

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- **Outdated MEPS** - India's Minimum Energy Performance Standards (MEPS) for ACs, represented by the star rating system, are lagging behind global benchmarks.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](#)