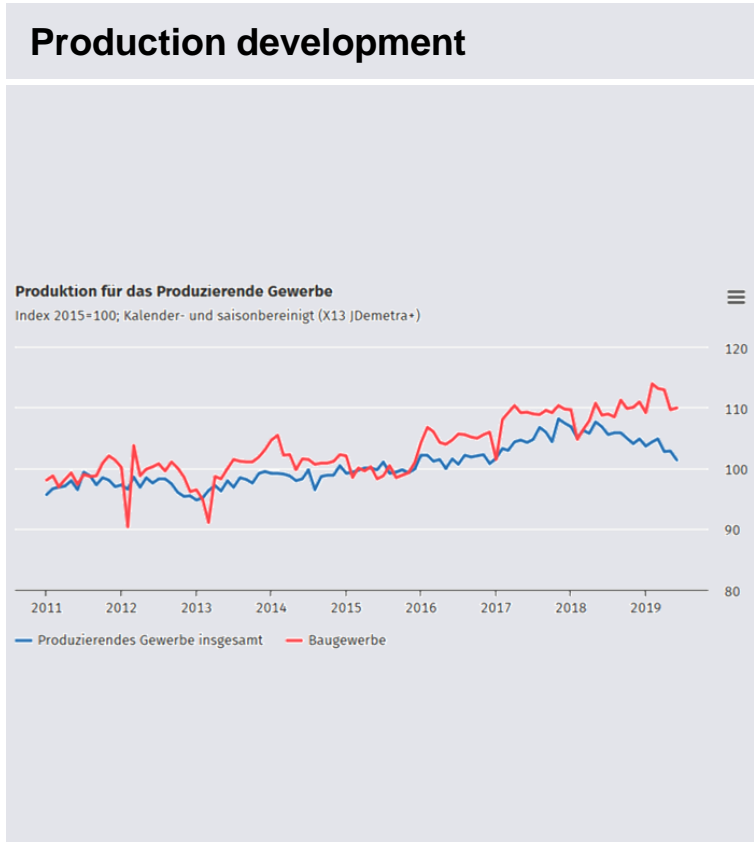
**Industry is under pressure:
 Pressure from the streets is increasing;
 economic growth is currently waning;
 Europe potentially faces recession**



tagesspiegel.de (2019)



ifo (2019)

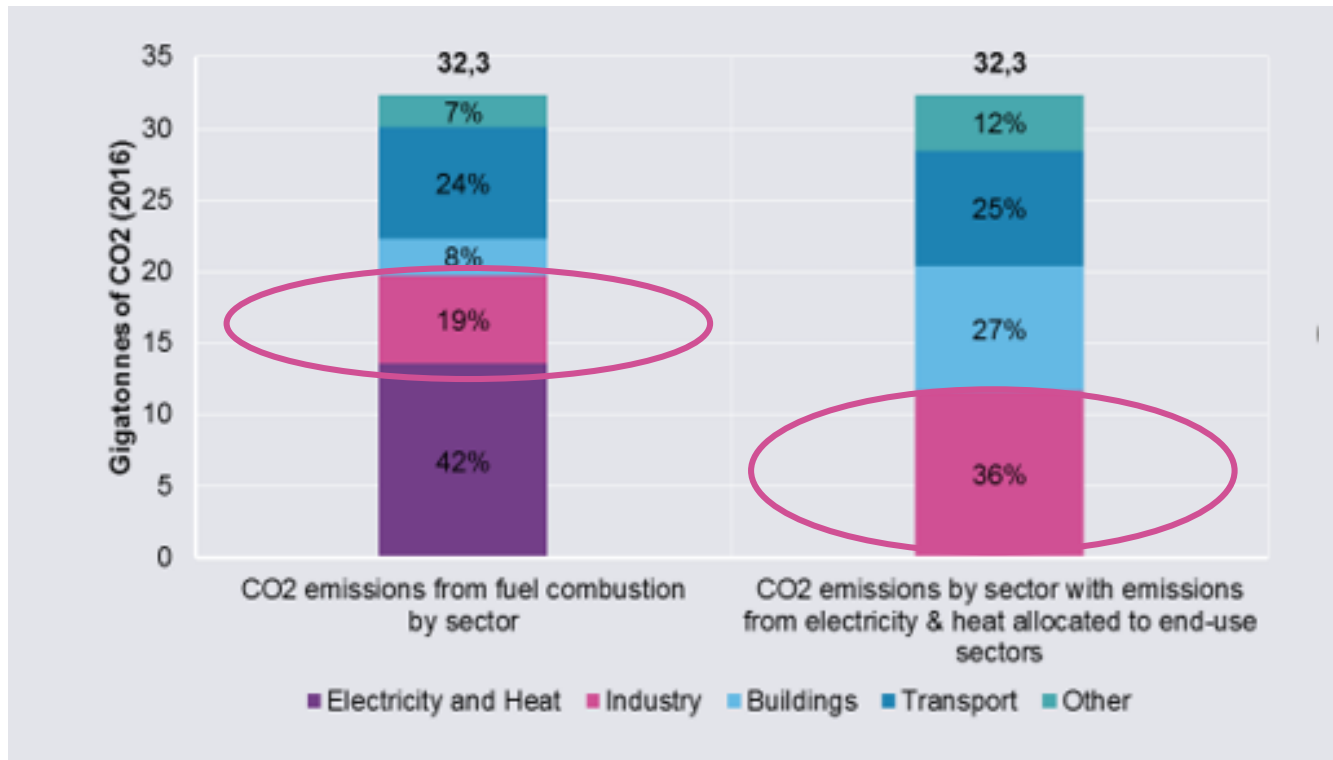


Destatis (2019)

A GHG-neutral industry must be in the center of discussions because its emission share is the second largest after electricity & heat



Global fossil fuel emissions by production (left) and end-use (right)



Different emission allocation methods

If the emissions by the electricity and heat sector are allocated to the end-use sector, industry is by far the largest CO2 emitting sector

Rising global demand for basic materials

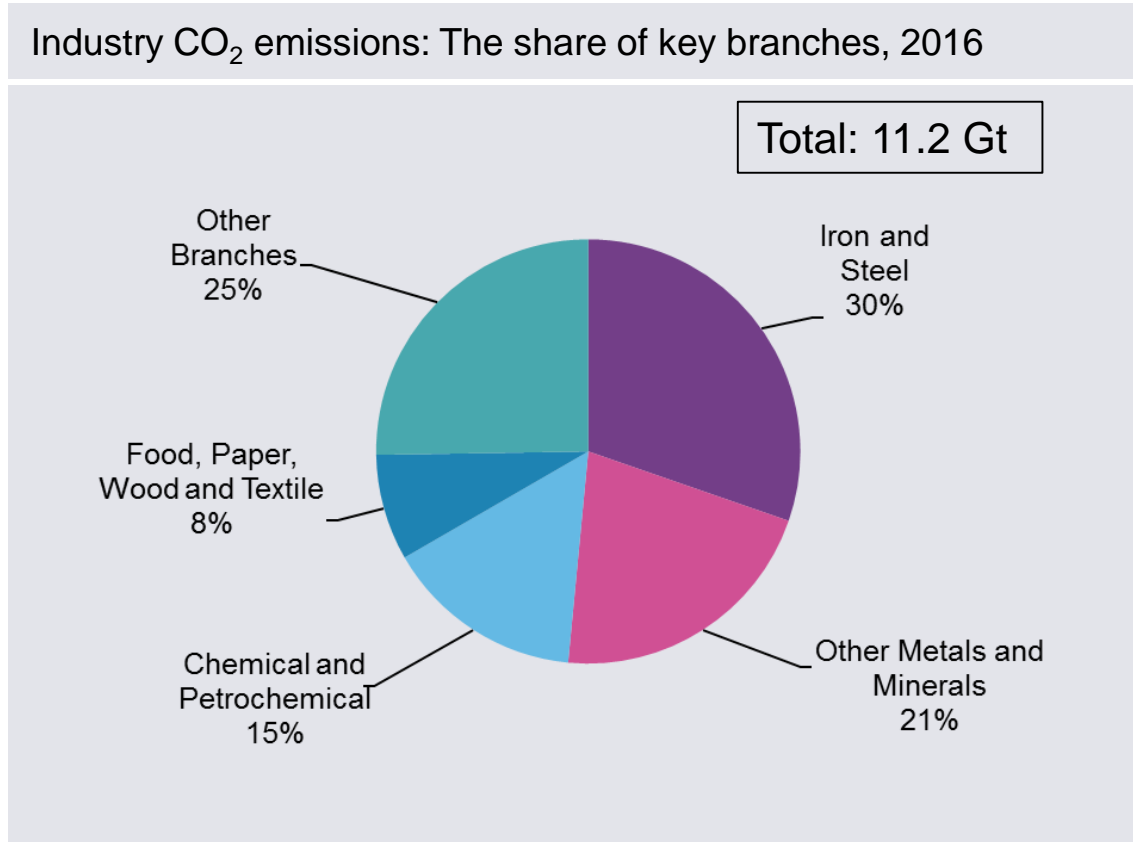
Yearly production in 2050 compared to 2015: steel (+30%); cement (+25%); ammonia (+65%)

Avoiding process emissions is key

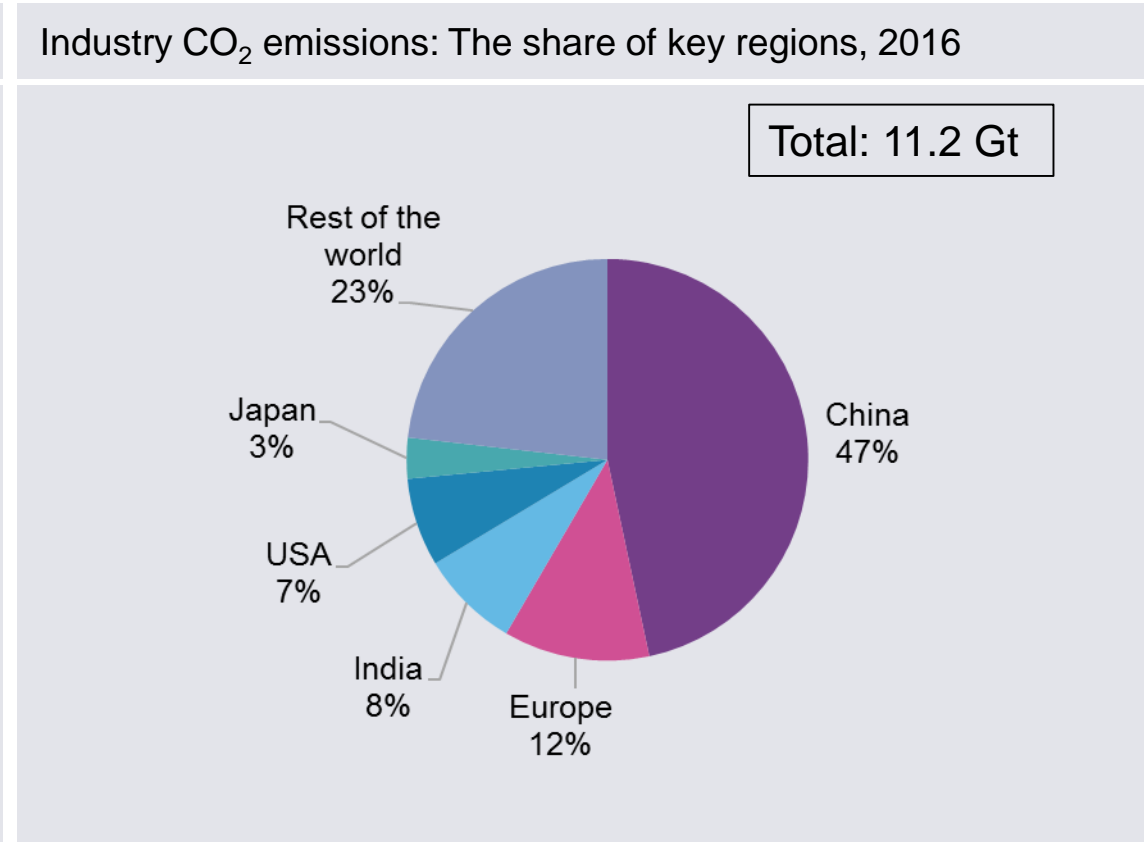
Due to the long life-times of industrial plants, future reinvestments must go into the new technologies

Agora Energiewende based on IEA 2018; McKinsey 2018

Climate-neutral industry is a major building block to achieve the Paris goals; steel, chemicals and cement = 2/3 of the problem; China accounts for almost half of industry emissions

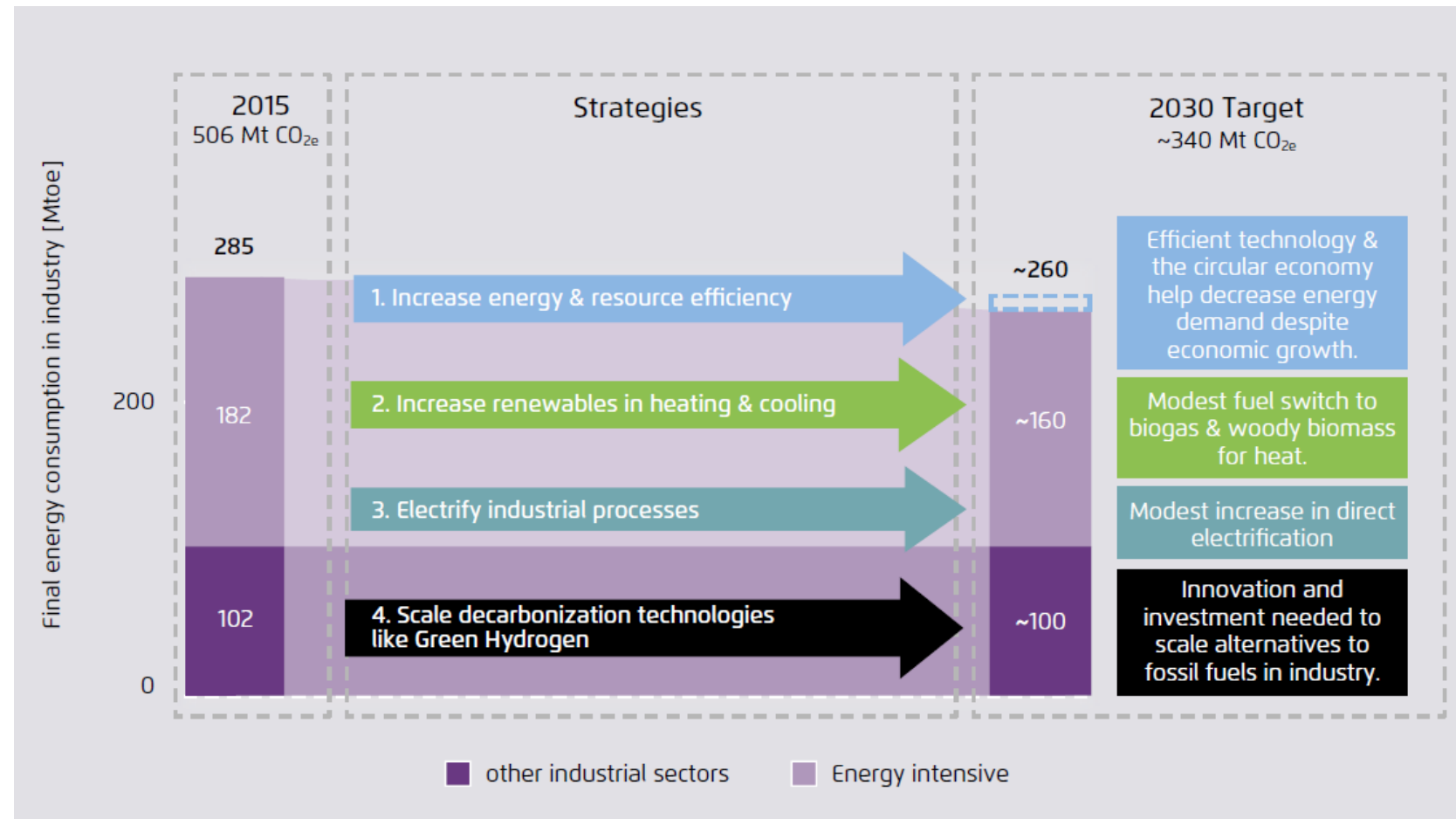


IEA (2018): CO₂ emissions from fuel combustion



IEA (2018): CO₂ emissions from fuel combustion

Transforming the industry sector for 2030 in a nutshell: Maximize energy & resource efficiency, increase the share of renewable & waste heat, electrify industrial processes directly where possible, and scale GHG-reduction tools where not.

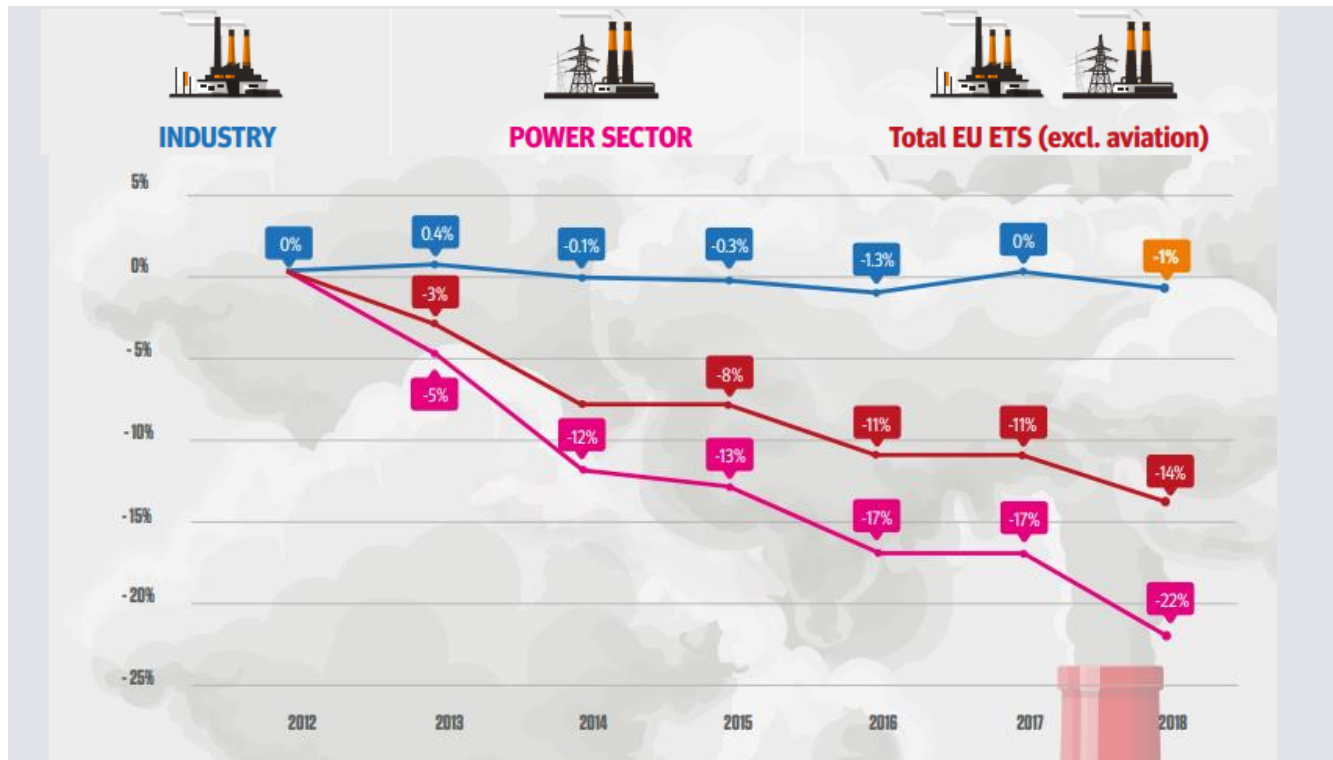


Four strategies for 2030:

- *Energy & resource efficiency:* Reduce energy use despite growing output through efficiency investments and circular economy measures.
- *Deployment of renewables* (biomass, solar thermal, geothermal) & waste heat.
- *Increase the electrification and flexibility of industry* to reduce fossil fuel use and tap into enormous potential for industrial flexibility and procurement of wind & solar.
- *Scale decarbonization tools:* Invest in alternatives to fossil fuels needed for net zero (eg. green hydrogen)

In recent years, little to no progress has been made in reducing GHG emissions from industry in absolute terms

EU carbon market emissions - power sector vs. industry 2012-2018



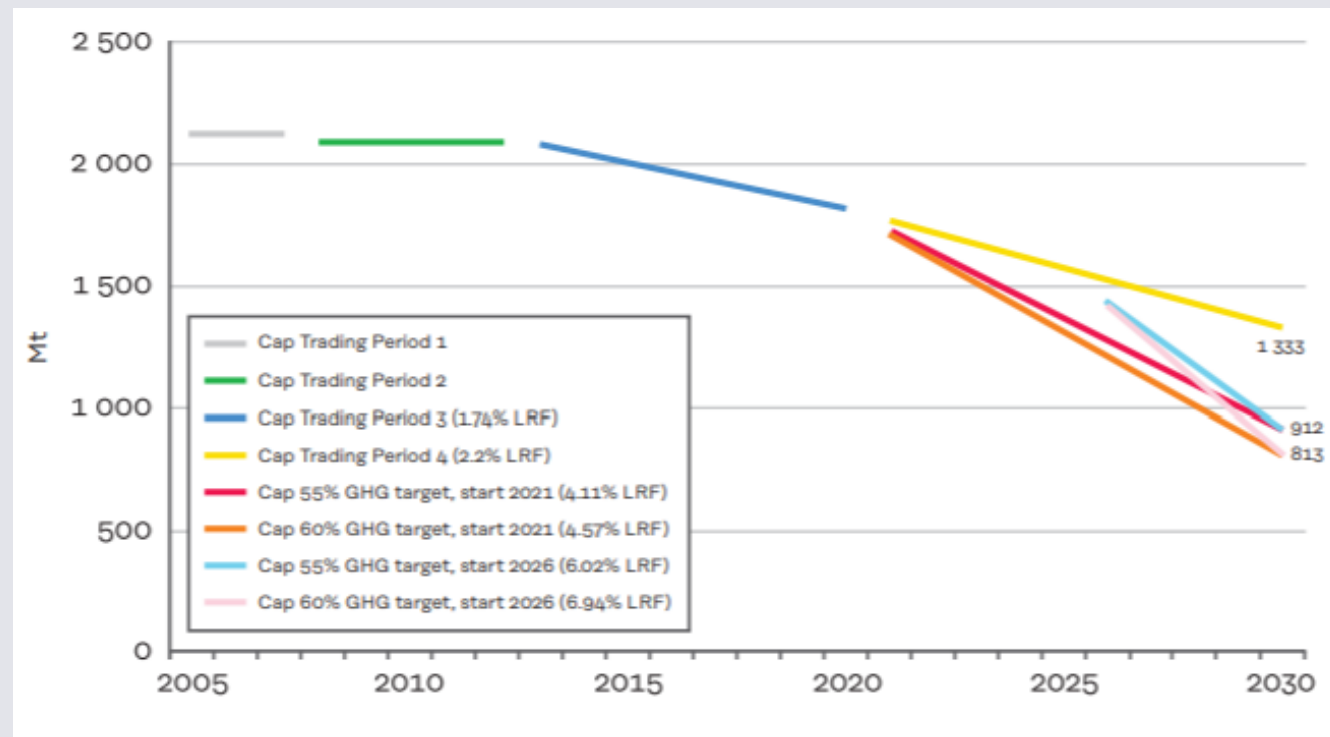
Source: [Carbon Market Watch \(2019\)](#) based on data from [Sandbag \(2019\)](#)

- Despite efficiency improvements, industry emissions have not declined due to an increase in production.
- Analysis by Sandbag finds from 2012 to 2018 overall emissions of the sectors covered by the EU ETS declined by 13% emissions, while emissions in industry sectors like steel, cement and chemicals have remained stagnant.
- More than 90% of industry GHG emissions under the ETS are not taxed due to exemptions and free pollution permits due to carbon leakage concerns, reducing incentives for industry decarbonization.

For an overall -55% GHG reduction target, a significant revision of the EU ETS Directive is needed, which will lead to higher ETS prices



EU ETS cap between 2005 and 2030 and LRF required to meet the enhanced EU GHG emission targets of 55% and 60%



Source: SITRA (2019) based on EEA data

Why State aid is needed to reducing GHG emissions from industry



- **Current market prices do not reflect the real costs of dangerous climate change.**
- **Internalising the costs of climate change through climate policy creates economic opportunities and risks.** Well-designed climate policy maximizes opportunities and minimizes risks. Europe has all means to develop and export breakthrough-technologies, but increases in cost must not discriminate European companies in such a way that they relocate (avoid carbon leakage).
- From a political economy perspective, ambitious climate policy is unlikely to gain support without taking into account the competitiveness of trade-exposed domestic European industry. **Thus, targeted exemptions are needed to enable ambitious climate policies.**
- State aid helps commercialization of innovative **breakthrough technologies** and infrastructures needed for achieving net-zero GHG-emissions, and to ensure an **adequate and affordable low-carbon energy supply** (e.g. renewables, efficiency, hydrogen, CCS).
- Moving towards a GHG-neutral industry means that sectors will transform (e.g. automotive industry) or disappear (e.g. coal industry). **State aid may be required to enable a just transition in parts of industry affected by the transition.**

Key concerns with regards to State aid and industry decarbonisation



Issue 1: Concerns about internal market distortions are continuous and growing

- The Commission is tasked with assessing the impacts of State aid on the internal market.
- Greater harmonization or coherence may be needed if the financial volumes of EII exemptions continue to grow, which could for example be the case with higher ETS price levels.

Issue 2: Distributional concerns between different consumer groups

- Non-exempted household and industry consumers frequently pay higher electricity prices, raising distributional and competitiveness concerns. At the same time, maintaining industry competitiveness contributes to value creation and maintains jobs in Europe, benefiting the European economy.
- At higher ambition levels for the EU ETS and renewables support policies new distribution mechanisms may be necessary to ensure fair cost sharing for the transition while maintaining industry competitiveness.

Issue 3: Complexity

- The full set of exemptions from taxes & levies, and industry protections (eg. free allocation) is increasingly complex and beginning to create perverse incentives.



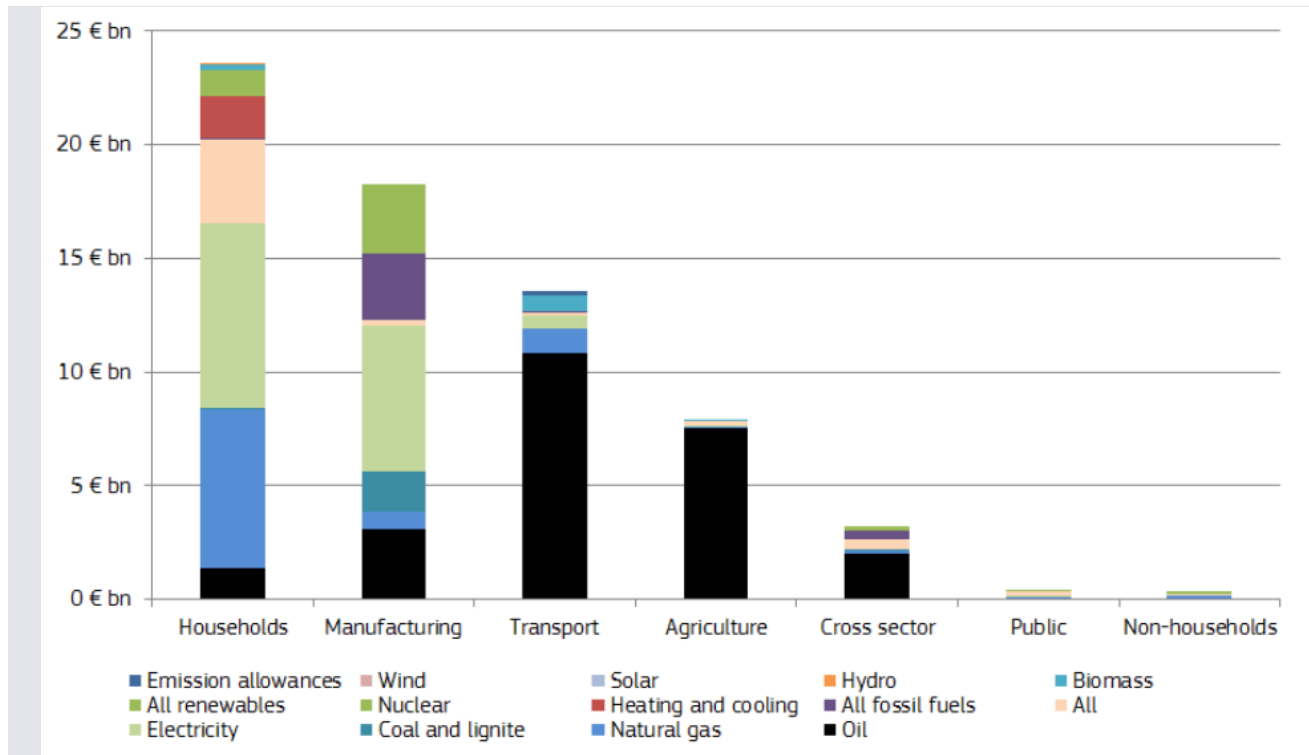
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Part I – Industry Exemptions

Manufacturing industry (mainly the energy intensive industries) received €18bn in energy related subsidies in 2016

Distribution of support among energy sources in 2016 in the EU



Source: DG ENER, data from Trinomics et alri study (2018)

- In the case of large energy consumers (energy intensive industries), the preservation of the international competitiveness for their products is ensured by preferential electricity tariffs or exemptions/reductions from energy taxes, costs of carbon emission and other climate policy measures (renewables levies or carbon taxes).
- Around 35% of the total support in the sector could be assigned to electricity consumption (€6.4 bn in 2016).
- Subsidies to petroleum products (€3 bn in 2016) could also be observed, mainly in the chemical industries and in the form of exemption from excise duties.
- The remaining part of subsidies in the energy sector could be assigned to general fossil fuel measures (€ 3bn), coal and lignite (1.8 bn)

EIIs receive measurable subsidies in the form of tax relief in FR, DE, GR, FI and SE. Support is less significant in other countries and in non-energy intensive industries



Recoverable taxes and tax relieves paid by large industrial (energy intensive) and median level electricity customers in some EU Member States in 2016



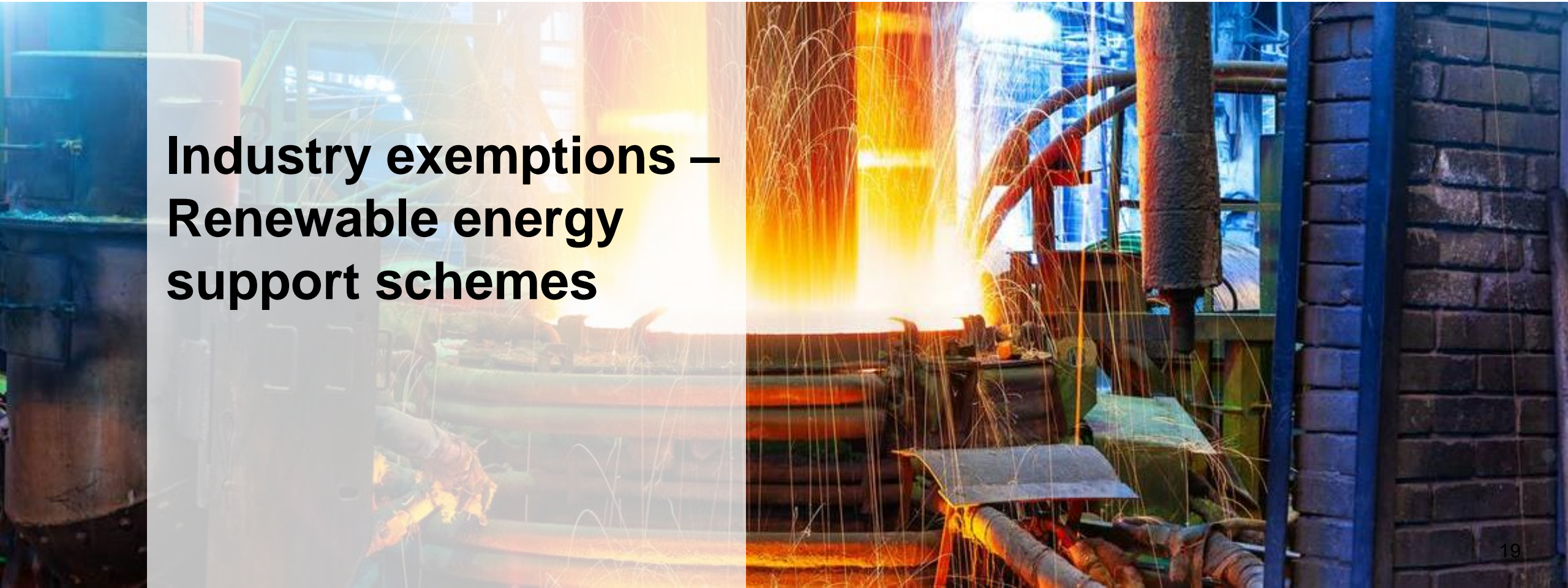
Source: DG ENER, data from Trinomics et alri study (2018)



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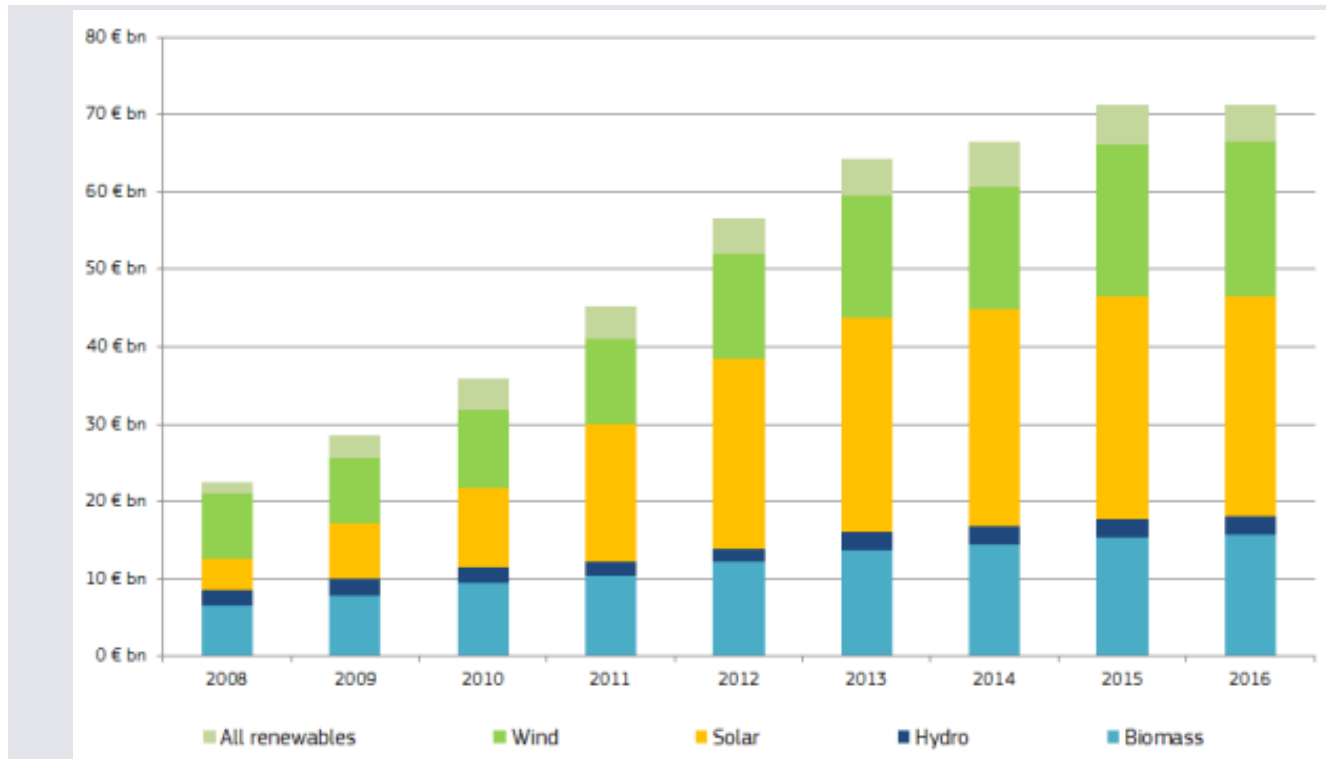
Industry exemptions – Renewable energy support schemes



Renewable energy support in Europe is significant and by far the largest intervention in energy markets in financial terms.



Support to renewable energy sources in the EU Member States



DG ENER, data from Trinomics et altri study (2018)

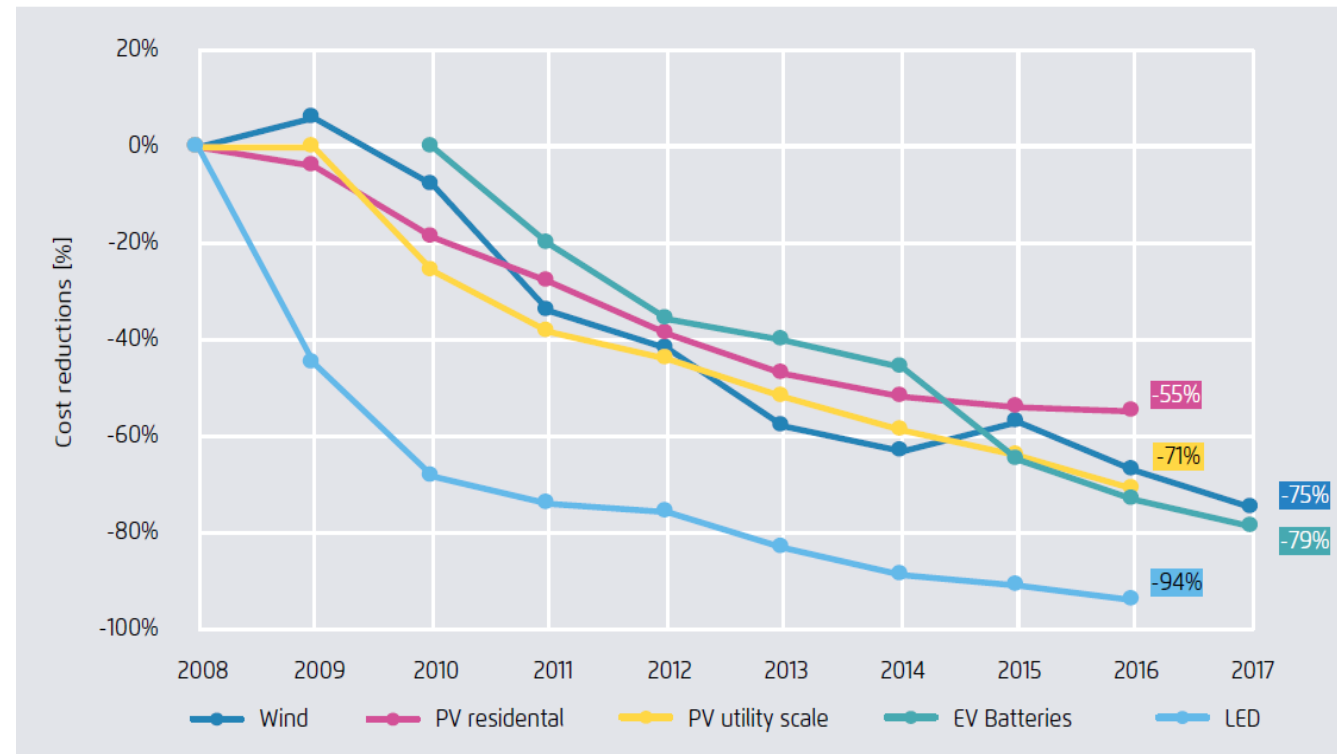
- According to the State Aid Scoreboard, in 2018, Member States spent €97 billion on State aid. About 58% of total spending was attributed to State aid to environmental and energy savings, largely due to support for renewable energy sources (including energy tax reductions for energy-intensive users)
- According to CEER, in 2016, total supported renewable electricity reached 538 TWh, accounting for 16,7% of gross electricity production and costing €56.8 billion in support expenditure.
- A study for DG ENER estimates support for RES at €71 Billion in 2016.

Clean energy solutions have seen significant cost declines. Wind and solar are now generally cheaper than conventional and fossil technologies leading to a decline in support



Cost reductions in major clean-energy technologies from 2008–2017

Figure 3



NRDC (2018) Revolution now

- The cost for wind and solar has fallen dramatically over the last decade. They are now cheaper than any other new built power technology.
- More and more RES installations (the more expensive ones) are reaching the end of their support time. In most countries financial support levels for new renewable capacity has been lower than already supported or old plants that were substituted by new ones.
- In many cases, due to the design of support policies (e.g. feed-in-premiums), the current trend towards higher ETS carbon price may help to further reduce RES support costs.
- **These trends will start to have a noticeable impact on the RES support cost developments in the coming years.**

Private corporate renewable PPAs could play an increasing role in the sourcing of power for energy intensive industry, but are currently still a niche market.



- Corporate Renewable Power Purchase Agreements (RES PPAs) are a private contract between a renewable energy generator and an end consumer, without an intermediary supplier. As they generally do not involve the State or public resources, they **generally fall outside the scope of State aid control**.
- RES PPAs could be an important tool for revenue stabilization of renewable energy operators while allowing energy intensive industries to source clean electricity at a fixed and competitive price. They come with certain benefits for generators to hedge the volatility of their revenues.
- To date, RES PPAs are still a niche market and not at the scale necessary to replace other policy driven revenue stabilisation mechanisms.
- The draft ETS State aid guidelines (released on 14 January 2020) include the contracting of RES/carbon-free PPAs amongst the options that EIs can consider in order to be eligible to compensation for indirect costs (*conditionality*). This may result in an increase of these agreements in future.

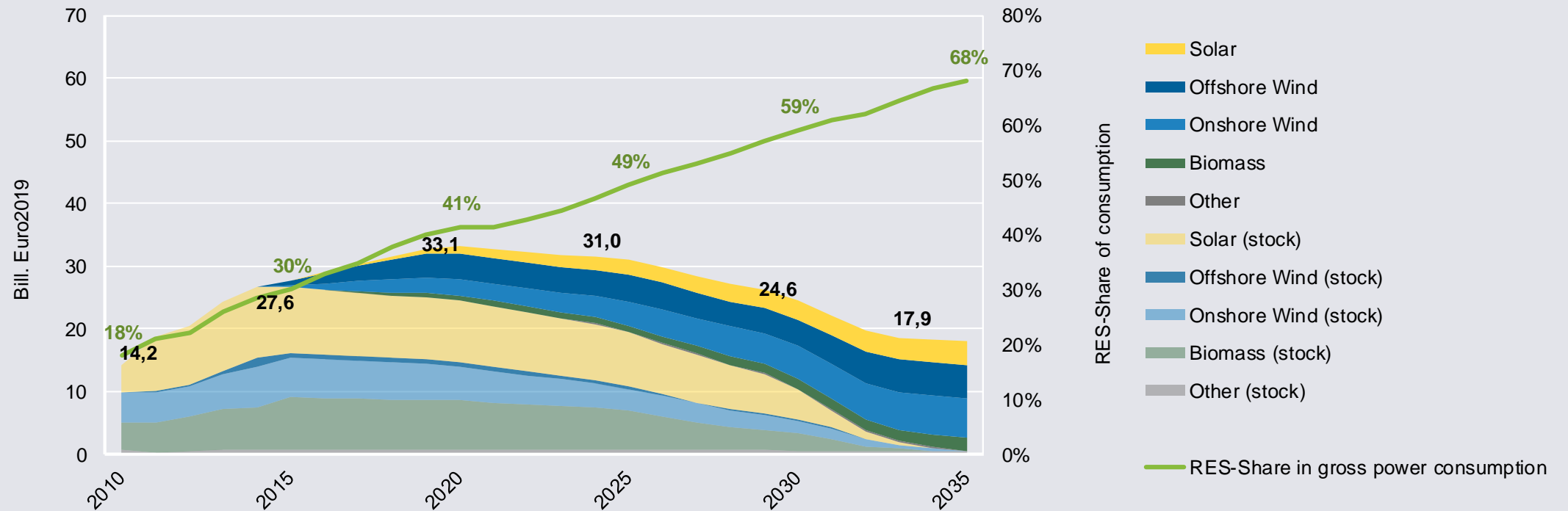
Potential barriers to corporate renewable PPAs

- **Price risk** linked to the uncertainty of future electricity price development and the long duration of PPAs represent the most prominent barriers to RE PPAs. So far (most) companies are willing to source renewable energy only if it does not cost more than conventional sourcing strategies.
- **Implementation of ETS State Aid Guidelines** on indirect cost compensation (e.g. Germany). Companies purchasing conventional electricity are compensated for part of the price they pay, whereas companies buying green electricity are not eligible to such compensation.
- Generators of renewable electricity have so far not been interested in signing PPAs because they were granted stable revenues by public support schemes providing a 100% protection from market risks (**'crowding-out effect'**). At the same time, without government guaranteed offtake, bank guarantees requested to off-takers can be very costly.
- **Some MSs (eg. FR, DE) do not allow RES projects benefitting from public support schemes to receive guarantees of origin (GOs) over their production**, while other MSs (e.g. NL, SE) allow companies to receive operational support for (eligible) RES production and claim GOs over the same production. This makes GOs a central item in RES PPA negotiations between project developers and off-takers.

Challenge 1: Overcoming the „cost hill“ between 2018 to 2025 and dealing with legacy support costs from the previous higher support cost period.



Guaranteed remuneration for renewable power plant owners, 2010–2035

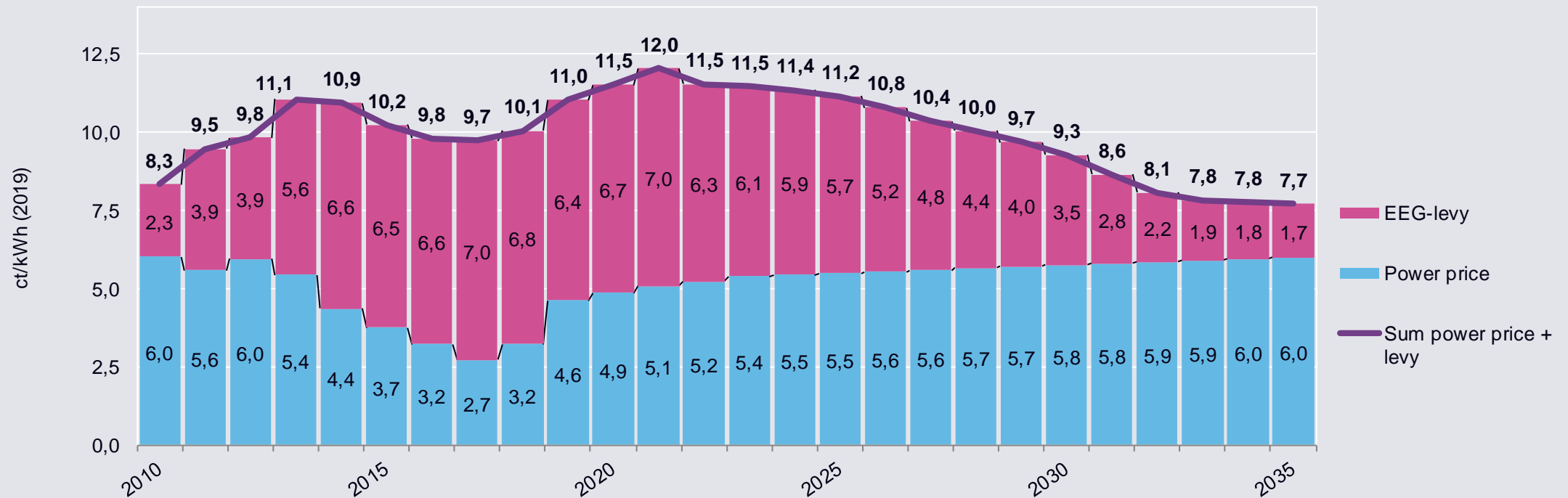


Own projection based on Öko-Institut (2019)

In Germany, even the sum of wholesale electricity price and EEG-levy should decline by 2022 at the latest.



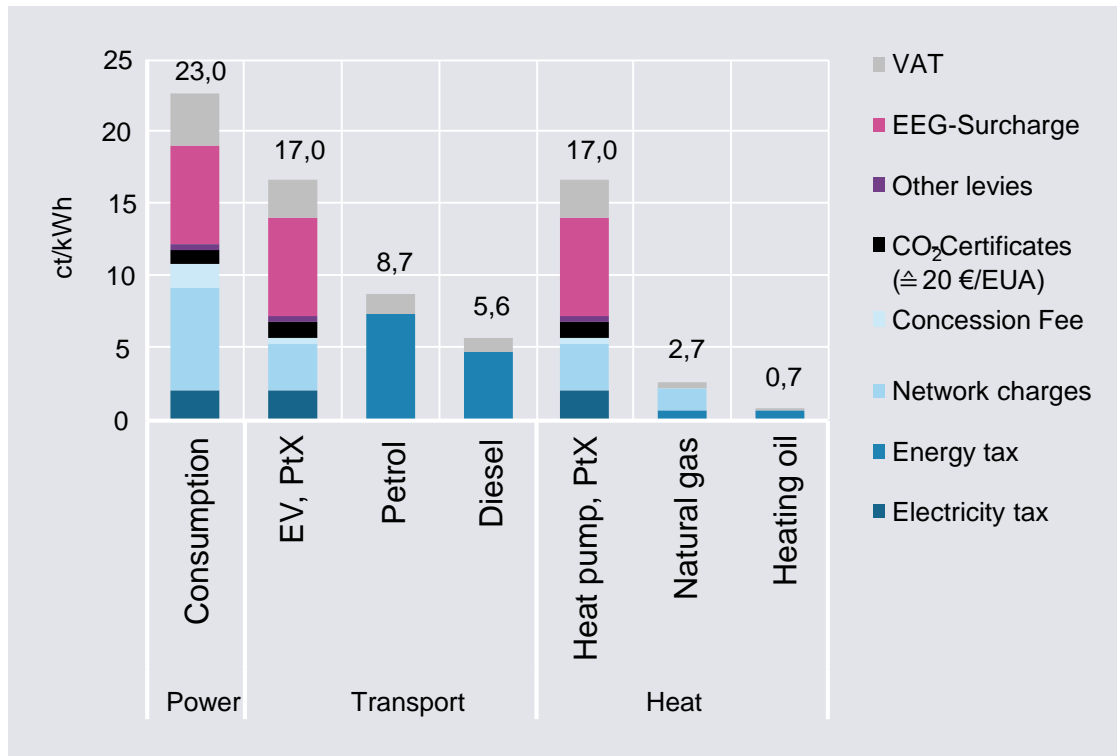
Electricity price (rolling annual future price for base load) and EEG levy, 2010–2035



Own projection based on Öko-Institut (2019)

Challenge 2: Taxes, levies & surcharges on electricity are often high in comparison to those placed on fossil fuels in heating & transport (disincentive for electrification), Challenge 3: Fair distribution btw. consumers

Energy-related regulated cost components for German households



Agora Energiewende (2018)

Electricity cost components (ct/kWh) for different German consumers types



Source: AEE (2014) based on BDEW, Eurostat, BNetzA

Funding of RES support schemes

- In principle there are two main approaches to the funding of RES support schemes:
 - 1) General taxation
 - 2) Non-tax levies paid via the electricity bill by some or all electricity consumers.
- A recent CEER Survey found that most countries fund their RES support schemes through non-tax levies (21 out of 27 responses).
- Four countries (Denmark, Finland, Luxembourg, and Malta) collect funds for the support costs by general taxation paid by all citizens.
- For example, since January 2016, renewables support in France falls under the general State budget, through a dedicated purpose fund – the financing of which being decided each year by the Parliament through a Finance Law (currently, internal taxes on fossil fuels).

Exemptions from financing RES support schemes

- Often there are exemptions (partial or full) to the financing contributions, which may increase the financial burden for non-exempted consumers.
- A recent CEER Survey found that most countries apply one or more types of exemptions:
 - Exemptions for energy intensive industries (12 of 27).
 - Exemptions for self-generated electricity from RES or conventional plants on site (9 of 27).
 - Other types of exemptions include partial or full exemption of low-income households (Austria), households and small enterprises (Hungary); captive users (Latvia); and consumers that have agreed to certain energy efficiency improvements (Netherlands).
- No explicit exemptions but costs socialised through the state budget (Malta).
- No explicit exemptions scheme (Ireland, Spain and Cyprus)

Reductions in funding support for electricity from RES – Compatibility criteria



- Need to demonstrate that the additional costs reflected in higher electricity prices faced by the beneficiary **only** result from the support to RES
- Eligibility:
 - Be included in the list of sectors which competitive position is affected due to their electro-intensity (EI) and exposure to international trade (Annex 3 EEAG)
 - *Or* having an EI > 20% and belonging to a sector with a trade intensity > 4%
- Objective, non-discriminatory and transparent criteria, and equality
- Proportionality: beneficiaries shall pay > 15% of the funding without reduction
- Form of the aid: reduction from charges and/or fixed annual compensation amount (tax refund)

Case studies / Specific points

- As opposed to some countries that have limited the eligibility of indirect compensation costs to part of the eligible EIs list (UK, NL), no such limitation of EIs eligible within Annex III EEAG was found for exemptions from renewable support.
- In its ruling of 28 March 2019, the CJEU found that the support scheme to RES provided for in the German EEG 2012 did not constitute State aid as suppliers were not under an *obligation* to collect levies from end-consumers. However there is no examination of the reductions for EIs whereas there are also elements of State control: the *reductions are compulsory* and set by law.

Reflections

- Exemptions from support to RES for EILs are found in nearly all MS that have a RES support scheme in place. Exemptions for other consumers exist, but are less commonly applied.
- In some cases (notably Germany), financing RES support via levies has raised significant distributional concerns and provided perverse disincentives for electrification. These concerns are further amplified by exemptions for electro-intensive industry.
- A shift to financing RES support or exemptions via the overall state budget – potentially using revenues from CO2 pricing – could reduce the regressive and distortive effects of taxes, levies and surcharges on electricity consumption, but is currently used by few countries to significant effect.
- To provide an incentive for corporate RES procurement, the **EEAG could factor in energy procurement strategies, notably corporate renewable Power Purchase Agreements, amongst the conditions for exemptions from the renewable energy surcharges**, as proposed in the draft ETS State aid guidelines released on 14 January 2020 for indirect costs compensation.
- In the context of future renewable revenue stabilisation mechanisms, state aid guidelines **should allow for revenues for RES PPA to stand in conjunction other RES support** – eg. in the form of renewable Contracts for Difference – to enable business models and reduce financing costs.



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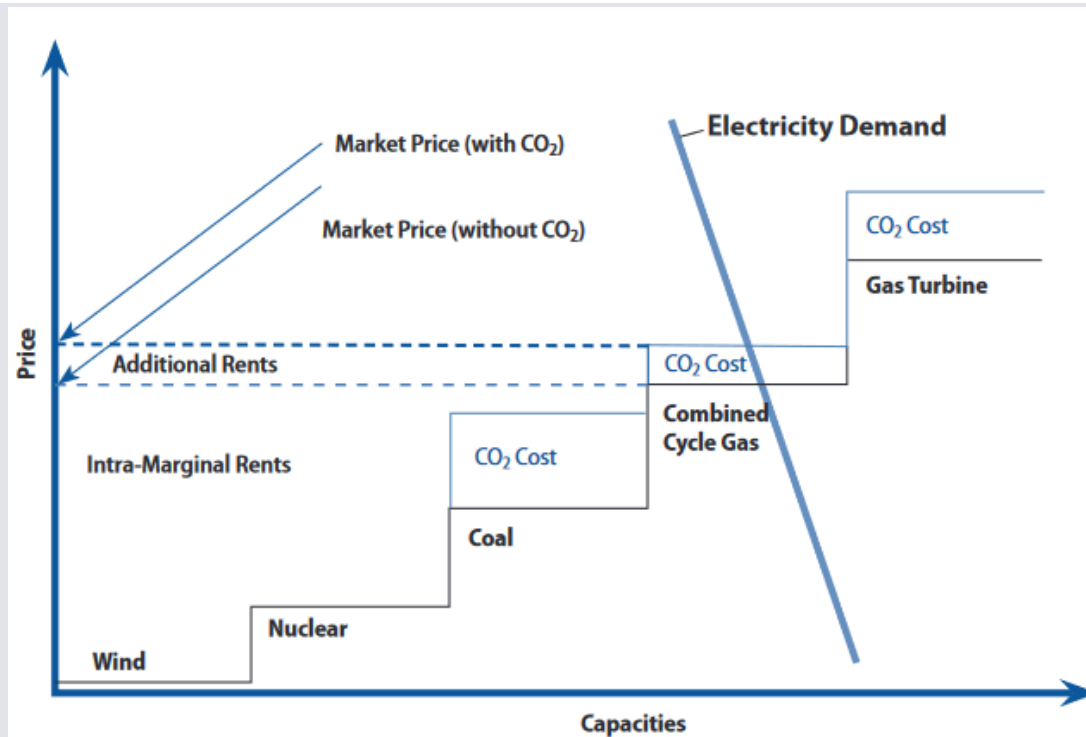


Indirect cost compensation under the EU ETS



Power markets can magnify the consumer cost of CO₂ pricing

Merit Order and Electricity Price Increase With CO₂ Price



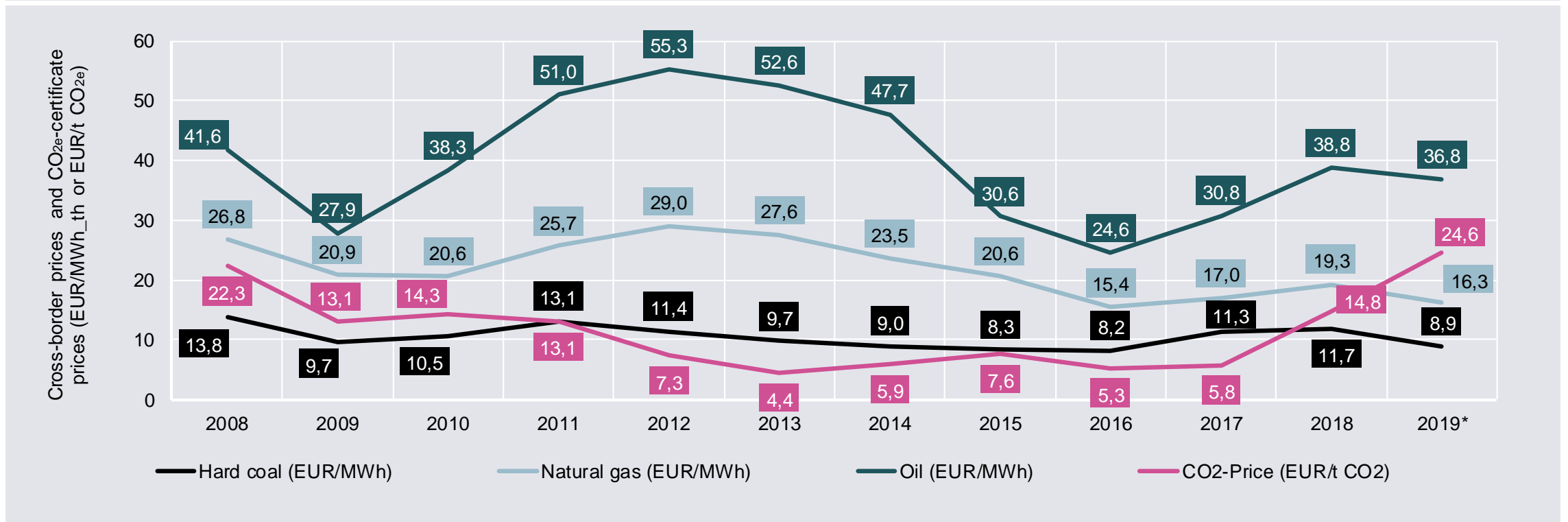
Source: RAP

- Estimating indirect costs is difficult, but power markets can magnify the consumer cost of CO₂
- When a carbon price is applied and where the marginal power plant is fossil-fueled, the clearing price increases and all generators in the stack receive additional income.
- The extra rent paid to generators, owing to the carbon price raising the wholesale electricity price, passes through to consumer bills.

In 2019, prices for coal, oil and gas decreased, while the price of CO₂ certificates reached the highest level seen in the past 10 years



Import prices for natural gas, hard coal, and oil, as well as CO₂ certificate prices

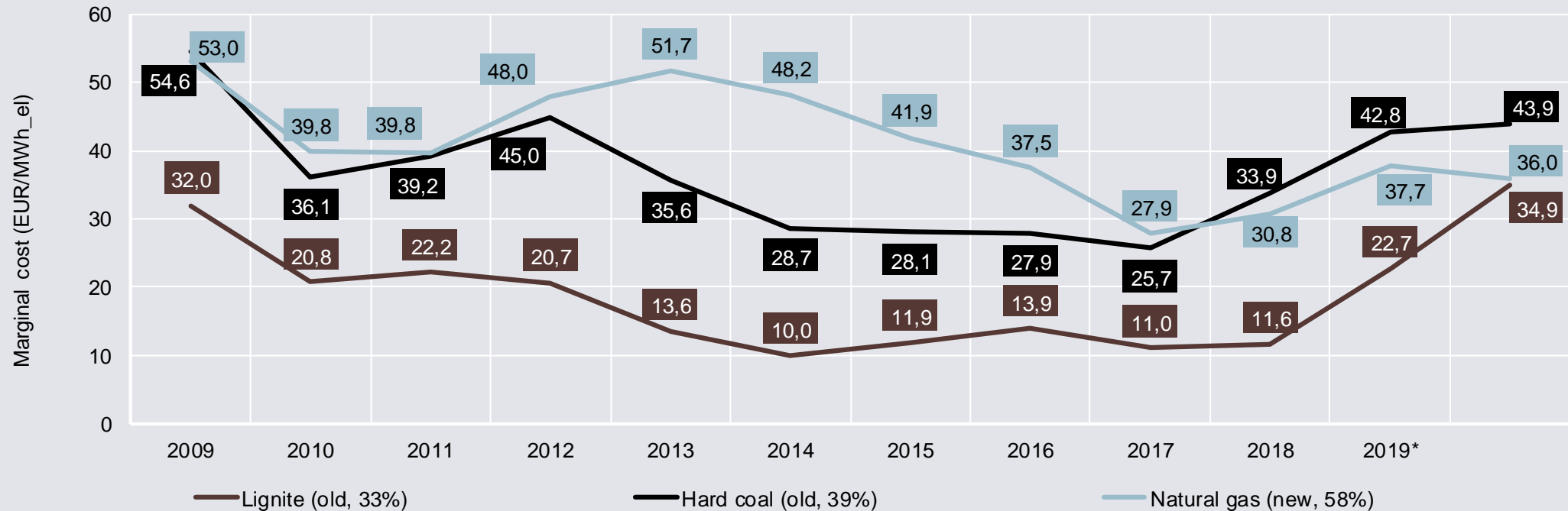


Federal Office for Economic Affairs and Export Control (2019), Deutsche Emissionshandelsstelle (2019), own calculations, *preliminary results

Due to these higher CO₂ prices gas plants have in many cases become as profitable as hard coal and even old lignite plants



Marginal costs for new natural-gas power plants and old power plants fired with lignite and hard coal

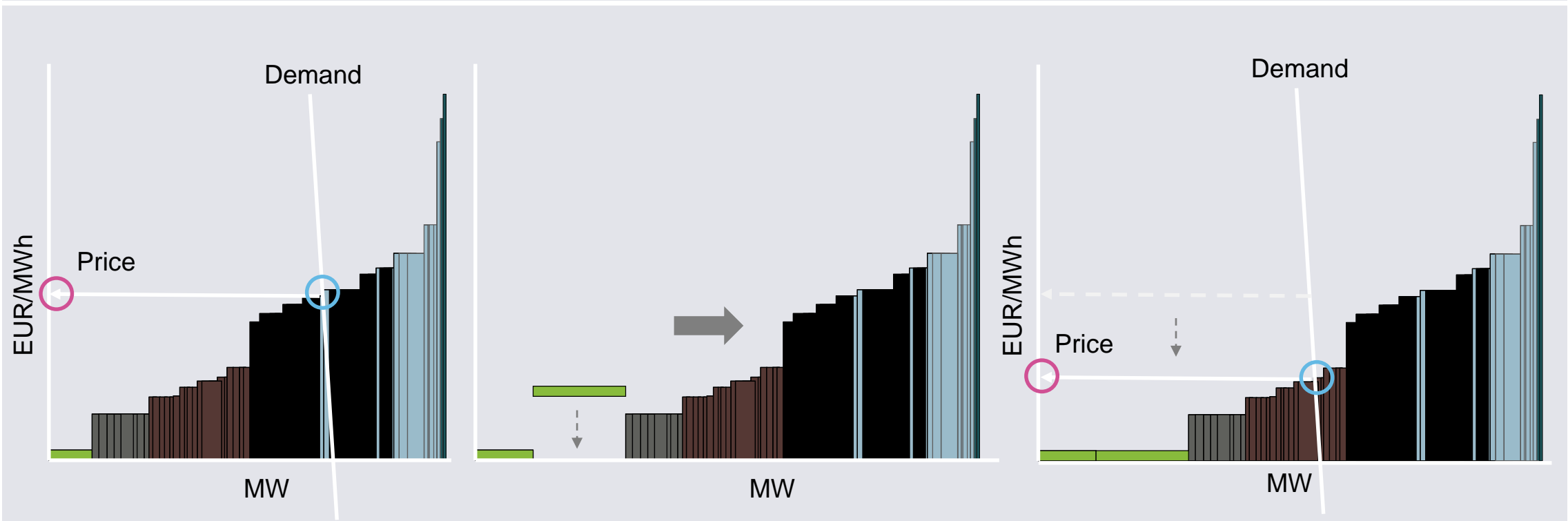


Federal Office for Economic Affairs and Export Control (2019), Deutsche Emissionshandelsstelle (2019/2006), Öko-Institut (2017), efficiency factor in brackets, *own calculations/preliminary data

At the same time, higher renewables generation is helping to mitigate the increase in wholesale prices from CO₂-pricing due to the 'merit order effect'



Merit-Order-Effects

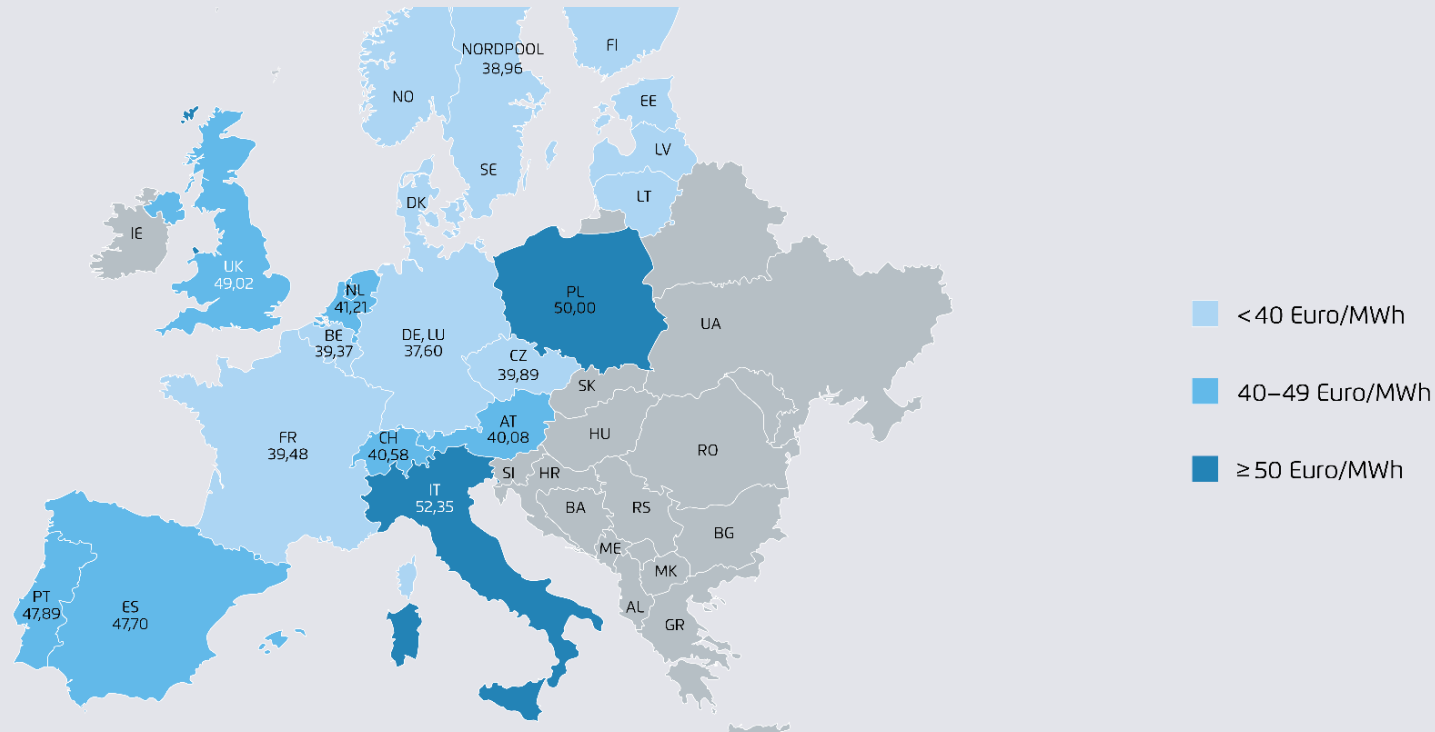


Own illustration

Electricity consumers in some Member States are thus more strongly impacted by a rise in CO₂ prices than others due to differences in generation mix.



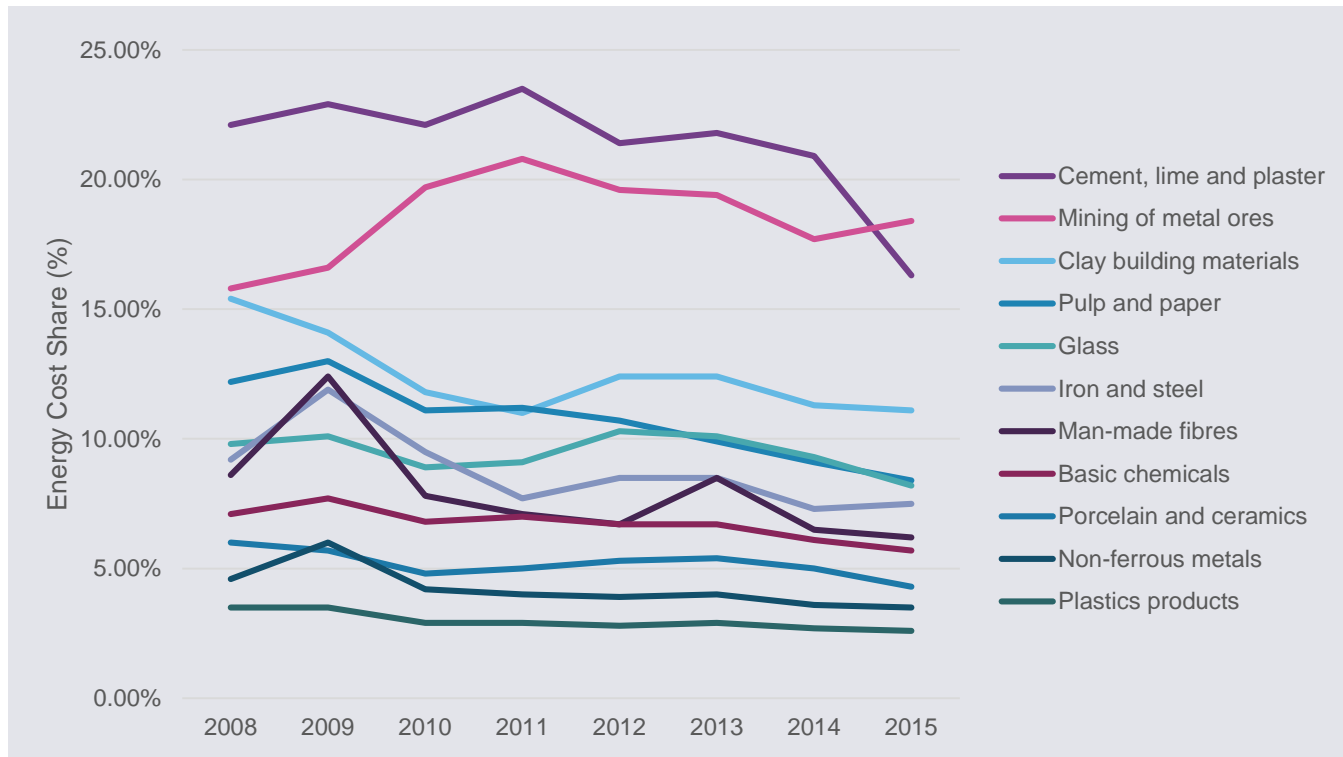
Comparison of wholesale power prices in selected European neighbouring countries



Own calculations based on ENTSO-E (2019), Mercato Elettrico (2019), Nordpool (2019), TGE (2019), OTE (2019), 30.12.19

In the past years, energy costs have actually come down in sectors being shielded from indirect electricity costs.

Evolution of the energy cost shares over time of select EEI sectors, 2008-2015



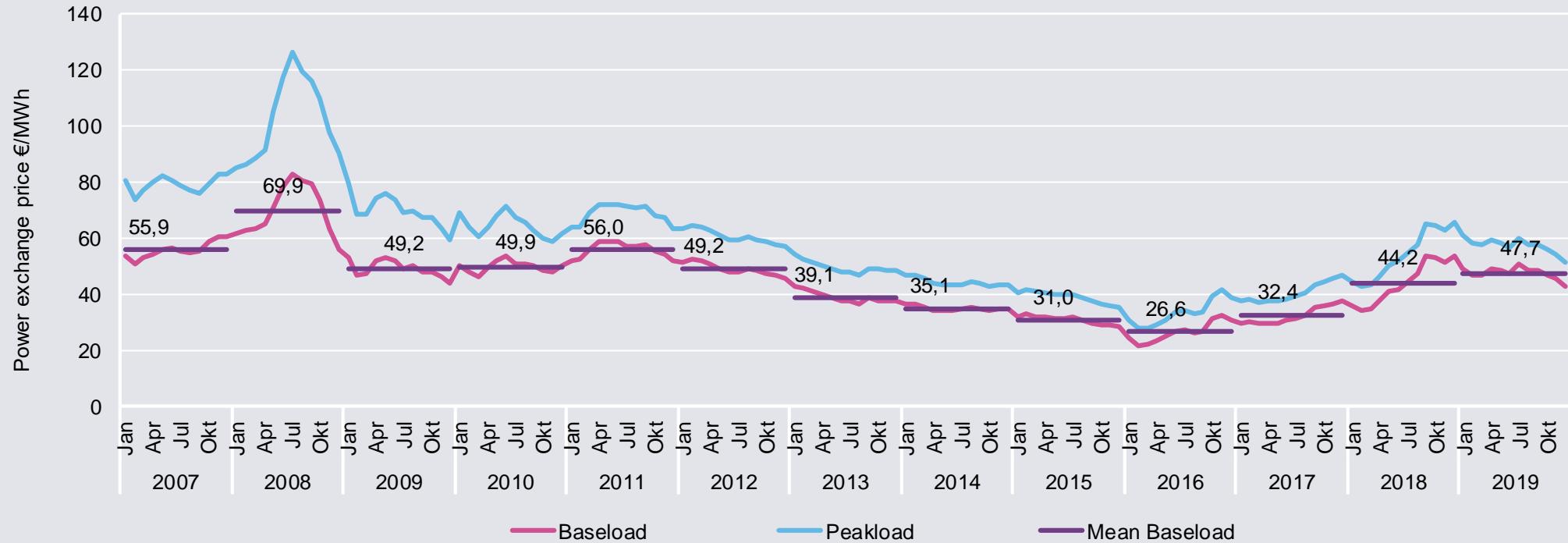
- From 2010-2015, energy costs fell substantially among a number of energy intensive industries, including in *Manufacture of cement, lime and plaster, Manufacture of basic iron and steel and of ferro-alloys and Manufacture of man-made fibres*, where energy costs fell by over 25% between 2010-2015;
- The largest percentage point decline in cost share can be observed in the cement, lime and plaster with a decline in cost share from around 23% to 16% observed (-7%).
- *Manufacture of abrasive products and nonmetallic mineral products, Manufacture of other porcelain and ceramic products and Sawmilling and planing of wood* saw increases resulting from higher energy prices and gross output outpacing cost savings due to energy intensity improvements.

Trinomics (2019): Study on Energy Prices, Costs and Subsidies and their Impact on Industry and Households - Annexes to the Final report

However, the price of futures has been on an upward trend since 2017 in part due to higher CO₂-prices



Rolling annual future prices 2007 to 2019

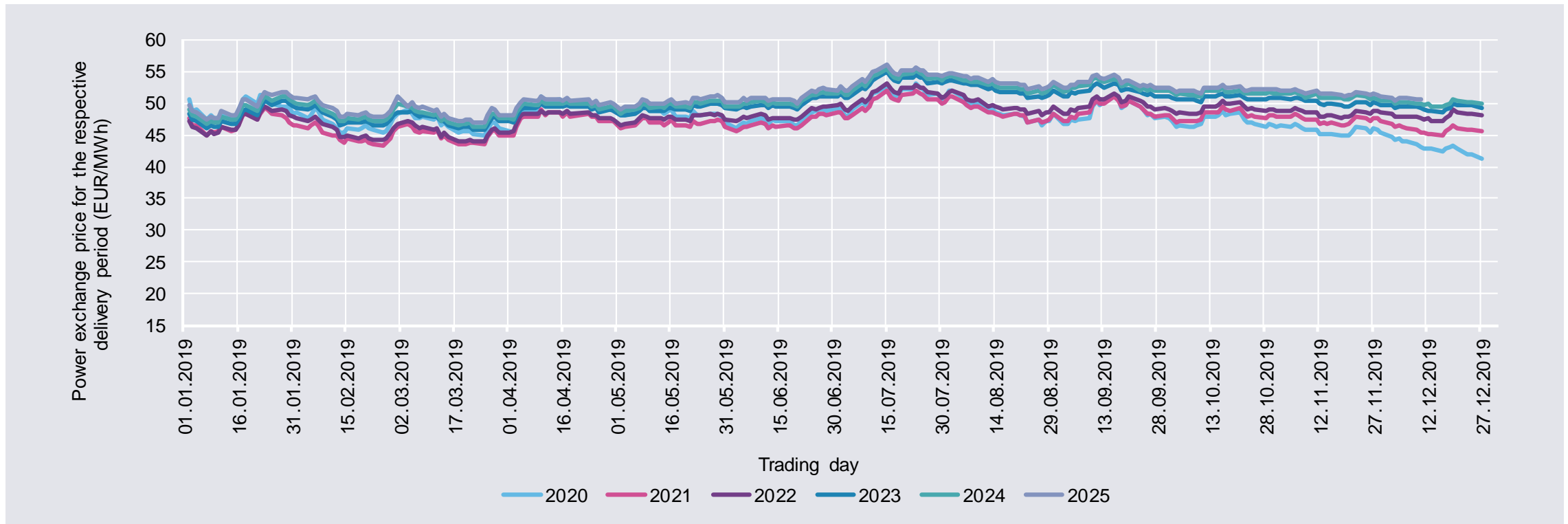


Own calculations based on EEX (2019, as of 30.12.19)

Moreover, market future prices indicate that even higher electricity prices are expected by 2025.



2019 future prices for power delivery in 2020–2024



EEX (2019, as of 30.12.19)

Thus, while often marginal today, it is possible that higher climate ambition will increase the impact of indirect CO2 costs on competitiveness



- In many cases today, the carbon price may be marginal in the composition of production costs for an exempted company - other factors influence a company's choice of location, such market proximity, quality of infrastructure, expertise in research and development and respect of the rule of law, to mention a few.
- At the same time, to reach a -55% GHG target a significant revision of the EU ETS Directive and greater electrification would be needed, which could lead to significantly higher ETS prices.
- **It is thus reasonable to expect that electricity intensive industries will experience higher indirect costs with EU allowances (EUA) prices on the rise.**

Compatibility rules on indirect cost compensation in the ETS State aid Guidelines (2012)

- ETS Directive: direct costs are compensated through free allowances, while **compensation for indirect costs** remains optional through **State aid** at the discretion of Member States.
- **Article 10a(6)**: Member States may adopt financial measures in favour of sectors exposed to a significant risk of carbon leakage due to “indirect emissions costs”. Indirect emissions costs refer to costs relating to GHG emissions passed on in electricity prices.
- The Guidelines on certain State aid measures in the context of the greenhouse gas emission allowance trading scheme post-2012 explain when Member States may **compensate electro-intensive undertakings** active in a sector exposed to international trade, for part of the higher electricity costs resulting from the EU ETS.
- Under the revised ETS Directive, Member States **may continue to grant operating aid** to compensate indirect emission costs. However, the ETS guidelines are being revised for the fourth trading period starting on 1 January 2021. A targeted consultation of the interested sectors took place from January to April 2019 to gather information on which sectors are exposed to carbon leakage risk. Draft guidelines were released for consultation on 14 January 2020 with a list of eligible sectors reduced by half.

Eligible aid measures and beneficiaries (2012 ETS guidelines)

Eligible sectors for indirect cost compensation

Aluminium	Mining of chemical and fertiliser mineral	Other inorganic chemicals	Lead, zinc and tin
Leather cloths	Basic iron and steel and of ferro-alloys, including seamless steel pipes	Paper and paperboard	Fertilisers and nitrogen compounds
Copper	Other organic basic chemicals	Spinning of cotton-type fibres	Man-made fibres
Mining of iron ores	Low-density polyethylene	Linear low-linear polyethylene	High-density polyethylene
Polypropylene	Polyvinyl chloride	Polycarbonate	Mechanical pulp

Source: [ERCST Presentation \(2019\)](#)

- Only beneficiaries active in sectors and subsectors explicitly listed in Annex II of the ETS Guidelines are considered at significant risk of carbon leakage and thus eligible for state aid.
- **13 sectors and 7 subsectors were eligible** in phase 3, including non-ferrous metals, textiles, chemicals, paper, basic iron and steel, plastics, and a number of mining sectors.
- Eligible sectors are defined using quantitative and qualitative criteria. Quantitative criteria include **trade intensity with third countries** (above 10%) and indirect costs that would increase **production costs** (Share of GVA of at least 5%) for automatic selection. Qualitative criteria are used for sectors with missing or low quality data.
- Sectors remaining in the draft guidelines of 14 January 2020 are highlighted in yellow.

Maximum aid intensity and digression

→ Compensation for installations is limited by the ‘maximum aid intensity’ based on a formula:

$$Am_{xt} = A_{it} * C_t * P_{t-1} * E * BO$$

- ***Am_{xt}*** is the maximum aid intensity in year t
- ***A_{it}*** is the aid intensity at year t, expressed as a fraction which decreases over time (75% in 2019)
- ***C_t*** is the applicable CO₂ emission factor (tCO₂ /MWh) (at year t)
- ***P_{t-1}*** is the EUA forward price at year t-1 (EUR/tCO₂)
- ***E*** is the applicable product-specific electricity consumption efficiency benchmark; and
- ***BO*** is the baseline output.

Maximum aid intensity and digression

- **Aid is set to decline degressively** over time. The digression for the maximum share of eligible costs that could be provided via state aid started at 85% (2013-2015) and declined progressively to 80% (2016-2018) and 75% (2019-2020), respectively. The draft revised guidelines provide for a stable aid intensity of 75%.
- Within these boundaries, **each Member State can freely decide whether to put in place State aid measures or not**, and to what extent.
- Under **Art. 10(6)** of the ETS Directive: 1) **Ex ante (sub-)sectoral benchmarks** are to be used for calculation of carbon leakage risk; and 2) **Member States shall also seek to use no more than 25 % of the revenues** generated from the auctioning of allowances for indirect cost compensation; otherwise they must publish a report setting out the reasons.
- Under **Art. 30** of the Directive, Commission will review international developments and may consider whether measures in relation to the compensation of indirect costs should be further harmonised.

State aid cases / review

Indirect costs compensation and total auction revenues – 2016 and 2017

Member State	Compensation paid for 2016 (€ million)	Auction revenues 2016 (€ million)	Percentage	Compensation paid for 2017 (€ million)	Auction revenues 2017 (€ million)	Percentage
Flanders	46.75	56.92	82.14%	31.72	76.14	41.67%
Netherlands	53.59	142.61	37.58%	36.9	190.71	19.35%
Germany	288.72	850.39	33.95%	202.21	1,146.82	17.63%
UK	19	424.33	4.48%	17.16	566.48	3.03%
Spain	71.44	369.46	19.34%	66.64*	493.55	13.50%
France	135.15	234.68	57.59%	98.73	313.40	31.50%
Slovakia	10	65.05	15.37%	10	87.06	11.49%
Finland	37.91	71.22	53.22%	26.75	95.26	28.08%
Latvia	1.04	11.5	8.70%	0.24	15.39	1.54%
Greece	12.4	148.05	8.38%	12.44	198.03	6.28%

Source: 2019 State of EU ETS Report (ERCST, I4CE, EcoAct, ICIS and Wegener Centre)

- In 2018, 11 Member States and Norway provided compensation for indirect costs. Luxembourg and Wallonia (BE) have recently been approved by the Commission and political agreements have recently been reached in the Czech Republic and Poland.
- The most recent data available on cost compensation is for the years 2016 and 2017. This data shows that there are big differences between Member States, which can largely be explained by the emissions intensity of their power production relative to auction revenues.
- This is compared with the percentage of auction revenues it represents. According to the revised EU ETS Directive, Member States should seek to compensate for maximum 25% of their auctioning revenues or must publish a report explaining why they exceeded that %.

State Aid Case Studies / Restricting eligibility

- Some MS limited eligibility to the scheme by adding criteria filtering within Annex II ETS Guidelines
 - UK (2013): EII which carbon costs (EU ETS and CPF taken together) in 2020 will amount to 5% of their gross value added. “Even within the EII sectors, there may be some processes which use much less electricity **and will be less exposed to electricity price increases.**”
 - Flanders (2013) and Netherlands (2013): EIIs must have in place **an agreement committing them to certain measures to improve energy efficiency**. These agreements are not specific to this aid scheme. They are linked to tax reductions on the consumption of energy products that can be granted under Article 17 of the Energy Tax Directive. They are open to all and not discriminatory.
- COM: “A Member State **is not obliged to grant aid to all sectors**, subsectors or even installations belonging to these sectors or subsectors. Rather, the Member State’s authorities may decide to further restrict the scope of eligible applicants. As long as such a restriction does not contradict or run counter to the ETS Guidelines, nor results in the breaching of any provision of EU law, and in particular as long as it is **based on objective criteria**, the Member State may opt for such a restriction.”

State Aid Case Studies / Going beyond the ETS guidelines



- Consumption threshold of 1GWh/y in NL, DE, FI, SK “to avoid disproportionate administrative burden”
- Finland (2017): The maximum aid intensity is **50% of the maximum aid intensities allowed** by the Guidelines for the same year. In consequence, the maximum aid intensities are 40% of the eligible costs incurred in 2016, 2017 and 2018 and 37.5% of the eligible costs incurred in 2019 and 2020, in line with point 26 of the Guidelines.
- Wallonia (2018): Obligation to repay the aid if the beneficiary relocates outside the EU within 5 years of the payment of aid. Monitoring and effective enforcement of this obligation remain doubtful in particular in case of progressive relocations of the industries that are difficult to control.

State Aid Case Studies / RES Procurement

- Current guidelines state that no State aid can be granted ‘in case of electricity supply contracts that do not include any CO2 costs’. If electricity prices are set through merit order, then 100% renewable contracts also pass through ‘opportunity’ CO2 costs.
- Some anecdotal evidence exists that this has disincentivized industry to engage in 100% RE contracts in Germany as Germany’s implementation of the guidelines risks them missing out on state aid.
- By contrast, in Finland, in order to demonstrate that aid is only granted for electricity including CO2 costs in its price, the applicant needs to show that the electricity could be sold to a third party in the market place and at market price by demonstrating that it has the readiness to do it and it is technically possible. This interpretation does not seem to create this challenge and seems to be in line with the current state-aid guidelines, as approved by the Commission.
- ***Has indirect cost compensation provided a perverse disincentive for RES procurement or just the implementation of the guidelines in Germany?***

Reflections

- Indirect cost passthrough is difficult to establish methodologically, in particular given the countervailing effects of renewables deployment on electricity prices.
- Policy objectives to be balanced include 1. carbon leakage risk mitigation for electro-intensive industry; 2. risk of overcompensation and windfall profits, harming other consumers; 3. risk of internal market distortions within, or between, sectors; 4. Incentivizing cost-efficient decarbonization.
- The ETS Guidelines are designed to provide a minimum level of coherence between Member State schemes on the sectors supported and the size of State aid permissible, but are not uniformly implemented due to Member State discretion. Thus, it is unclear to what extent this goal is met.
- In absolute volumes, indirect cost compensation granted by Member States is much smaller in financial terms compared to exemptions for renewables support or direct support through free allocation. However, these volumes could increase with higher climate ambition.
- Interpretation of the current guidelines may perversely disincentivize corporate RES procurement through PPAs in the case of Germany, but is not seemingly an issue in other countries. Thus it is unclear to what extent the Guidelines would be improved through clearer language.

New draft COM Guidelines (14.1.2019) – Stated Objectives



- The draft Guidelines proposed for consultation need to address three specific objectives:
 - minimising the risk of carbon leakage,
 - preserving the EU ETS objective to achieve cost-efficient decarbonisation and
 - minimising competition distortions in the internal market.
- The Commission will make sure that the Guidelines:
 - “remain consistent with, and contribute to, all relevant climate-related policy instruments that will be proposed in the context of the Green Deal to ensure effective carbon pricing throughout the economy, while respecting a level playing field.”

Source: COM Explanatory note (2019)

New draft COM Guidelines (14.1.2019) – Main Changes



- Reduces number of eligible sectors from 13 to 8
- Instead of digression, maximum aid intensity is to remain constant at 2020 levels (75%).
- The draft Guidelines proposed for consultation also introduce the possibility for Member States to further limit the exposure of beneficiaries to indirect ETS cost as a function of their gross value added (“GVA”).
- A mid-term update of the electricity consumption efficiency benchmarks will be performed, based on the most efficient methods of production for the product considered. Moreover, the methodology for updating these benchmarks is to be updated to extrapolate and annual reduction rate.
- Baseline output will be calculated based on actual as opposed to historical emissions.
- Compensation will be conditional to decarbonisation efforts, in particular with regards to energy efficiency.

New draft COM Guidelines (14.1.2019) – Conditionality



- Compensation will be conditional to decarbonisation efforts, including conducting energy audits, and:
 - Implementing energy audit recommendations, OR
 - Investing a significant share (> 80%) of the aid amount in projects that lead to substantial reductions of the installation's greenhouse gas emissions and well below the applicable benchmark used for free allocation in the EU ETS, OR
 - Reducing the carbon footprint of their electricity consumption (eg. via onsite RES or a RES PPA).
- Member States would have to verify that beneficiaries, irrespective of their size, have conducted or commit to conduct an energy audit or have an energy or environmental management system in place. Member States would also have to monitor the implementation of the resulting recommendations by large undertakings. The Commission as part of its monitoring efforts for approved schemes can check compliance with this requirement.
- Source: COM Explanatory note (2019)

New draft COM Guidelines (14.1.2019) – Included sectors



- Sectors deemed exposed to a genuine risk of carbon leakage due to indirect costs:
 - Manufacture of leather clothes; Aluminium production; Manufacture of other inorganic basic chemicals; Lead, zinc and tin production; Manufacture of pulp; Manufacture of paper and paperboard; Manufacture of basic iron and steel and ferro-alloys; Manufacture of refined petroleum products.
- Removed sectors:
 - Mining of chemical and fertiliser minerals; Manufacture of fertilisers and nitrogen compounds; Copper production; Manufacture of other organic basic chemicals; Spinning of cotton-type fibres; Manufacture of man-made fibres
- Source: COM Explanatory note (2019)

New draft COM Guidelines (14.1.2019) – Formula for calculating eligible aid



- The formula for calculating the eligible aid amount remains largely the same with some exceptions:
 - The baseline output used for the purposes of the calculation will in future correspond to the *actual* production in the year preceding the granting of the aid (as opposed the average *historical* output over the reference period 2005-2011).
 - The electricity consumption efficiency benchmarks will be updated at the beginning and in the middle of the next ETS trading period and the actual regional CO2 factors must still be set.
- In 2025, the Commission will also assess whether additional data is available allowing to improve and revise the methodology used to calculate the CO2 emission factors, i.e. to take into account the increasingly important price-setting role of low-carbon technologies in EU electricity markets.

Source: COM Explanatory note (2019)



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Industry exemptions – Other topics of relevance



Reflections on other regimes of exemptions for EIUs



- **Environmental taxation in the non-ETS sector:** Are negotiated agreements credible? What use of the simplified approach in Section 3.7.1 EEAG since Article 44 GBER covers exemption from energy taxes with no threshold?
- **Carbon price floor (UK):** The exemption is compatible with the EEAG.
- **Funding of capacity mechanism (Poland):** Critics relate to dis-incentive for EIUs from reducing consumption in peak hours and distributional effects of this novel scheme.
- **Energy efficiency obligations schemes:** New exemptions to come?
- **Grid / network charges (Germany):** Full exemption from network charges is incompatible.

Reflections - Environmental Taxation in the Non-ETS Sectors



- Taxation remains a Member State competence, but some State aid principles (eg. Environmental taxation) and harmonized legislation (eg. the Energy Taxation Directive) apply.
- Efficient decarbonization of the non-ETS sectors will require CO₂-oriented energy tax reform for heating and transport fuels on EU or MS level. A reform of the Energy Taxation Directive, envisaged in the Green Deal, could play an important role in harmonizing minimum energy taxation based on CO₂ intensity across Europe.
- The ability to exempt trade exposed energy intensive industries from part or most of these costs is likely to be critical to gaining support for a revision of the Energy Taxation Directive and domestic tax reforms, but could raise concerns about internal market distortions and cost distributions, as already highlighted by the recent COM evaluation of the ETD.
- **Harmonised taxes under Energy Taxation Directive:** What use of the simplified approach in Section 3.7.1 EEAG since Article 44 GBER covers them with no notification threshold?
- **Non-harmonised taxes:** Are the negotiated agreements credible? Is monitoring adequate?

Reflections – Industry exemptions under a carbon price floor



- While not eliminating the need for a robust enabling framework for clean energy investments, a *Carbon Price Floor* under the EU-ETS would create investment certainty by reducing risks for investors in clean energy technologies.
- State aid questions are raised by concerns over the need to exempt energy intensive industry from the costs resulting from higher ambition. Exemptions for EII under the UK CPF suggest that the current EEAG enable these exemptions in the case of a surrender charge.
- For an EU-wide CPF implemented via an Auction Reserve Price, the ETS State Aid Guidelines and system of indirect cost compensation would apply.

Reflections – Exemptions from funding capacity mechanisms



- Poland plans to reduce the capacity mechanism surcharge that ≈ 350 energy intensive users have to pay for energy consumed during peak hours.
- Commission opened a formal investigation on 15 April 2019 > final decision awaited
- No compatibility criteria in the EEAG > general rule of Article 107(3) TFEU
- Foreseeable consequences of a reduction in capacity mechanism surcharge:
 - Lack of incentive of EIUs to reduce consumption and/or to shift production outside peak hours > increase / maintains need for a capacity mechanism;
 - Increase financial burden on small consumers (businesses & households)
- **Chances of success:** Why is Poland the only MS trying its luck?
- **Data:** the opening decision demonstrates the Commission's lack of data for a critical assessment of such a scheme that is "novel in both its subject matter and its implications for the future".

Reflections – Release of costs of energy efficiency obligations schemes?



- “Member States shall assess and, if appropriate, take measures to minimise the impact of the direct and indirect costs of energy efficiency obligation schemes on the competitiveness of energy-intensive industries exposed to international competition.” (art. 7a EED)
- New form of reduction/exemption for EIIs, not currently in the EEAG > assessment on a case by case basis pending the revision of the EEAG.
 - Will the eligible industries be the same as in Annex III EEAG, by analogy?
 - What will be an acceptable aid intensity / level of reduction of costs?
 - How to incentivise these EIUs, which shall be the main target of energy efficiency schemes, to realise the adequate investment in energy efficiency? Giving them investment aid + exonerating them from the costs of energy efficiency obligation schemes is counter-productive.
 - Agreements with MS with energy efficiency targets are a poor fall-back solution.

Reflections – Exemptions from network charges



- Germany fully exempted baseload consumers from network charges in 2011-2013 (≈ 200 EIUs)
- Complaint by consumer associations, energy companies and citizens
- Final decision after formal investigation (6 March 2013 - 28 May 2018)
 - No aid in 2011 ≠ State resources involved in 2012-2013 (levy)
 - Network charges are a typical part of electricity costs that users have to pay: price for using a service
 - No objective justification for a full exemption: EIUs generate network costs, even if lower due to their stable consumption profile
 - Increase the financial burden on other electricity users
 - Incompatible with the Treaty & monies need to be recovered
- Court actions: no state resource; no selective advantage; unequal treatment

Reflections – Exemptions from a climate levy or a carbon price on end-products



- Recent studies have proposed financing policy instruments for decarbonizing the industry sector – eg. Carbon Contracts for Difference (CCfDs – covered in Part II) – via a climate contribution based on the carbon intensity of basic materials or a carbon price on end-products.
- Where these instruments would be implemented on a national basis and exemptions were granted to specific industries – instead of EU-wide with exemptions granted via free-allocation and indirect cost compensation under the EU ETS – these would have to go through separate state aid approval.



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Discussion



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Lunch Break



**Part II –
Support for industry
decarbonization**



Climate-neutral industry

The Agora-Industry-Trilogy



Klimaneutrale Industrie

Schlüsseltechnologien und Politikoptionen für Stahl, Chemie und Zement

STUDIE

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Klimaneutrale Industrie

Juristische Kurzbewertung der Politikoptionen

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Ausführliche Darstellung der Schlüsseltechnologien für die Branchen Stahl, Chemie und Zement

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Die Zukunft der energientensiven Industrie in Deutschland

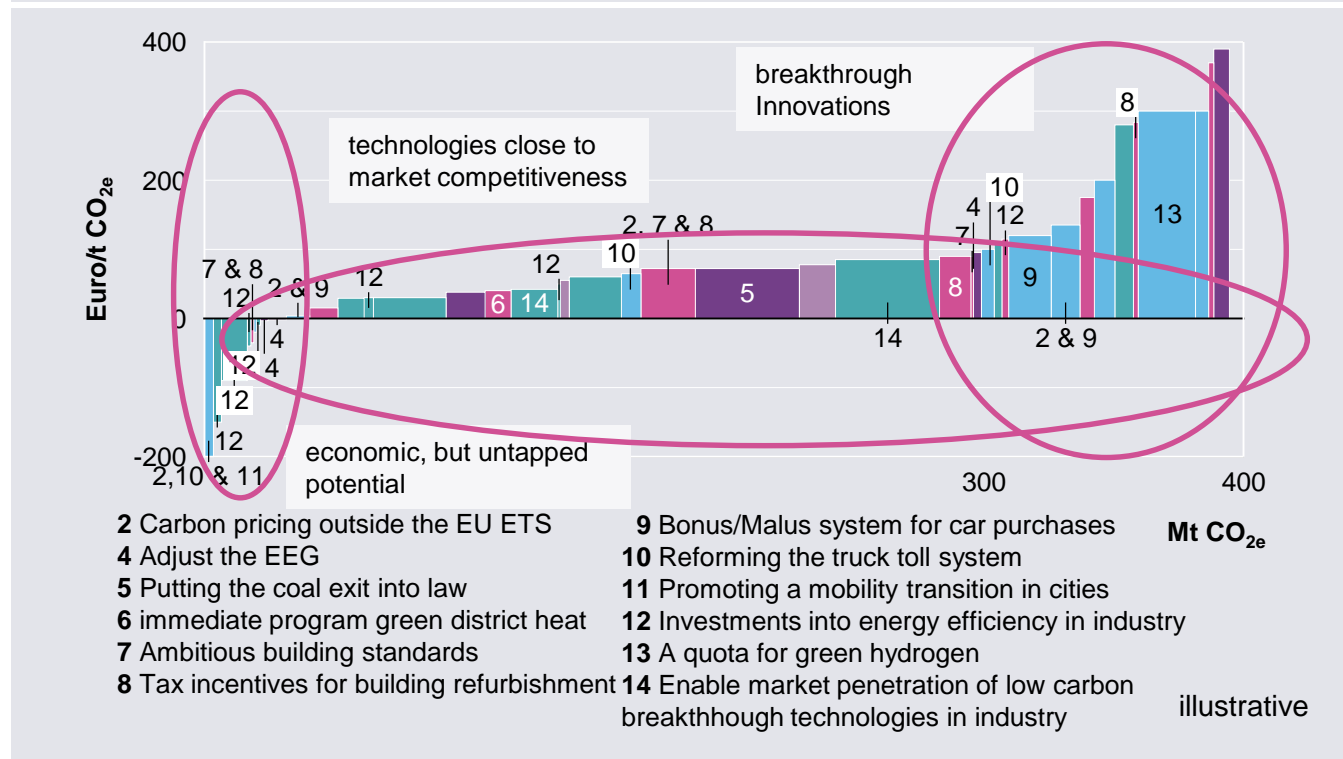
Chancen und Herausforderungen

Ort: Berlin | 26.11.2019, 10:00 - 16:00

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Smart industry decarbonisation policy requires a policy-mix

Illustration of the climate policy-mix, and principles for a Climate Change Act



Source: own illustration based on BDI (2018) and Matthes (2010)

→ Carbon pricing allows you to find the cheapest emissions abatement options (*efficiency*) and get the most out of your actions (*effectiveness*)

→ However, measures on the left and right end of the abatement cost curve are currently barely deployed, mainly due to such factors as:

- Long-term planning requirements
- Technological developments
- International competition
- Non-price barriers
- Infrastructure

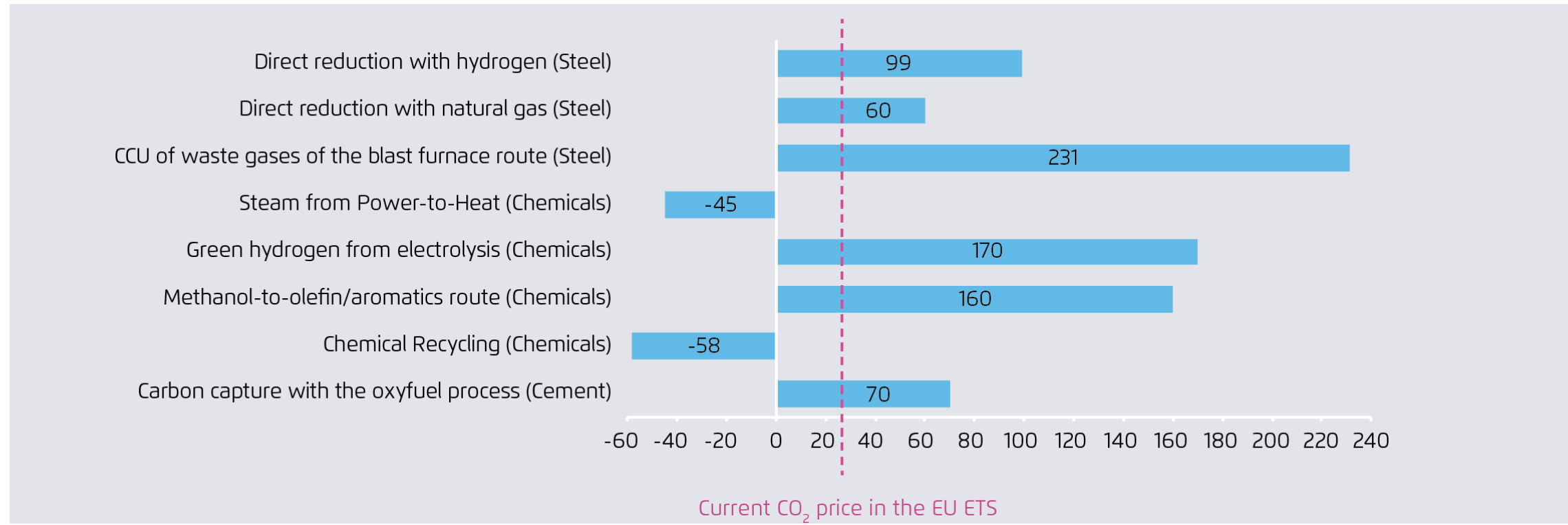
→ Therefore, standards and additional policy measures (eg. subsidies) are necessary complements to a CO₂ price, in particular in the case of industry decarbonization.

Why a policy mix?

The marginal abatement costs of many breakthrough innovations are significantly higher than current EU ETS-prices



Marginal abatement costs of new technologies in industry 2030, lower range, in Euro/t CO₂



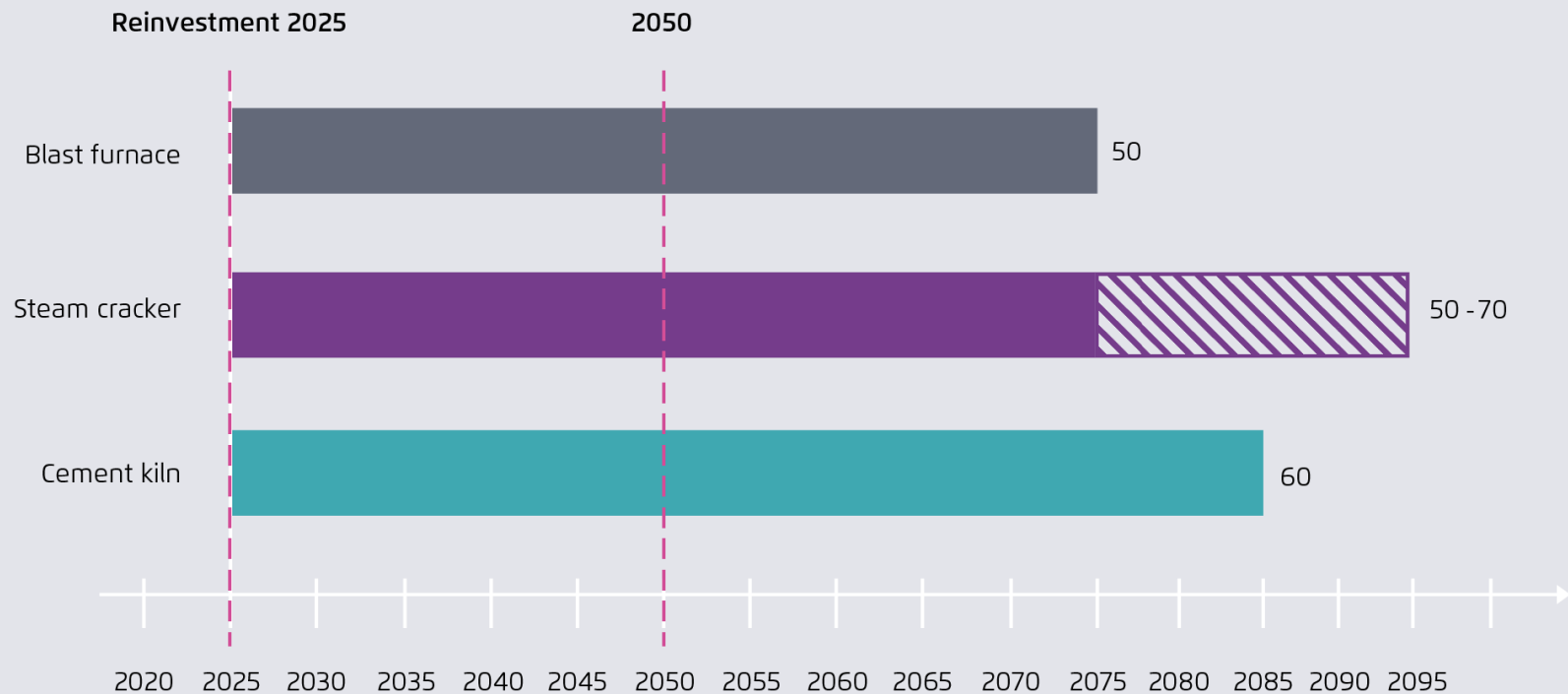
Sources: Wuppertal Institute/Agora, 2019

Why a policy mix?

**All plants built today will still exist in 2050
– any future investment must therefore be
Paris-compatible**



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



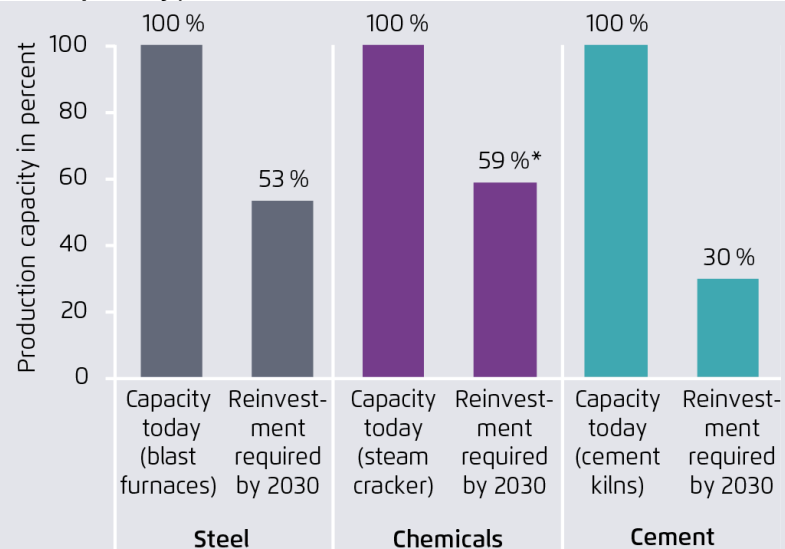
Sources: Agora Energiewende/Wuppertal Institute, 2019

Why a policy mix?

Until 2030 there is a very high need for reinvestment in the energy-intensive industry - many jobs are affected



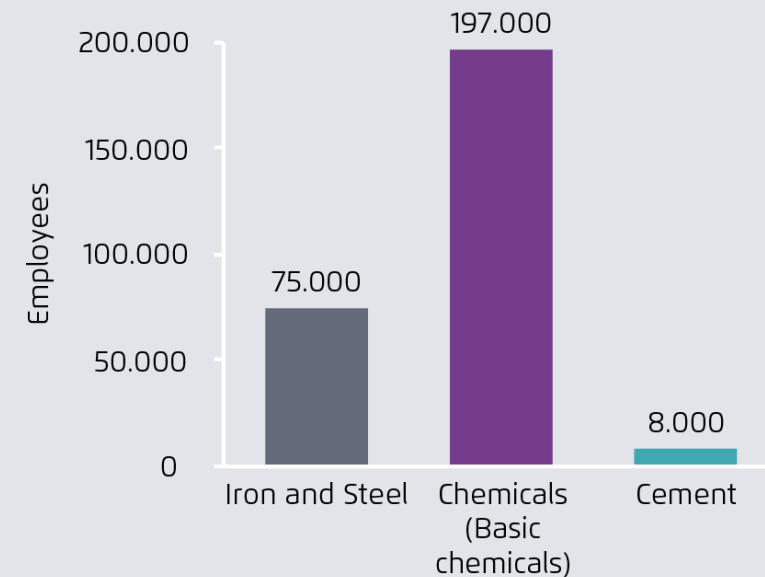
Reinvestment needs in German Industry until 2030 (primary production capacity)



* Steam crackers are normally maintained and modernised continuously so that they are not completely replaced at one time. However, the need for reinvestment gives a rough impression of the need to modernise existing facilities.

Source: Wuppertal Institute, 2019

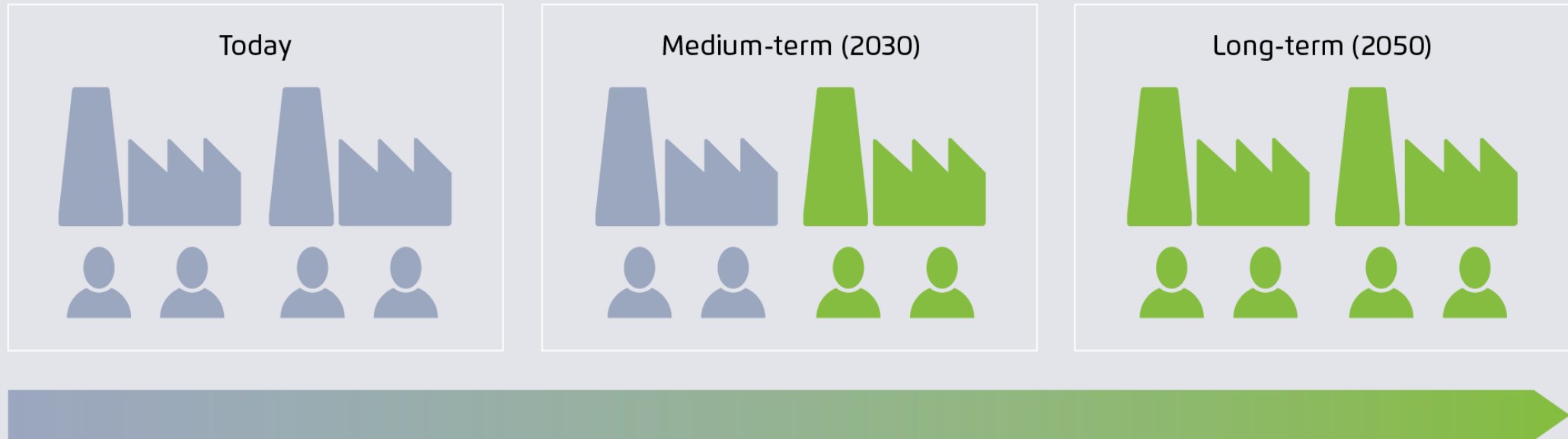
Direct employment of relevant industries in Germany 2018



Source: Statistisches Bundesamt, 2018

The transformation will take place within established companies – this requires a rapid phase-in of the new technologies

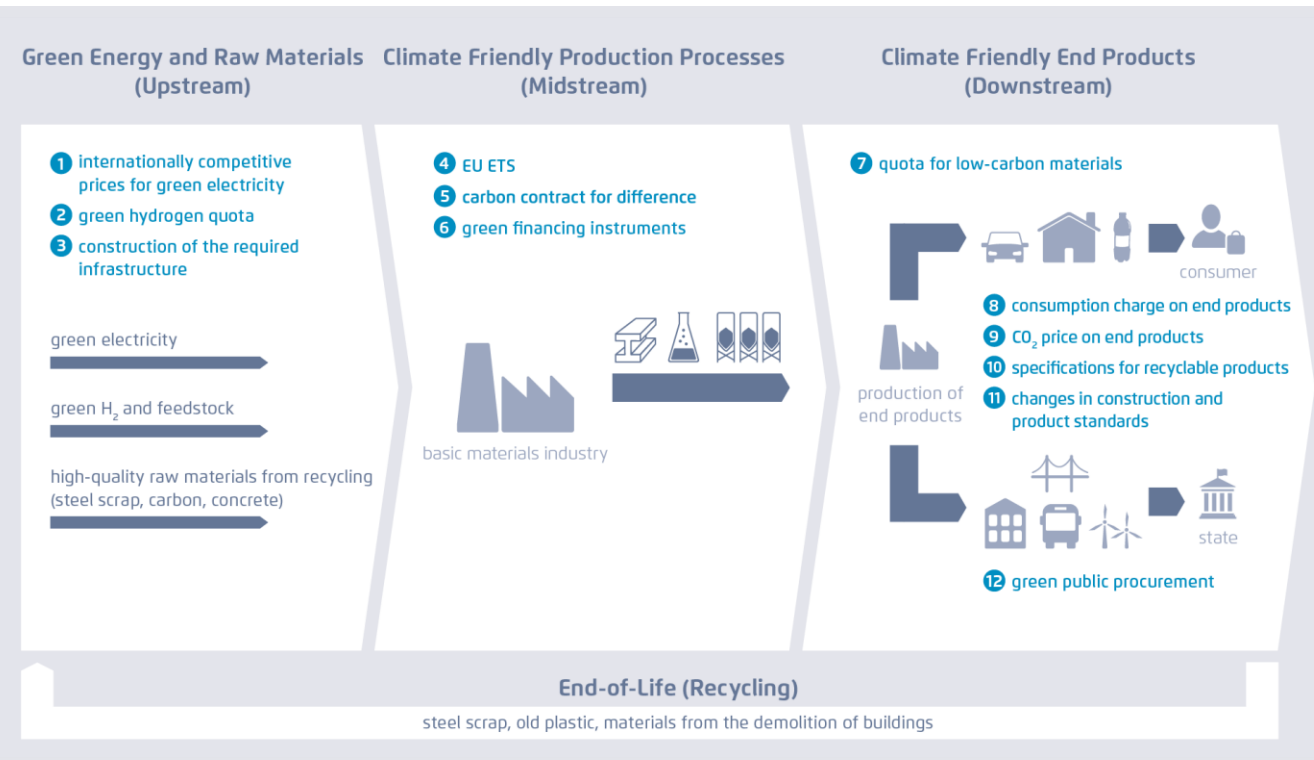
Transformation of the portfolio of an energy-intensive company (indicative presentation)



Source: Agora Energiewende, 2019

A number of policy instruments are available to support industry decarbonization.

Upstream-Midstream-Downstream-Regulation



Upstream

- Mechanism for internationally competitive energy prices
- Feed-in quota for green hydrogen
- Access to raw material (including from recycling)

Midstream

- EU-ETS / Carbon pricing
- Carbon Contracts for Difference (direct support)
- Green financing

Downstream

- Green material quota
- CO₂-price for final products
- Circular economy standards
- Building codes that reduce steel and cement use



Carbon Contracts for Difference (CCfD)



Background

- Most promising breakthrough industrial decarbonization technologies require high investment and operational expenditures compared to conventional technologies.
- As it currently stands the carbon price in the EU ETS will not create sufficient incentives for investment.
- Due to the high variability of the CO₂-price in the EU ETS and its high risk of policy change, these technologies are also marked by higher financing risks compared to established technologies.
- The price signal of the EU ETS can provide efficiency improvements in current operations, but is insufficient for providing the investment security needed for innovative technologies and cover the incremental costs associated with them. Under these circumstances little has been invested in innovative low-emissions breakthrough technologies thus far.
- Therefore, in particular for capital-intensive innovative low-carbon processes and alternative materials, carbon pricing needs to be complemented in the short term by other policies that create lead markets and hedge against regulatory risk, as well as trigger incentives in the value chain.

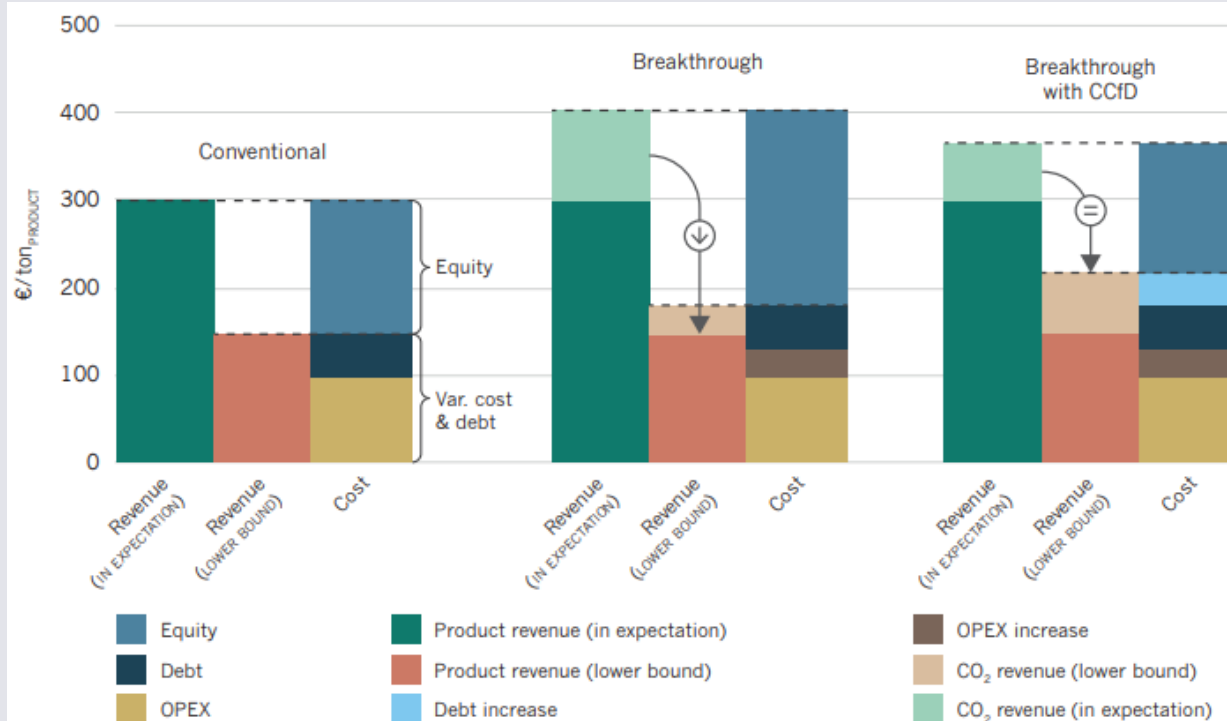
What is a Carbon Contract for Difference (CCfD)?



- **CCfDs can be used to provide project-specific support for operational expenditures for breakthrough technologies needed for the long-term greenhouse gas reduction of heavy industry** (eg. Steel, Cement, Chemicals), while orienting the support towards the EU ETS price.
- CCfDs are contracts between national governments and companies developing a low-carbon project, which reimburse the difference between the yearly average price of EU ETS emission allowances (EUAs) and an agreed strike price per ton of emission reduction. In turn, companies are obliged to pay back the previously received funding in case ETS prices exceed the strike price.
- **Project-based CCfDs create lead markets for innovative low-carbon production processes and materials at national and European scale.** By determining a fixed project-based strike price, a CCfD provides a guaranteed carbon price, thus ensuring that the incremental operating costs of the project are covered so that the project can continue to operate even if the EU ETS allowance prices decline.
- CCfDs can help stabilize revenue streams enough for investors to **secure lower financing costs** and **ensure commercial viability**.

Why is it relevant?

Effect of CCfD on financing structure and total cost of production

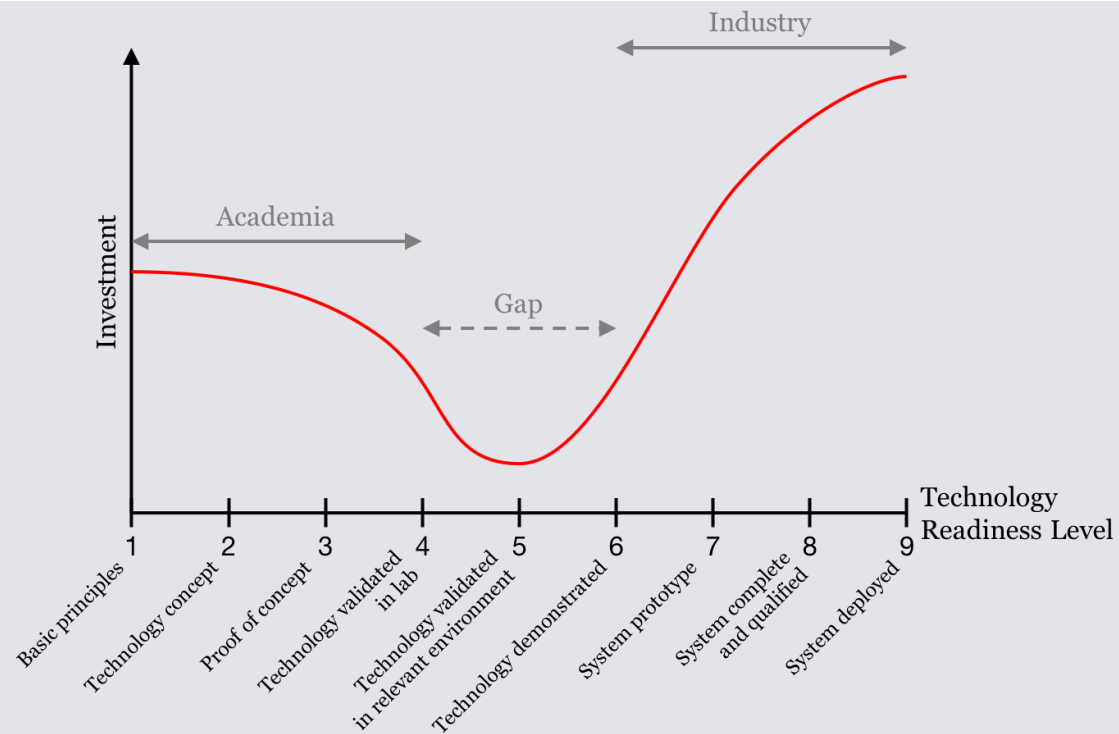


- In the case of the breakthrough technology without a CCfD the uncertainty of CO₂ prices in addition to the usual revenue uncertainty needs to be covered by additional expensive equity.
- A CCfD reduces the expected CO₂ price that is required for the technology to break-even because it allows for the use of more debt to pay for the investment and thus reduces the overall financing cost as compared to the case without a CCfD.

Climate Strategies (2019)

Why is it relevant?

Illustration of the 'valley of death' concept relative to technology readiness



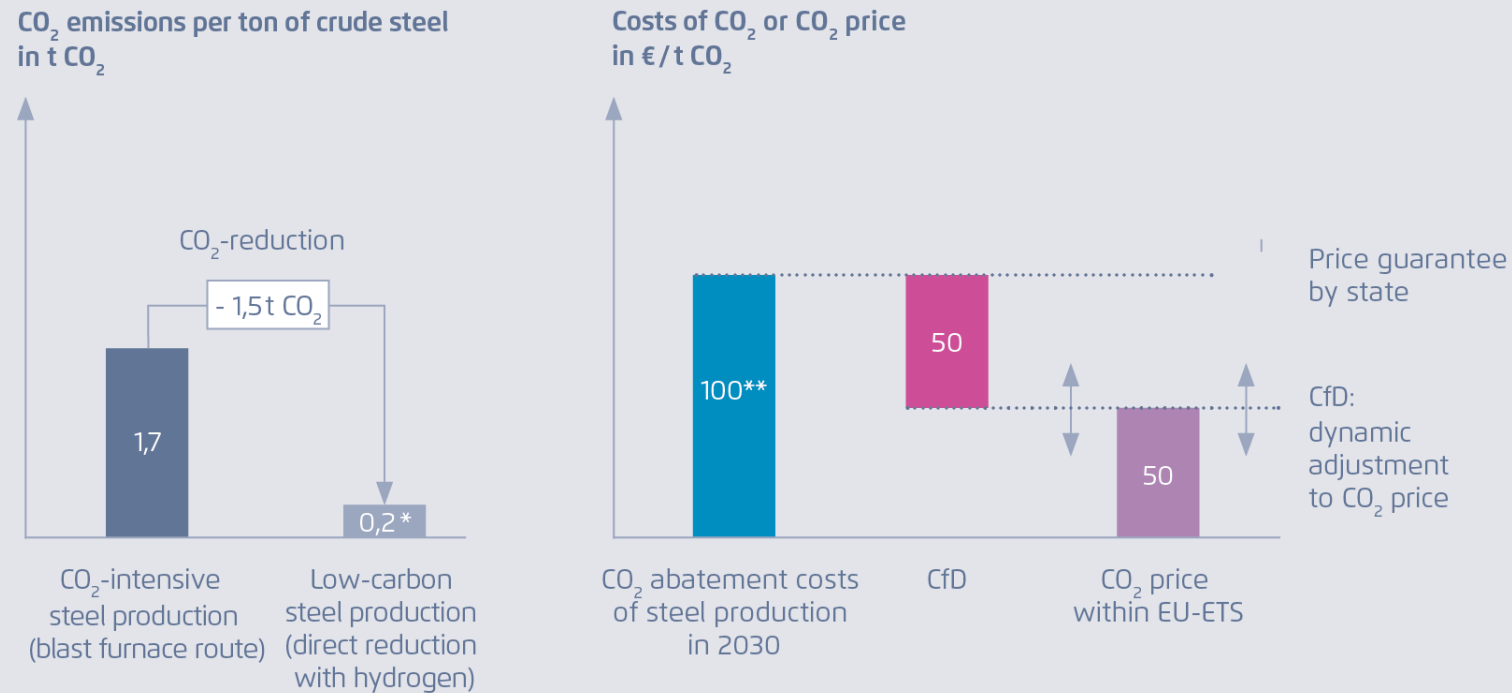
PWC

- CCfD would close an important gap in the support landscape, and be **especially well suited for technologies transitioning from the Research & Development (R&D) phase to large-scale commercial deployment** and at risk of stranding in the so-called “*Valley of Death*”.
- This instrument would thus help to support the large-scale commercialization of key breakthrough industry technologies with a large GHG mitigation potential.
- These key technologies include direct-reduction of steel using green hydrogen and specific carbon capture and storage applications. Other relevant areas include process innovations related to CCU, optimization of product design and material substitution.

Illustration: How a Carbon Contract for Difference could help finance new low-carbon key technologies



Illustration of the policy mechanism of the Carbon Contract for Difference

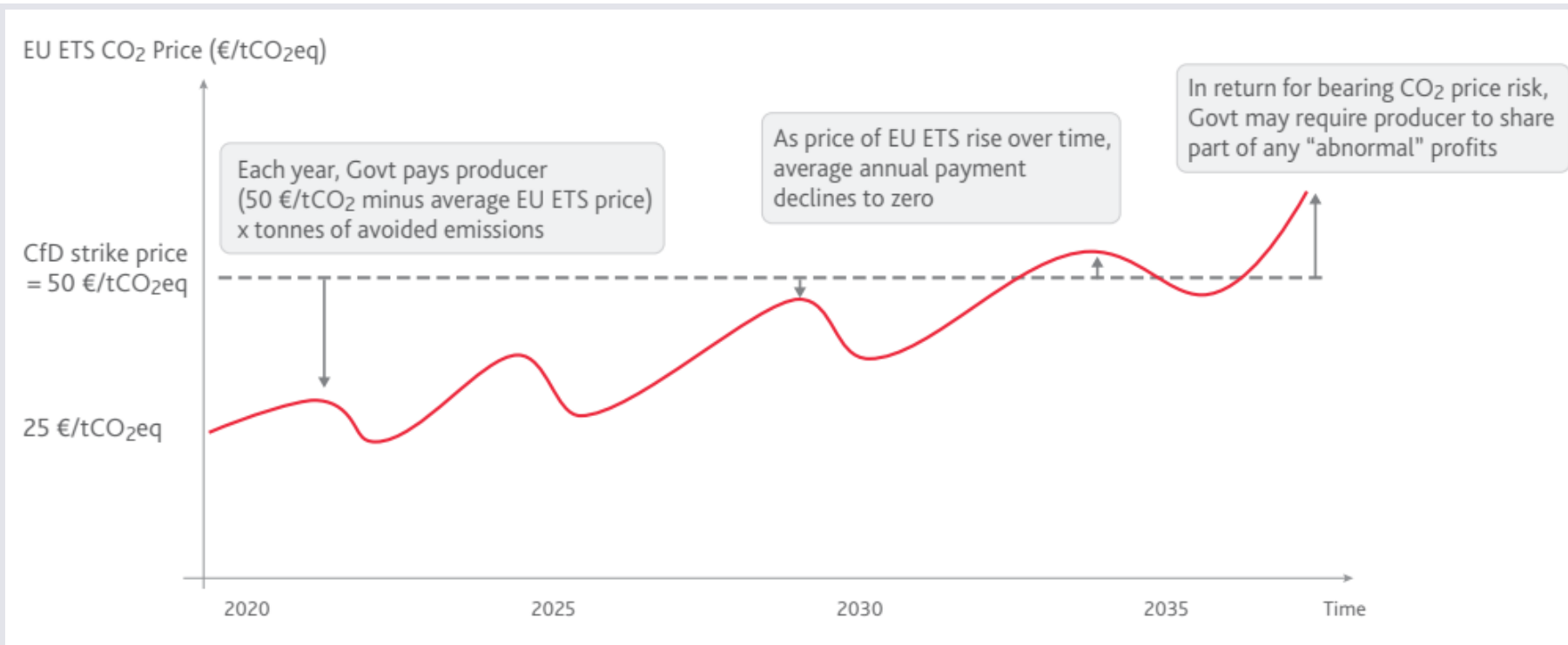


Source: Agora Energiewende, 2019

Illustration: How a Carbon Contract for Difference could help finance new low-carbon key technologies



Example of how a CCfD could work to support commercial-scale investments in first-of-a-kind decarbonised basic materials production



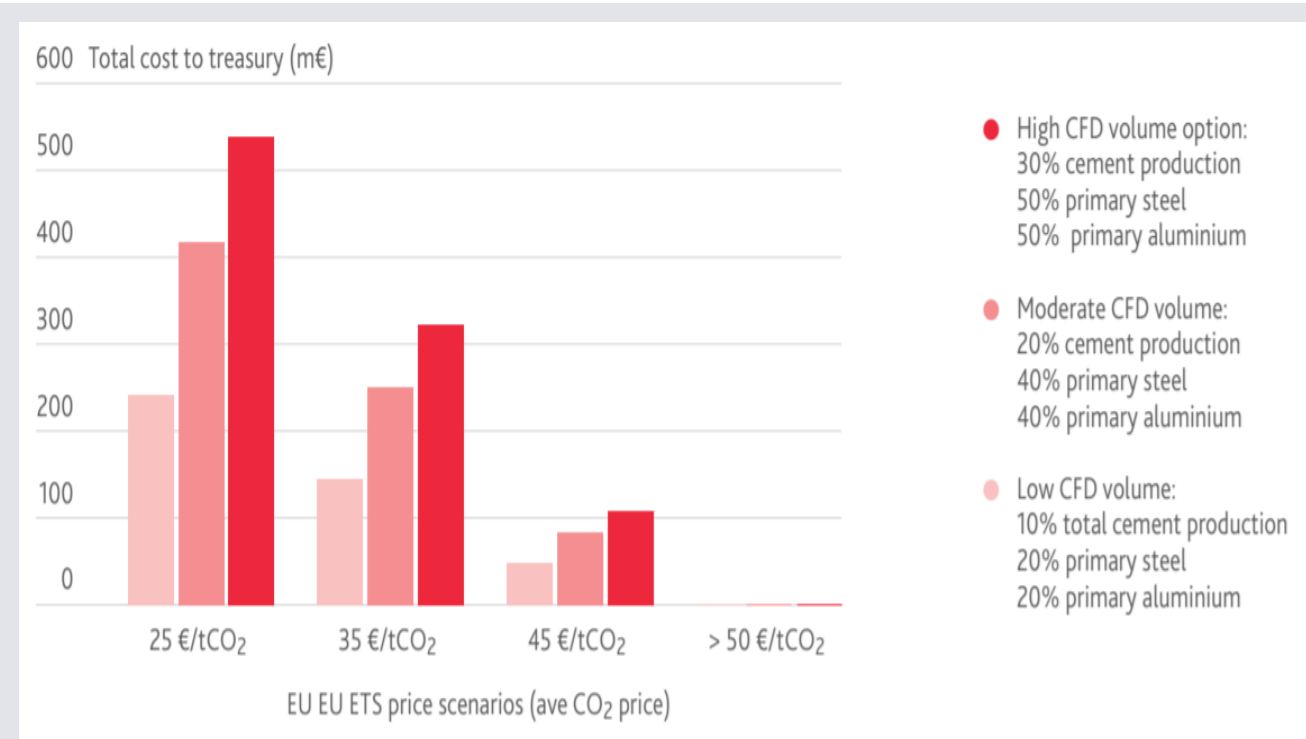
O. Sartor, IDDRI (2019)

CCfD Design Considerations

- **CCfDs largely target support for OPEX.** A carbon price floor or additional instruments targeting project-specific CAPEX, or energy supply infrastructure can be used complementarily.
- **CCfDs can be implemented as a double-sided instrument.** The “double sided” nature of the CCfD limits the likelihood of unjustified ‘windfall profits’ being generated. Furthermore, auctions can be used to make sure the most cost-effective projects meeting key criteria are selected.
- CCfD are effective as long as CO₂-intensive technologies are cheaper than innovative low-emissions technologies due the failure to adequately price their externalities. **The effectiveness of CCfDs is therefore limited to the phase of introducing innovative technologies to the market.** A support period can, therefore, be limited to specific time period (eg. 15-20 years).
- **CCfDs can be introduced at both a national and EU level,** and complementary financing via both national budgets and the EU budget (eg. the EU Innovation Fund) is also possible.
- Policy-makers can choose to only provide CCfDs to projects aligned with carbon neutrality objective by setting strict project qualification criteria.

How much would it cost?

Total cost scenario estimates of a CCfD for cement, steel & aluminium in France



- Support for a CCfD for low-carbon materials would be smaller compared to RES support.
- Estimates by IDDRI for France show that, even for relatively low range of carbon price scenarios during the next 20 years, i.e. between 35-45€, the total cost for a country the size of France would be quite small, ranging from 100-500 million €/yr in the highest volume scenario to as low as 42 million €/yr in the low volume scenario.
- Reasons include: 1) relevant basic materials markets are much smaller than the domestic energy market; 2) the CCfD can be restricted only to first-of-a-kind commercial projects; 3) the Treasury would pay (or receive) only the difference between the strike price and the actual observed EU ETS price.

IDDRI 2019

The combination of the following 3 policy instruments is a viable option for closing the investment gap for breakthrough technologies with a CCfD



1.) Revision of the EU ETS Directive

- New low-carbon production facilities still need to get free allocation of EUA for a limited amount of time based on the product benchmarks of the CO₂-intensive production plant that was replaced (e.g. 1.6 EUA per t of steel). Sales of these EUA generate one stream of income to cover additional costs.
- New low-carbon production facilities do not (fully) count towards reducing the benchmarks for conventional production plants (top-runner approach)

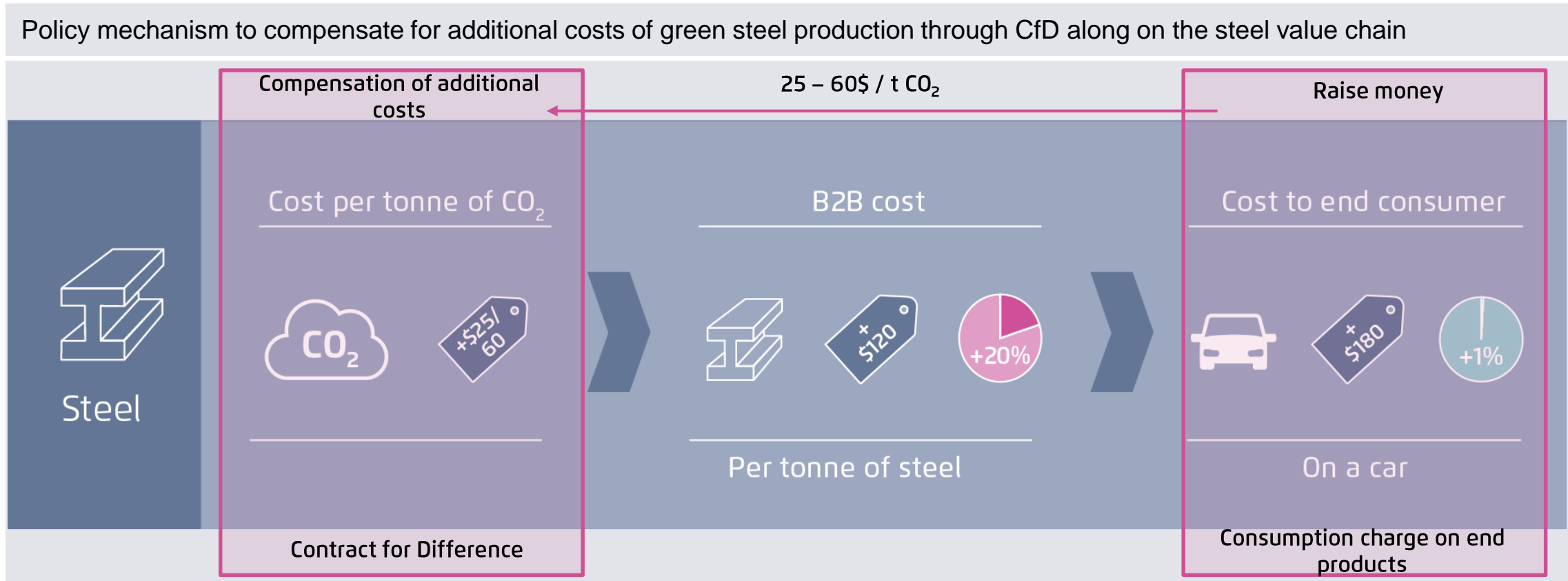
2.) A Carbon Contract for Difference (CCfD)

- The CfD pays the financial gap between the CO₂-Price in the EU ETS and the required CO₂-Price for a low-carbon production plant. This creates another stream of income to cover additional costs.

3.) A Climate surcharge on end products

- A climate surcharge is levied on end products containing basic materials, irrespective of their production method and location (green, grey, domestic, import). Costs for end consumers are small.

Illustration: How a Carbon Contract for Difference could be financed by a consumption charge on end products



Source: ETC, 2018

Compatibility with State Aid Rules

- The EEAG do not mention CCfDs but tools are there to assess compatibility:
- Measures aimed at increasing environmental protection in the absence of EU standards.
- **Eco-innovation:** the mechanism for CCfDs would only be designed to support first-of-a-kind commercial scale projects. CCfDs would be an extension of EU R&D&Innovation policy.
- Aid intensity: 50% for large enterprises with eco-innovation bonus, or **100% if competitive tenders.**
- At European-level, a CCfD system could be set up under Art. 10a paragraph 8 of the ETS Directive, which establishes an EU Innovation Fund with 400 million certificates foreseen to be auctioned to finance projects aimed at reducing GHG emissions – e.g. CCU & CCS. Funding granted from the EU Innovation Fund would be automatically considered State Aid compatible.

Considerations with regards to use and design of competitive auctions



Sartor, O. (2019) reflects on the design of competitive tenders:

- Financial Risks: Poorly designed auctions risk windfall profits due to an asymmetry of information about the true cost of technologies or tendering outcomes resulting from insufficient competition.
- Cost mitigation options:
 - require expert third party independent verification of incremental cost estimates of the project
 - have eligible projects bid for a strike price set at a relatively conservative level.
 - make the tender open to enough basic material uses that currently have a high carbon footprint embedded in the materials (e.g. construction) to ensure sufficient competition.
- Potential eligibility criteria: a) Capacity to replace **significant volumes** of high-carbon primary materials for the relevant usage; b) Consistency with national **long-term decarbonisation strategy**; c) **Economic justification** (i.e. does the project face an incremental cost compared to alternatives?); d) Cost per **unit of CO2 reduced**; e) Social, environmental or economic co-benefits.

Stakeholder feedback on the EEAG with regards to support for climate-neutral technologies and applications



- More generally, several stakeholders suggest that the GBER, EEAG and R&D&I guidelines do not provide a sufficiently clear and reliable framework to scale climate-neutral technologies and propose to create a **new chapter for climate-neutral technologies and applications** under the EEAG that is consistently included in the GBER. This chapter could include:
- Setting up a **fast-track notification procedure** for climate-neutral projects. For example, notification thresholds for climate-neutral technologies should be increased to € 200mn with the possibility of an ex-post control mechanism for the European Commission.
 - **Clear and ambitious provisions on sandboxing** which cover, inter alia, a state aid exemption, that create more legal certainty about how industrial-scale sandboxes could be implemented.
 - **Increasing aid intensity** for climate-neutral technologies in first-of-its-kind large-scale installation to 100%.
 - Streamlining and clarifying the existing rules for the **cumulation of aid**, including a provision that generally allows the cumulation of aid for climate-neutral technologies.

Reflections (1)

- The **funding of operational costs** together with capital investment needs to be strengthened within the new state aid framework for many breakthrough technologies to become viable.
- **CCfDs could play a key role in securing lower financing costs** and ensuring the commercial viability for key breakthrough technologies needed to achieve a climate-neutral industry
- **Future state aid guidelines should provide an appropriate framework to enable the development of CCfDs** by Member States either by developing a chapter explicitly devoted to this instrument in the EEAG, or clarifying the scope of their application in a new chapter for climate-neutral technologies and applications.
- The risk of asymmetry of information and low competition mean that in many cases **competitive auctions may not be well suited as a mechanism for determining support rates** or come at the expense of significantly limiting the scope of the application of CCfDs as an instrument.

Reflections (2)

- **CCfDs are not a silver bullet for reducing GHG-emissions from basic materials industries.** Additional instruments will be needed to enable large-scale financing of basic materials production and to tackle parts of the problem that CCfDs do not fully address (eg. carbon leakage protection).
- With regards to financing and carbon leakage protection, a **carbon consumption charge (climate contribution)** raised on consumers of basic materials **combined with continued free allocation** may from a political and governance perspective be more easily feasible than the introduction of a **border carbon adjustment, full auctioning of CO2 allowances** and **use of EU ETS revenues**. If this system is chosen, it should be clarified within the framework of the EEAG that it is allowed to combine aid with free allocation for projects enabling emission reductions.
- Specific regulatory barriers will still need to be removed (Eg. the cement sector cannot currently sell certain low carbon cement alternatives as cement under certain EU cement standards).
- **Key infrastructure (eg. CCS transport & storage) is also still missing.** Encouraging adequate investment in this infrastructure will require additional support frameworks.



Carbon Capture, Utilisation and Storage (CCUS)



Carbon Capture and Storage – State Aid rules

- Directive 2009/31 on the geological storage of carbon dioxide
- EEAG, section 3.6 on CCS:
 - CCS contributes to the common objective of environmental protection
 - Beneficiaries: fossil fuel and biomass power plants; industrial installations equipped with CCS
 - Commission presumes that aid to CCS addresses a residual market failure (economic gap between the CO₂ price and cost of CCS technology does not incentivise investment in CCS)
 - Both operating and investment aid are permitted
- Article 107(3)(c) TFEU for CCU
- Framework for State aid for research and development and innovation (2014)
- GBER, Article 25 - Aid for research and development projects (no specific mention of CCS)

Stakeholder feedback on the EEAG with regards to CCS



With regards to CCS, the EEAG provisions are generally considered clear and appropriate. However, stakeholders have suggested specific provisions be revised to ensure greater clarity:

- The EEAG should be revised to provide clarity that waterborne/shipping/ship-based CCS solutions for transporting CO₂ for permanent storage, as in the case of the Northern Lights project, are eligible for State aid to prevent difficulties in accessing public funding.
- The definition of CCS should be clarified to ensure it includes CCS associated with natural gas steam methane reforming plants to produce blue hydrogen.
- The definition of permanent CO₂ storage should be defined more broadly to include approaches to safely storing CO₂ other than geological formations.
- The current EEAG are written in a way that envisages the CCS projects being carried out within the same company responsible for the carbon emissions as an integrated project, with capture, transport and storage all being performed within one project. The Guidelines should be revised to reflect alternative business models with disaggregated value chains.

Stakeholder feedback on the EEAG with regards to CCU, DAC



- An explicit framework beyond CCS is needed to include CCU and DAC with CCS
- State aid should be permissible for companies providing a service to another company while not realizing an environmental effect by its own activities (eg. CCU with CO2 captured for a greenhouse)
- If included, the eligibility of CCU should refer to life-cycle emissions criteria to ensure that state funded CCU projects contribute to GHG emission reductions and not only circularity.

Case studies / The Netherlands – Investment aid for CO₂ capture and pipelines

- **Investment aid** to (1) Meerlanden for the installation of CO₂ capture technology enabling the removal of CO₂ from flue gases at its biomass digester facility; (2) Zuidplaspolder, (3) de Kwakel and (4) OCAP (PrimA4a area) to build CO₂ pipelines, compressor and reduction station. The captured CO₂ will be fed into a network and transported to greenhouses where it is to be **used**.
- **Objective:** Increase environmental protection by reducing the use of primary energy sources for conventional forms of CO₂ generation for horticultural processes and by reducing CO₂ emissions linked to the horticultural process, by avoiding that greenhouses use natural gas for CO₂ production.
- **Legal framework:** 107(3) TFEU! (1) the EEAG **do not cover CCU**; (2) the increase of environmental protection is achieved by the end consumers, **not at the beneficiary's level** who „do not reduce its own pollution“. *Despite that „The capturing of the CO₂ and its transfer to the greenhouses also avoids that MEERLANDEN's CO₂ emissions are released into the atmosphere.“*
- **Necessity for aid:** remedy the funding gap of the investment: costly infrastructure, low CO₂ revenues, lack of coordinated cooperation between suppliers and consumers.
- **Cumulation with Energy Investment Deduction** : no for Meerlanden ≠ yes for Zuidplaspolder, de Kwakel and Prim4a

Case studies / Front End Engineering and Development studies (UK 2009 & 2013 and Norway 2017)



- FEED studies aim to reduce the technical, environmental and financial risks of CCS projects.
- **Advantage:** (1) FEED studies enable the beneficiaries to stay in the competition for the final contract for the UK CCS project. (2) They provide the beneficiaries with additional know-how that they can use commercially as 'first movers', e.g. to compete for further CCS projects.
- **Outside scope of EEAG:** do not result directly in capturing CO₂ & are not environmental studies
- **Objective:** CCS commercialisation in line with the targets laid down in the Roadmap 2050 towards the development of commercial-scale CCS technology + environmental protection.
- **Appropriateness:** (1) making CCS mandatory is not an option given the high risks and costs associated with such projects. (2) Supporting FEED studies rather than the final CCS project enables to compare the environmental and technical aspects of both studies and thus to choose the project with the best 'value-for money'. (3) the EPS will not by itself incentivise investment in CCS.
- **Proportionality:** Fund only activities that are genuinely required for the purposes of reaching the Final Investment Decision. Plans to reach agreement as to the precise nature of all FEED activities prior to the commencement of funding and scrutinise all costs + maximum aid intensity of 75%.
- July 2019: call for CCU demonstration projects: projects must fall **within the GBER Article 25**

Case studies / Norway

- “The Norwegian CCS strategy encompasses a wide range of activities, including **research, development and demonstration**, work on the **realisation** of large-scale demonstration facilities, transport, storage and alternative use of CO₂ and efforts to promote CCS on a global scale.
- (...) the first CCS projects [shall] serve as reference projects and generate the greatest possible amount of knowledge and that they establish necessary infrastructure, thereby contributing to the further deployment and dissemination of large-scale CCS internationally.
- Moreover, the success of the first projects may stimulate **CCS deployment on a commercial basis**.
- (...) An important part of the strategy is the Norwegian Government's ambition to realise **at least one full-scale CCS demonstration project by 2020.**” (EFTA, decision 16 March 2017 on FEED studies)

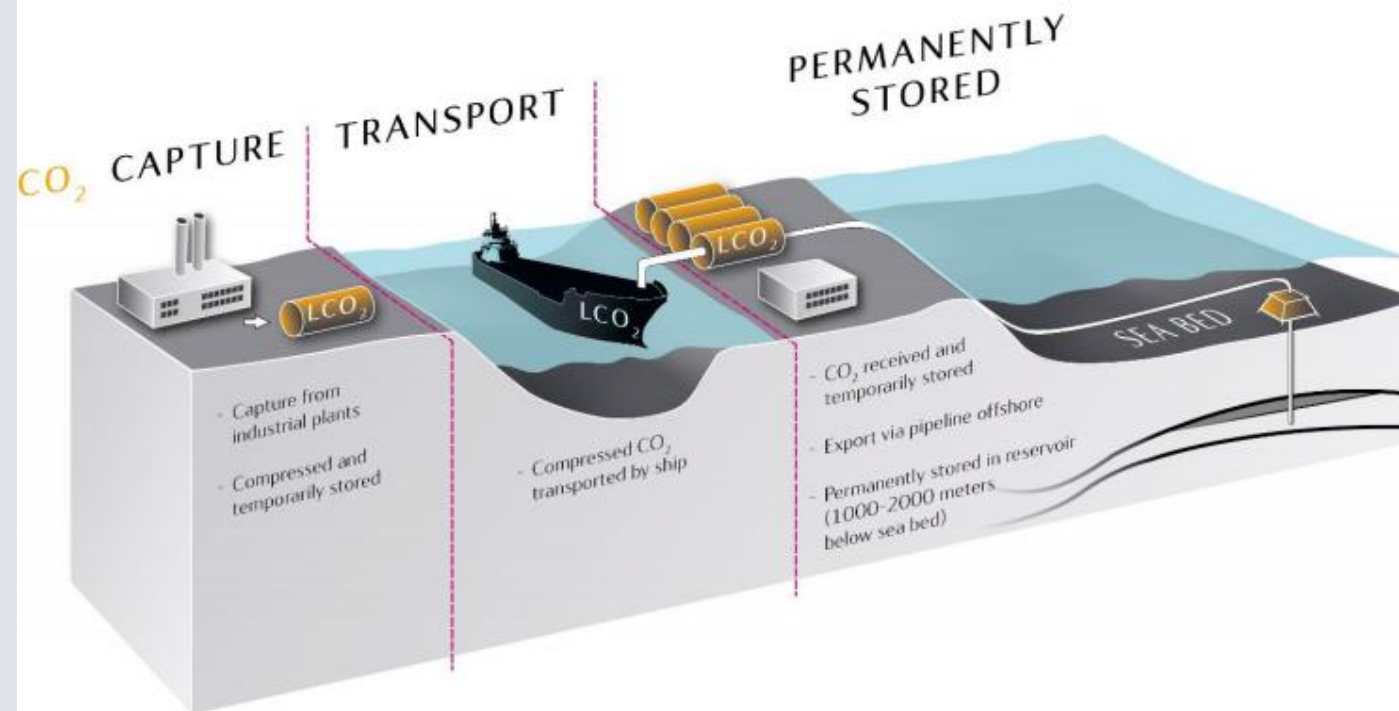
Case studies/ CCS projects in Norway

- 2008: Capital injection for construction and ownership of the Test Centre Mongstad, a post-combustion plant including an oil refinery and a combined heat and power plant, equipped with post-combustion CCS technologies, intended to test, verify and demonstrate CCS.
 - **Non-compliance with MEIP:** TCM project was meant to operate for 5 years and no profit was foreseeable in such a short term.
 - There were “not sufficient information available for the moment to assess whether the TCM constitutes a **project of common European interest**”. EFTA did not give criteria for qualification.
 - **Objective:** likely to contribute as a preliminary phase to the full chain demonstration of CCS.

- 2018: Norway looking for (EU?) financing for equipping cement plant and waste incineration facility with CCS. In the demonstration phase, the CO₂ captured at a cement plant and a waste incineration facility in Norway would be stored temporarily on site in big containers before it is shipped off the Norwegian coast for injection deep beneath the seabed.

State aid case studies: Norway

The full-scale CCS value chain in Norway



- Total value chain; by Gassnova
- Capture scope; by respective industrial plants
- Transport scope; by Gassco
- Storage scope; by Statoil

Source: [Euractiv](#)

Reflections

- Little number of projects or even FEED studies submitted under State aid rules: lack of take off of the technology in the EU. In any case, it seems to be admitted that CCS/U projects cannot be achieved without EU or State support.
- The scope of the EEAG is restrictive: CCU is excluded; FEED studies are not covered (the use GBER art. 25 is capped by EUR 20 million/undertaking/project for industrial research). GBER Art. 48 on energy infrastructure would not apply to CCS/CCU.

Conclusion on CCS

- CCS is/was politically almost dead in Germany and has a very tough road ahead in Europe.
- However, limited technology options place CCS at the forefront of the cement industry's net-zero strategy and negative emissions are essential to reach the targets under the Paris agreement.
- Parts of the CCS technology chain could be developed under the umbrella of CCU. But the technology is very expensive and the mitigation potential limited.
- In other sectors, CCS could become a “bridge” technology that is required because other options are delayed or too expensive in the mean time.
- Politically, von der Leyen's Green Deal and the EU's pledge for carbon neutrality open up a window of opportunity to make substantial progress in developing a comprehensive European CCS strategy within the next year. The Sustainable Europe Investment Plan intends to support investment in scaling up CCS/CCU via the Innovation Fund.
- Whatever the result, CCS policy support efforts should not be pursued in isolation, but rather embedded in a broader decarbonization strategy, in particular with regards to the industrial sector.



Green Hydrogen



Reflections on green hydrogen

- Market: **Green H2 is mostly uncompetitive** with blue and fossil H2 today.
- Imports of green hydrogen are estimated to be cheaper than domestic production
- Policy: **Current instruments are largely insufficient** to overcome cost difference
- Major cost reduction expected through scaling, **deployment** and learning, similar to experience with renewable energy technologies
- **Willingness to pay** share in green H2 learning cost is unclear
- **Overcoming free-riding** calls for European and international cooperation
- Support mechanism should define **sustainability criteria** for creating sufficient investment certainty
- EU: The upcoming **sector integration strategy** is an opportunity to design a **gas decarbonization package** that helps overcome some free-riding in technology learning.

Among the different support instruments that are conceivable, a quota mechanism is receiving increasing attention in Germany.



- **Potential support instruments** include tenders, feed-in-tariffs, reducing taxes, levies & surcharges on electricity, CO2 levies, market incentive programs and quotas
- **Financing options** – who is paying the extra cost?
 - Tenders or market launch programs → taxpayers
 - Reduction in surcharges in electricity → electricity customers
 - Quota → gas customers
- **Quotas are called for by:**
 - FNB Gas, the German gas TSOs –acknowledging the importance of openness for imports
 - Thüga, a group of German gas DSOs – combining the quota with a market incentive programme
 - BDEW, Association of the German Energy and Water Industries – conditional on other measures not being able to substantially increase the share of green gases in the market

Stakeholder feedback on the EEAG with regards to hydrogen



- Neither hydrogen or low-carbon gases are specifically covered under the EEAG. However, national subsidies to CCS are permissible under the EEAG and could under certain circumstances favour blue hydrogen.
- EQUINOR, IOGP argue that the EEAG should incorporate hydrogen / low-carbon gases in the definition of energy infrastructure and review the chapter accordingly or create a separate chapter on hydrogen / low-carbon gas applications, in line with the future gas regulatory framework.
- Based on the R&D funding in the German 'Sandboxing' pilots for testing the scaling of climate technologies (in particular power-to-X and hydrogen), Siemens suggests that the programme is at risk of not meeting its full potential due to the limited funding scope permitted under state aid rules:
 - Funding is limited to €15 mn per project partner and spread out over 5 years
 - The funding rate for companies is capped at 45%.
 - No OpEx funding is possible.

Reflections on green hydrogen

- Most proposed support instruments for green hydrogen (eg. mandatory hydrogen quotas) would not be considered state aid, unless exemptions are applied. A notable exception is a CCfD.
- The choice of financing option also determines who pays for financing green hydrogen.
- High network charges and high electricity levies reduce the attractiveness of producing green hydrogen. Thus some stakeholders argue for exemptions from electricity taxes and levies for green hydrogen production. However, if financed by higher taxes and levies for other consumers these exemptions also risk making direct electrification elsewhere less attractive.
- It is unclear whether special provisions for green hydrogen under the EEAG specifically for green hydrogen are necessary, or rather an enabling framework for climate-neutral investments (eg. through a CCfD) and targeted exemptions for specific energy consumers wouldn't be more appropriate.
- Either way, however, the new EEAG should in be drafted to reflect a supportive investment framework for green hydrogen, including with regards to support for renewable energy.



Agora
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Thank you for your attention

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