Welcome to the Workshop!

Join at
slido.com
#2937 739

In order to ensure a smooth meeting we would kindly ask you to respect the following "house-keeping" rules:

1. In WebEX please **indicate your name followed by Member State / organisation** that you represent. For example:

   John Doe MEMBER_STATE
   John Doe NAME_OF_THE_ORGANISATION

2. Please **mute your microphone** when you are not speaking.

3. Indicate that you would like to take the floor or ask your questions directly in the **chat box.**

4. For each session, we will poll two short questions via slido. Please open the slido details in the corner.

The meeting will start at 9:30.

European Commission

Roadmap for the day

Join at
slido.com
#2937 739

What is the **Context** for this workshop?

- The EU Commission is designing auctions for CfDs and CCfDs under the Innovation Fund.

What are our **Objectives** today?

- Have a good and open debate “before politics” on auction design and experience with auctions.

How will we go about this, what’s the **Map**?

- Four topic-sessions with short and crisp input presentation, followed by open debate.

What are the **Benefits** of this of spending half a day with this?

- Mutual learning and sharing of experience. Polling an “expert audience” on questions we are all answering in some way. Network building on CfDs and CCfDs.

TECH FOR NET ZERO ALLIANZ

Scaling up climate tech solutions

CARBON / CONTRACTS FOR DIFFERNCE

dena 1.5° VENTURES Climate Tech Venture Builder

Supported by Breakthrough Energy

Carbon Contracts for Difference can accelerate the industrial transformation towards net-zero.

Why do we need Carbon Contracts for Difference (CCfD)?

- Many **high-emissions industries** are keen to start the industrial transformation to achieve carbon neutrality, while new climate tech solutions are commercially available.
- Sectors such as **cement, steel or basic chemistry** are able to significantly advance the EU's climate objectives, as CO2 emissions are concentrated in a limited number of installations. Steel alone covers about 25% of EU industrial and almost 6% of EU total CO2 emissions.
- Decarbonizing these industries has only one major **prerequisites**: the new low-carbon products need to find their way into the market at a price that covers all cost. That requires **buyers who are willing to pay a green premium** on fossil alternatives.
- However, until now, companies cannot invest in low-carbon technologies that will entail higher production costs as there is **no market which would pay a green premium** accounting for the additional cost of a low-carbon product vis-à-vis conventional fossil products with similar properties.
- **Project-specific long-term Carbon Contracts for Difference (CCfD)** can be an important tool to enable large scale, investments that will reduce emissions in industrial sectors, such as cement, steel or basic chemistry.

TECH FOR NET ZERO ALLIANZ

CCfD can help to mobilize private investment for innovative climate technologies.

- The CCfD mechanism can help **accelerate the decarbonization of industries** with high GHG emissions.
- **Industries** where CCfDs can enable the diffusion of climate technologies and thus the achievement of climate targets include

  (i) steel production and processing,

  (ii) cement production, and

  (iii) basic chemicals, i.e. green ammonia and green methanol.

- The **original concept for a 'Carbon Contract for Difference'** is to compensate for the difference between the 'strike' price (i.e. the agreed price in the contract) and the yearly average price of emissions allowances (EUAs). However, this design would not contribute to a viable business case.
- An **effective CCfDs** should rather be seen as instrument that aims to reduce carbon, and effectively contributes to de-risking. All costs and benefits should be taken into account in the contract in order to address risks of under/over- compensation.

TECH FOR NET ZERO ALLIANZ

An effective CCfD instrument requires decisions on several key features

1.Tenders: CCfDs need to be tendered on a sector-specific basis to promote technology competition within specific industries and the resulting continuous innovation.

> **Why?** Since different climate technologies with different cost structures are needed to decarbonize the cement, steel, and chemical industries, etc., CCfDs can develop the strongest effect when tailored to each sector.

2. Two-sides contracts: CCfDs with a two-sided contract guarantees a minimum revenue, while allowing excess revenues to flow back to the CCfD fund.

> **Why?** Capital returns can be used to finance additional CCfD tenders, extending the runway and impact of the instrument, while maximizing fiscal efficiency.Two-sides CCfDs are aligned with existing asset classes (low-risk-low-return), and allow leveraging conservative investors (e.g. pension funds, reinsurance funds, etc.)

3. Duration: CCfD terms should span 10-15 years to unlock private investment for climate technologies.

> **Why?** CCfD contracts need to be aligned to the investment duration of the private investors to align risks and returns for the entire investment period. If CCfD contracts are too short, private investments are prevented due to the higher exposure to risks.

TECH FOR NET ZERO ALLIANZ

Setting the strike price as a market mechanism is key to the effectiveness of a CCfD

In any market, the price serves as ultimate mechanism for clearing demand and supply. When the price mechanism fails, the market collapses. **Carbon Contracts for Difference** need to cover the full abatement costs of the new low-carbon processes, as this is the only way to create a concrete business case

- **Green Premium:** The CCfD affects the price mechanism by bridging the gap between the clearing price and the effective production price. The CCFD is based on a strike price, that is in essence set to bridge the green premium.
- **Technological Openness:** CCfDs should be technology-agnostic within each sector to avoid choking the competition between nascent and fragile climate tech solutions.
- **De-risking:** Instead, CCfD tenders should account for key contract variables (e.g. ore, coke, coal, scrap, electricity and hydrogen) to ensure a level playing field among bidders.
- **Input prices**: The strike price of a CCfD should cover the full cost-difference of the transformation, including operational costs and the additional investment costs. Prices for key variables should be automatically adjusted once they leave a certain range. To minimize the administrative burden, the central parameter prices could be indexed.

➢ **CCfDs can be a game-changer**, kickstarting the green industrial transformation. If well designed, CCfDs can help mobilize substantial financial resources and underpin viable business models that scale-up climate technologies at a commercial scale in Europe.

TECH FOR NET ZERO ALLIANZ

CCfDs should allow other existing financial instruments

A CCfD that compensates only for the difference with the EU ETS price would fail to provide sufficient incentives in high-risk investment in low-carbon technologies since they would remain exposed to international competition not subject to any carbon constraints.

- **EU ETS & CBAM:** In the medium term, reform of the EU ETS and the introduction of climate levies on products manufactured outside Europe (CBAM) and the subsequent abolition of free allocation of emission allowances can reduce the financial needs of CCfD and promote the market penetration of climate technologies.

- **Free ETS allocation**, only allowances that are actually granted to the installation after the implementation of the project (i.e. taking into account the possible cross sectoral reduction factor and any other possible reduction) and available to be sold on the market should be accounted for and deducted in the calculation.

- **Other instruments**: CCfDs can be most effective for scaling up climate technologies when thought of in combination with other climate policy instruments. They pave the way towards a market for climate-neutral industrial products that is driven by price signals (EU-ETS) and demand stimuli (e.g., through application quotas or appropriate public procurement).

- **EU State Aid:** Legal analyses show that CCfD are perfectly compatible with the EU State Aid Guidelines. This is especially true if they are awarded through public tenders.

- **EU:** To further promote climate technologies through competition, CCfDs should be harmonized at EU level.

TECH FOR NET ZERO ALLIANZ

More details on the design of CCfDs is available in our report

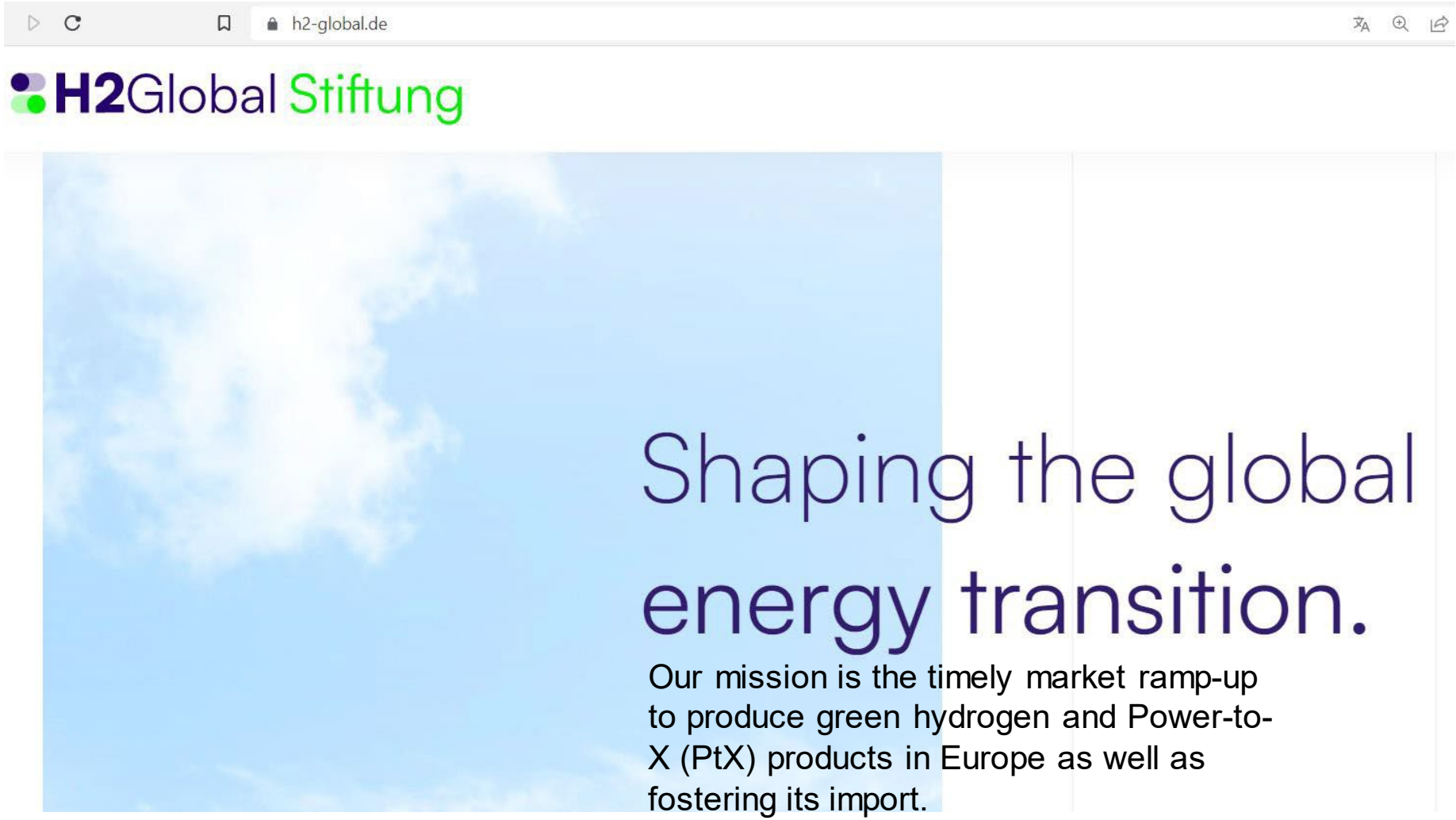
Position Paper on CCfDs for policy makers available

- Although various innovative technologies are ready to decarbonize production processes, the current market environment hardly allows investments in these technologies.
- At the same time, due to **long investment cycles** and path dependencies, these investments have to be made today in order to achieve the sectoral climate targets.

TECH FOR NET ZERO ALLIANZ

2. Contracts for Difference (CfD) & the EU hydrogen bank

H2Global Foundation



TECH FOR NET ZERO ALLIANZ


TECH FOR
NET ZERO
ALLIANZ
Thank you
tobias.lechtenfeld@techfornetzero.org
dena
Deutsche Energie-Agentur
Breakthrough Energy
1.5° VENTURES
Climate Tech Venture Builder

Agora Industry

(Carbon) Contracts for Difference: a hedging instrument for transforming basic materials industry

DG Clima Workshop on Competitive Bidding Mechanisms

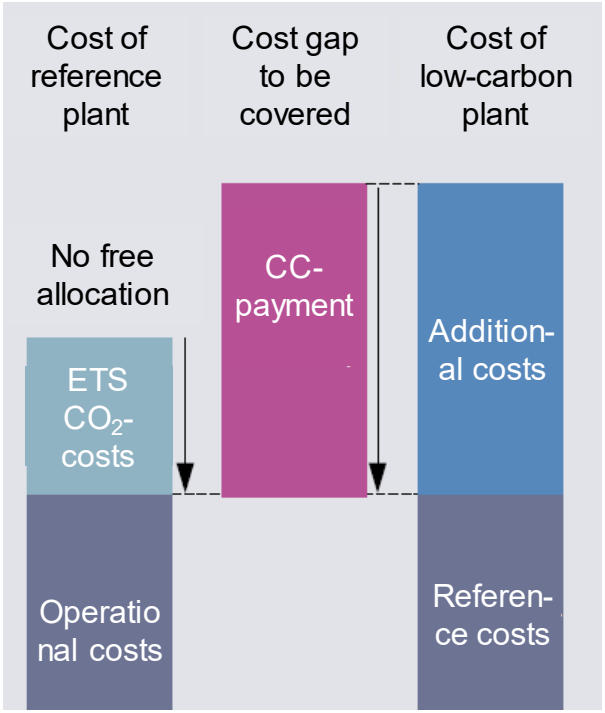
Oliver Sartor & Helen Burmeister

Agora Energiewende

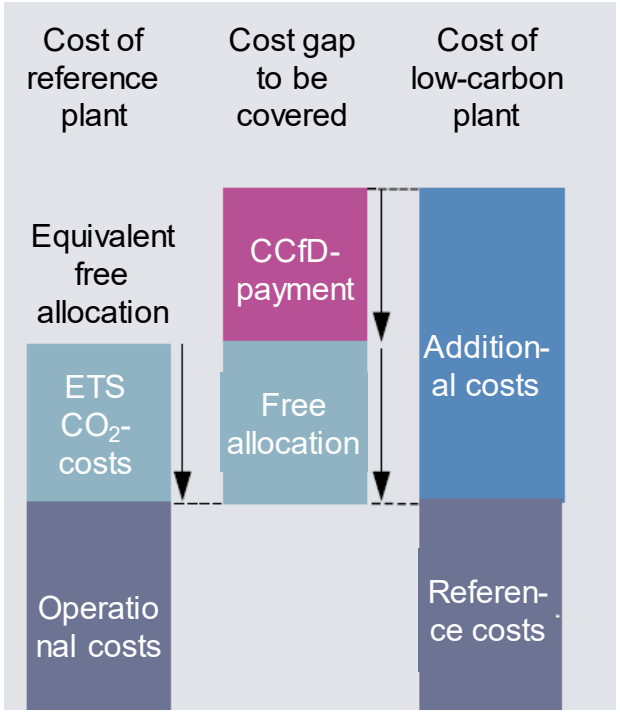
28.10.2022

The original motivation for CCfDs was to help commercially-relevant-scale deployment for near zero emissions *basic materials* production technologies

1) Technology-specific free allocation



2) Product-specific free allocation



→ Combination of

- Significant incremental OPEX cost +
- Significant CAPEX (risk) +

→ …but market CO2 price too low and/or too risky

→ Also missing free allocation to new processes under ETS BM Regulation

CCfDs can play a crucial, multifaceted role in kick-starting transformation of industry..

Key insights from our research on carbon contracts for the industrial transformation

Unlock chicken or egg dilemma of missing supply => missing demand => missing supply. Thereby, they **kick-start industry transformation allowing markets and regulation to emerge.**

Business case for clean materials production provides **anchor** for strategically important **infrastructure for hydrogen, CCS, biochemicals, starting with no-regrets usages**.

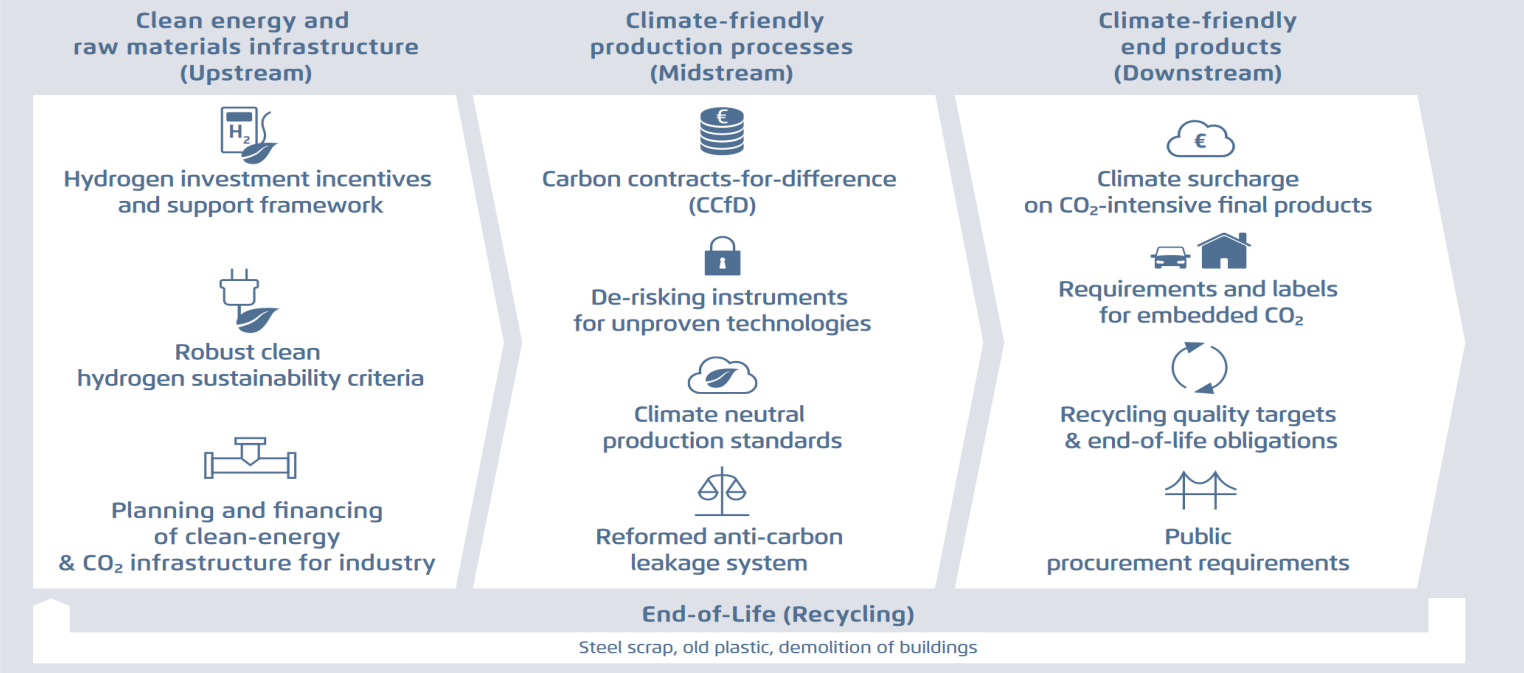
Accelerate industry transformation and **allow for substantial emission reductions before 2030,** using reinvestment cycles.

Combined with other policy + financing instruments (e.g. product CO2 labelling standards, embodied carbon regulation, investment / de-risking of critical infrastructure) to secure the transition to a market-based system.

Agora Industry (2022)

CCfDs must sit inside a broader policy package that enable and provide clean energy supply at reasonable costs (upstream) and create scalable markets (downstream)

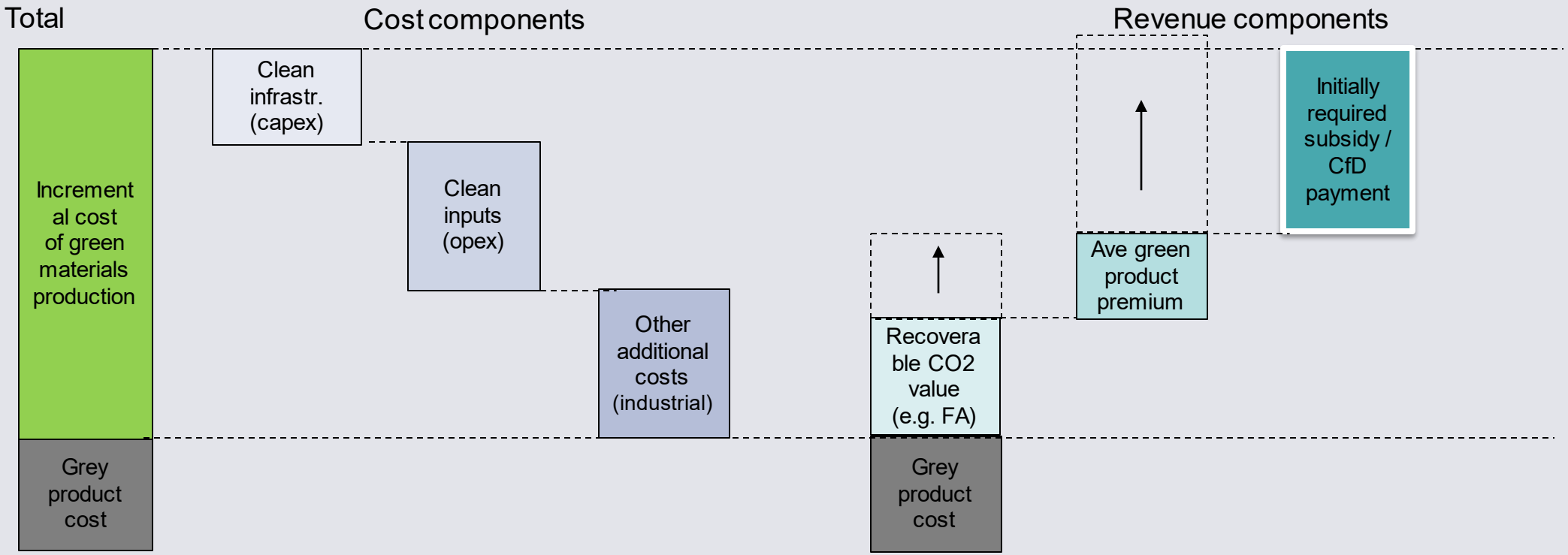
A Clean Industry Package along the industrial value chain



Agora Energiewende (2020)

Additional costs of green production could be paid for in various ways. But CCfD is the backstop.

A Clean Industry Package along the industrial value chain



Agora Energiewende (2020)

Upstream	Midstream	Downstream

CCfDs as *project-specific* funding to compensate for the additional but unrecovered costs of building and operating low-carbon industrial plant and upstream infrastructure

Tender and selection process

	1	2	3
	Consortia submits project outline with operating concept and estimate of incremental costs	**Consortia** submits formal project-specific application	**Consortia** commits to implement the project under the conditions of CCfD
	Commission makes **pre-selection** on the basis of **competitive criteria and process**	Public authority undertakes **business audit** and **competitive dialogue** as a basis for defining the contract strike price and other parameters	Public authorities deposit the CCfD with a commitment authorization Share of funds set aside based on **maximum allowable aid per project** (incentivise some private hedging)

Designing CCfDs with the goal of supporting the development of the upstream supply chain (Building H2, CCUS, and supply of biogenic waste and fuels infrastructure).

Settlement of a grant by CCfD

(contract period: 10 years)

Dynamic funding based on the agreed contract price

Regular advance payment of the CCfD payment on the basis of the agreed expected values

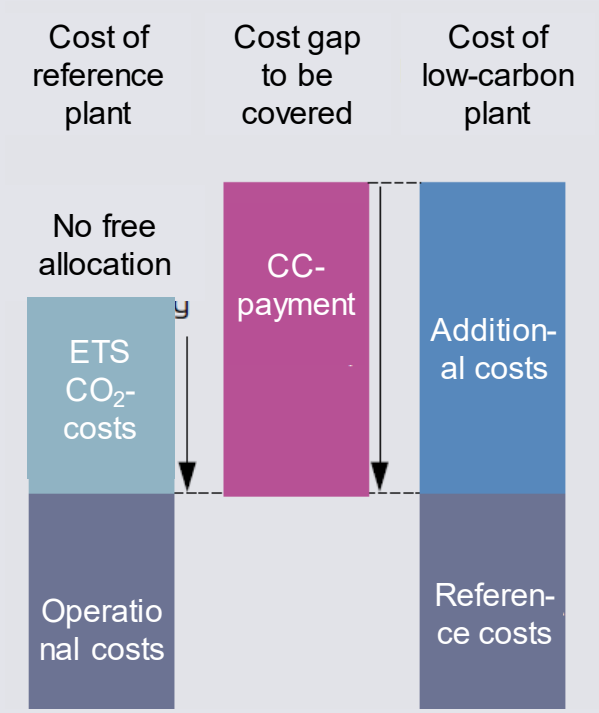
Dynamic ex-post settlement of the effective premium at the end of the agreed settlement periods

Question of articulation with upfront lump sum to aid financing of initial investment?

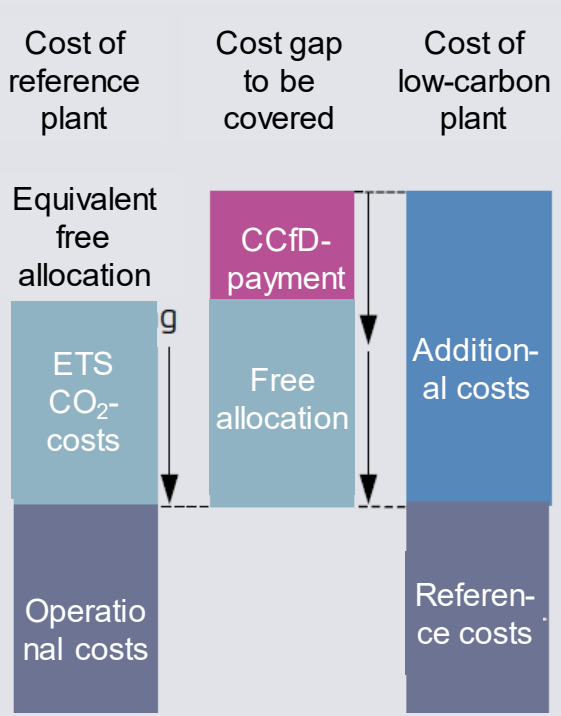
Green lead markets establishment via stimulation of demand and willingness to pay through supply of climate-friendly basic materials created via CCfD. Monitoring & crediting of products sold as climate-friendly in the definition of the premium.

CCfDs must work under the given regulatory framework and support the evolution of Europe's ETS & carbon leakage policies.

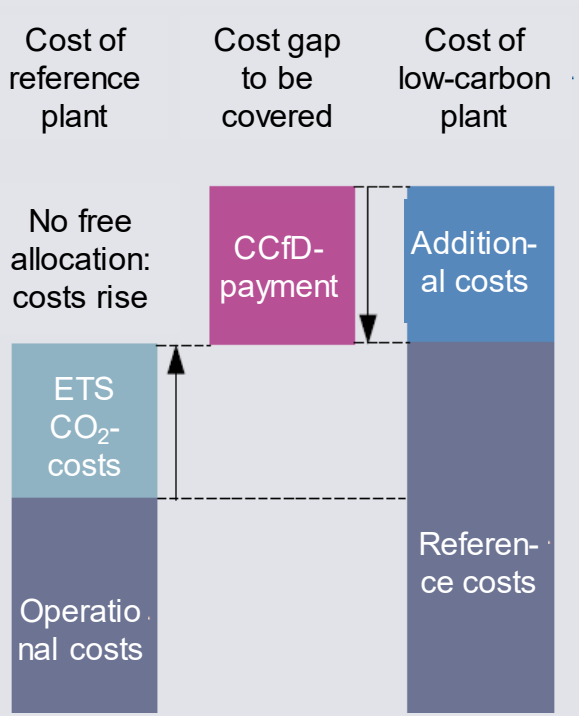
1) Technology-specific free allocation



2) Product-specific free allocation



3) No free allocation



Agora Energiewende, FutureCamp, Wuppertal Institut und Ecologic Institut (2021)

Who should receive (C)CfDs?

→ Focus on energy intensive industries first.

- Esp. CBAM sectors : steel, ammonia, cement, aluminium:
- Projects here meet the conditions of high capex + a “who pays the a green premium” problem
- Have urgent need to decarbonize to remain competitive as CBAM comes in/FA declines
- These sectors also can be anchors + priority usages for initial H2, PtX + CCS investments

→ Other innovative technologies also need to be considered better in funding arrangements (FiP schemes are quite dumb)

- but their barriers, expose to CO2 price risk and cost structures may imply different kinds of instruments:
- Integration into feed-in-tariffs, direct capex support for demonstration, changes to electricity levies and taxes, etc

(C)CfDs for downstream materials vs upstream inputs (H2)?

If downstream:

→ Closer conditions to normal market functioning/long run goal => easier to phase out?

→ Allows (complex) contracting and price negotiations by private sector between upstream and downstream

→ Prioritises initially scarce H2/CCS to the most desirable no regrets usages

→ Provides for coverage of any significant additional costs to be covered that go beyond just one inputs

If upstream:

→ Allows for larger systemic infrastructure for an industrial region to be promoted directly

→ Provide benefits to many end users in an industrial cluster.

→ Enhances possibility to ensure public good nature of infrastructure: open access and competitive pricing?

CCfDs or CfDs? which references prices? green premia and dynamic adjustments?

The perfect is the enemy of the good

→ For basic materials, Agora tends to prefer CCfDs over CfDs because there are not reliable published reference prices for the relevant materials being produced.

→ A CO2 price hedge would not hedge all input cost fluctuations. However, the cure may be worse than the disease.

→ Important to incentivize private or public demand increasingly pays the green premium..

- Tendering award criteria (depends on competitive process)
- Opt out provision from CCfD where share of production can be sold at premium: requires double sided CCfD => where clawback of excess revenues.
- Phase down of share of volumes coverable by CCfD over time to force direct marketing? (shorter contract)
- Complementary demand creation policies: standardized labelling definitions, public procurement, CPR/Ecodesign regulations

Agora Industry
Anna-Louisa-Karsch-Str. 2
10178 Berlin

T +49 (0)30 700 1435 - 000
F +49 (0)30 700 1435 - 129
www.agora-industry.org

Please subscribe to our newsletter via
www.agora-energiewende.de
www.twitter.com/AgoraEW

Agora Industry

Thank you for your attention!

Questions or comments? Feel free to contact me:

oliver.sartor@agora-energiewende.de

POTSDAM INSTITUTE FOR CLIMATE IMPACT RESEARCH

Rationale for (C)CfDs: How much “tough love” for decarbonizing industry?

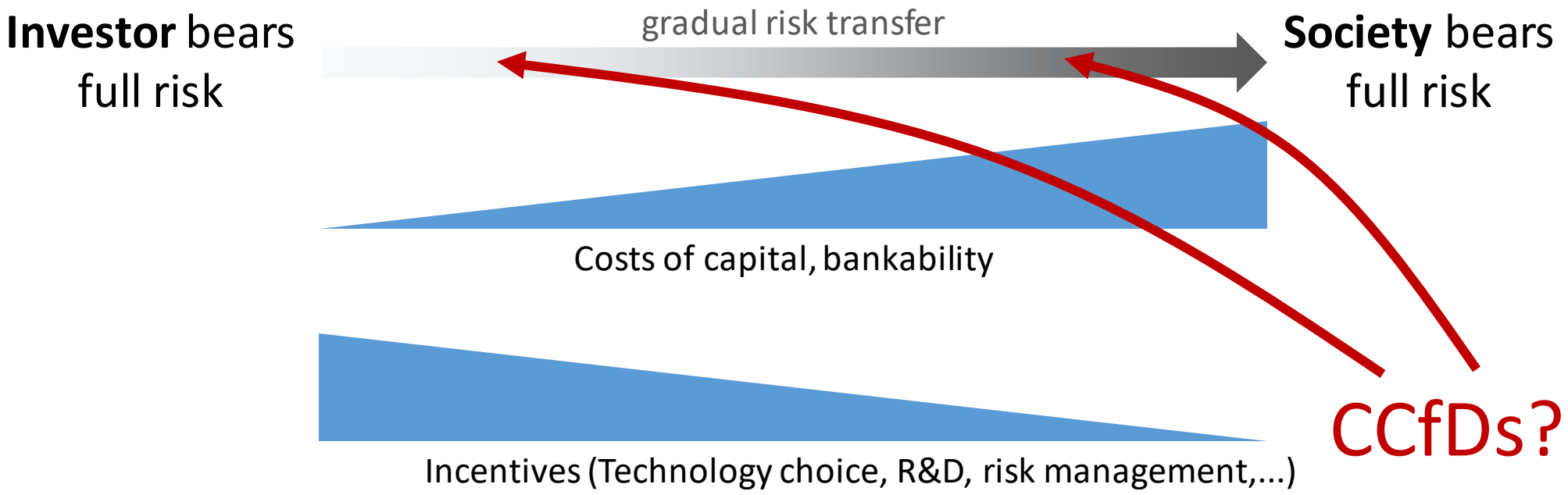
Michael Pahle & Darius Sultani

also based on discussions & joint work with O. Edenhofer (PIK), M. Jakob (Ecologic), B. Steffen (ETH)

DG CLIMA Workshop on (C)CfDs, 28 Oct 2022

CCfDs to transfer risk, but how much?

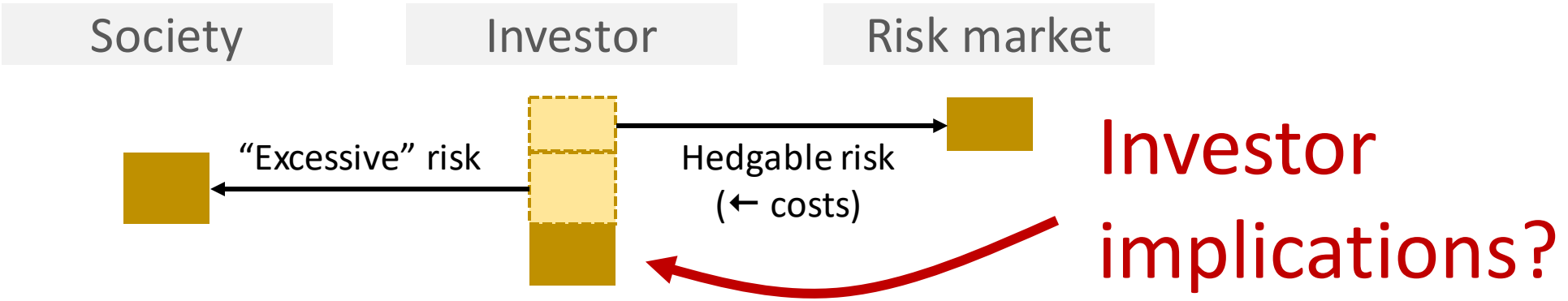
- Most proposals justify CCfDs as instrument for **risk transfer**
- But good reasons for retaining (some) risk: **“tough love”** [1]



[1]Pahle & Schweizerhof (2016)

Efficiency perspective: risk-related market & policy failures

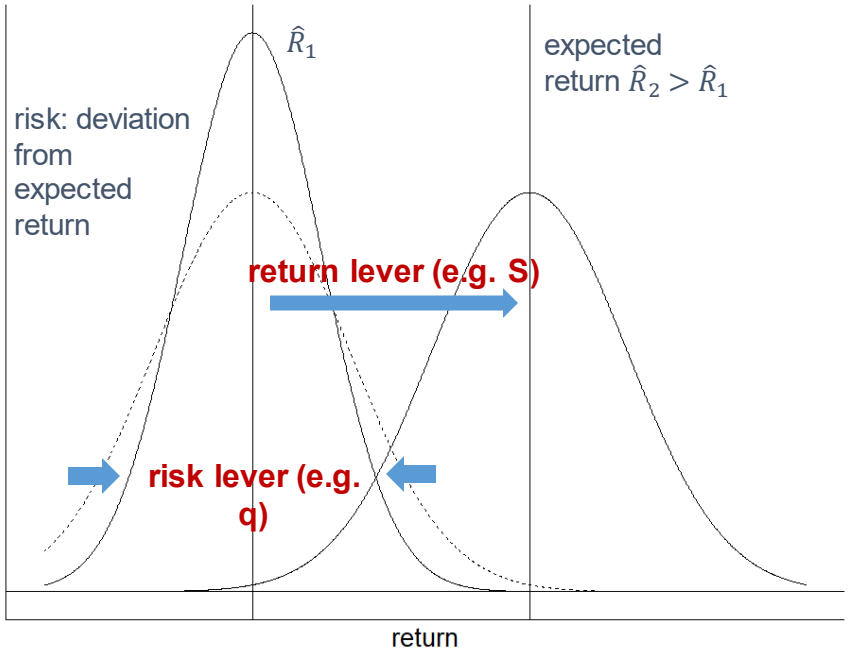
- If **risk markets were efficient & complete**, problem would "solve itself"
  → Hedging allows allocation that minimizes overall costs of risk
- But **market and policy failures** that imply **"excessive" risk**
  - EU ETS: Commitment problem[1], EUA futures market >3y illiquid (single seller)
  - Finance: Credit rationing [2] (depending on type of finance[3])
- Risk offload to society **efficient** if it comprises **this, and only this risk**



[1]Pahle et al. (2022), [2]Stiglitz & Weiss (1981), [3]Steffen (2018)

Investor perspective: risk-return profile matters

- Investments hinge on overall **risk-return profile** → CCfDs also need to consider **volume risk** (q)[1] and **CAPEX subsidies** (S)



$$NPV = -I + \boldsymbol{S} + \sum_t (1+\delta)^{-t} \times \boldsymbol{q_{out}} \times (r - c + c_{CO2})$$

① ② ③

Risk factors embedded in q (volume risk), related to…

① Revenue r: product offtake and price risk

② Cost of inputs c: procurement and price risk

③ Carbon cost/revenue c_{CO2}: level of abatement risk

- Two options to **deal with volume risk**: contract volume = output volume, contract volume fix (risk: $q_{out} - q'_{fix}$)

Which one?

[1]Kitzing et al. (2014)

Regulatory perspective: investor type risk

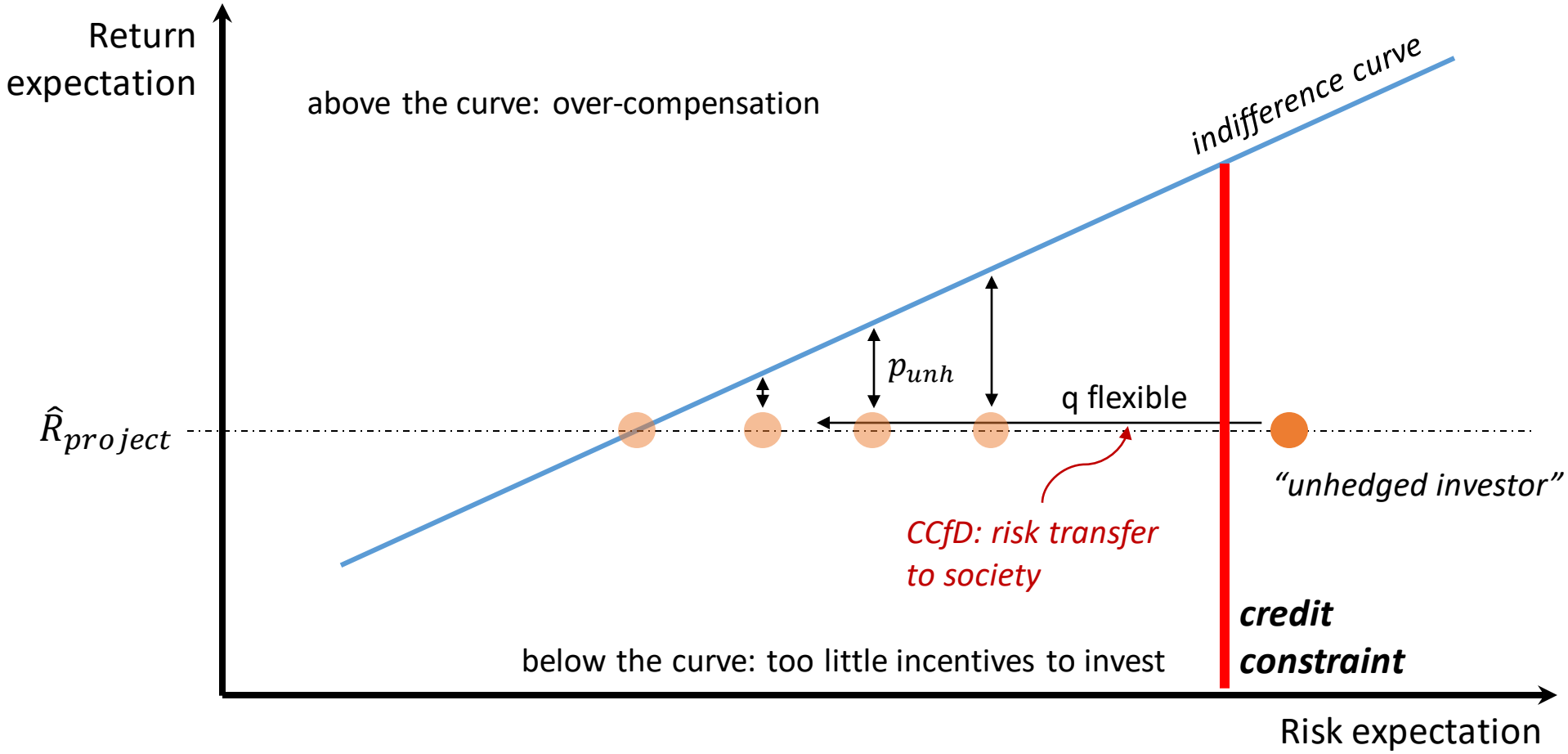
- Choice of volume clause depends on **investors' capacity & willingness to hedge**

Investor type / Volume clause	"No hedge" investor	"Full / partial hedge " investor
Volume **flexible**	**Suited**	**Unsuited**
Volume **fixed**	**Unsuited**	**Suited**

- Risk transfer efficient if different **investors bear all the risks they "can"**
- Main Challenge: **share of different types** in the market **unknown**

→ Upside and downside **risk (for regulators)** of different clauses…

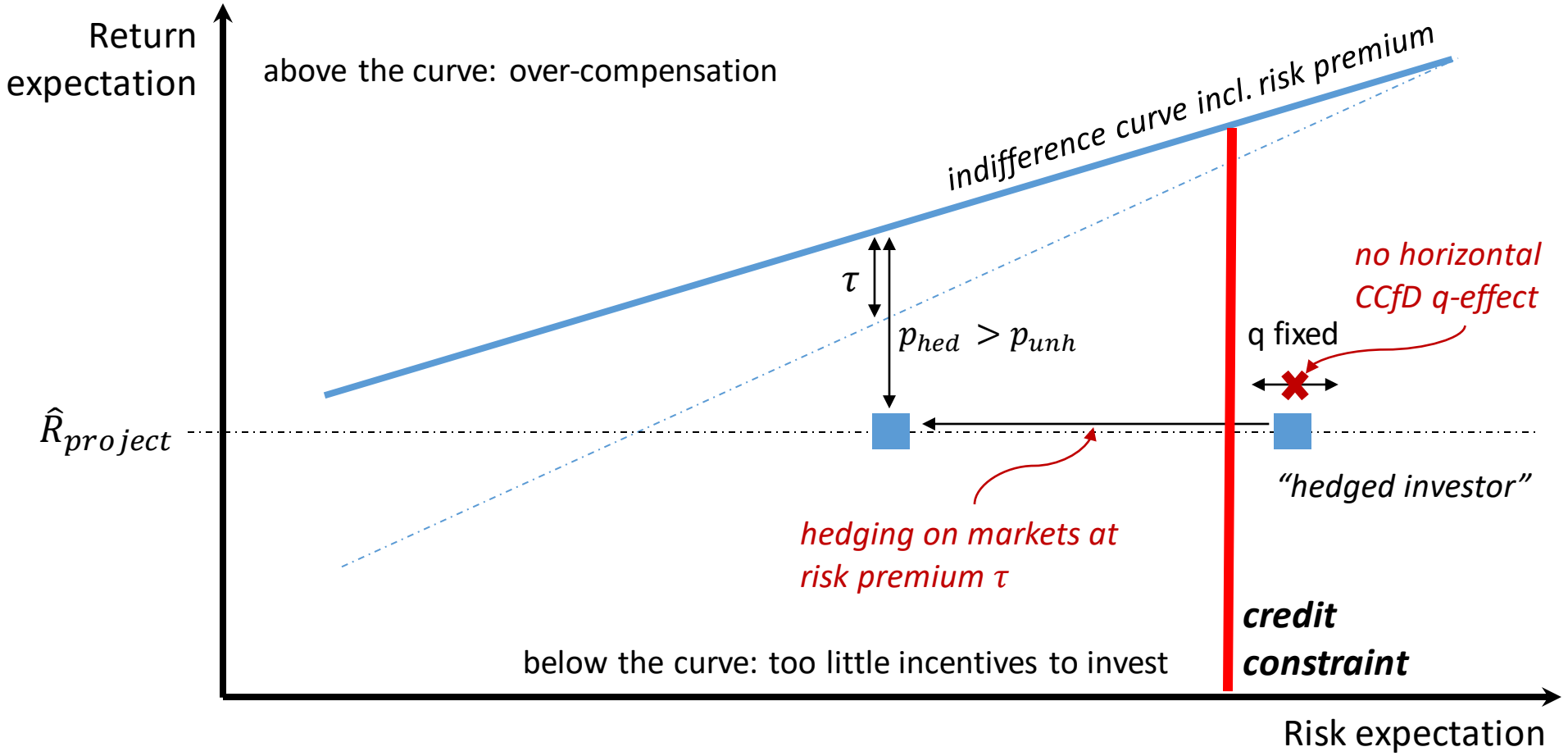
Flexible q contract: Regulatory risks



Upside:
Higher likelihood to make projects bankable
→ More bids

Downside:
Higher risk transfer to society
→ Budget risk

Fixed q contract: Regulatory risks

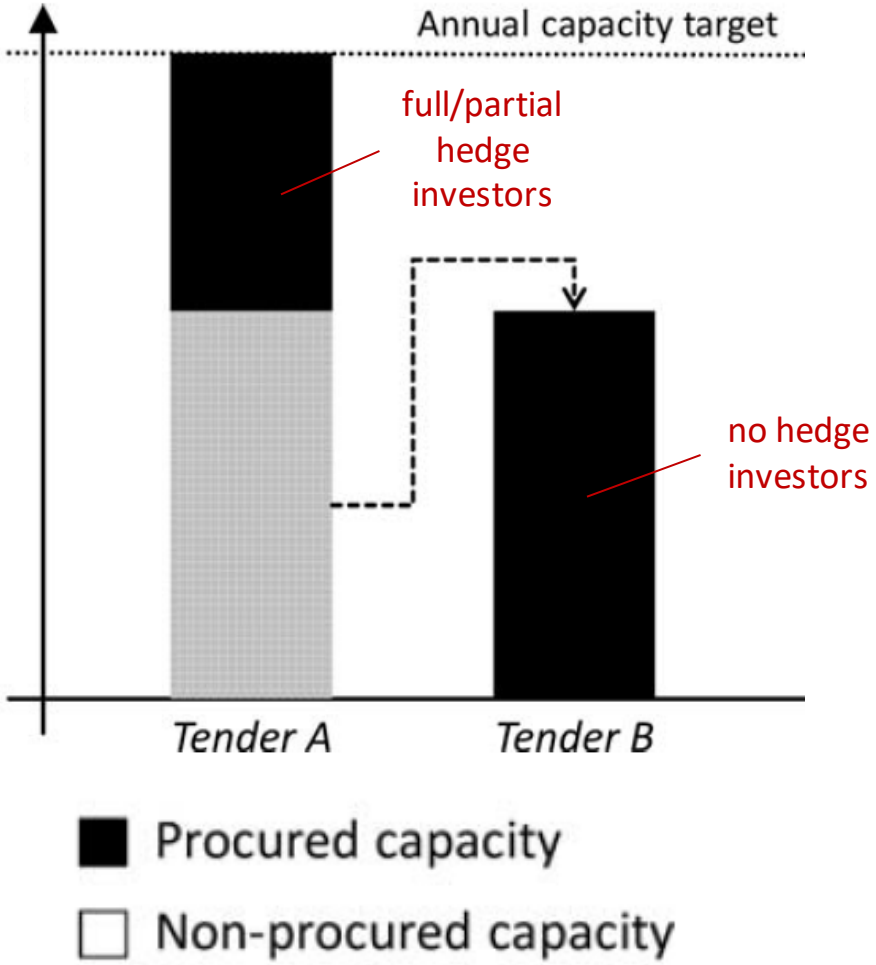


Upside:
Risk transfer to markets rather than society

Downside:
Uncertainty about investors' ability to hedge on markets
→ Bid volume risk due to credit constraint

Competitive bidding as discovery mechanism

- Role of CBM not only to **discover** lowest cost, but also **highest risk-taking capacity / willingness**
- **Cascading auction**[1] could be an option for **“tough love”**:
  - **Tender A (fixed q)**: Incentive to take on risks to get support
  - **Tender B (flexible q)**: Backstop to ensure sufficient number of bankable projects



[1]Pahle & Schweizerhof (2016)

References

- Agora Industrie, FutureCamp, Wuppertal Institut and Ecologic Institut (2021). Klimaschutzverträge für die Industrietransformation: Kurzfristige Schritte auf dem Pfad zur Klimaneutralität der deutschen Grundstoffindustrie.
- Ball, J. (2012). Tough Love for Renewable Energy. Foreign Affairs, May.
- Edenhofer, O., Kosch, M., Pahle, M., Zachmann, G. (2021). A whole-economy carbon price for Europe and how to get there. Policy Contribution 06/2021.
- Kitzing, L. et al. (2014). Risk Implications of Renewable Support Instruments: Comparative Analysis of Feed-in Tariffs and Premiums Using a Mean–Variance Approach. Energy 64 (January): 495–505.
- McWilliams, B. and G. Zachmann (2021). Commercialisation contracts: European support for low-carbon technology deployment. Policy Contribution 15/2021, Bruegel.
- Pahle, M., & Schweizerhof, H. (2016). Time for Tough Love: Towards Gradual Risk Transfer to Renewables in Germany. Economics of Energy & Environmental Policy, 5(2).
- Pahle, M., Tietjen, O., Osorio, S., Egli, F., Steffen, B., Schmidt, T. S., & Edenhofer, O. (2022). Safeguarding the energy transition against political backlash to carbon markets. Nature Energy, 7(3), 290–296.
- Richstein, J.C., and Neuhoff, K. (2022). Carbon contracts-for-difference: How to de-risk innovative investments for a low-carbon industry? iScience 25, 104700.
- Sartor, O., and Bataille, C. (2019). Decarbonising basic materials in Europe: How Carbon Contracts-for-Difference could help bring breakthrough technologies to market. IDDRI Study No. 6/2019.
- Steffen, B. (2018). The importance of project finance for renewable energy projects. Energy Economics, 69, 280–294.
- Stiglitz, J E, and A Weiss (1981). Credit Rationing in Markets with Imperfect Information. American Economic Review 71 (3): 393–410.

Cleantech for Europe

Cleantech Group

Technology Baskets for CCfDs

Why the EU needs to be strategic about technology choices

DG Clima Workshop – October 2022

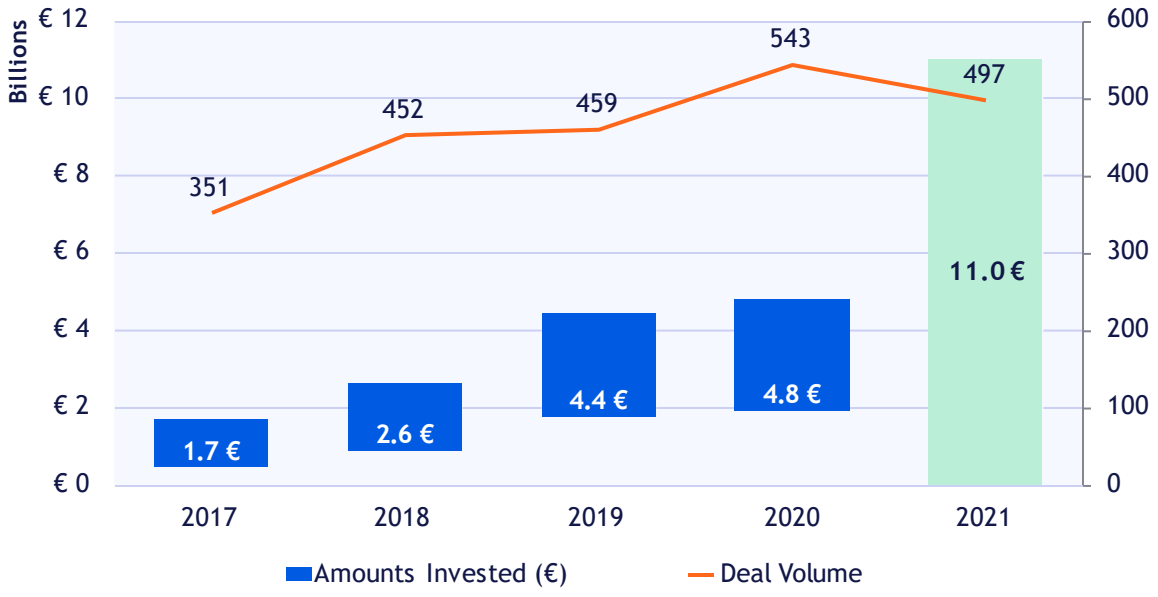
With the support of Breakthrough Energy

Cleantech investment is growing fast. But the real challenge is ahead of us.

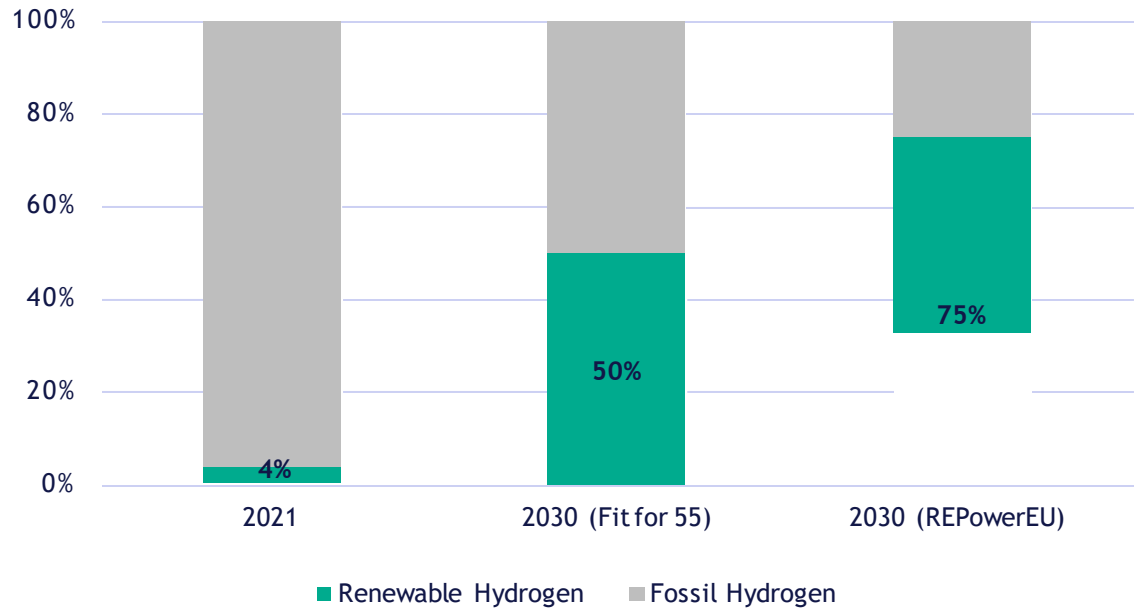
- VC funding for EU cleantech more than doubled in a year, on the back of:
  - Increased maturity of cleantech solutions
  - Increased commitments from corporate off-takers
  - Abundant liquidity in financial markets
- A portfolio of European technology is ready to be scaled, to take us to net zero, energy security and industrial leadership

- Now for the hard part: reaching massive scale by 2030
- This scale-up has been slow so far:
  - It is capital-intensive: trillions needed beyond VC
  - Industrialisation is hard: permitting, standards, operational, staff, etc.
  - Regulatory framework is orientated towards incumbents
- Race to scale is on for green hydrogen, innovative renewables, energy storage, sustainable fuels, green steel, cement and many more techs

EU27 Cleantech Venture & Growth Capital investment, 2017–21



Share of Renewable Hydrogen in EU, 2021–30



SOURCES: CLEANTECH GROUP, EUROPEAN COMMISSION

How to prioritise technologies for CCfDs?

1. Time to be strategic on technologies/projects supported and carefully take into account:
   - Security of raw materials / supply chains (blue vs. green hydrogen)
   - Maturity of technology: does it need CCfD support?
   - Capital needed to reach low green premium (CCUS vs. avoidance)
   - Potential for decarbonization (CCUS vs. avoidance)
   - Potential for energy security
   - Potential for European innovation, jobs and value chain leadership

2. Auctions should be technology specific, and provide room for strategic assessment
   - Quantities for each technology specified upfront
   - OR one auction with handicaps for non-strategic technologies or minimum quotas for strategic technologies
   - Pre-selection based on price, then criteria above

3. Some strategic technologies are developed by scale-up companies: CCfDs must be newcomer-friendly
   - Accept that CCfDs will be part of a financial maturity build-up for some players
   - CCfDs can be used as collateral to raise debt to build plants
   - Many of these payers don't have access to free allowances – CCfDs can't replace an effective carbon price

SOURCES: CLEANTECH GROUP, EUROPEAN COMMISSION

Example 1: Renewables

TYPE	TECHNOLOGY	SUMMARY	TRL
Mature Tech	Solar parks, offshore wind, geothermal, etc.	Wide roll-out phase	9
Advanced Wind	Offshore floating wind	Unlocks major potential: 80% global wind resource located in waters deeper than 60 metres. Industry ready to scale Politically advantageous vs. onshore	8
Innovative Solar	Solar roofs, building-integrated PV, thin-film, high- performance panels	Innovation in new form factors, increased efficiency, community rollout Further price reductions needed to increase uptake	7-8
Ocean energy	Tidal energy	Power produced by the natural rise and fall of tides, no intermittency	6-7
Ocean energy	Wave power	Large resource potential, complementary generation profile to other intermittent generation Industry entering demonstration phase	5-7
Advanced Geothermal	Millimeter wave drilling, Plasma drilling, closed-loop technology	Continuous baseload power, small land footprint compared to other renewable generation technologies Prototype to demonstration phase	4-6

Mature tech, different kind of support needed

Strategic tech: scale-up needed, ringfence for (C)CfDs

Challenger techs: to be put in a separate basket and compete on price

Relevant for tenders 2-3 years from now

SOURCES: CLEANTECH GROUP, EUROPEAN COMMISSION

Example 1:Renewable hydrogen

Technology	Summary	TRL	End use: why do we need it?	EU strengths / innovators
Alkaline	100MW+ Alkaline systems have been deployed worldwide in industry Lowest installed cost: simple stack & system design, easy to manufacture	Commercial (7-8)	Industrial applications with constant operation eg Fertiliser	EU is long time leader in alkaline
PEM Polymer Electrolyte Membrane	Smaller footprint than alkaline; higher current density & output pressure. More design choice at system level	Commercial (7-8)	Potential to scale: suited to distributed, modular systems & intermittent use Transport, intermittent power generation	Industrial consortia projects mostly using PEM techology
AEM Anion Exchange Membrane	Simplicity and efficiency of PEM, doesn't use rare metals Current limits in balance of plant size, performance needs to improve	Scaling (5-7)	Potential to scale Transport, industry, power to gas, power to heat	Manufacturers and OEMs mostly based in EU Limited deployment: EU market not developed
Solid Oxide	High temperature operation Highest electrical efficiency Issues with lifetime/degradation	Scaling (5-7)	Can pair with heat-producing technologies for higher efficiency Decarbonisation of steel (potential to use heat offtake)	EU research projects including innovators Some commercial-scale industrial consortia projects
Gasification Biomass, Biowaste	SMR/ATR using biomass/biogas as feedstock Currently at sub-MW demonstration stage	R&D (2-3)	Optionality / potential for future cost reduction	SMEs actively innovating, involved in EU-funded projects and ventures with corporates
Solar Photochemical, Photoelectrochemical	High temperature heat drives chemical reactions that produce hydrogen Range of technologies being explored at lab scale	R&D (2-3)	Optionality / potential for future cost reduction	EU-funded research projects, not much evidence of innovators

Mature tech, still needs some support, ringfence

Challenger tech with benefits in materials / EU players: ringfence

Relevant for tenders 5 years from now

SOURCES: CLEANTECH GROUP, EUROPEAN COMMISSION

Example 2: Alternative fuels

TYPE	TECHNOLOGY	SUMMARY	TRL
Sustainable aviation fuel	Biofuel: HEFA	Oil-based feedstock converted into green diesel using hydrogen. Issues with feedstock availability	9
Sustainable aviation fuel	E-fuel: power-to-liquid (PtL)	Production of liquid fuel through using electrolysis to produce hydrogen from renewable electricity and water, then combining with carbon from CO2 (either captured from air or industrial point source)	7-8
Sustainable aviation fuel	Alcohol to jet	Converting alcohols into hydrocarbon through dehydration, oglimerisation and hydroprocessing	6-7
Shipping fuel: synthetic methanol	Methanol synthesis	CO2 and renewable electricity converted to e-methanol	6-7
Shipping fuel: green ammonia	Synthesis and separation	Synthesis from nitrogen via air separation and green hydrogen	4-5

Not a scalable solution in terms of resource use, exclude

Sweet spot: Scale-up needed

No clear leading tech to date, allow competition

OR separate by application (aviation vs. shipping)

Relevant for tenders 2-3 years from now

SOURCES: CLEANTECH FOR EU, EUROPEAN COMMISSION

For Comparison: UK Contracts for Difference AR4 Innovative Renewables

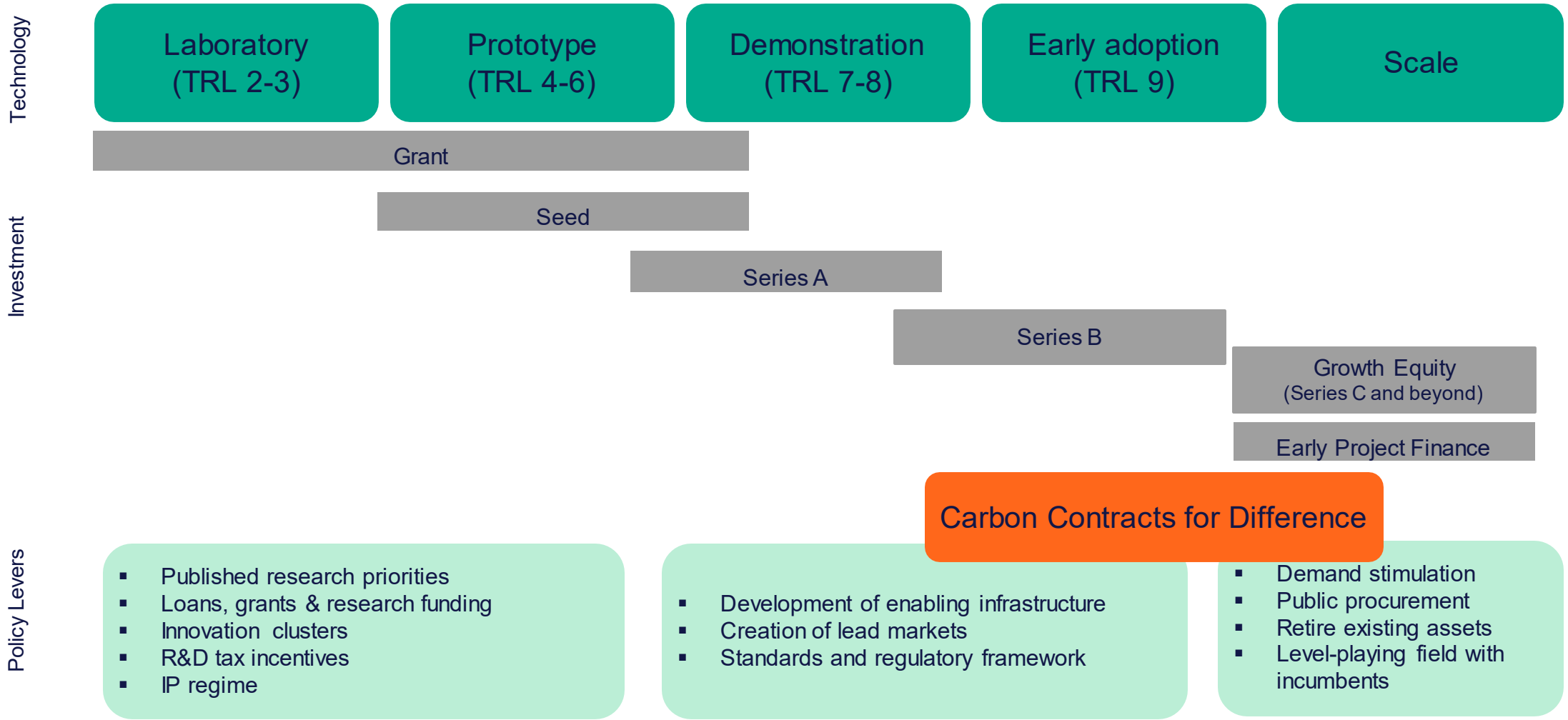
Pot 1		Capacity cap	AR4 budget	AR3 budget
Established technologies	• Onshore wind (>5MW) • Solar Photovoltaic ("**PV**") (>5MW) • Energy from Waste with CHP • Hydro (>5MW and 5MW) • Landfill Gas • Sewage Gas	5GW (including a 3.5GW limit for each of onshore wind and PV)	£10 million	None
Pot 2		**Capacity cap**	**AR4 budget**	**AR3 budget**
Less established technologies	• Advanced Conversion Technologies ("**ACT**") • Anaerobic Digestion ("**AD**") (>5MW) • Dedicated biomass with CHP • Geothermal • Remote island wind (>5MW) • Tidal stream • Wave	None	£31 million (£55 million less floating offshore wind ringfenced amount)	£65 million
	• Floating offshore wind		£24 million (ringfenced)	
Pot 3		**Capacity cap**	**AR4 budget**	**AR3 budget**
Offshore wind	• Offshore wind	None	£200 million	No budget used due to 6 GW capacity cap

See the full results of the tender:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1088875/contracts-for-difference-allocation-round-4-results.pdf

SOURCE: CLEANTECH FOR EUROPE, CMS LAW-NOW

CCfDs and the technology development lifecycle



Cleantech
for
Europe

Cleantech Group

Jules Besnainou
Executive Director, Cleantech for Europe
jules.besnainou@cleantech.com

Read the full research at

cleantechforeurope.com

With the support of
Breakthrough Energy

Practical steps for auction design – GB's CfD for Power

Key steps and parameters to set are:

1. Auction frequency
2. Pipeline mapping
3. Pot Structure
4. Delivery years
5. Maxima and minima
6. Budget and administrative strike prices
7. Auction delivery
8. Evaluation of results (to feed into next round)

Sulaiman Ilyas-Jarrett
Head of Policy and Strategy, Renewable Delivery

1

Auction frequency

Sulaiman Ilyas-Jarrett
Head of Policy and Strategy, Renewable Delivery

2

Pipeline mapping

Sulaiman Ilyas-Jarrett
Head of Policy and Strategy, Renewable Delivery

3

Pot Structure

Sulaiman Ilyas-Jarrett
Head of Policy and Strategy, Renewable Delivery

4

Delivery years

Sulaiman Ilyas-Jarrett
Head of Policy and Strategy, Renewable Delivery

5

Maxima and Minima

Sulaiman Ilyas-Jarrett
Head of Policy and Strategy, Renewable Delivery

6

Budget and Administrative Strike Price

Sulaiman Ilyas-Jarrett
Head of Policy and Strategy, Renewable Delivery

7

Auction delivery

Sulaiman Ilyas-Jarrett
Head of Policy and Strategy, Renewable Delivery

8

Evaluation of results

Sulaiman Ilyas-Jarrett
Head of Policy and Strategy, Renewable Delivery

Ministerie van Economische Zaken
en Klimaat

SDE++

An introduction to the Dutch subsidy scheme for renewable energy and CO_2 reduction

Keijen van Eijk – Ministry of Economic Affairs & Climate Policy

Jan Bouke Agterhuis – Netherlands Energy Agency

28 October 2022, Brussels

Contents

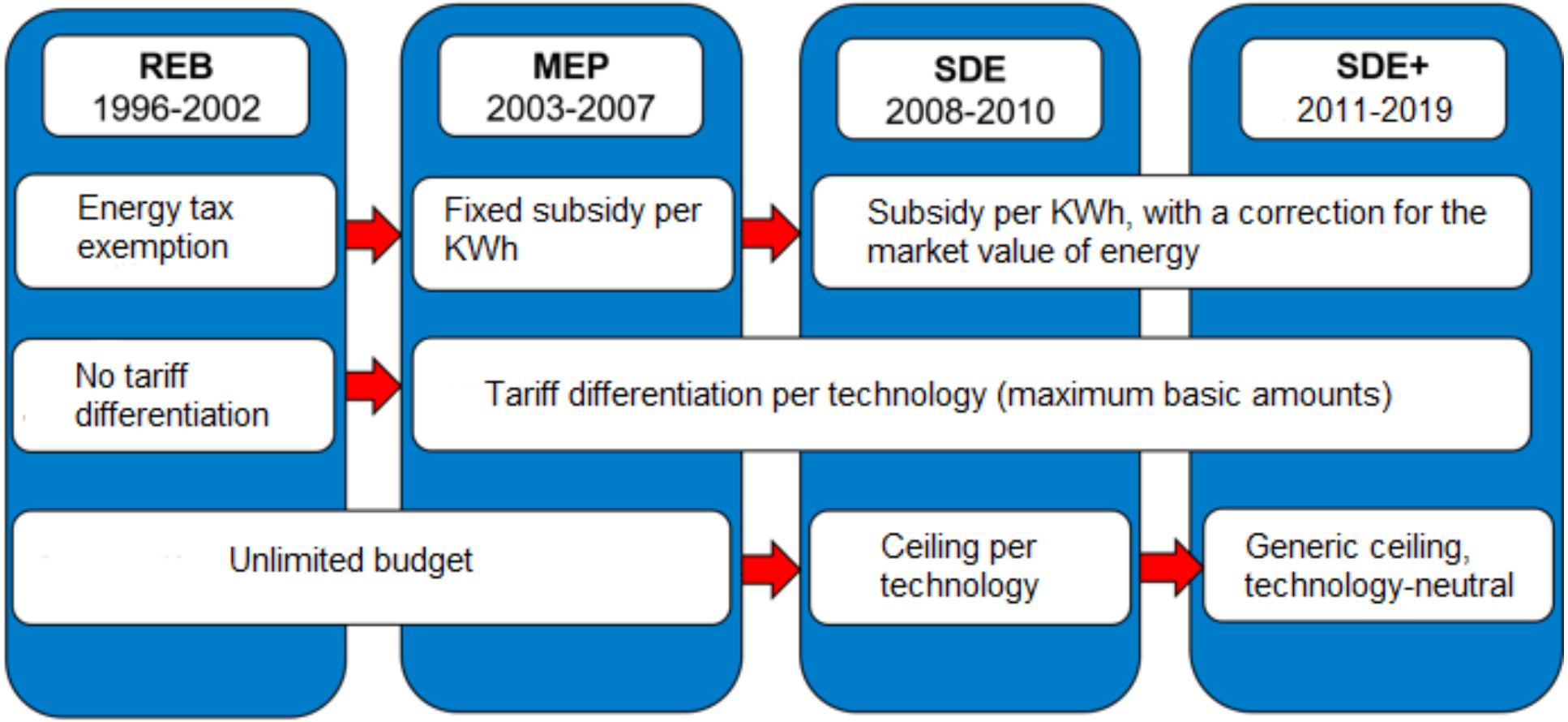
1. Recent developments
2. A short history of the SDE
3. Basics of the SDE++
4. Specifics of the SDE++
5. Challenges and solutions
6. 2023: introduction ‘fences’
7. Q&A / Discussion

Energy transition in The Netherlands: recent developments

- Jan’ 22: new cabinet with high climate ambitions
  - Reduction target in Climate Law to 55%, policy aimed at 60%
  - € 35 bln climate fund to help realise ambitions

- Business interest in sustainable development is high
  - In 2021 applications total € 12.1 bln (with subsidy budget of € 5 bln)
  - In 2022 subsidy budget of € 13 bln: first impressions show a lot of interest from the market

A short history of the SDE



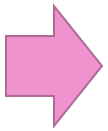
Basic principles of SDE++

- Technology neutral
  - All approved technologies and sectors compete for budget
  - Ceilings only in exceptional cases
  - Separate tenders for offshore wind (currently without subsidy)
- Focus on cost-effectiveness (€ subsidy/ton CO_2)
  - Applicants compete in 4 stages, based on cost effectiveness
- Focus on CO_2 reduction instead of energy production
- Long-term certainty for investors
  - Subsidy paid out on an annual basis for 12-15 years
- Clear division of roles:
  - Between government (policy), market (consultation) and PBL (independent advice about financial parameters)

From SDE+ to SDE++ (2020)

SDE+

- Only renewable energy production technologies
- Ranking based on €/KWh
- Correction amount based on energy price

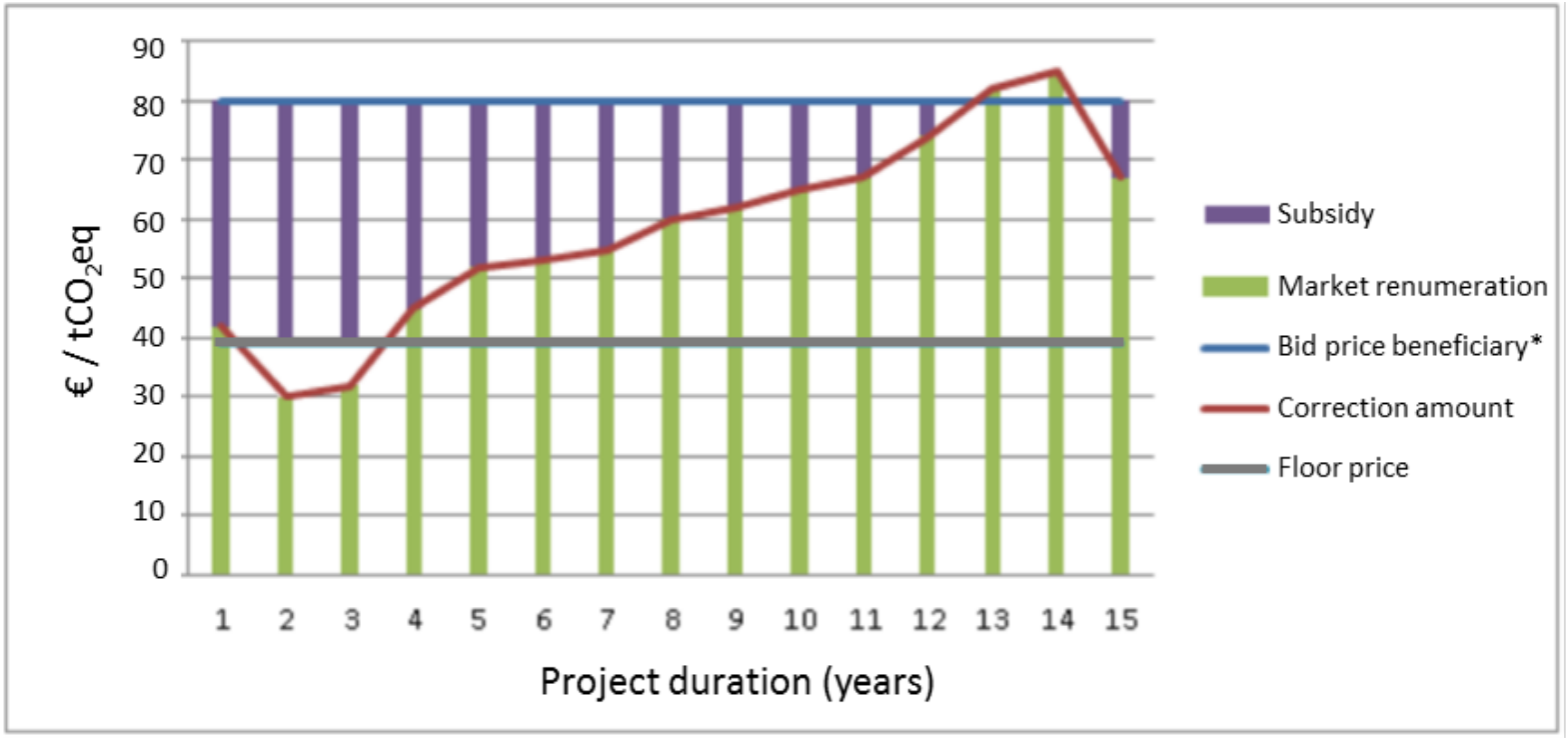


SDE++

- Renewable energy production and CO_2 emission reduction technologies
- Ranking based on € subsidy/ton CO_2
- Correction amount based on e.g. energy price and/or CO_2 price, depending on technology

SDE++ calculation method

- **Base amount:** cost price for the reduction of CO_2
  - Fixed for entire subsidy period
- **Correction amount:** product price
  - Based on real, annual energy and/or CO_2 prices
- **Floor price:** 2/3 of long-term energy and/or CO_2 price



* The bid price is equal to or lower than the technology specific base amount.

SDE++: five stages for application

27 €/tCO$_2$

76 €/tCO$_2$

90 €/tCO$_2$*

I ⟹ II ⟹ III ⟹ IV

I: € 60/tCO$_2$

II: € 80/tCO$_2$

III: € 115/tCO$_2$

IV: € 130/tCO$_2$

- Majority of successful applications are below the base amount

*Indication of subsidy-intensity.

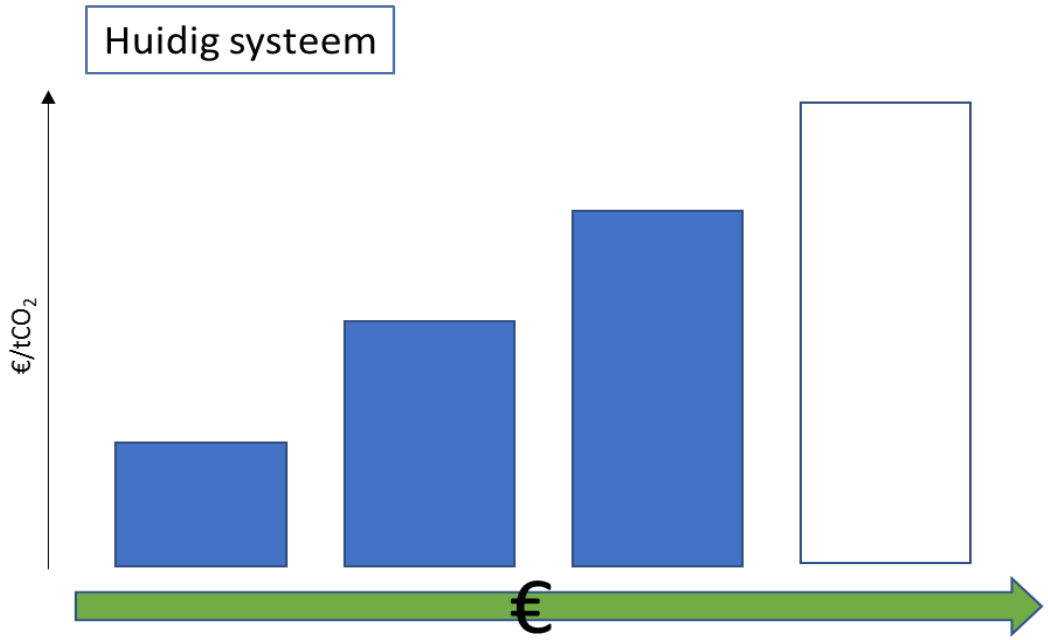
Challenges and solutions

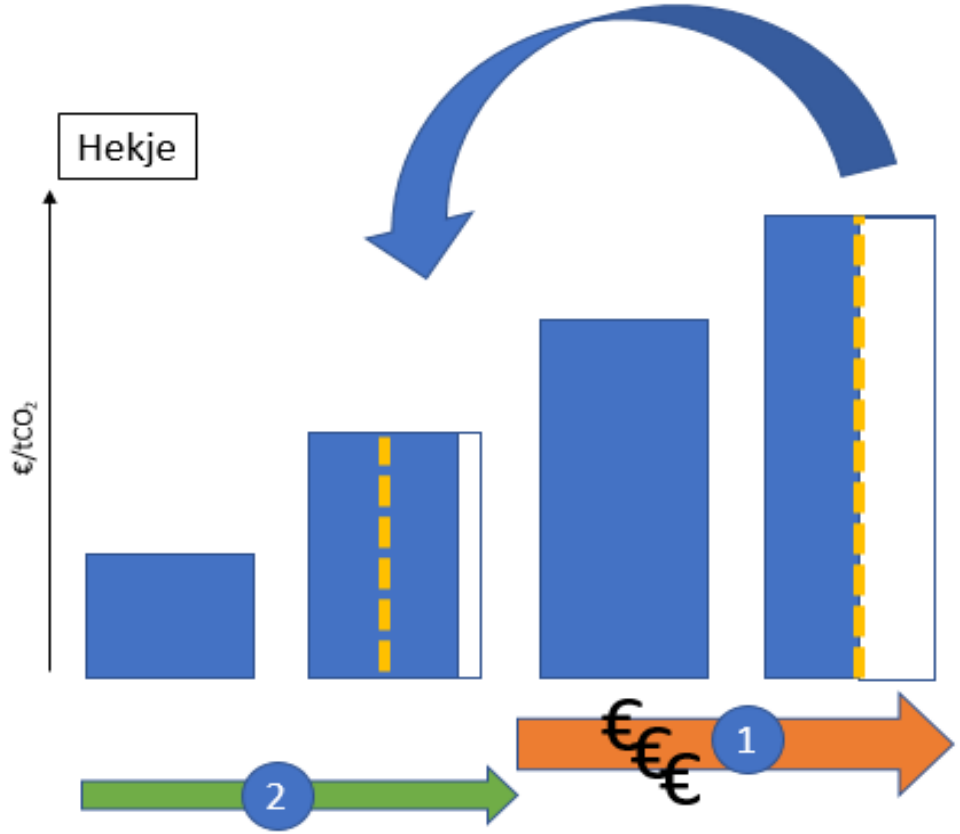
- SDE++: optimal cost effectiveness
  - Affordable energy transition
  - Maximum speed of CO_2 reduction
  - However, no possibility to target certain sectors, techniques or goals other than CO_2 reduction

- From 2023: Introduction of "fences" in SDE++
  - Separate budget for 3 "energy domains" (technology baskets)
  - Keep sufficient budget outside of fences to ensure cost effective CO_2 reduction
  - Remaining budget from domains flows back into general budget

Electricity CCS/CCU | *Molecules* | *Low-temp heat* | *High-temp heat*

Current system vs “Fences”



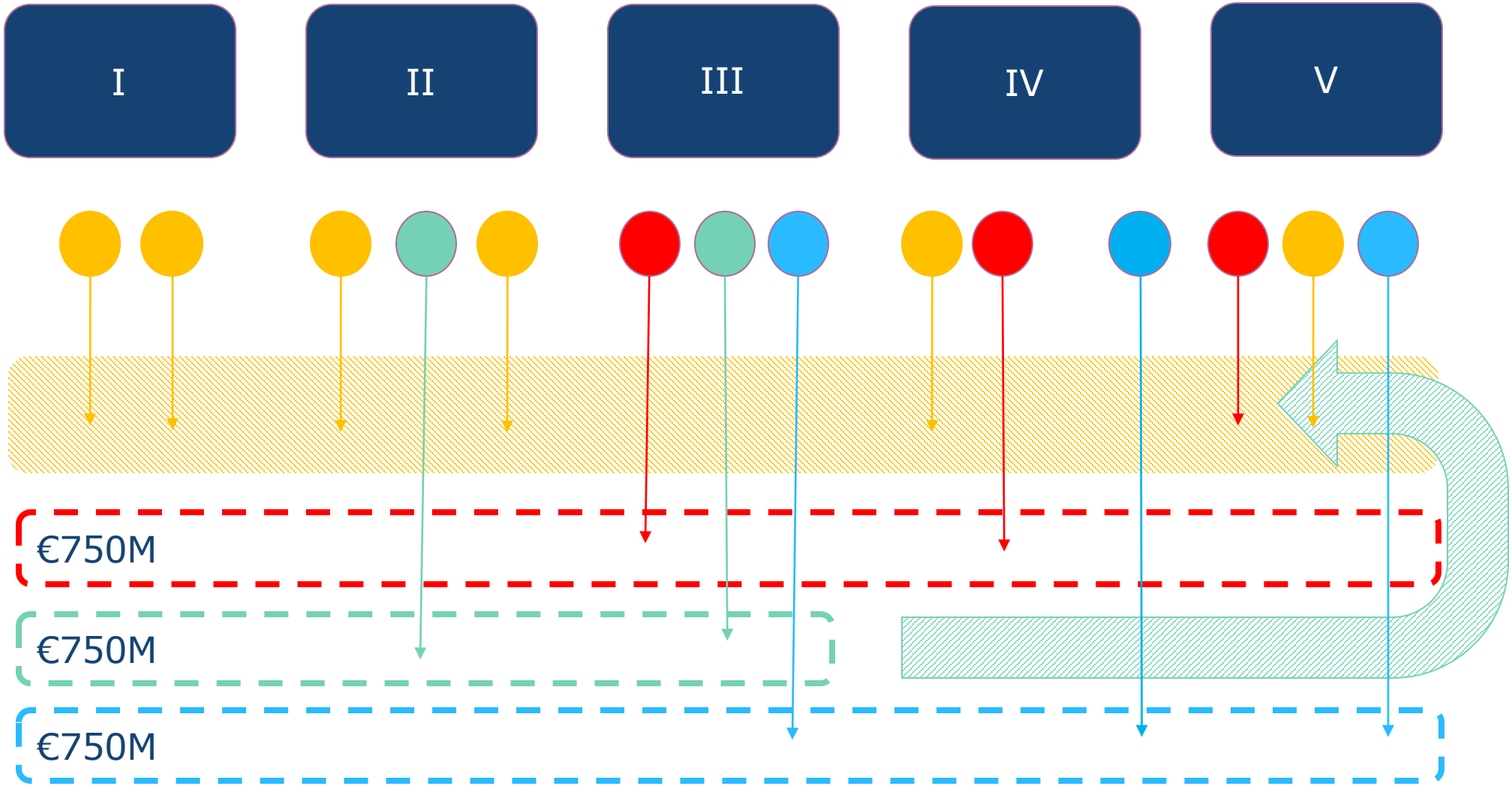


Phase

Applications

Non-preferred budget €2.750M (€5.000M – 3*€750M)

Domains / technology baskets



How do the fences work?

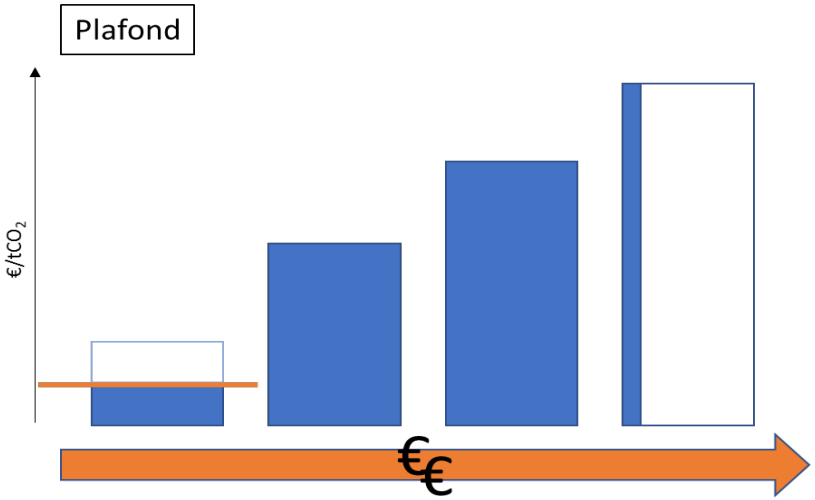
With fences, a part of the total SDE++ subsidy budget is preferably available to subsidies for a domain which is placed within a fence.

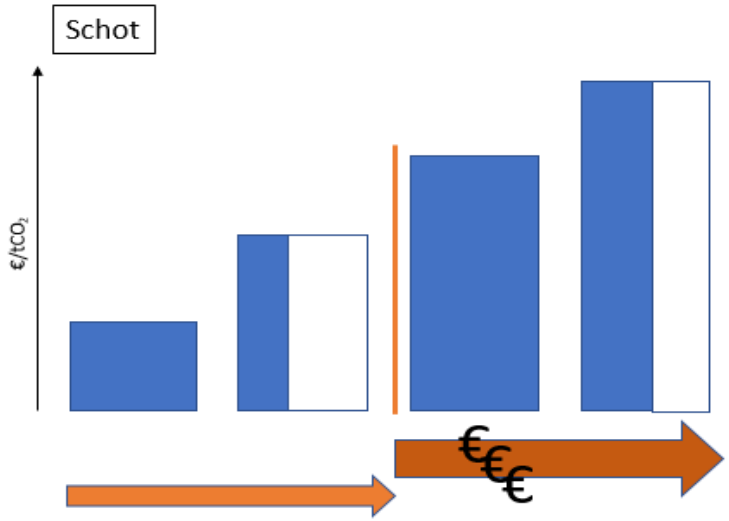
a. Applications *not* in a fenced domain, will be granted subsidy from the non-preferred budget (i.e. the total SDE++ budget minus the preferred domain budgets)

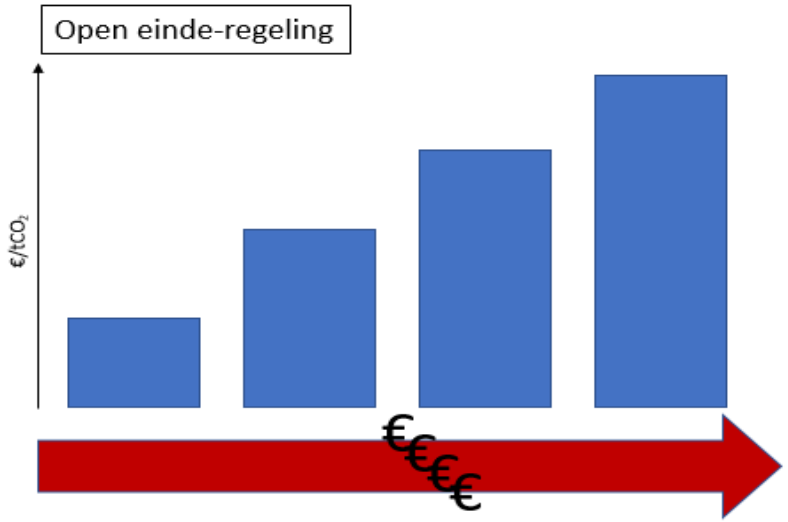
b. Applications *within* a fenced domain will be granted subsidy from the preferred part of budget for that domain

c. In case the preferred part of the budget is insufficient for all the applications within a fenced domain, it will be assessed whether that or those application(s) can be granted subsidy from the 'non-preferred' budget, and the application(s) will be assessed in competition with other applications (see a), by order of receipt.

Some other considered options







Follow up process

- Nov 2022 and onwards: Dialogue with DG COMP on compatibility with State Aid guidelines
- Aim to open up the 2023 round before summer ‘23

Q & A / Discussion

Coffee Break

Start again at 11:40

European Commission

BELLONA

Issue 1: How does the carbon price affect profitability of low carbon technologies and thus the design of reference prices?

Market prices for products	**Value of assets**
Non trade-exposed product allows carbon prices to be passed through	Allocation of free allowances is retained by project (perhaps with volume guarantees)
CBAMs may increase market prices	
Carbon regulation in other countries may price carbon in marginal production	
Low carbon product markets, including procurement rules, may lead to a price premium for low carbon products	
Carbon price may not affect commodity prices due to international conditions	*Allocation of free allowances removed from project*

BELLONA

Issue 2: CCS support: For a given reference price, how to calculate volumes on which payment is based?

Tonnes captured (for CCS)

Simple to measure

Risks incentives for "CO_2 factory"

Benchmark tonnes – actual tonnes

Efficient incentives

More complex

Benchmarks may continue to be contentious

- **UK has chosen tonnes captured with reporting clauses in contract to prevent distortions to efficiency and fuel choice**
- **Netherland SDE++**

Issue 3: Other contract terms? These may vary with technology.

Structure of payments

- Separate capex and opex components to payments?
- Any capital grants?
- Indexation of the strike price? Inflation indexed? Other indices e.g. labour costs? electricity prices? gas prices?

Timing of payments

- Duration?
- Profiling of payments e.g. front loading?

Incentives and risk sharing

- Risk sharing provisions and contract re-openers or in response to market conditions or project economics?
- Penalties for underperformance e.g. if low carbon product fails to reach a defined standard? Loss of payments?
- Cost pass through e.g. of regulated costs?
- Effect of existing contracts? - e.g. waste to energy plants

Volume risk allocation relevant for some products

Complexity of CCfD contracts may imply they are more suited to larger projects

Department for Business, Energy & Industrial Strategy

Hydrogen Production Business Model – Summary

The hydrogen production business model is being designed to **incentivise the production and use of low carbon hydrogen,** to deliver the government's ambition of up to 10 GW of low carbon hydrogen production capacity by 2030, subject to affordability and value for money. The business model will provide producers with revenue support to overcome the operating cost gap between low carbon hydrogen and fossil fuels in order to unlock private investment in hydrogen projects.

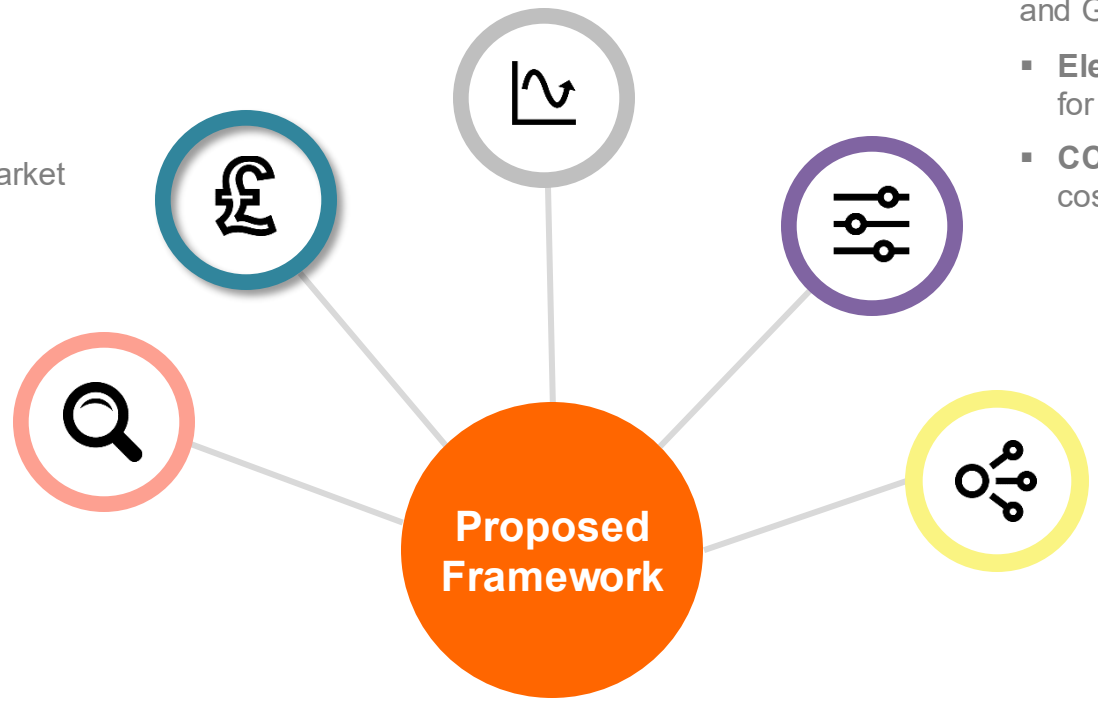
Managing price risk

Through a **CfD-type variable premium** support model where the subsidy is the difference between:

- 'Strike Price' reflecting the cost of producing hydrogen, and;
- 'Reference Price' reflecting the market value of hydrogen, combined with price discovery incentive

Managing volume risk

- Through **sliding scale** where the strike price is higher on a per unit basis if hydrogen offtake falls



Strike Price indexation

Providing security of supply to end users, protecting producers where production cost change is unmanageable, and Government from excessive risks and costs

- **Electrolytic** – Consumer Prices Index (CPI) indexation for all cost components
- **CCUS-enabled** – natural gas indexation for natural gas cost, CPI indexation for all other cost components

Scope and delivery mechanism

- Applicable on a UK-wide basis
- New production that meets the UK Low Carbon Hydrogen Standard
- Open to range of end users
- Private law contract

Additional considerations

- **Contract duration** between 10-15 years
- **Scaling of volumes**, under consideration
- **Treatment of feedstock users**
- **Subsidy cumulation**, under consideration
- **Limited support for hydrogen transport and storage**

Department for Business, Energy & Industrial Strategy

In the absence of a market benchmark price for hydrogen, the Hydrogen Production Business Model sets out a proxy Reference Price

Reference Price – intended to reflect the market price received by the producer for each unit of hydrogen sold. For initial projects, the reference price is the higher of:

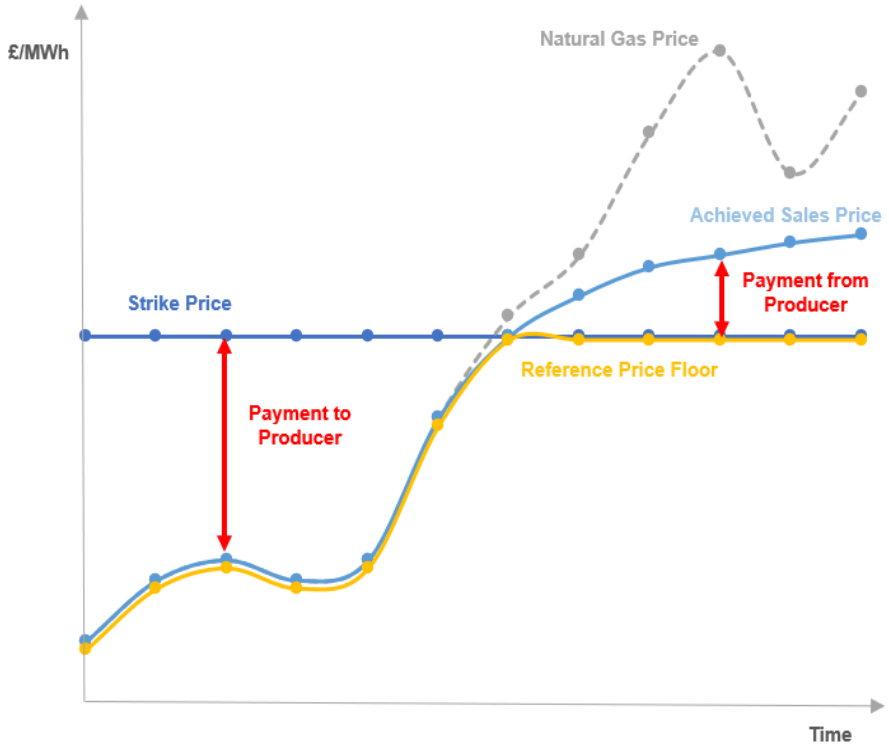
1) The producer's **achieved sales price**, and;
2) The **price floor**, which is the lower of the Natural Gas price (NBP Month Ahead) and the Strike Price

Intention to integrate market benchmark as soon as possible

Reference Price combined with Price Discovery – reward for sales above the natural gas price floor to promote price discovery and accelerate reduction in subsidy, with potential cap of reward if sales price exceeds a certain threshold

Sales to feedstock users – consider if adjustment to reference price is needed

Variable premium – two-way payment

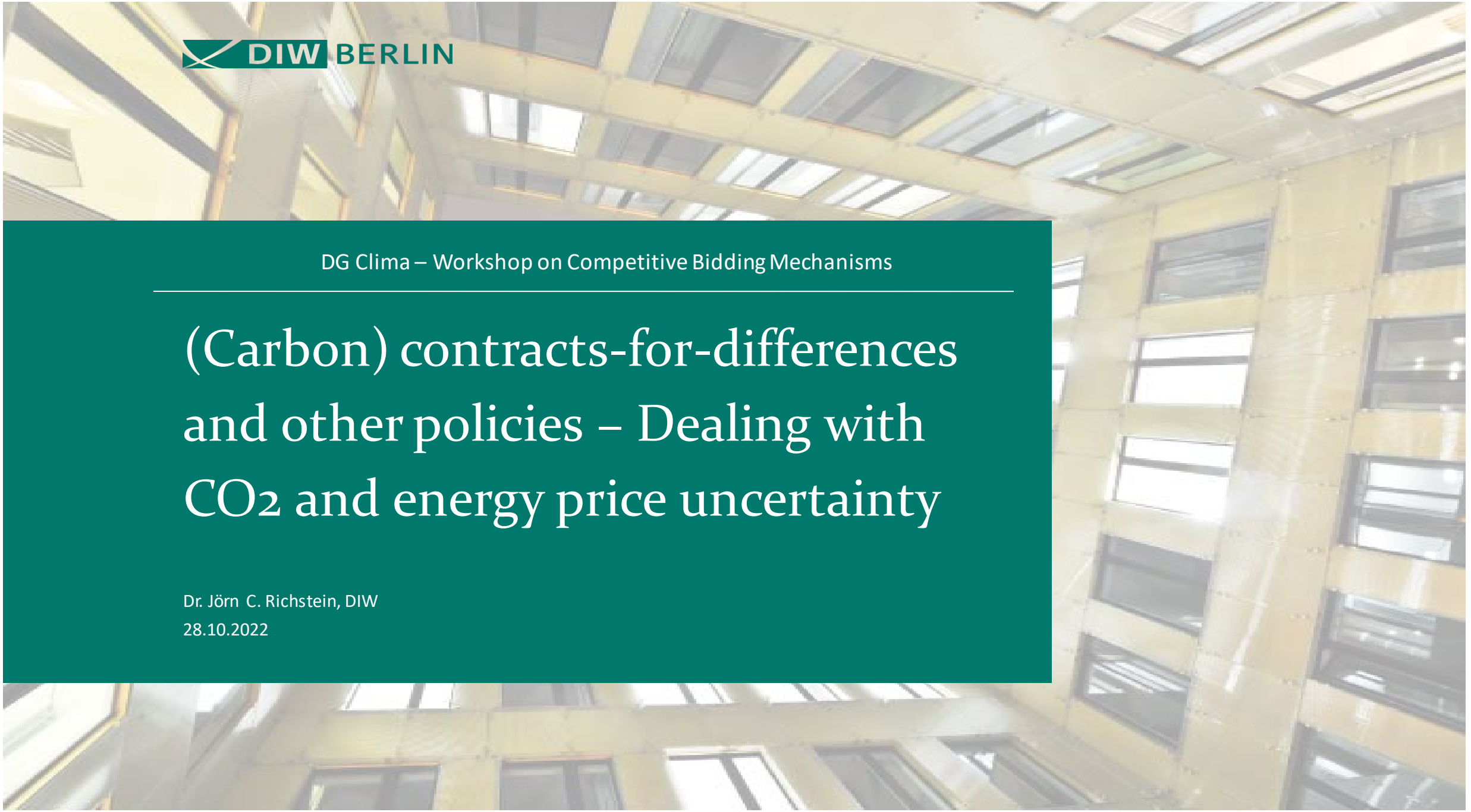


CORE COMPONENTS

Achieved sales price:
- Best represents market value of hydrogen sold in the near term
- Gives producers flexibility to price hydrogen differently according to affordability of end users

Natural Gas as price floor:
- Most prevalent counterfactual fuel offtakers would switch from
- Provides incentive to switch for users no longer subject to carbon prices
- Avoids market distortions

Capping price floor at strike price:
- Allows the producer to sell hydrogen at a price that is above the strike price but does not have to be at or above the natural gas price in the event of elevated natural gas prices



DG Clima – Workshop on Competitive Bidding Mechanisms

(Carbon) contracts-for-differences and other policies – Dealing with CO2 and energy price uncertainty

Dr. Jörn C. Richstein, DIW

28.10.2022

Rationale for addressing price risks

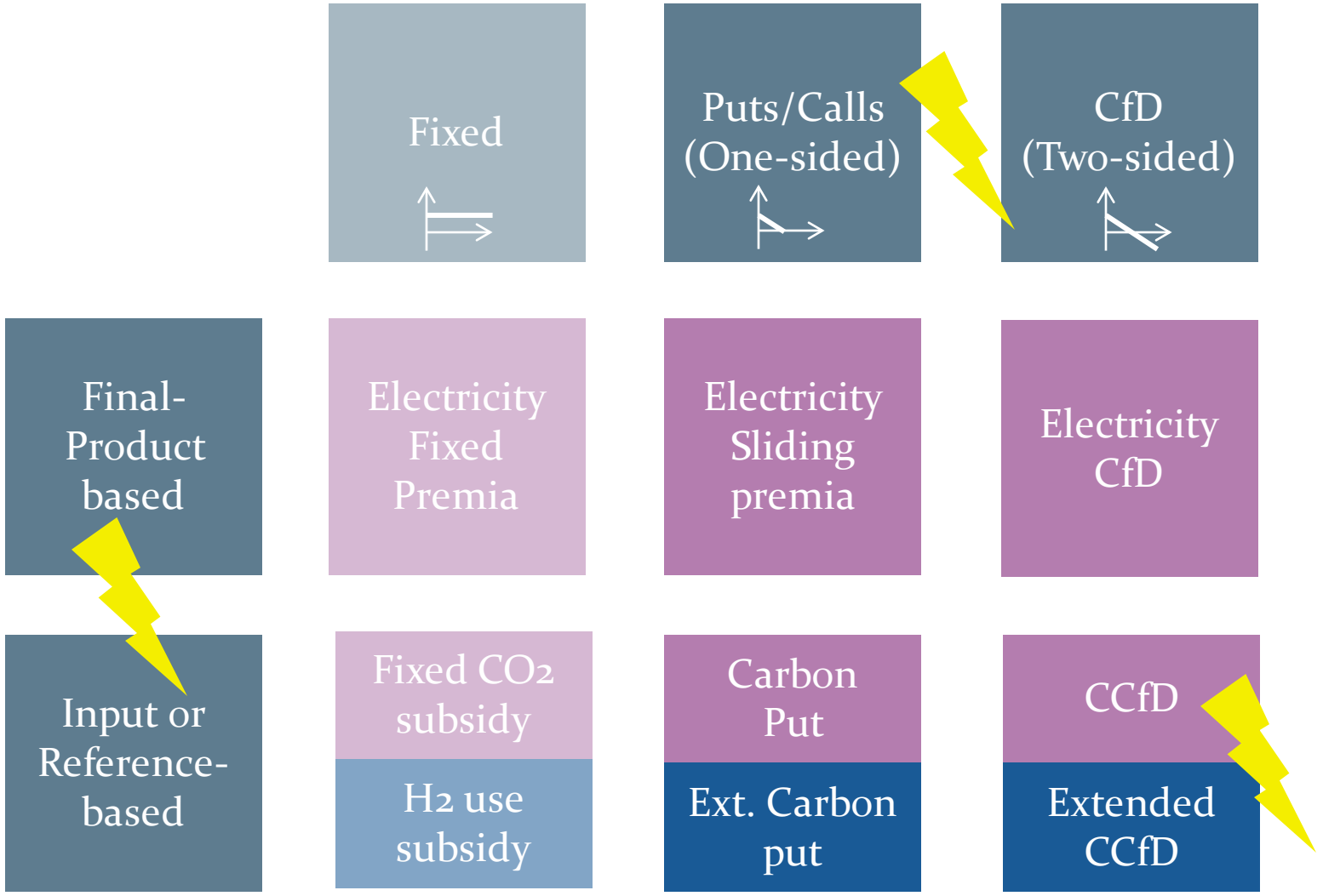
- Commitment problem of governments & political uncertainty[1,2]
- Incomplete (risk) markets[3,4] for CO_2 (and other markets!) → early abatement investments inefficiently[5] postponed.
- New technologies exposed to price risks that incumbents are not, because they are price setting (CO_2, different input factors)

[1] Helm and Hepburn 2007, [2]Chiappinelli and Neuhoff 2020, [3] Newbery, Reiner, and Ritz 2019, [4] Greenwald and Stiglitz 1986, [5] Vogt-Schilb, Meunier, and Hallegatte 2018

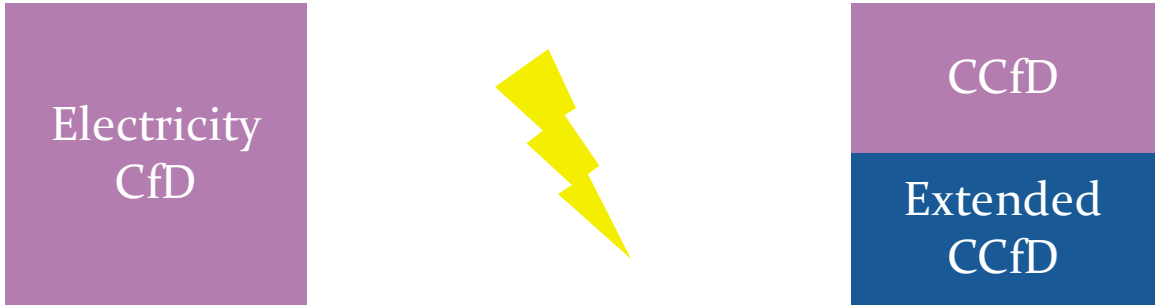
Ways to address price risks (and subsidy need)

	Fixed	Puts/Calls (One-sided)	CfD (Two-sided)
Final-Product based	Electricity Fixed Premia	Electricity Sliding premia	Electricity CfD
Input or Reference-based	Fixed CO_2 subsidy H_2 use subsidy	Carbon Put Ext. Carbon put	CCfD Extended CCfD

Ways to address price risks (and subsidy need)



Final-product vs Reference/Input price risk mitigation



E.g. Electricity

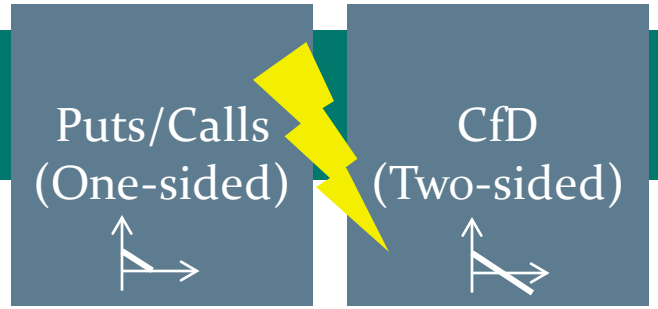
- Homogenous goods - Clear reference price exists
- Political risks in final-product markets exist
- The natural counter-party can be part of regulated deal (e.g. electricity consumers)

E.g. Industrial goods

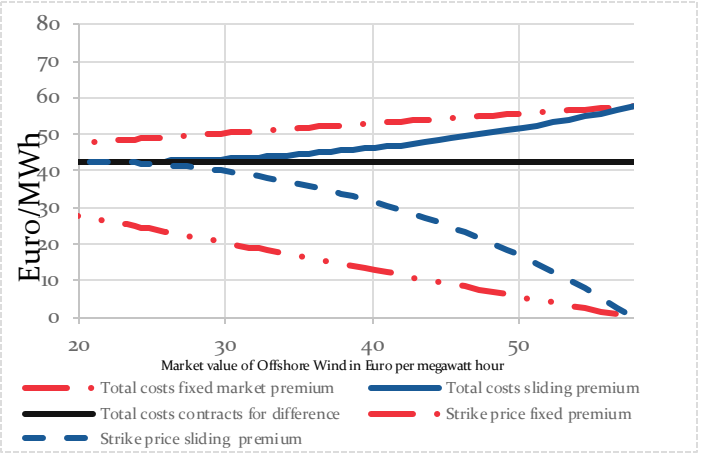
- Heterogenous good – clear reference price doesn‘t exist
- Absence (or smaller) political risks in competitive markets

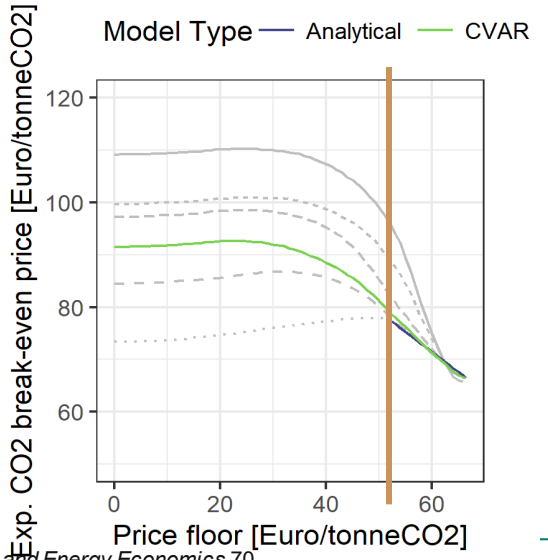
Related question: push in clean fuels (via pricing or subsidy) or pull via use sector policy?

(C)CfDs vs Puts



- Strike price for puts can be <= strike price for CfD (as investors can profit from up-side) → decreases with higher profit expectations
- This increases risks, and overall financing costs (and costs to society if risk markets incomplete!) ~ 30% in absence of policy[1]
- For process dominated by OPEX-cost increases (industry), only limited reduction of strike price possible without[2]
  - project otherwise at high risk of not operating
  - not getting debt-funded
- On the other hand government/counterparty foregoes potential for pay-back
  - Higher net support over time (dep. on CO2 prices)
  - risk for ex-post regulatory intervention (see current crisis)?





[1]Neuhoff, Karsten, Nils May, and Jörn C. Richstein. 2022. "Financing Renew ables in the Age of Falling Technology Costs." *Resource and Energy Economics* 70 (November): 101330. https://doi.org/10.1016/j.reseneeco.2022.101330.

[2]Richstein, Jörn C., and Karsten Neuhoff. 2022. "Carbon Contracts-for-Difference: How to de-Risk Innovative Investments for a Low-Carbon Industry?" *IScience* 25 (8): 104700. https://doi.org/10.1016/j.isci.2022.104700.

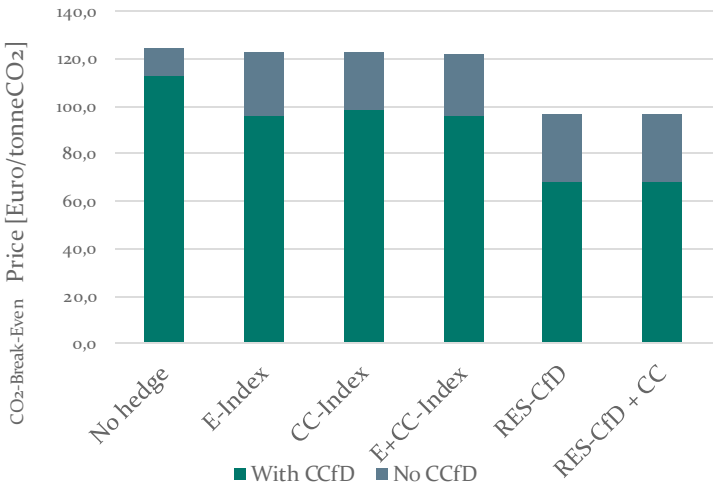
DIW BERLIN

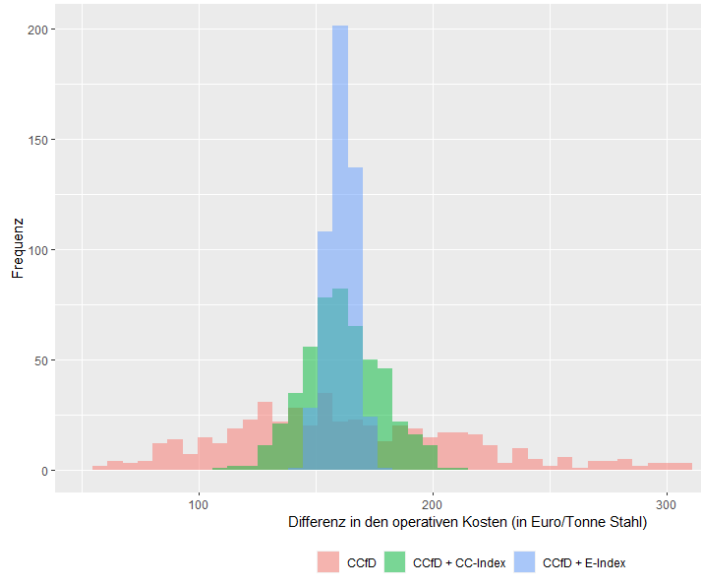
Carbon price and other risks

CCfD

Extended CCfD

- Incumbent technologies set the market price (for now up to long-term)
- Carbon price risks, but also new input factors (electricity, hydrogen) affect new (non-price-setting) technologies more[1]
- For many industrial processes input factor risks as big (or bigger) than CO2 price risks → significant risk premia if not hedged[2]
- → can these risks be hedged otherwise (and can regulation help, e.g. gov-secured electricity CfDs)?





[1] Gross, Robert, William Blyth, and Philip Heptonstall. 2010. "Risks, Revenues and Investment in Electricity Generation: Why Policy Needs to Look beyond Costs." *Energy Economics* 32 (4): 796–804. https://doi.org/10.1016/j.eneco.2009.09.017.

[2] Richstein, Jörn C., Mats Kröger, Karsten Neuhoff, Olga Chiappinelli, and Frederik Lettow . 2021. "Carbon Contracts for Difference. An Assessment of Selected Socio-Economic Impacts for Germany." Climate Strategies. https://climatestrategies.org/publication/carbon-contracts-for-difference-an-assessment-of-selected-socio-economic-impacts-for-germany/.

DIW BERLIN

Conclusions

- Market failures exist that warrant a regulatory approach with regard to CO2 price (and energy price risks) when supporting decarbonisation technologies
- Tailored approach for sectors needed – derisk final production output or input/reference price risks?
- CfDs better suited to address price risks in presence of incomplete risk markets
- Energy price risks for new industrial processes have similar size to CO2 price risks

References

- Chiappinelli, Olga, and Karsten Neuhoff. 2020. "Time-Consistent Carbon Pricing: The Role of Carbon Contracts for Differences." SSRN Scholarly Paper ID 3576402. Rochester, NY: Social Science Research Network. https://doi.org/10.2139/ssrn.3576402.
- Greenwald, Bruce C., and Joseph E. Stiglitz. 1986. "Externalities in Economies with Imperfect Information and Incomplete Markets." *The Quarterly Journal of Economics* 101 (2): 229–64. https://doi.org/10.2307/1891114.
- Helm, Dieter, and Cameron Hepburn. 2007. "Carbon Contracts." In *The New Energy Paradigm*, edited by Dieter Helm. Oxford, New York: Oxford University Press.
- Neuhoff, Karsten, Nils May, and Jörn C. Richstein. 2022. "Financing Renewables in the Age of Falling Technology Costs." Resource and Energy Economics 70 (November): 101330. https://doi.org/10.1016/j.reseneeco.2022.101330.
- Newbery, David M, David M Reiner, and Robert A Ritz. 2019. "The Political Economy of a Carbon Price Floor for Power Generation." *The Energy Journal* 40 (1).
- Richstein, Joern Constantin. 2017. "Project-Based Carbon Contracts: A Way to Finance Innovative Low-Carbon Investments." *DIW Berlin Discussion Paper* 1714.
- Richstein, Jörn C., Mats Kröger, Karsten Neuhoff, Olga Chiappinelli, and Frederik Lettow. 2021. "Carbon Contracts for Difference. An Assessment of Selected Socio-Economic Impacts for Germany." Climate Strategies. https://climatestrategies.org/publication/carbon-contracts-for-difference-an-assessment-of-selected-socio-economic-impacts-for-germany
- Richstein, Jörn C., and Karsten Neuhoff. 2022. "Carbon Contracts-for-Difference: How to de-Risk Innovative Investments for a Low-Carbon Industry?" IScience 25 (8): 104700. https://doi.org/10.1016/j.isci.2022.104700.
- Vogt-Schilb, Adrien, Guy Meunier, and Stéphane Hallegatte. 2018. "When Starting with the Most Expensive Option Makes Sense: Optimal Timing, Cost and Sectoral Allocation of Abatement Investment." *Journal of Environmental Economics and Management* 88 (March): 210–33. https://doi.org/10.1016/j.jeem.2017.12.001.

Fraunhofer ISI

Fraunhofer Institute for Systems and Innovation Research ISI

Guidehouse Outwit Complexity

ICF

BBH BECKER BÜTTNER HELD

Competitive bidding in the Innovation Fund

Ensuring a level playing field: prequalification, cumulation with State Aid, existing vs new assets

Background

- Part of the Innovation Fund will allocate support based on competitive bidding
- Sufficient competition is necessary to reach efficiency and lead to price discovery
- A level playing field for participation in the competitive bidding mechanism across the EU is therefore necessary

How to ensure a level playing field?

- Potential competitive bidding mechanisms
- Prequalification requirements
- Cumulation with State aid
- Auctions for new vs. existing assets
- Further aspects impacting the level playing field and thus level of competition

Two possibilities for a competitive bidding mechanism for hydrogen
to be discussed in detail at 21 November stakeholder work

Supply-side auction for green hydrogen production

- Support payment for production of green hydrogen, i.e. electrolysers
- Payment per unit of generated hydrogen (i.e. €/kg or €/MWh)
- Plant operator sells hydrogen on the market and receives premium based on the competitive bidding process

Demand-side auction for decarbonisation/hydrogen usage in industry

- Support payment for carbon emission reduction (Carbon contract for difference against ETS price)
- Restriction to ETS Annex 1 sectors (or potentially to hydrogen technologies)

Prequalification requirements

Bidder qualification (Selection criteria)	Project qualification	Bid bonds
Proof of financial ability or experience Financial capacity criteria, e.g.: Profit and loss for the last two financial years, balance sheet for the last two financial years, explanatory notes and/or annexes that form part of the above financial statements (if available), as well as external audit report	Proofs for an adequate maturity of the project • Permits, business plans etc. • Typically, required permits etc. are country-specific	Guarantees or cash payments for possible penalties to ensure seiousness of participating bidders Percentage of maximum support for the project (investment not suitable due to cost structure and importance of operational costs)
Anything that needs to be considered regarding a level playing field?	Is a declaration stating that all permits have been received sufficient? Can this enable a level playing field between MS?	Anything that needs to be considered regarding a level playing field?

Do you see different requirements for demand and supply side auctions to enable a level playing field based on prequalification?

Cumulation with other (national) support instruments

- State aid guidelines CCEAG foresee support for green hydrogen and industry decarbonisation
- A number of Member States plan to or have implement(ed) individual support schemes
- Interactions between national and European support scheme
- Current IF scheme allows for cumulation but does not cover full cost differences
- Should cumulation be allowed in the competitive bidding schemes? Especially when considering the level playing field and objective of price dicovery?

Cumulation with other (national) support instruments – direct support

Options	1) Cumulation without requirements	2) Consideration at time of auction	3) Consideration during the support period	4) Mutual exclusion
Description	Bidders with and without national support participate in the IF auction without restrictions	Bidders are required to acknowlegde other (national funding) when applying and these funds are added to the bid (based on a defined procedure) for the bid ranking	If bidders start receiving additional (national) support during the support period (e.g. for electricity) the IF support is recuded accordingly	Bidders receiving national support are excluded from the IF competitive bidding mechanism
Advantages	• Higher competition in IF auction • Low administrative costs • Support savings for IF	• Level playing field • High competition in IF auction • Support savings for IF	• Support savings for IF • Reduced probability of excess support payments	• Level playing field • Lower administrative costs • Simpler implementation
Drawbacks	• Bidders from MS with national support schemes are disadvantaged	• Sligthly higher administrative burden	• Potentially lower interest in national support schemes • Higher administrative burden	• Reduced competition in IF auction

Options 2 and 3 can also be combined.

How do you consider cumulation in your national support schemes? What would be your preferred option?

Cumulation with other (national) support instruments – indirect support

- MS (and EIB) also provide low interest loans or use other instruments to enable decarbonisation (tax reliefs etc.)
- Such measures can be very diverse and systematically differ from direct support
- These measures shall therefore not be considered in the IF competitive bidding mechanism

Do you see any problems with regards to the level playing field based on this approach?
What would be your preferred option for consedering low interest loans etc.?

New vs. existing assets

- Including projects with existing assets might increase competition in the IF auction
- In some cases (e.g. steel DRI) changing the fuel (from natural gas to hydrogen) implies potentially higher costs and contributed substantially to GHG reduction
- But: investments most crucial for reaching climate neutal system
- Therefore, focus of IF competitive bidding is on new plants

Do you see any problems with regards to the level playing field based on this approach?
How do you deal with existing assets in the national support schemes?

Additional aspects impacting the level playing field

➢ Availability of infrastructure or integrated projects:

- As long as infrastructure is not available, supply side projects are restricted to integrated projects (i.e. electrolyser on site or close to the site)
- Impacts on level playing field as this resticts supply side applications to MS with industry (unless produced hydrogen can also be used in other sectors)
- **How do you see this problem? What would you recommend for the first IF bidding rounds?**

➢ Taxes, levies, lease rates etc.

- Apart from support schemes other aspects influence competitiveness of projects in different MS (e.g. taxes, levies, lease rates, etc.)
- The IF competitive bidding will not try to mitigate resulting advantages and disadvantages of bidders due to complexity and limited capacity for analysing and assessing national conditions on a regular basis
- **Does this seen adequate to you? Do you see other options or challenges?**

➢ Indexation of energy inputs

- Fluctuations in energy costs are important risk factors for projects and depend heavily on political decisions
- Indexation of support payments for such costs can reduce risks for investors
- If indexation levels out differences between costs in MS this can also contribute to a level playing field
- MS specific indexation is however quite complex the IF competitive bidding might not use indexation (potential exemption: CPI)
- **What is your opinion on this topic? What are the effects on a level playing field that should be considered from you perspective?**

Questions for discussion today

Question 1 (Prequalification):
Do you see different requirements for demand and supply side auctions to enable a level playing field based on prequalification?

Question 2 (Cumulation with other direct support): How do you consider cumulation in your national support schemes? What would be your preferred option?

Question 3 (Cumulation with indirect support (e.g. credits)): Do you see any problems with regards to the level playing field based on this approach? What would be your preferred option for consedering low interest loans etc.?

Question 4 (New vs. existing assets): From your point of view, do you see any problems with regards to the level playing field based on this approach? How do you deal with existing assets in the national support schemes?

Question 5 (Infrastructure): What would you recommend for the first IF bidding rounds regarding missing H2 infrastructure?

Question 6 (taxes, levies, lease rates): Do you see any options to include framework parameters of different MS in the selection process?

Question 7 (indexation of energy inputs): What is your opinion on this topic? What are the effects on a level playing field that should be considered from you perspective?

Thank you for your attention and inputs!

Contact: Jenny Winkler
jenny.winkler@isi.fraunhofer.de

Fraunhofer ISI

Fraunhofer Institute for Systems and Innovation Research ISI

Guidehouse
Outwit Complexity

ICF

bbh
BECKER BÜTTNER HELD