Efficient Air Conditioners (ACs)

Prelims – *General issues on Environmental ecology, Bio-diversity and Climate Change.*

Mains (GS III) – *Conservation, environmental pollution and degradation, environmental impact assessment.*

Why in news?

Intense summers and economic growth are driving rapid AC adoption, straining India's power grid, especially during peak hours, making AC efficiency a critical issue.

Challenges faced due to Air Conditioners (ACs)

- **Rapid Growth** – India is adding 10-15 million AC units annually, with projections indicating an additional 150 million units over the next decade.
- **Peak Load Crisis** – ACs significantly contribute to peak electricity demand, especially during evening and night-time hours when solar power generation diminishes, but heat persists.

  In May 2024, India's evening peak demand hit a record 240 GW, largely driven by cooling needs.

- **Supply-Demand Gap** – Potential shortfall in firm power capacity (reliable 24/7 power) projected as early as 2026, despite overall capacity additions.

The issues with Current Standards

- **Outdated MEPS** – India's Minimum Energy Performance Standards (MEPS) for ACs, represented by the star rating system, are lagging behind global benchmarks.
- **Inverter AC Gap** – The widely sold inverter (variable-speed) ACs at India's 1-star minimum rating are nearly 50% less efficient than the minimum standards in countries like China and Japan.
- **Lagging International Benchmarks** – China's minimum standard is roughly equivalent to India's highest 5-star rating, meaning a large portion of ACs sold in India *would not meet basic requirements in the Chinese market*.

Strategic Importance

- Enhancing AC efficiency acts as a power system reliability safeguard.
- It offers a consumer savings strategy through lower electricity bills.
- Provides an industrial competitiveness lever, potentially positioning India as a leader in efficient cooling technology.

Proposed Roadmap for Higher Efficiency		
Year	**Proposed Minimum Efficiency (Indian Seasonal Energy Efficiency Ratio)**	**Relevance**
2027	5.0 (current 5-star)	India’s top-rated models now
2030	6.3	Premium models in Indian market
2033	7.4	Global best-in-class
• The *Indian Seasonal Energy Efficiency Ratio (ISEER)* is a metric used to assess the energy efficiency of air conditioners, considering seasonal variations in temperature and operating conditions and is a key factor in the BEE (Bureau of Energy Efficiency) star rating system for room air conditioners.		

Benefits of Efficiency Upgrade

- **Peak Demand Reduction** – Projected to contribute up to 120 GW by 2030 and 180 GW by 2035 to peak demand.
- **Consumer Savings** – Cumulative savings by 2035 projected between ₹66,000 crore to ₹2.25 lakh crore ($8–$26 billion) due to reduced electricity bills."
- **Infrastructure Cost Savings** – Avoided investments potentially reaching ₹7.5 lakh crore by 2035 in new power generation and grid infrastructure.
- **Energy Savings** – 120 terawatt hours (TWh) per year by 2035, which is equivalent to 60 GW of solar capacity.
- **Environmental Gains** – Reduced carbon footprint.

Challenges to Efficiency Adoption

- Higher upfront cost of efficient ACs.
- Low consumer awareness about ISEER ratings.
- Retailer preference for low-efficiency models (higher margins).
- Tenant-owner disconnect (buyers don’t pay the electricity bills).
- Absence of strong regulatory push.

Reference

The Hindu | Energy Efficiency