

Overview presentation

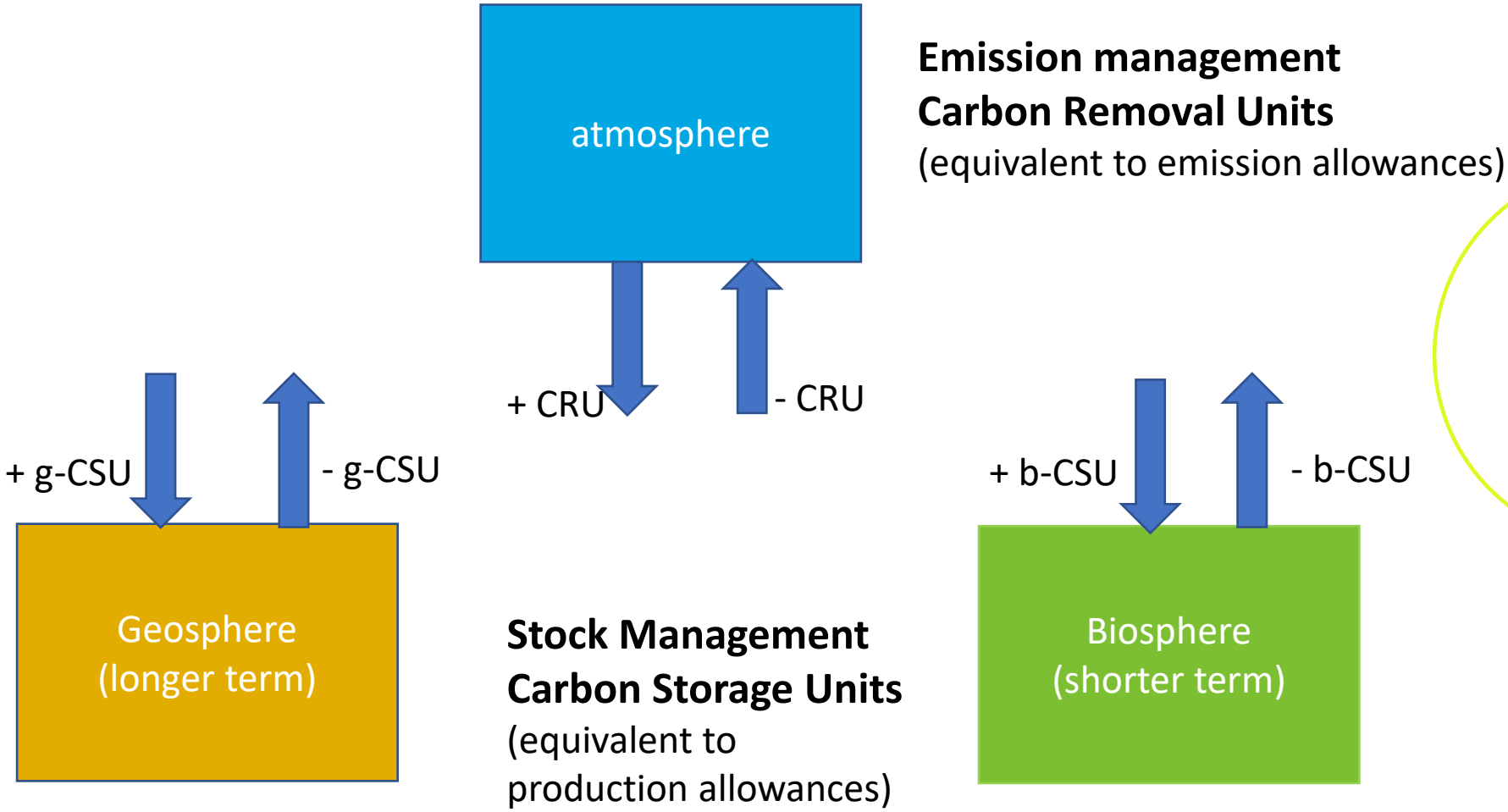
1. Carbon accounting net zero world
2. CTBO study NL
3. Carbon Removal accounting
4. Conclusions and Recommendations

NL CTBO report:

https://uploads-ssl.webflow.com/5f3afd763fbfb08ae798fbd7/6012eccf84bfa326b5ee01ce_CTBO_Final_Report_Jan_2021.pdf

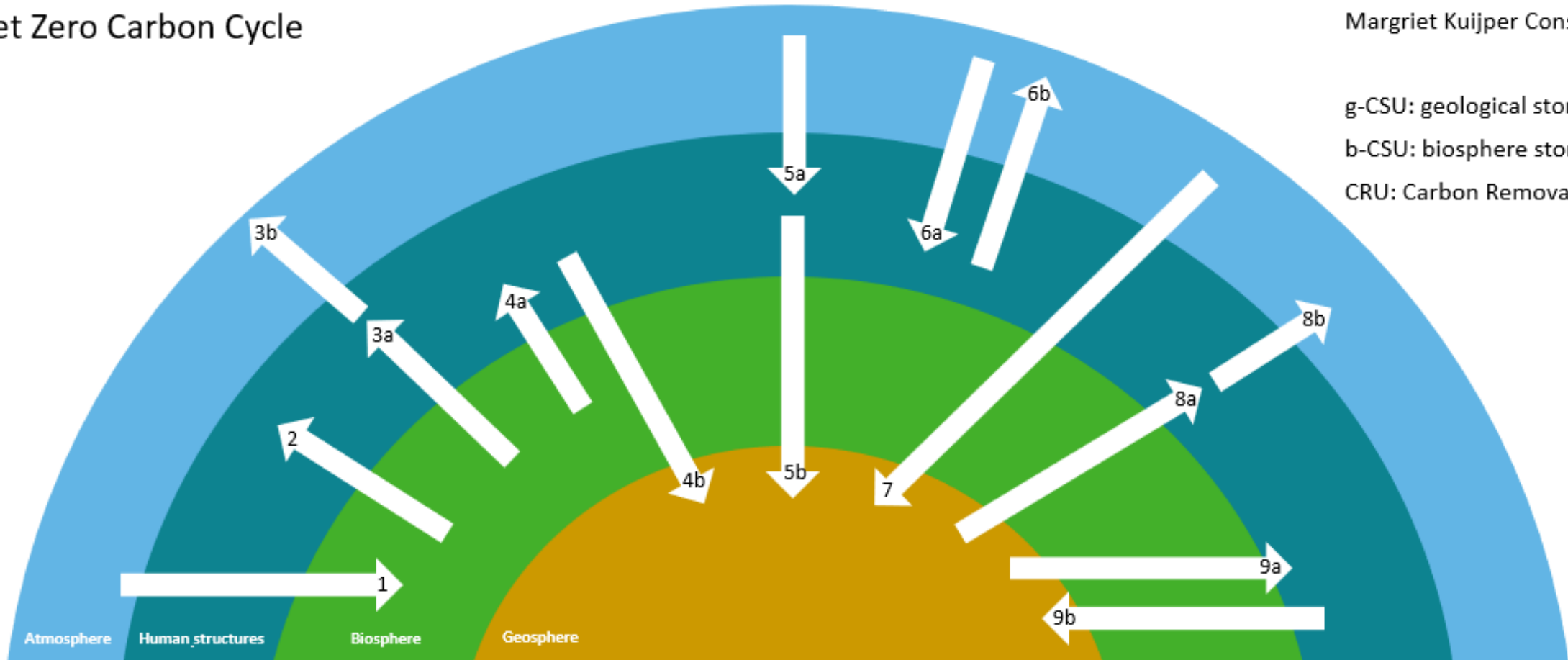


Carbon Accounting in Net Zero World



Net Zero Carbon Cycle

Margriet Kuijper Consultancy



g-CSU: geological storage unit
 b-CSU: biosphere storage unit
 CRU: Carbon Removal Unit

Type	Activity	Type	CSU	CRU
1.	Growing forests (reforestation)	1.	+ b-CSU	+CRU
2.	Timber use construction	2.	- b-CSU	
3.	Biomass use for energy	3a.	- b-CSU	
		3b.		-CRU
4.	BECCS	4a.	- b-CSU	
		4b.	+ g-CSU	
5.	DAC + CSS	5a.		+CRU
		5b.	+ g-CSU	

Type	Activity	Type	CSU	CRU
6.	DAC+CO2 for synthetic fuel	6a.		+CRU
		6b.		-CRU
7.	Mineralization	7.	+ g-CSU	+CRU
8.	Unmitigated fossil carbon use	8a.	- g-CSU	
		8b.		-CRU
9.	Fossil carbon use with CCS	9a.	- g-CSU	
		9b.	+ g-CSU	

Like-for-like principle

Which technologies/activities can generate Carbon Storage Units that can be used for fossil carbon production?

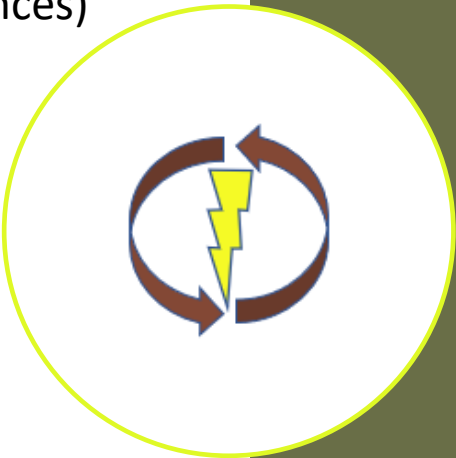
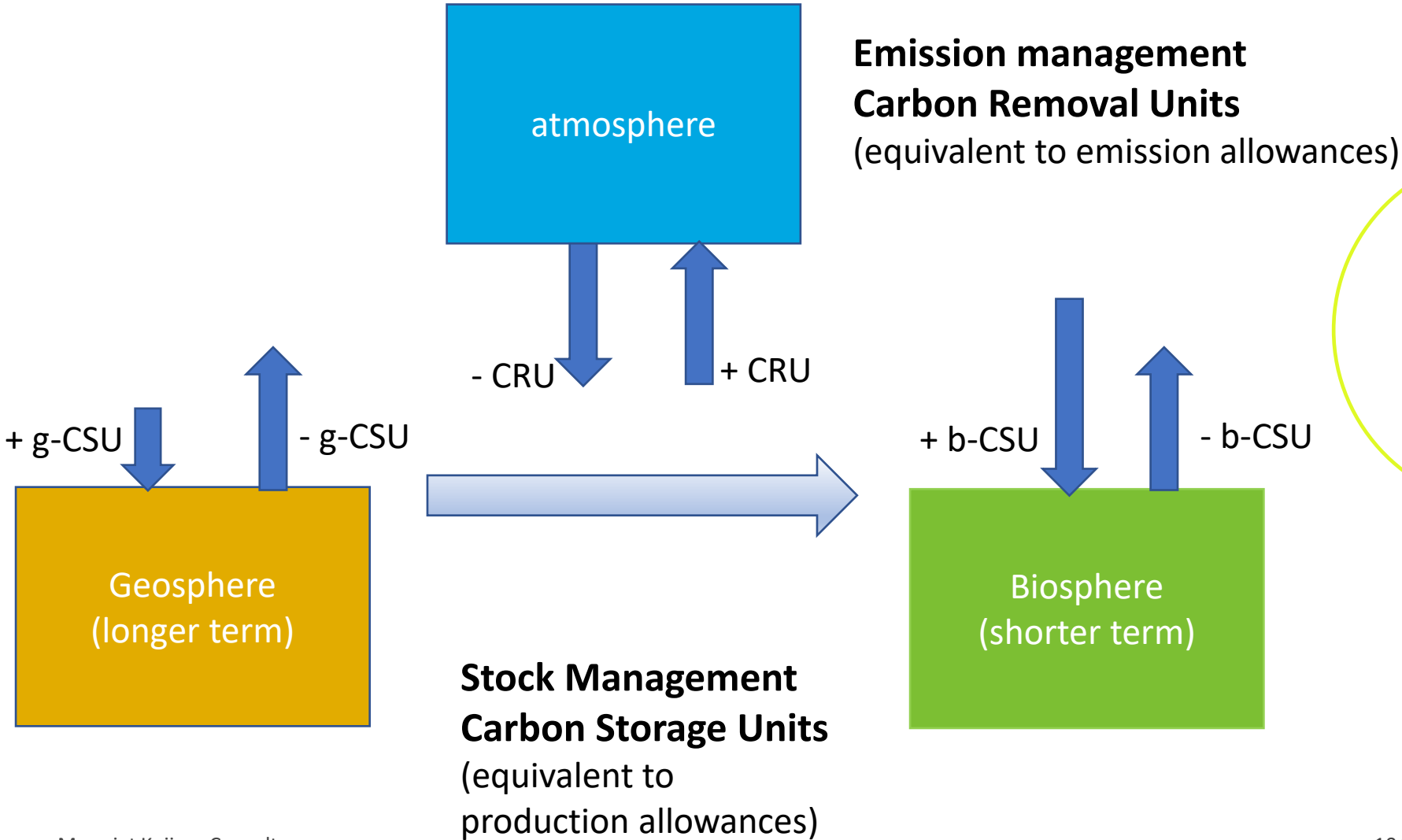
Only activities that safely store/sequester the carbon for a very long time (>1000 yrs)

Examples:

Geological storage, mineralisation, biochar, black carbon



Carbon Accounting in Net Zero World *with transfer geo- to biosphere*



CTBO study NL

1. Multi-stakeholder study looking at objectives and design options for a CTBO for natural gas
2. Follow-up study starting May 2021
3. Legal/regulatory basis: Extended Producer Responsibility principle

Selling natural gas on the Dutch Market would include a responsibility to collect and safely store the waste (CO2).

4. Sponsored by Oil&gas companies and Ministry Economic Affairs and Climate Change



CTBO: impact in value chain

Helping customers decarbonise:

1. **CCS:** Large point sources (gas or other hydrocarbons) for whom easiest/cheapest/quickest way to reduce emissions is by CCS
2. **Low-carbon electricity or hydrogen:** users that can switch to electricity or hydrogen should do so; this can also be supplied by gas + CCS until enough renewable energy is available and green hydrogen is scaled up
3. **Bundled sales:** Users for whom it is very difficult or expensive to switch, and therefore prefer offsets



Bundled sales

Customers that continue to burn & release CO₂ create 2 problems:

- 1) Their own emissions need offsets (CRU)
- 2) Producers/suppliers of fossil carbon need an alternative source of carbon to store (g-CSU)

By investing in long-term carbon removal technologies the fossil energy supplier can procure both: CRUs and CSUs and offer **‘virtually decarbonised products’**.

CSUs are needed to meet the CTBO requirements (and to produce the hydrocarbons)

CRUs are needed by the customer to offset/neutralize his emissions in compliance markets



Examples

1. DAC + Carbon Storage:
 - DAC: generates CRU
 - CS: generates CSU
2. Mineralisation:
 - Generates both: CSU and CRU
3. BECCS (and possibly biochar):
 - Generates both: CSU and CRU

Conclusion: a CTBO will ADD a revenue stream for any Carbon Removal activity resulting in PERMANENT storage.

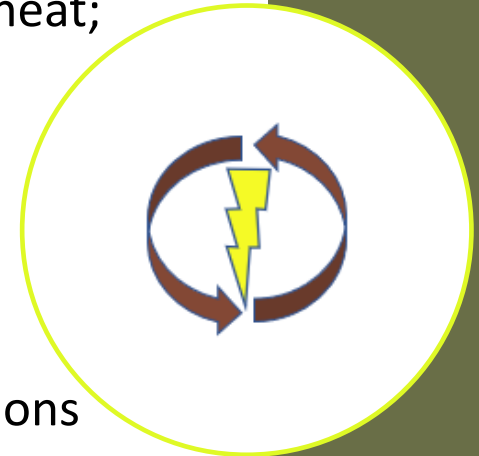
When fossil carbon producers run out of fossil carbon to store they will be looking for other sources of carbon (biosphere, atmosphere) to generate sufficient CSUs.



Conclusions & recommendations

TRUST in accountancy is paramount, therefore any system needs to:

- Be **simple**: the more complex the more difficult to explain, the easier to cheat; counterfactuals, LCA's etc don't help
- Contain **cross-checks**: emissions are invisible, difficult to measure, etc, so system-level x-checks are essential
- Regulate **stocks and flows** management ALL along the value chain
- Be **future-proof**: avoided/reduced emissions are NOT removals
- Be **consistent** in the way emissions/emitters are treated, to avoid accusations of 'accounting tricks' (eg bio-energy rules)



Conclusions & recommendations (2)

Leading to the following recommendations:

1. Certify and reward 'removal' and 'storage' separately:
Complementary roles for **carbon custodians** and **carbon emitters**
2. Introduce 'Carbon Takeback' requirements for any carbon stock that can cause emissions due to human activities
3. Distinguish between Carbon Removal and Negative Emissions:
 1. Carbon Removal unit/certificate: 1 ton of CO₂ removed from the atmosphere
 2. Negative Emissions (project, activity): net amount of carbon removed taking into account also any emissions generated in the process of carbon removal
4. Restrict sale/purchase of Carbon Removal Credits (compliance markets)
 1. Sale: only by entities with Paris-aligned net zero targets
 2. Purchase: only for compensation of 'hard-to-mitigate' emissions, or overshoot/historic emissions

