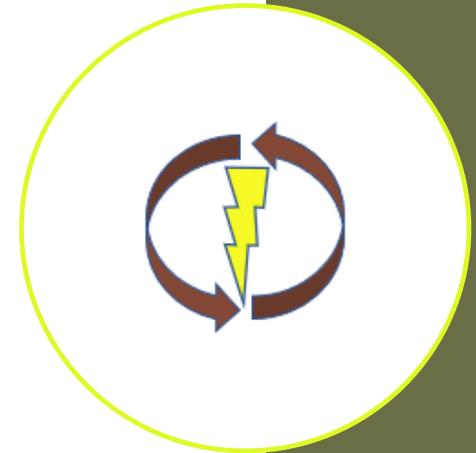


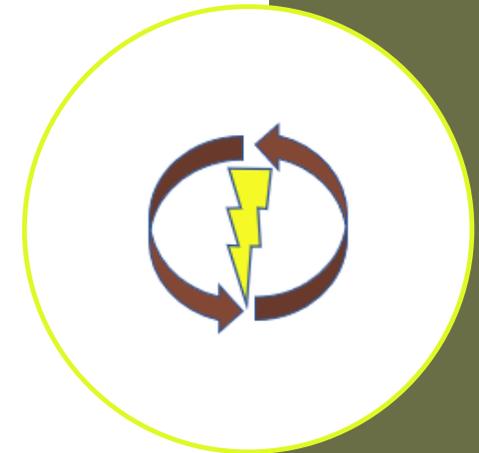
Carbon Take Back Obligation (CTBO)

- Why do we need it?
- What is it?
- How do we pay for it, and who is 'we'?
- What impact could it have?
- Advantages
- Conclusions



Why we need a CTBO

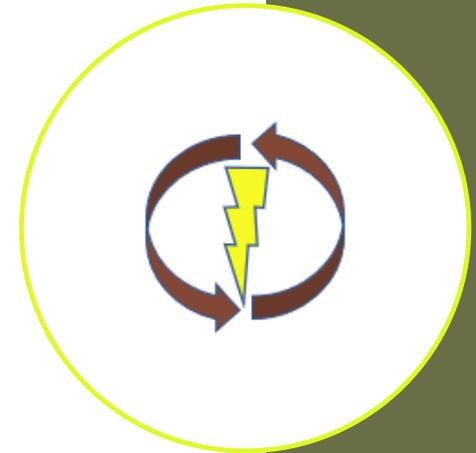
- Scenario's: growing energy demand (probably) requires continued use of fossil energy and therefore significant amounts of CCS
- Current approach is not working;
 - carbon pricing: too (s)low and uncertain
 - no public support for massive and long-term subsidies
- Disconnect between 'moral' and 'formal' responsibilities for emissions
- Disconnect between decisions on energy supply and security and decisions on climate and emission reductions
- Reduced trust in fossil fuel industry, increasing polarisation, calls for supply side bans, 'leave it in the ground', divestments, court cases, etc.



What is a CTBO?

A smart supply-side policy balancing carbon produced and carbon stored

- Obligation on the producer to permanently store an increasing % of the carbon taken out of the ground
 - Comparable to Renewable Energy portfolio standards
 - Consistent with Extended Producer Responsibility for other products
- Includes tradeable CO2 storage certificates
- Storage (certificates) costs are paid by the producer
- Compliance options: generate own certificates, buy certificates
- Insufficient storage certificates: penalties, or possibly other options:
 - Purchase/retire ETS-allowances
 - Allow also certified nature-based CDR certificates, up to a certain maximum percentage e.g. (forestry, agriculture, etc)

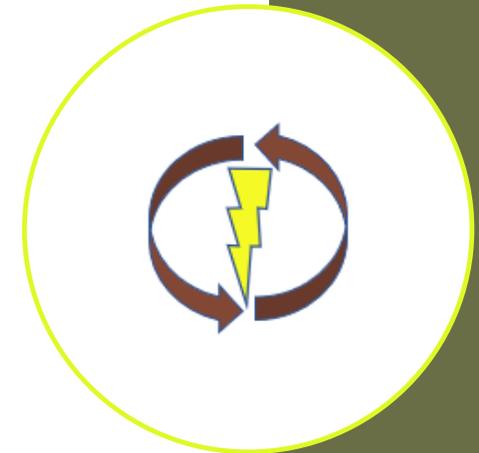


For example, applied to NL natural gas use:

- Around 40 bcm of gas expected to be used in 2025,
- Which releases around 72 Mton of CO2
- Assuming a CTBO of 5% in 2025 (going up to 100% in 2050)
- This will require storage certificates for 3.6 Mton (per year) in 2025.

- Companies can decide to act alone or to set up a dedicated company (private, or public/private partnership)

- Interesting precedents can be found in the waste industry, eg organisation set up to collect and process **packaging waste** (afvalfonds verpakkingen), electrical goods, household appliances, etc.
- **Extended Producer Responsibility** is a core element of a more Circular Economy





NL CTBO: estimated storage requirement

YEAR	GAS USE bcm	CO2 Mton	% CTBO	Stored Mton
2025	40	72	5	3.6
2030	40	72	20	14
2040	20	36	50	18
2050	10	18	100	18

How do we pay for this? and who is 'we'?

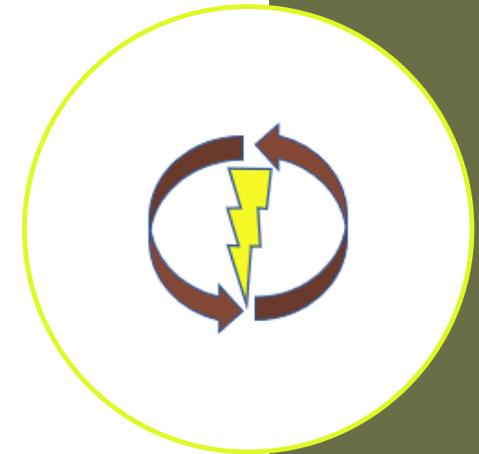
The fossil energy value chain has many beneficiaries: producers, governments, industrial users, consumers: **they should all contribute and pay**

Possible sources of revenue (to offset costs of storage certificates):

1. Redistributing fossil energy revenues on supply and demand side
who: governments & oil/gas companies
2. Savings from reduced carbon taxes or emission certificates
who: industrial users
3. Premium product prices by selling 'Paris-compliant' fossil energy
who: customer

A CTBO means: polluters pay to clean-up

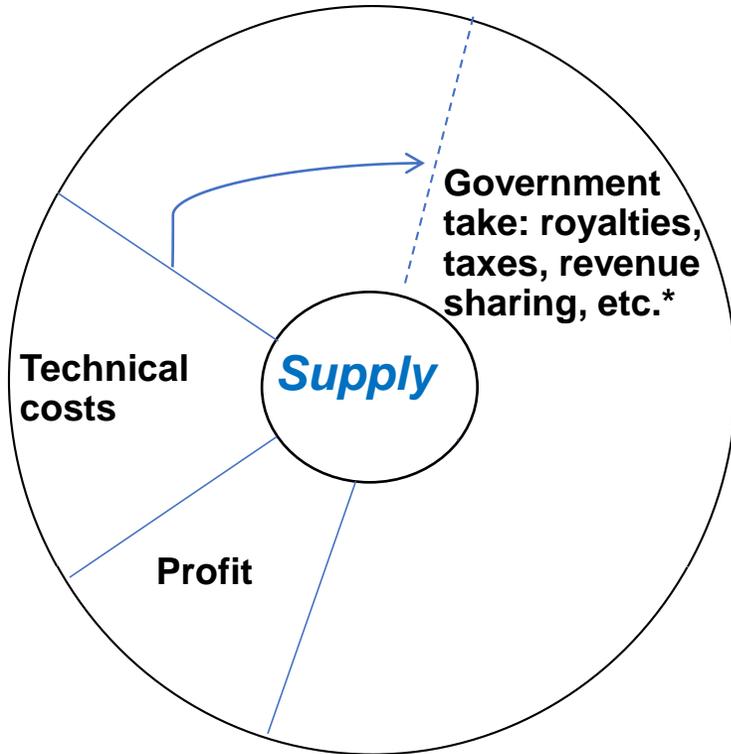
A carbon tax often means: polluter pays.... to pollute



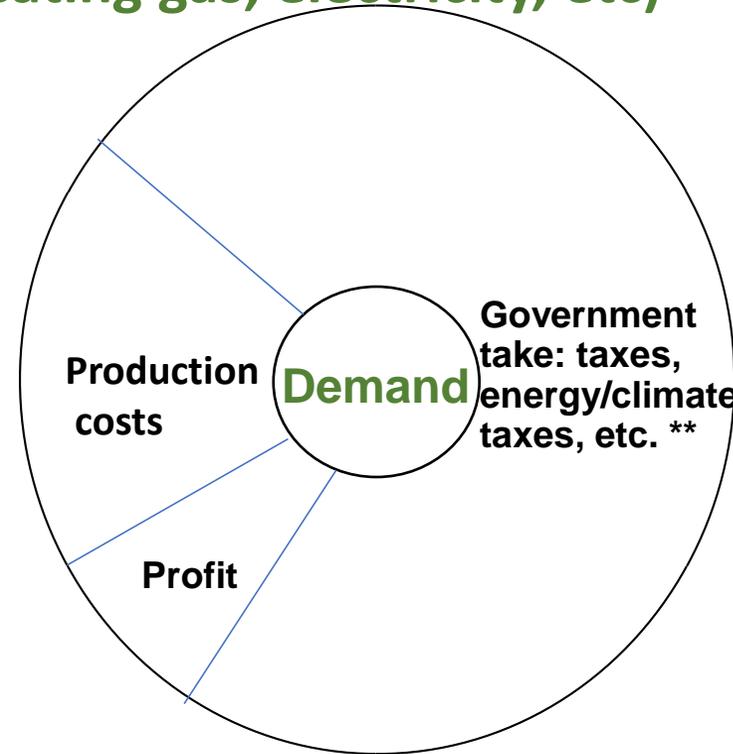
Supply and Demand



Commodity Price (oil, gas, coal)



Consumer price (gasoline, diesel, heating gas, electricity, etc)



Large margins often between 'technical production costs' and commodity market prices

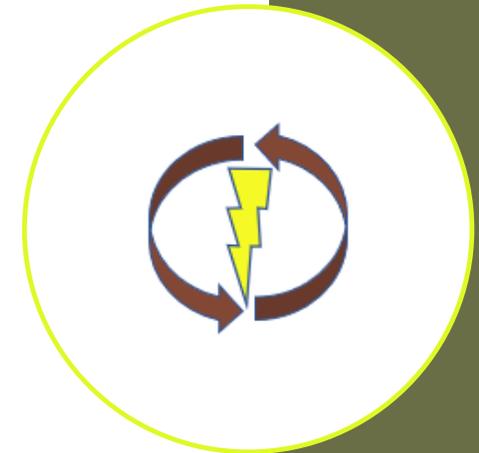
Large margins often between product costs and consumer prices

* Government take varies from very little for small, marginal, end-of-life fields to very high for the best reserves (eg > 80% for Groningen gas field in NL)

** Government take varies significantly per country and for different types of consumers. Lower tax rates are common for large users in most countries and for eg aviation and shipping fuels.

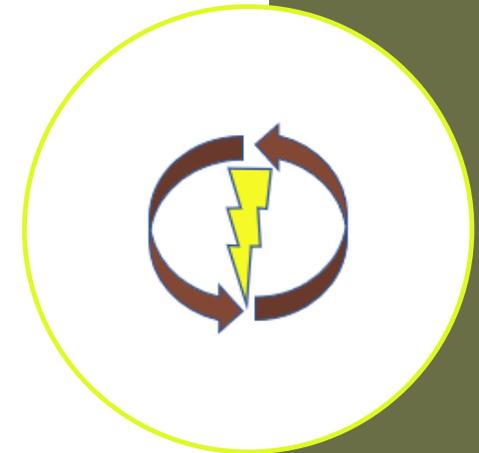
What could be the impact of a CTBO?

1. Accelerates **'traditional' CCS projects**: industry, power plants
2. Stimulates business-driven innovation: more **integrated** solutions in which producers convert fossil energy into **end-user products** such as **hydrogen** and **electricity** (and possibly other fuels with lower footprints)
3. Stimulates CDR (Carbon Removal) Technologies: DAC, BECCS, forestry, agricultural carbon storage, solid materials (olivine, concrete, building materials, etc)



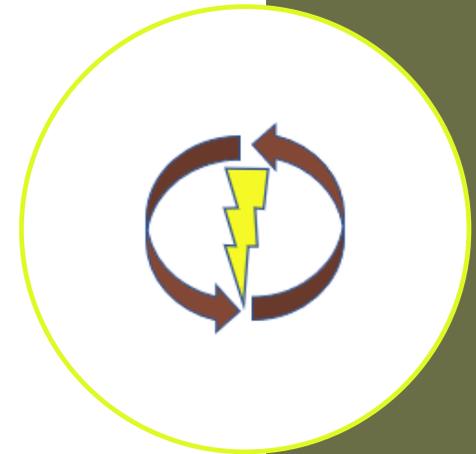
Advantages

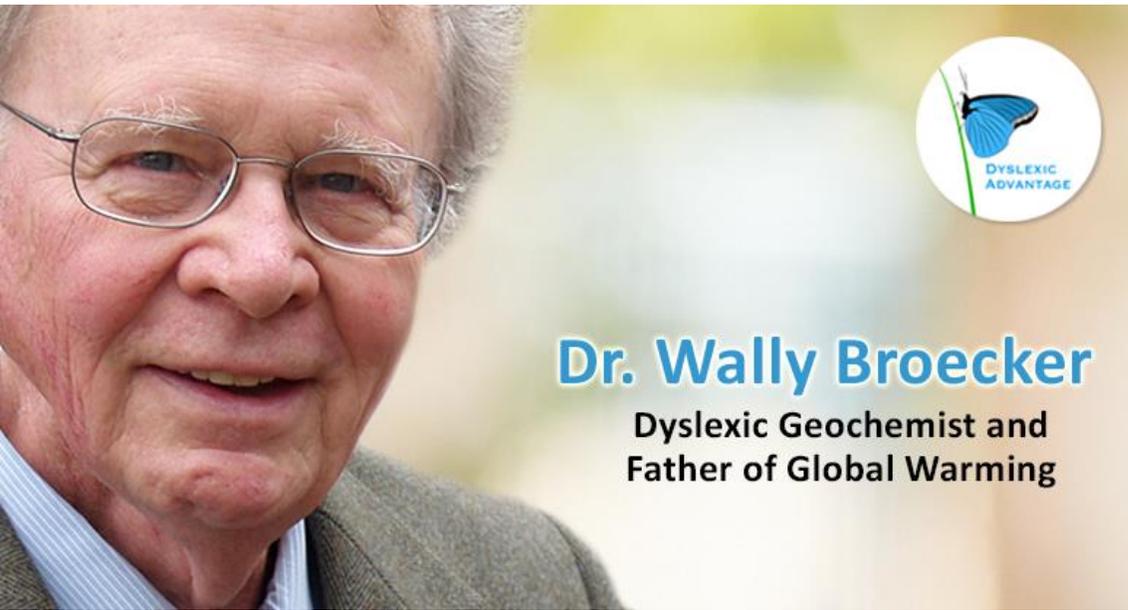
- More certainty that **emissions will actually be reduced**
- **Public support** as 'supply-side' is made co-responsible for waste disposal
- **Reduces subsidies** needed for CCS for industry
- Makes **blue hydrogen economically feasible** with limited public funding
- Can be done at national level with **little risk of leakage**, waterbed, etc.
- Will **incentivise oil & gas producers** to efficiently use their assets, expertise and resources to decarbonise the use of fossil resources
- Will help **governments** to justify continued **permitting** of hydrocarbon production while respecting Paris agreement NDC's
- Will give **investors** a 3rd option (in addition to simply invest or divest)
- **Easy to administer**: 100 companies are responsible for 71% of world-wide production (and all relevant data is already collected).



Recap: why we need a CTBO

- Scenario's: growing energy demand (probably) requires continued use of fossil energy and therefore significant amounts of CCS ✓
- Current approach is not working;
 - carbon pricing: too (s)low and uncertain ✓
 - no public support for massive and long-term subsidies ✓
- Disconnect between 'moral' and 'formal' responsibilities for emissions ✓
- Disconnect between decisions on energy supply and security and decisions on climate and emission reductions ✓
- Reduced trust in fossil fuel industry, increasing polarisation and calls for supply side bans: 'leave it in the ground', divestments, court cases, etc. ?





*"Garbage brought disease to our streets.
We learned to dispose of it.
Sewage poisoned our waters.
We learned to treat it.
CO2 threatens to change our climate.
Hence, we must learn how to capture and bury it."*

