Environment & Ecology · GS - III

Distributed renewable energy systems, particularly rooftop solar installations, can contribute to India's energy transition. Assess their potential in promoting energy security and decentralised development, while examining the barriers to wider adoption.

EXAM YEAR	PAPER	SUBJECT
DAILY PRACTICE 17/11/2026	GS - III	Environment & Ecology

MARKS	WORD LIMIT
15	~250 words

Answer Hint

Distributed generation, PM Surya Ghar Yojana, energy access, consumer participation, net metering, grid integration, battery storage, DISCOMs, financing, rooftop suitability, energy security.

Model Answer

Introduction

Rooftop solar enables electricity generation closer to consumption centres. It can reduce dependence on conventional power sources while promoting decentralised and cleaner energy production.

Potential Benefits

1. **Energy security:** Distributed generation diversifies electricity supply and reduces dependence on centralised power plants.
2. **Consumer empowerment:** Households and businesses can generate their own electricity and potentially reduce electricity bills.

3. **Environmental benefits:** Solar power reduces dependence on fossil fuels and associated greenhouse gas emissions.
4. **Reduced transmission losses:** Local generation can reduce transmission and distribution requirements.
5. **Employment:** Installation, maintenance and manufacturing create opportunities for skilled and semi-skilled workers.

Challenges to Wider Adoption

- High initial installation costs and limited access to finance.
- Inadequate rooftop suitability and lack of awareness.
- Delays in subsidy disbursement and administrative procedures.
- Grid integration challenges arising from intermittent solar generation.
- Limited battery storage and concerns regarding DISCOM revenue models.

Way Forward

India should strengthen simplified subsidy delivery, net-metering frameworks and low-cost financing. Investment in battery storage, smart grids and domestic solar manufacturing is essential. DISCOMs should be encouraged to adopt sustainable business models that support distributed generation.

Conclusion

Rooftop solar can transform consumers into electricity producers and strengthen India's clean-energy transition. Its success requires coordinated policy support, reliable grid infrastructure and affordable financing.

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