ENERGY CLUB
IIT BOMBAY

itc Institute Technical Council

THE CARBON CODE: TRADING, TRACKING AND TRANSFORMING EMISSIONS

WEEK 2 DAY 2

CARBON CREDIT SECTORS- FROM FARMS TO FACTORIES (FORESTRY AND LAND USE/AGRICULTURE AND SOIL CARBON/BLUE CARBON)

I. NATURAL SECTOR CREDITS

1. Forestry & Land Use (REDD+, ARR)

How It Works:

REDD+ (Reduced Deforestation): Pays to protect existing forests.

Example: Kasigau Corridor, Kenya (VCS-certified, 20M+ credits).

Controversy: Kariba REDD+ accused of inflated baselines.

ARR (Afforestation/Reforestation): Credits for planting trees.

Methodology: Verra's VM0045.

Risk: Monocultures harming biodiversity.

Key Tools:

- Global Forest Watch (satellite monitoring).
- SilviaTerra (forest carbon mapping).

2. Agriculture & Soil Carbon

click here for an interesting video

How It Works:

1. **No-Till Farming:** Stores CO_2 in soils.
   Example: Indigo Ag's Carbon Program.
   Issue: Reversibility (tilling releases CO_2).
2. **Biochar:** Pyrolyzed biomass buried in soils.
   Certification: Puro.earth.
   Debate: Scalability limited by feedstock.

Data Insight:

Soil credits trade at $20–$100/ton but face MRV challenges (soil microbes vary daily).

3. Blue Carbon

How It Works:

Mangrove/Seagrass Restoration: Stores 4x more CO_2 than forests.
Example: Delta Blue Carbon, Pakistan (250k tons/year).
Controversy: Cambodian mangrove land grabs.

Science Note: click here

II. Engineered Sector Credits

1. Renewable Energy (Wind/Solar/Hydro)

How It Works:
Credits for displacing fossil fuels.
Gold Standard's Methodology: "Grid-connected renewable energy."
Problem: Most fail additionality (e.g., India's wind farms built anyway).
Case Study:
South Pole's Indian Wind Farms – Over-credited by 300% (SourceMaterial).

2. Industrial Tech (DACCS, CCS)

How It Works:

DACCS (Direct Air Capture): Machines absorb CO_2 from air.

Example: Climeworks, Iceland ($600/ton).

Hurdle: Energy-intensive (1 ton DAC = 1,000 kWh).

What is Direct Air Capture? A Technical Explainer

CCS (Carbon Capture & Storage): Captures smokestack emissions.

Controversy: Chevron's Gorgon Project captured only 50% of promised CO_2.

3. Waste Management

How It Works:

Landfill Methane Capture: Burns CH_4 (84x worse than CO_2).

Methodology: ACM0001 (CDM).

Risk: Incentivizes waste production.

Plastic Pyrolysis: Converts waste to fuel.

Debate: Critics call it "greenwashed incineration."

Example:

Clean Development Mechanism's Brazil Landfills.

Sector Comparison Table

Sector	Credit Type	Cost/Ton	Permanence	Co-Benefits
REDD+	Avoidance	$3–$15	10–30 yrs	Biodiversity
Soil Carbon	Removal	$20–$100	5–20 yrs	Farm yields
DACCS	Removal	$600–$1,200	1,000+ yrs	Minimal
Wind Energy	Avoidance	$1–$5	N/A	Jobs

Emerging Sectors to Watch

Ocean Alkalinity Enhancement: CO_2 storage via mineral weathering.

Enhanced Rock Weathering: Spreads crushed basalt on fields.

THANK YOU