Ethics & Morality · GS - III

Describe the benefits of deriving electric energy from sunlight in contrast to the conventional energy generation. What are the initiatives offered by our Government for this purpose?

EXAM YEAR	PAPER	SUBJECT
2020	GS - III	Ethics & Morality

MARKS	WORD LIMIT
15	~250 words

Answer Hint

Solar energy; renewable electricity; reduced emissions; energy security; decentralised generation; Jawaharlal Nehru National Solar Mission; solar parks; rooftop solar; PM-KUSUM; grid integration and storage

Model Answer

Introduction

Solar energy converts sunlight into electricity through photovoltaic systems or solar thermal technologies. As a renewable source, it can complement conventional electricity generation and support India's energy transition.

Benefits over conventional energy generation

- **Lower operational emissions:** Solar electricity produces no direct greenhouse gas emissions during generation, unlike coal-based power.
- **Renewability:** Sunlight is naturally replenished, whereas fossil fuels are finite resources.
- **Energy security:** Domestic solar resources can reduce exposure to imported fossil-fuel price volatility.
- **Decentralised supply:** Rooftop systems and mini-grids can serve remote areas and reduce dependence on distant power plants.

- **Lower operating costs:** Solar plants have relatively low operating and maintenance costs after installation.
- **Water conservation:** Photovoltaic systems generally require less operational water than many conventional thermal power plants.
- **Employment opportunities:** Solar manufacturing, installation and maintenance can create new jobs.

Government initiatives

- **National Solar Mission:** Launched under the National Action Plan on Climate Change to promote solar power deployment.
- **Solar parks:** Support large-scale solar installations with shared infrastructure.
- **Rooftop solar programmes:** Encourage households, institutions and businesses to generate electricity locally.
- **PM-KUSUM:** Promotes solar pumps and decentralised renewable energy for farmers.
- **International Solar Alliance:** India helped establish this initiative to advance international cooperation on solar energy.
- **Manufacturing and grid support:** Policy measures seek to strengthen domestic solar manufacturing, transmission and integration of renewable power.

Challenges

Solar generation is intermittent and depends on weather and daylight. Land requirements, storage costs, grid flexibility and manufacturing dependence remain important concerns.

Conclusion

Solar electricity offers environmental and energy-security advantages over fossil-fuel-based generation. Storage, transmission expansion, domestic manufacturing and well-designed deployment policies are essential to realise its full potential.

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