

# Energy Trends During the Last Decade

Data gathered for the CII Energy Awards during the last decade was analyzed to identify the trends to show how the Indian industrial scenario is changing. For analysis major sectors like Cement, Power Plants, Steel, Aluminum, Sugar, Paper & Pulp industry are studied. Following are the observations:

## 1. Specific Energy Consumption (considering 2014 as a base year)

Sector	Reduction	Reasons for reduction in SEC
Power Plants (IPP)	11%	VFDs, Improved operating practices, automation, AI
Cement	12%	Higher fly ash utilization, 1000+ MW WHR installation, RE
Paper & Pulp	7%	Black liquor indirect heater, condensing turbines, anaerobic digester & better operational practices
Aluminum	15%	Recycling of scraps, WHRS, Continuous casting etc
Steel	19%	Recycling of scraps, WHRS, Continuous casting etc
Sugar	7%	Incentive for exporting power, process optimization, automation of control systems etc

## 2. Comparison of Indian SEC with Global Benchmark (sector wise)

The Indian sectors are divided into two categories. The one which is doing better than the global benchmark and the other which requires more efforts to reach the Global Benchmark numbers.

### Sectors doing well:

Sectors	Unit Of Measurement	Global Benchmark	Average	Best Achieved
Power (APC)	%	7.71	6.92	4.56
Cement	kWh/T	83	70.47	52

### Sectors that require more effort:

Sectors	Unit Of Measurement	Global Benchmark	Average	Best Achieved
Paper	Gcal/T	6.85	7.52	5.85
Steel	Gcal/T	4.88	6.65	5.3
Sugar	kWh/T of cane crushed	20	26.41	21.75
Aluminium	Gcal/T	12.1	13.05	12.09

## 3. Investment & Savings as a % of Total Energy Bill

The comparison of investment & savings as a % of Total Energy bills shows that the investment is increasing year on year while the savings are decreasing.

Year	Savings	Investment
2010	6.30%	5.90%
2014	5.20%	6.80%
2018	4.40%	7.40%
2022	3.80%	7.80%
2024	3.10%	8.30%

## Insights

- The low hanging fruits have already been plucked. The energy savings measures that are basic and require less investment like installation of VFD, LED lighting, energy efficient pumps and compressors etc have been explored.
- Now in 2024, the industries are spending in more sophisticated technologies requiring higher investment. These technologies include Waste Heat Recovery Boilers, VAMs, ORC power generation etc.

#### 4. Sectors Meeting COP-28 Goal of 4% Improvement in Productivity

At COP-28, one of the key productivity goals is to double the global average annual rate of energy efficiency improvements from around 2% to over 4% every year until 2030.

Based on the energy award data, the identification of sectors meeting the productivity goals was carried out.

Sectors	Level of Energy Efficiency Improvement	Shortfall
Power	3.46%	0.54%
Paper	3.60%	0.4%
Cement	3.62%	0.38%
Aluminium	3.64%	0.36%
Steel	3.76%	0.24%
Sugar	4.00%	Meeting the goal

#### 5. GHG reductions in NSE 500 companies (considering 2020-21 as base year)

Sector	Reduction in GHG Emissions
Cement	5%
Metal	5%
Paper	8%
Automobile	44%
Power Plants	0.2%

#### 6. Flexible Operations of Power Plants:

The comparison of investment & savings as a % of Total Energy bills shows that the investment is increasing year on year while the savings are decreasing.

Year	Plant Load Factor (PLF)
2012-2013	90%
2018-2019	72%
2023-2024	73%

The same is expected to further reduce as the installed capacity of Thermal Power Plants is further projected to reduce to 34% by the end of 2032.