ENERGY CLUB
IIT BOMBAY

itc Institute Technical Council

THE CARBON CODE: TRADING, TRACKING AND TRANSFORMING EMISSIONS

WEEK 4 DAY 2

NEW TECHNOLOGIES

interesting video to watch

1. SATELLITE LIDAR & DEFORESTATION MONITORING

How It Works:

High-Resolution Imaging: Satellites like Planet Labs capture daily 3m-resolution images, detecting deforestation events within 48 hours.

LiDAR for Biomass Estimation: Measures canopy height and density to calculate carbon stocks (e.g., Rimba Raya uses this to verify peatland carbon sequestration).

Impact on Transparency:

Real-Time Alerts: Flags illegal logging or fires, allowing immediate corrective action (used in Cordillera Azul to reduce encroachment by 80%).

Permanence Assurance: Tracks reforestation growth over decades, ensuring long-term carbon storage.

2. BIOACOUSTIC SENSORS & BIODIVERSITY VERIFICATION

How It Works:

Non-Invasive Monitoring: Sensors (e.g., veritree's ROOT system) record bird/animal sounds 24/7 to assess species richness.

AI Analysis: Machine learning models identify species from audio data, correlating biodiversity health with carbon benefits (e.g., Cordillera Azul's jaguar conservation).

Impact on Transparency:

Co-Benefit Validation: Proves projects deliver promised biodiversity gains (critical for CCBS Gold certification).

Fraud Prevention: Detects "empty forest syndrome" where trees exist but wildlife is absent.

3. IOT SENSOR NETWORKS FOR SOIL & MICROCLIMATE

How It Works:

Soil Carbon Sensors: Measure real-time CO2 fluxes and organic matter (e.g., Digi's IoT systems in regenerative farms) 17.

Weather Stations: Track rainfall/temperature to adjust carbon sequestration models 1.

Impact on Transparency:

Data Granularity: Farmers get per-hectare carbon estimates (e.g., COMET-Farm tool), reducing over-crediting risks 116.

Automated Reporting: IoT feeds data directly to registries like Verra, cutting manual errors 716.

4. BLOCKCHAIN INTEGRATION

How It Works:

Immutable Records: Tokenized credits (e.g., Toucan) link to satellite/IoT data, creating auditable trails.

Impact on Transparency:

Double-Counting Prevention: Smart contracts retire credits instantly on-chain.

Buyer Trust: Corporates like Microsoft trace credit origins via blockchain dashboards.

Key Challenges & Solutions

Cost: Startups like Agreena subsidize IoT for small farmers.

Standardization: Gold Standard's dMRV pilots harmonize sensor data with legacy methods.

Example: Jain Irrigation's IoT network cut water/energy use by 30%, with data auto-uploaded to carbon registries.

THANK YOU