FUNDAMENTAL ANALYTICS CARBON SERVICES

Module 1: Fundamentals of Compliance Carbon Markets

Carbon Market Overview

Carbon credits come in various forms: permits, project-based credits, RECs, carbon tax mechanisms, fleet efficiency credits (e.g., Tesla). The key feature across all types is pricing based on emissions per ton of carbon.

HISTORY & POLICY DEVELOPMENT

- Key Agreements: KYOTO, PARIS, UNFCCC
- Global Adoption: 85+ carbon markets covering **30%** of global emissions, with new markets emerging and existing ones expanding.

PRICING & EFFECTIVENESS

- A review by the Potsdam Institute of 1,500 emission policies concluded that **pricing carbon is the only proven method to drive reductions.**

KEY DISTINCTION: VOLUNTARY vs. COMPLIANCE MARKETS

- Voluntary: Companies and institutions opt in, often for sustainability goals.
- Compliance: Mandatory frameworks set by governments, regulators, or sector-specific rules.

Carbon Market Design

EVOLUTION OF CARBON PRICING

- 1980s: The EPA's ***Bubble Concept*** introduced emissions pricing for point-source pollutants in the U.S.
- Acid rain drove adoption of trading systems for **SOx and NOx permits,** demonstrating market-based environmental solutions.
- **The Kyoto Protocol** established an international cap-and-trade market, defining core mechanisms for carbon markets:
  - **Permits**: Account for controlled emissions within regulated systems.
  - **Offsets**: Project-based reductions outside of compliance markets.

KEY DESIGN FEATURES

- **Cap**: Limits total emissions
- **Cap Reduction**: Decreases over time to drive reductions.
- **Distribution Method**: Allocation of permits (auction vs. free allocation).

- **Compliance Periods**: Defined timelines for reporting and adjustments.
- **Monitoring, Verification, & Reporting (MVR)**: Ensures accuracy in emissions tracking.
- **Leakage**: Mitigates emissions shifting outside regulated markets.

TAKEAWAY: TWO KEY ASSETS IN TRADING:

Carbon Permits & Project Credits

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Compliance Markets Overview

Compliance carbon markets are regulatory mechanisms designed to reduce greenhouse gas (GHG) emissions by setting legally binding limits on emissions from specific sectors. Governments/regulatory bodies establish frameworks where entities must either stay within their emissions allowances or purchase additional allowances to comply. These markets operate under the principle that **market-based solutions incentivize cost-effective emission reductions while allowing flexibility for businesses.**

Compliance markets generally follow two core structures:

Cap-and-Trade Systems

- A total emissions cap is set for a jurisdiction or sector.
- Companies receive or purchase allowances that permit a certain number of emissions.
- Entities can trade allowances in secondary markets, creating economic incentives for reductions.
- Examples: EU ETS (Europe), California Cap-and-Trade (WCI), RGGI (Northeast U.S.), China ETS, UK ETS, Korea ETS

Baseline-and-Credit Systems

- Entities establish a baseline level of emissions based on past activity or industry standards.
- Those emitting below the baseline generate tradable credits.
- Companies exceeding their limits must purchase credits to offset excess emissions.
- Examples: Clean Development Mechanism (CDM) under Kyoto Protocol, China's CCER Market

Major Compliance Markets Comparison

Compliance Market	Jurisdiction	Date Founded	Emissions in Scope	Market Value	Industry Coverage
EU ETS	European Union	2005	~1.3B $MtCO_2e$ (around 45% of EU's emissions)	€751B (2023)	Power, industrial, aviation, shipping
CA Cap-and-Trade (WCI)	California	2013	~290M $MtCO_2e$ (around 76% of CA's emissions)	$30B (2023)	Power, industrial, transportation
RGGI	U.S. Northeast (11 states)	2009	~87.2M $MtCO_2e$ (around 14% of participating states' emissions)	$6B (2023)	Power generation
China ETS	China	2021	~5.36B $MtCO_2e$ (around 40% of China's emissions)	~$10B (2023)	Power, industrial
UK ETS	United Kingdom	2021 (post-Brexit)	~106.7M $MtCO_2e$ (around ~25% of UK's emissions)	£36B (2023)	Power, industrial, aviation
Korea ETS	South Korea	2015	~468.1M $MtCO_2e$ (around 75% of South Korea's emissions)	$2B (2023)	Power, industrial, waste management

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EU ETS

The EU ETS was launched in 2005 as the world's first international emissions trading system. It was designed to help the European Union meet its climate targets by capping emissions from high-intensity sectors and allowing companies to trade allowances. The system has evolved over different phases:

- **Phase 1 (2005-2007):** Pilot phase with free allocation of allowances.
- **Phase 2 (2008-2012):** Aligned with Kyoto Protocol, introduced auctioning and stricter caps.
- **Phase 3 (2013-2020):** Expanded sector coverage, reduced free allocation, and introduced the Market Stability Reserve (MSR) to manage surplus allowances.
- **Phase 4 (2021-2030):** Strengthened emissions reduction targets, phased out free allowances for certain industries, and expanded to include emissions from maritime shipping.

Trading Mechanisms	Sector Coverage	Compliance & Penalties
• Cap on emissions for covered sectors, reduced over time. • Companies receive or purchase European Union Allowances (EUAs), each representing one metric ton of CO_2. • Companies can buy, sell, or bank allowances.	• Power generation • Industrial manufacturing • Aviation • Maritime shipping • The ETS2, launching in 2027, will extend coverage to road transport and buildings	• Companies must surrender allowances equal to their emissions annually. • Non-compliance results in fines (€100 per excess ton of CO_2) and mandatory offsetting in the following year.

Thank You