Comments/Suggestions on the MNRE's "Draft Rajasthan Solar Energy Policy, 2019", by Prayas (Energy Group), Pune

Firstly, we welcome the publication of this draft solar policy and welcome the objective of making Rajasthan in to a national leader in solar energy. Below we provide our detailed comments on some aspects of the draft policy.

1. The policy lists a target of 50 GW by 2025-26 which includes 25 GW in the state by 2022. This is an extremely ambitious target and should be supplemented by comprehensive capacity expansion and production cost simulations which can model system dispatch in these years (2022 and 2026) and determine how this amount of solar generation can be reliably integrated into the Rajasthan system considering its load profile, load growth and existing and future system flexibility. This is crucial since a number of actions which need to be taken to make sure such a high capacity can come online in this time period needs to begin now. This would be mainly with regard to detailed transmission planning followed by getting appropriate transmission capacity on ground. A detailed note on '*The need and importance of a new framework and long term perspective for transmission planning*' to incorporate the increasing renewable energy targets is attached for your reference. Other actions would be to do with system flexibility (coal thermal flexibility, battery systems, changes in ToD tariff signals etc.)

   Two recent papers, one which describes the preliminary production cost modelling exercise by Prayas (Energy Group) focusing on simulating the MSEDCL system operation in 2030 (without any transmission constraints) and another paper by Deshmukh et. al evaluating the value of Battery Storage in High Renewable Energy Scenarios for India are attached for your reference. These give an idea of the potential modelling exercises which would give policy makers and regulators greater confidence in high RE targets. These papers were presented a few days ago at the 2nd International Conference on Large-Scale Grid Integration of Renewable Energy in India (Sep, 2019).

   Additionally, given the short period for such a significant target, there is a need for constant review and assessment. To avoid lock-ins in a dynamic environment with changing technologies and uncertain demand, it is suggested that the policy explicitly mentions that the target will be reviewed every year based on national and international developments.

2. Para 6.1 (ii) notes that, *"… State will endeavor to develop Solar Power Projects for sale to parties other than Discoms of Rajasthan within the State and outside the State and for captive consumption within the State of Rajasthan."*
   This is a welcome objective. However, para 8.4 - *Utility Grid Power Projects for captive use within State/Third Party sale within and outside of the State of Rajasthan* notes that

The State will promote setting up of Solar Power Plants for Captive Use/3rd party sale for consumers within the State. The ***maximum permissible capacity of individual plant will be limited to "Average Annual Demand (MW)****".*

"Average Annual Demand (MW)" means "Previous financial year consumption (kWh)/1000x8760".

This is a very restrictive constraint on the potential Open Access and Captive generators/consumers and will certainly deter sale of power under such routes. A 1 MW solar plant with 20% CUF can generate 17.52 lakh kWh. However, by the above calculation a consumer with 17.52 lakh kWh consumption can have a maximum permissible capacity of only 0.2 MW, thereby limiting solar to only a maximum of 20% of your consumption. We submit that this restriction should be removed from the solar policy and potential OA and CPP consumers should be free to put up solar capacity as needed provided they pay all associated charges.

Increased penalties or charges for exceeding contracted demand could address the challenges faced by the DISCOMs with respect to planning without restricting solar capacity. These could be introduced in the RERC regulations.

3. Para 8.5.1 notes that, *"The State will promote setting up of solar power projects with a minimum capacity of 0.5 MW and maximum capacity of 3 MW in the vicinity of existing 33 kV Grid sub-stations for sale of power to Discoms. The selection of such projects will be done through tariff based competitive bidding process. The quantum to be procured by Discoms will be decided by RUVNL/Discoms on the basis of requirement and commercial viability."*

   Prayas (Energy Group) strongly supports the above initiative and recommends that such an approach be used comprehensively to supply solar power for agriculture. The significant cost savings from this approach are a wind-win-win situation for the farmers (reliable day-time power) and subsidy/cross-subsidy savings for the state govt and DISCOMs. The policy can also consider revising the upper limit of 3 MW to 5/10 MW considering the high average pump size and usage in Rajasthan as noted below.

Table 1: Average pump details for Rajasthan

2017-18	Number of agriculture consumers	Connected Load (kW)	Sales (MUs)	Average pump size (kW)	Annual average hours of use (hours)
JVVNL	483,593	3,676,756	7,021	7.6	1910
AVVNL	446,607	3,148,946	5,369	7.1	1705
JdVVNL	323,217	5,820,781	10,405	18.0	1788
Total	1,253,417	12,646,483	22,795	10.09	1802

Source: Audited actuals submitted by DISCOMs in the true-up process for FY18.

4. Para 11 talks about Solar Energy Projects with Storage Systems. A 5% of RPO in addition to the solar RPO for solar + storage projects is a welcome first step. Again, as noted in the first point, detailed production cost simulations will help the DISCOMs/RERC in deciding the absolute quantum of storage needed as well as the hours of discharge needed from such storage projects.

5. Section 24 introduces the Rajasthan Renewable Energy Development Fund. It proposes a new levy of Rs 2.5-5 lakhs/MW per year for the entire life-cycle of the project. The higher amount of Rs 5 lakhs is for projects *'set up in the State for sale of power to other State Discoms/Sale to 3rd party outside the State'.* The lower amount of Rs 2.5 lakh is for captive and all non-DISCOM PPA projects set up in the state for power consumption in the state.
    a. To begin with, the purpose and objective of this new levy and fund is not stated. Similarly, how these funds will be utilised and under whose discretion is also not stated. Hence this makes it rather difficult to comment on the appropriateness of this new levy.
    b. Our modelling shows that with existing industry assumptions without this levy, the solar tariff would be Rs 2.76/kWh. With an additional Rs 2.5-5 lakh/MW/year levy, the tariff would rise to Rs 2.9-3.04/kWh. This is a 5-10% increase in the levelised tariff. While Rajasthan enjoys higher solar radiation compared to most states as well as the advantage of relatively lower land costs, these advantages need to be considered against this 5-10% increase in costs.
    c. Considering this 5-10% increase in costs for OA and CPP solar projects, there is a possibility of projects moving away to either other states or to other technologies like wind power which do not have this levy. Hence it is important to debate whether a levy on only one specific generation technology, namely solar is the best way forward. Other options including a levy on all generation technologies or shifting it to consumers rather than generators could also be considered.

6. Section 33.10.2 is about a Pilot project for installation of battery backup for grid stability:

a. *RVPNL will undertake a Pilot Project for installation of 100 MW battery backup on the appropriate locations for absorption of fluctuations due to intermittence of RE power for ensuring Grid stability. The battery installation will be done by the private sector service provider on Build-Own-Operate-Transfer (BOOT) basis selected through transparent bidding process. On the basis of outcome of the Pilot project, a decision to scale up will be taken.*

   We welcome this initiative to set up a large scale battery pilot project. However rather than committing the entire 100 MW to one specific application, namely *'for absorption of fluctuations due to intermittence of RE power for ensuring Grid stability',* it would be prudent to select few more applications, namely generation shifting and other ancillary services.

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