

GOVERNMENT OF INDIA
MINISTRY OF NEW AND RENEWABLE ENERGY
RAJYA SABHA
UNSTARRED QUESTION NO. 2856
ANSWERED ON 25.03.2025

SOLAR PV AND ENERGY STORAGE INTEGRATION

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Will the Minister of New and Renewable Energy be pleased to state:

- (a) the manner in which the co-location of Energy Storage Systems (ESS) with solar PV will enhance grid stability and reliability in the country;
- (b) the expected benefits of mandating a minimum 2-hour ESS duration for future solar PV tenders;
- (c) the manner in which the integration of storage with solar PV contributes to India's goal of achieving 500 GW of non-fossil fuel generation by 2030; and
- (d) the manner in which the introduction of double-cycle operation for energy storage improves power availability during peak demand period?

ANSWER

**THE MINISTER OF STATE FOR NEW & RENEWABLE ENERGY AND POWER
(SHRI SHRIPAD YESSO NAIK)**

(a) Renewable Energy sources are variable and intermittent in nature and Co-locating Energy Storage Systems (ESS) with Solar PV enhances grid stability by addressing intermittency and variability and ensuring reliable power supply. Co-located Energy Storage Systems can help by storing excess Solar PV energy generation during solar hours and supply the same during non-Solar hours and during peak demand. This also enables peak load management, frequency regulation, reduces Renewable Energy curtailment and enhances grid resilience.

(b) Central Electricity Authority (CEA), Ministry of Power on 18/02/2025 has issued an 'Advisory on co-locating Energy Storage Systems with Solar Power Projects to enhance grid stability and cost efficiency'. Mandating a minimum 2-hour Energy Storage Systems in future Solar PV tenders can enhance the grid reliability and mitigate intermittency issues by ensuring consistent power supply during peak demand periods, and reducing reliance on conventional power sources.

(c) India has set a target of achieving 500 GW installed capacity from non-fossil fuel sources by 2030. As per the National Electricity Plan published by the Central Electricity Authority, in order to integrate the 364 GW of solar and 121 GW of wind capacity by 2031-32, India would require 411.4 GWh of storage capacity (175.18 GWh from PSP and 236.22 GWh from BESS). Integration of storage with Solar PV ensures a steady, reliable supply of power and facilitating a higher share of solar in the energy mix.

(d) In double-cycle operation, energy storage can be charged not only from solar power but also from the grid during low-demand hours and can be discharged during peak periods and during non-solar hours. This approach enhances power availability, ensuring more stable and reliable energy supply to optimize the grid efficiency.
