Incentives and regulatory frameworks influence on CCS chain establishment

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Certainty
Regulatory frame-work
Long-term financial schemes

To facilitate and accelerate the development of a CO_2 value chain, governments should **adopt incentives schemes** and/or **regulations that encourage stakeholders to initiate CCS and CO_2-EOR projects**

CO_2-EOR as an early opportunity for CCS deployment:

- Increase state's revenues, increase energy security, can stimulate the entire CCS chain…
- However, need to create sufficient value for delivered CO_2 to justify the costs of capture and transport and subsequently a market for CO_2 storage
- Need to mitigate/remove economic and non economic barriers:
  - Economic barriers; currently not viable? need for financial support?
  - Non economic barriers: need to build infrastructure, to facilitate/accelerate the granting of permits etc….

The Storage Directive*

Compliance with the EU ETS scheme

Directive (2004/35/EC)**

* Proposal for a directive of the European parliament and of the council on the geological storage of carbon dioxide and amending council directives 85/337/eec, 96/61/ec, directives 2000/60/ec, 2001/80/ec, 2006/12/ec, regulation (ec) no1013/2006 and drafts for guidance documents to the CO_2 geological storage directive.

**The Environmental Liability Directive (ELD) applies only in narrow circumstances and provides that liability is statute barred after 30 years

Regulations on storage

EU Directive on Geological Storage

•Provides legal basis for environmentally safe storage of CO2 +sets environmental rules and liability requirements

•CCS not mandatory

•Member states determine whether and where CCS will happen on their territory

•Emissions captured and stored underground recognized as not emitted under the ETS

•Applicable to demonstration projects with a total intented storage capacity of 100 000 k tonnes

•Entry into force 26.06.2009 – Implementation within 2 years

CCS in International convention

- London Protocol and Ospar convention
- Last barriere for transboundary tranport of CO2 removed (london convention- norwegian amendment)

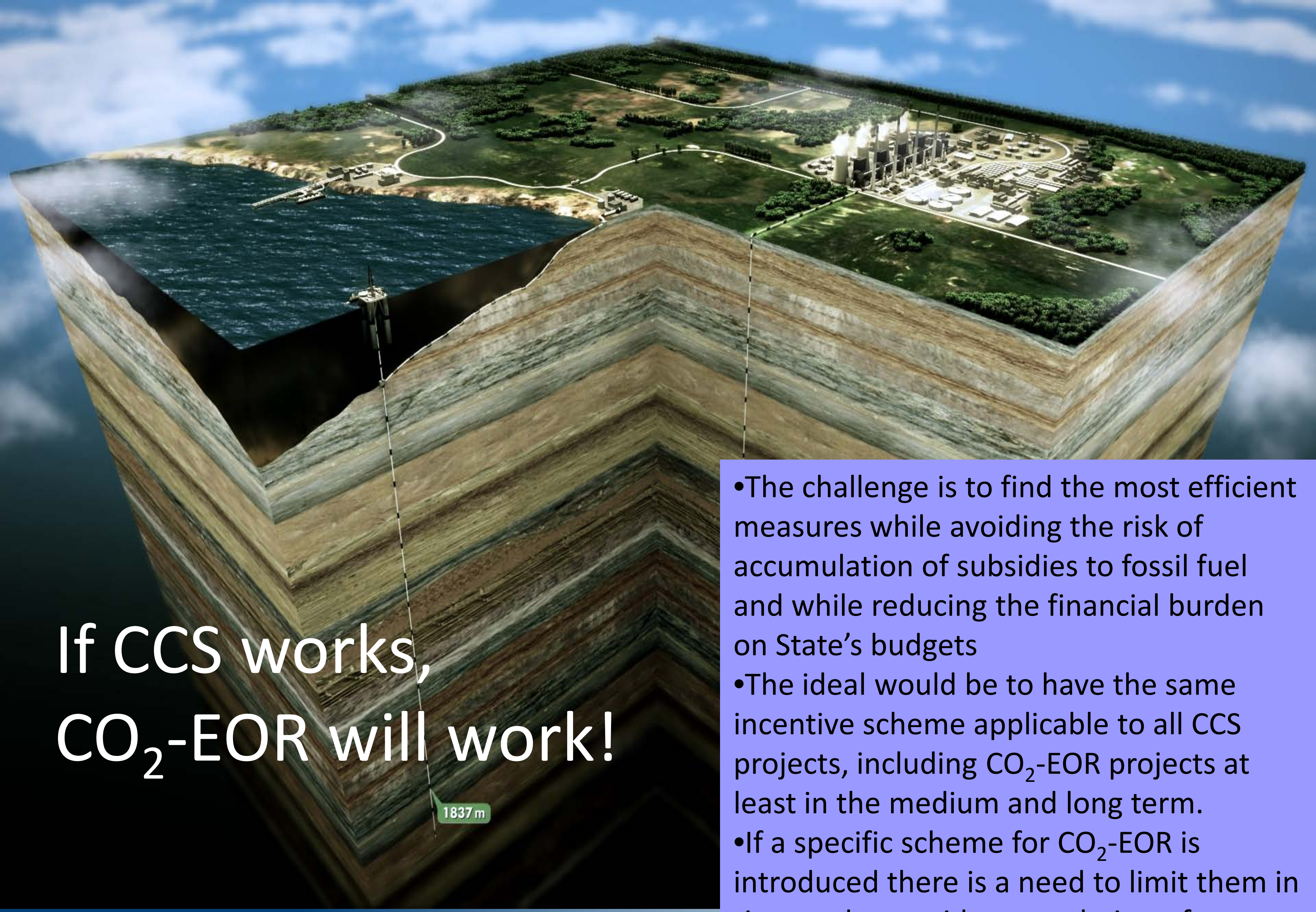
- Sorting out who will be responsible for what
- Long-term liability is a core issue
- Adapting existing policy to accomodate capture, transport and storage of CO_2

Regulations for CCS in EOR-operations	Incentives	Description	Comments/ Recommendations	Are these existing policies or new recommendations?
	Earmarked revenues	Earmark additional revenues to the State arising from the increase of oil produced though CO_2 for EOR for further investments in CCS	Allows to finance the establishment of pipeline infrastructure, research, site selection etc	New incentive
	Plan for Development and Operation. EOR ready- EOR retrofit	Set as a condition in the POD that CO_2 injection for EOR has been assessed and considered. Require, when applicable, a condition of "EOR ready" for new fields and "EOR retrofit" for existing fields		New incentive

Financial security and liability

- Improve and clarify the liability regime between actors in the CCS chain
- Directive: each part of the CCS chain is liable to surrender allowances for the part of emissions occurred under their activity (producer, capturer, transporter, storage) = polluter pays principle.
- Challenging in a cross border context as an installation (pipeline or storage) can cross several MS: to which state will the installation (activity) have to surrender allowances in case of leakage? And what is the reliability of detecting leakages?
- The transfer of responsibility does not cover everything: Operators can still incur liabilities from certain sources after transfer and if operator is in fault. The state can also postpone the transfer..
- MS should try to close off some of these uncertainties (provide for ex that the operator's liability can not be revisited after site transfer)
- Financial security: Commission's consultants have estimated likelihood of leakage, size etc. And found that for a 54MT 40-year storage site, the cost of FS to operator would be maximum 20 million euros, - or less than 50 cents/tonne.

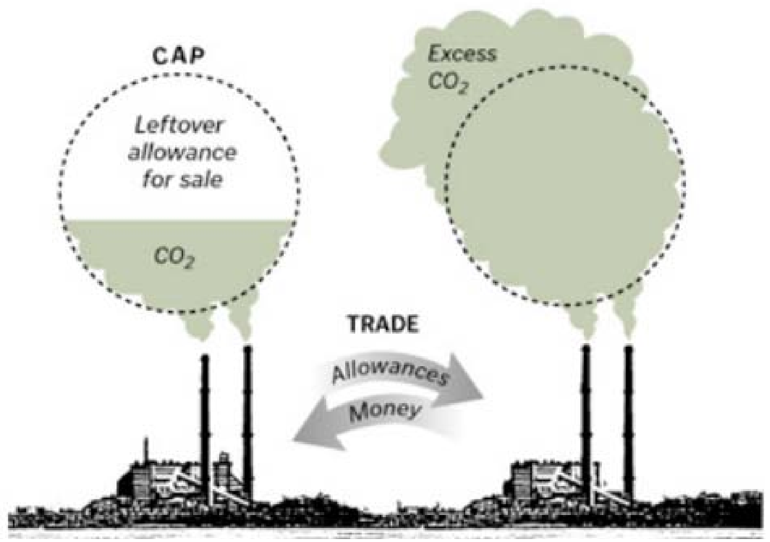
CCS- Liability issues		Recommendations	Comments
	Cross border liabilities	Define guidelines for allocation of risk between countries in cross border projects (cross border pipelines, cross border storage sites and ships transporting CO_2)	Encourage countries to involve in cross border projects by giving certainties regarding the allocation of EUA in case of leakage.
	Long term liability/transfer	Favor the transfer of all liabilities, including liabilities to third parties Define mechanism to avoid the delay of transfer to the State	
	Trust Fund	Establish a Trust Fund to mutualise responsibility of storage operators	To be established either at national of EU level and financed by operators by way of a fee per tonne of CO_2 injected. Fund to be used to cover liabilities or expenses not already covered by the financial guarantee and any other liabilities that are excluded from the transfer How relevant is it really?
	Financial guarantee/ contribution	Clarify whether the constitution of a Financial Contribution and Financial guarantee are applicable for CCS for EOR	



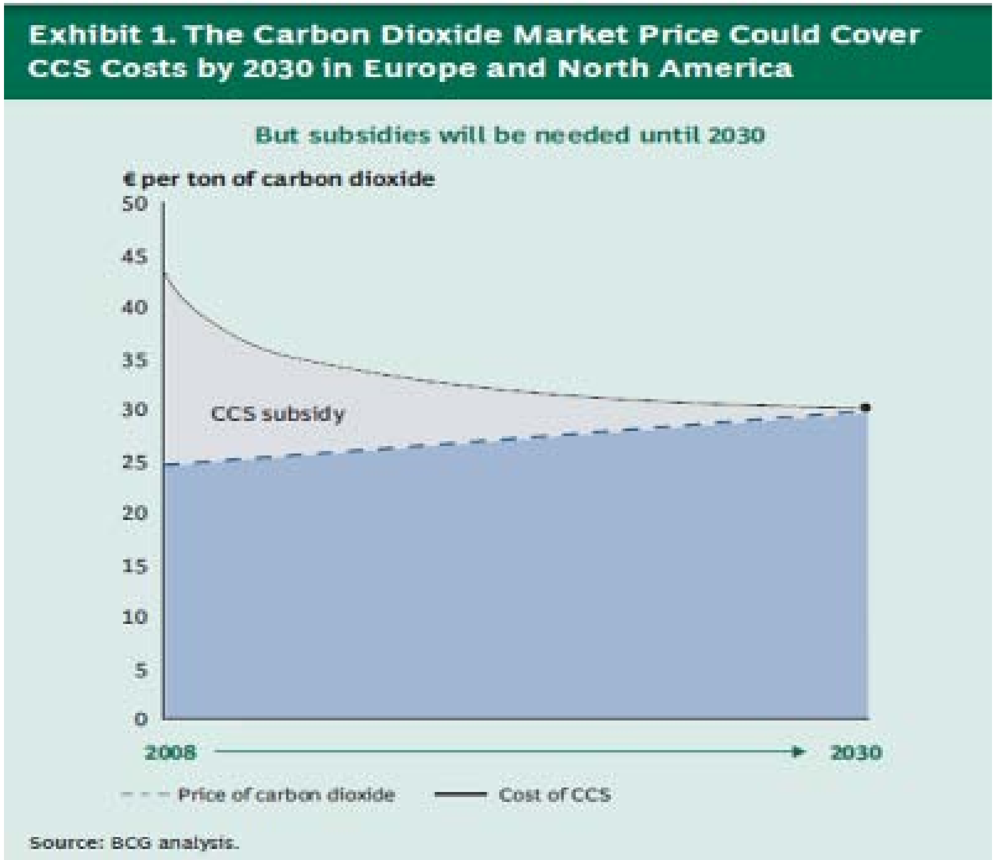
If CCS works, CO_2-EOR will work!

- The challenge is to find the most efficient measures while avoiding the risk of accumulation of subsidies to fossil fuel and while reducing the financial burden on State’s budgets
- The ideal would be to have the same incentive scheme applicable to all CCS projects, including CO_2-EOR projects at least in the medium and long term.
- If a specific scheme for CO_2-EOR is introduced there is a need to limit them in time and to avoid accumulation of subsidies

Emission credits for CCS



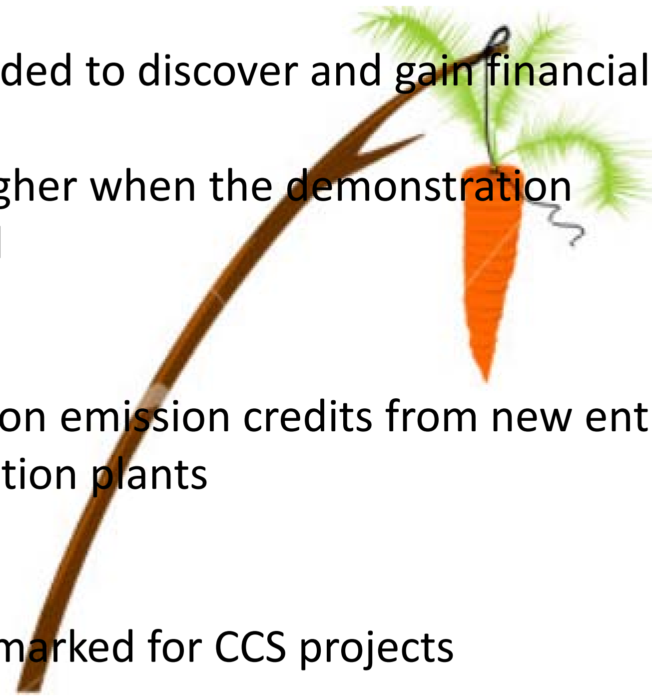
The ETS regulative was augmented so that CO_2 captured and stored is considered not emitted. This gives an incentive to invest in CCS.



In the long run (2025-2030), it is expected that the price of emission credits and cost of CCS will meet. When this happens, CCS is considered commercially mature.

Financial support to encourage early movers

- Substantial industrial experience exist for all individual parts of the CCS value chain, but large-scale experience is very limited
- Demonstration at near-commercial scale is needed to discover and gain financial and technical confidence
- Learning effect of demonstration program is higher when the demonstration programme is carried out at the European level

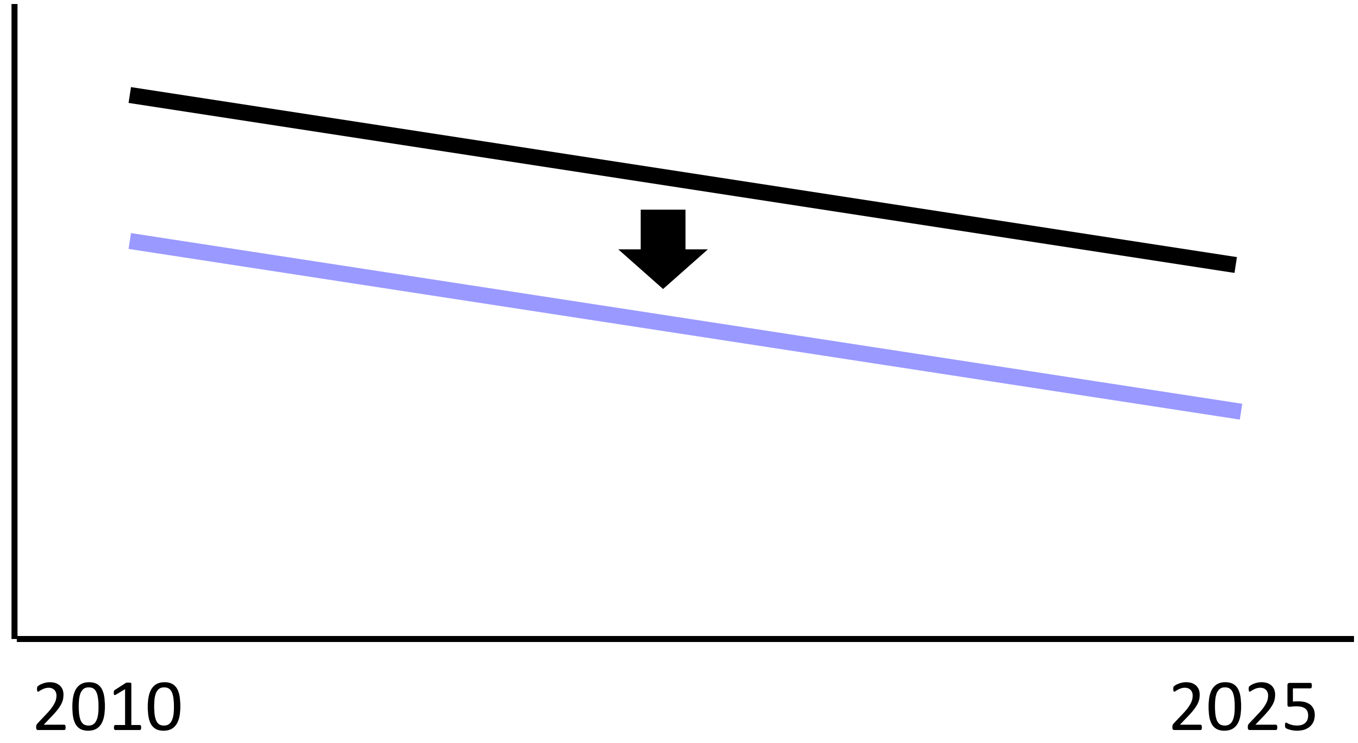


Status:

- NER300: Revenues from auctioning of 300 million emission credits from new entrant reserve earmarked to finance 10-12 demonstration plants
- 1.05 billion EUR from EU recovery package
- Structural funds
- 20% of Norway`s contribution through EEC earmarked for CCS projects

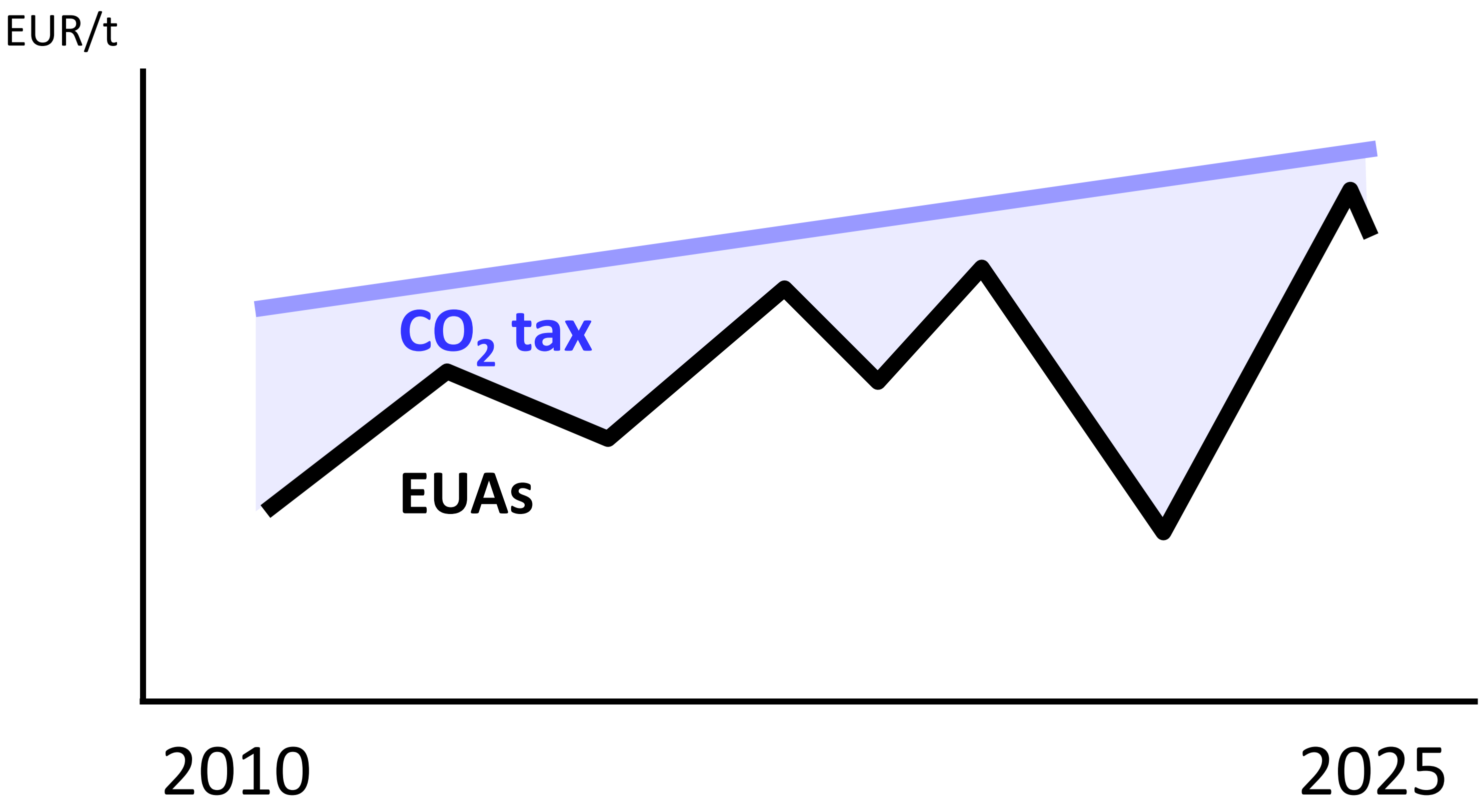
Improving the Emission Trading System

Amount of EUAs



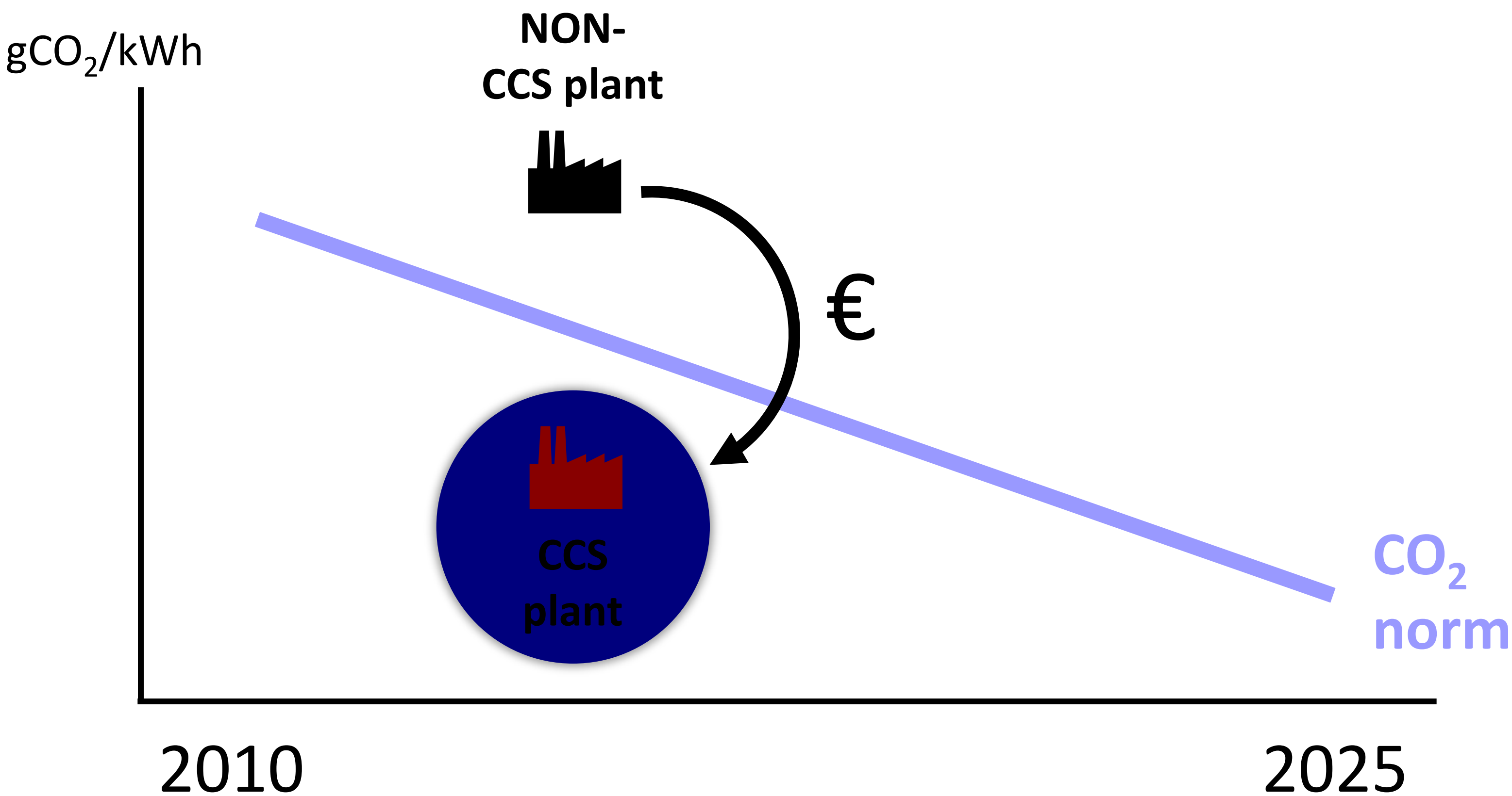
Reducing the cap, stabilising the price

Carbon price floor



EUAs + carbon tax (tax back in fund?)

Bonus-malus



Establish a 'shadow' carbon price for power sector without taxing it

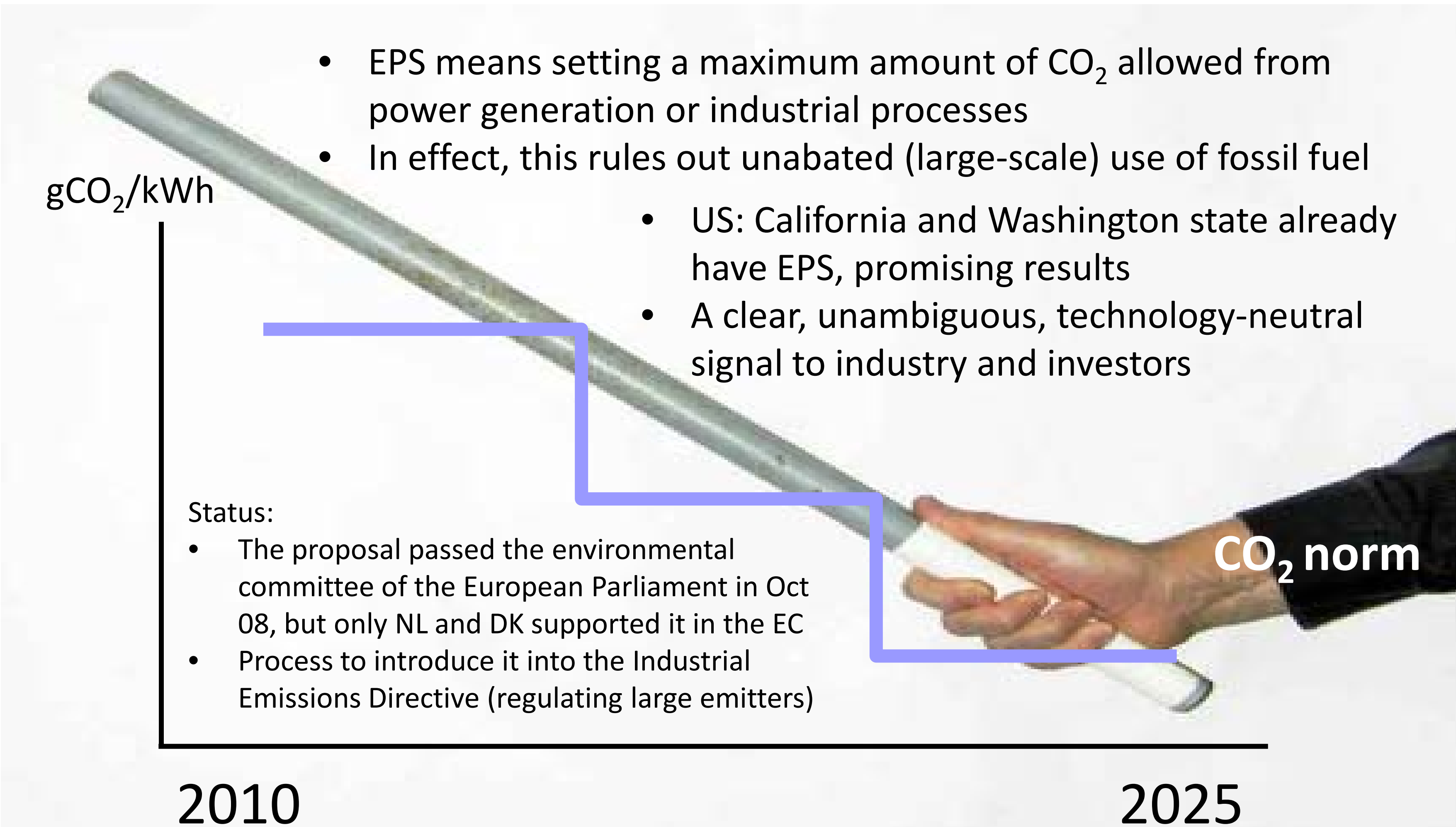
Emission Performance Standard

- EPS means setting a maximum amount of CO_2 allowed from power generation or industrial processes
- In effect, this rules out unabated (large-scale) use of fossil fuel

- US: California and Washington state already have EPS, promising results
- A clear, unambiguous, technology-neutral signal to industry and investors

Status:

- The proposal passed the environmental committee of the European Parliament in Oct 08, but only NL and DK supported it in the EC
- Process to introduce it into the Industrial Emissions Directive (regulating large emitters)



	Financial Incentives	Description	Comments/recommendations	Are these existing policies or new recommendations?
Current General incentive Schemes applicable to all CCS project	Emission Trading Scheme/ EU subsidies/ States subsidies	EU - ETS NER 300 EERP 50% of revenues from auctioning allowances to be used by MS for climate measures, including CCS Direct subsidies at national level	Insufficient incentives to encourage wide deployment of CCS. Recommendation to establish incentive schemes common to all CCS projects, including EOR projects, to encourage a wide portofolio of CCS projects. If not politically feasible, specific incentives for CO_2 for EOR to be considered as a fall-back for a given time (time to be clearly defined).	Existing policies EU policy National policies
Additional General incentives to be considered (example)	Capacity Market	Create a Forward Capacity Market to low carbon electricity generation for any sources not already supported by support schemes (such as feed in tariffs or green certificates)	Stimulates CCS investments and gives predictability to investors	New Incentive - Adaptation of traditional FCM
	Bonus Malus Schemes	Scheme directed towards CO_2 producers. Power plant emitting under a specific norm are rewarded (bonus). Power plant emitting above a specific norm are penalized (malus)	Creates long term predictability for a high price on CO_2 emission in the power sector	New Incentive - Suggested by the Netherlands' CCS task force recommendation
	Reward stored volume of CO_2 for permanent storage through delivered CO_2 price support	Directed toward storage operators		New incentive

Specific tax incentives for CO_2 for EOR	Options to consider	Tax exemption/tax reduction Shorten depreciation time Tax credit Modification of the tax basis	Applicable only for a kick-off period – until sufficient EOR projects have created a market for CO_2 storage. To be reviewed if more general CCS incentives are introduced. Need to avoid accumulation of subsidies. Verify compliance with State aid rules	New incentives-Recommendations mainly based on similar tax incentive schemes in US
	Tax exemption/reduction	Grant tax exemption or reduction for all oil produced through CO_2 for EOR Alternatively only for a specific volume of oil produced through CCS for EOR	Consider risk that oil companies under-estimate their resources recoverable without CO_2 in order to maximize profits	Id.
	Period of depreciation	Shorten depreciation time on investments directly tied to the use of CO_2 for EOR	Gives lower taxable income in the period from initial investment to full write down and consequently a lower up-front taxation	Id.
	Tax credit	A tax credit could apply to all costs associated with installing the CO_2 flood, CO_2 purchase and CO_2 operating costs	With a tax credit of 15% granted, the remaining 85% of qualifying costs would be depreciated normally	Id.
	Modification of the tax basis	Base taxation on the achieved oil price in the market place rather than on an averaged fixed price	Enables companies to hedge their production and reduce further risk by selling oil on forwards contracts without being taxed based on a potentially higher average fixed price assessment than actually achieved	Id.

Organisation of the Value chain	Issue	Recommendations	Comments
	Buffer location	Clarify the regime of buffer location to avoid any significant risk of leakage and environmental health risks Clarify Third party access to buffer location	
	Vertical integration/ Versus independent TSO	Assess the potential effects of vertical integration on competition. Consider the establishment of independent TSO MS to ensure transparency and non-discrimination in the access to infrastructure (information and condition of access to be published)	Need to avoid situation of ownership structure resulting in competition distortion Independent TSO could manage capacity allocation and coordination of CO2 flows.
	Third party access	Need to clarify the circle of those who are entitled to require access to transport and storage network Clarify access to buffer location Use approach of EU gas legislation Stimulate TPA through the assessment of the PDO	Need for flexible mechanism as infrastructure not yet established. The Norwegian petroleum concession system gives the competent authority the legal basis for stimulate third party access through injunction and prohibition when assessing the POD

Clarity and pre-visibility required from investors

Clear policies

Financial **support** necessary for at least the first movers

Avoid multiplication of subsidies to fossil fuel

To enable support schemes to be effective, **address access to transport and storage network**

Thank you for your attention!

Improving the Regulatory Framework, optimizing organization of the CCS value chain and financial incentives for CO_2-EOR in Europe

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Abstract

This article provides recommendations for improvements of the regulatory framework that is deemed necessary to facilitate the establishment of CO_2 value chains in the near term. The recommendations address liability issues, cross border regulations and emission trading schemes (like EU ETS). Recommendations for an overall organization of the value chain in terms of access rights, trans-boundary transport and storage of CO_2 and rules for utilization/capacity allocation are also made.

A range of financial incentives for CCS and CO_2 for EOR are reviewed. The article