Business Models in the Carbon Market

Master Thesis

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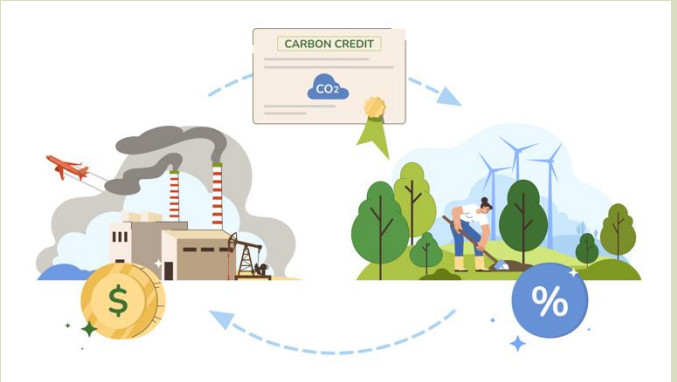
Introduction to the Carbon Market

- Key role in **climate change mitigation**, helping companies and governments achieve **net-zero emissions**
- By enabling the **trading of carbon credits**, it creates **financial incentives** to reduce or remove CO2 from the atmosphere
- Companies use carbon credits to **compensate for emissions** that cannot be eliminated through internal reductions



- **Compliance** vs. **Voluntary** Carbon Market

Key Stakeholders

Project Developers

Generate and supply carbon credits through CO2 avoidance or removal projects

Intermediaries

Provide carbon measurement, consulting, and trading platforms, matching supply and demand

Standards Bodies

Independent organizations that verify and certify carbon credits

End Buyers

Companies purchasing credits to offset their emissions

Project Developers

- Project Developers are key players, directly responsible for generating carbon credits
- Their **Business Model** varies based on the type of carbon avoidance or removal solution they offer

Nature-Based Solutions (NBS)

Use biological processes to capture and store CO_2, contributing to ecosystem restoration and conservation

Technology-Based Solutions (TBS)

Use industrial technology to physically extract CO_2, storing it or repurposing it

Nature-Based Solutions

Nature-Based Avoidance

- Prevents additional CO2 from being released into the atmosphere

→ REDD+: “Reducing Emissions from Deforestation and forest Degradation

Nature-Based Removal

- Actively extracts CO2 from the atmosphere and stores it in natural carbon sink

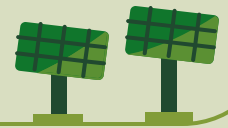
→ ARR: “Afforestation, Reforestation, and Revegetation”

Key factors:

- Land ownership
- Control over the sale of credits
- Revenue sharing model
- Standard vs. premium credit

Pros: Cheaper, environmental co-benefits, limited technology
Cons: Risk of reversal, slower carbon removal

Companies: Finite Carbon, Forest Carbon, Wildlife Works



Technology-Based Solutions

Carbon Capture and Storage (CCS)

- CO_2 is permanently stored underground

Carbon Capture and Utilization (CCU)

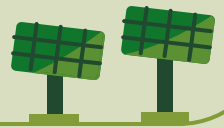
- CO_2 is repurposed for chemicals, fuels and materials

Companies:
Climeworks, Carbon Engineering, Charm Industrial

Key distinctions:

- Direct Air Capture vs. Point-Source Capture
- Storage vs. Utilization
- Subscription-Based vs. Upfront Payment

Pros: Permanent storage, precise measurement, scalability
Cons: High costs, energy-intensive infrastructure



Industry Evolution & Trends

- 1990s: **market-based** approaches to reducing GHG emissions
- **Kyoto Protocol**, EU ETS, Chinese ETS
- Focus on **Compliance Carbon Market**
- Mandate-based approach

- Growth of the **Voluntary Carbon Market**
- Emergence of **technology** and TBS
- **Digital Marketplaces & Intermediaries**
- **Growing Demand**: Net-zero commitments are driving demand for high-quality credits

- **Hybrid Business Models**: Companies integrating NBS and TBS solutions
- **Shift towards Standardization**: Stricter verification and premium credit markets
- **Role of AI & Blockchain**: Increasing transparency and automation in credit trading