

Green Energy Corridor: India's Renewable Energy Grid and UPSC Relevance

The **Union Cabinet approved Green Energy Corridor Phase-III (GEC-III) on 30 September 2026** to strengthen India's transmission infrastructure and facilitate the integration of large-scale renewable energy into the national grid.

GEC-III has a total outlay of **₹1,86,405 crore** and will enable the evacuation of up to **135 GW of renewable energy**. It also includes **50 GWh of Battery Energy Storage Systems (BESS)** to improve grid flexibility. The scheme is targeted for completion by **FY 2032-33**.

What is the Green Energy Corridor?

The **Green Energy Corridor (GEC)** is a government initiative to develop dedicated transmission infrastructure for evacuating electricity generated from **renewable energy sources such as solar and wind**.

India's renewable-energy potential is concentrated in particular regions, while electricity demand is distributed across the country. Therefore, generation capacity alone is not sufficient.

The Green Energy Corridor aims to create the **transmission backbone required to transport renewable electricity from generation centres to consumption centres**.

Green Energy Corridor Phase-III: Key Features

The latest GEC-III scheme focuses on strengthening the **Intra-State Transmission System (InSTS)**.

Feature	GEC-III
Renewable power evacuation	Up to 135 GW
Battery storage	50 GWh
Total outlay	₹1,86,405 crore
Transmission component	₹1,36,378 crore
BESS component	₹50,000 crore
Central Financial Support	₹54,082 crore
Target completion	FY 2032-33

The Central Financial Support is intended to reduce the impact of intra-state transmission charges and ultimately help keep electricity costs under control.

Why Does India Need a Green Energy Corridor?

1. Rapid Growth of Renewable Energy

India is rapidly expanding solar and wind power. The government is targeting **500 GW of non-fossil fuel capacity by 2030**.

As renewable generation increases, transmission infrastructure must expand simultaneously to prevent congestion and under-utilisation of generating capacity.

2. Renewable Energy is Intermittent

Solar power depends on sunlight, while wind power depends on wind conditions.

This creates fluctuations in electricity generation.

Therefore, India needs a combination of:

Renewable energy + transmission + energy storage + grid management

to ensure reliable electricity supply.

3. Avoiding Renewable Energy Curtailment

Insufficient transmission capacity can force grid operators to reduce or curtail renewable generation even when electricity is available.

A stronger transmission network allows more renewable electricity to reach consumers.

Role of Battery Energy Storage Systems

A major feature of GEC-III is the deployment of **50 GWh of BESS**.

Battery storage can:

- Store surplus renewable electricity
- Supply electricity during peak demand
- Reduce renewable-energy curtailment
- Manage solar and wind intermittency
- Improve grid stability

- Supply electricity during non-solar hours

Thus, GEC-III moves India's renewable-energy strategy beyond simply installing solar and wind capacity towards **integrated grid management**.

Green Energy Corridor: Earlier Phases

Before GEC-III, the government implemented **GEC-I and GEC-II**.

The first two phases focused on strengthening intra-state transmission systems in renewable-energy-rich states.

The programme covers states including:

- Rajasthan
- Gujarat
- Tamil Nadu
- Karnataka
- Andhra Pradesh
- Madhya Pradesh
- Maharashtra
- Kerala
- Uttar Pradesh
- Himachal Pradesh

GEC-I and GEC-II together were designed to facilitate evacuation of about **44 GW of renewable energy**, with around **26 GW integrated** as of early 2026.

Green Energy Corridor and India's Energy Transition

The Green Energy Corridor supports India's broader energy-transition objectives by connecting renewable generation with the electricity grid.

It also complements:

- Battery Energy Storage Systems

- Pumped Storage Projects
- Green hydrogen
- Solar and wind power
- Smart-grid technologies
- Renewable Energy Management Centres

The government has planned expansion of transmission infrastructure alongside renewable capacity addition, recognising that **generation and transmission must grow together**.

Challenges

Despite its importance, the Green Energy Corridor faces several challenges:

- High capital costs
- Land acquisition and right-of-way issues
- Environmental concerns
- Intermittency of renewable generation
- Need for large-scale energy storage
- Coordination between Centre and States
- Increasing demand for critical minerals and battery technologies

Effective planning, modern grid-management systems and greater storage capacity will therefore be essential.

UPSC Relevance Prelims

Remember:

- **GEC:** Green Energy Corridor
- **GEC-III approved:** September 2026
- **Renewable evacuation capacity:** 135 GW

- **Battery storage:** 50 GWh
- **Total outlay:** ₹1.864 lakh crore
- **Central Financial Support:** ₹54,082 crore
- **Target completion:** FY 2032-33
- Focus of GEC-III: **Intra-State Transmission System**

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The topic can be linked with:

- Renewable energy
- Energy security
- Electricity transmission
- Energy storage
- Climate change
- Sustainable development
- Grid stability
- India's energy transition

Possible UPSC Mains Question

“India’s renewable-energy transition requires not only generation capacity but also robust transmission and storage infrastructure. Discuss the role of the Green Energy Corridor in achieving this objective.”

Conclusion

The **Green Energy Corridor** is a critical component of India’s renewable-energy transition. The approval of **GEC-III**, with provisions for **135 GW of renewable-energy evacuation and 50 GWh of battery storage**, represents a shift towards building an integrated and flexible electricity system.

For UPSC aspirants, the topic should be studied through the interconnected themes of

renewable energy, energy security, battery storage, climate action, transmission infrastructure and sustainable development.

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