Ministry of Power (Draft guidelines to promote development of Pump Storage Projects in the country)

Ministry of Power notified a draft for promoting the development of PSP in the country on 15th February, 2023. The comments are invited for the same up to 2nd March, 2023. The major highlights on the draft are mentioned as below:

- India for clean energy transition by NDC targets of 50% of installed capacity to be renewable and 45% reduction in emissions by 2030 and going net zero carbon emissions by 2070.
- Considering large amount of VRE integration, PSPs are of importance for greater inertia and balancing power to the grid. They are well-suited to address dynamic supply and demand in the country. Peaking operation and reliability while battery storage solutions are still evolving and address only short duration storage needs in grid management.
- As per planned RE capacity addition of India as per NEP has set a target for 51.5 GW of BESS and 18.8 GW of PSP addition till 2032. It is worth noting that on-river pumped storage potential is 103 GW. As of now, 8 projects are presently in operation of 4745.60 MW.
- Appropriate guidelines are required basically for execution of this long term plan effectively for PSP promotion as well as to whom and how the development projects would be allocated.
- In short, the allocation would be to State PSU and Central PSUs based on predefined criteria specified, based on competitive bidding under which the tariff would be determined as per Section 62 in EA 2003 and based on TBCB whose tariff would be determined as per Section 63 in EA 2003.
- There are certain benefits provided to PSP related to tax, charges and many more. Also, the participation of PSP into market and specifically HP-DAM is discussed considering their timely support for ancillary services and offer suitable monetization.

The document can be accessed here.

Comments on

Draft guidelines to promote development of Pump Storage Projects (PSP)

Dr. Anoop Singh, Professor
Founder & Coordinator, Centre for Energy Regulation (CER) & Energy Analytics Lab (EAL)
Department of Industrial and Management Engineering
Indian Institute of Technology Kanpur
Kanpur – 208016 (India)
E-mail: anoops@iitk.ac.in

1. **Competitive Bidding and Swiss Challenge Approach to Develop Pump Storage Plants (PSPs):** Rising share of variable renewable energy sources requires interventions in terms of flexible operation of the conventional power plants as well as deployment of energy storage systems. PSPs offer a relatively cost effective way to help implement a storage solution especially for absorbing higher RE generation, particularly solar generation. The efforts should be to made to ensure that such projects are developed on competitive bidding basis.

   In case a project develop seeks to develop an identified site under section 62 of the Electricity Act, the same should be subject to Swiss Challenge Approach wherein a competitive project developer may offer lower capital cost/levelised cost/tolling charge as applicable. The Ministry should develop guidelines for implementing Swiss Challenge Approach for the Indian power sector.

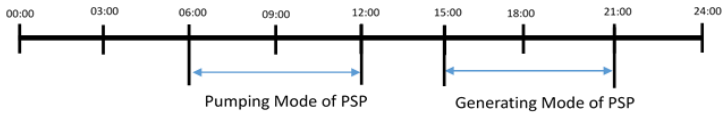
2. **GNA Regime and Waiver for ISTS charges**: As per the Clause 2.3 of the draft document proposes, *"…waiver of ISTS and other transmission charges have also been made available to Pumped Storage Projects…".*

   The PSPs operate in 'generator' as well as 'consumer' mode. As of the transmission pricing regime under General Network Access (GNA), the drawing entity pays for transmission charges. It may be clarified that whether the waiver of ISTS charges will be applicable to the PSP while operating in the pumping mode and to the beneficiary while the PSP is operating in the generating mode.

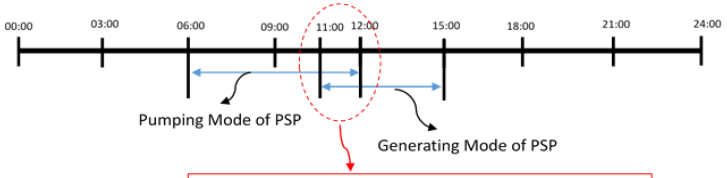
3. **PSDF for Support for Enabling Infrastructure for PSPs**: The Power Sector Development Fund (PSDF) created under the CERC's regulation and operated as per guidelines issues by the Ministry of Power, may be used for providing infrastructural/connectivity support or other similar support as per the CERC regulation. This may also be included in the proposed draft Clause 2 and Clause 4.3.

4. **Tolling Based Competitive Bidding for PSP**: The PSP projects may be awarded to the project developers based on tolling charges, i.e. charge for conversion of energy fed in an off-peak hour to be converted into energy delivered during the peak hours. Such **Tolling Based Competitive Bidding would reduce the energy price risk for the project developers**. This would also not have adverse impact on the beneficiaries as they would now have **a cost effective solution to 'convert' off-peak (including solar power generated during the day) into peak power to be delivered to the beneficiary.**

5. **Allotment through Tariff Based Competitive bidding**: As per the draft Clause 3.1(iii)(a) *" Composite tariff (including the cost of input power) in case input power is arranged by the developer;"*. The composite tariff should only be applicable for the power injected during the generation mode of the PSP.
   Further, the competitive bidding guidelines should also ensure that the **time period for drawal of input power by the PSP should not overlap with the delivery period (see figure below)**, which if allowed, would result in the supply of the input power drawn by the PSP directly to the beneficiary without any value addition through the PSP, and hence would impose additional avoidable cost to consumers.



a. Disjointed timelines for power delivery and consumption PSP



b. Overlapping timelines for power delivery and consumption for a PSP

6. **Issue of Allotment Letter**: As per the draft Clause 3.2 *"Developers shall begin construction within a period of 2 years from the date of allotment of the project, failing which, allotment of the project site shall be cancelled by the State."* Along with the time to begin the project development for PSP from the date of allocation of the project that is within 2 years, there should also be a **time limit specified for issue of allotment letter to the project developer for ensuring timely start of the project. This would reduce risk for the project developers.**

7. **Term and Conditions for PSP tariff and, Notification for peak and off-peak tariffs**: As per the draft Clause 3.3(ii), *"Appropriate Commission shall **notify** Peak and Off-Peak tariffs for Generation to provide appropriate pricing signal to Peak and Base Load Generating Plants. (emphasis added)"*

As per Electricity Act 2006, the tariff is 'determined' (u/s 62) by the respective Commission. To ensure that the PSPs are operated in the most efficient manner, tariff for PSP be determined with a normative assumption that almost 80-90 % of electricity 'generated' from PSPs would be suppled through the 'charging' cycle and be supplied during the designated peak hours. This may differ based on specific project design as varying amount of energy (across seasons) would be produced by PSPs functioning purely as a hydro-electric plant.

An equivalent treatment of peak/off-peak energy injection while determining tariff whereas actual payment being done on the basis of energy injected during peak hours may lead to significant over-recovery imposing higher cost to the consumers. Thus, **separate regulations defining terms and condition for determination of tariff for PSPs should be put in place by the respective Commissions.**

8. **Participation of PSP in HP-DAM**: As per the draft Clause 3.3 (iii) *"PSPs and other storage projects shall be allowed to participate in the proposed high price segment of the day ahead market (HP-DAM) so that they can take suitable advantage of the price differential between Peak and Off-Peak tariffs."*

The option for PSP to participate in electricity market should only be available after fulfilling the commitments under contract between the PSP developer and the beneficiary. Since PSP projects are to be developed, under this policy, through any of the three options mentioned in the draft document, the associated power would tied up in PPAs and hence a PSP project developer itself would not be able to participate in HP-DAM. However, the signatories to the PPA with PSPs can sell the associated power on HP-DAM.

As highlighted above, it would be important to specify that **only power 'stored' in HPDAM through the RE sources would qualify for participation in HP-DAM,** rather than the directly selling the RE power, which is to be 'stored' by the PSP through pumping mode. In absence of such a criteria, cheaper RE power (associated with RE integrated PSPs) could be directly sold in HP-DAM.

However, merchant PSPs and other storage projects may be allowed to participate in HP-DAM to trade 'stored' energy so that they can take suitable advantage of price differential between off-peak and peak tariffs.

9. **Special Treatment of Pumped Storage Plants (PSPs) in SCED:** The PSPs run both as a load as well as generator as per the operational strategy of the PSP. Under current mechanism for SCED implementation, PSP under generator function would only be eligible for participation. The pumping action of PSP, which would use energy from identified source, can also be optimized through the SCED

mechanism, if the PSP-Pumping is allowed as a 'load' along with its source of supply to be integrated in the SCED mechanism. **The SCED mechanism would thus need to be modified to allow dual role of PSPs (and other storage technologies).** Furthermore, co-optimisation of SCED and RRAS would also have to accommodate dual role of PSPs and other storage technologies.

10. **Capex Limit of PSP**: As per the draft Clause 3.4 *"…the Central Government may notify a benchmark **cost of storage** for investment decisions of CPSUs for PSPs considering 6-8 hours of operation…..(emphasis added)"* It is suggested that the benchmark cost of pumped storage specifically should be considered for reference and investment decision making. Consequently, the projects having higher benchmark costs should be avoided. An overall limit for capital investment may also be put so that cost effective PSPs are selected for development and the expensive ones are excluded wherever their tariff is to determined under section 62 of the Act.

11. **Operational Strategy for PSPs:** It has been observed that some of the existing PSPs have not been utilized effectively for the intended purpose in the past. The discoms as well as the SLDCs/RLDCs would have to cross the learning curve under the applicable framework to ensure that such assets are efficiently utilized for the intended purpose. SERCs would play a very important role in ensuring such a framework. Given that storage obligation limits the use of non-renewable power (up to 25% only), the same should be incorporated in the **respective regulation to be amended/introduced by the respective SERCs for optimal operation of PSPs**.

12. **Applicability of CSS and Electricity Duty:** As a 'consumer' of electricity, the PSPs may be subject to cross subsidy surcharge. The respective regulation of the SERCs would have to **exclude the electricity consumed by PSPs from the ambit of CSS**. Furthermore, the state governments, where electricity duty is applicable on its consumption, should also **exempt such consumption from applicability of electricity duty**.