Market design for the environment

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WHAT ARE WE TALKING ABOUT ?

Nature provides a number of essential services that support our lives and economies … all subject to externalities.

Common pool resources (non-excludable, subject to congestion)		Privately-owned natural resources
Overexploitation	Degradation	Underprovision
Fisheries, water resources, hunting	Pollutants at different scales (NOx, SO2, CO2, toxic effluents, …)	Biodiversity, carbon sequestration, other ecosystemic services

WHAT ROLES FOR MARKETS ? WHAT KIND OF MARKETS?

	Overexploitation	Degradation	Underprovision
Typical legacy ownership	Shared or nonexistent	Shared or nonexistent	Private
Policy objective	Ensure sustainable exploitation	Limit pollution	Encourage provision
Role for markets	Efficiency	Cost-effectiveness	Efficiency
Types of markets	Markets or auctions for quotas	Cap-and-trade, benchmark and trade, auctions for quotas, exit auctions	Payment-for-ecosystem services, project finance, biodiversity or carbon credits markets
Market governance	Public or private	Public	Public or private

KEY MESSAGE

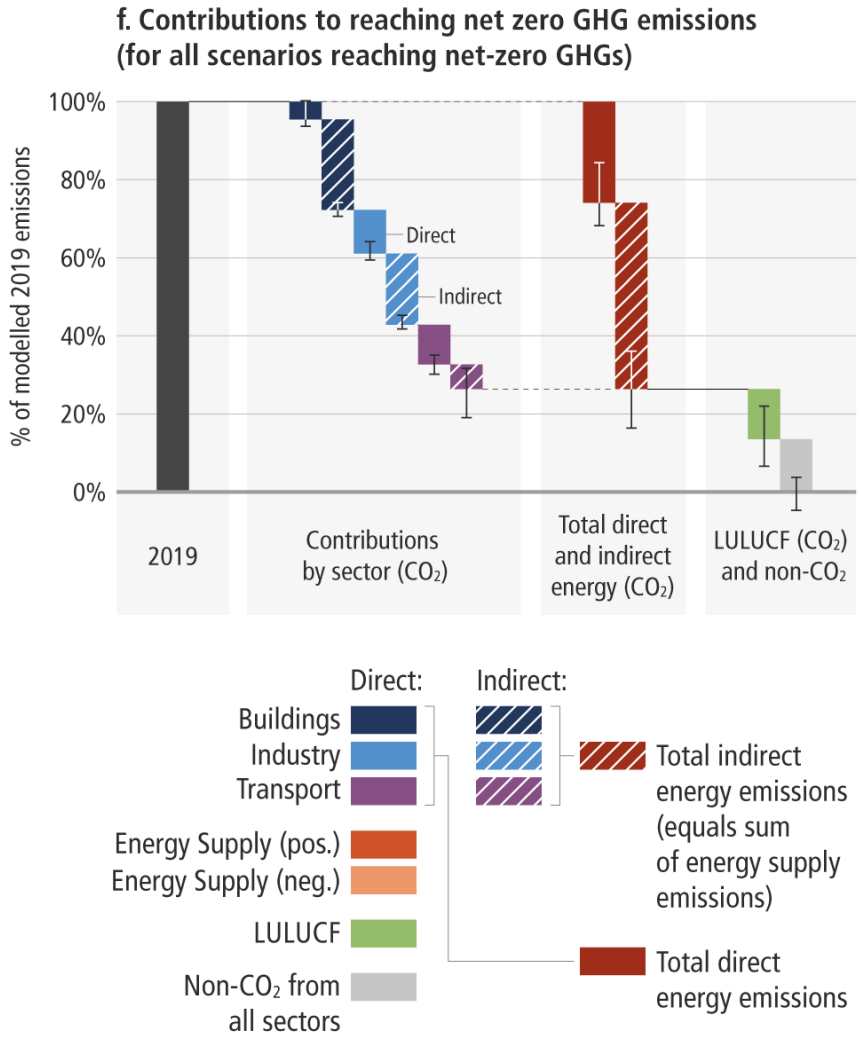
Underlying bio-physical process

Nature of market

First-order design parameters and solutions

FOCUS ON CARBON MARKETS - « POLLUTION » VS « PROVISION » MARKETS

Carbon emissions mitigation



IPCC, 2022

Carbon sinks

- Nature-based solutions could contribute 37% of cost-effective emissions reduction (Griscom et al. 2017)
- Land use and forests represent around 25% of planned contributions in NDCs (Grassi et al. 2017)

« POLLUTION » VS « PROVISION » MARKETS

	Pollution market	Provision market
	• Compliance motive • Public governance mechanism	• Mostly voluntary motive • Mostly private or hybrid mechanisms
	• Well-identified regulated entities • Property right is a permit to emit one ton of GHG	• Global market, anyone can join (self-selection) • Property right is a claim to avoid or remove one ton of GHG
Carbon is a global pollutant	• Linking, free allocations or CBAM to deal with carbon leakage (boundary problem)	• Crediting methodology to deal with boundary problem

POLLUTION MARKETS

With an application to the EU ETS

ETS: A RANGE OF MARKET DESIGN CONSIDERATIONS

- **Market scope**
  - Sectors and Gas
  - Size limits
  - Jurisdiction (linkages)
  - Time (banking and borrowing)
- **Cap** including cap adjustment mechanisms, cost containment reserves, MSR
- **Allocation of allowances**: auctions vs free allocation, allocation criteria
- **Compliance**: frequency, penalties, …
- **Market organisation**: Who can trade? Where ? What? Limits on trading ?

Role for market:
Cost efficiency

Informative and stable price signal

Other considerations:
Underlying biophysical process (CO_2 is a stock pollutant), leakage (CO_2 is a global pollutant), employment & industrial activity, implementation costs, accountability and governance

A BRIEF HISTORY OF THE EU ETS – MARKET DESIGN MATTERS

Phase I 2005-07	Phase II 2008-2012	Phase III 2013-20	Phase IV 2021-30
Scope: EU, 5 industrial sectors	Scope: Norway, Iceland and Liechtenstein, CDM and JI	Scope: Integration of aviation, new gases added (N2O and PFCs)	Scope: Phase-in of maritime transport (2024), separate ETS for buildings & road transport (2027)
Cap: EC guidelines, nat'l choice		Cap: Top-down cap setting	Cap: Accelerated decrease in cap
Nat'l registries		Single EU registry	
Allocation: grandfathered allowances		Default allocation is auctions. Free allocation based on benchmarking	Phase-out of free allowances (phase-in of CBAM starting in 2026)
Bankability and limited borrowability within phase	Allowances can be banked for the future	Backloading of allowances Market stability reserve (2019)	
	Hacking events, VAT fraud Economic crisis creates a market glut	Market regulated under MiFID	Fit-for-55 reforms (2023)

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WHAT DRIVES PRICES ?

Market fundamentals:

- Abatement costs (technology)
- BAU emissions: economic activity, overlapping policies
- Cap, timing of allocation and constraints on borrowing and banking

Eqm predictions without further frictions predict **relatively stable prices** (martingale property, shocks are spread out)

- ESSENTIAL to drive LT investment !

IS THE EU ETS DELIVERING THE RIGHT PRICE SIGNAL ?

source: tradingeconomics.com

EXCESS VOLATILITY ?

Price volatility of EU allowances high relative to other commodities despite absence of storage costs

WHY THIS EXCESS VOLATILITY ? MARKET DESIGN IMPLICATIONS

Risk management practices and/or short-sightedness of compliance firms (Quemin and Trotignon, 2021)	Support long-term markets for hedging ? Impact on cap adjustment?
Overlapping policies lead to large shocks in BAU emissions (Borenstein et al., 2019)	How should the cap be adjusted ?
Financialisation of the ETS (Cheng and Xiong, 2014)	Who should participate ?
Thin markets / compliance cycle	Lower the frequency of the market ? Staggered compliance cycles ?
Market fragmentation and opacity (Cantillon and Slechten, 2024)	Centralize trading ? Market makers ?

PROVISION MARKETS

With an appln to voluntary carbon markets

VOLUNTARY MARKETS 101

Standards

Gold Standard
Climate Security & Sustainable Development

Verified Carbon Standard

Third-party certifiers

Registries

Market platforms and intermediaries

- **Additionality**
- **Permanence**
- **Baseline accuracy** (avoiding over-crediting)
- **Traceability** (avoidance of double-counting)

Project that reduces carbon emissions relative to BAU or removes carbon

Individual or company eager to compensate their emissions

HUGE POTENTIAL BUT MARKET PLAGUED BY LOW TRUST

Thomson Reuters Foundation News

Can new global guidance for carbon market stop greenwashing?

Efforts are underway to boost the quality of carbon credits by setting a higher threshold and make it easier for corporations to know what...

21 Jul 2022

The Guardian

Revealed: more than 90% of rainforest carbon offsets by biggest certifier are worthless, analysis shows

Investigation into Verra carbon standard finds most are 'phantom credits' and may worsen global heating.

18 Jan 2023

Eco-Business.com

APAC regulators signal closer look into carbon markets amid Verra controversy

Governments and bourses across the Asia Pacific dealing in voluntary carbon markets say they are studying claims that Verra,...

15 Feb 2023

Mongabay

Carbon credits from award-winning Kenyan offset suspended by Verra

The carbon offset certifier Verra told Mongabay it had initiated a "quality control review" of the Northern Kenya Grassland Carbon Project,...

1 month ago

Grantham Research Institute on Climate Change and the Environment

Centre for Climate Change Economics and Policy

Do carbon offsets offset carbon?

Raphael Calel, Jonathan Colmer, Antoine Dechezleprêtre and Matthieu Glachant

« At least 52% of approved carbon offsets were allocated to projects that would very likely have been built anyway. In addition to wasting scarce resources, we estimate that the sale of these offsets to regulated polluters has substantially increased global carbon dioxide emissions»

Cooking the books: Pervasive over-crediting from cookstoves offset methodologies

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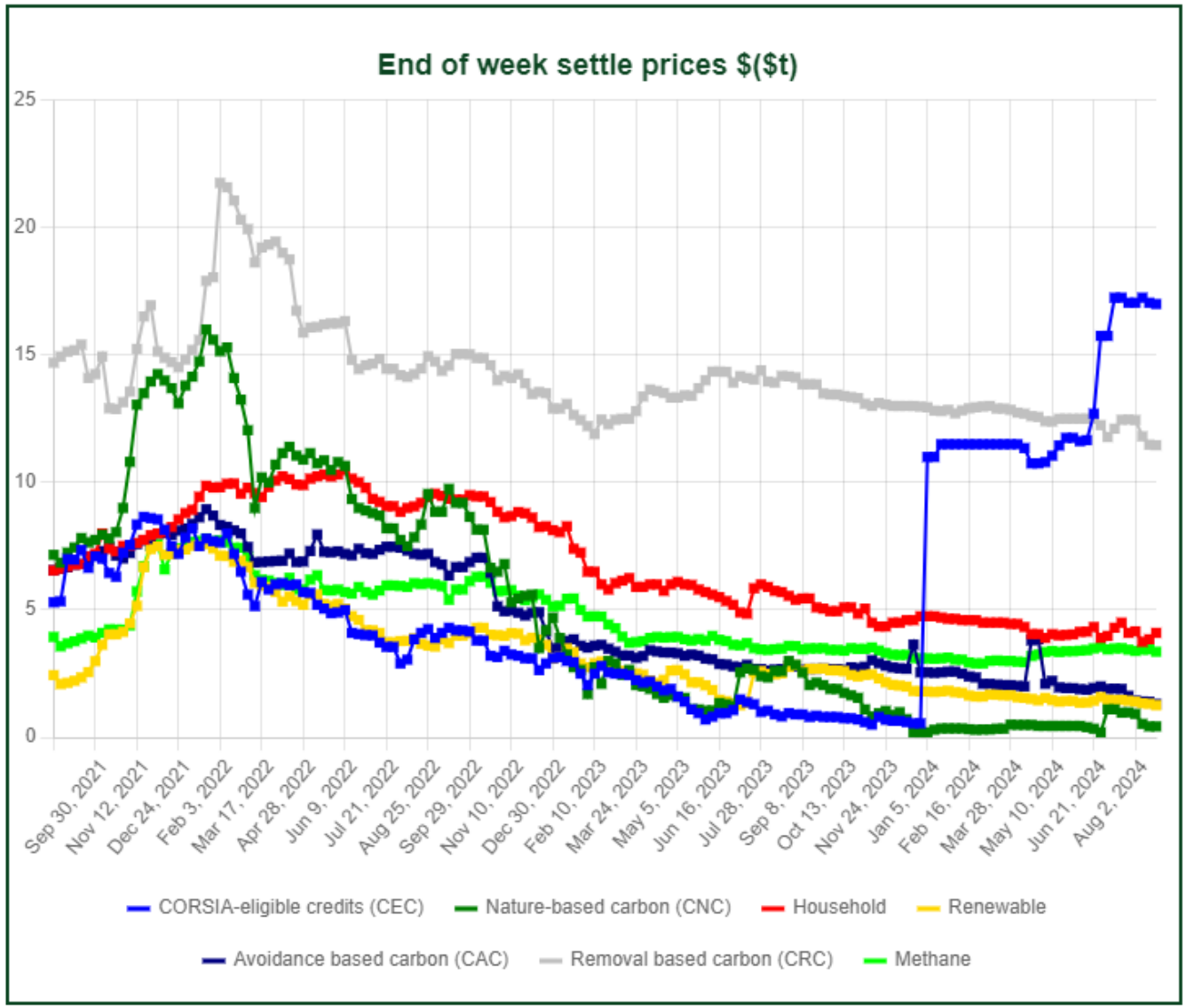
FRAGMENTATION IN VOLUNTARY CARBON MARKETS



In 2023, 261 million carbon credits issued (170 million retired)

To be compared with size of EU ETS 1,485 million in 2023 (stationary installations)

RECENT DEVELOPMENTS AND OPEN MARKET DESIGN QUESTIONS

Recent developments

- **Technological advances**
  - satellite imagery, block chain, … reduce the costs of monitoring and control (baseline accuracy, traceability)
- **Restrictions on supply and demand:**
  - Industry-wide efforts to revamp and harmonize **standards** and put restrictions on **credit use**
  - Legislative initiatives on carbon credits **certification** and carbon **credit use**
- Demand for carbon offsets will not decrease any time soon

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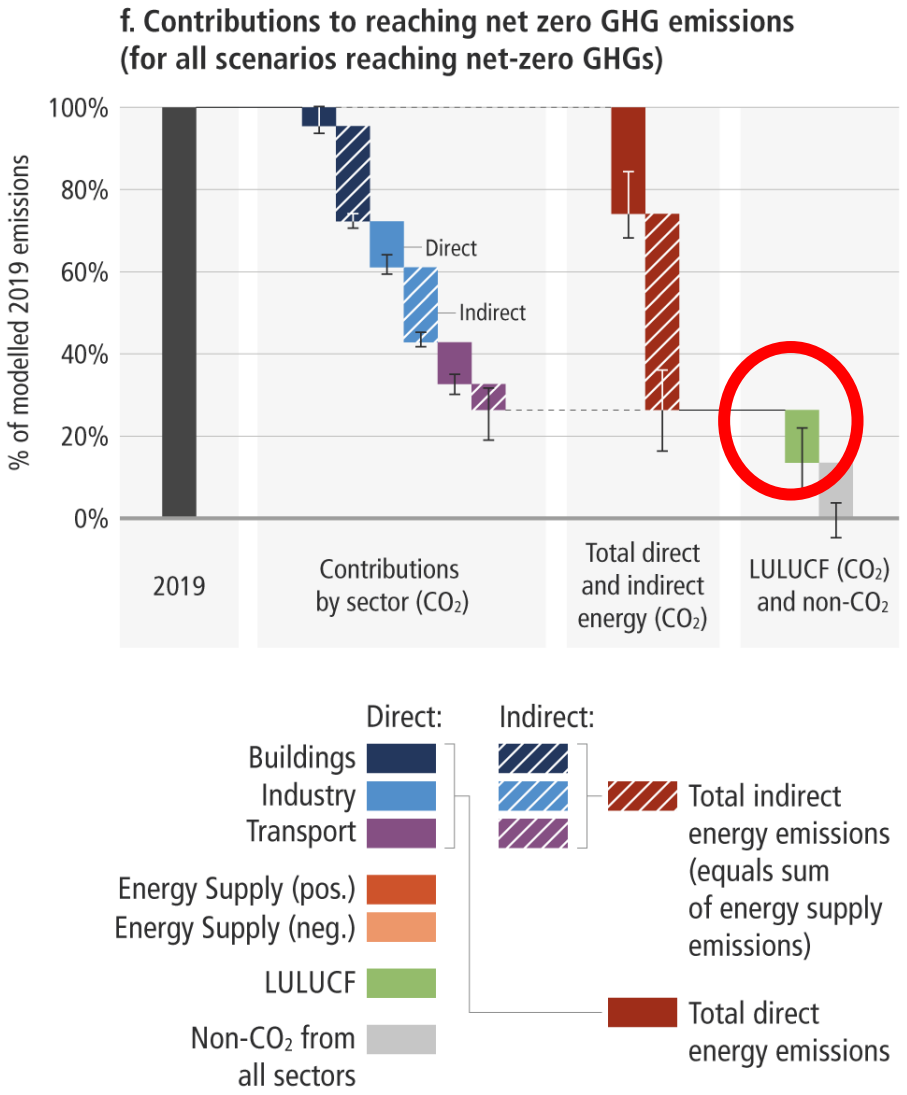
We need more

- What's the **primary objective** of a market here ?
  - Project finance in jurisdictions without a carbon price?
  - Payment for ecosystem services ?
  - Access to cost-effective abatement options
- **Asset design** at issuance level and along their life-times to mitigate the risks of overcrediting, leakage and non-permanence
- **Market governance** (lessons from the EU ETS)

SHOULD VOLUNTARY AND COMPLIANCE MARKETS BE INTEGRATED ?

- Strong pressures to do so
- Under what conditions?
- Improving the integrity of nature-based carbon markets is a must
- But important to realize that nature sinks and mitigation play distinct roles in net zero trajectories: both needed !



CONCLUDING COMMENTS

- Wide-open area for research, huge societal impact
- Fundamental questions about the nature of product traded, behavior, the proper governance of these markets

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Insight #1: Design must be tailored to underlying biophysical process

- Restriction on borrowing for stock pollutant, scope considerations in pollution markets
- Asset design that accounts for the non-permanence of the carbon removal in provision market

Insight #2: The EU ETS and the voluntary carbon market each have their issues

Insight #3: Pollution markets and provision markets are pursuing distinct objectives in the context of climate action and should not be integrated

CARBON MARKETS AS FINANCIAL MARKETS – CHOICES AROUND THE WORLD

	California ETS (2012)	Korea ETS (2015)	China ETS (2021)	EU ETS (2005)
Coverage	500+ entities, 74% of GHG	680+ entities, 74% of GHG	2,100+ entities, 40% of GHG	10,000+ entities, 39% of GHG
Status of allowances	Limited tradable authorisations	Not defined	Physical asset	Financial instrument
Primary market	Quarterly auctions	Free allocations + some auctions	Free allocations	Daily auctions
Secondary market	OTC	OTC and KRX	Shanghai EEE	OTC + EEX, ICE and Nasdaq
Derivative market	ICE and CME	-	-	EEX, ICE and Nasdaq
Participation in physical market	Compliance traders, holders of offset projects and firms offering clearing services	Compliance traders, authorized market makers, brokers (position limit)	Only compliance entities	Compliance traders + others (investors, brokers, other service providers)