Institute for Energy Economics and Financial Analysis

# Fact Sheet

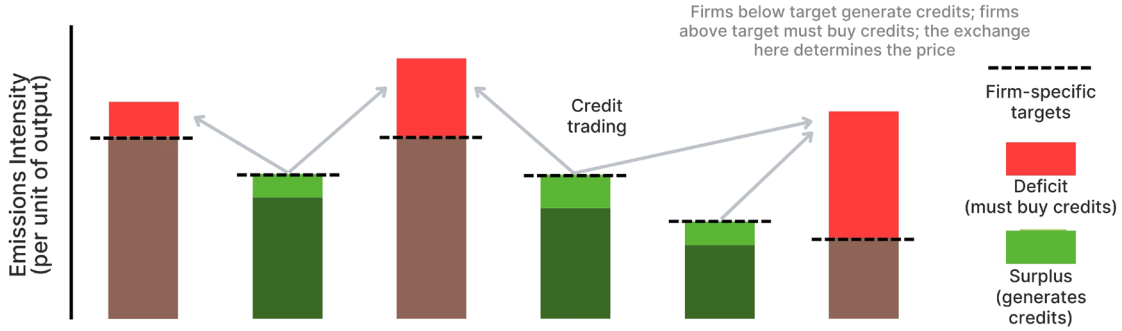
# Stability mechanisms in carbon markets:
## Functions, design, and global examples for India's CCTS

### Why do carbon markets need stability mechanisms?

Carbon markets are regulatory constructs. Hence, their price dynamics are vulnerable to external shocks, uneven demand growth, and structural imbalances inherent to such markets especially at the start. Left unmanaged, these forces push prices outside acceptable zones, impeding their ability to work as a decarbonisation signal. Stability mechanisms are rule-based tools to hold prices within a functional range that is attractive enough to drive long-term low-carbon investment decisions, and stable enough to sustain market credibility over time. This is especially relevant for India's Carbon Credit Trading Scheme (CCTS), which operates as a baseline-and-credit market — a design that shapes both, the challenges it faces and the stability tools available to it.

### What is baseline-and-credit carbon market?

Each entity is assigned a distinct emissions intensity target, and its performance relative to this benchmark determines whether it earns or must purchase credits.




### What are the essential functions of a stability mechanism?

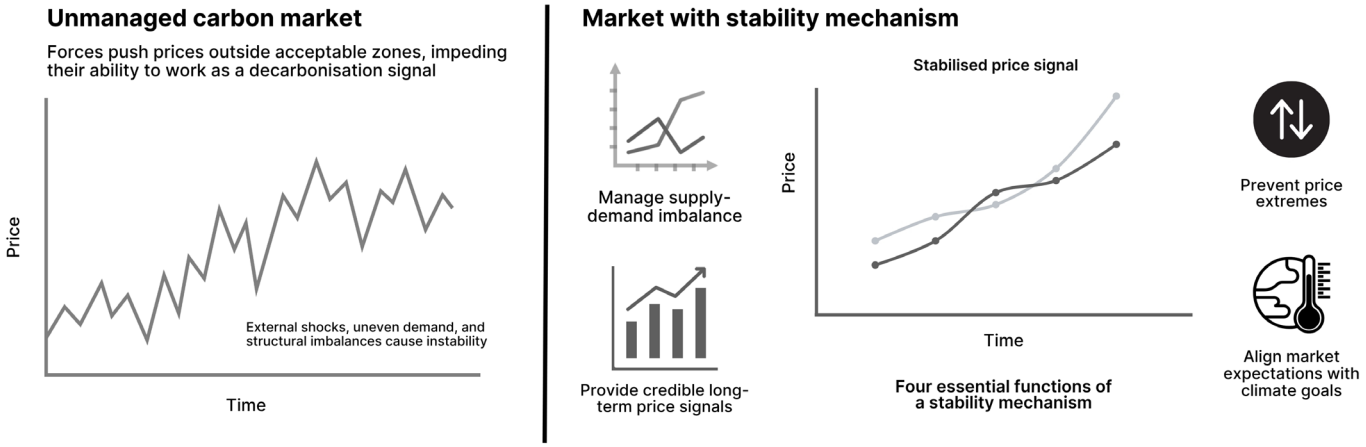
Market stability mechanisms serve as rule-based anchors that perform four essential functions:

1. Manage supply-demand imbalances
2. Prevent price extremes
3. Provide credible long-term price signals that reduce investment risk
4. Align market expectations with climate policy goals.

To carry out these functions, a well-designed mechanism requires structural elements to act as a trigger to activate intervention based on transparent market indicators. These include a supply regulation level to make those adjustments, apart from an organically built reserve that accumulates surplus credit over time. This ensures that the stability mechanisms can respond when needed.

Together, these functions and elements constitute a rules-based architecture that insulates the market from volatility while preserving its environmental and economic integrity.

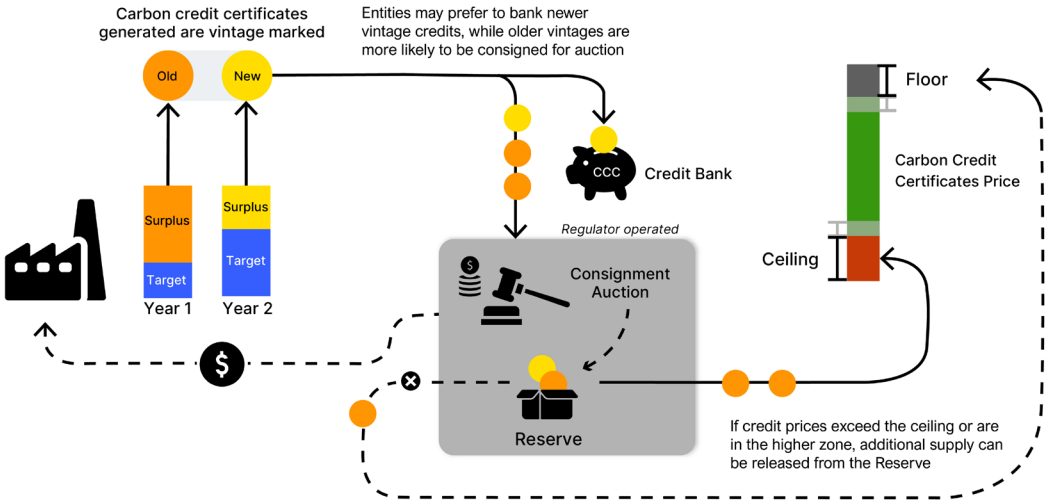
### What stability mechanisms do: Unmanaged vs. managed markets



## Which stability mechanism could work for India?

India's CCTS offers a distinct setting for a stability mechanism. It uses a baseline-and-credit system where credits are issued ex-post against performance, making it difficult to control supply proactively through conventional auction methods. Unlike cap-and-trade systems, there is no natural way to create a reserve without affecting the perceived ownership of earned credits by obligated entities.

Additionally, as an emerging carbon market, India does not have historical data or precise modelling to set a reliable trigger metric. Therefore, any stability mechanism for the CCTS must be adapted to these conditions, being legally and administratively simple, fiscally neutral, and rule based, rather than trying to introduce designs meant for cap-and-trade systems. IEEFA suggests achieving this with vintage-based credit management, a consignment mechanism, and a price corridor, which together can replicate the key functions of supply regulation, reserve-building, and price anchoring within India's current framework.




(Refer to this report for more)

## Some stability mechanisms from other markets

Global carbon markets provide valuable lessons in stability mechanism design and demonstrate why direct replication isn't enough. The following global examples illustrate how leading systems manage prices and supplies, considering the design context of India's CCTS.

Low-price trigger  High-price trigger  Structural / quantity trigger

| **EU Emissions Trading System** [Quantity-based]<br>European Union – core tool: Market Stability Reserve (MSR) | | |
|---|---|---|
| *Issues faced* | *Condition ⟶ system response* | *Why the design choice matters* |
| Phase I (2005-07) over-allocated allowances using estimated data – prices collapsed to near zero. After the 2008 financial crisis, industrial output fell but supply remained constant. By 2013, surplus exceeded 2 billion allowances, holding prices low for nearly a decade and undermining long-term investment signals. | Total Number of Allowances in Circulation (TNAC) > 833 million allowances<br>↓ *System response*<br>Auction volumes reduced<br>A share of surplus is moved into the MSR, tightening near-term supply.<br><br>TNAC < 400 million allowances<br>↓ *System response*<br>Allowances released to market<br>Allowances move from the MSR back into auctions.<br><br>MSR holdings exceed previous year's auction volume (from 2024)<br>↓ *System response*<br>Excess allowances permanently cancelled<br>Allowances above the 400 million threshold are invalidated — not stored. | The MSR targets structural surplus, not a specific price band. This matters because the European Union (EU) did not want to set an explicit price floor or ceiling — the mechanism adjusts quantity to let prices find their own level. The cancellation rule (from 2024) is the key innovation: it prevents surplus from simply accumulating in a reserve and re-entering the market later, making the scarcity signal more credible over time. No price floor or ceiling exists. |

## **California–Québec Cap-and-Trade** [Price-based]

USA/Canada (linked market) – core tools: Auction Reserve Price, Allowance Price Containment Reserve (APCR), Price Ceiling

| *Issues faced* | *Condition ⟶ system response* | *Why the design choice matters* |
|---|---|---|
| Complementary climate policies (renewable mandates, efficiency standards) reduced allowance demand beyond what the cap alone anticipated. From 2016-early 2017, multiple auctions settled at the minimum price with large volumes unsold. Political uncertainty about continuity post-2020 further weakened buyer confidence. | Bid price falls below the Auction Reserve Price<br>↓ *System response*<br>Bid rejected; allowance withheld<br><br>Allowances go to an Auction Holding Account. They return only after two consecutive auctions clear above the floor, and at most 25% of that auction's volume at a time. After 24 months unsold, they move into the APCR.<br><br>Market price reaches an APCR tier<br>↓ *System response*<br>Reserve allowances sold at fixed tier price<br><br>Pre-set reserve is offered at two price tiers. These allowances come from within the cap.<br><br>APCR exhausted and prices still rising (from 2021)<br>↓ *System response*<br>Unlimited price ceiling units sold<br><br>Revenues must fund equivalent real-world emissions reductions – ceiling units are not issued under the cap. | This is a price corridor with managed re-entry rules. It is more sophisticated than a simple floor-plus-ceiling. The 'two-consecutive-auctions' rule for unsold allowances prevents a sudden oversupply, smoothing re-entry. The 24-month limit adds urgency. The ceiling's environmental integrity condition (revenues = real reductions) is important: it prevents the ceiling from becoming a simple buy-out of compliance obligations. The floor rises at 5% + inflation annually, ensuring a steadily strengthening price signal even in low-price periods. |

## **RGGI – Regional Greenhouse Gas Initiative** [Price-based (two-sided)]

Northeast USA – core tools: Minimum Reserve Price, Emissions Containment Reserve (ECR), Cost Containment Reserve (CCR)

| *Issues faced* | *Condition ⟶ system response* | *Why the design choice matters* |
|---|---|---|
| Early programme phases saw weak power-sector demand driven by cheap natural gas and economic slowdown, generating a persistent allowance surplus. The original auction reserve price proved binding at several auctions. To address accumulated oversupply, the cap was revised downward for 2014-2020. Allowances withheld in that period were never reoffered. | Auction price falls below minimum reserve price<br>↓ *System response*<br>Bid rejected; allowance withheld<br><br>Historical withheld allowances were never reoffered – a permanent supply reduction.<br><br>Price falls below ECR trigger (USD 6 in 2021, +7% p.a.)<br>↓ *System response*<br>Up to 10% of state budgets withheld<br><br>Withheld ECR allowances are permanently removed, and are not saved for future sale.<br><br>Price exceeds CCR trigger (USD 13 in 2021, +7% p.a.)<br>↓ *System response*<br>Reserve allowances injected above the cap<br><br>CCR allowances are additional to the cap – unlike California's APCR which draws from within it. | RGGI is the clearest example of a two-sided automatic adjustment framework in North America. Both triggers are automatic – no committee decision required. The key distinction from California: CCR allowances are additional to the cap, which means high prices can be relieved without drawing down the pre-set reserve. However, this also means the environmental integrity of the cap is diluted under high-price conditions. ECR withholding being permanent (not banked) strengthens the low-price signal more forcefully than systems that merely delay re-entry. |

| | | |
|---|---|---|
| | Triggered in 2014 and 2015 (15 million allowances released).<br>Programme review underway: Proposed to replace the ECR with a higher minimum reserve price from 2027. | |

| **Washington Cap-and-Invest Program** [Price-based (California-style)]<br>Washington State, USA – core tools: Auction Floor, APCR, Ceiling price | | |
|---|---|---|
| *Issues faced* | *Condition ⟶ system response* | *Why the design choice matters* |
| Unlike older systems, this programme's problem was not prolonged weakness but prices rising quickly above the floor after its 2023 launch. Strong initial demand and tight market expectations pushed auction prices up, raising compliance-cost concerns and political pressure in the programme's early months. | Bid price falls below the auction floor<br>↓ *System response*<br>Bid rejected; allowance withheld<br>Floor rises at 5% + inflation annually. The separate ECR (additional low-price withholding) exists in the rules but is currently suspended.<br>Auction price reaches an APCR tier threshold<br>↓ *System response*<br>Reserve allowances auctioned to covered entities<br>Special reserve auctions release additional supply. Ceiling price sets the absolute upper cost boundary.<br>ECR is written into the programme rules but suspended — the active lower-bound tool is the floor price only.<br>Note: Design closely mirrors that of California, but the programme is newer and its mechanisms have not yet been tested under prolonged low-price conditions. | Washington adopted a California-style price collar in light of their similar policy contexts (overlapping clean energy mandates, economy-wide coverage). The ECR suspension is an important caveat: the low-price automatic trigger that RGGI uses to permanently remove allowances is not currently active here. This means the Washington programme's downside protection in a prolonged low-price scenario relies solely on the floor price — a weaker tool than an automatic withholding rule. Whether the ECR is reactivated will be a key design question as the programme matures. |

## Resources

Report: 'Strengthening India's carbon market: The case for a stability mechanism in India's CCTS'.

Webinar: 'Designing a market stability mechanism for India's carbon market: Insights from global markets'.

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