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NTPC
A Maharatna Company

एन टी पी सी लिमिटेड
(भारत सरकार का उद्यम)
NTPC Limited
(A Govt. of India Enterprise)

केन्द्रीय कार्यालय / Corporate Centre

Date: 10.06.2026

The Secretary
Central Electricity Regulatory Commission,
6th, 7th & 8th Floor, Tower B,
World Trade Centre,
Nauroji Nagar,
New Delhi-110029

Subject: NTPC Submission on Staff Paper on Capacity Market for Electricity in India.

Sir,

Hon'ble Commission has issued Staff Paper on **Capacity Market for Electricity in India** and has invited comments from various stakeholders on the Staff Paper.

In this regard, please find enclosed submissions of NTPC on Staff Paper for Capacity Market for Electricity in India.

Thanking you,

Yours sincerely

Ajay Dua
ED (Commercial)

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NTPC Submissions on CERC Staff Paper on Capacity Market for Electricity in India

Hon'ble CERC has issued a Staff Paper on Capacity Markets in India aimed at ensuring resource adequacy in the power system through contracting of capacity and providing assured recovery of capacity remuneration. In India, long-term PPAs already function as capacity-based contracts, enabling recovery of fixed costs based on availability, with buyers retaining scheduling rights and energy charges linked to scheduled generation under a regulated framework.

As per the Staff Paper, the rationale for introducing capacity markets appears to stem from the concern that, while long-term contracts ensure capacity availability, they may not guarantee supply during critical stress periods. Capacity markets, therefore, seek to address this gap by ensuring resource adequacy, i.e., the reliable availability of capacity to meet demand at all times.

The Staff Paper examines various capacity market designs, including capacity obligation (decentralised model), capacity auctions (centralised model), and strategic reserves (dedicated standby capacity), along with international practices in the USA, UK, and Germany. Further, the Staff Paper has solicited Comments on the three proposals:

a. Capacity Market for RA/Capacity Obligation

b. Reserve Capacity Market and

c. Secondary/Short-term Capacity Market

NTPC comments on the staff paper in general and specific to the 3 proposals are as follows:

Preface

1. Indian power sector is predominantly based on a capacity-contracted framework, wherein long-term PPAs based on two-part tariff ensure recovery of fixed costs based on availability, with DISCOMs retaining first right over scheduling and energy offtake**.** Further, the reliance on short-term energy markets (DAM/RTM/bilateral) remains limited (around 14%-15%) as compared to long-term contracted capacity**.**

Data from the CEA on peak demand shortages for FY 24-25, 25-26 & 26-27 (till May'26) shows that there is no shortfall in power supply during peak hours. This demonstrates that the existing framework of long-term contracting, supported by system planning, has been effective in ensuring capacity adequacy. Non-availability of tied up capacity during peak hours has not been a significant issue in India. Further, it may be noted that:

a) The current PPA-based structure in India already functions as a de-facto capacity mechanism, ensuring certainty of cost recovery and capacity availability. Accordingly, the primary objective of capacity markets i.e. ensuring adequacy of capacity, appears to be substantially met under the existing framework**.**

b) Capacity markets are typically suited for energy-only markets with weak or inadequate investment signals, whereas India follows long-term contracted capacity-based system, already ensuring requisite capacity creation and remuneration.

2. The Resource Adequacy (RA) framework mandates DISCOMs to tie up sufficient generation capacity on a long-term basis**,** which has led to most DISCOMs entering into long-term power procurement arrangements through tariff-based competitive bidding (TBCB) (Section 63) or regulator-determined tariffs (Section 62)**.**

It is submitted that these arrangements have ensured efficiency and economy in procurement through competitive processes / regulatory oversight. They have also provided DISCOMs with adequate control and scheduling rights over the tied-up capacities. This enables DISCOMs to optimally dispatch resources and reliably meet demand even during peak and stress periods. **Additionally, the existing regulatory provisions provide for higher fixed cost recovery for thermal generating units linked to availability during peak hours.** Accordingly, the existing framework effectively ensures capacity availability (including during peak/stress hours), cost efficiency, and operational control**,** thereby addressing the primary objectives that capacity markets seek to achieve.

3. The paper highlights that the energy market is the primary tool for short-term resource optimisation and efficient price discovery, However the current scheduling framework in India, through implementation of Security Constrained Economic dispatch **(SCED)**, is already achieves similar outcomes by optimising dispatch of generating stations on a least-cost basis while ensuring system security.

4. Proposal for introduction of a capacity market is, inter alia, aimed at addressing the "missing money" problem, i.e., inadequacy of revenue recovery for generators in **energy-only markets,** thereby discouraging investment in new capacity.

However, this issue may not be directly relevant in the Indian context, as the power sector is not based on Energy-only markets. Indian power sector is predominantly based on long-term contracting mechanisms, wherein a large portion of generation capacity is already tied up through long-term Power Purchase Agreements (PPAs). These contracts provide:

a) Complete right of scheduling to the procuring DISCOMs,

b) Assured recovery of fixed costs and revenue visibility over the contract period to the capacity provider/generators,

Thus, the existing mechanism provides higher control to the DISCOMs for contracted capacities, mitigates investment risks of generators and creates adequate incentives for new capacity addition.

Further, the procurement through tariff-based competitive bidding (TBCB) or regulator-determined tariffs (section 62) ensures that capacity addition takes place in an efficient and economically optimal manner, while also providing financial comfort to lenders and developers.

5. Accordingly, unlike energy-only markets where the "missing money" problem is pronounced, the existing contractual framework in India already addresses the issue of investment adequacy for new capacity, thereby reducing the need for a separate capacity market on this ground. It is respectfully submitted that the major issue in India is not overall capacity adequacy, but availability of a reliable mix of power sources (incl. storage) catering peak/stress hours and flexibility to handle renewable intermittency. Accordingly, instead of introducing a full-scale capacity market, emphasis may be placed on strengthening Resource

Adequacy (RA) framework implementation, enhancing participation in energy markets (DAM/RTM) & developing targeted mechanisms, such as:

a) Reserve Capacity Mechanism

b) Ancillary Services

c) Incentives for flexible/peaking capacity

In view of the adequate capacity position and negligible peak deficit as elaborated above, introduction of a comprehensive capacity market may not be immediately warranted in Indian context.

NTPC comments specific to the proposal are as follows:

(A) Capacity Market for RA/Capacity Obligation:

As submitted above, the proposed Capacity Market for Resource Adequacy/Capacity Obligation is not suited for Indian context given that the share of Energy Market in India is significantly lower than the other world markets (US, UK or parts of Europe). Capacity markets as envisaged under the 3 different options may lead to following major issues:

1. The proposed capacity market may introduce significant **complexity in estimation of capacity requirements and bidding prices (based on Net-CONE)**, **particularly in the context of India's rapidly growing demand and evolving generation mix**. Any inaccuracies in estimating capacity needs or price benchmarks may lead to distorted price discovery and inefficient market outcomes, with potential financial implications for both buyers and generators. Given that the issue sought to be addressed is not presently significant in the Indian context, the proposed mechanism may introduce avoidable risks and complexities in an otherwise stable system**.**

2. **Likely Double Payment Liability on DISCOMs:** Under the proposed capacity market mechanism, DISCOM's shall be paying the capacity charges based on the contractual arrangements between capacity provider & DISCOM. However, in situations where the supply is constrained and Market Clearing Price (MCP) is high (more than the actual total cost of capacity provider), the DISCOMs may be liable to pay the increased MCP in addition to the capacity charges for the contracted capacity. In such situations, financial implications for DISCOMs may be significantly higher than the existing mechanism of bilateral PPA based contracts.

3. **Limited Scheduling Rights of Buyer/DISCOMs:** Under the proposed framework, DISCOMs have limited scheduling rights (particularly under Options I & III), despite bearing capacity payment obligations. As dispatch is market-driven, actual scheduling may not always align with tied-up capacity due to market clearing outcomes, transmission constraints, or competitive bidding behaviour, leading to potential inefficiencies in demand planning and increased cost exposure.

4. **Risk of Increased Prices for DISCOMs:** Proposed design of the demand curve and bidding rules including provisions such as DISCOM bids placed above the market price cap and generators required to bid as price takers during stress periods may lead to distortions in market price discovery. **Such artificial constraints on bidding behaviour could skew capacity prices away from true market fundamentals, resulting in**

inefficient outcomes and potentially higher procurement costs. In the proposed capacity markets, Generators may gain stability but lose efficient price signals whereas DISCOMs may gain reliability but risk systematically higher costs due to artificial demand/supply behaviour. Such mechanism may inadvertently lead to structurally higher system costs over time.

5. **Increase in Generator Risk:** Proposed capacity market framework may increase revenue uncertainty for generators, as a portion of cost recovery would be dependent on outcomes in the energy market. **In situations where capacity does not clear in the energy market, particularly during non-peak periods**, generators may face under-recovery of fixed costs, thereby affecting project cash flows. This uncertainty in revenue streams could adversely impact bankability and financial viability of projects, especially for new investments, undermining the confidence of investors and lenders in the sector.

6. **Critical Issues for Thermal Generators**:

   It is understood that Capacity Contracts are employed globally in energy only markets with high RE penetration to facilitate new investment in generation capacity. It is submitted that the coal-based thermal stations provide firm, dispatchable, round the clock capacity, system inertia and essential backup for RE variability thus ensuring the paramount need of grid stability/security. The proposed capacity market framework for resource adequacy/capacity obligations inherently undermines the established and proven mechanism of securing thermal capacity through long-term power purchase agreements (PPAs). The major reasons for this are as under:

   a) Proposed framework does not fully account for the **technical constraints of thermal stations, such as ramp rates, start-up time, and minimum technical load (MTL)**. While supply during peak/stress hours is critical for recovery, absence of assured scheduling at MTL levels during non-peak periods may lead to operational inefficiencies, over injections and grid security issues affecting the ability of generators to meet peak obligations.

   b) **Additional costs associated with flexible operation of generating stations,** such as part-load compensation, additional oil consumption and other cycling costs (increased O&M costs), would need to be factored into capacity bids.

   However, given the long-term contract duration and uncertainty in future load profiles and dispatch patterns, accurate estimation of loading factors and associated costs become challenging, which may lead to inefficient pricing and risk of cost under-recovery.

   c) **Retrospective revision of ECR**: In the current FSA framework, actual cost of fuel is known month after it is supplied. In proposed market-based dispatch framework, retrospective revision of Energy Charge Rate (ECR) to account for variations in fuel quality may not be feasible, as scheduling and settlement would be governed through market mechanisms. In such a scenario, generators may be exposed to unrecovered fuel cost variations, leading to financial risks particularly for thermal stations dependent on variable fuel quality. In view of the same, FSA framework would need to be reworked.

d) As Scheduling and Despatch of energy is envisaged through market, following needs to be considered:

i. **Start-up time of Units:** Super-critical units have start-up time up to 36 hours and it will not be possible for generators to schedule these unit always on day ahead basis.

ii. To bid as price taker does not permit inclusion of start-up and other incidental cost in energy charge.

iii. Units with high ECR are likely to be scheduled only in morning and evening peak hours, it will be difficult for grid operator to keep these units on bar for the entire day.

iv. After closure of the DAM window, the flexibility for schedule revision would narrow down, which may lead to system inefficiencies, as schedule revisions help accommodate variations in demand and generation, manage contingencies and outages, and ensure optimal utilization of resources.

v. The staff paper does not provide that how the variations in coal prices, transportation cost, taxes & duties etc. shall be taken care as it is not feasible to gauge the expected variations at the bidding stage particularly for long-term horizon of 15 years. Further this uncertainty may lead to increase in bid price or otherwise shall impact the competitiveness.

vi. While all the energy transactions are through market route, this will lead to significant increase in payment transaction fees and daily settlement of large funds will increase operational and financial complexity.

In view of the above, it is submitted that the Indian power market is still evolving and without a mature energy market in place, capacity only markets do not seem to fulfill the requirements of the Indian power system. It is also necessary that introduction of capacity contracts must not disturb or override the framework of existing contracts, including the capacity under implementation which has served the nation very well so far. The relinquished/untied capacity available with the capacity providers may be fully utilized for providing Resource Adequacy, Reserve services for shortfall through Central Agency without affecting the existing PPA/contract obligations. Such utilization may be facilitated through reserve capacity arrangements or short-term capacity trading, as outlined in the following paragraphs.

(B) Reserve Capacity Market

As brought out in the staff paper, unlike the mature power systems of west/developed countries, the Resource Adequacy (RA) framework in India is still under implementation and DISCOMs do not consistently maintain adequate reserve margins. This results in insufficient reserves in the system, thereby posing a threat to grid security.

1. Indian power system faces insufficiency of reserves in crunch periods despite adequate overall capacity; the said insufficiency becomes critical for Grid security particularly during:

   a) Solar hours, when thermal units operate at minimum technical load, and

b) Peak hours, where there are sudden demand spikes or contingencies, requiring immediate flexible response.

2. To address the challenges related to grid reliability and system security, the introduction of a Reserve Capacity Market for advance procurement of reserve until adequate resources through resource adequacy framework are available in the power system, is necessary in the Indian context. In view of the same:

a) Advance procurement of unutilized reserves such as available Gas capacities would ensure availability of flexible capacity during system stress.

b) It would serve as a transitional safeguard until RA framework is fully operational.

c) It would enable optimal utilisation of existing resources, including thermal, gas, hydro, storage, and demand-side resources.

d) It would support integration of renewable energy by providing balancing support.

Additionally, a Reserve Capacity Market would:

a) Strengthen grid reliability and frequency control.

b) Reduce reliance on ad-hoc mechanisms (e.g., Section 11 directions)

c) Provide clear price signals for reserve provision.

3. It is pertinent to mention that NTPC has gas-based generating capacity of around 4 GW including an untied gas capacity of 1,340 MW (908 MW relinquished from various gas stations under Ministry of Power, GoI exit scheme of March'2021 plus 432 MW of Faridabad GPS due to expiry of PPA). Presently, the beneficiaries are reluctant to schedule the tied-up gas capacity owing to the high cost of natural gas. Also, there are no long-term takers for the un-tied gas capacity due to high fuel cost. However, considering the inherent capabilities of gas stations (low start-up time, fast ramp-up/ramp-down etc.) suitable for meeting emergency grid situations. Gas capacity is often being utilized by the Grid Operator/NLDC during high demand periods under the SCUC & Ancillary Services mechanisms (scheduling of 222 days in FY 25 & 205 days in FY 26). Thus, the gas capacity is already serving as a reserve for the power system.

In this background, it is suggested that the NTPC gas based generating capacity (including untied capacity) be treated as a system level resource and allocated/tied-up to the Grid Operator for meeting the shortfall of reserves. Considering that the tariff for NTPC gas capacities is determined by the Hon'ble Commission, tie-up of these gas capacities with the Grid Operator may be done at the CERC determined price. This shall address the uncertainty & risk associated with the proposed Net-CONE based auctions.

4. The dispatch principles for the gas capacity tied up with Grid Operator may be as proposed in the staff paper i.e. NLDC retains first right of scheduling/dispatch of such capacity and capacity provider is paid capacity charges/compensation charges/holding charges/variable charges based on the tie-ups/requisitioning/scheduling/dispatch status of the capacity.

5. As brought out in the staff paper, it is not expected that new capacities will be created solely to provide reserve and ancillary services. Advance procurement of reserve like gas capacity of NTPC would help the optimal utilization of existing resources. In the absence of an appropriate mechanism to contract or remunerate gas-based capacity as reserves,

a structural gap persists between system service obligations and cost recovery, posing risks to the financial sustainability of such assets.

In view of the above, the proposal for advance procurement of capacity reserve is necessary for Grid Security. It is suggested that a targeted Reserve Capacity Market may be implemented in a phased manner, starting with tying up of the available gas capacity with the Grid operator to strengthen system reliability and address reserve deficiencies.

(C) Secondary Short-Term Capacity Market (for existing capacities)

1. Staff paper mentions that there are situations when certain capacities are available in the system but are not visible in the market because of silo based/bilateral contracting and scheduling. Optimal utilization of such capacities is essentially required for grid security and keeping cost of power lower during peak hours. Therefore, there is a need to introduce secondary short-term capacity markets for such existing capacities.

2. The proposed short-term market options may create challenges such as complex capacity estimation and pricing, potential double payments for DISCOMs, limited scheduling rights, price volatility under market-based dispatch, and uncertainty for generators in recovering investments.

3. Currently interchange of short-term surplus capacities is possible in the following ways:
   (i) Any beneficiary/Discom having surplus power can request Ministry of Power (MoP), GoI for surrendering its allocation for a certain period. MoP then allocates such capacity to another needy beneficiaries for that period after considering its request.
   (ii) MoP also allocates 15% GoI unallocated quota to various beneficiaries as per their requirement from time to time.
   (iii) MoP has also launched the PUShP Portal (Portal for Utilization of Surplus Power) in March 2023 to improve power availability and to optimize unused surplus generation capacity in India. The portal enables DISCOMs and States with surplus contracted power to offer it temporarily to power-deficit states and thus optimize capacity utilization across the country.
   (iv) As per the MoP LPSC Rules 2022, Generating Companies are also required to offer their entire Un-requisitioned surplus (URS) power of stations in the Power Exchange for utilization by other beneficiaries and the gains realized by such sale are shared with beneficiaries which offsets their fixed charges liability.

   Hence the existing system also provides the mechanism which enables capacity holders to exchange capacity rather than energy alone.

It is submitted that the proposed short-term secondary capacity market for existing resources should be aligned with the current capacity contracting framework in India. This means that DISCOMs should have the right to schedule power from the short-term capacity they procure, while capacity providers must be fairly compensated through capacity charges for ensuring availability.

Alternatively, the grid operator may procure short-term reserves from existing capacities (at regulated tariff for Section 62 & at TBCB tariff for Section 63) and allocate the costs to those DISCOMs that fall short of their targeted resource adequacy levels.

Additional Submission:

The Staff Paper issued by the Hon'ble Commission explores the introduction of a capacity market in the Indian context based on such markets already existing in energy-only markets elsewhere like UK, US, etc. However, it is pertinent to note that India already has an established framework for capacity addition and scheduling through long-term PPAs and centralized economic dispatch mechanisms. It needs to be recognized that India does not have an Energy- only market where there can be issues in capacity addition due to absence of adequate price signals for capacity addition. Therefore, capacity market in India appear pre-mature and not pertinent to existing conditions. Any transition from the existing framework to a capacity market would involve significant regulatory, operational, and commercial changes, including modifications in contracting structures, scheduling practices, and risk allocation between buyers and generators.

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