

## STAKEHOLDER CONSULTATION WORKSHOP

On

### Designing a BCS-Style Framework for India



**Session 1 : Need, Relevance and Scope of BCS-style Mechanism in India**

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# Overview of India's Power Sector

- India's power sector has moved from a phase focused mainly on capacity shortages to one increasingly shaped by the timing, location, and commercial terms of despatch and settlement.
- Short-term and exchange-based procurement is growing, but the market remains dominated by long-term PPAs and other legacy contracting structures.
- Rapid RE growth has significantly altered system dynamics, with non-fossil capacity accounting for over half of installed capacity.
- India has set ambitious target of 500GW and 900GW of non-fossil fuel capacity by 2030 and 2060, respectively.
- RE capacity growth is now interacting with rising peak demand, widening intra-day price spreads, curtailment pressures, and increasing need for flexibility and storage.
- While RE contracting frameworks have evolved towards hybrid, RTC, and FDRE structures, they remain largely energy-based and insufficiently aligned with system needs, particularly in valuing flexibility, managing price risk, and reflecting temporal market signals.
- Next phase of transition depends not only on adding capacity, but on improving commercial risk allocation, market alignment, and investment support for firm and flexible renewable supply.

**A high-renewable power system calls for contracting and settlement mechanisms that support efficient despatch, better risk allocation, and market-based price signals.**

# India's Renewable Energy Ambition

## Where India Stands Today (as on 28.02.2026)

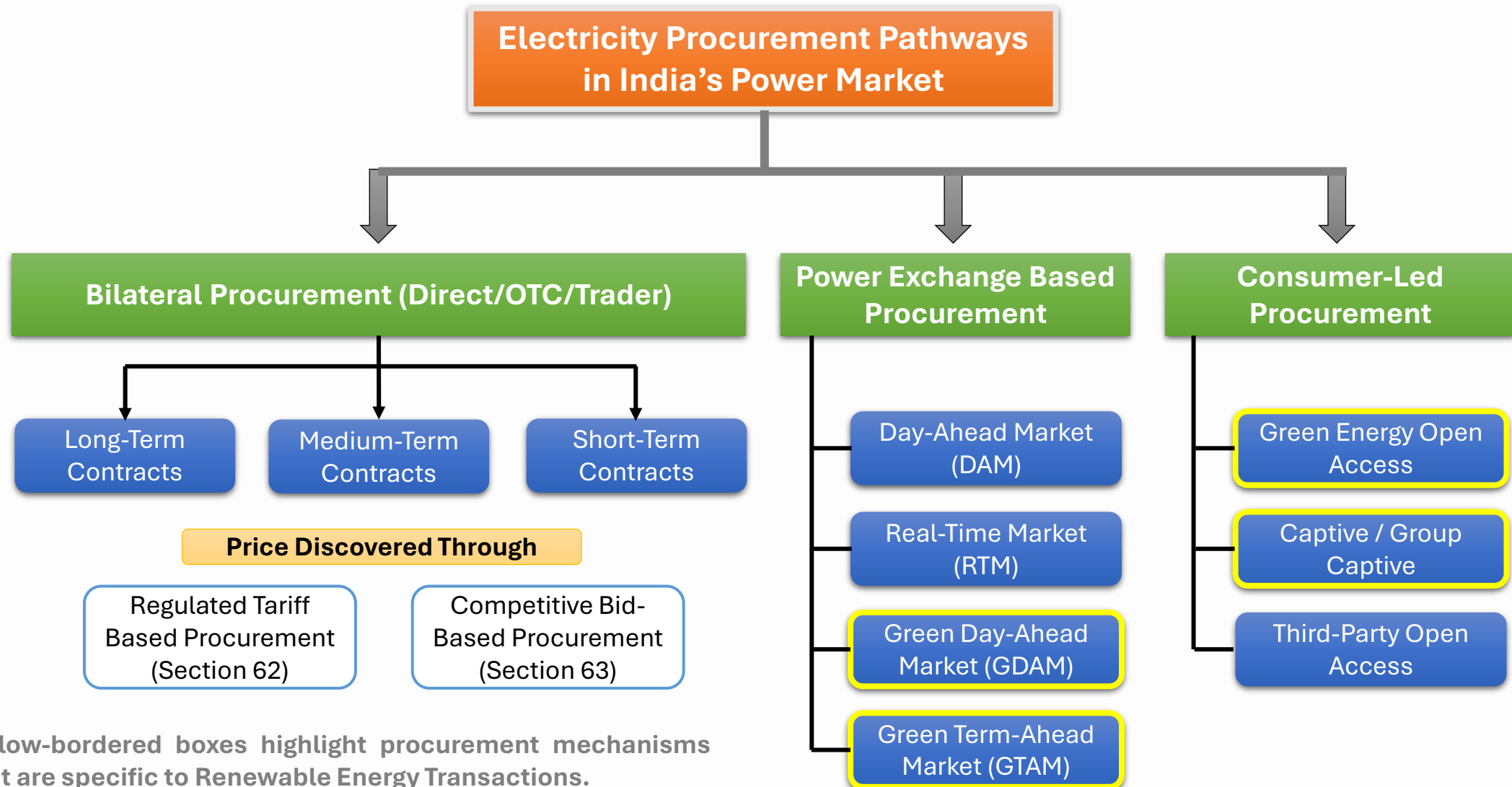
| Parameter                                        | Approximate Figure                           |
|--------------------------------------------------|----------------------------------------------|
| Total RE Capacity (Wind, Solar & Other RE)       | 216 GW                                       |
| • of which: Solar                                | 144 GW (27.40% of total installed)           |
| • of which: Wind                                 | 55 GW (10.52% of total installed)            |
| • of which: Biomass Power                        | 10.8 GW                                      |
| • of which: Small Hydro                          | 5.2 GW                                       |
| Total Non-Fossil Capacity (RE + Hydro + Nuclear) | 275 GW (52.57% of total installed)           |
| India achieved 50% non-fossil share              | June 2025 — 5 years ahead of 2030 NDC target |
| Renewable additions in Calendar Year 2025        | ~45 GW (Solar ~38 GW)                        |

## Where India Needs to Reach

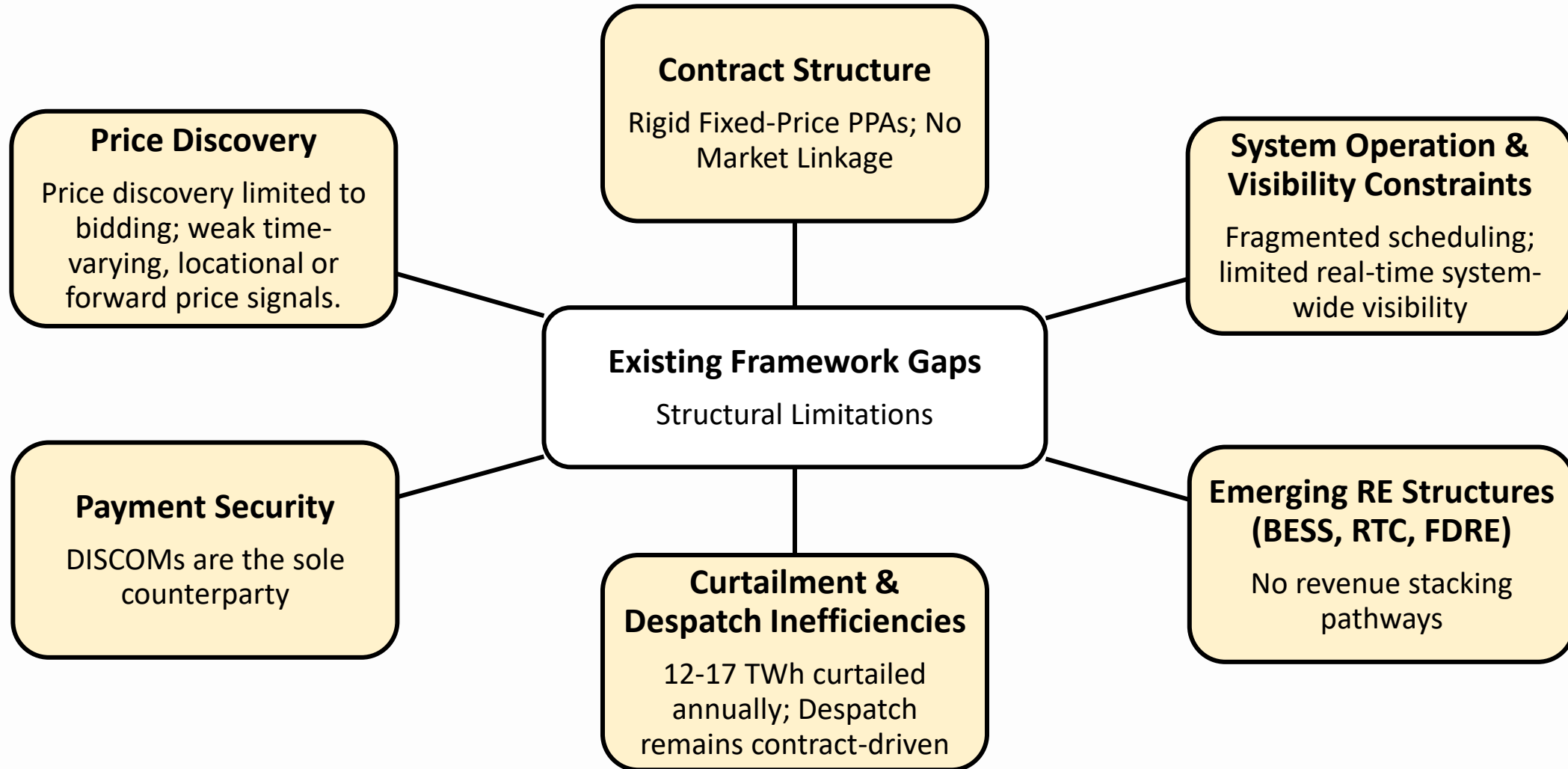
| Target                                        | Figure            |
|-----------------------------------------------|-------------------|
| Non-Fossil Capacity Target by 2030            | 500 GW            |
| Solar Capacity Target by 2031–32              | ~364.6 GW         |
| Wind Capacity Target by 2031–32               | ~121.9 GW         |
| Total Capacity Target by 2031–32              | ~900 GW           |
| Non-Fossil Share of Total Capacity by 2031–32 | ~68.4% (~596 GW)  |
| Required Annual Additions (sustained)         | 40–50 GW per year |

# Electricity Market in India

# Current Electricity Procurement Pathways in India



# Limitations of the Existing Contracting Framework





# Key Stakeholder-Level Market Gaps

**Limited contracting flexibility for generators beyond long-term PPAs and restricted pathways for merchant or hybrid projects**

**Continued exposure of generators to payment delays, curtailment risks, and counterparty credit risk**

**Constrained ability for DISCOMs to dynamically optimise procurement and respond to evolving demand patterns**

**Restricted participation and limited procurement flexibility for C&I consumers and corporate buyers**

**Limited system-level visibility and coordination for system operators due to decentralised scheduling**

**Weak Integration between bilateral contracts and organised electricity markets, and limited development of financial and hedging instruments for RE**

**Fragmented and non-continuous price discovery across different market segments**

# Need for CfDs for the Indian Electricity Sector

- Indian power market is Illiquid, Opaque and Non-Flexible
  - Long-term power contracts dominate: ~85% of total volume is via PPA with 25 years (in 2024-25)
    - Delivery based contracts on the power exchanges are (as TAM or GTAM) for short duration
    - Volume of trade done via Power Exchanges is ~7% in 2024-25 (as a percentage of total volume)
- Liquidity & depth of power market is critical for both Market Efficiency & Competitive Price Discovery
  - To boost Industrial Competitiveness
  - For Clean Energy to reach 40-50% penetrations by 2030
- Financial derivatives (like CfD, Electricity Futures, etc) will provide **both higher liquidity & depth to Indian power market**
- A well proven mechanism like a CfD scheme for India will additionally provide
  - Higher certainty to investors and developers
  - Efficient means for the government to administer (direct tariff) incentive support to new & emerging clean energy technologies
  - Allows cost optimization for Discoms and Open Access Consumers

# Bilateral Contract Settlement Style Mechanism

# Bilateral Contract Settlement Mechanism – Concept

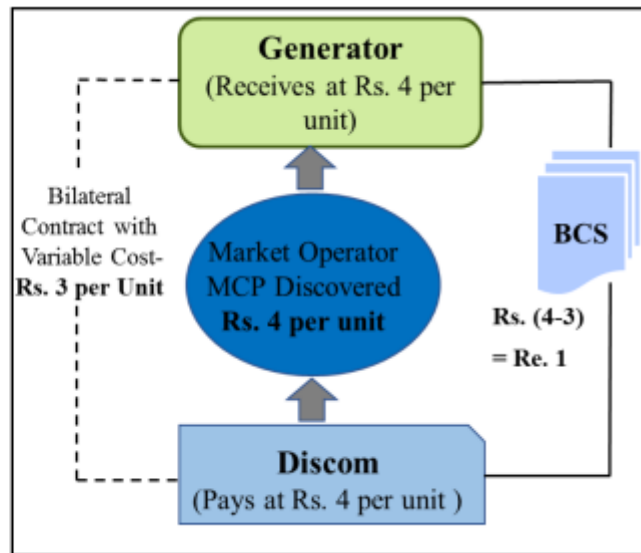
- A Bilateral Contract Settlement (BCS) mechanism is a **financial contracting framework** between a generator and a buyer, wherein both parties agree on a **pre-determined strike price**, typically discovered through a competitive process.
- **No physical delivery obligation** under the contract. **Generator sells power in market** as per system dispatch, while the BCS operates as a **financial overlay linked to a reference market price** (such as exchange-based prices).
- Settlement occurs based on the **difference between the strike price and the reference market price**.
- Buyer pays when market < strike price
- Generator pays when market > strike price

Consider a discom and a generator with a Contracted Price (VC) of Rs. 3 / kWh

If the Market Clearing Price (MCP) is Rs 4 / kWh,  
- discom pays to pool/Market Operator (MO) Rs 4 / kWh  
- Generator receives Rs 4/kWh from pool/MO  
- Generator refunds discom 1 Re/kWh.

Discoms would be hedged against any increase in the market clearing price through BCS

For demand which is met out side of existing contracts, discoms would pay MCP.



This structure enables decoupling of physical power flows from financial risk settlement, thereby ensuring revenue certainty for generators and cost stability for buyers, while preserving efficient market-based dispatch and price discovery.

Source: CERC Discussion Paper on MBED, Dec. 2018

# Need for a BCS-Style Mechanism in India

- Identified structural gaps indicate that existing procurement and contracting frameworks are not sufficient to support the next phase of India's power sector transition.
- With renewable capacity expected to expand significantly towards ~500 GW non-fossil targets, the system will face higher variability, price volatility, and integration challenges.
- At the same time, increasing reliance on short-term markets and widening price spreads is exposing both generators and buyers to greater revenue and procurement risk.
- Existing PPAs, being largely fixed-tariff and energy-based, are not designed to manage market-linked risks or provide efficient price signals.
- This creates a critical need for a mechanism that can:
  - ❖ Provide revenue certainty to generators
  - ❖ Enable cost stability for buyers (DISCOMs / Consumers)
  - ❖ Retain market-based price signals and efficient despatch

**In this context, a BCS-style mechanism can act as a financial overlay, bridging the gap between long-term contracting certainty and short-term market efficiency**

## Revenue Certainty for Generators

- Provides a guaranteed strike price floor, protecting generators from market price volatility while allowing upside participation
- Particularly critical as intra-day price spreads widen: DAM prices at ₹2.5–4.5/kWh during solar hours vs. ₹6.8–10/kWh at evening peak
- Improves bankability and reduces cost of capital, especially for high-CAPEX hybrid and storage projects

## Decoupling Financial Contracts from Physical Despatch

- Generators sell power into DAM/RTM at market prices; BCS contract settles the difference between strike price and market reference price
- Physical despatch remains fully under NLDC/RLDC/SLDC authority, no interference with Grid Code or MBED
- Eliminates the geographic inflexibility of bilateral PPAs, no requirement for physical delivery to a specific buyer

## Support for Next-Generation Procurement Structures

- Hybrid projects: >12.7 GW tendered in FY 2024, >16.5 GW in FY 2025, yet no contract structure exists to reward their dispatchability
- Storage procurement expanded from ~290 MW (FY 2024) to >5 GW (FY 2026), yet revenue stacking across energy, ancillary services, and flexibility remains commercially unviable under existing PPAs
- BCS enables multi-stream revenue monetization, energy + flexibility + ancillary services - in a single framework

## Insulating Generators from DISCOM Credit Risk

- A central counterparty becomes the sole contractual counterparty
- Backed by sovereign guarantee, decoupling generator revenues from individual DISCOM financial health
- Outstanding DISCOM dues of ₹64,577 crore (Feb 2025) would no longer directly threaten project cash flows

# Stakeholder-wise Benefits envisaged

## Renewable Energy Developers

- Revenue Certainty with Market Participation
- Improved Management of Generation Variability
- Greater Flexibility in Project Structuring
- Enhanced Opportunities for Hybrid and Storage-Linked Projects

## DISCOMs

- Improved Price Risk Management
- Portfolio Optimisation
- Reduced Exposure to Renewable Generation Variability
- Better Alignment with Evolving Procurement Models (FDRE and Storage-Linked Supply)

## Commercial & Industrial Consumers

- Price Stability for Renewable Procurement
- Flexible Procurement Strategies
- Support for Corporate Renewable Targets
- Consumers can manage RE procurement without extensive Scheduling Obligations (Reduced Operational Complexity)

## Power Markets & System Operators

- Improved Market Liquidity
- Better Price Discovery
- More Efficient System Dispatch
- Support in integrating higher shares of VRE into the grid while maintaining system reliability

# Enabling Legal & Regulatory Framework



# Evolution of Power Market Regulations

|                                                 | PMR, 2010                                                                                          | PMR, 2021                                                                                      | Draft PMR Amendment, 2025                                                                                          |
|-------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| <b>Market Design Philosophy</b>                 | Exchange-centric framework focused on organised spot and term-ahead markets with physical delivery | Transition to a multi-segment market structure (DAM, RTM, TAM, etc.) enabling granular trading | Integrated market design with coexistence of exchange and OTC markets                                              |
| <b>Duration of Contracts</b>                    | Short-tenor contracts, mainly term-ahead                                                           | Expanded to include day-ahead contingency, intra-day and longer TAM products                   | Further flexibility with diverse OTC and customised contract structures                                            |
| <b>Contract Types</b>                           | Primarily delivery-based energy contracts traded via exchanges                                     | Inclusion of multiple exchange-based products across time horizons                             | Explicit inclusion of OTC, capacity, VPPA, BESS, and banking contracts                                             |
| <b>OTC Market Recognition</b>                   | No formal recognition; bilateral trades largely outside PMR scope                                  | Initial recognition of non-exchange transactions, but limited structure                        | Formally defined OTC market with regulatory clarity. Detailed framework for OTC Platforms.                         |
| <b>VPPA / Financial Contracts</b>               | Not available                                                                                      | Not explicitly defined                                                                         | Formal definition of VPPA (financial OTC contract)                                                                 |
| <b>Price Discovery Mechanism</b>                | Centralised exchange-based price discovery (primarily DAM)                                         | Price discovery across multiple segments (DAM, RTM, TAM)                                       | Flexible discovery via exchange, OTC, bilateral agreement, or bidding                                              |
| <b>Participants &amp; Market Access</b>         | Participation limited to DISCOMs, generators, traders, and exchange members                        | Broader participation including open access consumers and diverse entities                     | Further expanded to include designated consumers and OTC platform members                                          |
| <b>Market Coupling</b>                          | Not envisaged                                                                                      | Introduced as a policy and regulatory concept                                                  | Coupling push strengthened in the 2025 reform cycle, though operational rollout came through a separate 2025 order |
| <b>Regulatory Alignment</b>                     | Operated as a relatively standalone market framework                                               | Increasing alignment with grid operations and scheduling frameworks                            | Explicit linkage with GNA Regulations, Grid Code, and system scheduling                                            |
| <b>Integration of Storage &amp; Flexibility</b> | Not addressed                                                                                      | Limited recognition in evolving market products                                                | Explicit inclusion of BESS and flexibility-linked contracts                                                        |

# Power Market Regulations – Enabling Bilateral Contract Settlements Style Mechanism

## CERC (Power Market) Regulations, 2021 — Foundation Framework

**Regulation 4(2) — Scope of OTC Market Contracts (Original)** The 2021 Regulations defined OTC Market contracts as limited to:

*"Delivery based contracts" only*

**Regulation 7(3) — OTC Settlement Conditions (Original)**

*"The settlement of contracts transacted in the OTC Market shall be only by physical delivery of electricity."*

**Significance: The original 2021 framework restricted OTC contracts exclusively to physical delivery**

## Draft CERC (Power Market) (First Amendment) Regulations, 2025

**Introduction to VPPA: Regulation 2(2)(a)**

*"Virtual Power Purchase Agreement (VPPA)" means the non-transferable specific delivery (NTSD) based Over-the-Counter (OTC) contracts entered between a Consumer or Designated Consumer and a RE generator, wherein, the Designated Consumer guarantees payment of the mutually agreed price (VPPA price) to the RE generator for the entire duration of the agreement. The RE generator shall sell electricity through Power Exchange or any other mode authorized under the Electricity Act 2003, and the difference between the VPPA price and the market price shall be settled bilaterally between the contracting parties as per mutually agreed terms."*

**OTC Market Contracts: Regulation 4(2)**

The original provision allowing only "delivery-based contracts" has been replaced with the following expanded list:

*"Contracts in the OTC Market, including: (a) Delivery-based Energy Contracts (b) Capacity Contracts (c) Renewable Energy Certificates (d) Contracts relating to Virtual Power Purchase Agreements (VPPAs) (e) Battery Energy Storage System (BESS) Contracts (f) Banking of Power (g) Any other contracts, as approved by the Commission."*

# Draft Electricity (Amendment) Bill, 2025 & Draft NEP 2026

| Instrument                                       | Enabling Clause                                                                                                                                                                                                                                                                                                                                                                                                       | Why it matters for BCS                                                                                                                                                                          |
|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Draft Electricity (Amendment) Bill, 2025</b>  | Proposed new Section 66: “The Appropriate Commission shall promote the development of a market including trading in power and may introduce and regulate market platforms, intermediaries, market products including non-transferable specific delivery contracts for difference, in such manner as may be specified and shall be guided by the National Electricity Policy referred to in section 3 in this regard.” | This is the strongest statutory enabler, because it expressly authorizes regulation of CfD-type products, which is the closest legal formulation to a BCS-style financial settlement framework. |
| <b>Draft NEP, 2026, Renewable Energy section</b> | “The Central Government shall evolve appropriate market-based frameworks, and the Central Commission shall make the necessary regulatory provisions for mechanisms such as Virtual Power Purchase Agreements and Bilateral Contract Settlement to attract investments in non-fossil fuel-based generation capacities.”                                                                                                | This is an explicit policy endorsement of BCS itself, not just a generic market-development statement.                                                                                          |
| <b>Draft NEP, 2026, Energy Storage section</b>   | “Besides long-term PPAs, the Central Government will promote ESS development through market-based mechanisms including bilateral contract settlement. The Central Commission must establish required regulatory framework to implement bilateral contract settlement-based capacity procurement.”                                                                                                                     | This goes beyond energy-only contracting and supports BCS for capacity-oriented procurement, especially relevant for storage and firmness products.                                             |

# Draft Electricity (Amendment) Bill, 2025 & Draft NEP 2026

| Instrument                            | Enabling clause                                                                                                                                                                                                                                                                                                           | Why it matters for BCS                                                                                                                                                            |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Draft NEP, 2026, Power Market section | “Suitable policy and regulatory framework shall be established for generation capacity addition through market mechanisms like Bilateral Contract Settlement.”                                                                                                                                                            | This positions BCS as a mainstream capacity-addition instrument, not a niche pilot.                                                                                               |
|                                       | “Standardized contracts for collective transactions will be executed on power exchanges. Electricity from long term PPAs may be encouraged to be routed through power exchanges or any other platform recognized by the Central Commission. Central Commission shall develop a suitable market mechanism in this regard.” | This supports the market infrastructure around BCS by pointing toward standardized contracts, exchange-linked execution, and Central Commission-designed settlement architecture. |
| Draft NEP, 2026, Risk Management      | “As markets deepen, measures may be taken to enable hedging of price and volume risks by market participants and progressively introducing forward contracts to be administered under appropriate regulatory frameworks.”                                                                                                 | BCS is fundamentally a hedge against market price risk, so this clause supports the economic logic of financially settled bilateral contracts.                                    |

# Current Legal and Regulatory Framework enabling BCS-Style Framework - Summarized

- DAM Market Coupling (CERC, July 2025): provides a robust, unified reference price for BCS settlement
- Draft Electricity Amendment Bill, 2025: explicitly enables CfD/BCS instruments under amended Section 66. It also empowers competent commissions (CERC/SERCs) to adopt and regulate such instruments within their respective jurisdictions
- Draft CERC Power Market (First Amendment) Regulations, 2025 defines regulatory perimeter for both exchange-traded products and OTC contracts. It also mandates consistency with open access, Grid Code, scheduling, and settlement provisions, confirming that BCS-style contracts can coexist with existing market architecture
- CERC VPPA Guidelines (Dec 2025): BCS builds directly on this framework, extending it to a broader technology and buyer base, and with a central counterparty
- Draft NEP 2026: endorses bilateral contract settlement and VPPAs to support non-fossil capacity alongside MBED
- Electricity (Amendment) Rules, 2026 simplify group captive arrangements and remove interpretational ambiguities, expanding the pool of eligible C&I participants who could engage as buyers under a BCS framework
- CERC Terms and Conditions of Tariff (Second Amendment) Regulations, 2026 introduces a formal integrated energy storage system tariff framework, covering BESS co-located with generation or ISTS assets. This provides the institutional foundation for integrating storage assets into BCS-style contracting structures, enabling revenue stacking across energy, capacity, and ancillary service streams

# Options for RE participation through BCS Mechanism

| Options                                                                   | Settlement Details                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Option-1:</b><br><b>Single strike price for entire contract tenure</b> | <ul style="list-style-type: none"> <li>▪ A fixed strike price is paid to RE generators for the full duration of the contract.</li> <li>▪ Settlement is done every 15 minutes via Pay-in/Pay-out if the market price differs from the strike price.</li> </ul>                                                                                                                                                                                |
| <b>Option-2:</b><br><b>Strike price range</b>                             | <ul style="list-style-type: none"> <li>▪ RE generators are assured a minimum and maximum price per MWh of output.</li> <li>▪ They are exposed to market prices within this band.</li> <li>▪ If market prices fall outside the range, 15-minute Pay-in/Pay-out settlements are triggered.</li> </ul>                                                                                                                                          |
| <b>Option-3:</b><br><b>Revenue support during high prices</b>             | <ul style="list-style-type: none"> <li>▪ RE generators quote a fixed strike price for the entire contract term.</li> <li>▪ If market price exceeds the strike price, generators retain the gains.</li> <li>▪ If market price falls below the strike price, the shortfall is compensated.</li> <li>▪ Settlements are conducted every 15 minutes basis on price deviations but revenue support is limited upon monthly adjustments.</li> </ul> |
| <b>Option-4:</b><br><b>Weekly Average Market Price Top-Up</b>             | <ul style="list-style-type: none"> <li>▪ RE generators participate fully in the market.</li> <li>▪ If the weekly average price earned is lower than the weekly market average, a top-up is provided.</li> <li>▪ If the generator earns more than the weekly average market price, a portion of the excess may need to be refunded.</li> <li>▪ Generator may be allowed to retain part of the excess revenue as incentive.</li> </ul>         |

*Source: MoP Report of Group for Development of Power Market in India (May 2023)*

## Eligible Technologies (Indicative)

### Category

Standalone RE

Utility-scale RE hybrids with storage

Firm & Dispatchable RE (FDRE)

Wind repowering with hybridisation

Grid-support BESS

Long-Duration Energy Storage (LDES)

Emerging technologies (at later stage)

### Examples

Solar or Wind Energy

Solar+BESS, Wind+BESS, Solar-Wind-BESS

RTC supply, peak power products

Legacy wind + Solar + BESS configurations

4–6-hour duration BESS owned by DISCOMs, STUs, CTUs

Flow batteries, CAES, pumped hydro, hydrogen storage

Green hydrogen, P2X, offshore wind, floating solar

## Eligible Market Participants

### Role

Sellers

Buyers

Settlement

### Participants

RE developers, hybrid/FDRE project developers, BESS operators, aggregators

DISCOMs, state procurers, C&I consumers (via open access), REIAs as aggregators

Central counterparty (SECI/NVVN/IREDA-type entity)

**Prospective Only:** Existing PPAs under Sections 62 and 63 will not be migrated



**Thank You**