May 25th, 2021

To
Shri. Ghanshyam Prasad
Joint Secretary (OM, R&R)
Ministry of Power

Sub: IESA inputs on draft National Electricity Policy'2021

Respected Sir,

Greetings from India Energy Storage Alliance (IESA)!

This is in reference to your invitation for comments on the draft National Electricity Policy 2021 vide notification no. 23/23/2018 – R&R dated 27th April'2021. On behalf of the Energy Storage and E-mobility industry, we take this opportunity to extend our gratitude to Ministry of Power and expert committee for giving us an opportunity to present our inputs on draft National Electricity Policy'2021 before expert committee on 13th May'2021.

Based on the discussions and inputs received from our Industry members, we are enclosing our comments/recommendations on the Draft Policy document for your kind consideration. Being in the Energy Storage industry from the inception of this concept in India and active participation in development of policies & regulations from past 15 years, we humbly offer all kinds of support at all stages of energy storage development in India.

As discussed during the meeting on 13th May'2021, we will be submitting separate note within this week on large scale adoption of storage for integration with Renewables for Ministry's kind consideration

We on behalf of our Industry members, assure full support and cooperation to Hon'ble Ministry towards development of the sector.

Yours Sincerely,

Dr. Rahul Walawalkar
President,
India Energy Storage Alliance

IESA Recommendations on Draft National Electricity Policy'2021

1. Aims & Objectives

Aims and objectives of the draft rightly included promoting clean and sustainable generation of electricity, revitalization of discoms, development of efficient markets, supply of reliable and quality power, move towards light touch regulations and promotion of manufacturing of goods and services in India under Atmanirbhar Bharat Abhiyan etc

However, it is equally important to include "**Replacing Peaker Power Plants with Clean Energy**" and "**Retirement of inefficient Fossil Fuel based plants by 2030/2035**" under objectives and vision of the policy in order to achieve the primary aim of achieving optimal generation mix and promoting clean and sustainable generation of Electricity. **Renewable Energy and Energy Storage Hybrid power plants can meet all the requirements for India's peaking power capacity even as on today's date in a cost-effective way, allowing us to retire older fossil fuel based plants and avoid building any new fossil fuel based peaker plants.**

India is the second-largest coal consumer in the world. Currently, more than half of India's 382GW power generating capacity comes from coal-fired power plants (approximately 234GW). Even Ministry is also planning to retire more thermal power plants and this space allocation to be allotted to RE plants. Hence, this plan for retiring fossil fuels needs Plan and Strategy and has to be included in NEP directive.

Hybridization of Existing Power Plants: NEP 2021 has recommended Renovation and Modernization of existing thermal plants to increase their efficiency and enhancing their flexibility. Hybridization/addition of energy storage to the existing power plants shall be considered as modernization and shall be encouraged and given special preference/upgradation for promoting grid balancing. CERC/SERCs should also come up with principles for adding energy storage into the tariff determination process of thermal power plants. R&M allocation provided for the thermal plants to be extended to storage plants coming in the place of retired thermal plants.

2. Storage Target Setting as part of the Policy

Previous experience in India has shown that government target setting can lead to rapid growth in a market, as was the case with the uptake of RE Generation, Roof Top Solar, Smart Meters, LED and mobile telephone technology.

Energy storage targets are the most direct and visible tool that US Regulators have used to jumpstart their in-state storage industries. Targets drive learning-by-doing among utilities, regulators, and agencies and help orchestrate updates to rules and processes that are often required to bring energy storage onto the electric grid. A target can overcome hurdles to longer-term investment and hiring that might otherwise be considered too risky, as well as accelerate learning-by-doing in business processes and construction that drives costs lower.

For example:

- Following legislation enacted in 2010, California state regulators devised a deployment target of 1,325 MW of additional energy storage by 2020. Additionally, a pipeline of over 24,000 MW storage interconnection requests are pending, and an estimated 16,000 people now work in California's energy storage industry.

- Following legislation enacted in 2017, New York state regulators devised a deployment target of 3,000 MW of additional energy storage by 2030. New York counts 706 MW of storage under contract with a pipeline of 9,779 MW of interconnection requests and an estimated 1,200 people now work in the New York's growing energy storage industry.

Hence, Policy may specify setting up of Energy storage targets across entire value chain including ancillary services, clean peak power, T&D upgrade deferral and should not have to be limited to RE+ generation

3. **Introducing Storage Purchase Obligation and keep the definition of storage, technology agnostic to promote innovation.**

Energy storage technologies include wide range of technologies including Mechanical storage (Pumped Hydro Storage, Compressed Air Energy Storage, Gravity Storage, flywheels), Electrochemical storage (lead acid, li-ion, flow batteries, metal air and solid state batteries), Electrical storage (Ultracapacitors), Thermal Storage, Chemical storage (Hydrogen) etc. A lot of research and development effort is being put forward for development of all forms of storage technologies, which together can support various objectives set forward in NEP2021. In fact, the terms like Hybrid policies should not be just limited to combination of multiple generations. The definition should be broaden and include combination of multiple generations, storage or load control technologies, whether physically co-located or virtually linked.

Traditional Pumped Hydro although proven, has significant challenges in terms of environmental and operational limitations. Large hydro power projects in India commonly get embroiled in social and political issues mostly related to loss of significant areas of agricultural flood plains and forest lands, and forced relocation without just compensation for affected rural communities. Interstate disputes over water rights compound environmental issues such as flood safety concerns and agricultural needs. Further, with seasonal water flows and mountainous, remote locations, hydro-electricity requires very patient capital, and engineering technology is certainly challenged. India's enormous plans for new low-cost, deflationary, domestic renewable energy also comes with an associated, critical need to accelerate the deployment of storage. Distributed energy storage technologies (including newer forms of closed loop PHS) can be deployed in accelerated manner (typically less than 1 year) to respond to uncertainties.

Instead of a Hydro Purchase Obligation, Storage Purchase Obligation (SPO) which can comprise of various existing and emerging cost-effective solutions that provide appropriate flexibility should be advocated. DISCOMs should be free to choose specific form of procurement - hybrid RE + storage or RE and storage independently.

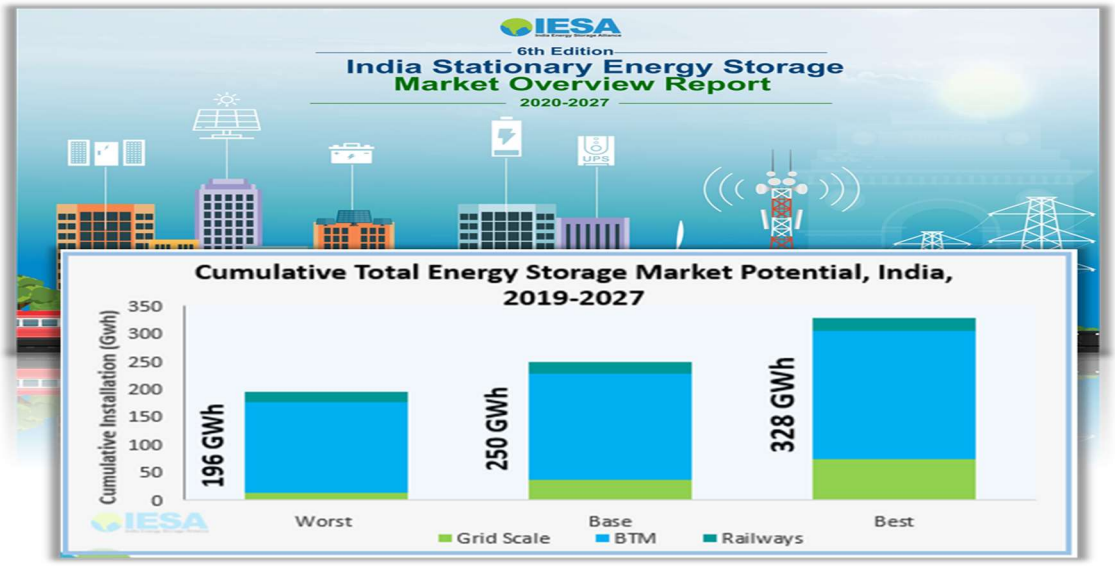
4. Direction to MOP/MNRE comprehensive Energy Storage policy:

In 2018, GOI had announced creation of the National Energy Storage Mission at the inaugural meeting of International Solar Alliance in October 2018. Even the draft mission was supposed to facilitate setting up of large scale integrated electric storage. Infact this mission was also planned to set up a national portal on energy-storage projects for knowledge dissemination purpose and to also involve constant performance monitoring, cost-benefit analysis, know-how on manufacturing, etc. Unfortunately, this draft was never finalized and National Mission on Transformative Mobility and Battery Storage, which was announced in Mar'2019 only covered partial content required for battery storage industry development.

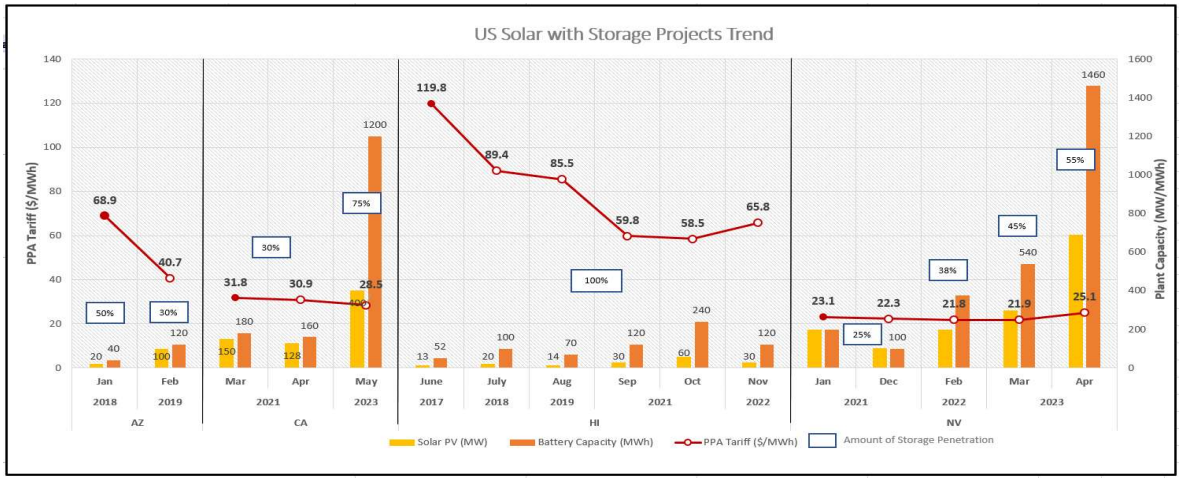
Meanwhile over the past 5 years, the policy framework for Energy Storage in India has evolved. Energy Storage sector is showing similar learning curve for cost reduction as exhibited by Solar Industry. Hence, it is required to come up with Comprehensive Energy Storage Policy with Phase wise development targets and strategies covering long term planning over all the applications of Storage.

5. Including Storage capacity under 5.1 Optimal Generation Mix

India Energy Storage Alliance (IESA) has estimated the stationary energy storage market potential in India to be around 250 GWh during the period 2020-2027. Due to lack of clear regulatory guidelines for grid scale storage, the share of grid scale applications contribution is expected to be only 15%, with behind-the-meter applications making up the rest. In grid application, renewable energy integration takes up majority of this share, split between solar and wind projects. CEA projects requirement of 500 GWh (136 GW) of storage in the grid at various levels by 2030.



With the rapid reduction of RE energy prices, many developed countries have started doing RFPs with 4+ hours of storage with up to 50% or higher storage capacity. This provides ~25% RE energy to be stored for smoothing and firming of the variable RE sources. This can also help optimization of the existing conventional generation sources, which otherwise need to be ramped from min gen levels to max gen levels, thus increasing emissions and causing wear and tear.



6. Capacity Reserve Margins:

The reserve capacity maintains the reliability of electricity system as it ensures that there is more supply available than the demand. If the system has the capacity which is exactly equal to the demand, there can be electricity shortage when just one power plant cannot operate as usual or there is a sudden increasing demand. That is why we need to monitor the supply situation using reserve margin. Reserve margin is capacity minus demand, where "capacity" is the expected maximum available supply, and "demand" is expected peak demand. For instance, a reserve margin of 15% means that an electric system has excess capacity in the amount of 15% of expected peak demand. It is pertinent to note that the capacity reserve margin is not be based on “nameplate” capacity, instead it is based on “dependable” capacity. Reserve margin is also referred as the differences between the dependable capacity of a utility's system and the anticipated peak load for a specified period. Globally, it is recommended that the capacity reserve margin should be 15% to 20% of the annual peak load. NEP shall recommend 15% reserve margin (dependable capacity) to be in place by 2025 and 20% by 2030.

7. Power Quality

In addition to norms on power quantum, it shall be the duty of every supply licensee to ensure power quality (covering voltage, harmonics, frequency, surges, etc.) as per norms prescribed by the relevant authority. The licensee shall be allowed to offer different qualities at different price points subject to regulatory approval as well as meeting a minimum power quality as mandated.

India needs to create power quality benchmark and monitor power quality across grid, so that consumers are aware of the power quality issues and improvements can be monitored systematically. Power quality might require the creation of new services and markets, such as ancillary services, and these need to be

enabled by the relevant authorities immediately as per the original ancillary services procurement guidelines developed by CERC in 2017.

8. Smart Grids and Grid interactive Micro Grids

Instead of only focusing on Micro Grids, this can be broaden and include the National Smart Grid Roadmap released by MoP and direct all the states to follow certain directions from central road map which may include

- ✓ Consumer production participation ("prosumers")
- ✓ Renewable energy integration, including required support mechanisms,
- ✓ Micro-grids (with or without grid connectivity)
- ✓ Electric Vehicle Integration (V2G and Charging Infra Integration with utilities)
- ✓ Differentiated supply (time of use, guaranteed supply, power quality etc.)
- ✓ Demand Response or dynamic load management.
- ✓ Licensee model can provide incentives for townships / campuses to opt for investments in such campus microgrids and adoption of smarter technologies.

9. Measures for Grid Stability to be part of National Electricity Plan

Directive might be issued to CEA/ POSOCO while working on National Electricity Plan to consider appropriate technical measures for ensuring grid stability and safety. Current frequency band needs to be tightened further and also enforcement of instantaneous frequency needs to be improved. CEA may develop a plan for storage system requirement for India by 2025/2030 to mitigate unpredictability and variability of renewable energy. It is also recommended to cconduct an in-depth study on the cost evaluation and environmental impacts of using thermal plants to meet ancillary services and RE integration and compare it with the use of energy storage for providing flexibility to the grid

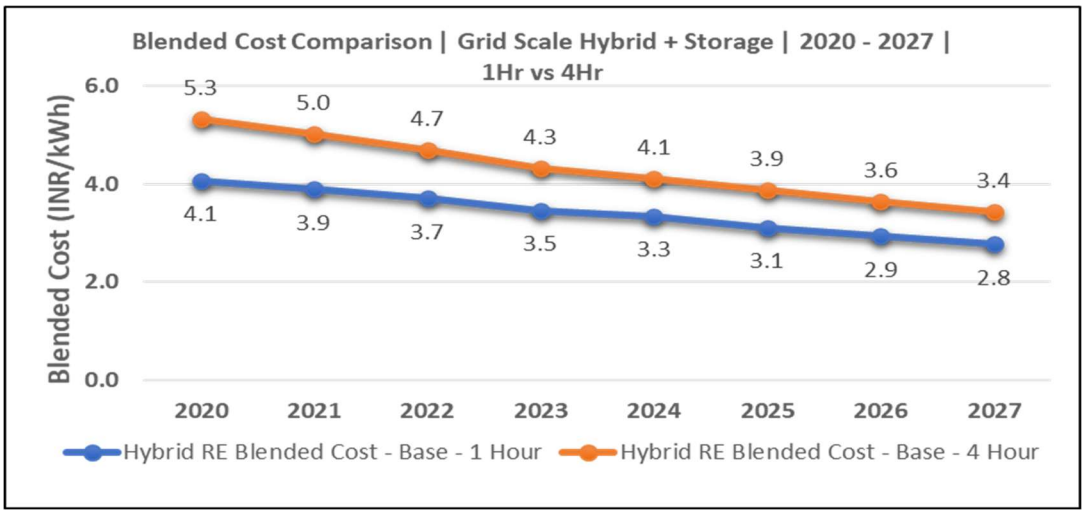
- ➢ **Integration of renewables:** Intermittent nature of renewables combined with aversions by states for drawing power from renewables increases variability of power. This also leads to financial stress for the developers. Combining renewables with battery storage can aid in ensuring round the clock (RTC) /firm and dispatchable power supply from these assets. This shall enable efficient forecasting & scheduling of renewable energy and benefit day-ahead as well as term ahead markets approved by CERC.

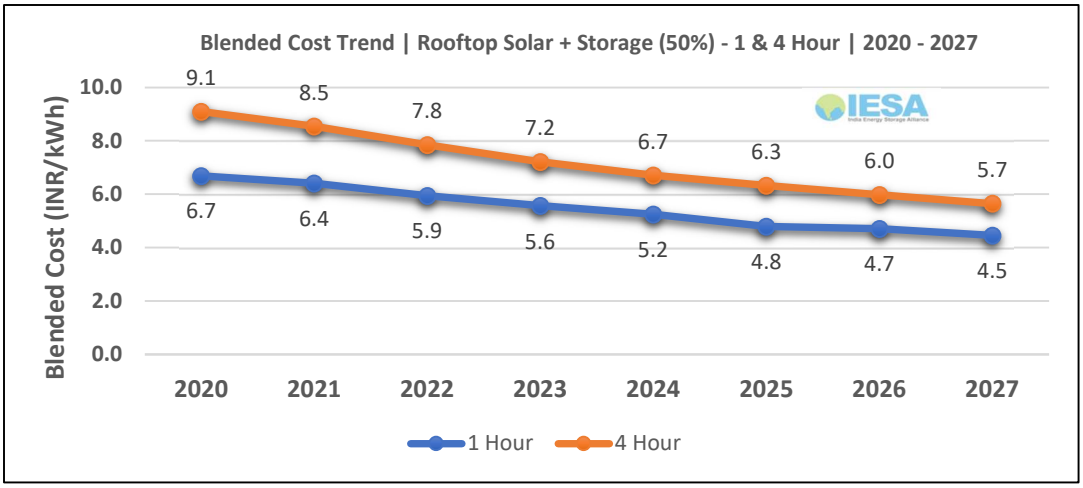
- ➢ **Ancillary Services:** Present regulations measures power quality in terms of frequency only and quality is managed through DSM mechanism. However, it is imperative that other quality parameters like interruptions, voltage level etc. should also be monitored for better power quality. Batteries are known to have quick response time and therefore can be used for ensuring quality of power as well as safe operation of grid. DISCOMs may be mandated to have Energy storage based energy reserves to thwart power disruptions to geographically critical areas like metro cities/ key asset areas etc.

- **Peak Power :** High power demand growth is anticipated with penetration of Electric Vehicles (EV). This shall put burden on the existing transmission & distribution (T&D) assets. Therefore, it is pertinent to have time-of-day tariffs (Peak/ Off-peak). Battery Storage Solutions can be used as remedy for peak power demand shaving as well as for T&D capex deferral. This shall enable smooth integration of EV charging infrastructure into the grid.

10. Separate tariff for renewable energy with storage assets

Separate tariff for renewable energy with storage assets as these hybrid assets could also be used to provide a firm and dispatchable renewable power and serve the peak load demand. Unfortunately number of announcements of such hybrid projects have not resulted in any deployment. we need regulators to take thought leadership and guide the state regulators and tendering authorities to take prudent decisions. Directions to State discom to encourage and procure from Storage Projects.





11. **Including preference to Indigenous Manufactured ESS under Make in India Initiative and Aatma Nirbar Abhyan section**

The Cabinet, chaired by Prime Minister Shri Narendra Modi, has approved the proposal of Department of Heavy Industry for implementation of the Production Linked Incentive (PLI) Scheme 'National Programme on Advanced Chemistry Cell (ACC) Battery Storage' for achieving manufacturing capacity of Fifty (50) Giga Watt Hour (GWh) of ACC and 5 GWh of "Niche" ACC with an outlay of Rs.18,100 crore. One of the benefits expected from the scheme includes demand creation for battery storage in India. Hence it is recommended to include purchase preferences to local suppliers of battery storage in any segment of Generation, Transmission and Distribution. All the benefits offered to power sector equipment to be extended to Manufacturing units established in India

12. **Including Draft Hydrogen Energy Mission and applicability of Hydrogen storage role in RE Sector**

Currently GOI in consultation with all key stakeholders drafting National Hydrogen Energy Mission to support development and widespread commercialization of green hydrogen technologies for meeting India's energy future. Pilot Projects are planned renewable energy integration using electrolysis to produce and store excess energy generation as hydrogen and also for decentralized energy applications. Hence it is important to include applicability of Hydrogen storage and NHEM mission at suitable areas of National Electricity Policy'2021 including RE integration, Research & Innovation.

Under Make in India Initiative, it may be included to scaling up of Manufacturing of electrolysers, including large ones. These electrolysers could be installed next to existing demand centres in larger refineries, steel plants, and chemical complexes. They would ideally be powered directly from local renewable electricity sources.Green hydrogen has potential to allow us to undertake deep decarbonization of industrial and transportation sector beyond the electricity sector.

13. **Allow the Aggregation of Open Access Electricity, and Access to Renewable Energy:**

As per Section 42 of EA "provided also that the State Commission shall provide open access to all consumers who require a supply of electricity where the maximum power to be made available at any time exceeds one megawatt". This requirement of a minimum threshold on contract demand especially for EV charging should be removed when the aggregated contract demand is more than 1 megawatt. Setting up a dense network of charging/swapping stations implies that energy demand would remain distributed, and allowing aggregation would incentivize energy operators to source renewable energy for powering electric vehicles yielding greater benefits in terms of improved air quality. Single window clearance in a time bound manner for availing the Open Access for all consumers and Incentivizing Renewable purchase by reducing Open Access Charges and Cross Subsidy Charges will help in faster adoption

14. ESS (Energy Storage System) MUST for Grid Stability to Manage the fast EV (Electric Vehicle) Chargers

Normally EV charging takes 7 to 8hr time for charging. Fast EV chargers takes approx. 45min to charge the EV, say a 10kW EV charging using normal (slow) charger for 7to 8hrs. i.e. total Energy 10kW*8=80kWh.

1. Now for the same 80kWh using fast charging the charger will take power from Grid 80kWh / 45min = Approx 100kW Power

2. Say "n" numbers of fast charger installed or demanding power from grid same time, then Grid or Local Distribution/Substations will face very-very high short time power requirements

Hence, ESS must to store power at normal "C" rate and discharge w.r.t. fast EV charger requirements without disturbing Grid / Distribution Substations. Hence local storage options to be explored near these fast charging stations instead of depending on entire distribution grid

15. Other Suggestions:

- Finalizing suitable Policy & Regulatory amendments needed to deploy energy storage with in 6 months after publishing this policy.
- Set up mechanism to monitor the timely implementation of projects announced.
- Evaluating the use of energy storage for deferring upgrade of transmission & distribution assets to reduce renewable generation curtailment or meeting load growth
- Setting up of a fund for accelerating the deployment of grid scale energy storage projects in the early years to explore learnings from these projects, which can help market adoption by addressing technology, policy and commercial risks
- Conducting a study on determining optimum storage targets for individual states.
- Conducting a study on the impact of meeting rooftop solar targets on system cost for discoms to determine the possible role of storage
- Formulating a regulatory framework to monetise the value of firming/smoothing of solar power, ramp rate control, peak shifting, demand response etc
- Following an integrated approach to define the policy around energy storage for grid services and electric vehicles. This will be spread across ministries including, but not limited to, the Ministry of New and Renewable Energy, Ministry of Power, Ministry of Heavy Industries and Public Enterprises, Department of Industrial Policy and Promotion and Ministry of Finance