



General Studies-3; Topic: Infrastructure: Energy

India's path towards net-zero emissions

Introduction

- **India's power generation and economy are heavily dependent on coal.** Estimates indicate that non-renewable fossil fuels account for **70% of the current (2020) generation capacity**.
- The world focuses on net-zero carbon emissions by 2050.

Challenges to India's transformation from fossil-fuel to renewable energy

- A recent Council for Energy, Environment and Water (CEEW) report has highlighted the challenges to India's transformation from a fossil-fuel-dependent economy to one based on renewable energy.
- There is the technological, managerial and regulatory capacity to manage this revolutionary transformation.
- There is the major constraint of finance. The transformation will involve **massive high-cost, high-risk, long-gestation investments**.
- There is little fiscal space for large public investment in renewables, while private investment in renewables at scale is just starting.
- The willingness of developed countries to make available adequate low-cost finance and required technologies remains uncertain.
- Another major constraint is **access to land**.
- Creating renewable power generation capacity for a net-zero economy could require between 4% to 6% of India's land mass.
- Tapering off of fossil-fuel-based power generation and closure of coal mines will be resisted by the owners as well as workers employed at these establishments.

Global gas supplies

- Carbon dioxide and other emissions from gas are only a small fraction of emissions from oil, and especially coal.

- Global gas supplies have grown dramatically following the shale revolution.
- International Energy Agency projections indicate that gas will overtake coal as the second largest energy source after oil within this decade.
- The share of gas in primary energy supply and power generation have been stuck at only 5-6% in India.
- India may have gas reserves of over 100 MMcf, only about 40% of this is in accessible terrain and would be depleted within a couple of decades.
- Given the high risks and costs of gas exploration and extraction, expected returns are low.
- These are further compromised by a distorted administrative pricing and taxation system.

Way Forward

- **Breakthrough technologies in carbon capture and storage (CCS) and hydrogen-based power could radically reduce the cost of power based on renewables.**
- A two-pronged strategy of accelerating renewable power generation and changing the composition of the fossil-fuel basket in favour of gas could significantly reduce the period of transition.
- Other than development of our neglected domestic gas distribution system, energy investments should be entirely directed towards development of renewables.
- Two recent technological developments, enabling liquefaction and re-gasification of LNG on board ships, will further disrupt the market and reduce costs.
- India therefore has a great opportunity to exploit these developments and strike excellent gas import deals.