Introduction of Green RTM (G-RTM) and High Price RTM (HP-RTM) contracts

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The Hindustan Power Exchange (HPX) Limited, filed petition to the CERC on Introduction of Green RTM (G-RTM) and High Price RTM (HP-RTM) Contracts, on 12th December, 2025. The main objectives of the petition are:

Objective: The petition aims to introduce Green Real Time Market (G-RTM) and High Price Real Time Market (HP-RTM) contracts on the HPX platform to enhance market depth, flexibility, and price discovery in the real-time segment. It seeks to provide a dedicated avenue for trading green power closer to real-time, thereby supporting renewable energy integration and enabling buyers to meet their sustainability and RPO requirements. The proposal also aims to address situations of high demand & supply tightness by offering HP-RTM as a premium price signal, while improving liquidity, operational efficiency, and risk management in the power market framework in line with evolving grid and market requirements.
The document can be accessed here.

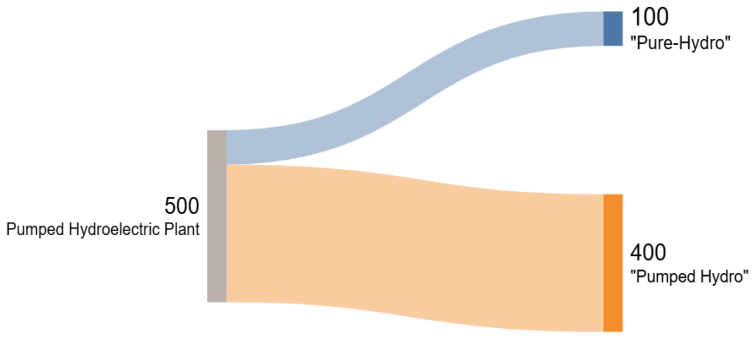
CER Opinion

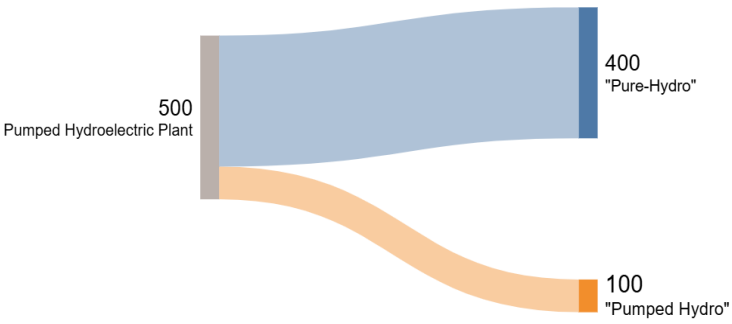
1. **Framework for Transition from Green RTM to Integrated Real-Time Market:**
   It is proposed that the Green Real-Time Market (G-RTM) be re-designated as the Integrated Real-Time Market (I-RTM), in line with the existing Integrated Day-Ahead Market (I-DAM) framework defined under CERC regulations. Under the I-RTM framework, two distinct sub-segments may be notified as Green RTM segment for transactions involving renewable energy sources and a Normal RTM segment for all eligible electricity transactions, thereby providing an integrated yet differentiated real-time market structure.

2. **Technology Agnostic Energy Storage System (ESS):**
   It is recommended to define technologically agnostic criteria for *"energy storage system (ESS)" rather than s restricted eligibility for the "battery storage system".* This would ensure that other technologies are not discriminated against by creating artificial barrier to entry through the eligibility criteria. ESS covers all forms of storage mechanical options such as pumped hydro, compressed air, flywheels, thermal storage technologies, electrochemical systems, and other emerging forms. The market design should permit broader eligibility, even while participation may depend on the respective economics of the storage technologies. This would also create an environment for competition amongst the alternate storage technologies.

3. **Treatment of 'Pure' Hydro Vs 'Pumped Storage' within a PSP's Portfolio:**

Development of pumped storage capacity can be undertaken on existing hydroelectric plants as well as those being developed on a greenfield basis. Furthermore, a pumped storage plant may have higher generation capacity through use of water in the upper reservoir[1], which is partly replenished by upstream flow and partly through the pumped water from the downstream reservoir. **Thus, a PSP could have a 'pure' hydro output as well as that based on 'stored' energy. The treatment of energy generated and injected by Pumped Storage Plant should ideally be differentiated from 'pure hydro' energy' as this would also affect eligibility of participation in the HP-RTM stage.** For e.g., an existing 400 MW hydroelectric generating station with an upper reservoir operating on natural inflows and reservoir storage. Subsequently, a 100 MW of energy generated through 'storage cycle' is integrated into the same project, which draws water from a lower reservoir using grid electricity and pumps it back to the upper reservoir for later generation. In contast, a PSP may have 100 MW of pure hydro function whereas 400 MW may be added through an add-on pumped storage facility. In this context, it may be difficult to distinguish between the energy generated from the pure hydro storage and that generated from the pumping operation of the plant for the purpose of participation in HP-DAM, and for scheduling, and settlement thereof.





[1] This would be the case in case of a PSP plant based on a water body that also releases water for ecological, irrigation and other multipurpose plant in contrast, a closed cycle PSP plant would not have 'pure' hydro generation component.

Figure 1: Sankey Diagram highlighting in both cases, entire hydroelectric plant qualifies as PSP even though proportion of "Pumped Hydro" and "Pure Hydro" vary. (figures in MW)

As per the current definition of PSP (by CERC), PSPs generate energy through 'stored' water through pumping from a lower to a higher reservoir. The complication arises in case a single a hydro complex that includes both a conventional large hydro station and a PSP unit sharing common injection point[2]. In such cases, care is needed to ensure that only the storage-related PSP component actually participates in Market, and the conventional hydro output does not enter the mechanism indirectly.

It is suggested that a minimum proportional share of, say, 70-80%, of storage capacity be mandated to qualify for participation in the HP-RTM (similarly for HP-DAM) market segment.

4. Treatment of RE Schedules, RTM Participation and DSM Exposure:

When a renewable generator procures power through the Green RTM, the cleared volume becomes part of its firm schedule, and any residual mismatch is settled under the applicable DSM regulations, broadly similar to the treatment of I-DAM schedules. At present, once green power is scheduled in the Day-Ahead or Integrated DAM, that schedule is effectively locked for DSM purposes; if the generator subsequently observes lower-than-forecast wind or solar availability, the resulting under-injection attracts deviation charges at the notified DSM rates. **From a regulatory design standpoint, the key challenge for the Commission would be to determine the extent to which a generator may use RTM (including Green RTM) to hedge its deviation risk, and under what conditions such RTM trades are recognized as legitimate balancing actions rather than gaming.**

When a renewable energy generator participates in the Green RTM, the cleared RTM volume shall form part of its firm schedule for the corresponding time block, and any deviation from this schedule shall be settled under the prevailing DSM framework. To minimize gaming, the Commission may specify conditions under which generators may utilize the RTM (including Green RTM) to mitigate bona fide forecast-related deviations, while disallowing strategies primarily aimed at arbitrage between DAM and RTM. **CERC's market monitoring operations would thus have to detect and address such a behavior.**

[2] Or a conventional hydro plant with add on pumping facility for functioning partly as pumped storage.