climate decode

India CCTS Primer

CCTS & Carbon Markets

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Climate Decode

Enterpise workspace for climate action

Climate Decode, established in 2023, is a global carbon markets and decarbonisation firm building agentic decision infrastructure for compliance-driven carbon systems. The firm brings together a team with deep, hands-on experience across global compliance markets and voluntary carbon mechanisms.
As carbon markets increasingly shape industrial costs, competitiveness, and capital allocation, they are still commonly managed as reporting or procurement exercises. This creates blind spots in compliance exposure and leads to inefficient decarbonisation and investment decisions.

Climate Decode addresses this gap by translating carbon regulations, benchmarks, and market signals into finance-grade, forward-looking decisions. Our focus is on regulated and regulation-adjacent markets, where carbon has material balance-sheet implications.
At the core of Climate Decode are two integrated platforms, powered by agentic AI:

- TerraNova, which models compliance exposure and least-cost decarbonisation pathways by linking production growth, benchmark trajectories, technology options, and carbon prices; and
- Canopy, which enables disciplined management of residual emissions through structured carbon credit and environmental-attribute portfolios.

Climate Decode's agentic AI systems continuously simulate regulatory outcomes, test scenarios, and rank decisions by economic impact as policy, market, and operational conditions evolve.

India's Carbon Credit Trading Scheme (CCTS) underscores the need for this approach. CCTS is an industrial policy instrument where production growth, emissions-intensity benchmarks, and decarbonisation investments interact to determine compliance cost and competitiveness. Managing CCTS therefore requires scenario-based decision support rather than static reporting. As CCTS moves into implementation, Climate Decode brings global compliance-market experience to India acting as market infrastructure to support economically rational, data-driven decision-making.

Understanding CCTS

The Carbon Credit Trading Scheme (CCTS) is India's national carbon pricing mechanism for industry. CCTS sets facility-specific greenhouse gas emissions intensity (GEI) targets for large facilities. Facilities that emit above the target incur a carbon cost by purchasing Carbon Credit Certificates (CCCs), while facilities that emit below the target earn tradeable CCCs. By linking compliance to performance and enabling trading, CCTS introduces a market signal that drives decarbonisation, accelerates efficiency improvements, and aligns industrial activity with India's NDC and net-zero 2070 pathways.

WHY NOW

- FY 2025–26 marks the first compliance cycle with mandated GEI targets; facilities must now deliver verified intensity reductions or purchase CCCs.
- From 2026 onward, CCC trading will scale rapidly, with market-based pricing, banking strategies, and exchange operations shaping compliance costs.
- Benchmark tightening and rising credit demand will increase compliance pressure, making early strategy, data systems, and decarbonisation planning essential.

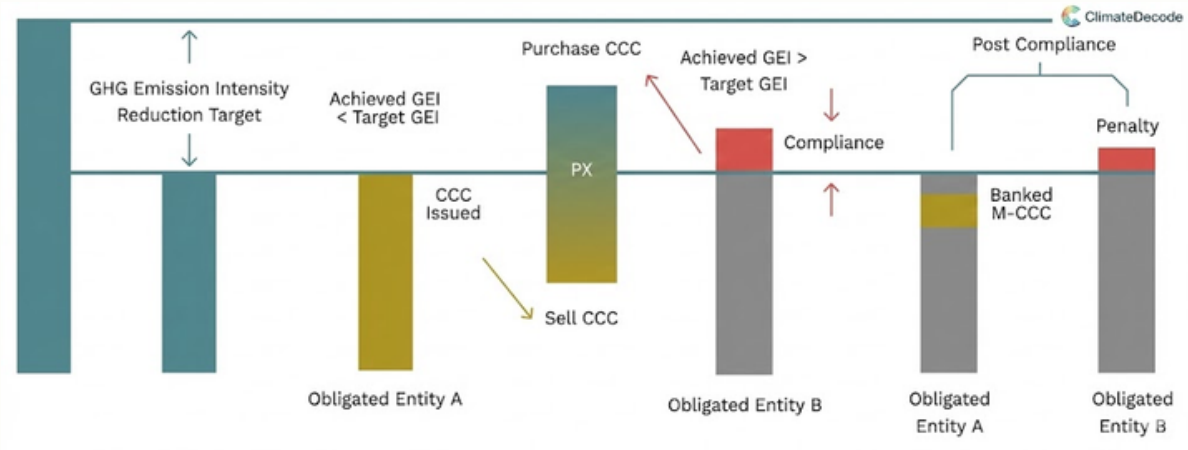
Obligated Entities

India's Carbon Credit Trading Scheme (CCTS) currently regulates ~740+ large facilities across seven hard-to-abate sectors, each with a mandated annual reduction trajectory designed as a stepping stone toward deeper decarbonisation and eventual alignment with national net-zero goals.

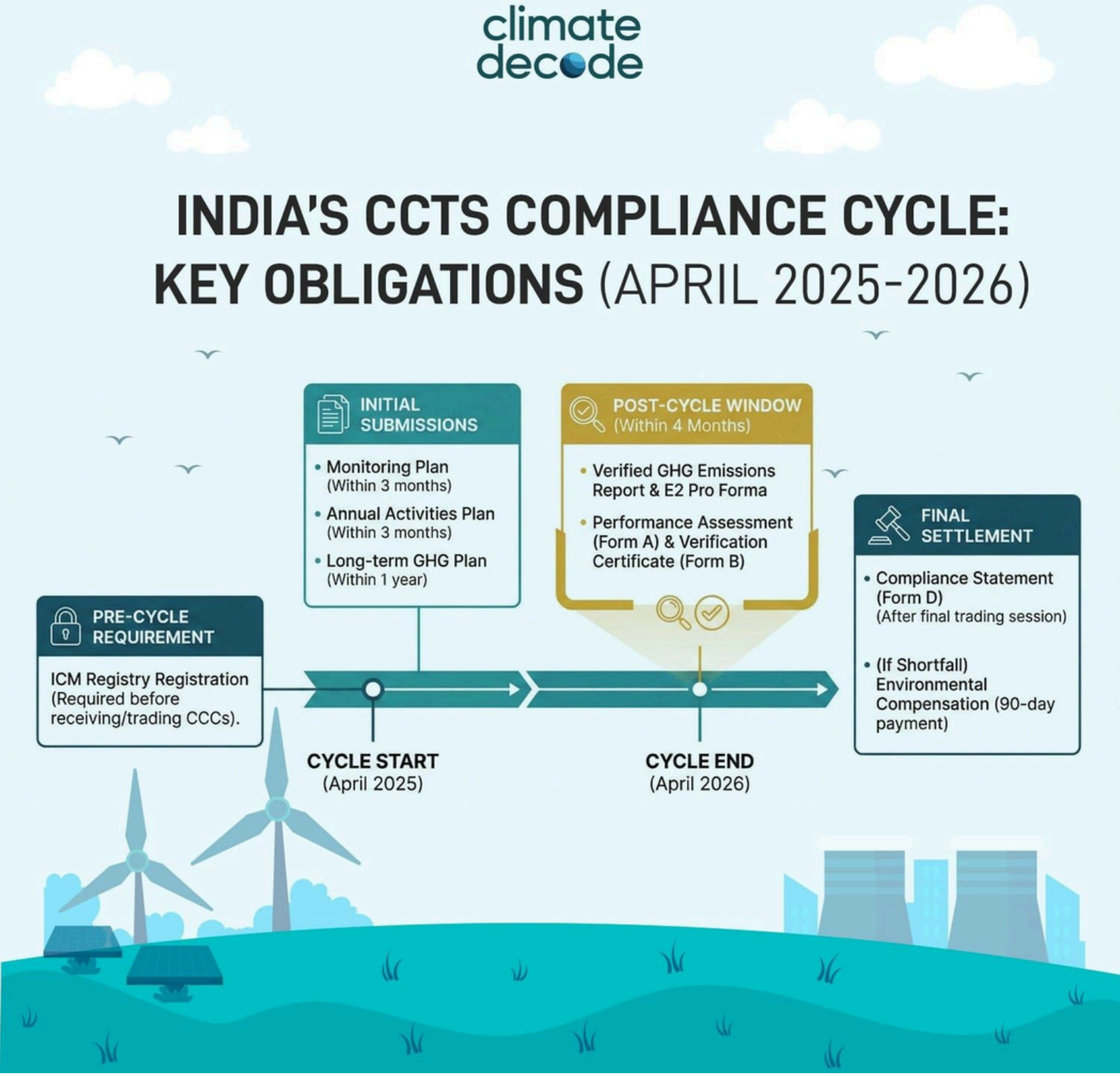
Sector	Facilities Covered	Estimated Emission Intensity Reduction Target
Aluminium	16	2.27%
Cement	186	1.57%
Chlor-Alkali	30	3.09%
Pulp & Paper	53	2.83%
Petrochemicals & Refining	32	1.70%
Iron & Steel*	253	1.85%
Textile	173	3.14%

*Provisional intensity released

Compliance Mechanism



- Each facility receives a GEI target and must report verified emissions and output annually.
- If actual GEI is above the target, the facility must purchase and surrender CCCs.
- If actual GEI is below the target, the facility generates CCCs that can be banked or sold.
- Non-compliance results in environmental compensation linked to average CCC market prices.



- Monitoring plan: Defines how emissions and activity data are measured, sampled and managed, forming the basis for annual reporting.
- Long-term GHG reduction plan: Lays out multi-year measures and timelines to meet GEI targets.
- GHG emissions report: Provides verified annual emissions and activity data aligned with the monitoring plan.
- Form A and Form B: Confirms achieved GEI, reduction actions and CCC entitlement, with ACVA verification.
- Compliance statement (Form D): Summarises CCCs issued, surrendered and used for compliance.

Challenges & Opportununity

Complexity and Challenges for Companies

CCTS adds real complexity across regulation, operations and strategy:

- **Regulatory and Market Complexity:** Companies must understand new rules, reduction targets, MRV process, compliance routs and evolving phases of the carbon market.
- **Price Uncertainty and Market Risk:** CCC prices will fluctuate based on supply and demand, requiring companies to manage carbon price exposure and budget accordingly.
- **Strategic Compliance Decisions:** Industry must develop abatement vs. buy strategies based on marginal abatement cost curves, expected CCC prices and long-term competitiveness.
- **Data and Administrative Burden**: Robust metering, emissions accounting, internal controls and third-party verification become mandatory, increasing administrative workload.

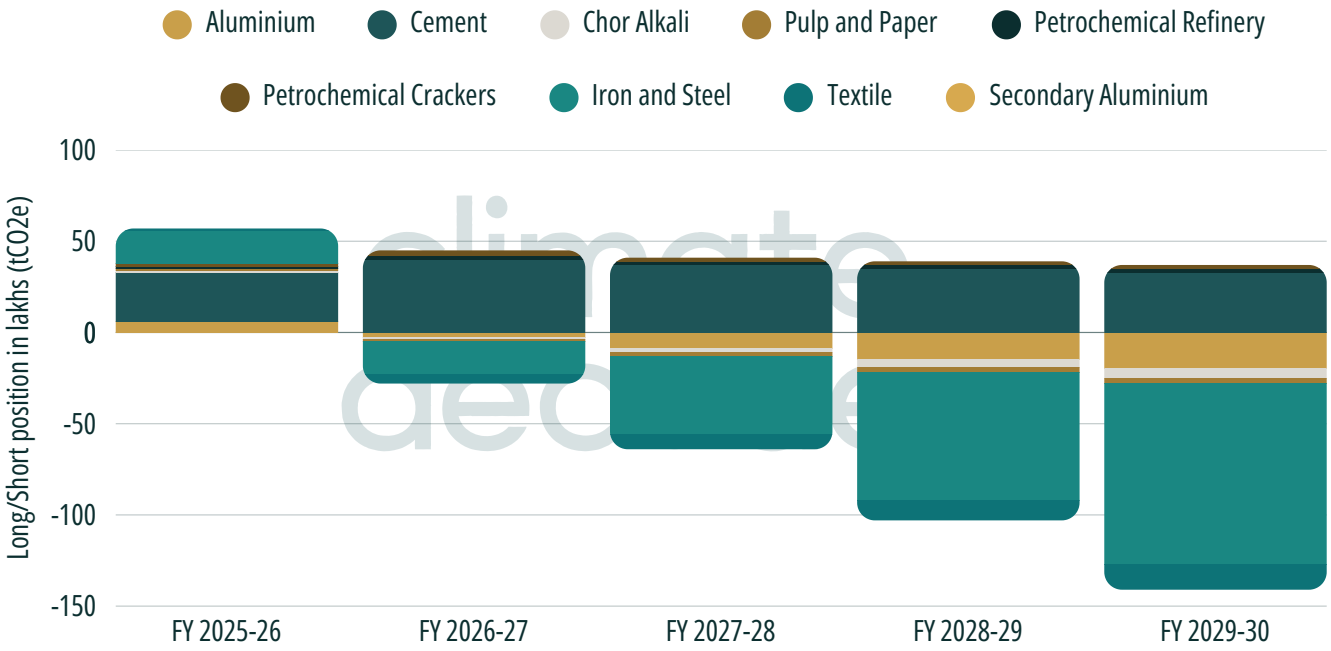
Opportunities

CCTS is not simply a compliance burden. It creates structured incentives for companies to decarbonise and provides a framework for strategic planning.

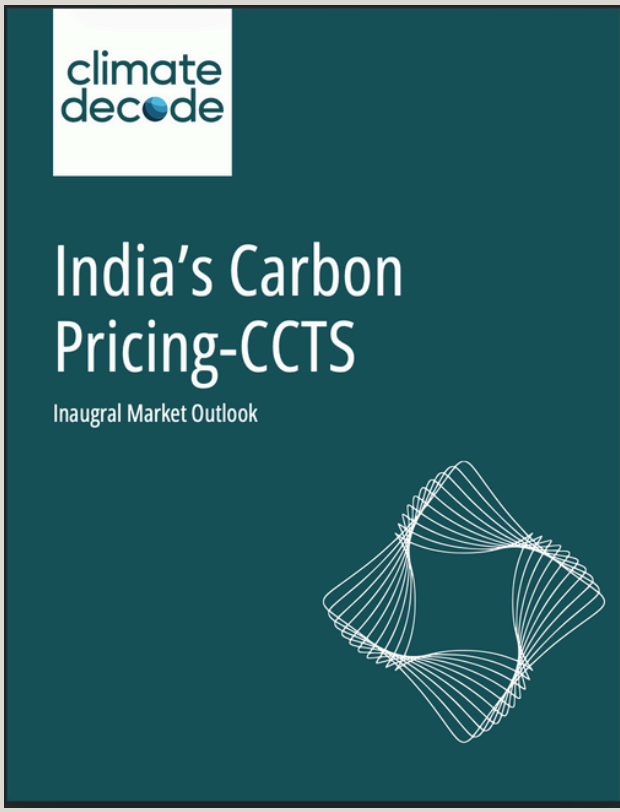
- **Cost Control Through Better Carbon Performance:** Companies that reduce emissions intensity can lower annual compliance costs and avoid exposure to rising CCC prices over time.
- **Revenue Potential From Surplus Credits:** Facilities that outperform their targets can sell CCCs, creating a direct financial return on efficiency and process improvements.
- **Stronger Positioning for Exporters:** Lower emissions intensity improves competitiveness under border carbon measures like the EU's CBAM.
- **Alignment With Finance and Investor Expectations:** A clear emissions trajectory improves access to transition finance, sustainability-linked instruments and internal capital allocation.

Climate Decode Inaugural Market Outlook Sneak Peak

CCTS Compliance Position- Base Case



- **Overall market direction** CCTS starts with early headroom, then tightens materially as benchmarks progress and production growth compounds.
- **Directional movement across major sectors:**
  - Iron & steel becomes the primary demand anchor as scale and benchmark tightening dominate.
  - Cement shows early surplus, but this advantage is time-bound.
  - Aluminium and textiles move progressively into deficit, adding sustained demand pressure.
- **Financial implications (order-of-magnitude)** CCTS creates ₹ crore–scale liabilities and opportunities at sector level. Early vs late action can swing outcomes by hundreds to thousands of crores. Initial surplus years offer a limited window to bank value or reshape future exposure
- **Why early planning matters** As an intensity-based system, growth and tightening benchmarks can reverse positions even for efficient facilities. Outcomes depend on timing and sequencing, not single-year compliance. Late action turns CCTS into an unplanned budget and balance-sheet risk.



Access the full report for a scenario-based outlook on pricing dynamics and sector-wise compliance pathways.

Why Climate Decode is Your Partner in CCTS

Climate Decode is built as an agentic planning layer, not just a carbon accounting tool. It connects decarbonisation, residuals, and finance so that CCTS targets can be translated into executable plans.

- **GHG Quantification:** Facility- and product-level GHG inventories aligned with CCTS system boundaries, notified methodologies, and sector-specific GEI benchmarks. Outputs are audit-ready and designed to support statutory compliance, third-party verification, and emissions-intensity reporting.
- **Verification Support:** End-to-end support through the CCTS verification cycle, including pre-verification gap assessments, documentation structuring, evidence mapping, and coordinated responses to verifier queries—reducing approval risk, delays, and rework.
- **Emissions Reduction Planning (Decarbonisation Roadmaps):** CCTS-aligned decarbonisation roadmaps that prioritise interventions based on emissions-intensity impact, cost effectiveness, technical readiness, and implementation timelines, with explicit linkage to compliance outcomes.
- **Feasibility Assessment:** Technical and economic feasibility assessment of identified decarbonisation options, covering capex and opex implications, operational constraints, emissions-intensity improvement potential, and sensitivity to future benchmark tightening.
- **Compliance Position Assessment & Management (CCTS S&D-backed):** Forward-looking assessment of CCC surplus or deficit positions under multiple production, benchmark, and policy scenarios. This analysis is underpinned by Climate Decode's proprietary CCTS supply–demand (S&D) report, providing market-level visibility on credit availability, demand pressure, and indicative price signals to support informed compliance, procurement, banking, or monetisation decisions.

TerraNova Platform

Agentic AI partner for your decarbonisation and compliance management

Advisory Services

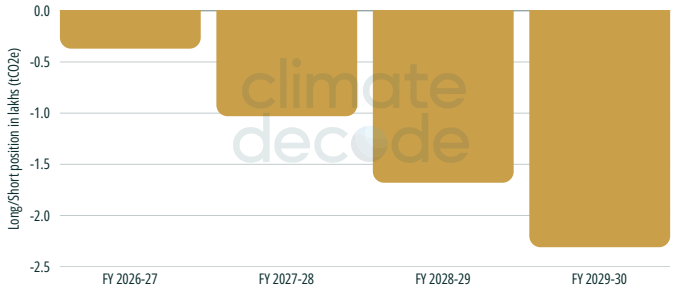
Experts delivering tailored solutions for you

Case Study: From Annual Compliance to Managed Exposure

An aluminium smelter would become a covered entity under India's Carbon Credit Trading Scheme (CCTS), and management approaches the new obligation as a routine annual compliance formality, with no immediate visibility on its actual surplus or deficit position. This scenario is hypothetical, based on publicly available data.

What Climate Decode helped the entity do?

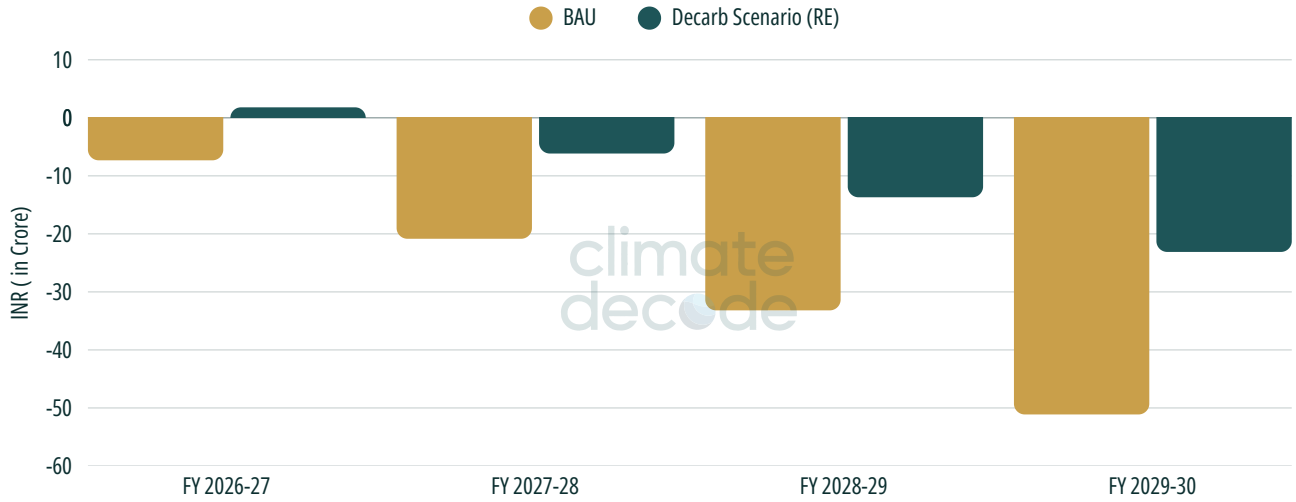
Position



Forecast position (4-year):

Climate Decode's Terranova would help the smelter translate tightening GEI into a year-by-year surplus/deficit outlook, so the team could see the compliance trajectory before it hit the P&L. This is the core advantage in an intensity-based system where targets tighten over time, and positions can flip even with stable operations.

Financial Exposure



Efficiently Decarb considering compliance exposure:

Climate Decode would help the team identify electricity as the dominant lever and assess the availability of renewable electricity (RE) sourcing. In this case, a 1% RE shift could be sufficient to flip FY26 into a surplus of 9,276 tCO_2e and show a net gain of ₹1.81 crore after electricity costs, turning a compliance action into a CFO-approvable ROI decision.

Carbon credits as risk management

Next, Climate Decode could help the entity decide what it could do with early surpluses by comparing near-term sale value to future avoided purchase cost under tightening GEI. Because the forecast showed a return to deficits (31,323 tCO_2e in 2027 and 69,519 tCO_2e in 2028 in this case), the platform would recommend banking the FY26 surplus to reduce exposure to later, potentially higher-cost procurement.

Decision Logic

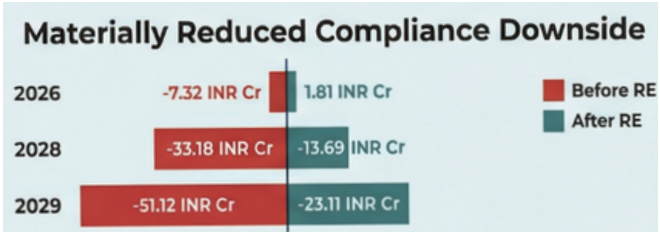
How does the platform determine if banking is better than selling?
By calculating whether future avoided procurement cost (from using banked CCCs against forecast deficits) is greater than today's sale proceeds, using a price curve, discount rate, and scenario probabilities.

What are the financial risks if GEI tightens further than expected?
Tighter GEI increases (i) the probability and magnitude of future deficits, (ii) forced procurement volumes, and (iii) exposure to price spikes in a constrained CCC market, raising both expected cost and tail risk. This generally increases the value of early banking as a hedge.

How does the RE shift directly impact the long-term deficit?
It reduces the facility GEI by lowering the emissions factor of electricity within the boundary. However, tightening targets can outpace the improvement, so the platform uses the 5-year projection to show whether the RE trajectory is sufficient or only delays the deficit.

Climate Decode could enable an aluminium smelter to transition from passive annual compliance to structured exposure management. By modeling forward GEI tightening, the client would justify near-term renewable electricity deployment on net financial benefit and convert early CCC surpluses into a hedge against anticipated future shortfalls.

Climate Decode would design a phased renewable electricity strategy for an aluminium smelter to cut grid-linked emissions without disrupting production growth.



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