



# A Clean Industry Package for Europe:

Making sure the Green Deal  
kickstarts the transition to  
climate-neutral industry

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## Two new studies by Agora Energiewende on decarbonising energy-intensive industry in Europe

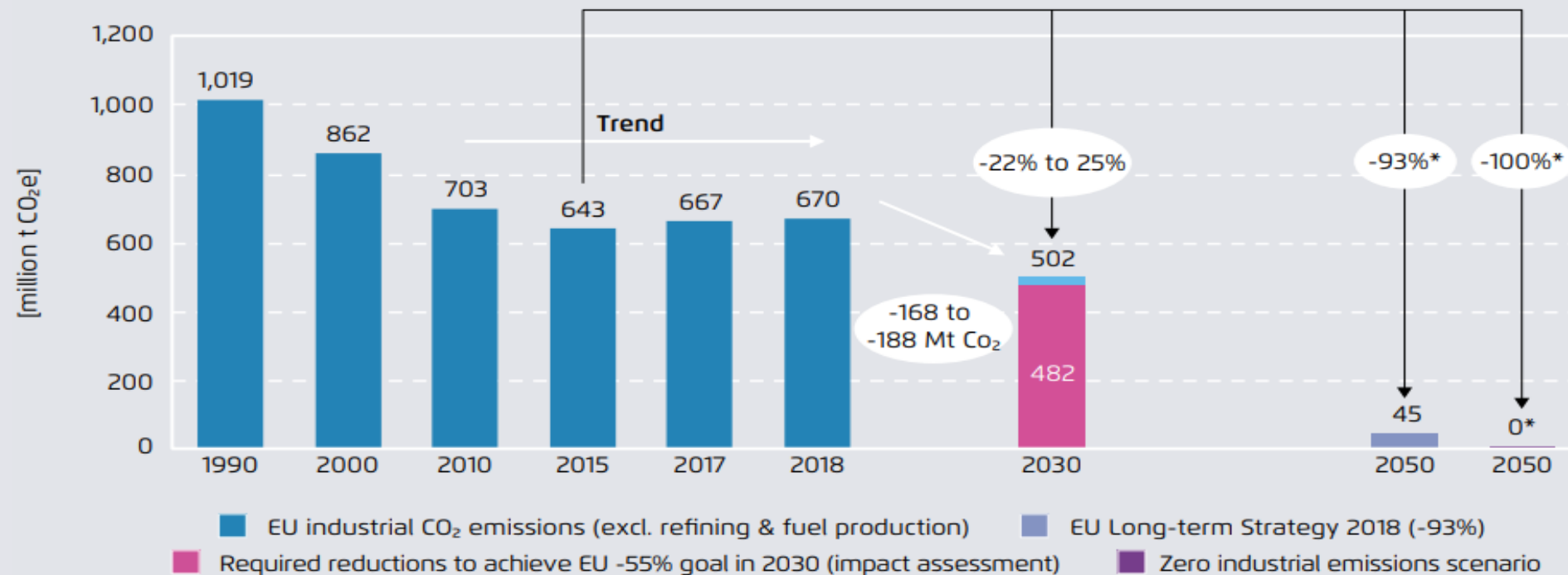


→ Available at:

<https://www.agora-energiewende.de/en/projects/a-clean-industry-package-for-europe/>

## Industry has a vital role in the EU achieving higher climate ambition in 2030 and 2050

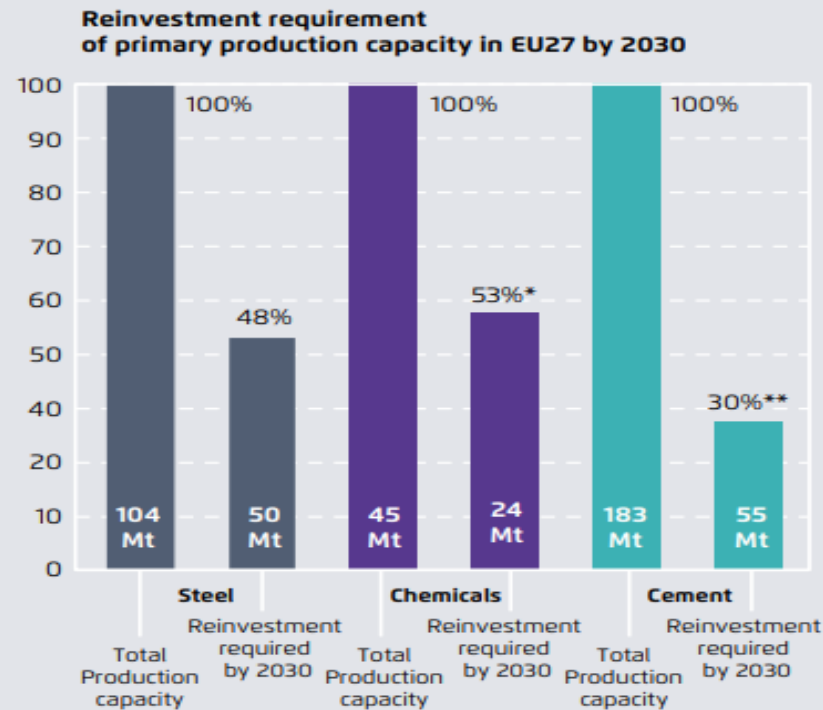
CO2 emissions of EU27 industry from 1990 to 2018 and proposed sector reductions for 2030 and 2050



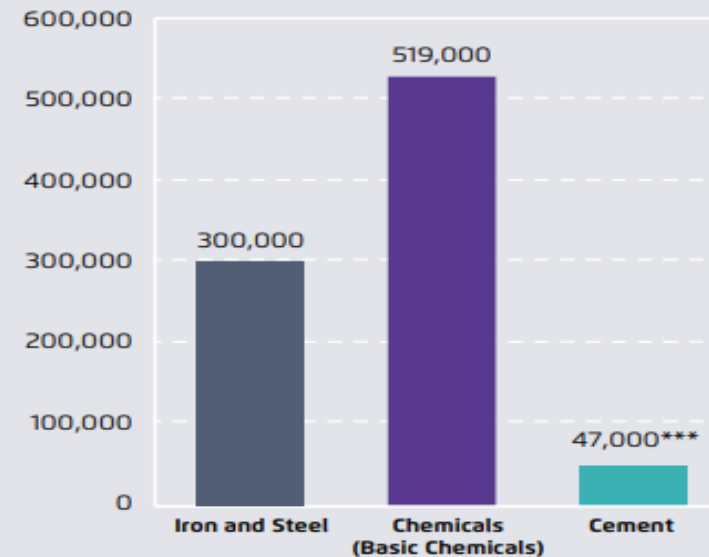
Agora Energiewende 2020, based on data from Eurostat, EEA and European Commission.

# The situation is urgent: investments in key low-carbon technologies must start during the coming decade

Re-investment needs by 2030 and direct employment in cement, steel and basic chemicals in the EU



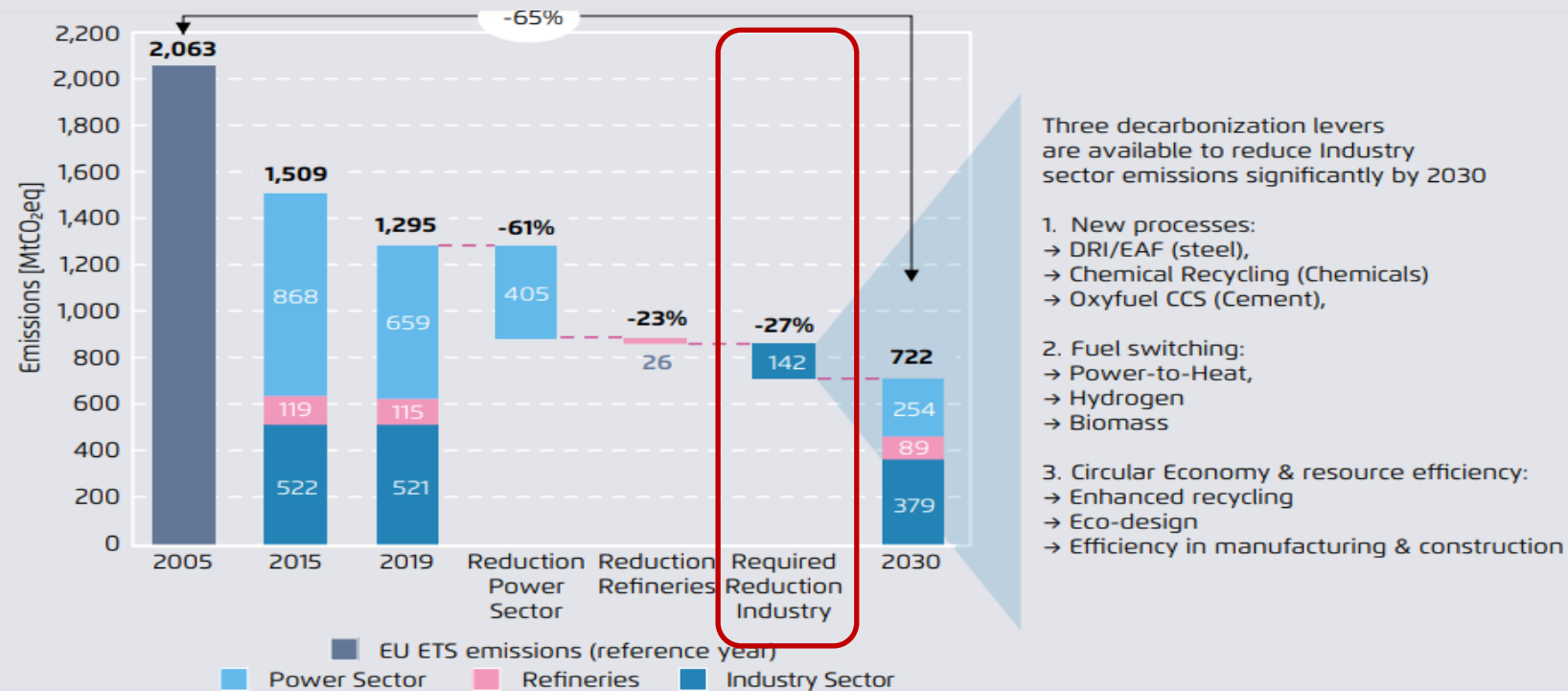
**Direct employment of the industrial sectors under consideration in 2017**



Agora Energiewende/Wuppertal Institut, 2020

# EU ETS industry would need to reduce emissions by ~27% under a -55% EU 2030 climate target, since much of the effort is done by the power sector and past abatement

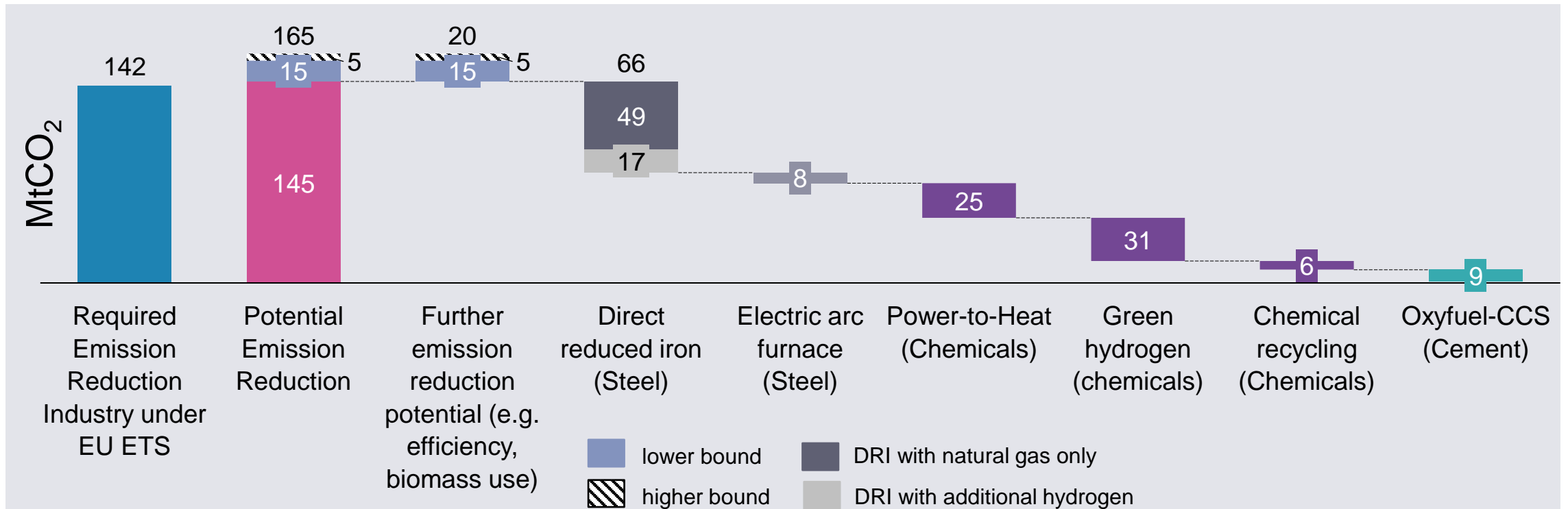
Expected emissions reductions from EU ETS industry under a -55% 2030 EU climate target and decarbonization options available



Agora Energiewende, based on data from European Commission, EEA, and Eurostat

# This 142MtCO<sub>2</sub> can and should be abated by deploying key *climate-neutral* technologies, not just setting tighter conventional technology benchmarks...








CO<sub>2</sub> abatement potential of selected key low-carbon technologies in the steel, chemical and cement sectors by 2030



Agora Energiewende and Wuppertal Institute, 2020

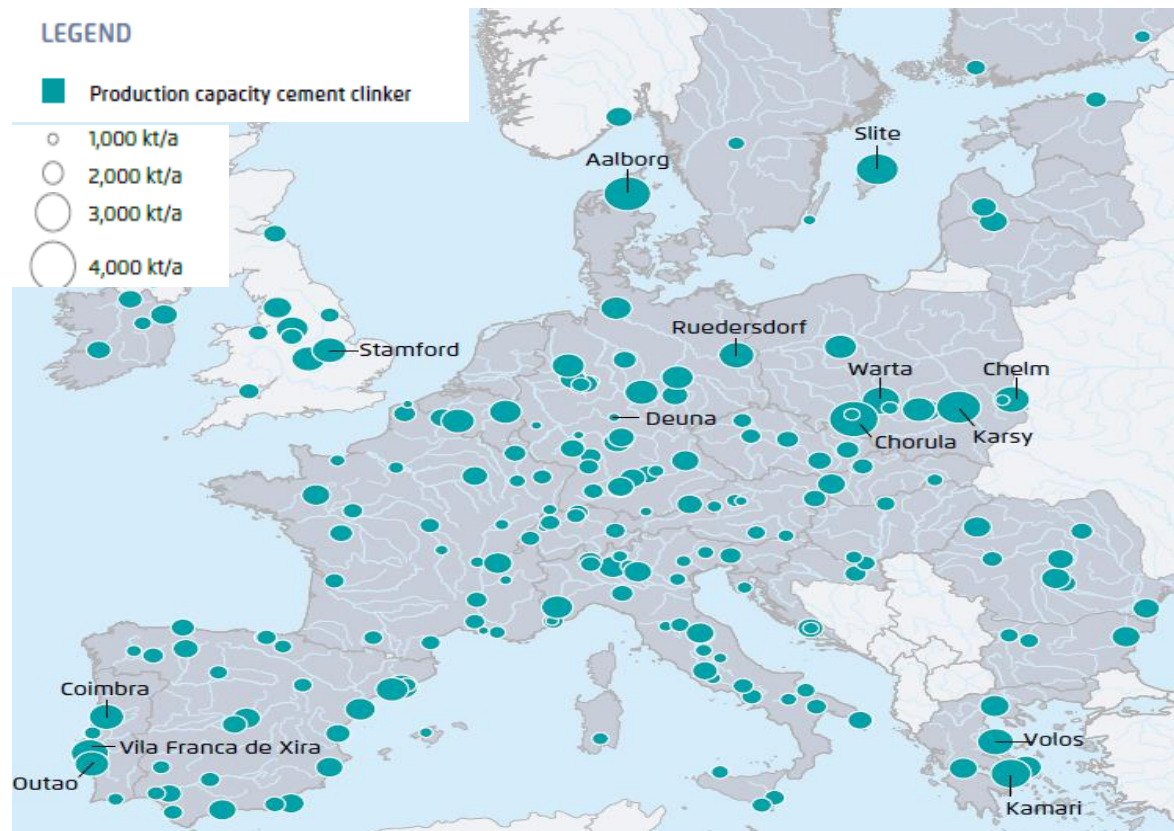
## EU steel companies are ready to build commercial DRI plants before 2030. They are hydrogen-ready, but could partially run on natural gas until enough clean H<sub>2</sub> is available

Overview of EU steel companies' plans for the deployment and commercialization of DRI plants before 2030

Project, Site	Country	Company	Status Quo	Fuel	Timeline
HYBRIT, Lulea		SSAB	Started pilot operation with clean hydrogen in 2020 (TRL 4-5)	Green H <sub>2</sub>	2020: pilot plant 2026: commercial
DRI, Galati		Liberty Steel	MoU signed with Romanian government to build large-scale DRI plant within 3-5 years Capacity: 2.5 Mt/DRI/year	Natural gas then clean H <sub>2</sub>	2023-2025: commercial
tkH2Steel, Duisburg		Thyssenkrupp	Plan to produce 0.4 Mt green steel with green hydrogen by 2025, 3 Mt of green steel by 2030	Clean H <sub>2</sub>	2025: commercial
SALCOS, Wilhelmshaven		Salzgitter	Feasibility study to build DRI plant in Wilhelmshaven	Likely Clean H <sub>2</sub>	n.a.
H-DRI-Project		ArcelorMittal	Planned construction of an H <sub>2</sub> -DRI demo plant to produce 0.1 Mt DRI/year (TRL 6-7)	Grey H <sub>2</sub> initially, Then green H <sub>2</sub>	2023: demo plant
DRI, Taranto		ArcelorMittal	Plans to build DRI plant, ongoing negotiations with Italian government	n.a.	n.a.
IGAR DRI/BF, Dunkerque		ArcelorMittal	Plans to start hybrid DRI/BF plant and scale up as H <sub>2</sub> becomes available	Natural gas then Clean H <sub>2</sub>	2020s

## In the cement sector, at least 11 well-located sites could be connected to offshore CO2 storage sites via shipping by 2030

### Cement sites and capacities in Europe

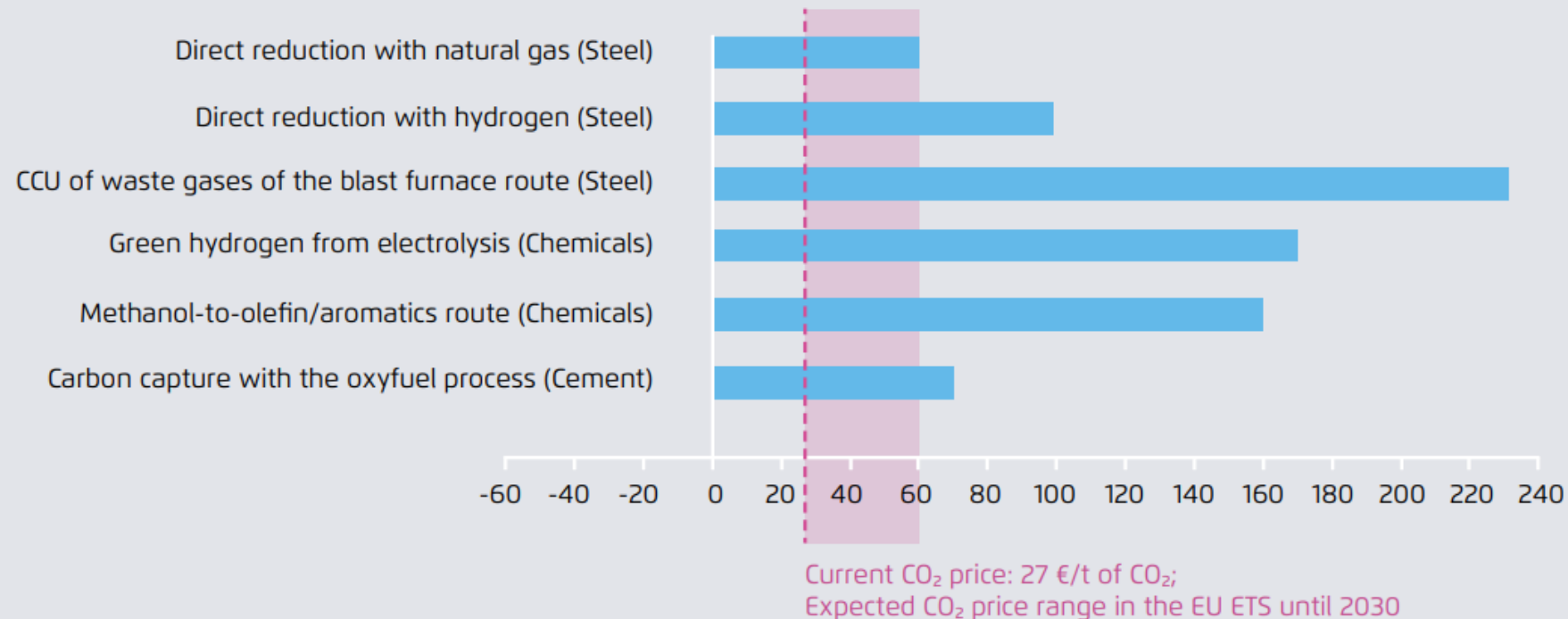


- CO2 infrastructure in coastal regions can be developed for cement and blue hydrogen.
- CCS in cement paves the way for negative emissions through Bio-energy and CCS (BECCS).
- The combination of biomass and Oxyfuel CCS allows for negative emissions once cement plants use more than 25% of biomass in the fuel mix.
- Additional lower CO2 cement solutions also available



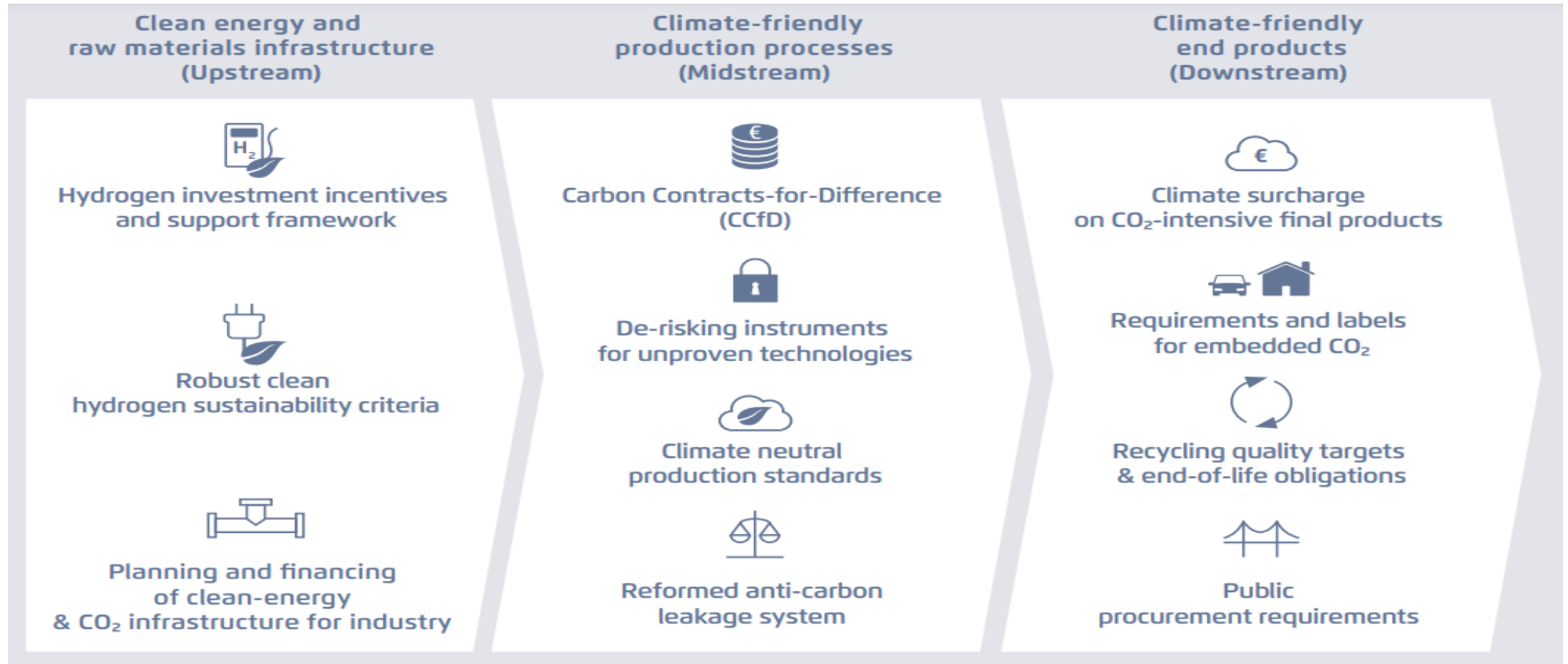
## Carbon pricing + CBAM + « hydrogen alliance » are not sufficient to drive these investments before 2030

Estimated CO<sub>2</sub> abatement costs of selected key technologies versus today's conventional reference process for 2030

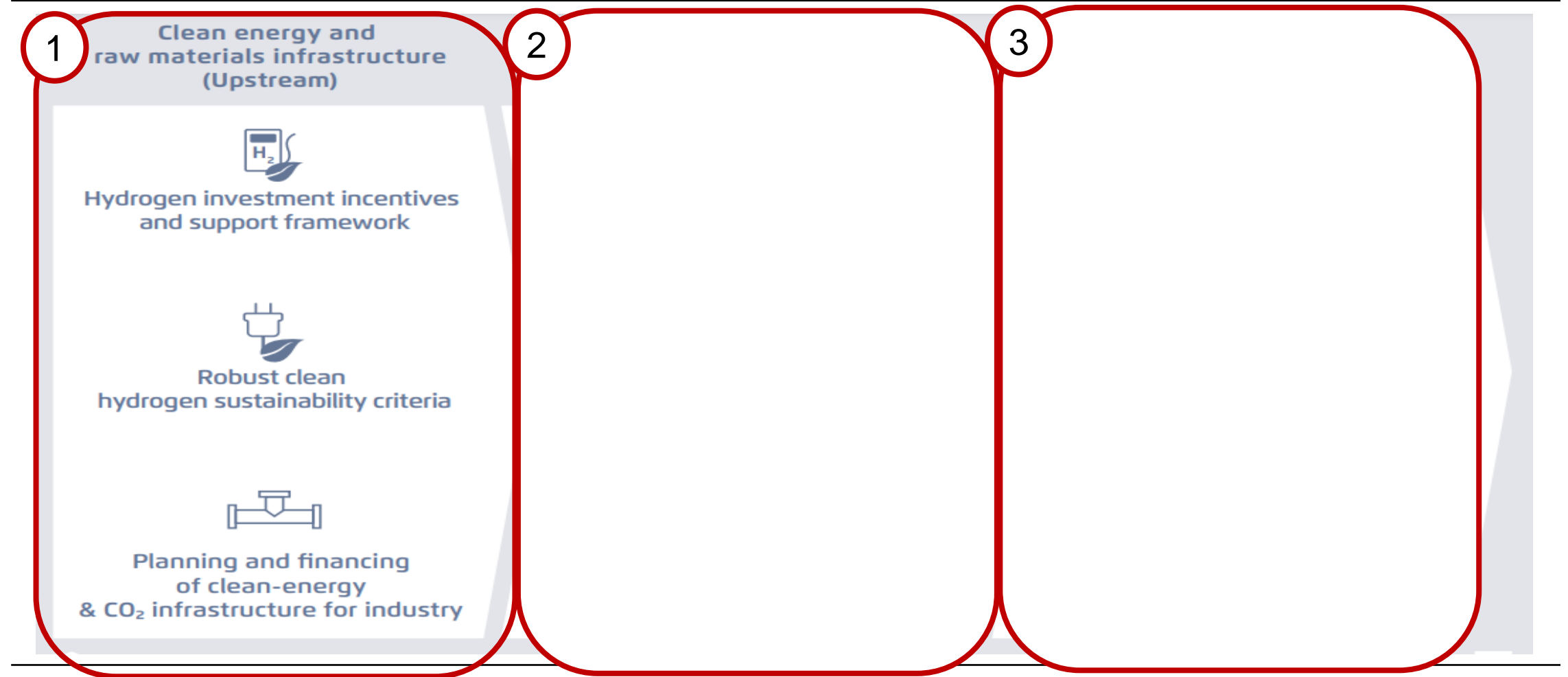


Agora Energiewende/Wuppertal Institute, 2019

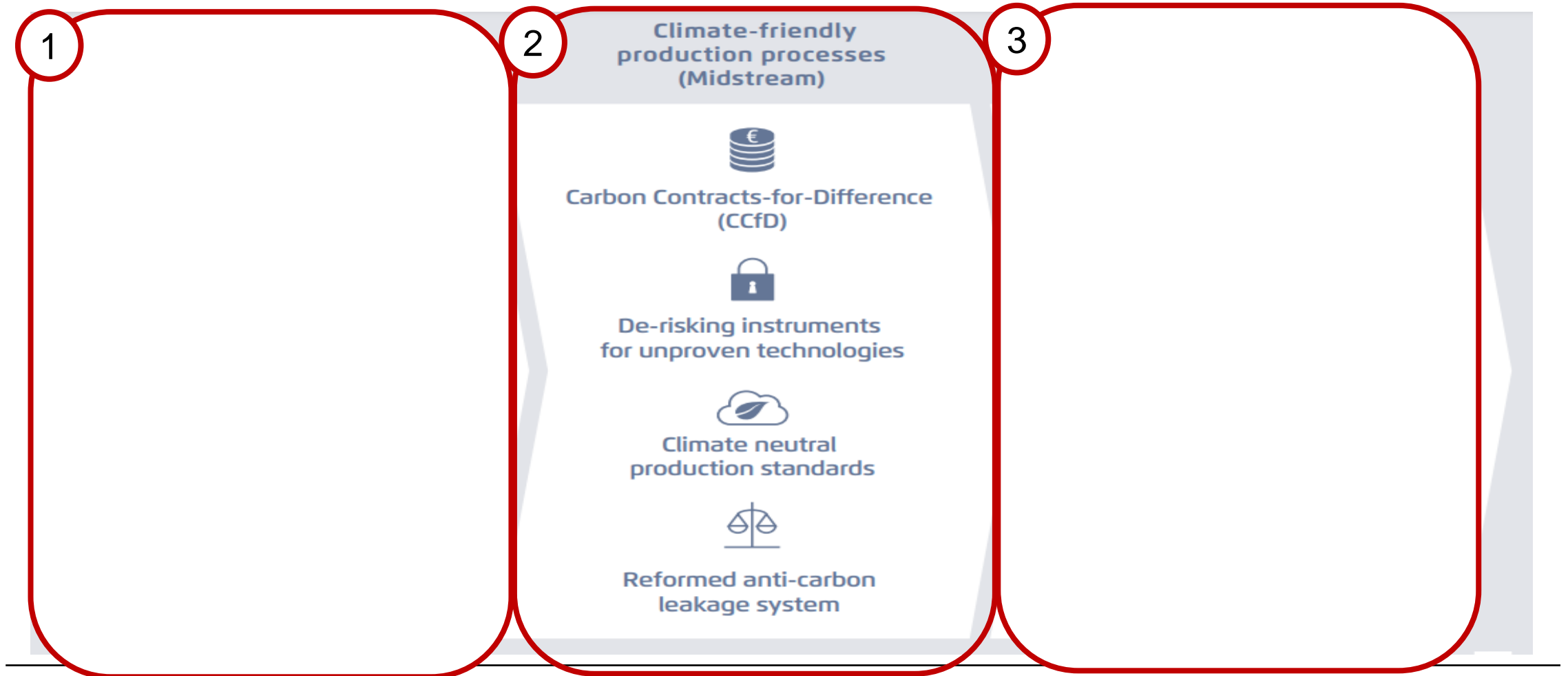
# The industrial transition is complex: a coherent “Clean Industry Package” covering the full value chain is required



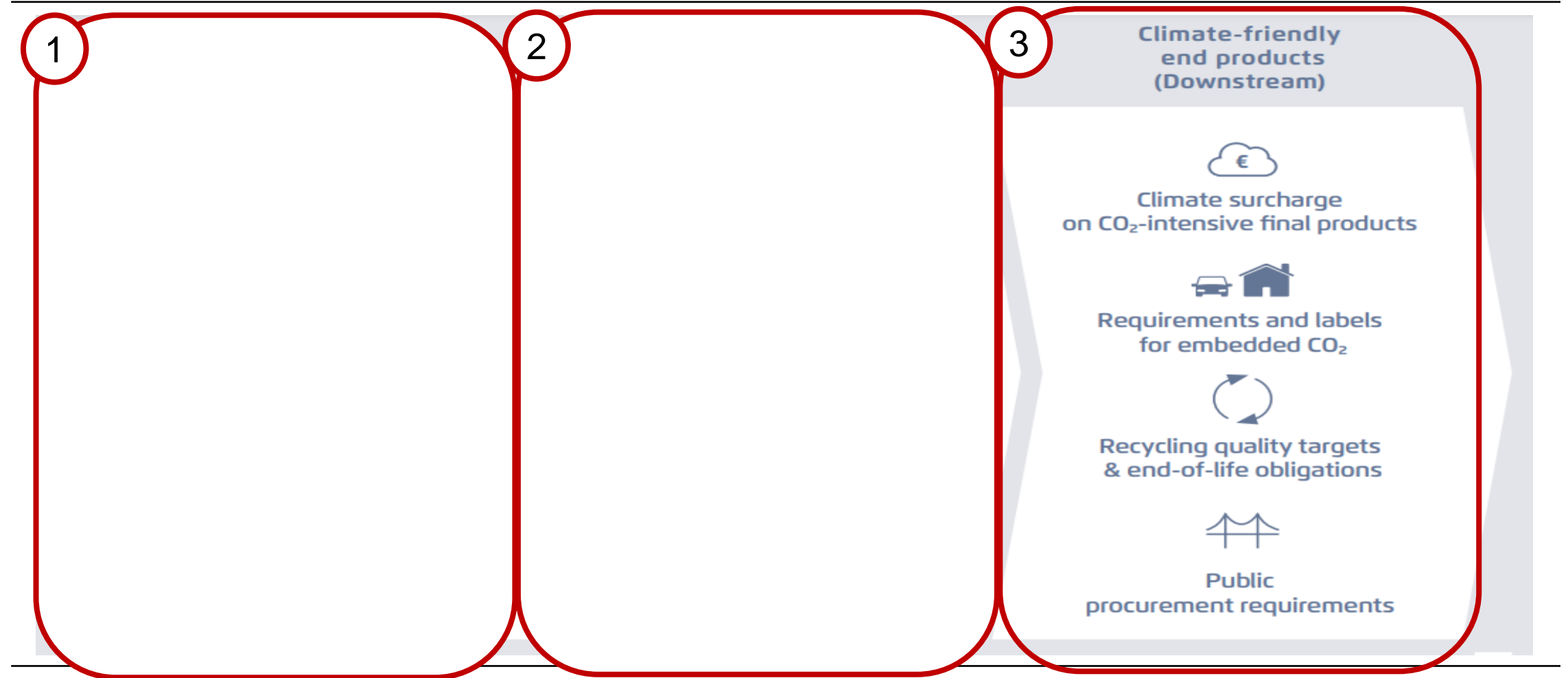
## Clean Industry Package: Policy needs (Upstream)



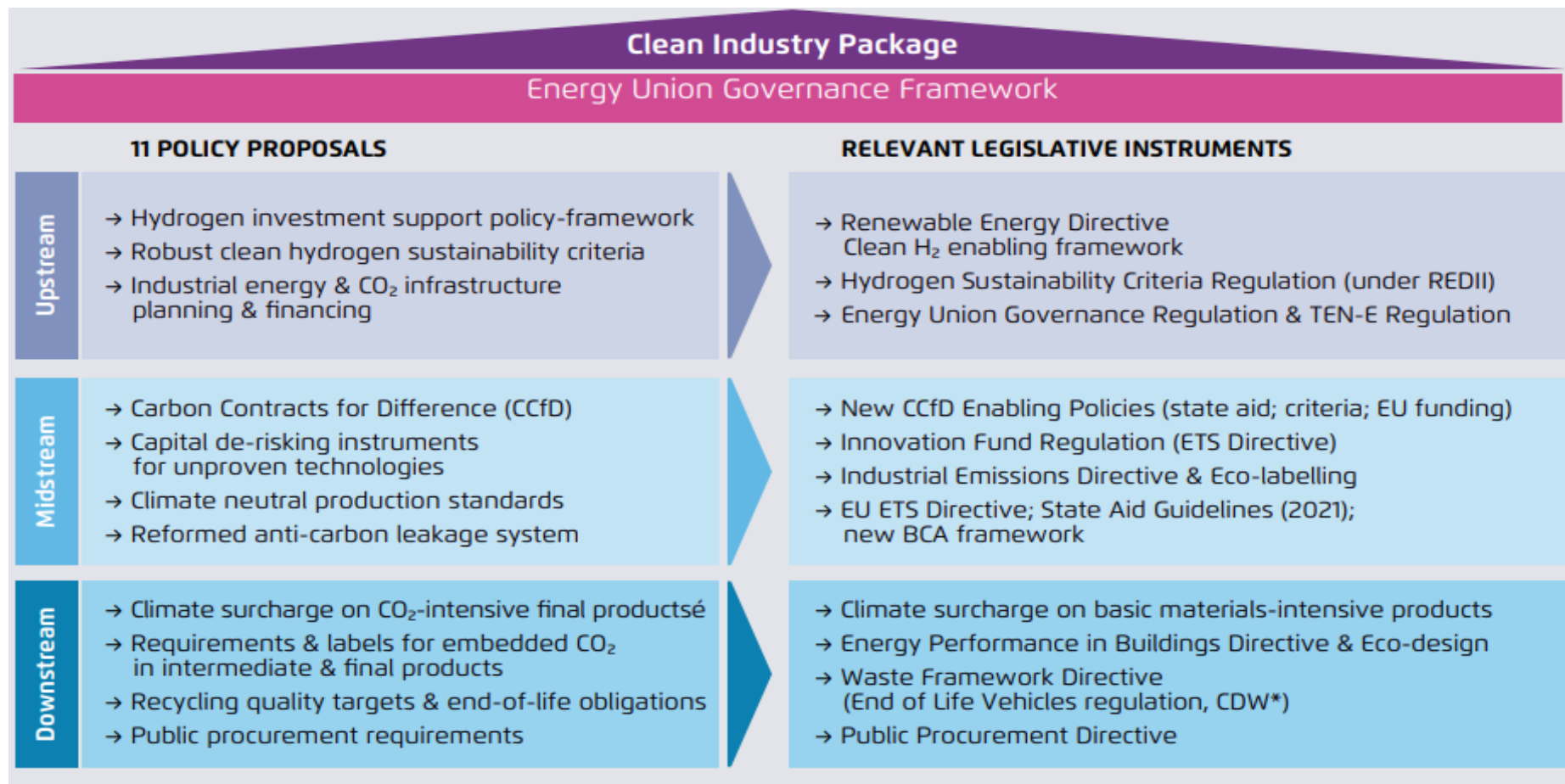
## Clean Industry Package: Policy needs (Midstream)



## Clean Industry Package: Policy needs (Downstream)




## A Clean Industry Package could be implemented by adapting *existing* legislation, planning and funding instruments.



## Summary

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- The situation is urgent, industry will need to make major reinvestments by 2030.
- CO2 prices, a CBAM and **“industry alliances”** will not be enough on their own.
- A Clean Industry Package is needed to unlock the needed incentives along the full value chain.
- A Clean Industry Package could be implemented by adapting existing legislation.



**Thank you for your  
attention**

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**PARIS, 18-11-2020**



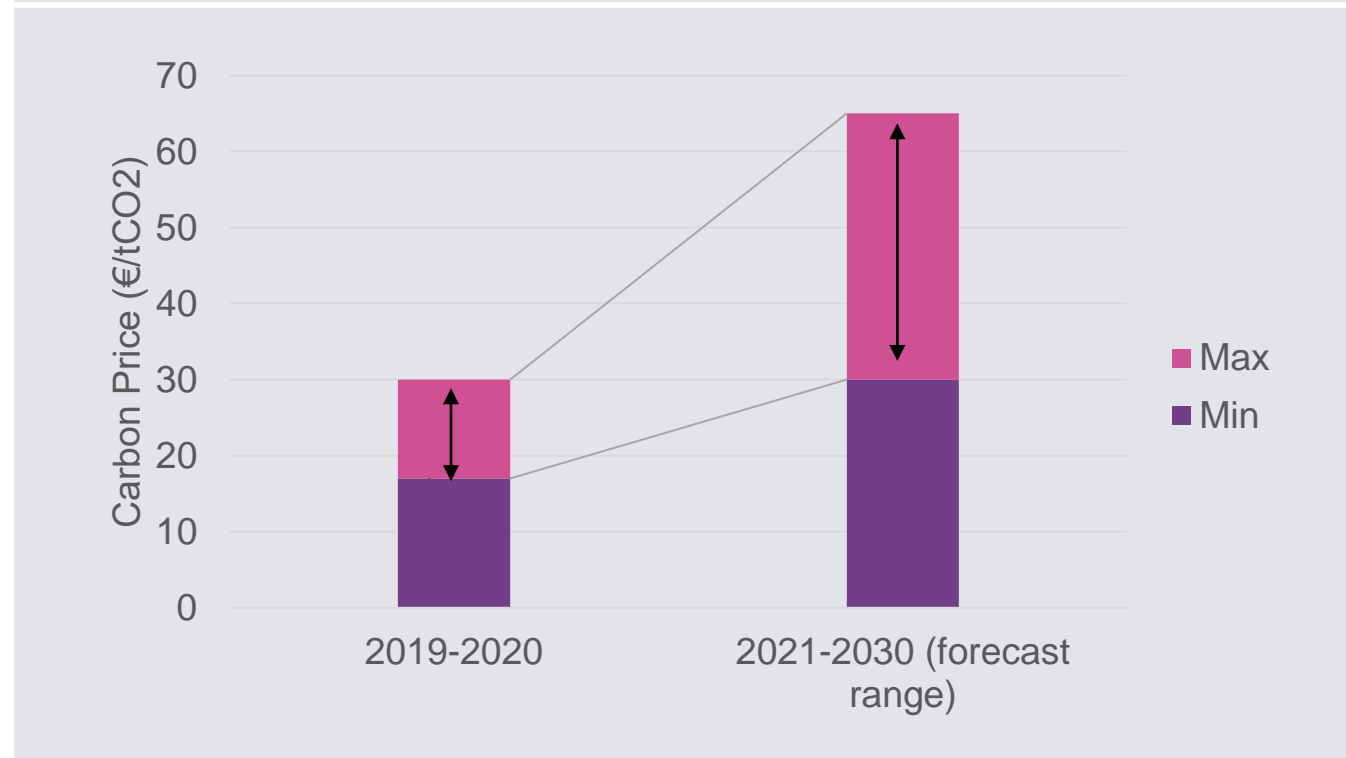


## 4. Annex I on Carbon Leakage



## Higher EU 2030 climate ambition will mean significantly higher carbon prices

CO2 Price Ranges Expected under Increased EU ETS 2030 Ambition

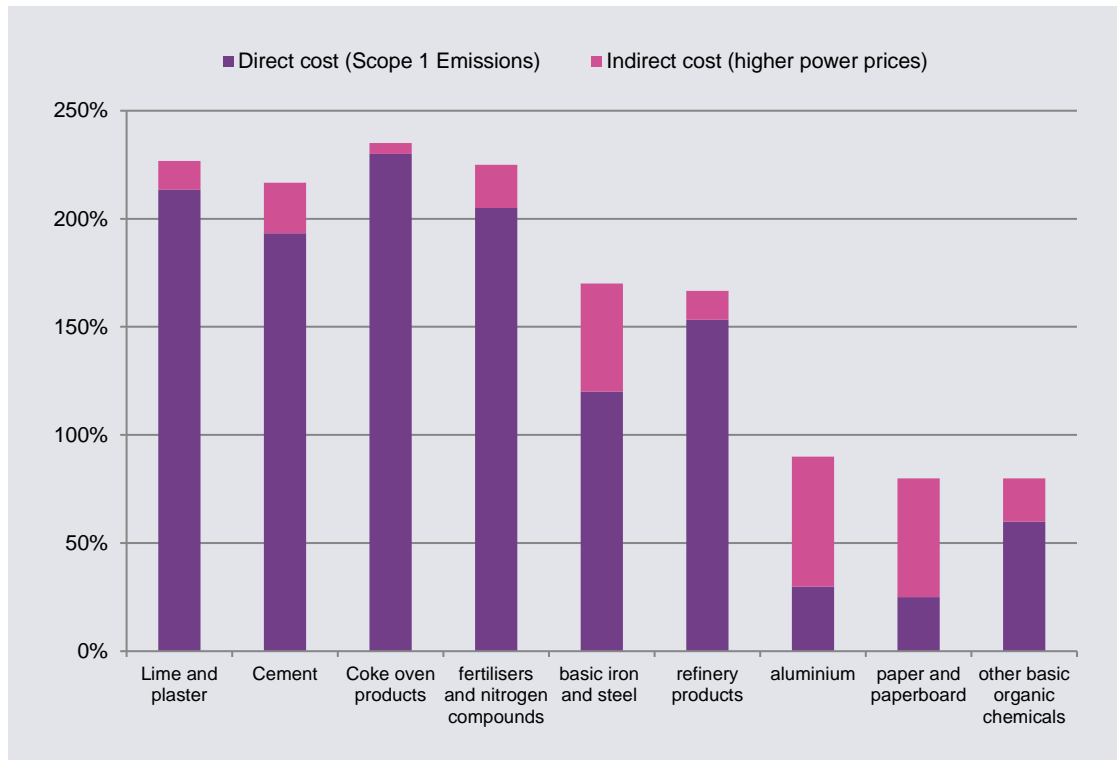


Sources: Agora Energiewende

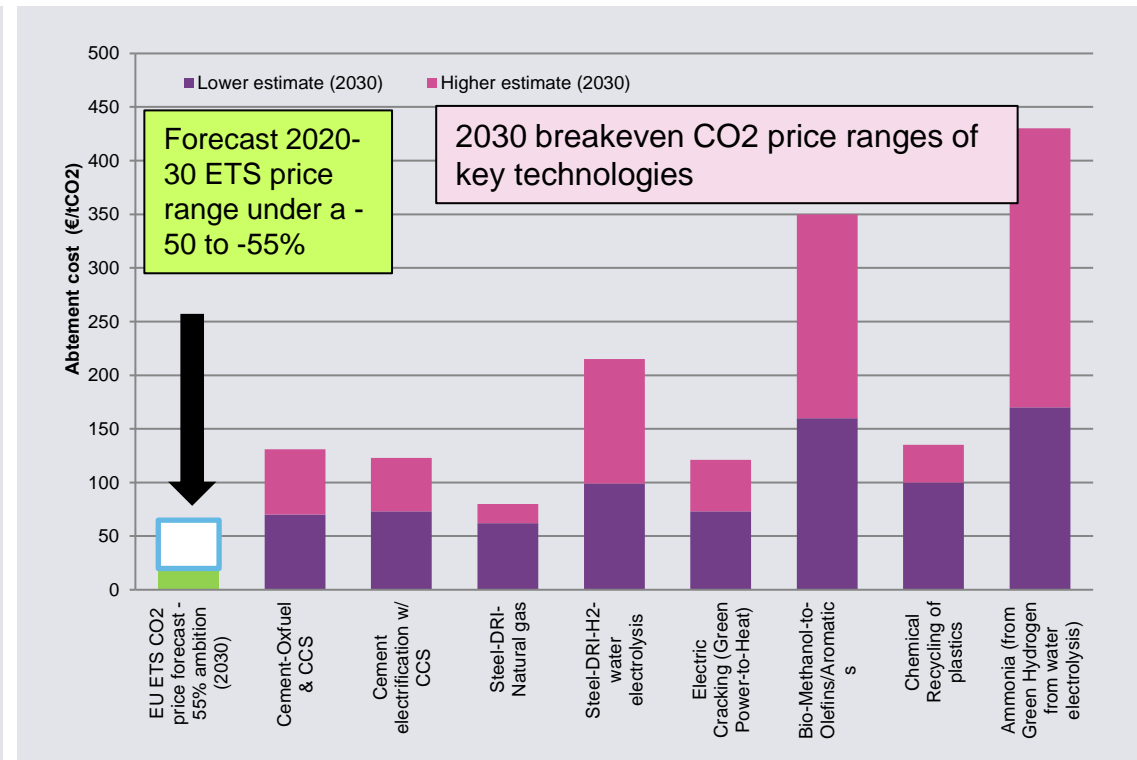
- A -55% ambition target for the EU in 2030 would lead to **significant increases in carbon prices** in the EU ETS.
- Carbon leakage risk is increased *unless* adequate carbon leakage protection is provided.

# Carbon leakage protection is not just about protecting incumbents, it is also about creating a viable business case for green production in the future...

Carbon costs as a % of gross operating margins at 50€/tCO<sub>2</sub>



Additional cost of low carbon technologies (in €/tCO<sub>2</sub>)



## The current anti-carbon leakage system which is in place consists of two elements: free allocation & state aid

### Pillar 1. Free allocation under the EU ETS

- Installations in sectors considered at risk of carbon leakage receive free allocation of ETS allowances
- Free allocation based on historical production x best performance benchmarks (BMs = average of best 10% in EU market)
- Given « *ex ante* » (i.e. at beginning of year: not adjusted for true production except in case of large changes)
- Adjusted downwards for all installations over time to reflect declining EU ETS cap (« cross sectoral correction factor »)

### Pillar 2. State aid for electro-intensive industries

- For traded electro-intensive industries (e.g. non-ferrous metals, certain chemicals),
- Higher CO<sub>2</sub> prices increase their power costs.
- EU State Aid Guidelines allow for Member States to offer maximum 75% compensation of assumed CO<sub>2</sub> price pass-through in power prices
- Guidelines currently being revised.

## Unfortunately, the existing system is not sustainable - increased climate ambition hastens the need for reform...

Free allocation and the EU ETS emissions cap with an EU-wide -55% in 2030 and climate neutrality in 2050 target...

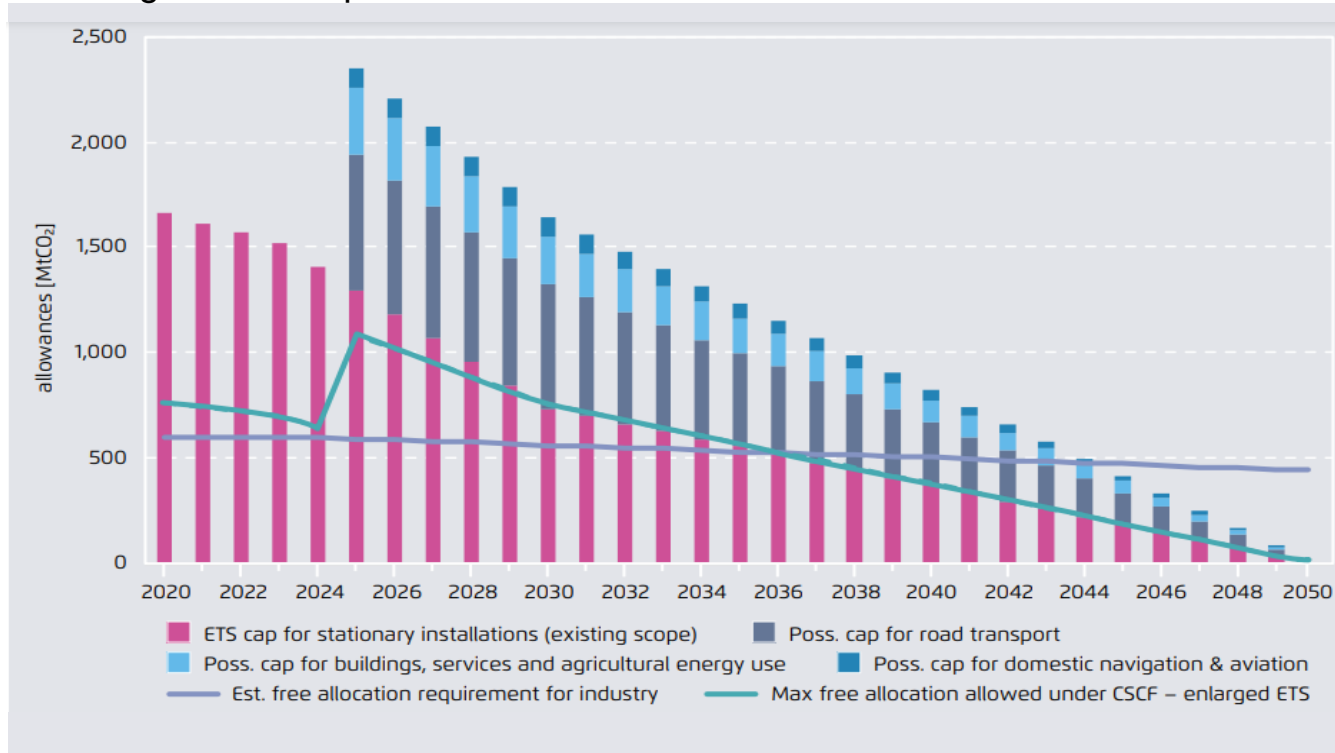


Source: Agora Energiewende

- **Problem 1.** At constant ETS scope, faster decline in total number of allowances means Cross Sectoral Correction Factor kicks in well before 2030
- **Problem 2.** At high CO2 prices, ex-ante free allocation does not avoid « operational leakage » (i.e importing products and selling excess allowances at profit)
- **Problem 3.** At higher CO2 prices, incomplete state aid protection for electro-intensives is more problematic (max of 75% of benchmark)

## Even if the ETS is enlarged to include other sectors, thus increasing the pool of free allowances, three kinds of reforms would be needed...

Free allocation and the EU ETS emissions cap assuming ETS extension to buildings and transport



Agora Energiewende, 2020. Own estimates based on data from EEA, European commission

In short run,

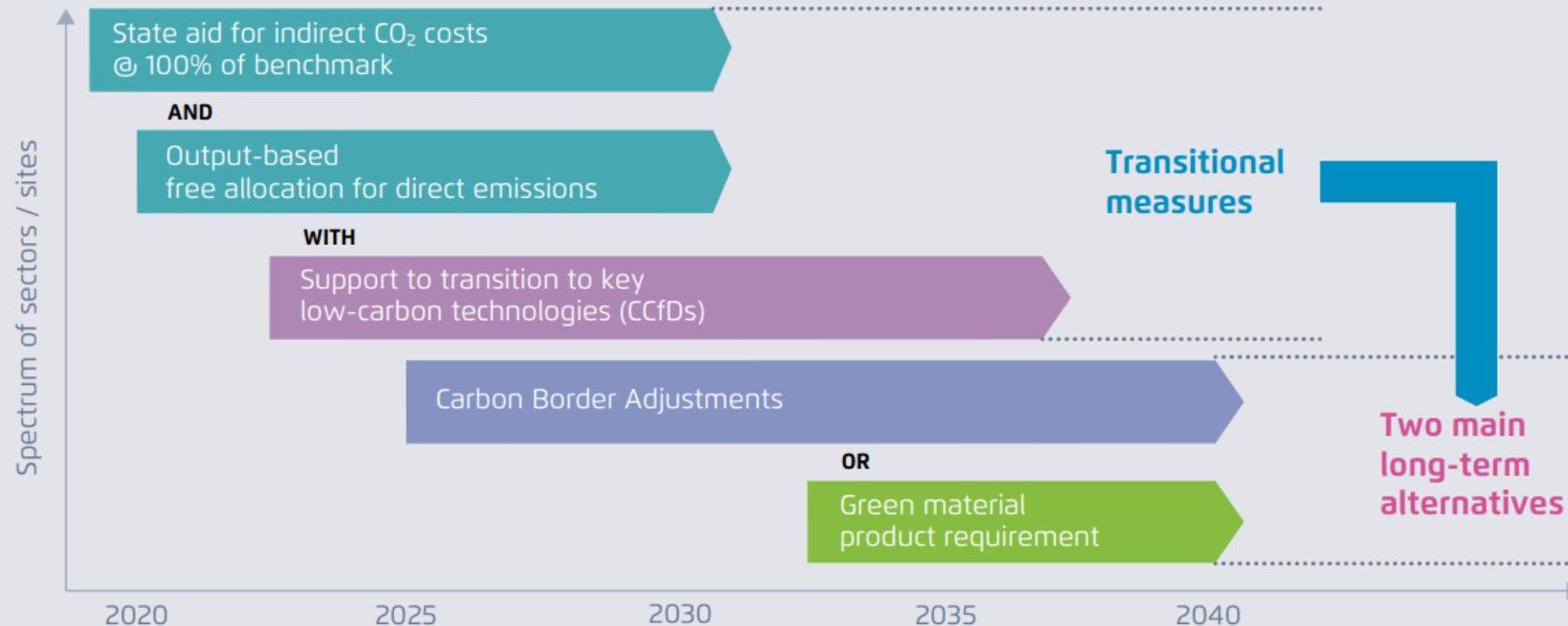
- Free allocation should be given to energy-intensives based on **ex-post verified production levels**, to avoid « operational leakage ».
- State aid to electro-intensives should be given at 100% of the BAT benchmark, when CO<sub>2</sub> prices are > 30€/tCO<sub>2</sub> not max. 75%

In medium term,

- A transition to a robust long-term alternative to free allocation needs to be made, to secure the investment framework for clean industry assets.

# A package of transitional and protective anti-carbon leakage solutions

Short, medium and long-term policy tools for carbon leakage protection



Source: Agora Energiewende (2020)

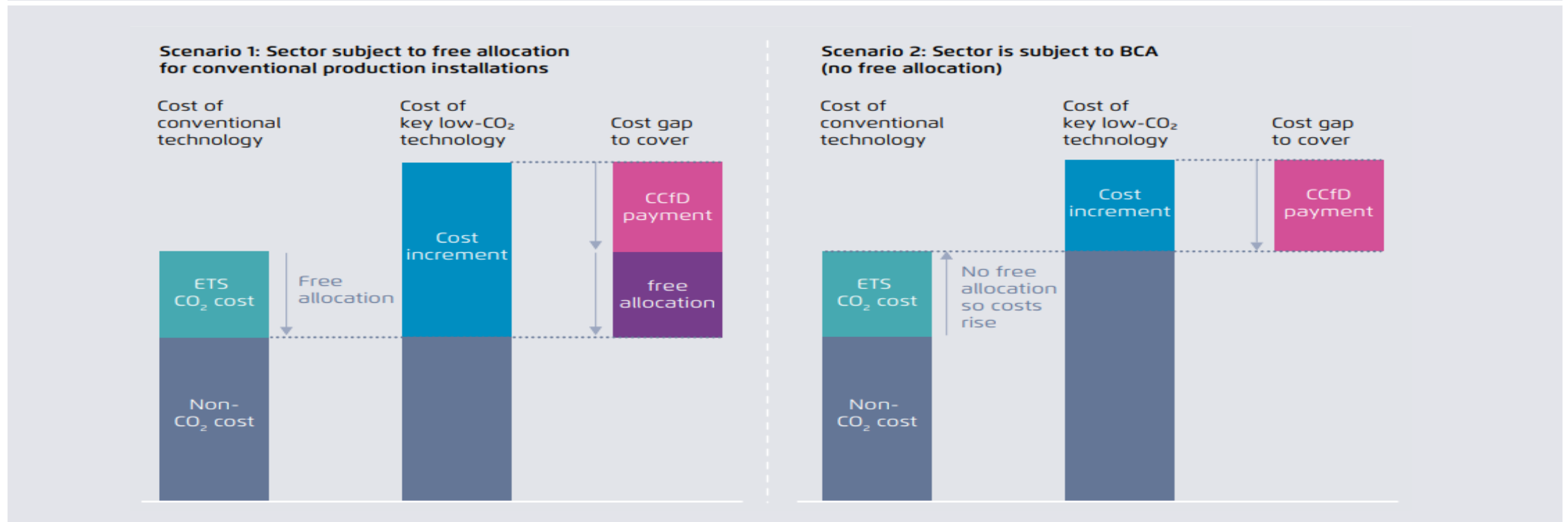


## 4. Annex II on CCfDs



# Carbon Contracts-for-Difference to support commercial deployment of key-low carbon technologies

The CCfD mechanism with two anti-leakage policies (free allocation vs BCAs)



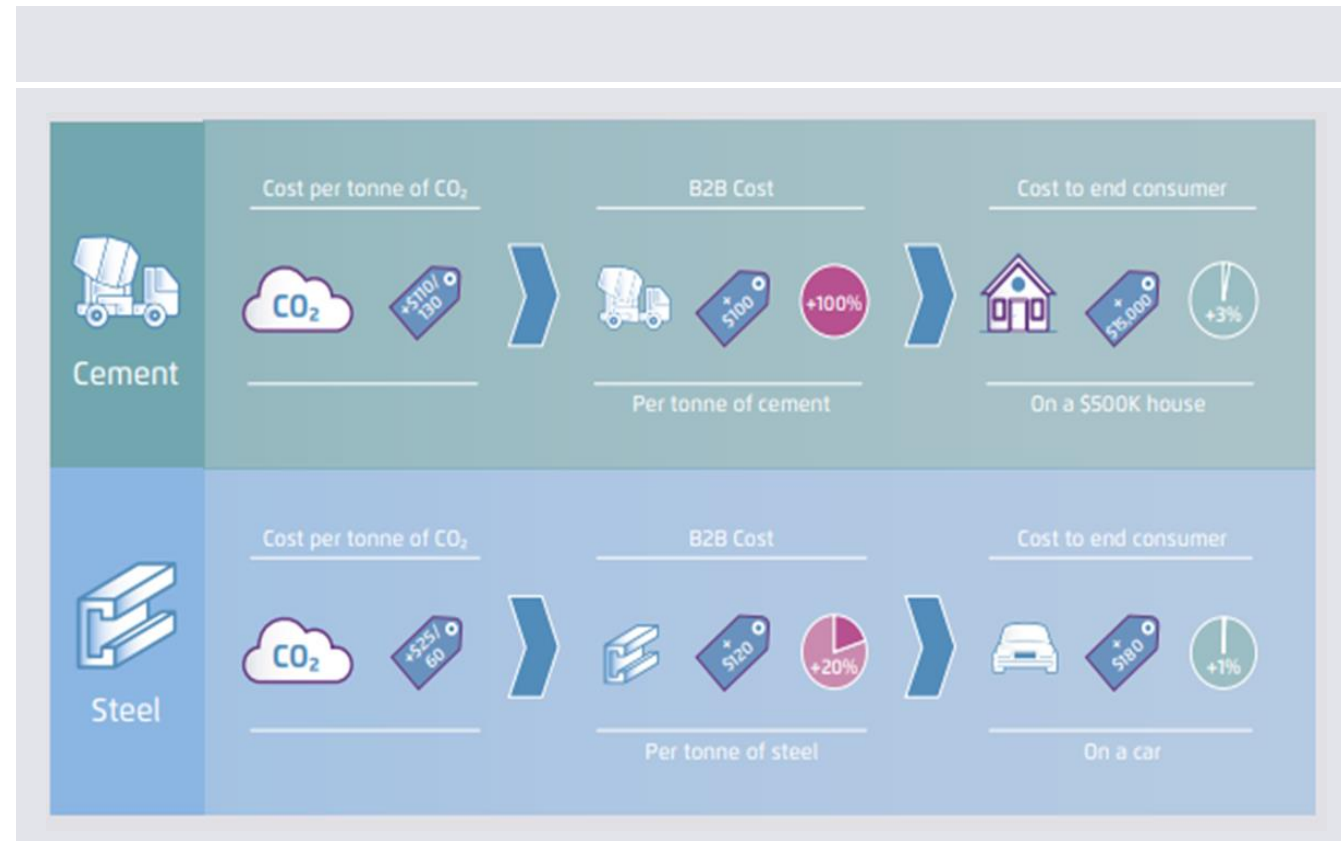
Agora Energiewende, 2020

# Cost of CCfDs would be manageable even for large member states, especially if combined with ETS reform to raise CO2 prices

Cost estimate for financing CCfDs of a hypothetical member state representing ~10% of the EU's primary steel or cement production

Breakthrough Technology	Breakeven CO <sub>2</sub> price range & central estimate for 2030*	CCfD payment per tCO <sub>2</sub> avoided @ETS= 45€/tCO <sub>2</sub>	Support per tonne primary steel/cement	10% of EU27 primary production	Annual Costs for CCfD (for greening 10% of EU market)
STEEL DRI (NatGas) (-66% t CO <sub>2</sub> /t steel)	71 } 49 } 60€/tCO <sub>2</sub>	15€/t CO <sub>2</sub>	17€/t CO <sub>2</sub>	x 10Mt/yr	= 0.17 bn €/yr
STEEL DRI (Green H <sub>2</sub> ) (-89% t CO <sub>2</sub> /t steel)	165 } 99 } 132€/tCO <sub>2</sub>	87€/t CO <sub>2</sub>	132€/t CO <sub>2</sub>	x 10Mt/yr	= 1.32 bn €/yr
CEMENT Oxyfuel-CCS (-90% CO <sub>2</sub> /t cement)	131 } 70 } 101€/tCO <sub>2</sub>	56€/t CO <sub>2</sub>	31€/t CO <sub>2</sub>	x 16Mt/yr	= 0.50 bn €/yr
CO <sub>2</sub> reductions refer to conventional process (steelmaking; cement)	Green Power price = 60€/MWh – 70€/MWh	Assumes 45€/t CO <sub>2</sub> average price in EU ETS		2017 EU primary steel (cement) production = 95 Mt (159 Mt)	Number will vary for bigger or smaller Member states & depending on capacity supported

## How might CCfDs be funded?



1. Re-direction of certain innovation funds
2. Use of new ETS auction revenues (from either ETS expansion / BCA)
3. Climate surcharges on final products with high levels of energy-intensive basic materials, e.g. buildings, vehicles, packaging...

## CCfDs are best suited to de-risk and support opex costs of breakthrough tech, while other « market creation » policies have different strengths

	De-risk & pay opex of breakthrough technologies	Time to implement at scale	Creates scalable markets ?	Leverages broad portfolio of decarbonisation solutions	Incidence of cost burden	Speeds up phase out of residual “high carbon” products/practices?
<b>Carbon contracts for Difference</b>	+++	Fast	++	+	Depends on revenue source	+
<b>Climate-neutral material labels/requirements</b>	+	Slow	+++	+	Final consumers	+++
<b>Embedded carbon requirements</b>	-	Medium/Slow	++	+++	Final consumers	+++
<b>Green Public Procurement</b>	-	Slow	++	+++	Public funds	+++