

India's Coal Import Burden

Renewable Energy boost can reduce forex outflows, stabilise Rupee and increase energy security

April 2025



Key Takeaways

India's electricity sector remains heavily dependent on coal imports: 20% or 206 MT of thermal coal was imported in 2023-24 at a cost of \$21 Billion.

Between 2013 and 2023, thermal coal imports have increased by 58%, however, the USD value of imports has increased by 124% due to volatile coal prices and depreciation of the rupee.

The increase in imports is noticeable during summer months when electricity demand spikes due to cooling needs.

A concentrated effort to meet RE targets by 2030 by adding 50 GW RE per annum can reduce thermal coal imports to near zero by 2029, saving about \$66 Billion in forex between 2025 and 2029. Between 2025 and 2034 this could result in a cumulative savings of at least \$173 Billion in forex.

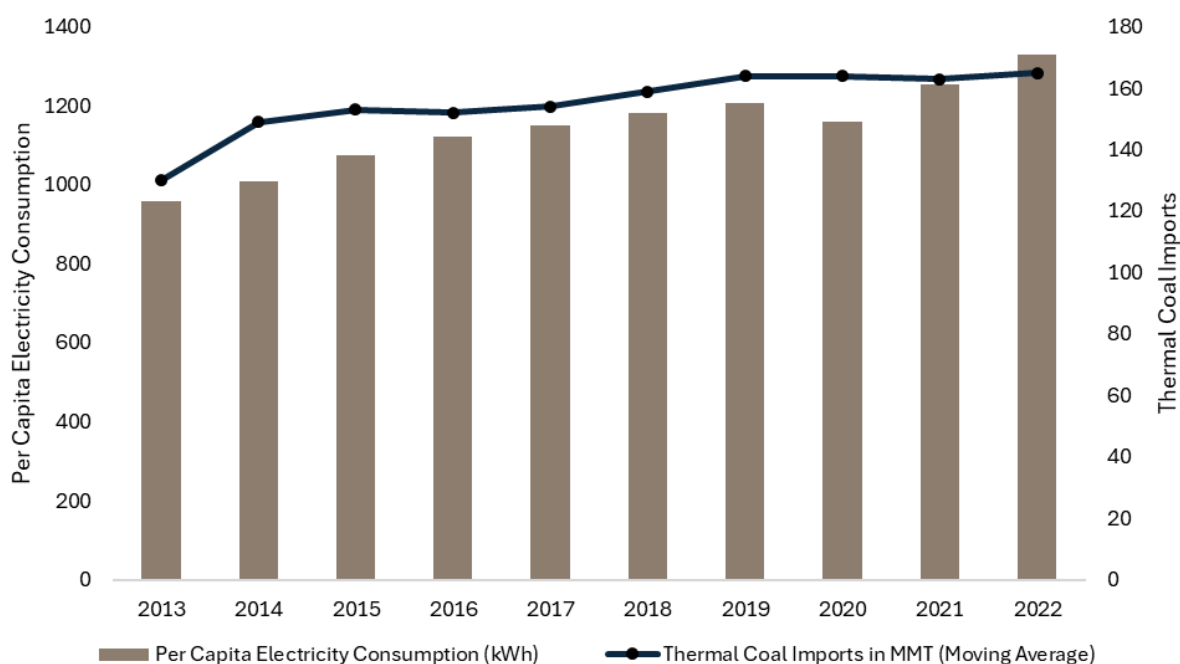


National electricity demand is experiencing a sustained and significant surge, driven by a confluence of factors including urbanisation, industrial growth, and the increasing adoption of electric technologies. With the worsening climate crisis, India is also experiencing hotter summers characterised by stronger, more prolonged heat waves. For instance, per capita electricity consumption in India went up from 957 kWh in 2013 to 1331 kWh in 2022. The previous decade's electricity consumption patterns clearly signal an imminent surge in electricity demand in the coming summer months.

Coal power driving India's energy insecurity

India's electricity sector is heavily dependent on coal imports. In the past 10 years (2013-2022), India has imported around 2,128 Million Tonnes (MT) of coal. Over three quarters of these imports were non-coking or thermal coal, primarily utilised by power plants to produce electricity. The import of thermal coal has been increasing steadily at 3.7% annually, and has gone up 40% since 2013. The growth of per capita electricity consumption and thermal coal imports follow a similar trend as seen in Figure 1, which shows that per capita electricity consumption also rose by 40% since 2013.

Figure 1: Thermal Coal Imports vs. Per Capita Electricity Consumption)



Source: Collated from data published by Ministry of Coal, India

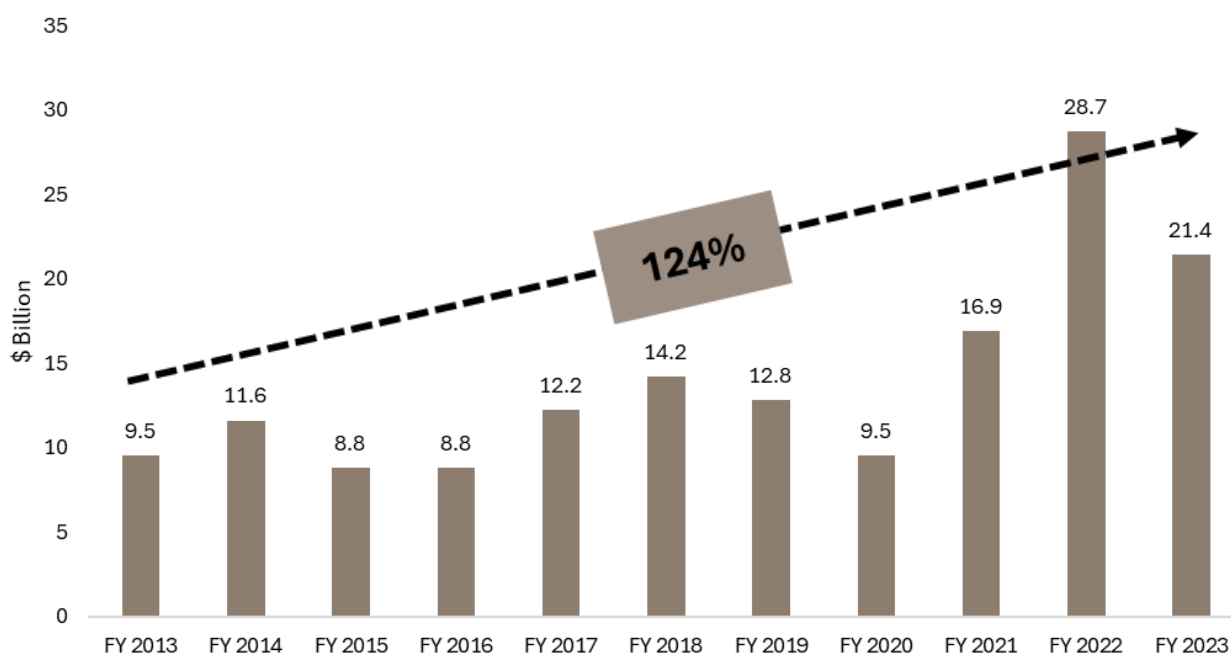


Economic risks due to coal dependence

India's dependency on imported coal poses both physical and financial risks. Physical risks arise with any disruption in the supply of imported coal, either due to unforeseen political changes or natural disasters. The volatility in energy prices pose a significant financial risk to power generators and consumers dependent on imported coal.

While the quantity of thermal coal imports has gone up by 58% (between FY 2013-23), the value of these imports has gone up by 124%. India's dependency on costly coal imports has thus also been a driver of energy inflation and rupee depreciation.

Figure 2: Value of India's Thermal Coal Imports (USD Billion)



Source: Collated from data published by Ministry of Coal, India

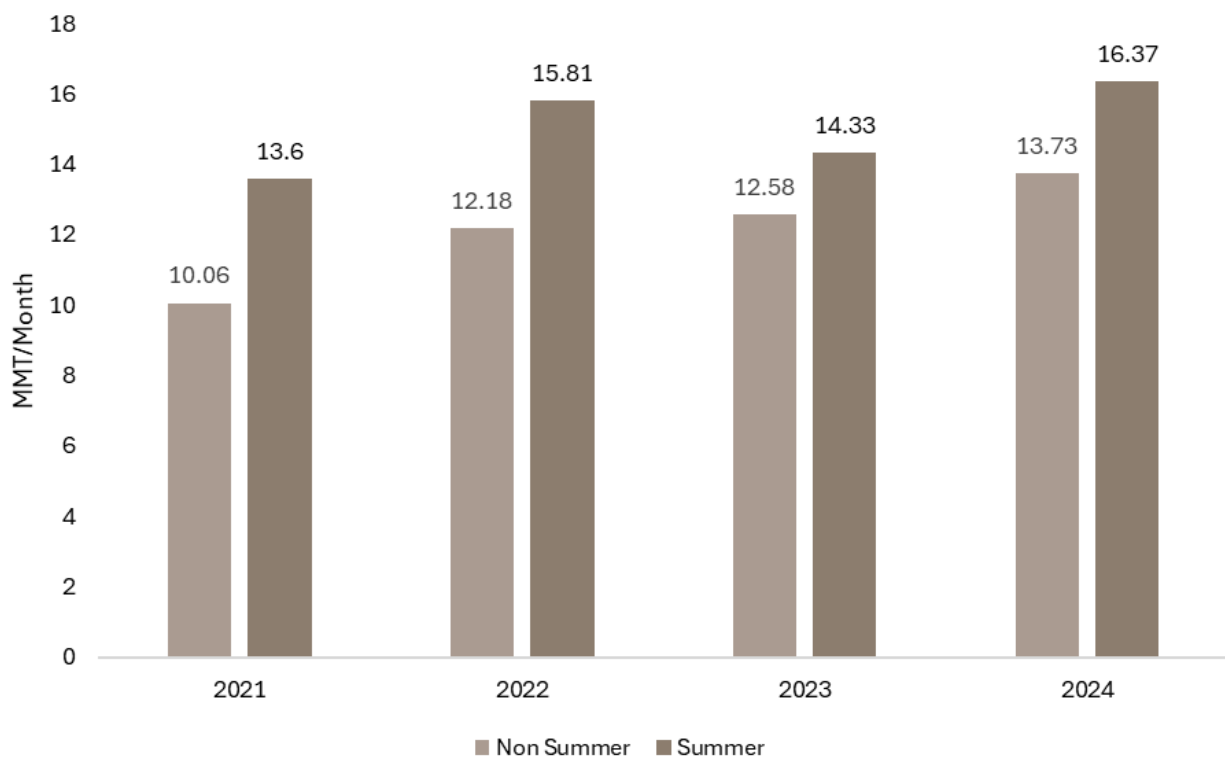
India's energy demand will continue to grow. The economic justification for replacing coal imports with indigenous electricity sources to boost energy and financial security is clear. While domestic coal extraction and the buildout of Renewable Energy (RE) has increased significantly in the last five years, there has been no reduction in coal imports.



A focused approach that seeks to replace power generated at import-dependent coal plants with homegrown RE such as solar PV and wind energy, augmented with energy storage systems, will deliver cheaper, more reliable power at constant rates, with larger macro-economic benefits including forex conservation and greater energy security.

Monthly thermal coal imports in the past four years (2021 to 2024) show a clear seasonal fluctuation. There is a significant jump in the import quantity during the summer months (April, May, and June). On average, coal imports increase from 10% to 35% during these months. This can be attributed to increased cooling requirements during the hotter months.

Figure 3: Average Monthly Thermal Coal Imports by Season (India)



Source: Collated from data published by Ministry of Coal, India



What if India was on track to deliver its RE targets?

In 2023-24, India revised its RE targets, aiming to reach 500 gigawatt (GW) of non-fossil energy capacity by 2030. The government is planning to infuse 50 GW of RE capacity annually till 2027-28. India currently has around 151 GW of RE capacity (Solar PV and Wind). In combination with hydro, small hydro, bio-gas etc., the non-fossil fuel capacity is at 200 GW. In order to reach 500 GW by 2030, 50 GW of RE capacity has to be commissioned every year. In FY 2025, 24 GW of RE was installed, the highest annual addition thus far.

“During 2023-24, Ministry put in place revised targets, and supportive measure across various RE technologies to strengthen the foundation and ecosystem that enables India to meet the ambitious target of 500 GW capacity by 2030.”

-Renewable Energy Statistics 2023-24 by Ministry of New & Renewable Energy (MNRE)

During the summer months of 2024 (April, May and June), on average, 2.65 MT/month of extra thermal coal (above non-summer months) was imported. Assuming that 90% of this is utilised to generate electricity, this coal would be sufficient to generate about 4.8 Billion Units (BU) of electricity per month. In order to cater to the spike in summer demand, about 33 GW of new RE capacity is required – well within the annual RE target. While expenditure on coal is recurring, any new RE capacity has a lifetime of 25 years, thus generating annual forex savings and savings by way of reduced tariffs.



Table 1 : RE capacity required to cater to extra demand in summer months

| Average Thermal Coal Import (per month) in 2024 | |
|---|-----------|
| Summer Months (Apr, May, Jun) | 16.37 MMT |
| Non Summer Months | 13.73 MMT |
| Deviation | 2.65 MMT |
| Extra electricity generated in summer months | 4.76 BU |
| RE capacity required to cover this extra generation | 33.09 GW |

Source : Authors' analysis

Having this extra RE capacity at hand can save India about \$826 Million (₹7,025 CR) per annum in terms of reduced thermal coal imports during the summer months. Augmenting this capacity with storage capacity (such as BESS) can help provide the required stability to the grid. Over the course of the year, RE generation from this capacity will help reduce non-summer coal imports as well, bringing savings of about \$3,300 Million (₹28,050 CR) (based on 2023-24 coal prices).

Can thermal coal imports be zeroed out?

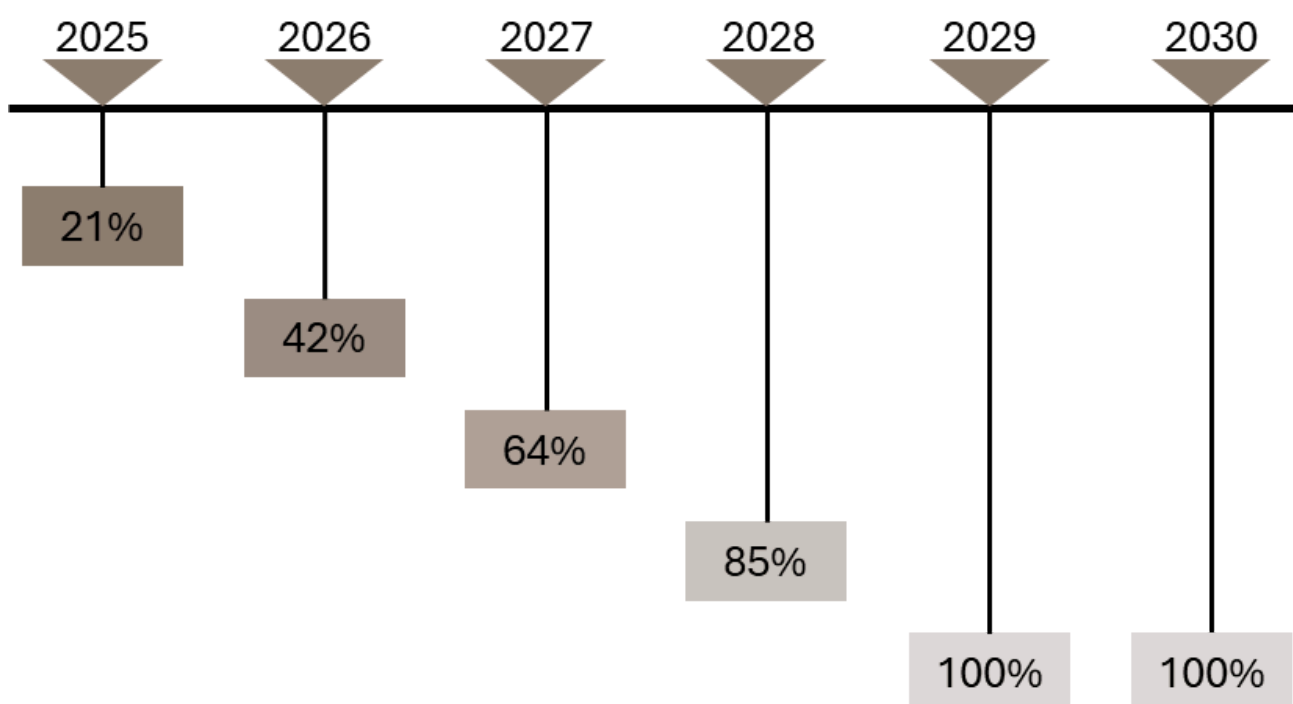
Completely eliminating thermal coal imports, as the government has targeted, is a more complex task. A concentrated effort to meet RE targets by 2030 (by adding 50 GW RE per annum) can reduce coal imports to near zero, with significant savings in forex and a boost to energy security.

In 2023-24, India imported about 206 Million MT of thermal coal, equivalent to 414 BU of electricity. This is equivalent to about 30% of India's annual electricity demand. India would require an extra 236 GW of RE capacity in order to eliminate thermal coal imports. This is well within the extra 300 GW of RE capacity India is planning to install by 2030.



By installing 50 GW RE per annum, India could eliminate thermal coal imports by the end of 2029, saving about \$66 Billion (₹5,67,545 CR) in forex between 2025 and 2029. Between 2025 and 2034 this could result in a cumulative savings of at least \$173 Billion (₹13,90,560 CR) in forex. Achieving this target and being on track with infusion of new RE capacity can not only save a large sum of money in terms of reduced coal imports but also reduce dependency on imported thermal coal.

Figure 4: Share of imported thermal coal generation covered by RE Capacity (capacity addition of 50 GW/annum)



Source : Authors' analysis

Summary

Adding 50 GW RE per annum can reduce thermal coal imports to near zero by 2029. This will save about \$66 Billion (₹5,67,545 CR at current prices) in forex between 2025 and 2029, and a cumulative savings of \$173 Billion (₹13,90,560 CR) in forex.



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