Environment & Ecology · GS - III

Discuss the role of large-scale solar power projects in India's energy transition. What challenges must be addressed to ensure their environmental and socio-economic sustainability?

EXAM YEAR	PAPER	SUBJECT
DAILY PRACTICE 06/11/2026	GS - III	Environment & Ecology

MARKS	WORD LIMIT
10	~150 words

Answer Hint

Renewable energy expansion, energy security, carbon emission reduction, 500 GW non-fossil capacity target, land acquisition, grid integration, energy storage, ecological impacts, domestic manufacturing and decentralised solar power.

Model Answer

Introduction

Large-scale solar power projects are important for India's transition towards a low-carbon economy. They contribute to renewable electricity generation, energy security and reduction of greenhouse gas emissions.

Role in Energy Transition

Solar projects diversify India's energy mix and reduce dependence on imported fossil fuels. They support the national target of 500 GW non-fossil fuel capacity by 2030 and help lower the carbon intensity of economic growth. They can also generate employment and encourage investment in domestic renewable energy manufacturing.

Key Challenges

Large solar parks require substantial land, potentially creating conflicts with agriculture and local livelihoods. Intermittent generation requires energy storage and reliable grid infrastructure. Poorly planned projects may also affect local ecosystems and biodiversity. Dependence on imported solar components creates supply-chain vulnerabilities.

Way Forward

India should promote rooftop and decentralised solar systems, strengthen storage technologies, modernise transmission networks and ensure environmentally responsible land selection. Domestic manufacturing and community participation should also be encouraged.

Conclusion

Solar expansion must combine technological innovation, ecological safeguards and inclusive development to ensure a sustainable energy transition.

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