

Assessment of cables, conductors' industries and investments in power sector in India

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Vishal K. Patel



Consulting

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1 Global macroeconomic assessment

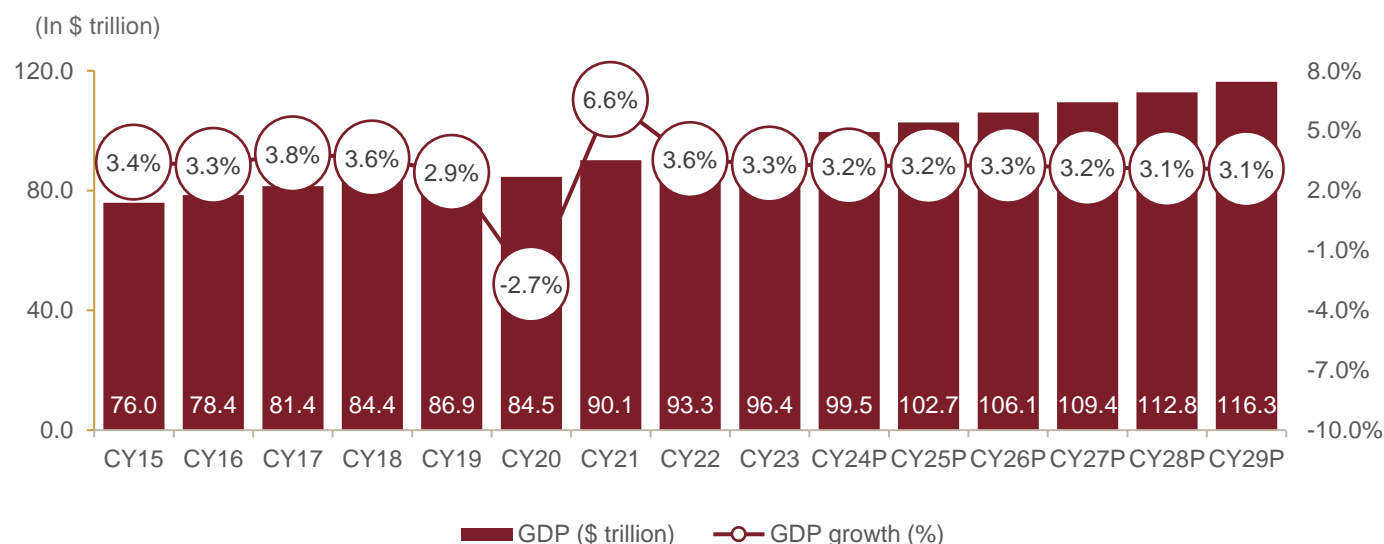
1.1 Global GDP outlook

Global GDP is estimated to grow 3.2% in calendar year 2025 amid moderating inflation and steady growth in key economies

The International Monetary Fund (IMF), in its October 2024 update, estimated global gross domestic product (GDP) growth at 3.3% for calendar 2023 and projected the growth rate of 3.2% for 2024. The estimate for 2025 is 0.1 percentage point higher than the fund’s forecast in April 2024. Emerging market and developing economies are also expected to experience stable growth through 2024 and 2025, with regional differences.

With disinflation and steady growth, the likelihood of a hard landing of the economy has receded, and risks to global growth are broadly balanced. Amid favourable global supply developments, inflation has been falling faster than expected. On the upside, faster disinflation could lead to further easing of financial conditions. On the downside, fresh commodity price increases because of geopolitical shocks and supply disruptions or more persistent underlying inflation could prolong tight monetary conditions. The property sector distress in China or elsewhere and a disruptive turn to tax hikes and spending cuts could also lead to moderation in growth in the near term.

Trend and outlook for global GDP (2015-2029P)



Note: E – estimated; P – projected

Sources: IMF economic database, CRISIL Market Intelligence and Analytics (MI&A)

2 Macroeconomic assessment of India

2.1 GDP outlook

India GDP logged 5.9% CAGR from FY12 to FY24

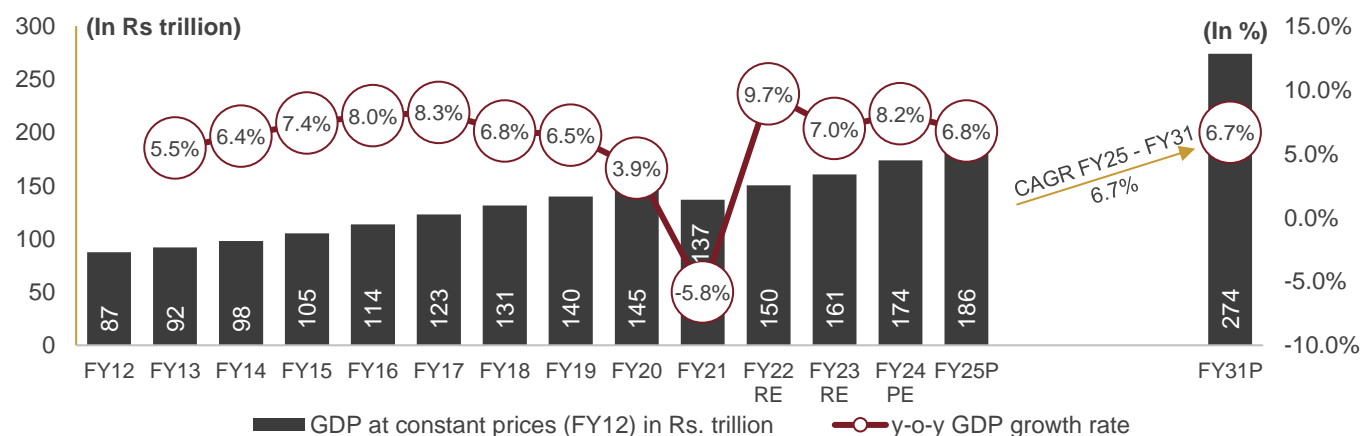
India's GDP grew at 5.9% compounded annual growth rate (CAGR) from Rs 87 trillion in FY12 to Rs 174 trillion in FY24. A large part of the lower growth rate was because of challenges heaped by the Covid-19 pandemic in FY20 and FY21. In FY22, the economy recovered with abating of the pandemic and subsequent easing of restrictions and resumption in economic activity.

In fiscal 2023, GDP rose 7% on continued strong growth momentum, propelled by investments and private consumption. In fact, the share of investments in GDP rose to an 11-year high of 34.0% and that of private consumption to an 18-year high of 58.5%.

The National Statistics Office (NSO) in its provisional estimates of Annual Gross Domestic Product (GDP) for FY24, estimated India's real GDP growth to be 8.2% which is higher than its Second Advanced Estimate of 7.6%. Even as the agricultural economy slowed sharply following a weak monsoon, the surge in non-agricultural economy has more than made up for it. The government's investment push, along with easing input cost pressures for industry, has also played a major role in shoring up the growth. However, services have been slowing owing to waning pent-up demand (post the pandemic), with the exception of financial, real estate and professional services, which have powered ahead on the back of a robust growth in banking and real estate sectors.

An analysis of the fiscal 2024 growth reveals notable dichotomies. The growth was primarily fuelled by fixed investments, exhibiting a robust 9.0% expansion, while private consumption growth lagged behind at 4.0%, trailing overall GDP growth. On the supply side, the manufacturing sector experienced the most substantial growth at ~9.9%, while agriculture exhibited more modest growth rate of 1.4%. These trends underscore the varied performance across sectors, highlighting the nuanced dynamics shaping India's economic landscape in FY24. Overall, real GDP of India is estimated to have grown at 8.2% in FY24 compared with 7.0% in FY23.

India real GDP growth at constant prices (new series)



Note: RE – revised estimates, PE – Provision estimates, P – projection
The values are reported by the government under various stages of estimates
Actuals, estimates and projected data of GDP are provided in the bar graph
Source: Ministry of Statistics and Programme Implementation (MoSPI), CRISIL MI&A

India's economy to grow 6.8% in fiscal 2025, pace to sustain till fiscal 2031

Post strong GDP prints in the past three fiscals, CRISIL expects India's GDP growth to moderate to 6.8% this fiscal, owing to the government's focus on fiscal consolidation, rising borrowing costs and waning of pent-up demand for services. Also, the net tax impact on GDP is expected to normalise and exports could be affected by uneven economic growth of key trading partners and geopolitical uncertainties. But another spell of normal monsoon and cooling domestic inflation could revive rural demand. Also, the manufacturing sector, investments in infrastructure and domestic demand are expected to remain resilient.

Over fiscal 2025 to 2031, CRISIL expects the pace of GDP growth to sustain, averaging 6.7%, thereby making India the third-largest economy in the world.

A large part of this growth will be because of capital investments. Within this space, the share of private sector in capital investments is expected to increase as the government continues to focus on fiscal consolidation. The manufacturing and service sectors are expected to grow at 9.1% and 6.9% CAGR, respectively, over the period, with the service sector remaining the dominant growth driver, thereby contributing to 55.5% share in GDP by fiscal 2031 vs. 20.0% share in the case of the manufacturing sector.

That said, the manufacturing sector is expected to grow at a faster pace between fiscals 2025-2031 vs. years between fiscal 2011 and 2020. Over the next seven years, as global growth is expected to be relatively tepid and the trade environment restrictive, domestic demand will play an important role in supporting the growth of the manufacturing sector.

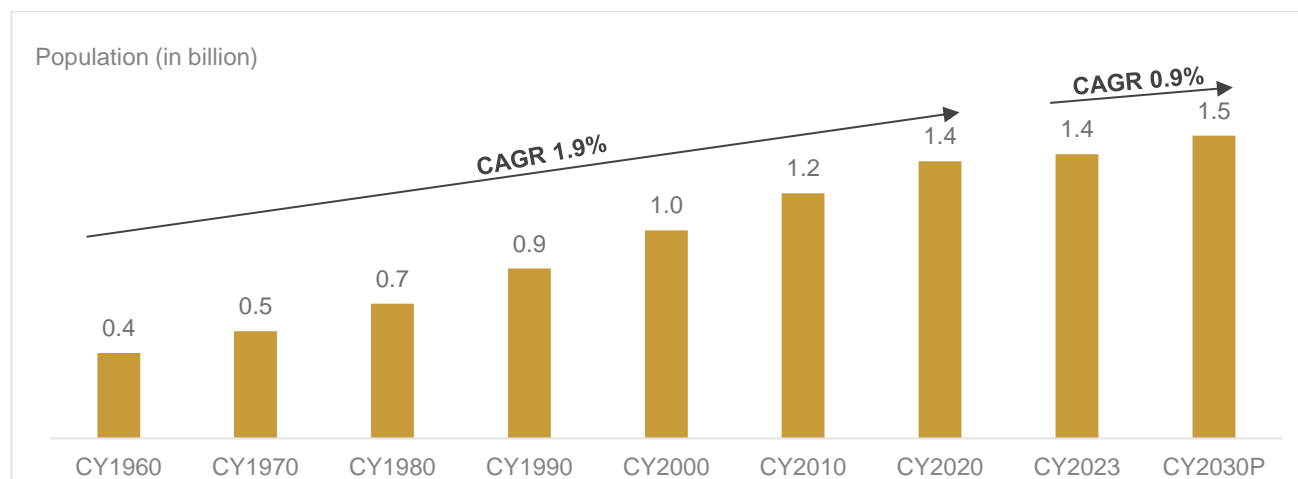
2.2 Demographic factors support India's growth

Growing population, increasing urbanisation and a young demographic profile to strengthen India's economic growth

India's population grew to ~1.4 billion in 2023 as per World Population Prospects 2024, compared to just 0.4 billion in 1960, thereby registering a CAGR of ~1.9%.

Additionally, as per World Population Prospects 2024, the population of India is expected to remain the world's largest throughout the century and will likely reach its peak in the early 2060s at about 1.7 billion.

India's population growth



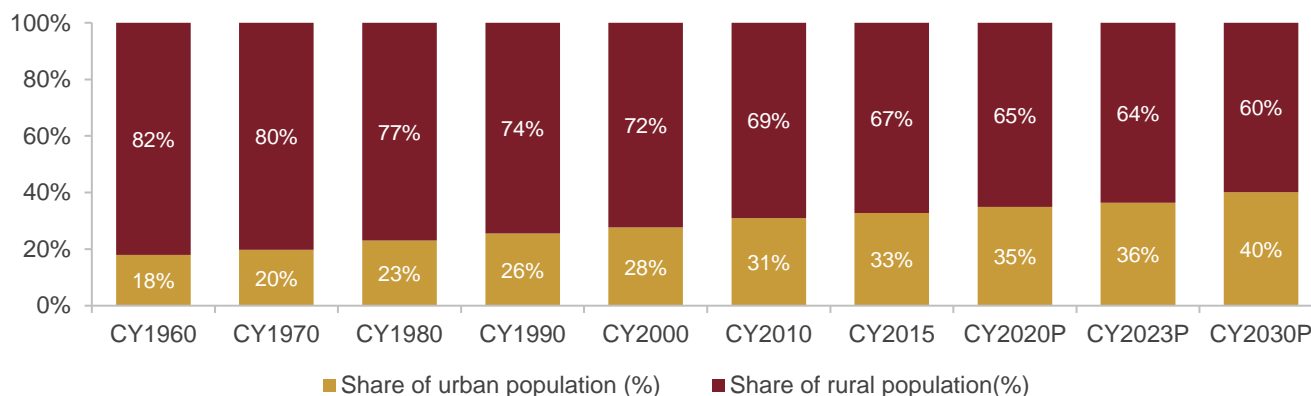
P: Projected

Source: UN Department of Economic and Social Affairs, World Population Prospects 2024, CRISIL MI&A

Further, urbanisation has also seen an uptrend growing from 18% in 1960 to an estimated 36% in 2023. This growth in urbanisation necessitates enhancements in facilities such as housing, transportation and utilities to support the increased population density. This in turn has aided in increased spends toward urban infrastructure.

Going ahead, India's urban population is expected to continue to rise on the back of economic growth. The share of urban population is projected to increase to nearly 40% by 2030, according to a UN report on urbanisation.

India's urban vs. rural population (in million)



P: projected

Source: World Urbanization Prospects: The 2018 Revision, UN, CRISIL MI&A

Manufacturing IIP increased to 144.7 in fiscal 2024

The Index of Industrial Production (IIP) for manufacturing rose to 144.7 in fiscal 2024 from 104.8 in fiscal 2013. The manufacturing sector is a significant contributor to the country's overall industrial growth, with 78% weightage in the overall IIP as of fiscal 2023.

Even though manufacturing IIP declined in fiscal 2020 to 129.6 and to 117.2 in fiscal 2021 owing to the pandemic, it recovered to 131.0 in fiscal 2022 on the back of easing of Covid-19 related restrictions, government stimulus measures, rising consumer demand and efforts to revitalise the manufacturing sector. Consequently, in fiscal 2024, manufacturing IIP stood at 144.6.

India saw robust growth in per capita income between FY12 and FY23

India's per capita income, a broad indicator of living standards, rose to Rs 99,404 in FY23 from Rs 63,462 in FY12, i.e., 4.2% CAGR. Growth was led by better job opportunities, propped up by overall economic growth. Moreover, population growth was stable at ~1% CAGR. Also, as per the provisional estimates, per capita net national income (constant prices) was estimated to have increased to Rs 106,744, thereby registering an on-year growth of ~7.4%.

With per capita income rising to upper middle-income category by FY31, the share of PFCE is expected to be dominant in India's GDP growth.

Per capita net national income at constant (2011-12) prices

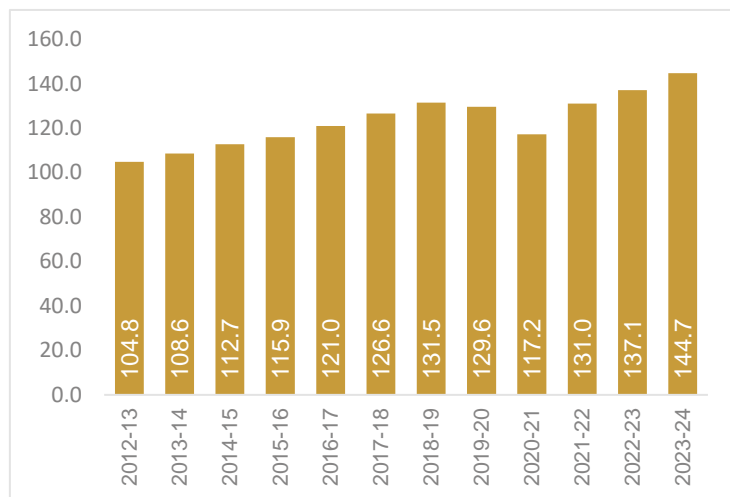
	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21RE	FY22RE	FY23RE	FY24PE
Per-capita NNI (Rs)	63,462	65,538	68,572	72,805	77,659	83,003	87,586	92,133	94,270	86,054	94,054	99,404	106,744

Y-o-Y growth (%)		3.3	4.6	6.2	6.7	6.9	5.5	5.2	2.3	-8.7	9.3	5.7	7.4
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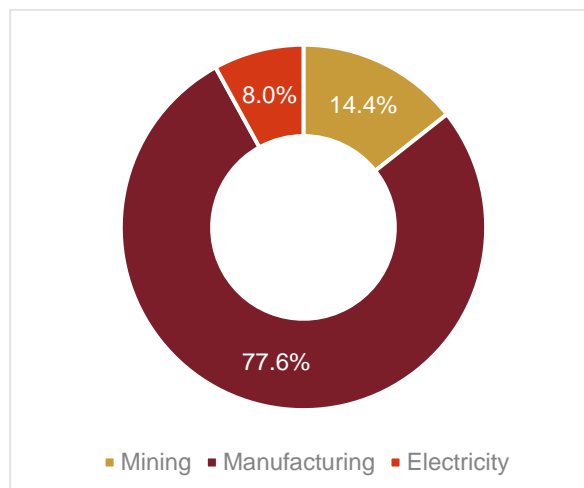
RE – revised estimates, PE – Provisional estimates of NNI, NNI – net national income

Source: Provisional Estimates of Annual National Income, 2022-23, CSO, MoSPI, CRISIL MI&A

Manufacturing IIP (fiscal 2013 to 2024)



Weight of manufacturing in IIP (fiscal 2024)



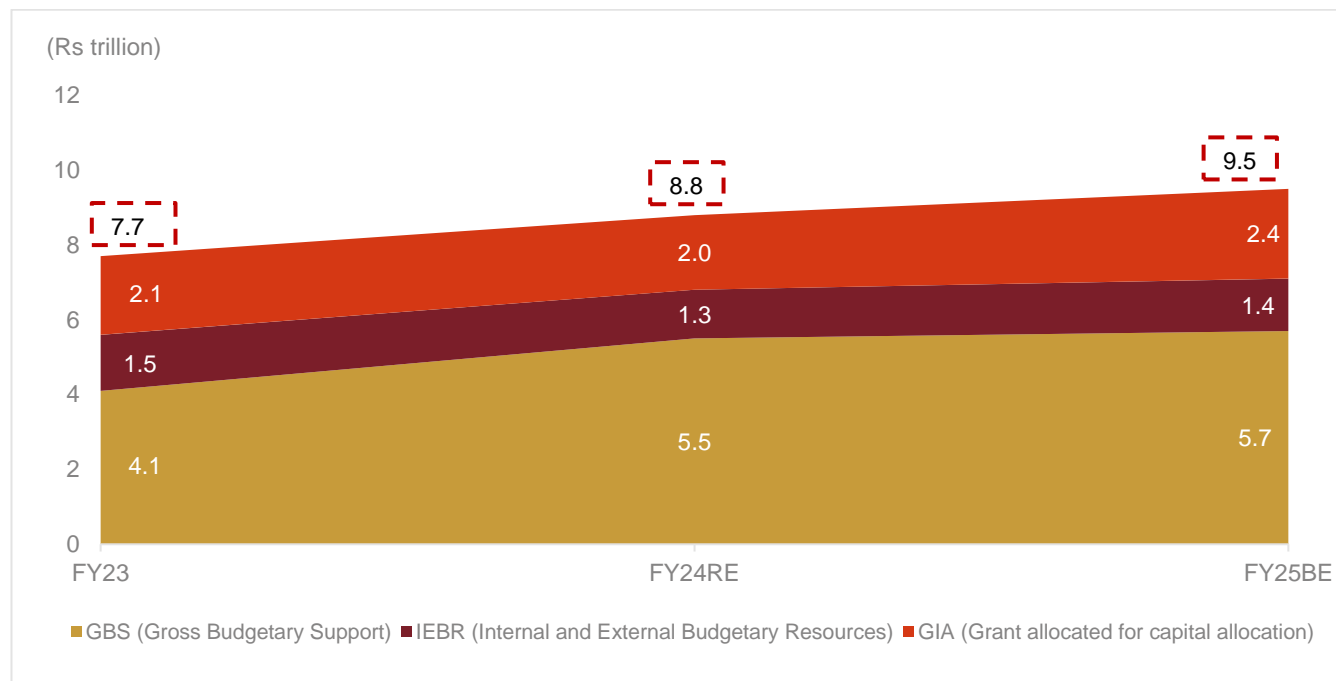
Source: MoSPI, CRISIL MI&A

Core infrastructure sector allocation moderates in fiscal 2025 as focus shift to fiscal consolidation; capex for core infrastructure ministries up by 8% year on year basis

In the FY25, the allocation for the core infrastructure sector is expected to rise moderate bases as the emphasis transitions towards fiscal consolidation. The total budgetary support designated for capital expenditures, which encompasses capital outlay, grants for capital development, and both internal and external budgetary resources, is projected to amount to Rs 18.6 trillion. This figure represents a 15% increase in comparison to the estimates for the previous FY24.

Within capital expenditures, the focus on enhancing infrastructure sectors is also evident, which includes 10 core infrastructure ministries of Road Transport and Highways, Housing and Urban Affairs, Civil Aviation, Power, Railways, Shipping, Rural Development, Water Resources, New and Renewable Energy, Department of Atomic energy. The share of these 10 core infrastructure ministries accounts for nearly ~55% of the overall capital expenditure and the aggregate budgetary support for capex for these 10 infrastructure ministries is up by 8% at Rs 9.5 trillion in FY25 budget.

Capital outlay across top 10 infrastructure ministries



Note: 10 core infra ministries include Road Transport and Highways, Housing and Urban Affairs, Civil Aviation, Power, Railways, Shipping, Rural Development, Water Resources, New and Renewable Energy, Department of Atomic energy; For Ministry of Power GIA is calculated as per Crisil MI&A

RE Revised Estimates, BE: Budget Estimates

Source: Budget Documents, CRISIL MI&A

Key government initiatives to boost infrastructure & manufacturing segment

Growth driver	Description and reasoning
National Infrastructure Pipeline (NIP)	<p>In fiscal 2019, Government of India has launched the National Infrastructure Pipeline (NIP) for FY20-25, with an aim to improve India's infrastructure and attract investments across various sectors. To draw up NIP, economic and social infrastructure projects worth more than Rs 1,000 million per project under construction, proposed greenfield projects, brownfield projects and those in conceptualisation stage were considered. These pipelines of projects are implemented by all the states and union territories of India and 22 infrastructure ministries under Government of India.</p> <p>Initially, the NIP started with 6,835 projects. By April 2024, this number has increased to 9,651 projects across 54 different sectors. Out of these, 2,104 projects are currently under development, showing progress in India's infrastructure development efforts. The total investment target under NIP during the period, has been revised from Rs 111 trillion to Rs 147 trillion.</p>
National Monetisation Pipeline (NMP)	<p>'National Monetisation Pipeline, stemming from the 2021-22 Union Budget directive for 'Asset Monetisation', aims to generate ₹6 trillion from key Central Government assets over four years (FY22-FY25). The top 5 sectors (by estimated value) capture ~83% of the aggregate pipeline value. These top 5 sectors include: Roads (27%) followed by Railways (25%), Power (15%), oil & gas pipelines (8%) and Telecom (6%).</p> <p>The total target for the first two years under NMP was around Rs. 2.5 trillion, against which around Rs. 2.3 trillion was achieved. During the FY24, against the target of Rs. 1.8 trillion, which is the highest among all the four years, the achievement has been around Rs. 1.7 trillion.</p>

Growth driver	Description and reasoning
PM Gati Shakti	<p>Prime Minister launched PM Gati Shakti - National Master Plan for Multi-modal Connectivity, essentially a digital platform to bring 16 Ministries including Railways and Roadways together for integrated planning and coordinated implementation of infrastructure connectivity projects.</p> <p>It will incorporate the infrastructure schemes of various Ministries and State Governments like Bharatmala, Sagarmala, inland waterways, dry/land ports, UDAN etc. Economic Zones like textile clusters, pharmaceutical clusters, defence corridors, electronic parks, industrial corridors, fishing clusters, Agri zones will be covered, and technology will be leveraged including spatial planning tools with ISRO (Indian Space Research Organisation) imagery developed by BiSAG-N (Bhaskaracharya National Institute for Space Applications and Geoinformatics).</p> <p>This multi-modal connectivity will provide integrated and seamless connectivity for movement of people, goods and services from one mode of transport to another. It will facilitate the last mile connectivity of infrastructure and also reduce travel time for people.</p>
Production linked incentive (PLI) scheme	<p>Production Linked Incentive Scheme was announced in Union Budget 2021-22, with the capital outlay of Rs 1.97 trillion for a period of 5 years starting from FY21.</p> <p>As of Aug 2024, investments under the PLI stand at approximately Rs 1.5 trillion, with projections to reach Rs 2 trillion soon. This is anticipated to generate around ₹12.5 trillion in production and sales, creating about 9.5 lakhs jobs. Additionally, exports have also surpassed Rs 4 trillion, especially in electronics, pharmaceuticals, and food processing.</p>
Central capital expenditure	<p>In the Union Budget 2025, the government is taking steps towards fiscal consolidation, buoyed by the widespread recovery of the Indian economy. The central government has maintained its emphasis on capital expenditure, allocating Rs. 11.1 trillion for fiscal 2025, a significant 16.9 % increase from Rs. 9.5 trillion in fiscal 2024. While the overall gross budgetary capital expenditure support has seen a 17%, the budgetary support for the 10 core infrastructure ministries has only increased by 4% to Rs. 5.6 trillion.</p>

Source: Budget Documents, CRISIL MI&A

2.3 Power consumption

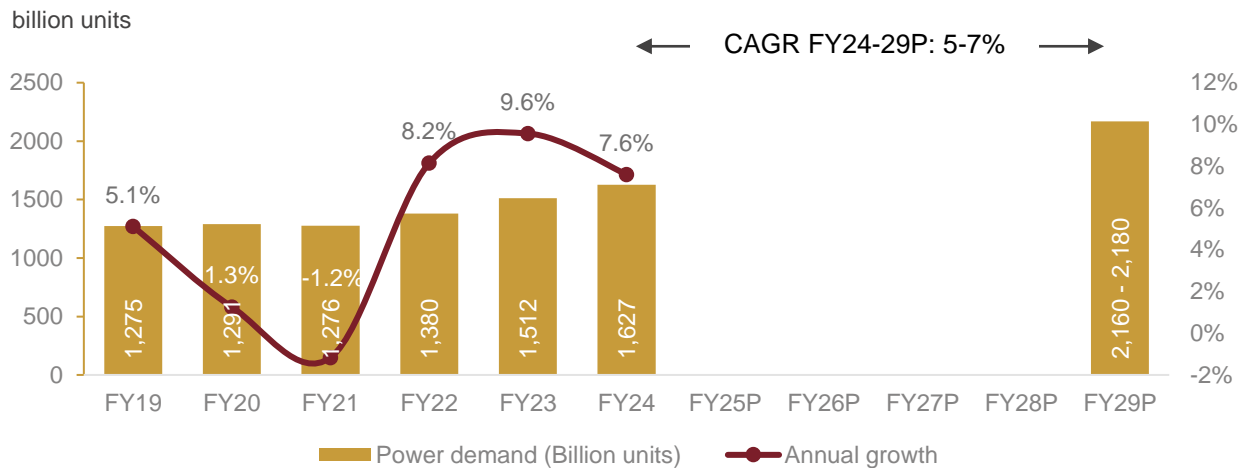
Power demand to maintain healthy momentum slated to grow at 5-7% CAGR from fiscal 2025 to 2029

India's electricity requirement has risen at a CAGR of ~5.0% between fiscals 2019 and 2024. Power demand surged in the first quarter of fiscal 2023 on the back of a severe heatwave raging through the nation, apart from continued momentum in economic activity. As a result, power demand registered a 9.6% on-year growth in fiscal 2023 despite a high base. Further, in fiscal 2024 power demand to grow at a rate of 7.6% driven by El-Nino led warmer temperatures along with an 8.2% increase in GDP growth despite a high base of 7.0% in fiscal 2023.

Over fiscals 2025 to 2029, power demand is expected to gradually pick up, logging a CAGR of 5-7% to reach 2,160-2,180 BUs, on the back of healthy economic growth and expansion of the power footprint via strengthening of distribution infrastructure. Major reforms initiated by the central government like Revamped Distribution Sector Scheme (RDSS), etc for improving the overall health of the power sector, particularly that of state distribution utilities, are expected to improve the quality of power supply, thereby supporting power demand. Between April-July 2024, base power deficit is -0.2% while peak power deficit has declined to 0.0% despite recording a historic peak demand of 250 GW in May 2024.

Moving forward, CRISIL expects power deficit to abate gradually to 0.15-0.20% in fiscal 2029 on the back of 280-290 GW of capacity additions between fiscal 2025-29

Power demand in billion units (BU)



Source: CRISIL MI&A

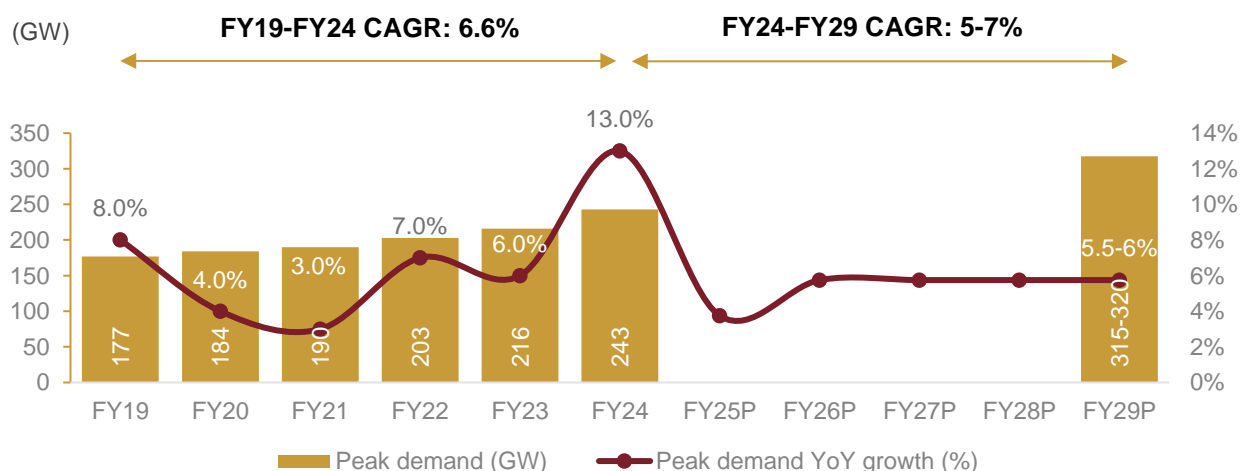
Peak demand has seen a sharp rise over past two fiscals, expected to sustain at 5-7% CAGR till fiscal 2029

Peak demand is the instantaneous surge in power requirement which occurs for a short duration. This may occur for instance when a large set of consumers utilize electricity simultaneously, such as in the evenings for lighting. Between fiscal 2019 and 2023, peak demand has grown from 177 GW to 216 GW. In fiscal 2024, peak demand was 243 GW seen in September 2023. India has recorded peak demand of 227 GW in July 2024. CRISIL MI&A expects peak demand to be 250-255 GW in fiscal 2025 driven by weather severity consequently pushing electricity consumption.

The constant rise in peak demand can be attributed to economic growth, seasonal vagaries, and an increasing daily average temperature that India has experienced over the last decade leading peak demand to touch 250 GW in May 2024. In fiscal 2025, CRISIL MI&A Research expects peak demand to reach 250-255 GW.

Peak demand is expected to grow at annual average 5-6% over fiscal 2024-29 to reach nearly 315-320 GW by fiscal 2029 with expected persistent high temperatures, rising urbanization, economic growth and infrastructure push leading to higher power consumption

Peak demand (FY19-FY29) in GW



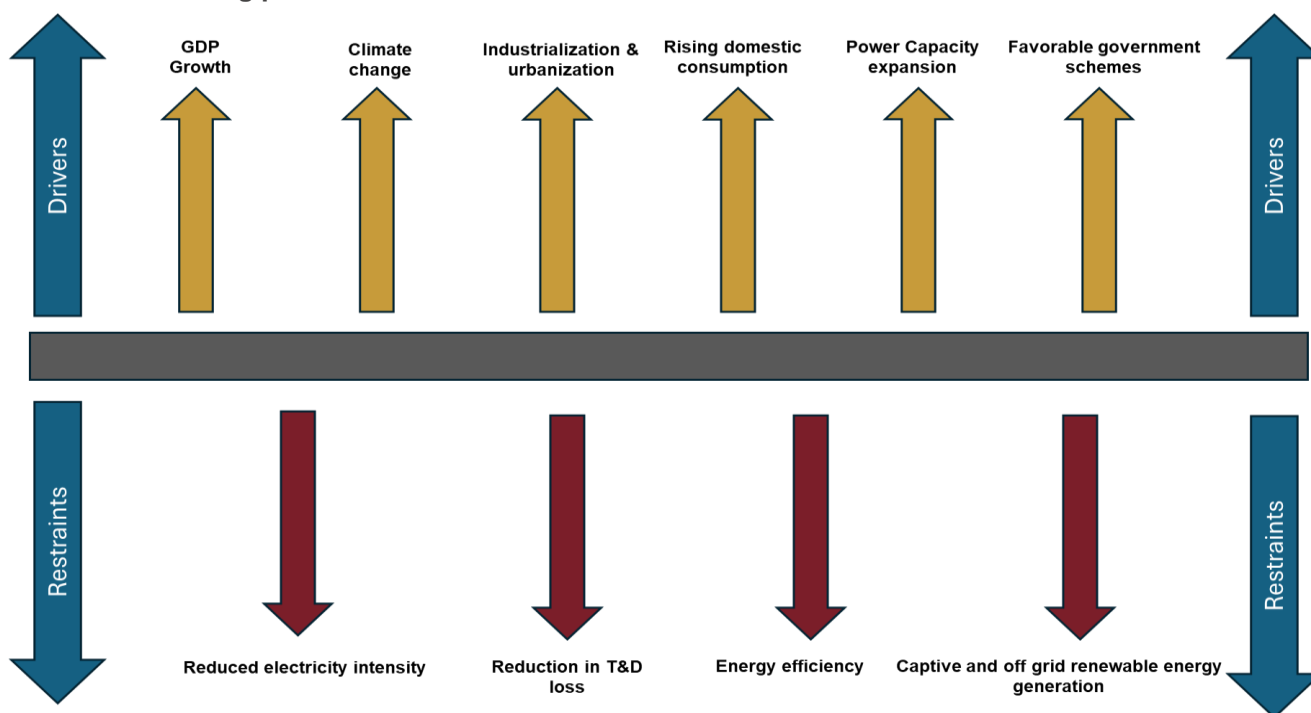
Note: E: Estimate, P: Projected

Source: CEA, CRISIL MI&A

Favourable long-term drivers to increase power demand in India

Power demand is closely associated with a country's GDP. Healthy economic growth leads to growth in power demand. India is already the fastest-growing economy in the world, with average GDP growth of 5.9% over fiscal 2012-24. The trickle-down effect of government spending on infrastructure through the National Infrastructure Pipeline, expansion of the services industry, rapid urbanisation, and increased farm income from agriculture-related reforms are key macroeconomic factors that are expected to foster power demand. Significant policy initiatives such as 24x7 power for all, Sahaj Bijli Har Ghar Yojana (SAUBHAGYA) scheme to provide electricity connections to all households, green energy corridor to facilitate evacuation of RE power, green city scheme to promote the development of sustainable and eco-friendly cities, PLI scheme and low corporate tax rates among others are expected to further support power demand in the country.

Factors influencing power demand



Source: CRISIL MI&A

Apart from macroeconomic factors, power demand would be further fuelled by railway electrification, upcoming metro rail projects, growing demand for charging infrastructure due to increased adoption of electric vehicles, higher demand from key infrastructure and manufacturing sectors. However, increasing energy efficiency, a reduction in technical losses over the longer term, and captive as well as off-grid generation from renewables would restrict growth in power demand.

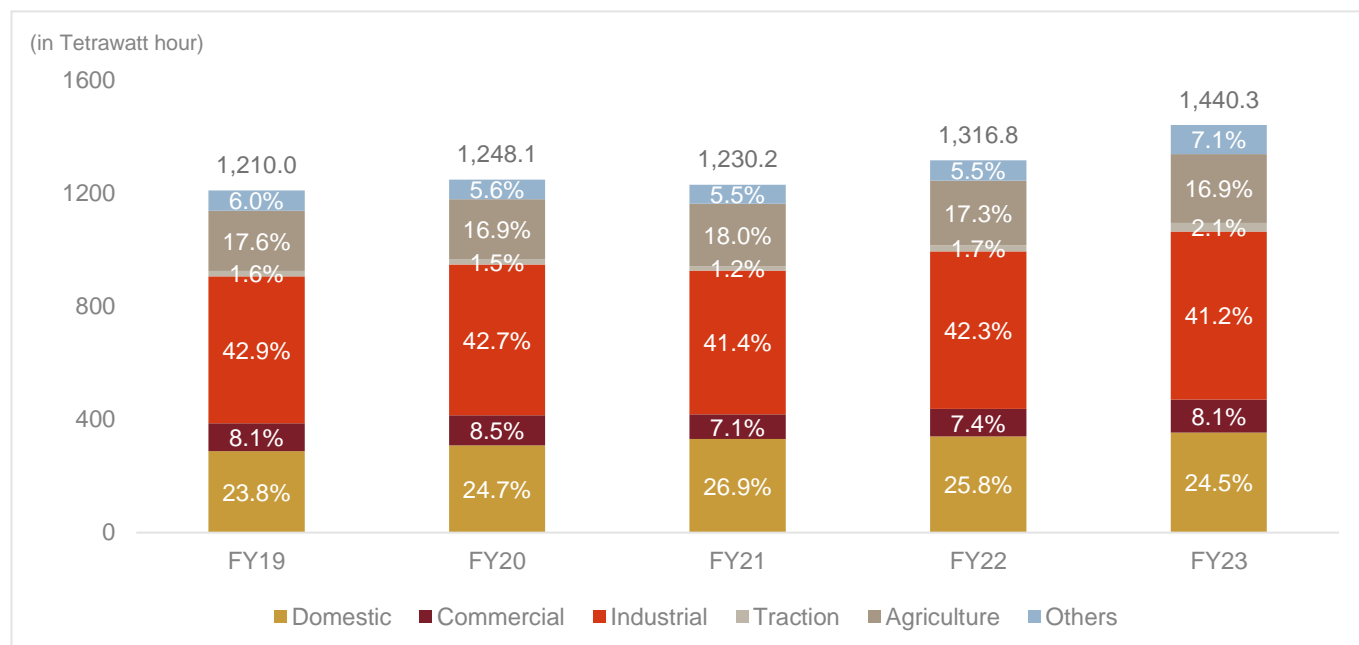
Industrial segment is the highest consumer of energy, followed by domestic segment

Energy consumption in India has consistently increased from 1,210.0 TWh FY19 to 1,440.3 TWh in FY23, barring FY20, when the overall power consumption decreased due to Covid 19 induced lockdowns, which negatively impacted the economic activities, thereby decreasing the energy consumption of industrial segment which has consumed the highest electricity across the years.

Although industrial segment remained the highest consumer of energy with 41.2% in FY23, its share in the overall electricity consumption has declined compared to FY19, when it represented 42.9%. In contrast, share of domestic segment in terms of power consumption has increased from 23.8% in FY19 to 24.5% FY23, indicating an improvement in electricity accessibility for homes, through enhanced electrification and infrastructure development.

Overall, share of Domestic, Traction and others have increased between FY19 to FY23, while share of the agricultural and industrial have decreased during the same period. Share of commercial has remained constant at 8.1% during the period.

Electricity consumption by end user type



Note: Percentages may not add up to 100% due to rounding off numbers

*Traction refers to the Electricity consumption for the propulsion of vehicles, primarily railways and other transportation systems

Source: CEA, CRISIL MI&A

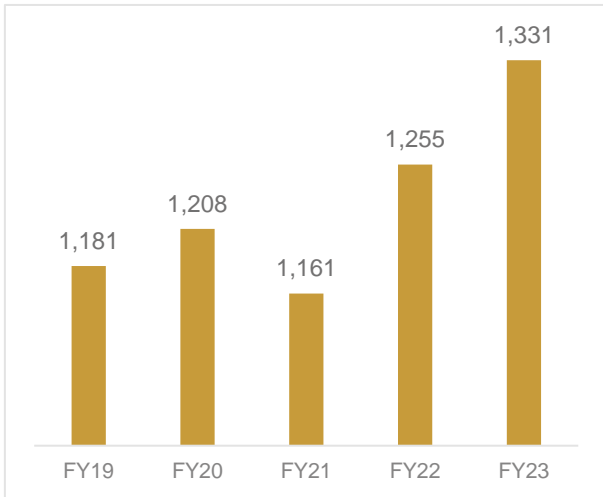
India's per capita electricity consumption increased to 1,331 (KWh) in FY23

The per capita consumption of electricity on all India basis works out to 1,331 kWh for the FY23 compared to 1,181 kWh for FY19, thereby reporting a CAGR of 3.0% between FY19 to FY23. However, it is still about below the global average. Economically rich countries are also the ones consuming more power on a per capita basis, led by higher functions of urbanization and industrialization. In 2022, Among the selected countries, USA, Finland and Sweden were the top three countries in terms of per capita electricity consumption with 83,401 kWh/ per capita, 53,138 kWh/ per capita and 44,143 kWh/ per capita respectively.

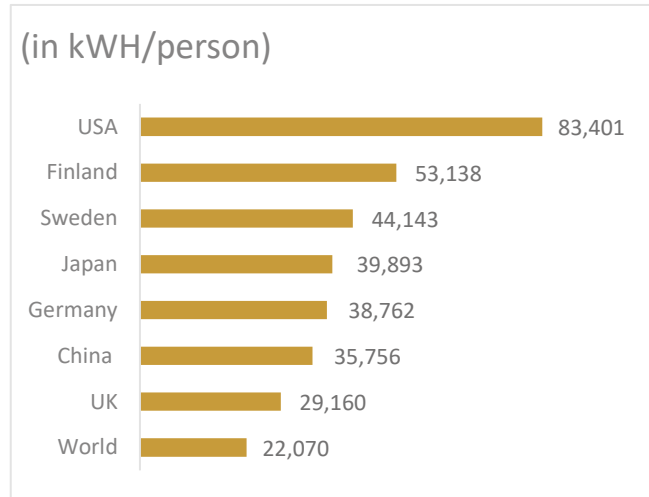
However, overall power consumption in India has constantly increased in tandem with India's GDP, barring FY21 where the consumption decreased due to Covid-19 lockdown and subsequent decrease in the economic activities.

Additionally, the trend of this increasing power consumption is expected to continue due to increased demand from industrial and manufacturing sector as well as better connectivity.

Per Capita Electricity Consumption (kWh)- India*



Per capita electricity consumption of selected countries (2022)**



Note:

* Per capita electricity consumption= The total gross electrical energy consumed/ Mid-Year Population during the year)

**Electricity consumption numbers (btu/ person) have been divided by 3412.14 to arrive at electricity consumption in kwh/person

Source: CEA, CIA, World Bank, CRISIL MI&A

3 Overview of global investments driving demand for power products

In this section, CRISIL MI&A has given details on global investments potential in power and electricity generation including infrastructure development, renewable sectors, power storage etc.

A few important definitions used in the module:

Stated Policies Scenario (STEPS): This scenario is designed to reflect the impact not just of existing policy frameworks, but also of today's stated policy plans

Announced Pledged Scenario (APS): The Announced Pledges Scenario (APS) assumes that all aspirational targets announced by governments are met on time and in full, including their long-term net zero and energy access goals

Net Zero Emissions by 2050 Scenario (NZE): The scenario maps out a way to achieve a 1.5 °C stabilisation in the rise in global average temperatures, alongside universal access to modern energy by 2030

3.1 Global investments in power sector

Global power sector investments expected to post a growth of 30-35% by 2030 compared to 2023 based on APS scenario

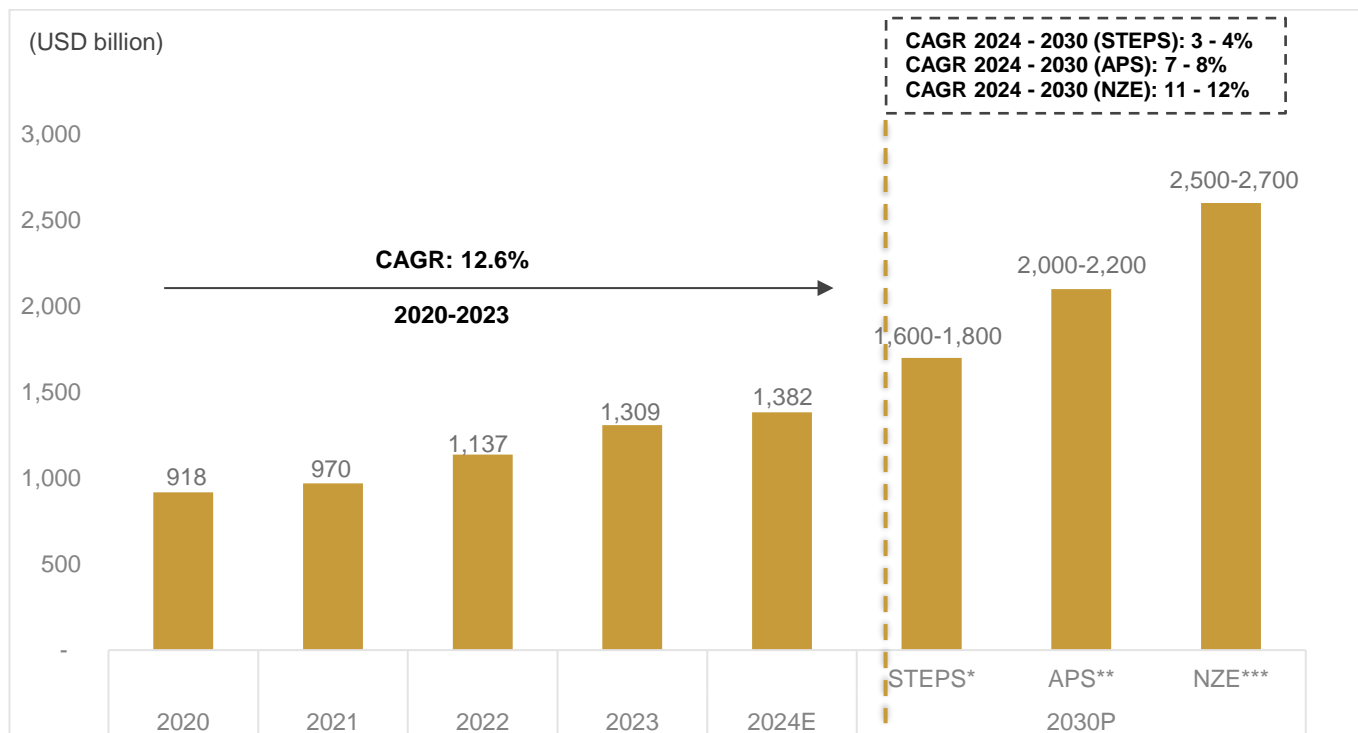
Global power sector investments increased from USD 918 billion in 2020 to USD 1,309 billion in 2023. Power sector investment grew by ~17% in 2022, crossing USD 1,000 billion for the first time, and saw a further increase of 15% in 2023 to ~USD 1,309 billion. Major effect of the global energy crisis has been to accelerate the investments to deploy cleaner energy technologies. Moving forward, investments in power sector is estimated to moderately grow by ~6% to reach USD 1,382 billion by 2024 due to cost reductions for renewables and a decline in fossil fuels.

Global investments on renewables reached USD ~605 billion in 2022, driven by solar and wind investments. As there is a push for renewables in large markets such as USA, China, Europe and India, and the gradual decrease in supply chain pressures, higher capacity additions are expected in solar and wind power sectors going forward. As a result, 2023 investments in global renewables reached USD 735 billion.

Moving forward, the investments are estimated to further grow by ~5% to reach ~USD 771 billion by 2024. Factors such as the stabilization of interest rates, ongoing technological advancements, and the increasing competitiveness of renewable energy sources are likely to support this continued investment. However, the market may also face challenges, including regulatory uncertainties and the need for further infrastructure development to accommodate the growing share of renewables in the energy mix.

Moving forward, global power sector investments are estimated to rise to USD 1,600-1,800 billion by 2030 in STEPS scenario, majorly driven by investments in wind PV, solar PV and grids. In the APS scenario, investment is estimated to increase to USD 2,000-2,200 billion by 2030 as low-emissions sources of energy and storage technologies are deployed more rapidly than in the STEPS. In case of NZE scenario, investments in global power sector is estimated to reach USD 2,500-2,700 billion by 2030.

Global investments in power sector (projections based on multiple scenarios)



Note: E stands for estimated, P stands for projected; *2030 projections based on Stated Policies Scenario (STEPS); **As per Announced Pledged Scenario (APS); ***As per Net Zero Emissions (NZE) by 2050 Scenario

All numbers based on 2023 USD rates;

Source: IEA, CRISIL MI&A

3.2 Overview of global investments in renewable energy segment

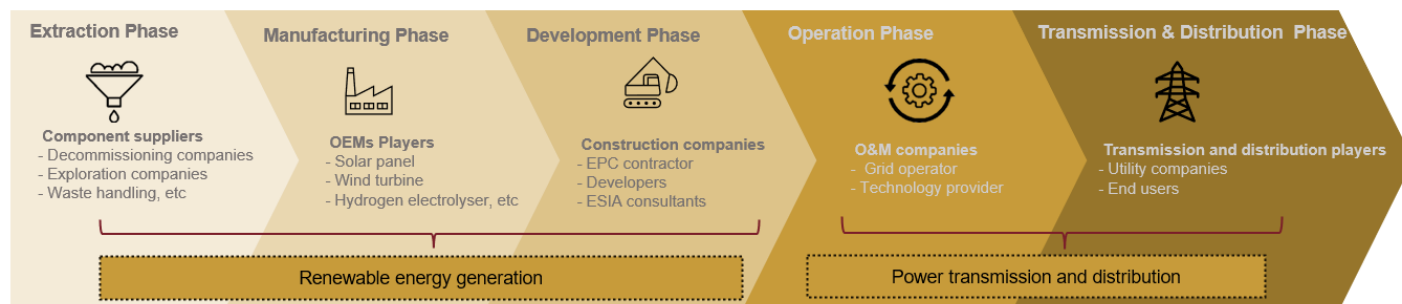
The renewable energy value chain is composed of two key stages:

- Renewable energy generation
- Power transmission and distribution

Within renewable energy generation phase, key processes include extraction phase, manufacturing phase and development phase, whereas in power transmission and distribution phase, operation phase and distribution phase are the major activities.

Additionally, a broad spectrum of stakeholders is engaged at each stage of the value chain, including material suppliers' equipment manufacturers, original equipment manufacturers (OEMs), project developers and owners, EPC contractors, operators, technology providers, end users, recyclers, etc. Moreover, the advancement and scalability of the renewable energy projects are contingent upon the involvement of various enablers, including policy makers,

Value chain of renewable energy power generation



Note: ESIA- Environmental and Social Impact Assessment, EPC: Engineering, Procurement and Construction
 Source: World Economic forum, CRISIL MI&A

Clean energy investments gathering pace indicating a higher demand for power and energy sectors

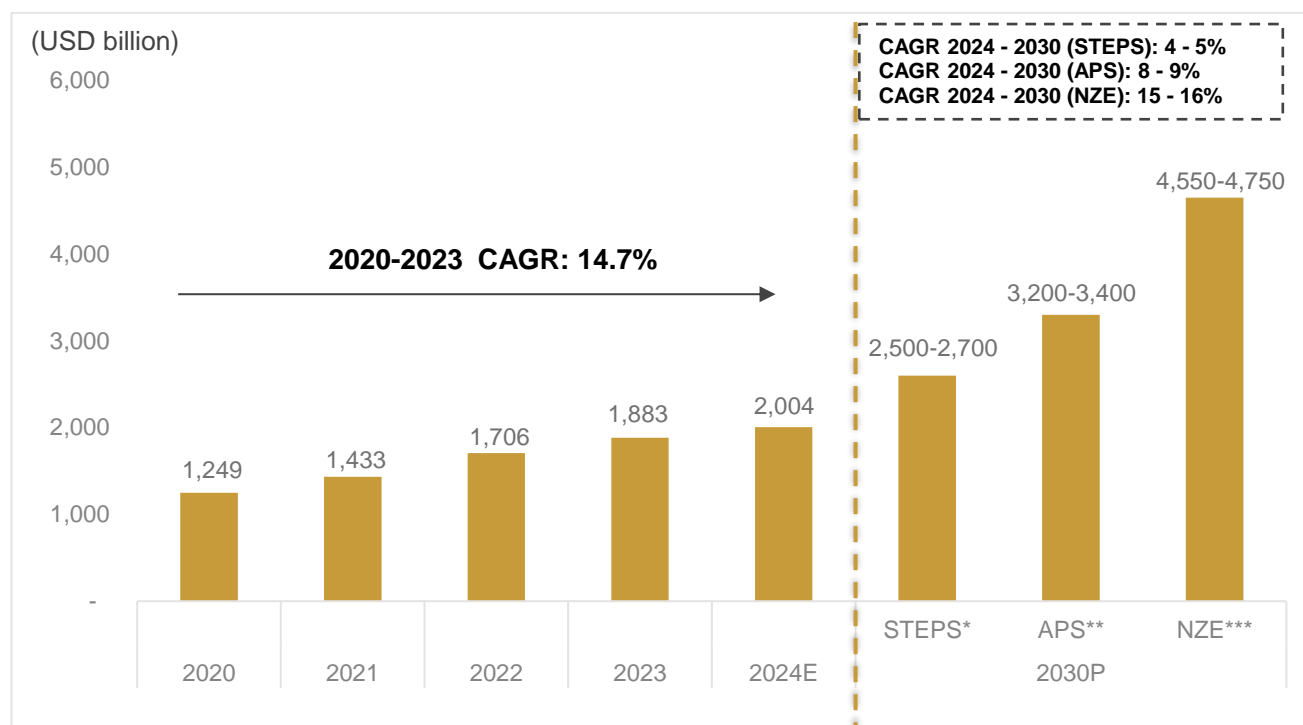
Investment in clean energy has accelerated since 2020, and spending on renewable power, grids and storage is now higher than total spending on oil, gas, and coal. In 2023, total global investments on clean energy reached USD 1,883 billion compared to USD 1,249 billion in 2020, thereby recording a CAGR of 14.7% between 2020-2023.

Additionally, as the era of affordable borrowing comes to an end, certain kinds of investment are being held back by higher financing costs. However, the impact on project economics has been partially offset by easing supply chain pressures and falling prices. Solar panel costs have decreased by 30% over the last two years, and prices for minerals and metals crucial for energy transitions have also sharply dropped, especially the metals required for batteries. Furthermore, in 2015, the ratio of clean power to unabated fossil fuel power investments was roughly 2:1. In 2024, this ratio is set to reach 10:1. The rise in solar and wind deployment has driven wholesale prices down in some countries, occasionally below zero, particularly during peak periods of wind and solar generation.

Moving forward, global energy investment is expected to exceed USD 3 trillion for the first time in 2024, with USD 2 trillion going to clean energy technologies and infrastructure.

However, in most cases, this growth comes from a very low base and many of the least-developed economies are being left behind due to several issues including acute problems servicing high levels of debt. In 2024, the share of global clean energy investment in emerging market and developing economy (EMDE) outside China is expected to remain around 15% of the total. Both in terms of volume and share, this is far below the amounts that are required to ensure full access to modern energy and to meet rising energy demand in a sustainable way.

Global investments in clean energy (projections based on multiple scenarios)



Note: E stands for estimated, P stands for projected; *2030 projections based on Stated Policies Scenario (STEPS); **As per Announced Pledged Scenario (APS); ***As per Net Zero Emissions by 2050 Scenario (NZE); 2020-2024 numbers based on 2023 USD rates; projection numbers based on 2022 USD exchange rates
Source: IEA, CRISIL MI&A

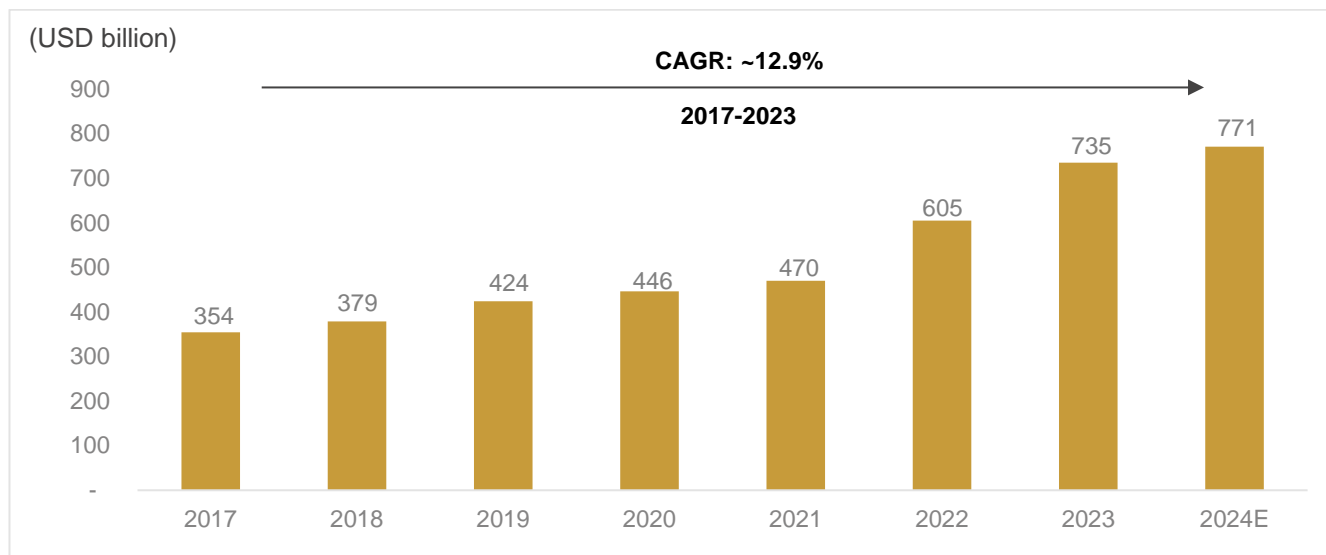
Investments in renewables have accelerated during the global energy crisis

Based on 2023 USD rates, global investments in renewable power have grown from USD ~354 billion in 2017 to USD ~735 billion in 2023, registering a CAGR of ~12.9%.

As there is a push for renewables in large markets such as USA, China, Europe and India, higher capacity additions are expected in solar and wind power sectors. As a result, 2024 is expected to ~USD 771 billion of global investments in renewable power. As per IEA, the current momentum behind renewable power is notable, and if the current spending trend persist, it is estimated that approximately two-thirds of the total capacity required to triple the renewable capacity by 2030 will be met.

However, to fully achieve this target, an additional USD 500 billion per annum will be necessary. This shortfall highlights the need for the doubling of current annual spending on renewable power generations grid, and storage by 20-30 in order to successfully triple global renewable energy capacity.

Global investments in renewable power



Note: E stands for estimated; all numbers based on 2023 USD rates

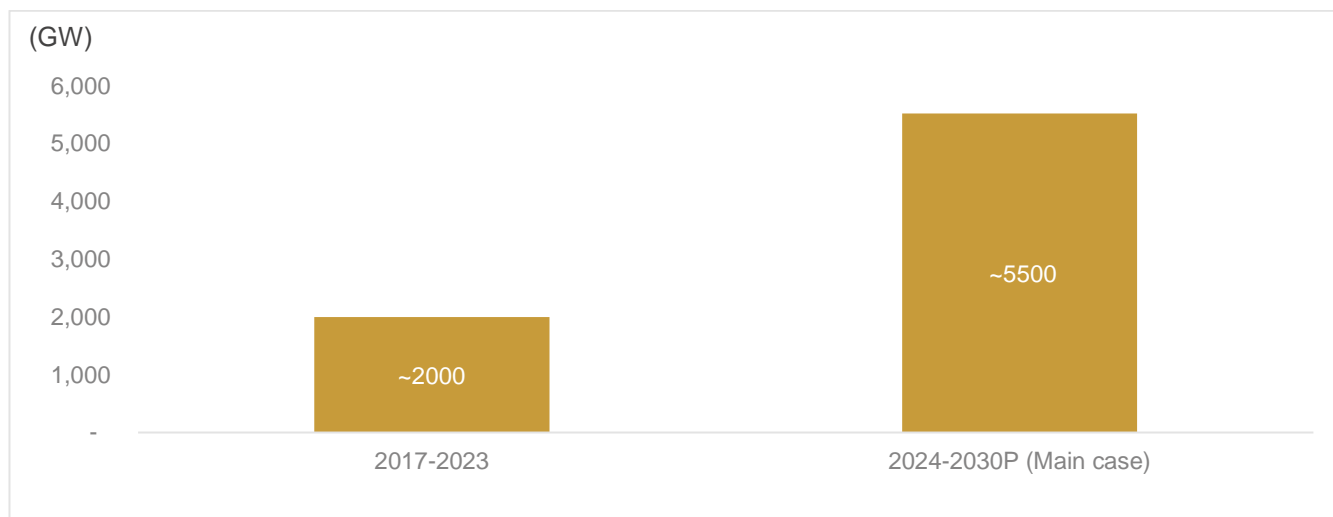
Source: IEA, CRISIL MI&A

2023- 22nd year in a row that renewable capacity additions set a record

Renewable electricity capacity additions reached an estimated 507 GW in 2023, almost 50% higher than in 2022, with continuous policy support in more than 130 countries spurring a significant change in the global growth trend. This worldwide acceleration in 2023 was driven mainly by year-on-year expansion in the China booming market for solar PV and wind.

Moving forward, global renewable capacity is expected to increase over 5,520 GW during 2024- 2030, 2.6 times more than deployment of the last six years (2017-2023). Utility scale and distributed solar PV growth more than triples, accounting for almost 80% of renewable electricity expansion worldwide. Solar PV adoption accelerates due to declining equipment costs, relatively rapid permitting and widespread social acceptance. PV project size can range from few watts to gigawatt-level utility-scale plants, providing low-cost zero-emission electricity to individuals, small companies, large industries and utilities.

Renewable electricity capacity



Note: P stands for projected

Source: IEA, CRISIL MI&A

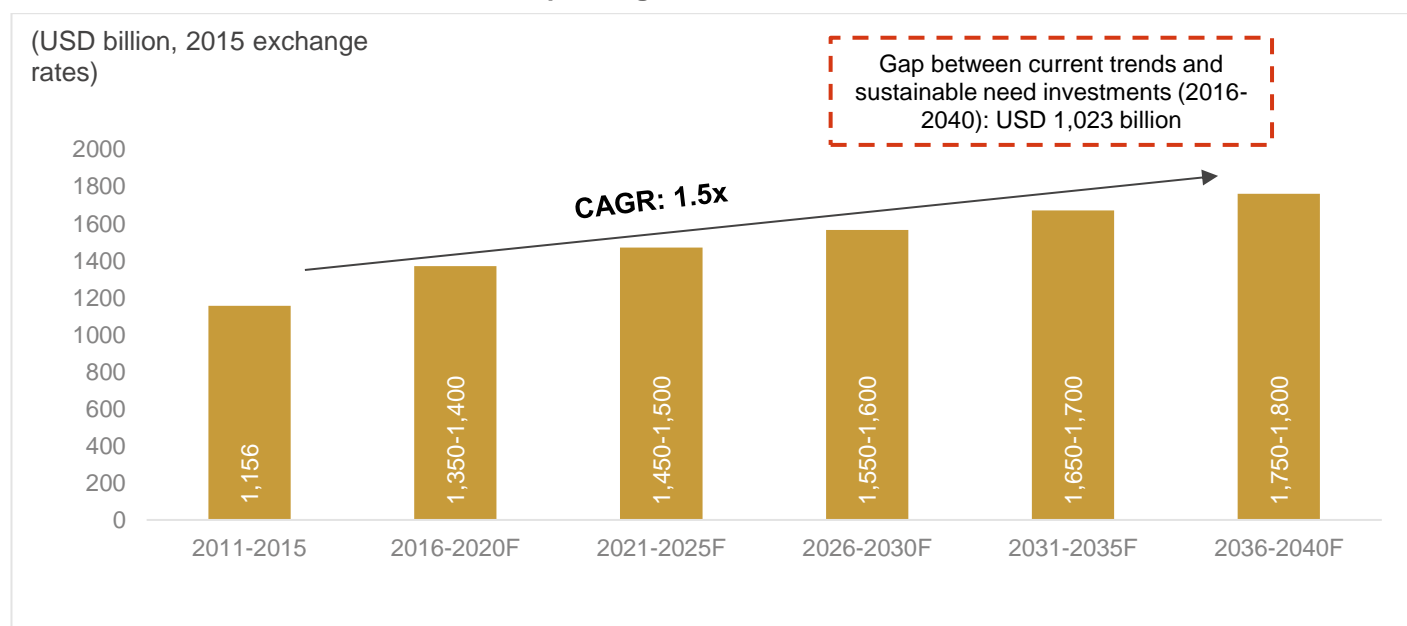
3.3

3.3 Overview of global investments in telecommunication & transport infrastructure and growth outlook

Average annual investment in telecommunication sector to increase from USD 233 billion to USD 314 billion leading to higher requirement of power & electric equipment

As per G20 Global Infrastructure Outlook Report, global investments in the telecommunication sector increased from USD 240 billion in 2010 to USD 296 billion in 2015 at a CAGR of 4.3%. Average annual spending was USD 233 billion during these years. Based on current trends, cumulative investments in the sector will be ~USD 7,838 billion (2016-2040) recording an average of USD 314 billion. Based on investment needs to achieve sustainable development goals, investments between 2016 and 2040 should be ~USD 8,861 billion, at an annual average of USD 354 billion.

Global telecommunication infrastructure spending



Note: All numbers based on 2015 US dollar prices and exchange rates; forecasts based on current trends given in Global Infrastructure Outlook by G20

Source: G20 Infrastructure Outlook, CRISIL MI&A

Globally the digital transformation is evolving faster. The average mobile data traffic per active smartphone (is projected to grow from 17 GB per month in 2023 to around 42 GB per month in 2029. Additionally, 5G is expected to become the dominant mobile access technology by subscription in 2028. Global 5G subscriptions¹ are forecast to reach close to 5.6 billion in 2029, making up 60 percent of all mobile subscriptions at that time.

Countries with large population like India have shown very positive growth in terms of internet subscribers, growing from 422.2 million subscribers in FY17 to 954.4 million subscribers in FY24. The wired-broadband market in India also found a strong uptake amid the pandemic, thanks to higher data-usage need, driven by work and study at home. The number of wired broadband subscribers increased from 18.2 million in FY17 to 40.1 million in FY24. To

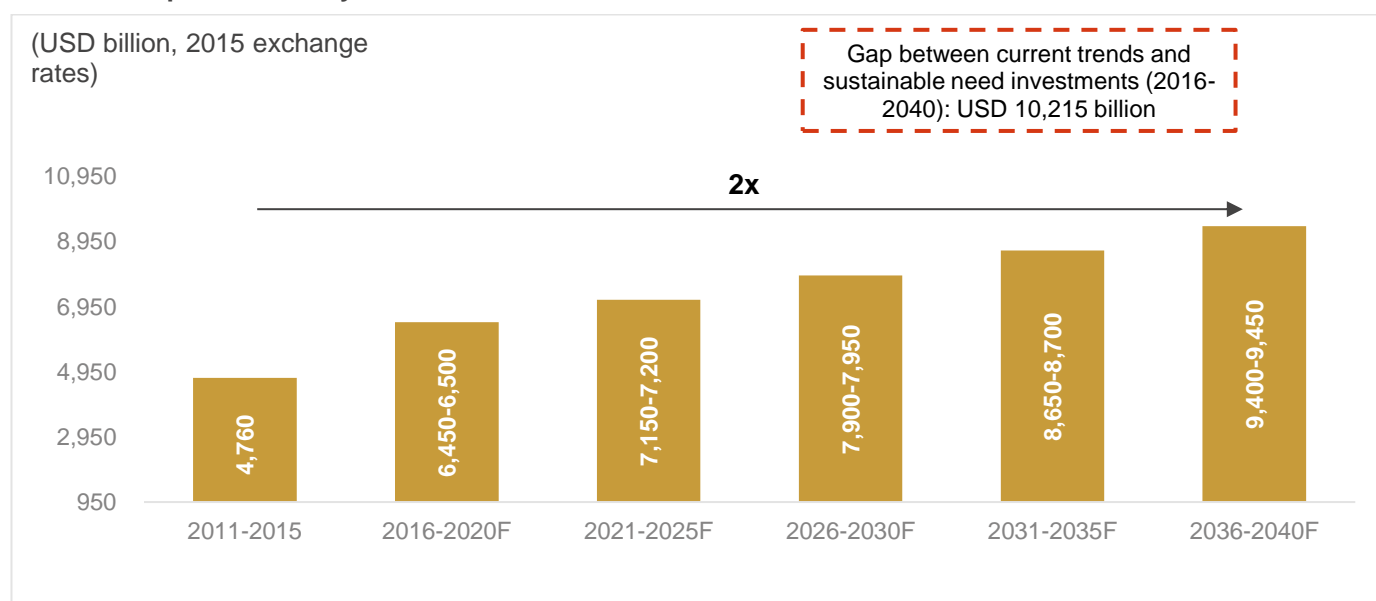
¹ As per Ericsson Mobility report, 5G subscription is counted as such when associated with a device that supports New Radio (NR), as specified in 3GPP Release 15 and is connected to a 5G-enabled network.

increase the broadband connectivity further, Indian government has approved Rs 1.39 trillion outlay for BharatNet telecom project for providing last mile connectivity across 6.4 lakh villages in India.

Increase in investments in the transport sector to further drive demand for power & electric equipment

As per G20 Global Infrastructure Outlook Report, global investments in the transport & mobility sector remained fairly constant between 2010-2015 in the range of USD 975-982 billion. Average annual spending was USD 977 billion during these years. Governments are allocating investments in building extensive road networks for freight transportation, ports, tunnels, airports and commercial buildings. There is a steady growth in personal mobility (including intercity) and road freight transportation over longer distances with shorter turnaround time. Based on current trends, cumulative investments in the sector will be ~USD 39,660 billion (2016-2040) recording an annual average of USD 1,586 billion. Based on investment needs to achieve sustainable development goals, investments between 2016 and 2040 should be ~USD 49,875 billion, at an annual average of USD 1,995 billion.

Global transport & mobility investments



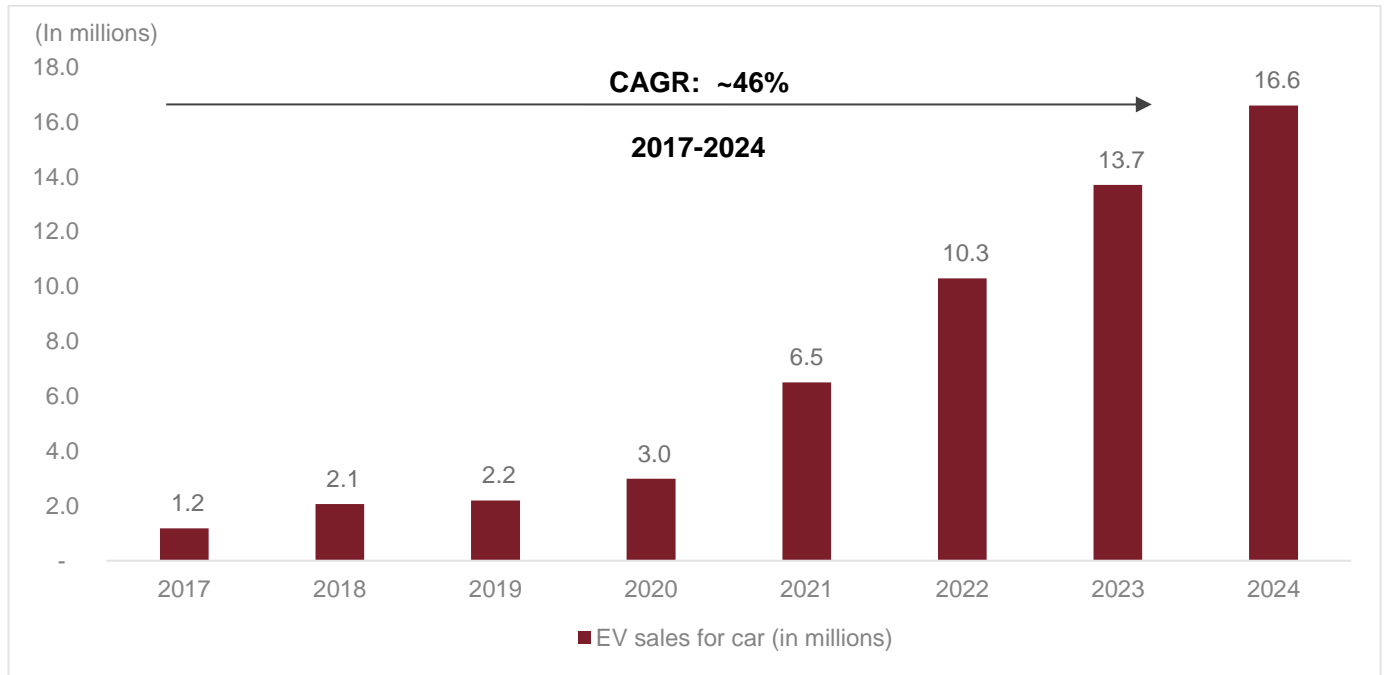
Note: all numbers based on 2015 US dollar prices and exchange rates; forecasts based on current trends given in Global Infrastructure Outlook by G20

Source: G20 Infrastructure Outlook, CRISIL MI&A

Global sales of electric cars neared 14 million in 2023, reaching 18% of all cars sold

Electric car sales in 2024 reached ~16.6 million units which was 3.1 million higher than in 2023, a 21% year-on-year increase. This indicates robust growth even as many major markets enter a new phase, with uptake shifting from early adopters to the mass market. The vast majority of electric car sales in 2024 were in China (61%), Europe (20%) and the United States (10%).

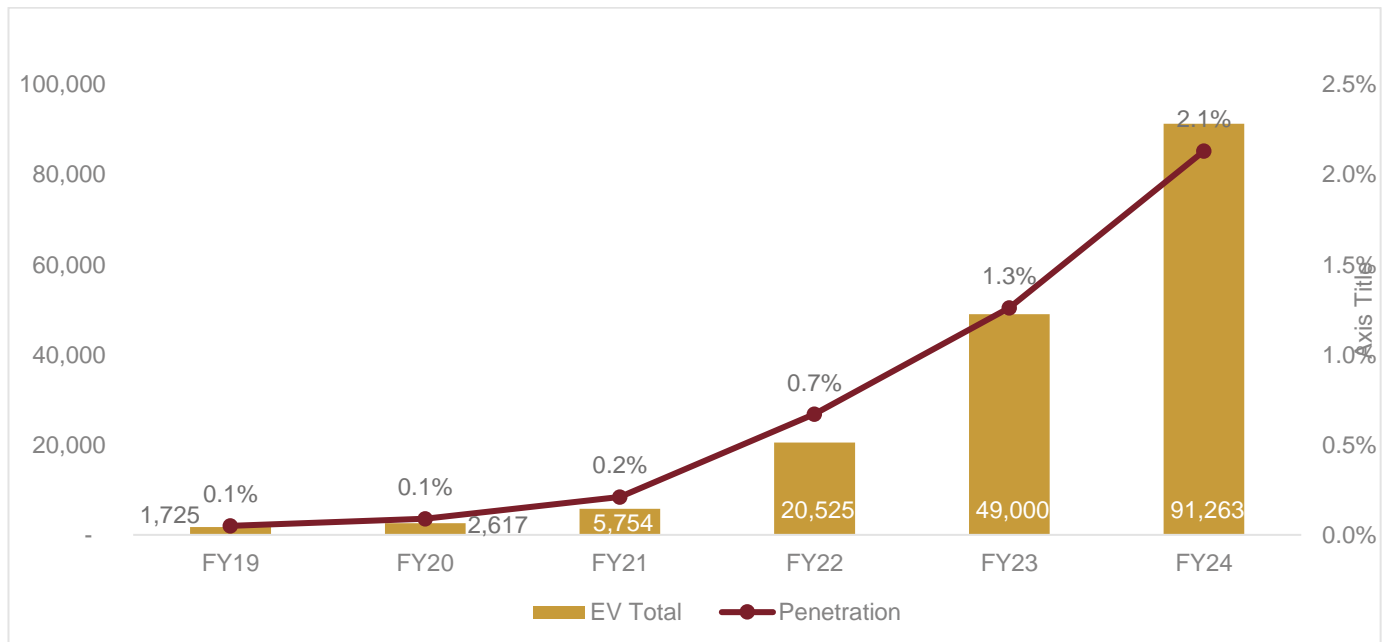
Global sales of electric cars (2017-2023)



Source: IEA, CRISIL MI&A

The overall electric passenger vehicle industry witnessed an exponential growth in past five fiscals where the segment grew at a compounded annual growth rate of 21% over fiscals 2019 to 2024 reaching ~90,000 units in sales. The EV penetration in fiscal 2024 stood at 2.1% against 1.2% penetration witnessed in fiscal 2023. Increase in number of models by OEMs along with reduction in range anxiety and reducing cost has been a major driver for electric vehicle growth. The number of models available has increased from just 3 in fiscal 2020 to 12 in fiscal 2024 with more than 6 OEMs introducing their models. This has provided consumers with a wide range of choice across body types and more importantly across price ranges.

EV sales for passenger vehicles- India (FY19-23)



Source: CRISIL MI&A

4 Indian Electrical wires, cables, and Power conductors' industry

4.1 Introduction to wires, cables

Wires consists of single conductor and cables are assembly of one or more conductors that are used for the transmission of electricity, data or signals. There are various types and varieties of cables, each designed to perform a specific function. Classification is based on the core structure of the conductor metal (majorly copper and aluminium), number of cores, type of insulation material and arrangement, etc.

Power and electrical cables are segmented into the following, based on voltage capacity:

- Low Tension / Voltage (LV) [1.1 kV and below]
- High Tension / Voltage (HV) [above 1.1KV to 33 KV]
- Extra High voltage (EHV) [66 kV and above] cables

Major uses of power cables are in the power sector (central, state and private electricity utilities) and sectors like petrochemicals, mining, steel, non-ferrous, shipbuilding, cement, railway, and defence.

The performance and durability of cables depend on the quality of raw materials. Specialised applications require superior chemical, mechanical, thermal and electrical performance from cables, resulting in usage of high-performance materials in cable construction. Additionally, it is seen that in order to achieve properties suited for varying applications, every cable has a distinguished construction. The number of SKUs of cables and wires are very high, with 500-600 fastest selling SKUs, differing in application and offering variation in cross-sectional area (size), number of cores used, core material (mainly copper or aluminium), insulation material used, armoured or unarmoured construction for strength, etc.

Types of cables	Description	Applications
Power Cable	A power cable is an assembly of two or more conductors with insulation and a protective jacket. The power cables industry is classified into low voltage (1.1 kV and below), medium voltage (3.3-66.0 kV), and extra high voltage (132 kV and above) cables. These cables are predominantly used in sub-transmission and distribution of power.	Transmission and distribution of electricity in mainly commercial and industrial settings
Building Wires	Building wires are usually made up of copper and aluminium. These are majorly used in residential settings and their carrying capacity/ voltage depends on their end use.	Commonly used in everyday household items like for connecting household appliances, power outlets, etc.
Communication Cables	Communication cables are specifically designed to support data transmission across distance at high speed and minimal loss. Examples include, LAN cables, Optic fibre cables, etc.	Used for transmission of data/ voice/ video signals at high speed without major energy loss.
Instrumentation cables	Instrumentation cables are generally used in industrial settings to carry low voltage signals with high accuracy. These cables are properly shielded to ensure no external signal interference and are mainly used to monitor/ control electric systems.	Few of the applications include industrial equipment control, process controls for e.g. in oil and gas or chemical plants, or mass transit systems which require cables to be heat

Types of cables	Description	Applications
	The functions of measurement and control are vital in manufacturing and processing applications.	resistance, resistance due harsh environment and chemicals, etc.
Other special cables	This class of cables includes cables that are especially designed for a particular end use/ industry due to particular requirements. These types of cables are usually provided as customized solutions against stringent requirements, including temperature, tensile strength, and chemical resistance. For example, Solar cables, which are required to have lifetime reliability of up to 30 years, resistance to extreme temperatures (-40°C to 120°C), ozone, and ultraviolet (UV), halogen free, flame and fire retardancy, etc.	Multiple specialized applications including sonar detection, mine sweeping and defence purposes across industries like marine, defence, aerospace, etc.

Source: CRISIL MI&A

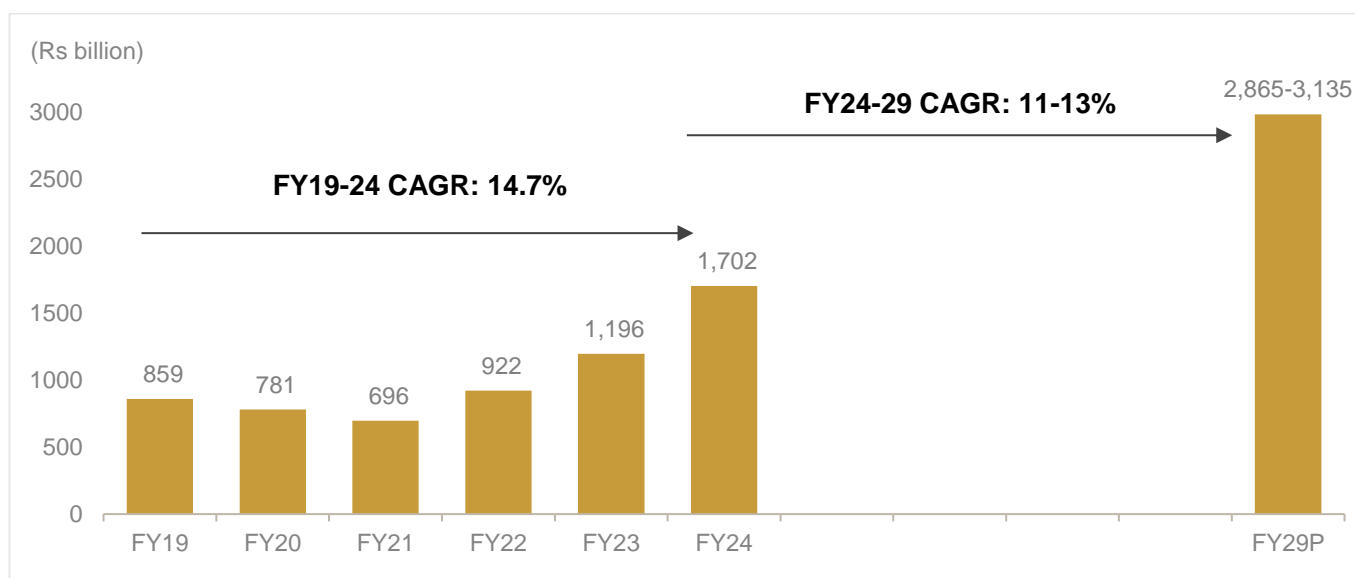
Overview of India wires & cables market

India wires & cables market to grow at 11-13% CAGR between FY24-FY29

In FY24, cables and wire market were valued at ~Rs 1,700 billion, up from Rs 859 billion in FY19, registering a CAGR of 14.7%. This notable surge can be primarily attributed to a remarkable growth of High Voltage (HV) & Extra-High Voltage (EHV)- Above 33 KV cables and Elastomeric Cables, which have registered exponential growth on the back of increased expansion of transmission lines and electrification initiatives in rural areas. Other cable categories contributing substantially to the accelerated market growth include PVC Control Cables & Instrumentation, building wires, and switchboard cables, driven by pickup in construction activities in both commercial and residential sectors post COVID-19.

Moving forward, CRISIL MI&A expects the wires and cables market size to grow at a CAGR of 11-13% between Fiscal 2024 and 2029 and reach Rs 2,865 billion - Rs 3,135 billion by Fiscal 2029 due to ongoing infrastructure development projects, surge in construction activities and increasing digital connectivity.

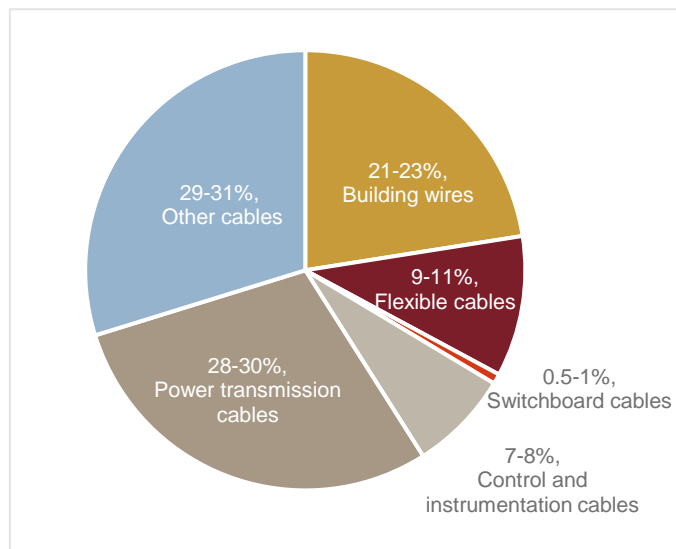
Market size of wires and cables in India



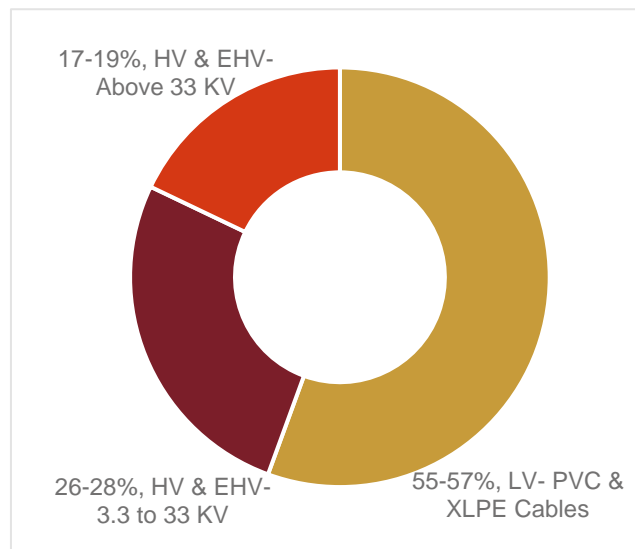
Source: IEEMA, CRISIL MI&A

Power transmission cables formed the highest market share in FY24

Segment wise split of cables and wires market (FY24)



Segment wise split of power transmission cables (FY24)



Source: IEEMA, CRISIL MI&A

In FY24, power transmission cables formed the highest market share in the overall domestic cables and wire industry at 28-30% (Rs 477-511 billion), followed closely by building wires at 21-23% (Rs 357-391 billion).

Within power transmission cables, Low Voltage Polyvinyl Chloride (LV-PVC) and Cross-Linked Polyethylene (XLPE) Cables had the highest share of 55-57%, followed by MV and HV (3.3 to 33 KV) at 26-28% and HV and EHV (above 33 KV) at 17-19%

The high share of power transmission cables is owing to favourable government initiatives in power segment like rural electrification schemes, railway electrification, etc.

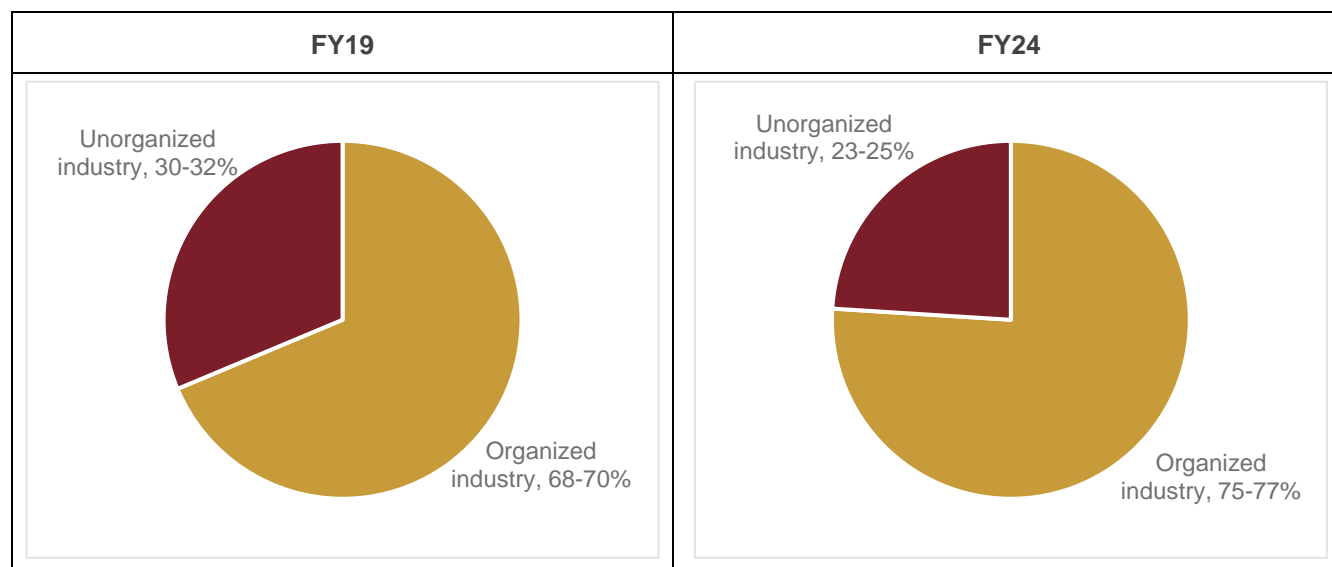
Additionally, increasing construction spends in building segments coupled with growing Fast-Moving Electric Goods (FMEG) industry is contributing to the demand of building wires

Segment wise market size and share of cables (FY24)

Type of Cables/ wires	Share in total industry (FY24)	Market size (Rs billion)- FY24
Building wires	21-23%	357-391
Flexible cables	9-11%	153-187
Switchboard cables	0.5-1%	9-17
Control and instrumentation cables	7-8%	119-136
Power transmission cables	28-30%	477-511
Other cables	29-31%	494-528

Source: IEEMA, CRISIL MI&A

Organized players dominate the overall domestic cables and wires industry



Source: IEEMA, CRISIL MI&A

The share of organized players has improved between FY19 and FY24 from ~68-70% to 75-77%. Consequently, share of unorganized industry has dropped from 30-32% in FY19 to 23-25% in FY24.

Additionally, within the overall industry, share of organized players is relatively higher in cables like power transmission cables.

Moving forward, the share of organized players is expected to increase further as the industry consolidates.

Cables and wires production crossed 21 million km in FY24

In FY24, cables and wire production in India crossed 21 million km, up from 16 million km in FY19, registering a CAGR growth of 5.5%. Out of the 21 million km, cables accounted for ~9 million km in FY24.

Major factors contributing to this growth included an overall upswing in exports, favourable government initiatives such as the REC and rural electrification initiatives fostering demand for High Voltage (HV) and Extra-High Voltage (EHV) cables, a resurgence in construction activities post the COVID-19 pandemic resulting in heightened demand for building wires (including Switchboard cables and flexible cables), and the increasing demand for communication cables propelled by the expansion of digital connectivity.

Total production of cables and wires

Production (in '000 kms)	FY19	FY20	FY21	FY22	FY23	FY24	CAGR FY19-24
LV- PVC & XLPE Cables	726	617	478	472	567	649	-2.2%
MV & HV- 3.3 to 33 KV	52	49	54	49	57	93	12.2%
HV & EHV- Above 33 KV	2	6	3	3	5	7	35.3%
Control and instrumentation cables	756	626	543	598	758	935	4.3%
Elastomeric cables	179	165	158	216	291	633	28.8%
Jelly filled cables	181	129	84	86	47	144	-4.4%
Switchboard cables	982	890	781	834	1,041	1,042	1.2%

Production (in '000 kms)	FY19	FY20	FY21	FY22	FY23	FY24	CAGR FY19-24
Building wires	9,818	8,966	7,793	8,685	10,951	11,841	3.8%
Flexible cables	3,326	3,265	3,056	3,519	4,318	5,641	11.1%
Total Production (in '000 kms) *	16,021	14,713	12,950	14,462	18,036	20,986	5.5%

Note: Production data of Elastomeric cables is in core kilometres

LV-PVC: Low Voltage Polyvinyl Chloride

XLPE: Cross-Linked Polyethylene

MV: Medium Voltage

HV: High Voltage

EHV: Extra-High Voltage

Source: IEEMA, CRISIL MI&A

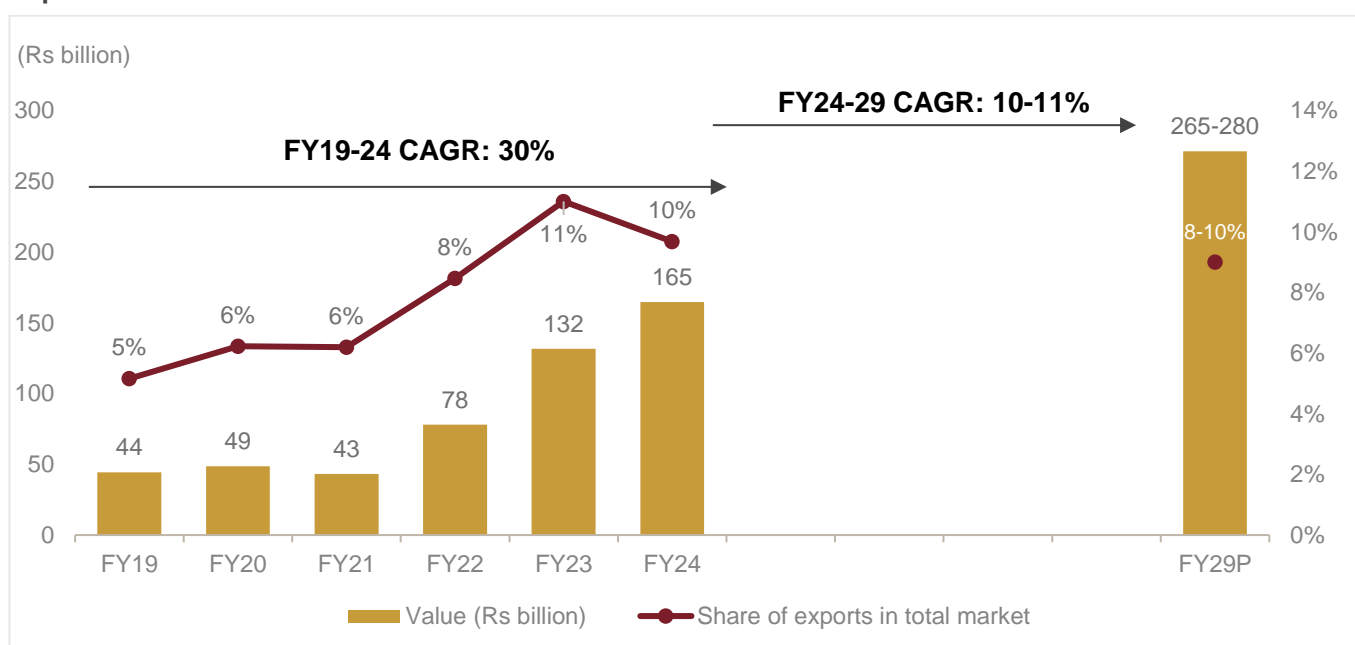
Exports of wires & cables to grow at a CAGR of 10-11% between FY24-29

The exports of wire and cables surged to ~Rs 165 billion in FY24 forming ~10% of the total market, marking a substantial increase from Rs 132 billion in FY23 and registering a year-on-year growth of ~25%. This growth can be principally attributed to heightened international demand stemming investments in transmission projects by organizations like International Development Association (IDA) and the International Bank for Reconstruction and Development (IBRD). Some of the key export partners for wires and cables in FY24 include Saudi Arabia, USA, UK, UAE, Italy, etc. Export destinations for wires and cables among African countries was led by Nigeria, Liberia, Tanzania, Kenya etc.

Moving forward, CRISIL MI&A expects cables and wires export to moderate and grow at a CAGR of 10-11% between FY24-29 and reach Rs 265-280 billion in FY29.

Note: CRISIL MI&A has considered following HSN codes for the analysis of wires and cables exports from India- 74081190, 85359090, 85444920, 85444930, 85446020, 85446030, 90011000. These include copper wires, plastic insulated conductors, optical fibres, etc.

Export value of wire and cables



Source: Ministry of Commerce & Industry, CRISIL MI&A

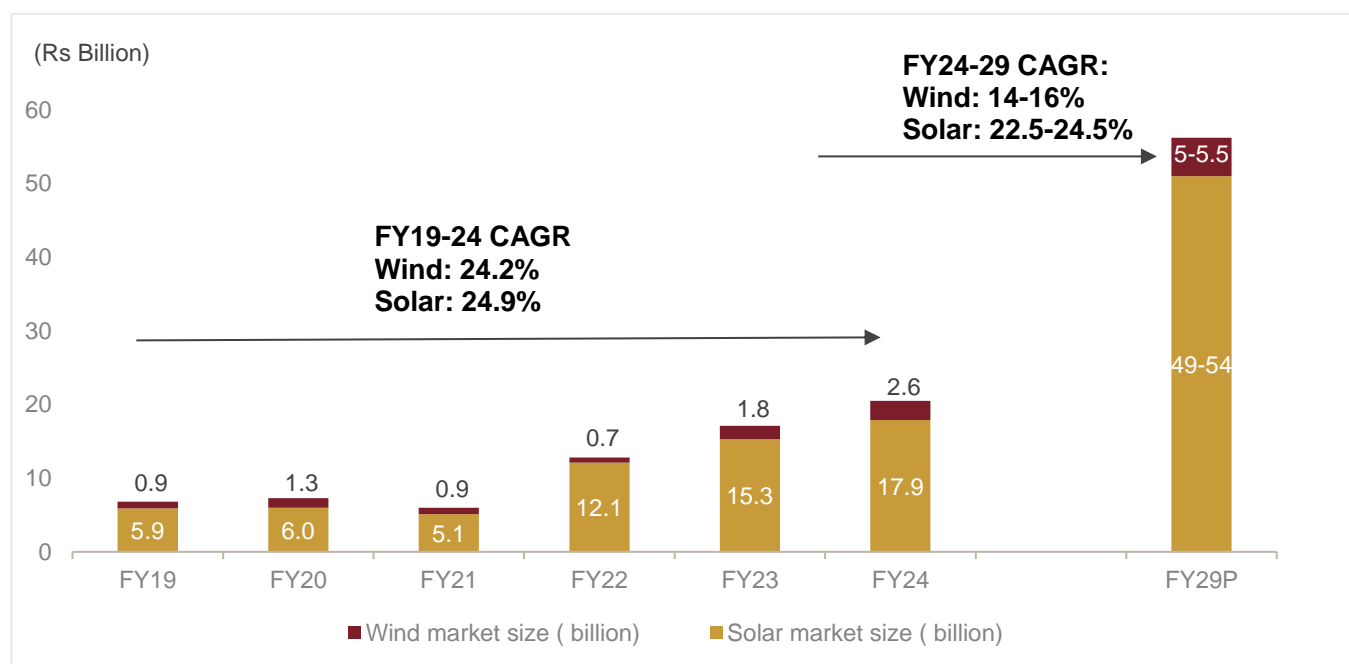
Demand for wires & cables expected to grow from renewables sector due to planned capacity expansions

The demand for wires and cables in the renewables sector, specifically in solar and wind applications, has experienced noteworthy growth in tandem with the global shift towards sustainable energy sources. Due to increased focus on renewable energy by corporate and government alike, the solar as well as wind industry are growing at remarkable pace.

Solar power transmission relies on essential components, with solar cables playing a crucial role. These specialized cables are engineered to withstand harsh weather, UV exposure, and high electrical loads, solar cables provide flexibility, durability, and reliability in advancing solar power system development and helps in connecting solar panels to the electrical grid, facilitating the widespread integration of solar power. The solar cables industry in India is propelled by factors including growing embrace of renewable energy, government initiatives and subsidies for solar projects, and an escalating awareness regarding the advantages of clean energy. Consequently, the market size of solar cables has risen from Rs 5.9 billion in FY19 to Rs 17.9 billion in FY24, and it is anticipated to reach approximately Rs 49-54 billion by FY29, reflecting a CAGR of approximately ~22.5-24.5% between FY24 and FY29.

Similar to solar energy, wind energy installations are growing in India. In the wind power sector, cables play a critical role in wind turbine installations as these are required to endure challenging environmental conditions, including exposure to wind, moisture, and temperature fluctuations. The demand for high-quality cables in wind energy projects arises from the need for reliable power transmission from the wind turbines to distribution networks and the overall market size of wind cables is expected to reach to Rs 5-5.5 billion in FY29 from Rs 2.6 billion in FY24, registering a CAGR of ~14-16%.

Market Size: Wind and Solar Cables



Source: IEEMA, CRISIL MI&A

4.2 Introduction to conductors

Conductors, such as all aluminium conducts (AAC), all alloy aluminium conductors (AAAC), aluminium conductors steel reinforced (ACSR), high ampacity conductors, AL-59 alloy conductors, High Performance Conductors (HPC) and High Temperature Low Sag (HTLS) are used as transmission and distribution lines to deliver bulk power from generating stations to the load centres and large industrial consumers. Bulk power transmission is generally done over bare, overhead conductors at voltage levels of 220 kV and above.

The Transmission system is to deliver bulk power from power stations to the load centres and large industrial consumers beyond the economical service range of the regular primary distribution lines whereas distribution system is to deliver power from power sector or substations to the various consumers.

Major types of Conductors

Conductor	Description
AAC – All Aluminium Conductors	The AAC conductors are used in low and high voltage overhead lines, majorly in urban areas where spans are usually short but high conductivity is required
ACSR – Aluminium Conductor Steel Reinforced	ACSR conductor is a high-capacity, high-strength stranded conductor typically used in overhead power lines due to its superior conductivity, low weight and low cost.
AAAC – All Aluminium Alloy Conductors	AAAC conductors are made from high strength Aluminium Magnesium-Silicon Alloy, designed to get better strength to weight ratio and offer improved electrical properties, excellent sag-tension characteristics and superior corrosion resistance when compared with ACSR.
OPGW- Optical Ground Wire/ Optical fibre composite overhead ground wire	OPGW is a type of cable/ wire used in transmission lines construction. Additionally, OPGW replacing earth wires expected to create backbone for intercountry high-capacity data transmission across all transmission network
High ampacity conductors	These conductors are designed to carry a large amount of current without significant voltage drop or overheating. They typically have larger cross-sectional area, which reduces resistance and allows to carry higher currents safely.
AL-59 alloy conductors	These are alloy conductors of Aluminium + Magnesium + Silica Alloy type. They have a conductivity of 59% and hence have less DC resistance and high current carrying capacity
HPC - High Performance conductors	High Performance Conductor (HPC) is stranded with combination of annealed aluminium or aluminium alloy wires for conductivity and reinforced by core wires. High Performance Conductors are capable of continuous operation at temperatures in excess of 150°C with stable electrical and mechanical properties
HTLS – High Temperature Low Sag Conductors	HTLS are made from Aluminium Conductor Alloy Reinforced (ACAR) or Aluminium Conductor Steel Reinforced (ACSR) which enhance their mechanical strength and thermal stability as these conductors are designed to operate at temperatures up to 250°C or higher making them ideal for high-voltage transmission lines

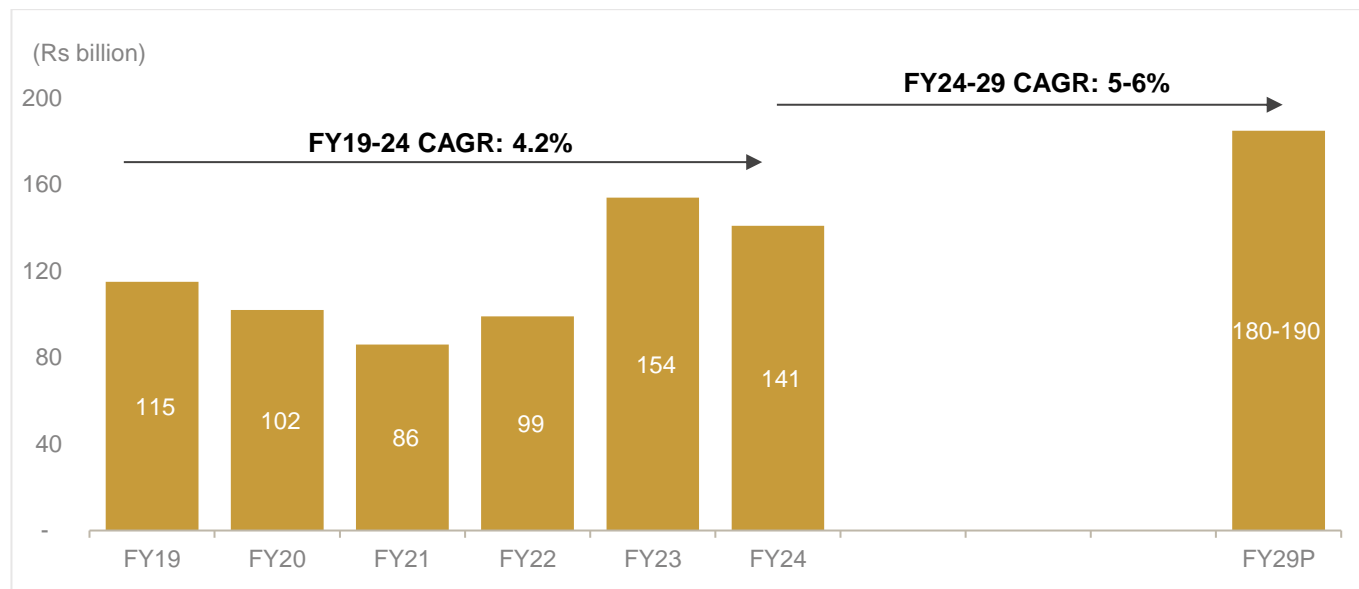
Source: CRISIL MI&A

Market size of conductors to reach ~Rs 180-190 billion by FY29

In FY24, total market size of conductors reached Rs 141 billion up from Rs 115 billion in FY19, registering a CAGR growth of 4.2%. Major factors influencing this demand includes railway electrification, healthy transmission line additions, etc.

Moving forward, CRISIL MI&A expects conductor industry to grow at a CAGR of ~5-6% from FY24-FY29 compared to CAGR of 4.2% between FY19-24 due to ongoing government schemes in power segment as well increased exports of conductors from India

Market size: Conductors



Source: IEEMA, CRISIL MI&A

Conductors' production stood at 385,108 MT in FY24

In FY23, conductors' production in India reached 3,93,424 MT. Newer technology conductors' entry in the market (high ampacity conductors and AL-59 conductors), drop in overall orders and the Covid-19 pandemic saw production of conductors drop between FY20-22.

Volumes recovered in FY23. Major factors contributing to this recovery included an overall upswing in exports, favourable government initiatives such as the REC and rural electrification initiatives fostering demand for conductors, and large planned capacity addition of renewable energy in the country, thereby providing an impetus to the growth of conductors' market in India. Additionally, infrastructure investments in Indian railways, Metros and High-speed rail are expected to grow exponentially, which will further boost the conductor industry.

However, in FY24, production volume of conductors tapered and stood at 385,108 MT due to an increase in the raw material costs towards the end of FY24.

Total production of conductors

Production	FY19	FY20	FY21	FY22	FY23	FY24	FY19-FY24 CAGR
Conductor volumes (in MT)	517,051	454,805	377,609	273,806	393,424	385,108	-5.7%

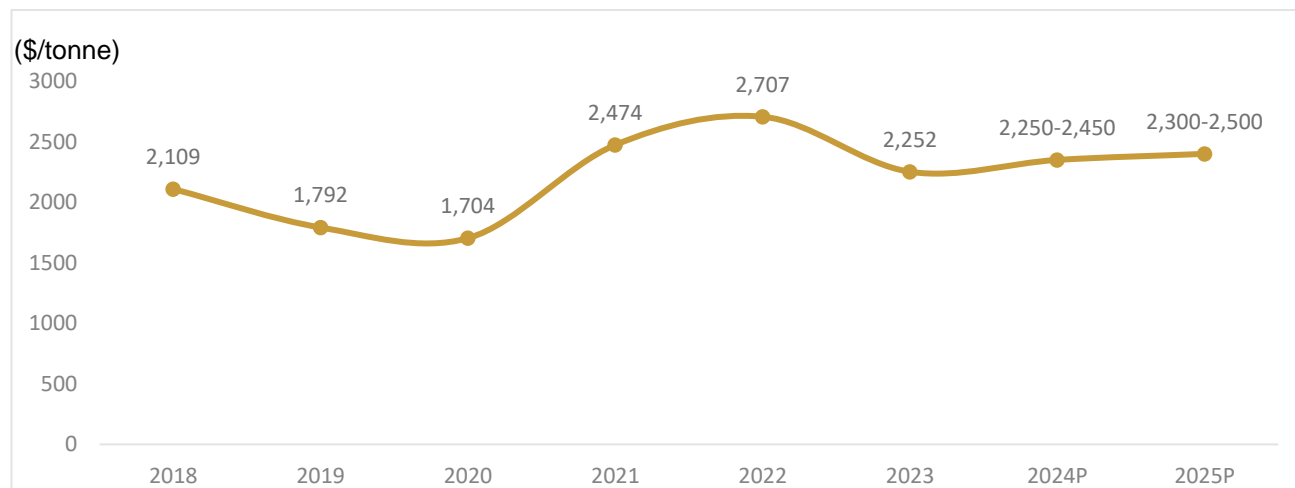
Source: IEEMA, CRISIL MI&A

One of the major raw material of conductors - Aluminium expected to see an increase in prices in CY24

Aluminium prices are expected to increase to \$2,250-2,300 per tonne in CY24. The market is expected to experience a marginal surplus of 100-200 KT in 2024 despite demand revival from major dormant consuming economies.

In CY25, prices are expected to remain rangebound with an upward bias at \$2,300–2,500 per tonne owing to demand driven by incremental renewable energy investments and electric vehicle penetration. However, the upside is expected to be limited owing to a healthy supply.

Aluminium prices (LME)



Source: LME, CRISIL MI&A

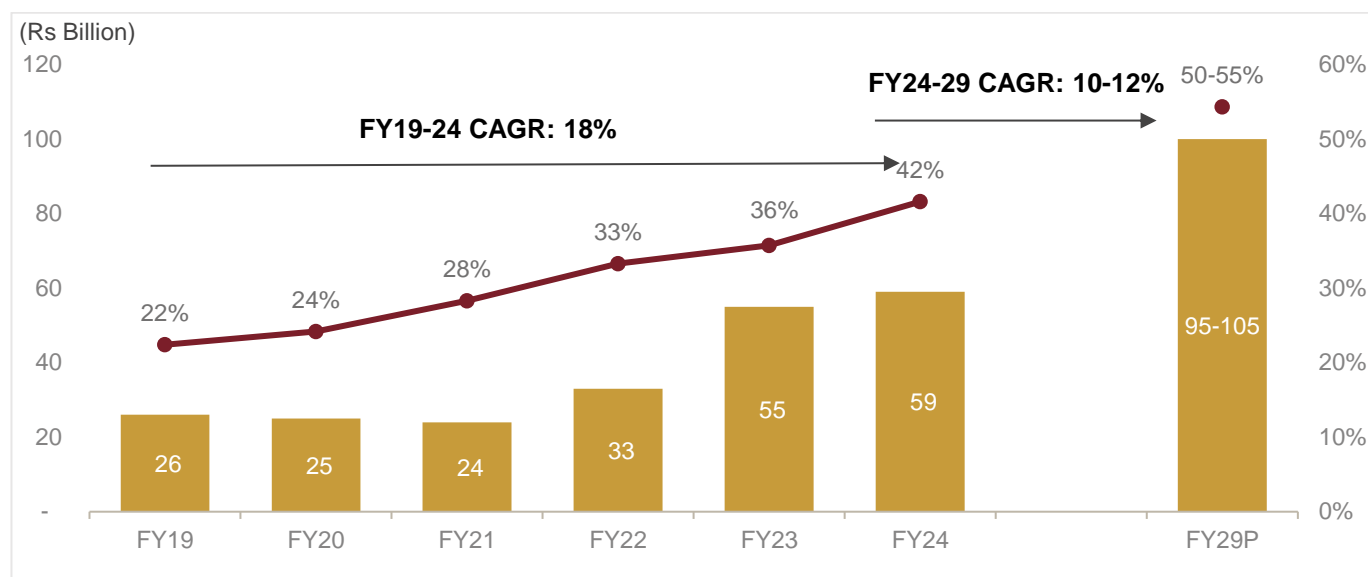
Conductors export grew at a CAGR of ~18% in value between FY19-24

The export demand of power conductors has grown at a CAGR of 18% between FY19-24 and reached Rs ~59 billion in FY24 from Rs 26 billion in FY19 due to increased international demand. Some of the key countries which exported conductors from India in FY24 includes USA, Australia, Iraq, Egypt, Finland, Bangladesh, Tanzania, Ghana, Cameroon, etc.

Additionally, moving forward, CRISIL MI&A expects share of exports in total market size to increase to 50-55% compared to ~42% in FY24 owing to a notable surge in the export of power conductors. Furthermore, multilateral organizations such as the World Bank and International Bank for Reconstruction and Development (IBRD), are actively involved in funding various power transmission projects in regions including Africa, Central Asia, South, and East Asia, which are further expected to boost the exports of power conductors.

Note: CRISIL MI&A has considered following HSN codes for the analysis of conductor's exports from India- 76042910, 76042920, 76042930, 76042990, 76141000, 76149000. These include hard drawn bare Aluminium conductors steel re-in forced, wire rods, stranded wires, cables with steel core, etc.

Export value of conductors



Source: Ministry of Commerce & Industry, CRISIL MI&A

Processes involved in the manufacturing of cables and conductors

The manufacturing of cables and conductors is a complex process that involves several stages, each crucial to ensuring the final product meets the required performance standards. It begins with the selection of raw materials, where copper, aluminium, or steel are typically used for conductors due to their excellent conductivity and mechanical properties. These metals are drawn into wires through a process called wire drawing, where the material is pulled through a series of dies to reduce its diameter. The wires are then insulated using materials such as PVC, polyethylene, or rubber, depending on the application's specific needs. Insulation is applied through extrusion, where the polymer material is heated and molded around the conductor. Afterwards the wires may undergo stranding, where multiple smaller wires are twisted together to form a larger, more flexible wire. In some cases, additional layers such as shields, or armouring are added for protection against physical damage or electromagnetic interference. The cables are then tested for electrical and mechanical properties, ensuring they can withstand the intended environmental condition, such as temperature fluctuations, moisture, and external stress.

Quality control measures such as inspection for defects like kinks or insulation gaps, are strictly adhered to, ensuring that the final product is durable, reliable and safe for use in various applications.

Key aspects involved in the manufacturing of cables and conductors

- **Raw material Availability** - Copper, aluminum, and their alloys are commonly used as conductors, with their purity being critical to achieving optimal conductivity. Insulating materials such as PVC, Polyethylene, or rubber, must meet specific criteria for durability, flexibility and thermal resistance. The availability, cost, and quality of these materials are pivotal to maintaining steady production and competitive pricing.
- **Design and Engineering** - The design process is central to meeting specific industry requirements. This involves determining cable types based on factors such as voltage capacity, flexibility and environmental exposure. Advanced computer aided design and simulation software are often used to optimize performance and efficiency
- **Workforce Expertise and Training** - A highly skilled workforce is essential for the operation of sophisticated machinery, troubleshooting production issues, and ensuring quality control. Continuous training is necessary to keep employees updated on the latest manufacturing technologies and safety standards.
- **Packaging and Distribution** - After production, cables are carefully wound onto drums or reels, labelled, and packaged for transport. Packaging must prevent damage to the product during the handling and transportation, particularly for long-distance shipments. Cables are often bundled or coiled in specific configurations to make them easier to store and deploy at the usage point

4.3 Key growth initiatives for power conductor and cables

Favourable government schemes and steps to address key issues to aid demand of cables and conductors

The government's effort to address key issues in the power sector, particularly in resolving supply bottlenecks affecting stressed assets are poised to increase the demand of power transmission equipment's like conductors as well as cables. Initiatives such as SHAKTI, stressed asset resolution, etc. are expected to increase the overall efficiency. Additionally, as these distressed assets are brought back to online and operational efficiencies restored, there may be additional requirements for upgrading and modernizing the transmission infrastructure which will involve deployment of transmission equipment like conductors and cables to ensure efficient and reliable power transmission across the grid.

Some of the schemes/policies expected to contribute to the power sector are mentioned in the table below.

Select government initiatives/ schemes related to power sector

Government initiatives	Description
Policies aimed at alleviating stress on account of non-availability of domestic coal	<p>The new coal allocation policy for the power sector, 2017-SHAKTI (Scheme for Harnessing and Allocating Koyala (Coal) Transparently in India) proposes to replace the old linkage allocation policy with more transparent bidding-based linkages. It segregates coal-based power plants in India in the following six categories and stipulates different mechanisms to provide fuel supply to plants not having FSAs/ coal linkages.</p> <p>While coal linkage rationalisation under the SHAKTI scheme did benefit several projects, and domestic supply also improved, the effect has been temporary or partial. The improvements would require a longer time to be implemented effectively. Having said that, a focused imported coal substitution drive by Coal India Limited has</p>

	improved coal supply all round to conventional power plants, especially in the pandemic year when off-take was lower.
Stressed asset resolution makes further headway as IBC resumes post-pandemic	<p>Large capacity additions without PPAs with discoms, lack of firm fuel supply and weak financials of discoms resulting in inability to pay generators, regulatory challenges, weak financials of promoters, and delays in project execution have led to a large part of the private sector generation capacity reeling under financial stress.</p> <p>Since the enactment of the Insolvency and Bankruptcy Code, 2016 (IBC), on May 28, 2016, stressed thermal power assets started seeing steady traction even as the law went through procedural amendments.</p>
Developments in transmission and distribution segment will support generation segment	India's inter-regional power transmission capacity is estimated to have increased from 17 GW in fiscal 2007 to 118 GW as of July 2024 and is further slated to increase. Strengthening and expanding the regional and intra-state grids, along with improved rural electrification, is also likely to ease the grid congestion issues and supply constraints, benefiting power generators

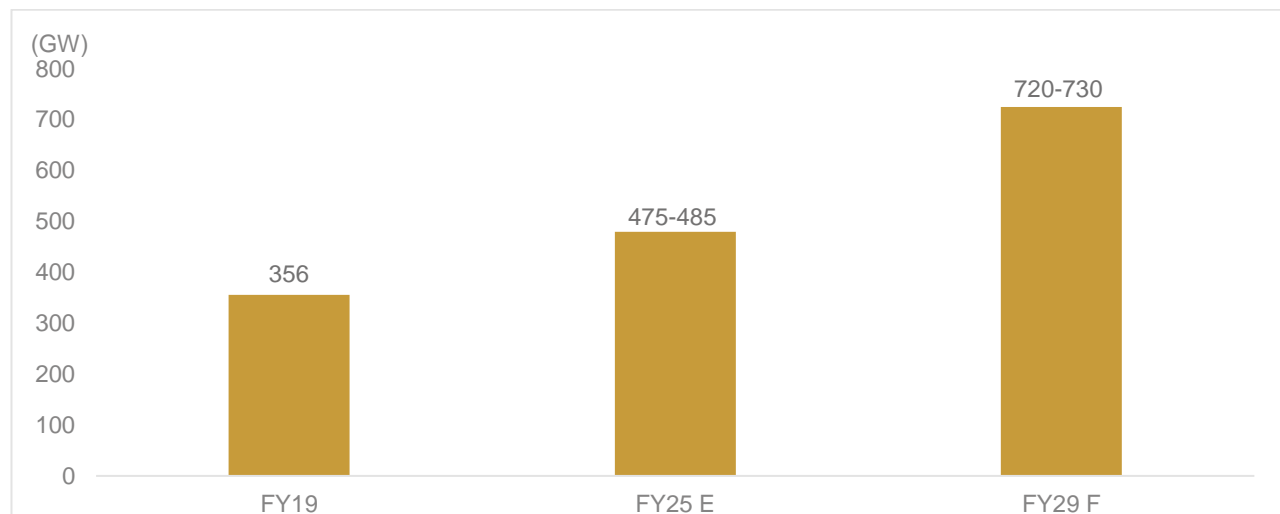
Source: CRISIL MI&A

India's power capacity expected to grow 1.5 times from FY25 to FY29 driven by renewable capacity additions

India's installed generation capacity, which stood at 356 GW at the end of FY19 is expected to reach ~475-485 GW in FY25 on the back of healthy renewable capacity additions (including solar, wind, hybrid, and other renewable sources, hydro, PSP and battery storage) even as additions in coal and other fuels have declined.

Going forward, renewable capacity is expected to surpass the 200 GW mark by fiscal 2026 on the back of strong renewable capacity additions over FY25-29. By FY29, RE capacity is expected to account for ~60% of the installed capacity of 720-730 GW. On the other hand, moderate coal-based capacity additions of 28.5-29.5 GW are expected to lower coal's share in India's installed capacity. Other fossil fuels (including lignite, gas, and diesel) are expected to remain stagnant due to negligible capacity addition. Inclusion of hydro and nuclear power in clean energy as compared with coal plants is expected to provide a fillip to non-fossil capacity (RE, nuclear, hydro and storage), taking it to 450-455 GW by FY29, constituting a staggering 60-65% share in installed capacity. Growing need for energy storage systems is expected to drive the capacity additions of PSP and BESS over the next 5 years.

Installed capacity in India (GW)



Source: CRISIL MI&A

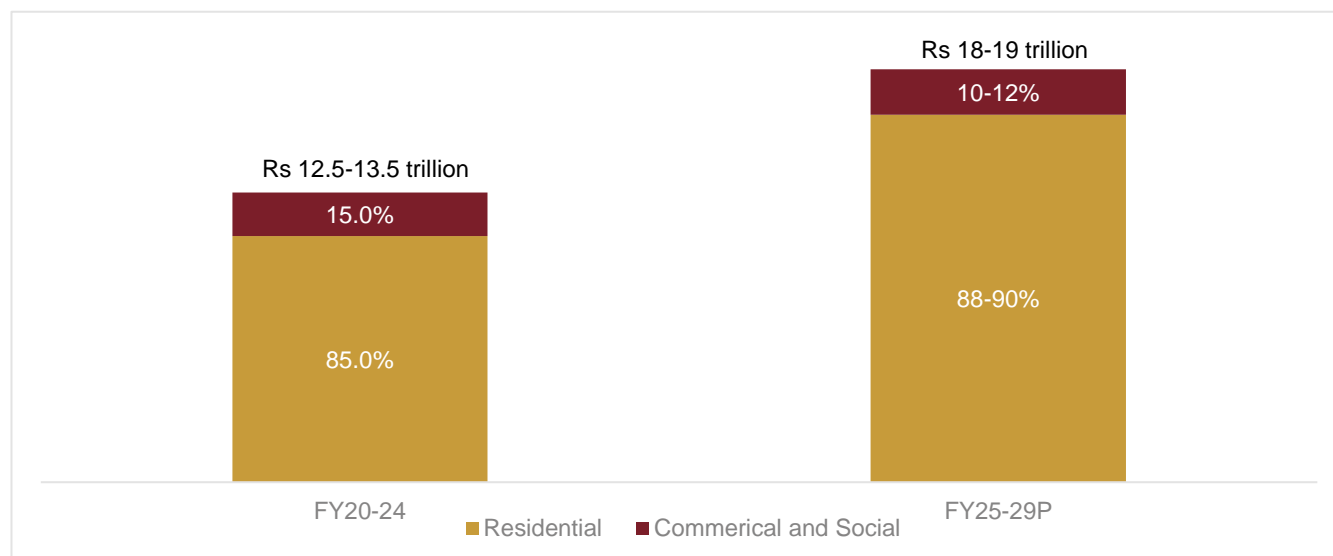
Additionally, India's total electricity generation capacity has reached 452.69 GW, with renewable energy contributing a significant portion of the overall power mix. As of October 2024, renewable energy-based electricity generation capacity stands at 201.45 GW, accounting for 46.3 percent of the country's total installed capacity. This marks a major shift in India's energy landscape, reflecting the country's growing reliance on cleaner, non-fossil fuel-based energy sources. Moving forward, share of renewable energy is expected to increase further due to increased capacity additions in renewable energy space as well as favourable government initiatives.

Such multi fold generation expansion plans also require upgradation in the transmission sector because grid-connected solar and wind plants are usually located in far-flung areas which have limited transmission infrastructure. Extensive transmission and cable infrastructure transmit power from remote generation sites to consumption centres. This in turn is expected to drive the demand of cables and conductors.

Growing demand of cables and wires from building segment

CRISIL MI&A estimates the construction capex in the building and construction sector to grow from ₹12.5-13.5 trillion between Fiscal 2020- 2024 to ₹18-19 trillion between Fiscal 2025-2029, resulting in growth of approximately 1.4x times. The growing demand for residential and commercial spaces will necessitate increased demand for cables, which is expected to provide an additional boost to the overall cable industry. Additionally, the emergence of data centres and cloud computing also presents promising opportunities for growth and development within the cable sector.

Total construction spends in building segment



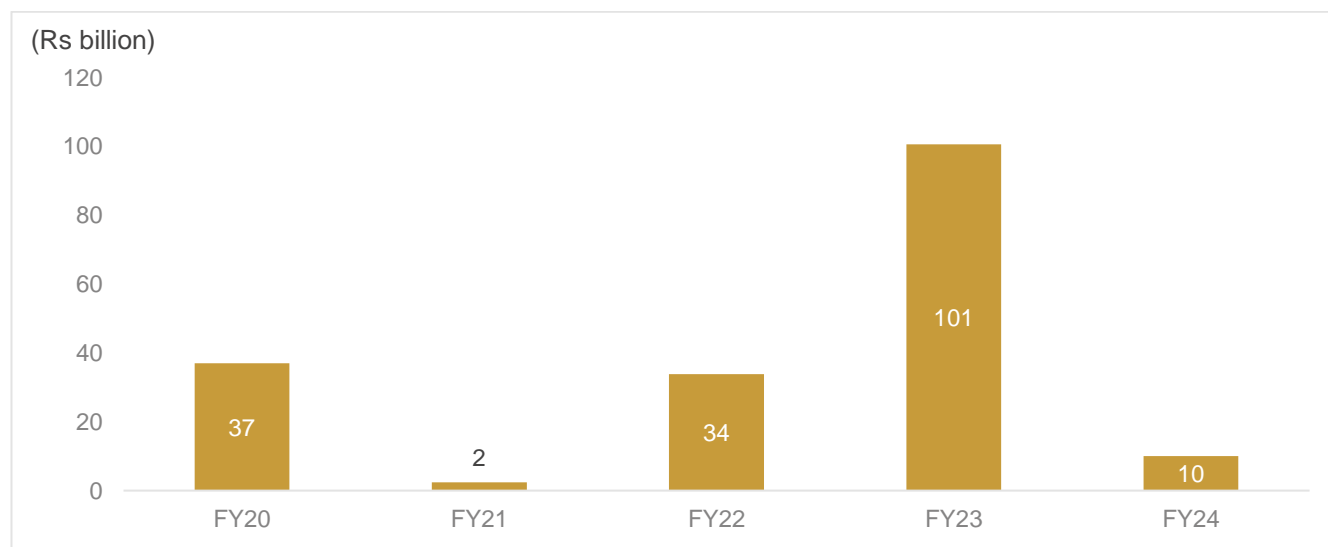
Note: P-Projected

Source: CRISIL MI&A

Growth in investments from Power Grid Corporation of India Ltd to aid demand of cables and conductors

Power Grid Corporation of India Limited (PGCIL) has approved total cumulative investments of ~Rs 184 billion between FY20-24 primarily on system strengthening and renewable energy, which is expected to drive demand for conductors and cables.

Major PGCIL investment approvals for FY20-24



Note: FY22 numbers does not include investments related to Inter-connection with neighbouring countries worth Rs 1,793 million

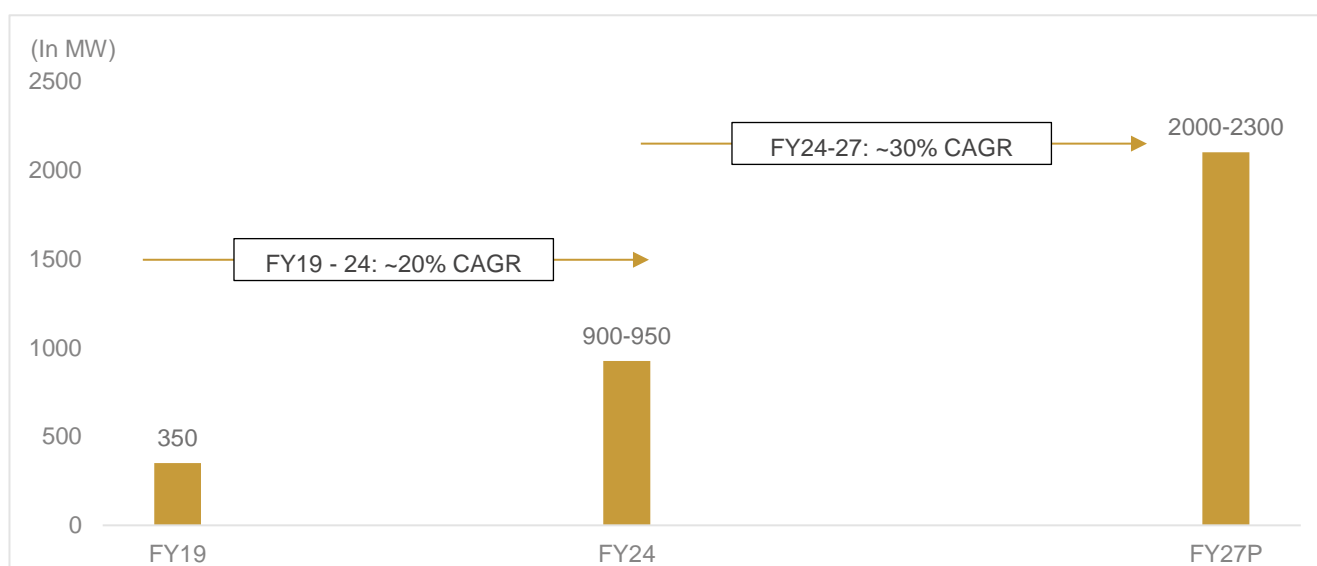
Source: PGCIL, CRISIL

Growing Indian data centre industry expected to boost demand of cables and conductors

From fiscal 2019 to fiscal 2024, the Indian data centre industry has seen a growth at CAGR of ~20% in terms of capacity. This growth can be attributed to factors such as growth in internet accessibility, surge in e-commerce adoption, rise in digital adoption, remote working, rise in OTT (over-the-top) consumption, etc.

Going forward, the industry is expected to witness a CAGR of ~30% between fiscal 2024 and 2027, crossing 2 GW in terms of installed capacity. The growth is enabled by increasing consumption of data, 5G rollouts across India as well as advancement in technologies such as IoT, Big data, Artificial intelligence and Machine Learning. This emergence of data centres and cloud computing is expected to present promising opportunities for growth and development within the cable sector.

Data centre industry in India (installed capacity)



Note: P: Projected,

"Capacity" refers to the data centre load that is consumed or is dedicated to IT equipment such as servers, storage equipment, communications switches, routers. Power for lighting or cooling the data centre is excluded from IT power. Further, the capacity mentioned in the above chart pertains to third party data centre only.

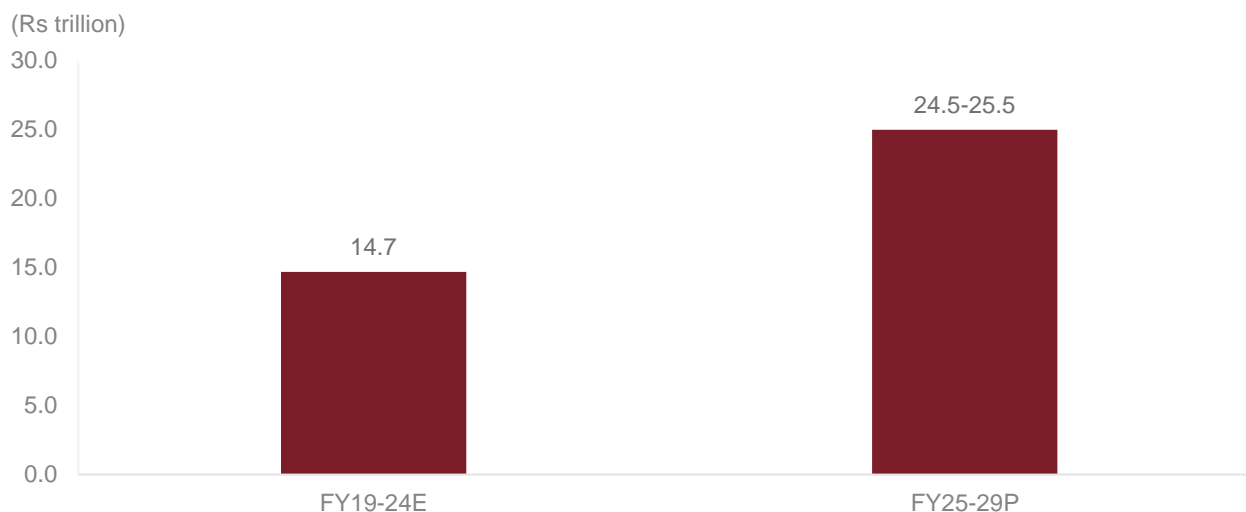
Source: Industry, company reports, CRISIL MI&A

Investments in power sector expected to increase moving forward

CRISIL MI&A expects investments in the power sector to grow 1.7 times increasing, from Rs 14.7 trillion from fiscal 2019 to fiscal 2024, to Rs 24.5 – 25.5 trillion during fiscal 2025 to 2029. In the power sector, the generation segment drives investments with capacity additions aimed at clean energy, followed by distribution investments due to the Revamped Distribution Sector Scheme (RDSS) scheme and transmission investments.

Over the next four fiscals, between fiscal 2025 to 2029, investments in a generation will be led by renewable energy capacity additions, followed by investments in conventional generation and flue gas desulfurization (FGD) installations, indicating a shift in investment flow towards enhancing clean energy supply. Further, investments in new coal-based plants to meet the fast-growing peak load demand and increased installation of emission-controlling FGD equipment in thermal stations, will further bolster the investments. This increased investments in power sector, including transmission sector is estimated to positively impact the demand for cables as well as conductors.

Overall investments in Indian power sector



Increased renewable energy (RE) capacity addition

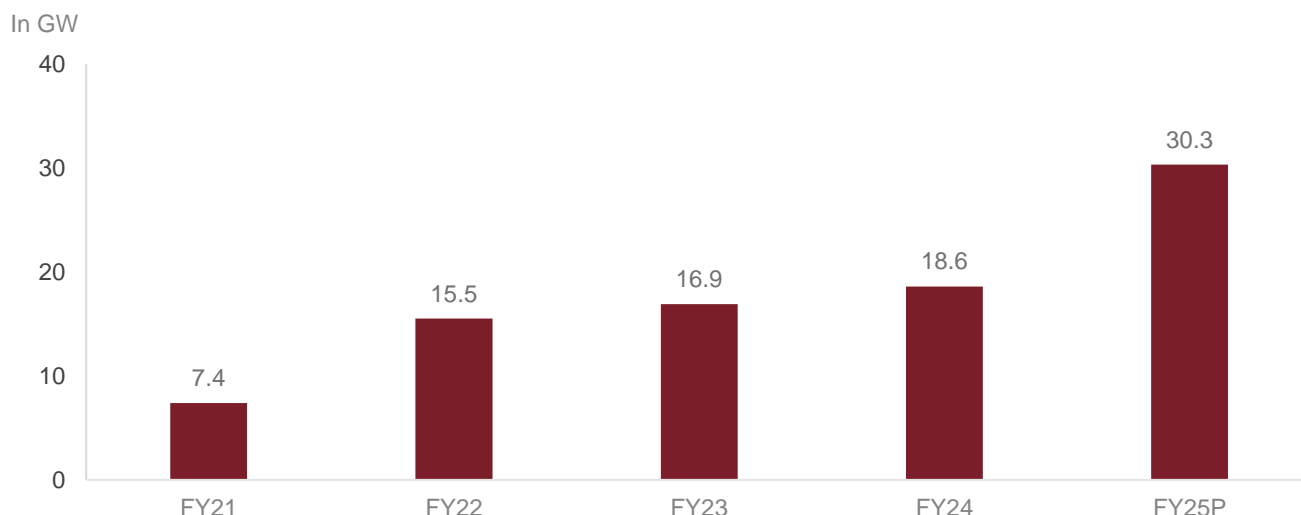
The global shift to renewable energy sources, including wind and hydro energy are expected to positively impact the demand on the specialty cables including photovoltaic cables, submersible cables, umbilical cables, that are used in renewable energy systems like solar energy, hydro energy and wind energy.

Robust capacity additions of 90-97 GW in renewables (primarily solar and wind energy) are expected over FY23-27, as compared with ~53 GW in the previous five years, and is expected to offset stagnant demand on the conventional side as India aims to reach 50% of cumulative electric power installed capacity from renewable sources with 45% reduction in emissions intensity of its GDP by 2030 and to achieve net zero emissions by 2070. Solar installed capacity and wind installed capacity in India are expected to grow by 200 GW and 55 GW respectively from 2024 to 2030.

Additionally, the Government of India has implemented a range of measures and initiatives aimed at promoting and accelerating renewable energy capacity across the nation, with an ambitious target of achieving 500 GW of installed electric capacity from non-fossil sources by 2030. Key programs include the National Green Hydrogen Mission, PM-KUSUM, PM Surya Ghar, and PLI schemes for solar PV modules.

Such multi fold generation expansion plans also require large-scale development in the transmission sector because grid-connected solar and wind plants are usually located in far-flung areas which have limited transmission infrastructure. Extensive transmission and cable infrastructure transmit power from remote generation sites to consumption centres. This in turn is expected to drive the demand of cables and conductors.

Renewable energy capacity additions



Source: CRISIL MI&A

Solar power and wind power accounted for ~89% of the renewable energy capacities as of FY24

As of FY24, solar power and wind power dominated the renewable energy capacity accounting for close to 89% of the total renewable energy capacity with solar power having a capacity of 81,813.60 MW and wind power having a capacity of 45,886.51MW. Small hydro power and bio-power accounted for the remaining ~11% of the renewable energy capacity having capacities of 5,003.25MW and 10,941.15MW respectively.

Breakup of renewable energy sources (FY24) in MW

Small Hydro Power	Wind Power	Capacity		Solar Power [^]	Total Capacity
		Biomass Power/Cogen	Waste to Energy*		
5,003.25	45,886.51	10,355.35	585.80	81,813.60	143,644.51

Note:

*Includes Waste to Energy and Waste to Energy (Off-grid)

[^]Includes Ground Mounted Solar, Rooftop Solar, Hybrid Solar Comp. and Off-grid Solar/ KUSUM

Source: CEA, CRISIL MI&A

Growing focus on floating solar projects

Floating solar projects, also known as floating photovoltaic are solar power installations mounted on floating structures on water bodies such as lakes, reservoirs, ponds, rivers, coastal areas etc. floating solar has a number of advantages over conventional solar plants such as it does not require additional land acquisition and can be installed in densely populated areas, Floating solar not only utilizes the unused water surface but also enhances the efficiency of the solar panels by cooling it, thereby reducing losses from evaporation and conserving water.

As focus shifts towards Floating solar projects, the demand for cables used in this industry is also expected to see an uptick, Floating solar projects mainly uses rubber cables as the wires must withstand harsh environmental conditions such as inclement weather, corrosion and cold environments. Additionally, the cables must also be mechanically strong, torsion resistant, UV resistant and abrasion resistant.

As per world bank, India boasts potential capacities of 280-300 GW in floating solar power. However, only a small fraction of it has been installed in states such as West Bengal, Kerala, Andhra Pradesh, Madhya Pradesh, Kerala, Bihar, Telangana and Rajasthan.

Some of the floating solar projects in India are:

Plant	Capacity	Description
NTPC Ramagundam Floating Solar PV Park, Telangana	100MW	Spread over an area of 600 acres, the project generates 223,000 MWh electricity every year
NTPC Kayamkulam Floating Solar Power Plant, Kerala	92MW	Spread across a 350-acre water body, the project generates 167,150 MWh electricity every year
NTPC Simhadri Floating Solar PV project	25MW	Spread over an area of 150 acres, the project power 7,000 households

Source: CRISIL MI&A

Growing shift towards high temperature low sag (HTLS) conductors

CRISIL MI&A expects a pickup in demand for high-voltage conductors, given increasing focus on adding transmission lines of higher voltage levels, for evacuation of bulk power. Also, the importance of high-voltage (HV) lines of 400 kV and 765 kV in the intra-state transmission network is also increasing, as higher voltage level enhances power density, reduces losses and efficiently delivers bulk power. In addition to increase in voltage levels, high efficiency conductors (the one which can carry more current compared to conventional conductor) will also see increased usage. Moreover, it reduces requirement of right-of-way, a key challenge facing the transmission sector. Consequently, the increasing thrust on high-voltage transmission lines will stimulate demand for high-voltage power conductors going ahead. Also, as electric consumption in urban areas goes higher, there is a need for higher ampacity transmission lines through limited ROW-HTLS conductors and reconducting turnkey solutions.

Green Energy Corridor to drive growth at high voltage level

The Green Energy Corridor (GEC) is dedicated infrastructure created to transmit power from renewable energy (RE) sources in states with high RE potential. Eight RE-rich states, namely Andhra Pradesh, Gujarat, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, and Tamil Nadu, submitted proposals for establishing infrastructure known as InST. In 2015-16, the Ministry of New and Renewable Energy (MNRE) sanctioned the GEC phase I project, which comprised inter and intra-state components.

The intra-state component of the GEC involved the implementation by the eight RE-rich states mentioned earlier. The plan aimed to complete approximately 9,700 circuit kilometres of transmission lines and substations with a total capacity of 22,600 MVA. This infrastructure was designed to evacuate over 20,000 MW of large-scale renewable power and enhance the grid in the participating states. The state transmission utilities (STUs) are responsible for implementing the project within their respective states. As of July 2023, progress on the intra-state component includes the installation of around 8,940 circuit kilometres of transmission lines and substations with a capacity of 21,293 MVA.

Power sector to witness incremental power demand from railway electrification

Indian Railways, to reduce fuel costs and lower its carbon footprint, has prioritized railway electrification projects along with upgradation for higher speed trains.

Indian Railways (IR) is one of the world's largest rail networks. As of 1st March 2024, Broad Gauge (BR) constitutes 65,775 rkms which accounts for 95% of the total rail route. As of March 2024, electrification on Indian Railways has been extended to 62,119 rkms out of the total broad gauge of 65,775 rkms. This constitutes more than 94% of the total BG Railway Network. In a bid to become net zero emitter by 2030 the government aims to achieve 100% electrification of Indian Railways by December 2023, however delayed electrification works due to pandemic induced lockdown coupled with sluggish pace of electrification. CRISIL expect that 100% electrification will be achieved by FY25.

This is expected to lead to an incremental power demand of approximately 23 BUs on an average every year between FY25-29, also driven by new track laying by the IR which is already electrified. Ministry of Railways has been allocated a capital outlay of Rs 2.52 trillion in the Union Budget 2024-25, which is expected to provide impetus to the sector in terms of creation of new lines, doubling existing lines and electrification of existing lines.

Overall, these electrification efforts will translate into additional demand for electrical transmission and distribution equipment, including conductors in the medium term.

Railway electrification

Running Track kms--	FY20	FY21	FY22	FY23
Electrified	67,452	74,534	82,654	92,358
Total	99,235	100,866	102,831	106,493
Electrification achieved	68%	74%	80%	87%

Note:

Railway electrification calculated using the following formula- (Electrified running track kms)/ (Total running track kms)

Source: Indian Railways, CRISIL MI&A

Inter-State Transmission System (ISTS) network expansion to drive growth for transmission line and transformation capacity

The demand for power equipment will be further driven by the central government has set a target of adding 27,000 circuit kilometres of transmission lines by fiscal year 2025, a target set at the start of fiscal 2024, which will entail an estimated investment of Rs 750 billion. Additionally, PGCIL's planned transmission system strengthening schemes will support the demand for power transformers. Moreover, several system strengthening projects have been approved by PGCIL, particularly in the Southern, North-Eastern, and Eastern regions, as well as in the newly created union territory (UT) of Ladakh, which will contribute to domestic demand.

ISTS network expansion rolling plans released by CTU (Central Transmission Utility), envisages addition of more than 46,000 ckm of new transmission lines and ~4,35,00 MVA transformation capacity by fiscal 2025-29. CTU estimates these additions will entail an investment of Rs 2.9 trillion over fiscal 2025-29.

Gradual transition to electric vehicles to increase the demand for charging infrastructure

The Government of India is focusing on building charging infrastructure and creating a conducive policy environment for faster adoption of electric vehicles (EVs) so as to reduce dependence on fossil fuels for transportation. India aims to increase the share of EVs in overall car population to 30% by 2030. Under the National Electric Mobility Mission plan, the government envisages to promote EV adoption through demand-side incentives, in terms of subsidies, promoting charging infrastructure, and encouraging research and development in battery technology, power electronics, battery management and system integration, etc.

This is to be supported by expansion of charging infrastructure across major cities as well as concomitant growth in distribution infrastructure, in addition to an appropriate tariff structure for charging of EVs. As a result, EV charging

demand is likely to aid power demand over the medium term, with gradual increase in share of EVs in the vehicle population.

This transition to EV will increase the demand for charging infrastructure, which in turn is estimated to positively impact the demand for cables and conductors.

4.4 Overview of power transmission and distribution in India

Power transmission and distribution forms the backbone of India's energy sector, ensuring electricity reaches urban and rural consumers. The transmission system operates at high voltages and is managed by corporations which oversees the interstate network. India's grid is divided into five regional zones-Northern, Eastern, Western, Southern and North-Eastern, all unified into a single national grid ensuring efficient power flow and resource sharing. Distribution, handled by state electricity boards (SEBs) and private companies focusses on delivering electricity to end consumers. Below are the key pointers related to power transmission and distribution aiding demand growth of cables and conductors.

Investments in the transmission and distribution sector to boost demand for cables and wires

RE evacuation, ISTS network expansion and upgradation to boost investment in transmission

To service a large generation installed base, the estimated investment in the transmission sector is expected to cumulatively reach Rs 2.5-3.5 trillion over fiscals 2025-29. Investments in the sector are expected to be driven by the need for a robust and reliable transmission system to support continued generation additions and the strong push to the renewable energy sector as well as rural electrification. Also, strong execution capability coupled with healthy financials of PGCIL will drive investments.

Outlook on transmission segment investments (Fiscals 2019-24 vs 2025-29)



Note: E: Estimated, P: Projected

Source: CRISIL MI&A

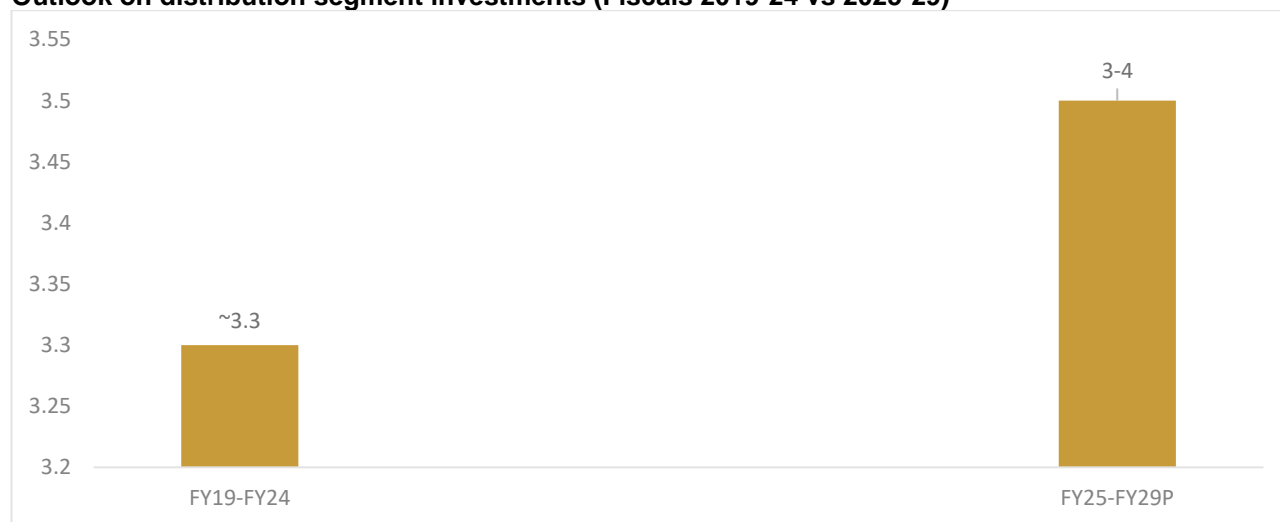
Distribution investments to be aided by Revamped Distribution Sector Scheme (RDSS) spending

In the Union Budget 2021-22, the government announced the Revamped Distribution Sector Scheme worth Rs 3.04 trillion for state discoms, to be allocated over the next five years. Rs 2.52 trillion worth of DPRs have been sanctioned by nodal agencies (PFC and REC) as of December 2023. While the amount is sanctioned, disbursement under the

scheme will be contingent upon work undertaken that was proposed under DPR. Fulfilment of the conditions, which primarily involve operational efficiency parameters, strengthening of distribution infrastructure, and regulatory compliance, will entail significant investments in the distribution segment.

The distribution segment is expected to attract investments worth Rs 3-4 trillion over fiscals 2025 to 2029 vis-à-vis ~Rs 3.3 trillion between fiscal 2019-2024 led by the government's thrust on the Revamped Distribution Sector Scheme, improving access to electricity and providing 24x7 power to all.

Outlook on distribution segment investments (Fiscals 2019-24 vs 2025-29)



Note: E: Estimated, P: Projected

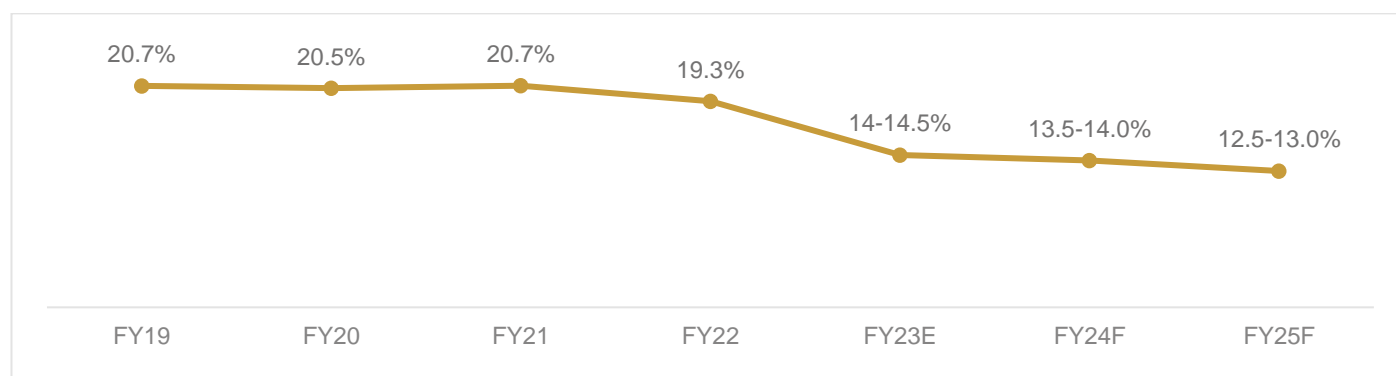
Source: CEA, CRISIL MI&A

Transmission & distribution (T&D) losses have been on a declining trajectory, to reduce further led by a host of infrastructural measures

The government has undertaken several initiatives to lessen the loss of Power Distribution Companies (DISCOMs) namely Revamped Distribution Sector Scheme which is a reform based and results linked scheme with the objective of improving the quality and reliability of power supply to consumers through a financially sustainable and operationally efficient distribution Sector. The scheme aims to reduce the AT&C losses to pan-India levels of 12-15%.

Reduction of AT&C losses will require upgrade of the transmission and the distribution infrastructure, which will boost the demand of transmission and distribution equipment including conductors and cables.

T&D losses India



Source: CEA, CRISIL MI&A

Increased transmission line additions

The transmission segment plays a key role in transmitting power continuously to various distribution entities across the country. The transmission sector needs concomitant capacity addition, in line with generation capacity addition, in order to enable seamless flow of power.

Robust generation capacity addition over the years and government's focus on 100% rural electrification through last mile connectivity has led to extensive expansion of the transmission and distribution (T&D) system across the country. The total length of domestic transmission lines rose from 413,407 circuit kilometers (ckm) in FY19 to 485,544 ckm in FY24.

Furthermore, the Government of India has implemented Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY) and Integrated Power Development (IPDS) schemes to achieve the objective of providing uninterrupted power supply by strengthening the sub-transmission and distribution network. The Government of India has also implemented the Pradhan Mantri Sahaj Bijli Har Ghar Yojana- (SAUBHAGYA) with the objective to achieve universal household electrification for providing electricity connection to all willing un-electrified household in rural area and all willing poor household in urban areas in the country. Under these schemes, 18,374 villages have been electrified and 2.86 crore household were provided electricity connection. As a result, 100% villages have been electrified. Besides this, 2927 new substations have been added, upgradation of 3,965 existing sub stations has been carried out and 8.5 Lac circuit kms of HT and LT lines have been added/upgraded. As a result of these measures, the availability of power in rural areas has increased from 12.5 hours in 2015 to 21.9 hours in 2024. The availability of power in urban areas is 23.4 hours

The ongoing additions and upgradations in the power infrastructure space will play a vital role in boosting the demand of transmission and distribution equipment, including power cables and conductors as these would be needed to efficiently transmit electricity from these new power generation sources to distribution points.

Power transmission lines (220 kv and above)



Source: CEA, CRISIL MI&A

Entry of private players in transmission & distribution space

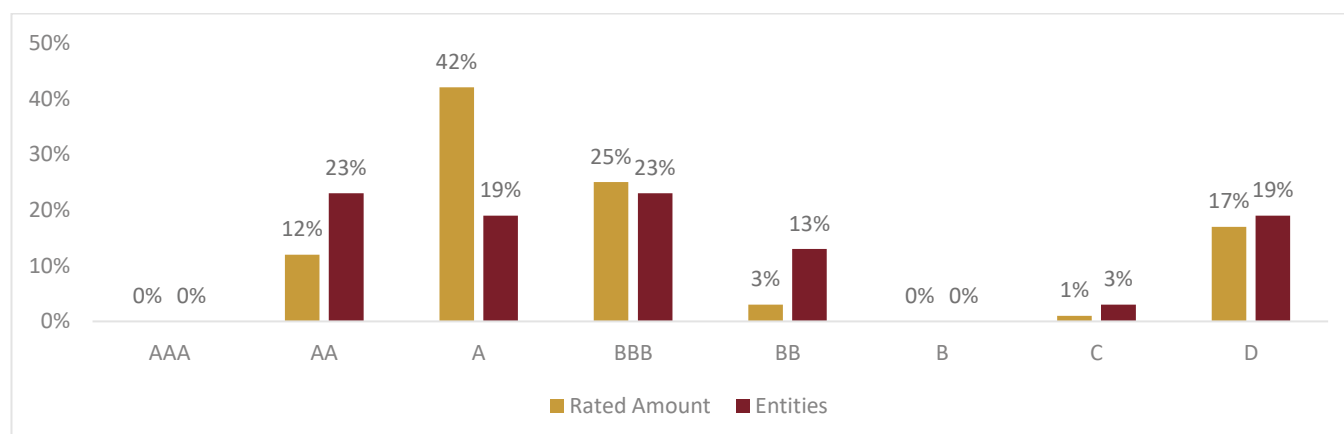
At present, private sector participation in the T&D space is low. However, with the introduction of tariff based competitive bidding (TBCB) and viability gap funding schemes for intra-state projects, the share of private sector players in the power transmission sector is expected to increase gradually over the long term. This move is

purportedly to shift burden from PGCIL and increase private sector participation in the sector, though PGCIL is also allowed to bid for the same. With increased awarding of projects under TBCB in the future, private participants are expected to play a key role in driving domestic power demand, thereby positively impacting the demand of cables including transmission and power cables.

Privatization of discoms to bring about distribution sector expansion

The privatization of power distribution companies (discoms) in India is viewed as a critical reform to address the long-standing issues in the power sector, including inefficiency, financial losses and poor service delivery. Various state power utility companies in India have suffered high indebtedness and bad credit history.

Debt rating of power distribution entities



Note: Rated universe consists of 31 rated entities in the power industry with total amount of Rs. 1,503 bn. as of 1st August 2024
Source: CRISIL MI&A

The analysis of 31 rated entities in the power distribution sector, with a total debt of Rs. 1,503 billion as of August 1, 2024, reveals a clear picture on the debt position of the discoms. The financial distress is evident in the lesser rated category with D-rating which indicates default accounting for 17% of the debt and 19% of the entities.

By allowing private players to take over the distribution of electricity, the policy aims to introduce more competitive practices, better management, and technological innovation. Private entities typically have better access to capital, which can drive the modernization of infrastructure, reduce transmission and distribution losses, and improve customer service. This influx of private investment is expected to foster massive expansion in the of the power distribution sector by accelerating grid development, enhancing rural electrification, and supporting the growth of smart meters and automation technologies. Successful examples like Delhi's privatized discoms- Tata Power Delhi Distribution Ltd. (TPDDL), BSES Rajdhani, and BSES Yamuna- highlight the potential of this policy, as these companies have significantly reduced aggregate technical and commercial (AT&C) losses while improving service quality.

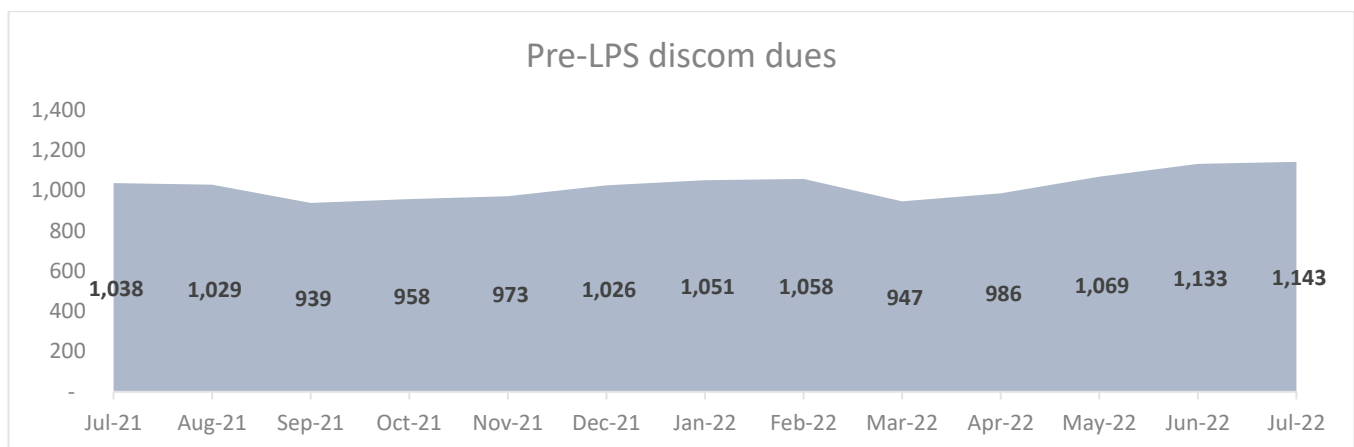
The increased efficiency of privatized discoms can result in more reliable power supply, thereby boosting industrial productivity, and meeting the growing demand for electricity across urban and rural areas. Moreover, the privatization initiative aligns with India's broader goals of energy transition, helping to integrate renewable energy sources into the grid while ensuring a stable and sustainable energy supply. Over time, such reforms are poised to attract significant private sector investments, reduce the burden on government subsidies, and create a more resilient and consumer-oriented distribution system.

Late Payment Surcharge (LPS) rules a wakeup call for errant discoms

The Ministry of Power (MoP) introduced Late Payment Surcharge (LPS) Rules on June 3, 2022 to tackle the problem of non-payment of generator dues by power distribution companies (discoms). The rules enable Power System Operation Corporation Limited (POSOCO) to penalise discoms for non-payment of both current dues and overdues by blocking of their access to the short-term energy market. These rules were formulated to prevent a looming power crisis in the country.

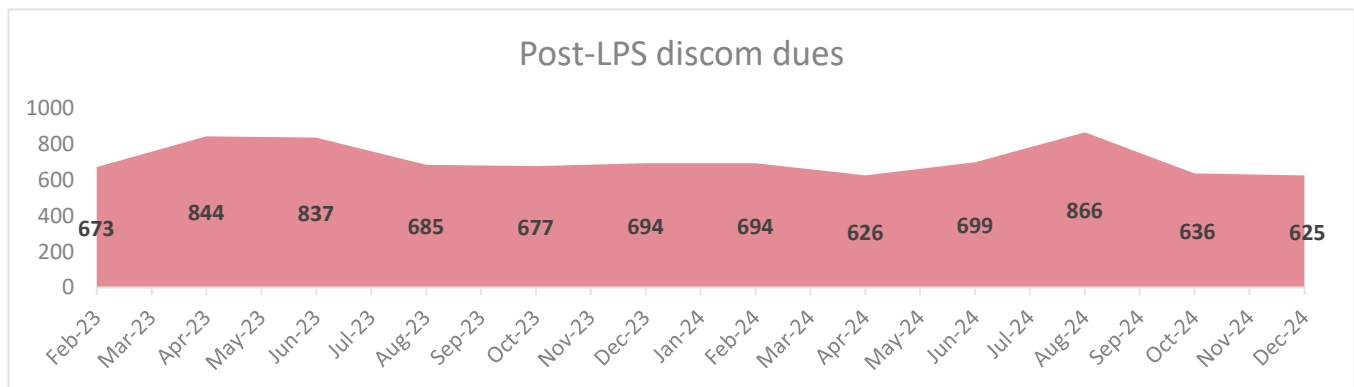
Overdues of discoms after introduction of LPS rules have declined from Rs 1,133 billion in June 2022 to Rs 625 billion in December 2024.

Discom outstanding dues to gencos pre LPS (Rs. billion)



Source: PRAAPTI, CRISIL MI&A

Discom outstanding dues to gencos post LPS (Rs. billion)



Source: PRAAPTI, CRISIL MI&A

Overview of smart meters

Smart meters are advanced devices designed to measure electricity, water or gas consumption with precision while enabling two-way communication, allowing real-time data transfers between consumers and utility providers. Unlike traditional meters, smart meters automate the measurement and reporting processes, eliminating manual readings and ensuring accurate billing. Utility providers benefit greatly from improved operational efficiency, better demand management, and enhanced infrastructure monitoring.

Electricity smart meters are at the forefront of modernizing energy management systems. They not only measure electricity usage in real time but also facilitate dynamic pricing models like time-of-use tariffs. Enabling consumers to adjust their consumption based on fluctuating energy costs. For utility providers, electricity smart meters improve grid reliability by supporting load balancing, detecting outages, and enhancing the integration of renewable energy sources such as solar and wind. Additionally, they provide valuable data for optimizing energy distribution, reducing waste, and minimizing carbon emissions.

In the Union Budget FY22, the government announced the Revamped Distribution Sector Scheme worth Rs 3.04 trillion for state discoms, to be allocated over the next five years. Rs 2.52 trillion worth of detailed project reports (DPRs) have been sanctioned by nodal agencies (PFC and REC) as of December 2023. While the amount is sanctioned, disbursement under the scheme will be contingent upon work undertaken that was proposed under DPR. Fulfilment of the conditions, which primarily involve operational efficiency parameters, strengthening of distribution infrastructure, and regulatory compliance, will entail significant investments in the distribution segment.

Statewise allocation for loss reduction and smart metering under RDS (as per FY22 budget)

State	Smart meter (Rs. billion)	Loss Reduction (Rs. billion)
Andaman & Nicobar Islands	0.54	4.52
Andhra Pradesh	41.28	92.93
Arunachal Pradesh	1.84	9.23
Assam	40.50	26.09
Bihar	20.21	70.81
Chhattisgarh	41.05	35.98
Delhi	0.12	3.24
Goa	4.69	2.47
Gujarat	106.42	60.21
Haryana	0	31.58
Himachal Pradesh	17.88	22.81
Jammu & Kashmir	10.64	46.36
Jharkhand	8.58	32.62
Kerala	82.31	23.47
Ladakh	0	8.76
Madhya Pradesh	87.69	94.03
Maharashtra	152.15	141.58
Manipur	1.21	4.01
Meghalaya	3.1	7.96
Mizoram	1.82	2.37
Nagaland	2.08	3.91
Puducherry	2.51	0.84
Punjab	57.69	38.73

State	Smart meter (Rs. billion)	Loss Reduction (Rs. billion)
Rajasthan	97.15	93.71
Sikkim	0.97	3.98
Tamil Nadu	192.35	90.66
Tripura	3.19	4.85
Uttar Pradesh	189.56	170.90
Uttarakhand	10.51	16.83
West Bengal	126.70	72.23
Total	1,304.74	1,217.78

Source: PIB, CRISIL MI&A

Smart meters to enhance demand for wires and cables

The adoption of smart meters is driving an increased demand for wires and cables due to the need for robust infrastructure to support their operation. Smart meters require reliable power cables to ensure continuous energy supply and specialized communication cables to transmit data back to utility companies. These cables can include fiber optics, Coaxial cables, or wireless technologies like Wi-Fi and cellular networks. Additionally, data transmission cables are essential for efficiently relaying the collected information to centralized systems for analysis and management. As the global push for smart cities and modernized energy grids grows, the demand for wires and cables that support these smart systems is expected to rise, further fueling the expansion of the wires and cables industry.

Transmission and Distribution reforms planned by the government to revive the sector

The government plans to implement several policies to resolve the issues of the Transmission and distribution segment, as it impacts the entire value chain. Key announcements pertaining to the same are as follows:

- Rs 3 trillion RDSS scheme aiming to improve operational and financial parameters of discoms
- LPS scheme to reduce payment dues from distribution companies to generation companies
- Letter of credit (LC) mechanism was also implemented in August 2019. This order mandated discoms to issue LCs or provide payments upfront before purchase of power. However, success of this scheme has been limited so far, due to various loopholes utilised by discoms and the lower bargaining power of private IPPs
- National Electricity Plan (Transmission)

Revamped Distribution Sector Scheme (RDSS) floated to address long-standing discom stress

Revamped Distribution Sector Scheme (RDSS), launched by Government of India with the objective of improving the quality and reliability of power supply to consumers through a financially sustainable and operationally efficient Distribution Sector, has an outlay of Rs. 3.04 trillion having Gross Budgetary Support of Rs. 0.98 trillion from Government of India over a period of five years from fiscal 2022 to fiscal 2026 and will subsume other schemes

(DDUJY, IPDS) under its ambit. RDSS is mainly focused on strengthening of sub-transmission and distribution network of project areas for the benefit of consumers.

The main objectives of RDSS are:

- Reduction of AT&C losses to pan-India levels of 12-15% by FY 2024-25
- Reduction of ACS-ARR gap to zero by FY 2024-25
- Improvement in the quality, reliability, and affordability of power supply to consumers through a financially sustainable and operationally efficient distribution sector

Prepaid Smart metering is the critical intervention envisaged under RDSS with an estimated outlay of Rs 1.5 trillion with GBS of Rs 0.2 trillion and 250 million prepaid smart meters are targeted to be installed during the Scheme period. Along with the prepaid Smart metering for consumers, system metering at feeder and DT level with communicating feature along with associated Advanced Metering Infrastructure (AMI) would be implemented under TOTEX mode (Total expenditure includes both capital and operational expenditure) thereby allowing the Discoms for measurement of energy flows at all levels as well as energy accounting without any human interference.

Integrated Power Development Scheme (IPDS)

Government of India launched the Integrated Power Development Scheme (IPDS) in December, 2014 under which Distribution Infrastructure projects for strengthening of sub-transmission and distribution networks in urban areas metering of distribution transformers / feeders / consumers in the urban areas, IT enablement works; Enterprise Resource Planning (ERP); smart metering; Gas Insulated Sub-stations (GIS); and, Real Time Data Acquisition System (RT-DAS) were executed.

Discom liquidity package

State discoms' payables to gencos against power purchased have been a pain point for a significant period, as the pending payments cause liquidity issues for generators and affect their working capital management as well as debt repayment ability.

To address the liquidity pangs of state discoms, the central government introduced a Rs 900 billion stimulus for state distribution utilities within the economic relief package announced by the government to tide over the economic crisis induced by Covid-19, which was further enhanced to Rs 1.2 trillion. The relief package is aimed to help discoms clear a significant portion of their outstanding dues to power generators. The package is expected to be provided in the form of concessional loans (moratorium, lower interest rates) to state distribution utilities, secured by discom receivables and state guarantees. Power Finance Corporation (PFC) and Rural Electrification Corporation (REC) have been identified as key lenders for this package. The package was eventually increased further to Rs ~1.35 trillion, with the full amount being sanctioned as of November 2021, whereas disbursement to the tune of Rs ~1.12 trillion has been achieved as of December 2023. The disbursement under the long-term transition loans has been linked to discoms undertaking specified reform measures.

National Electricity Plan (Transmission)

CEA with the aim of transmitting of 500 GW of Renewable Energy installed capacity by the year 2030 and over 600 GW of Renewable Energy installed capacity by the year 2032, prepared the detailed Nation Electricity Plan (Transmission).

As per the National Electricity Plan, over 1,91,000 CKm of transmission lines and 1270 GVA of transformation capacity is planned to be added during the ten-year period from 2022-23 to 2031-32 (at 220 kV and above voltage level). In addition, 33 GW of HVDC bi-pole links are also planned. The inter-regional transmission capacity is planned to increase to 143 GW by the year 2027 and further to 168 GW by the year 2032, from the present level of 119 GW.

Key policy initiatives by West Bengal in the Transmission and distribution sector

• West Bengal power sector reforms transfer scheme, 2007

The West Bengal power sector reforms transfer scheme, 2007 marked a pivotal moment in the restructuring of the state's power sector. This policy unbundled the West Bengal State Electricity Board (WBSEB), creating two separate entities:

- West Bengal State Electricity Transmission Company Limited (WBSETCL) - responsible for power transmission
- West Bengal State Electricity Distribution Company Limited (WBSEDCL) - responsible for power distribution

This restructuring was designed to improve operational efficiency and management within the power sector, and it was aligned with broader national reforms under the Electricity Act, 2003. These reforms have contributed to a more transparent and accountable power system in the state.

• West Bengal Electricity Regulatory Commission (Modalities of Tariff Determination) Regulations, 2023

The modalities of Tariff Determination Regulations, 2023 were introduced by the West Bengal Electricity Regulatory Commission (WBERC) to provide a clear framework for determining power tariffs across generation, transmission and distribution sectors. This policy ensures a structured and transparent process for tariff setting, preventing arbitrary pricing. Key features of this regulation include:

- Tariff Determination for Renewable Energy: Special Provisions are made for renewable energy projects. For projects below the competitive bidding threshold, the WBERC can specify ceiling tariffs to ensure fair pricing for consumers and encourage the growth of renewables.
- Hydroelectric and Pumped Storage Tariffs: Tariffs for hydroelectric projects, including pumped storage, are determined based on the regulated tariff mechanism (RTM) under Section 62 of the Electricity Act, 2003, ensuring stability for long-term power purchase agreements (PPAs)
- Transmission Tariffs: The policy includes a detailed framework for determining transmission tariffs, with a focus on adopting a competitive bidding process for large-scale transmission projects, and a clear tariff-setting mechanism for intra-state projects

• Electric Vehicle Policy, 2021

The electric Vehicle (EV) Policy, 2021 focuses on promoting electric vehicles as a key part of the state's sustainable energy transition. The policy encourages the adoption of the EVs and sets up necessary infrastructure for their widespread use. Key features of the policy are:

- Charging stations: The policy aims to set up widespread EV charging infrastructure, especially in urban and industrial areas.
- Subsidies and Incentives: Financial incentives and subsidies are provided to consumers and companies investing in EVs and associated technologies.
- Promotion of clean energy: The policy aligns with West Bengal's broader renewable energy goals by ensuring that EVs use cleaner, renewable sources of energy. It is a part of the state's strategy to reduce carbon emissions and improve air quality.

● Alosree Program

The objective of Alosree Program is to install Grid Connected Solar Photovoltaic (GRTSPV) System in all government buildings and buildings of local bodies which are technically fit for such installations. As per the program, the State Nodal Agency which is the WBREDA was to oversee the project. Some of their key responsibilities of the agency involved:

- West Bengal Renewable Energy Development Agency (WBREDA) will get the project done on turnkey basis through vendors to be deployed through tendering process for installation of GRTSPV Systems.
- Handing over the project after commissioning to the local authority to be nominated by the Department.
- WBREDA will ensure warrantee obligation including trouble free operation of the GRTSPV Systems through the vendor for a period of five years from date of commissioning
- Routine & breakdown maintenance of the project as and when required for a period of five years from the date of completion of the project.
- Training for day to day operation of the project to the In charges at each of the units/sites/project to be nominated by the local authority.
- Coordination and facilitation to obtain Incentive from MNRE, Government of India, if available

Key projects under execution/partially completed in the power distribution sector

Project name	Promoter	Project cost (Rs. million)	Description
Power Distribution (Jodhpur) Project - RDSS	Jodhpur Vidyut Vitran Nigam Ltd.	8,903.2	The project will aim to reduces loss by segregation of agricultural/mis feeders, feeder bifurcation, reconductoring works, AB cabling, New 33/11 KV power substation, New 33KV lines and New 11KV lines etc
Power Distribution (Prayagraj) Project - RDSS	Purvanchal Vidyut Vitran Nigam Ltd.	23,911.0	Metering & Distribution Infrastructure Works (Part-A): Installation of smart prepaid meters for all consumers, communicable meters integrated with AMI for all DTs & Feeders and a unified billing and collection system; Feeder Segregation, AB cables installation, SCADA and DMS in urban areas and regular distribution infrastructure creation and strengthening works. Training & Capacity Building and other Enabling & Supporting Activities (Part-B):

Project name	Promoter	Project cost (Rs. million)	Description
			Supporting and enabling components, such as Nodal Agency fee, enabling components of MoP (communication plan, consumer awareness and other associated measures such as third-party evaluation etc.), up-gradation of Smart Grid Knowledge Centre, training and capacity building, awards and recognitions etc.
Power Distribution (Raipur) Project - RDSS	Chhattisgarh State Power Distribution Co. Ltd.	2,133.3	Chhattisgarh State Power Distribution Co. is implementing Revamped Distribution Sector Scheme (RDSS) for distribution infra works and system smart metering works in Raipur district of Chhattisgarh
Power Distribution (Kodarma, Ramgarh, Chazzribagh & Chatra) Project - RDSS	Jharkhand Bijli Vitran Nigam Ltd.	4,359.2	Jharkhand Bijli Vitran Nigam is implementing Revamped Reforms-based and Results-linked, Distribution Sector Scheme (RDSS) by development of distribution infrastructure like replacement of LT conductor with AB cable feeder segregation, feeder bifurcation, HVDS works and other works at Electric Supply Area Hazaribagh in Kodarma, Ramgarh, Chazzribagh and Chatra districts of Jharkhand on full turnkey basis
Power Distribution (Chittoor) Project - RDSS	Southern Power Distribution Co. of AP Ltd.	19,414.3	Southern Power Distribution Co. of AP is implementing Revamped Reforms-based and Results-linked, Distribution Sector Scheme (RDSS) by Loss Reduction by Segregation of AGL Feeders and Bifurcation of Over Loaded 33 kV Feeders in Chittoor district of Andhra Pradesh on partial turnkey basis.
Power Distribution (Anantapur) Project - RDSS	Southern Power Distribution Co. of AP Ltd.	15,297.7	Southern Power Distribution Co. of AP is implementing Revamped Reforms-based and Results-linked, Distribution Sector Scheme (RDSS) by Loss Reduction by Segregation of AGL Feeders and Bifurcation of Over Loaded 33 kV Feeders in Anantapur district of Andhra Pradesh on partial turnkey basis.
Power Distribution (Bhagalpur & Banka) Project - RDSS	South Bihar Power Distribution Co. Ltd.	2,918.2	South Bihar Power Distribution Co. is developing distribution infrastructure for loss reduction component works at Bhagalpur Electric Supply Circle in Bhagalpur & Banka districts of Bihar under Revamped Reformed-Based and Results-Linked Distribution Sector Scheme (RDSS).
Power Distribution (Jamui & Sheikhpura) Project - RDSS	South Bihar Power Distribution Co. Ltd.	2,487.9	South Bihar Power Distribution Co. is developing distribution infrastructure for loss reduction component works at Jamui Electric Supply Circle in Jamui & Sheikhpura districts of Bihar under Revamped Reformed-Based and Results-Linked Distribution Sector Scheme (RDSS)

Project name	Promoter	Project cost (Rs. million)	Description
Power Distribution (Ri-Bhoi) Project - RDSS	Meghalaya Power Distribution Corporation. Ltd.	1,335.9	Meghalaya Power Distribution Corpn. is implementing Revamped Reforms-based and Results-linked, Distribution Sector Scheme (RDSS) in Ri-Bhoi district of Meghalaya on turnkey basis. The scope of work will include: Reconductoring works, Cabling in natural disaster-prone areas etc

Note: The above list of projects is an indicative list and not an exhaustive list of projects

Source: Projects Today, CRISIL MI&A

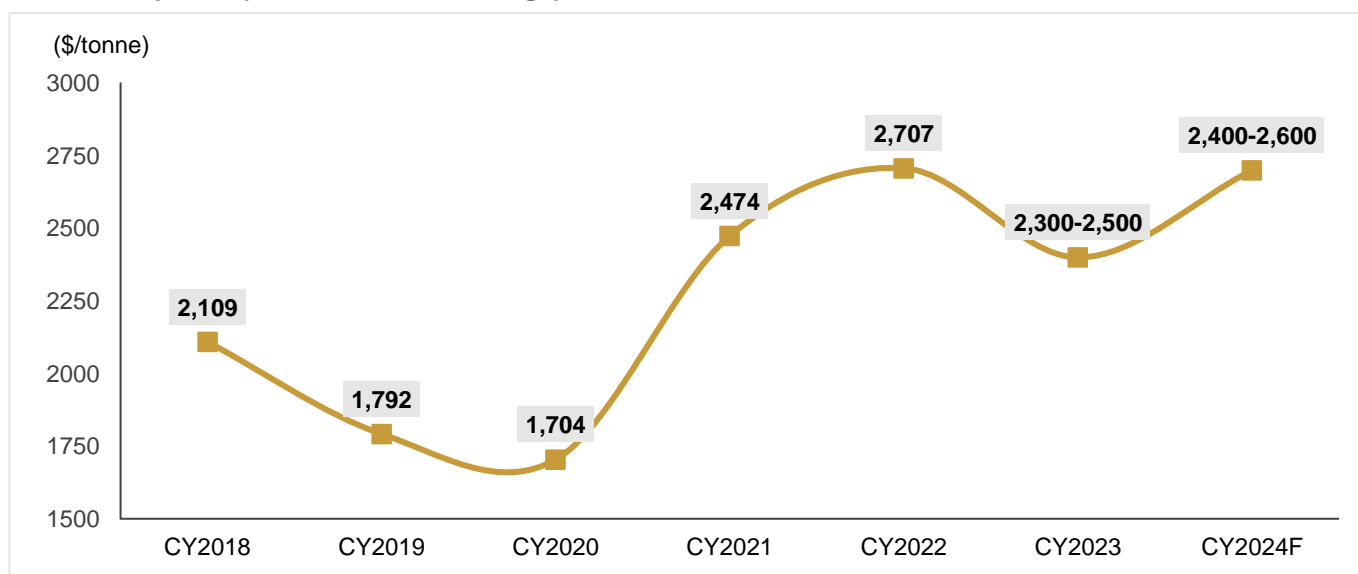
4.5 Key challenges and risk in the cables and conductor industry in India

Rise in commodity prices

Profitability of players in the power conductor segment majorly relies on the input prices of raw material as well as capacity utilisation levels of their production plants. Power conductor industry has high working capital requirements, given long gestation periods. The industry's profile is further constrained by the raw material price risk and stiff competition. As raw material cost accounts for nearly 70-75% of net sales, effective inventory management remains critical, especially given the prevalent volatility in global commodity prices. In cable industry too, a prevalent challenge lies in the volatility of raw material prices. Particularly the surge in costs for essential materials like copper, zinc, and aluminium. This price increase significantly affects profit margins within the industry.

Aluminium prices increased at the end of FY22 (CY2021) due to Russia-Ukraine conflict. Prices increased significantly in FY23 (CY2022) due to anticipated demand revival from China post the removal of lockdown restrictions and the Chinese Lunar Year.

Aluminium prices (London metal exchange)



Source: LME, CRISIL MI&A

Counterfeit products

Counterfeit products pose a severe challenge for cable industry in India. These products are made of subpar materials, posing a series threat in the end use industry. The counterfeit versions of the authentic products spoil brand image and customer trust in the company when these counterfeit versions of authentic products falter. Counterfeit cables may not meet the required safety standards, posing a risk of electrical fires, shocks, and other hazards. Genuine cables are typically designed and tested to comply with safety regulations, but counterfeit products may cut corners to reduce costs. Counterfeiters can also engage in intellectual property theft by copying designs, trademarks, and other proprietary information from legitimate manufacturers. This undermines the innovation and investment made by genuine companies.

Weak financial health of state distribution companies

The distribution sector is controlled by state distribution utilities (SDU) with private participation limited to circles such as Mumbai, Ahmedabad, Surat, Delhi, Agra, and Kolkata. State distribution utilities continue to reel under huge losses due to unprofitable tariff structures, high AT&C losses and inadequate subsidies received from state governments. The sector is marred with financial irregularities due to the nature of the business. Inability to increase power tariffs along with high commercial and technical losses have led to high losses for the discoms.

Strong power demand revival in fiscal 2023 led to an 18.7% on year increase in total revenue on subsidy billed basis to Rs 8.8 trillion. Continued growth in power demand in fiscal 2024 and 2025 will support the financial positions of state discoms to an extent. However, tariff hikes and operation efficiencies remain a key monitorable.

Keeping up with competition and innovations

The companies in these industries grapples with the diverse pace of innovations in product development. To keep up with innovations and competitions, companies have to continuously update their technology to compete in the market.

5 Overview of EPC industry in India

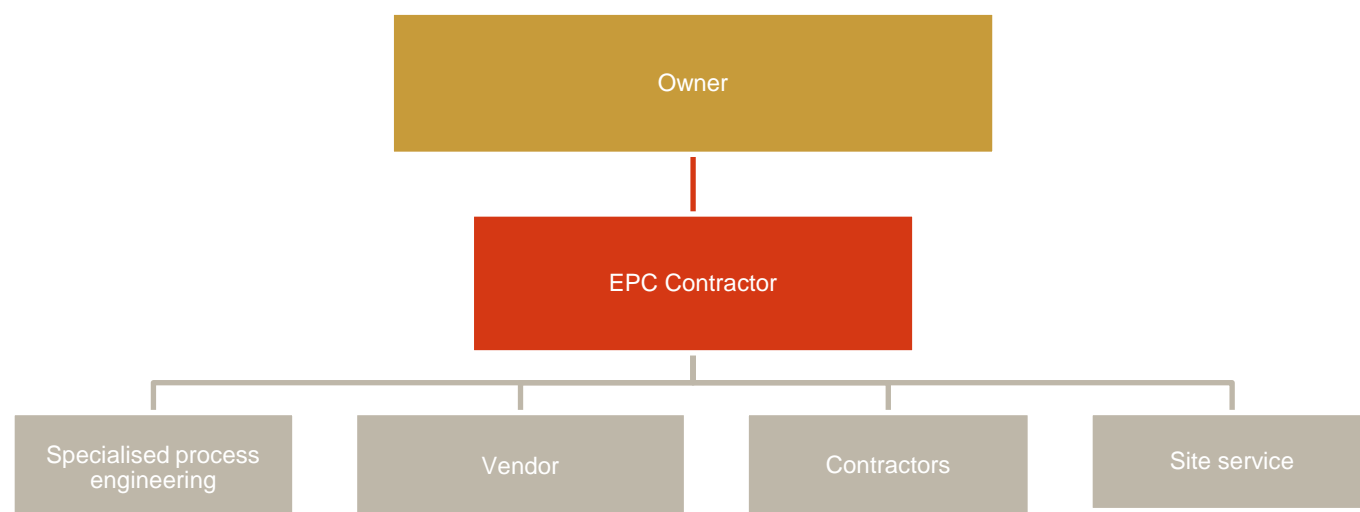
5.1 Qualitative overview of structure of EPC Market

Over the years, the infrastructure business has seen various contracting methods evolve. Traditional contracting models have been replaced by new approaches as projects have grown more complex. Gradually, the responsibility for project management has moved from the owner or developer to the contractor.

This shift is evident in the move from owner-managed projects to Engineering, Procurement, and Construction (EPC) contracts. In EPC contracts, the contractor assumes the risks of time and cost overruns, along with the responsibilities for design, material procurement, and construction. These contracts also shield the owner/developer from currency and interest rate fluctuations.

Unlike other contracts where procurement and design are separate processes, EPC contracts integrate them, reducing the overall project duration. Contract which requires heavy financial and technical requirement generally divided into smaller EPC projects.

EPC Model



Source: CRISIL MI&A

A typical EPC project covers design, civil works, equipment purchase and installation, and commissioning. Most of the EPC players provide integrated and customised solutions as per the client requirements through a consultative approach. Favourable government initiatives, increased infrastructure development in sectors such as roads, power, railways, irrigation etc have provided impetus to EPC contracts.

Overview of key client types in Indian EPC industry

In the Indian Engineering, Procurement, and Construction (EPC) industry, clients can be broadly categorized based on their sector and specific requirements. Here are some key client types:

1. Public Sector Institutions

These include government bodies and public sector undertakings (PSUs) involved in large-scale infrastructure projects.

Ministries and Government Departments: Various ministries such as the Ministry of Road Transport and Highways, Ministry of Power, and Ministry of Railways oversee significant infrastructure development.

Public Sector Undertakings (PSUs): Organizations like Oil and Natural Gas Corporation (ONGC), National Thermal Power Corporation (NTPC), and Indian Railways act as major clients for EPC contractors.

2. Private Sector Clients

Private companies across various industries also play a substantial role in the EPC industry.

Industrial Sector: Companies in sectors such as oil and gas, power, petrochemicals, and manufacturing frequently require EPC services for setting up plants and facilities.

Real Estate and Commercial: Real estate developers and commercial establishments often engage EPC contractors for large-scale construction projects.

3. International Clients

Foreign companies and multinational corporations looking to establish or expand their presence in India often require EPC services.

Multinational Corporations: Global players in industries such as energy, automotive, and chemicals may engage Indian EPC firms for their projects in India.

Development Agencies: International development agencies and financial institutions like the World Bank and Asian Development Bank often fund infrastructure projects, requiring EPC services for execution

5.2 Overview of power EPC in India

A typical EPC project covers design, civil works, equipment purchase installation, and commissioning. However, the scope of an EPC work has been evolved over the years and now may also include O&M (Operation and Management) services. Most of the EPC players provide integrated and customised solutions as per the client requirements through a consultative approach. The overall project works are classified as supply (material) contracts and services contracts. In a comprehensive package, most of the EPC providers offer 3-5 years of O&M services after commissioning of the project and after expiry of the services, the developer executes a separate long-term O&M agreement with a dedicated O&M service provider.

Mechanical, instrumentation, civil, electrical, operations & maintenance (O&M) and annual maintenance contracts (AMCs) are the key type of EPC works undertaken in the Indian power industry

Mechanical works / erection works is the most critical component when building a power plant due to its high complexity, necessitating involvement of highly specialised suppliers/contractors of power generation, material handling and instrumentation equipment. In terms of civil works, construction requires high design prowess and construction capability due to installation of specialized equipment. Instrumentation and electrical works are of medium complexity level, with equipment and power plant operations conforming to uniform industry standards. Environmental clearance is a must for all the projects. As per interactions with industry stakeholders, EPC contracting is the preferred route for power plants due to standardized process of power plant construction. EPC players typically subcontract different packages of civil, mechanical, instrumentation and electrical works, with specialized suppliers / vendors being awarded contracts for supply of equipment's such as boilers, turbines and generators (BTG), heaters and cooling systems.

Below is the overview of types of EPC works that are undertaken in the power sector. It majorly includes Erection, Testing and Commissioning (ETC) power plants, with complete boilers, turbines and generators (ETC-BTG) and balance of plant (BOP) works, for various sizes and scale. It also includes integrated construction services to power plants, which include responsibly sourced gas (RSG) reactors, waste heat recovery boilers (WHRB), circulating fluidized bed combustion (CFBC) boilers, steam turbine generators, steam generators including auxiliaries, electrostatic precipitators (ESPs), hydro turbines and BOP packages, including structural steel works, ash handling, coal handling, fuel oil systems, selective catalytic reduction (SCR) & flue gas desulphurization (FGD), high-pressure piping works

Overview of EPC works across generation, transmission and distribution in the power sector

Civil (15-20%)*	Mechanical/Erection works (50-55%)*	Instrumentation (10-15%)*	Electrical (10-15%)*	O&M and AMCs (8-12%)*	Miscellaneous (~5%)*
<ul style="list-style-type: none"> Includes Buildings, chimney, cooling tanks, land development, roads & boundary walls, erection and fabrication, substations, foundation for different machinery and material handling, etc. 	<ul style="list-style-type: none"> Erection, testing and commissioning including Various complex and heavy engineering equipment - Turbine-generator and boilers, heaters, cooling system, condensing system, SCR and FGD, substations etc. 	<ul style="list-style-type: none"> Instrumentation and process control requirement is high in case of power sector and various equipment involves: Distributed digital control monitoring, PLC based control, Control system of boiler, turbine & balance of plant etc. 	<ul style="list-style-type: none"> Electrical systems such as auxiliary transformers, generators, panels, electrostatic precipitators, switchgears and cabling, transmission lines, transmission towers, substations, electrification and distribution etc. 	<ul style="list-style-type: none"> Operation and maintenance of power plants Electrical network maintenance O&M contracts of exports 	<ul style="list-style-type: none"> Other components such as procuring licenses, contingencies, pre-operative expenses, other development costs, etc

Note: *Figures in brackets indicate estimated break-up of total project cost across various verticals shown above (civil, mechanical, instrumentation, electrical, O&M and miscellaneous)

Source: CRISIL MI&A

Overview of type of projects, mode of construction and customers in power EPC

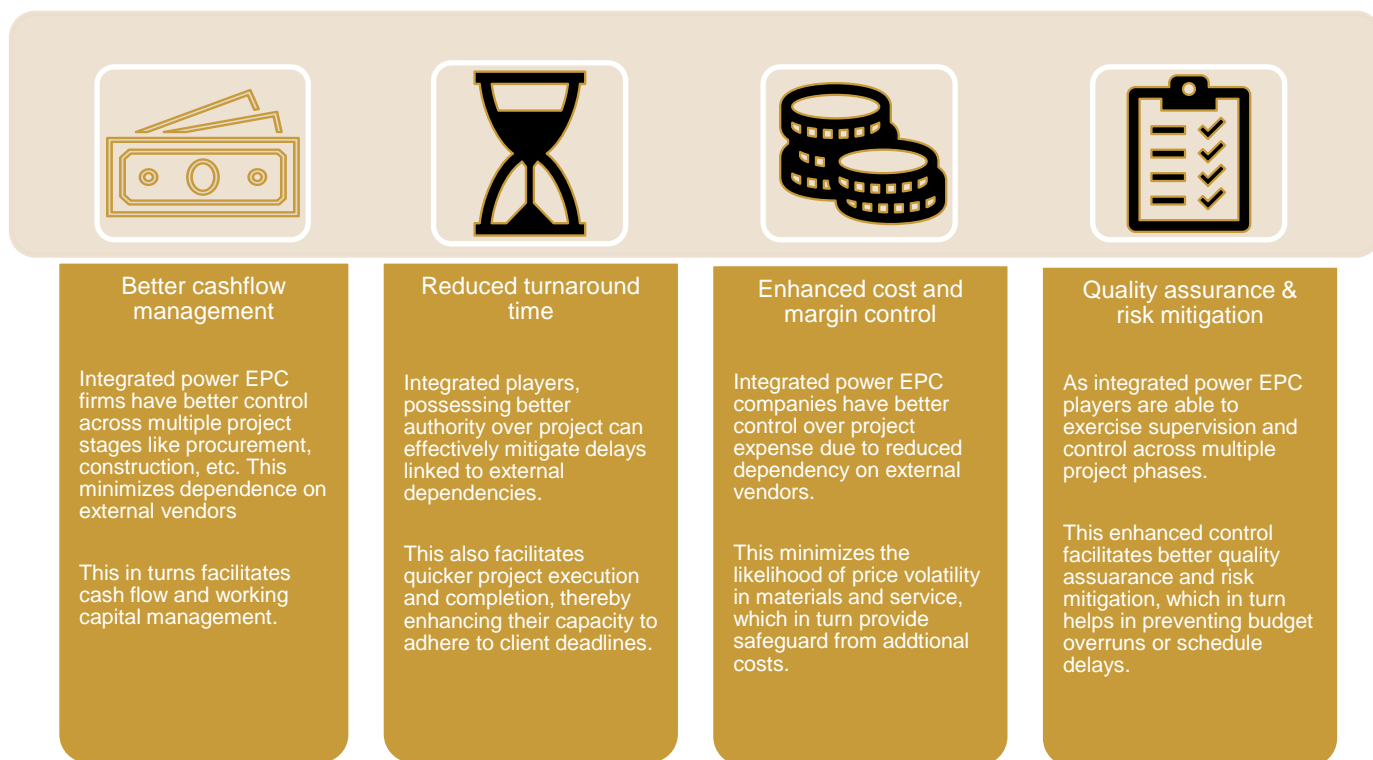
Segment	Type of projects	Clientele in the segment
Generation	End-to-end EPC projects for setting of generation power plants or sections of projects which include but not limited to Flue Gas Desulphurization (FGD) Systems, Boilers, Turbine and Generator systems, steam generator and its auxiliaries	<ul style="list-style-type: none"> ○ Government and public sector enterprises such as NTPC Ltd ○ Private power generation companies ○ Industrial companies for captive usage
Transmission and distribution (T&D)	In T&D projects include but not limited to erection of various sub-stations such as transmission substation, distribution substation and converter substation, construction of transmission lines, underground and overhead distribution power line construction, smart metering	<ul style="list-style-type: none"> ○ PGCIL, state transmission utilities, power producers, and DISCOMS

Source: CRISIL MI&A

Integrated player in the power EPC industry entails greater operational, financial and managerial benefits

An integrated approach in the power EPC sector offers several strategic advantages that drive operational efficiency, financial performance, and project management capabilities. Additionally, by supplying its own products such as Transformers, cables, conductors, switchgear or power generation equipment, the company ensures a seamless alignment between its product capabilities and the specific needs of the product thereby providing a distinct advantage to the customers. This vertical integration eliminates dependencies on third-party suppliers, reducing the risks of delays, cost overruns, or quality inconsistencies. Moreover, the company's in-depth knowledge of its products allows for better customization, optimization, and technical support, ensuring that the equipment performs efficiently under project-specific conditions. This approach not only enhances operational efficiency and reliability but also simplifies project execution by maintaining tighter control on supply chain. For customers, this translated into a more cohesive and cost-effective solution, improved project timelines, and superior long-term performance of power infrastructure, reinforcing trust and long-term partnerships.

Benefits of being an integrated power EPC player



Source: CRISIL MI&A

5.3 Investments in Indian power sector

Infrastructure investments in power sector expected to increase moving forward

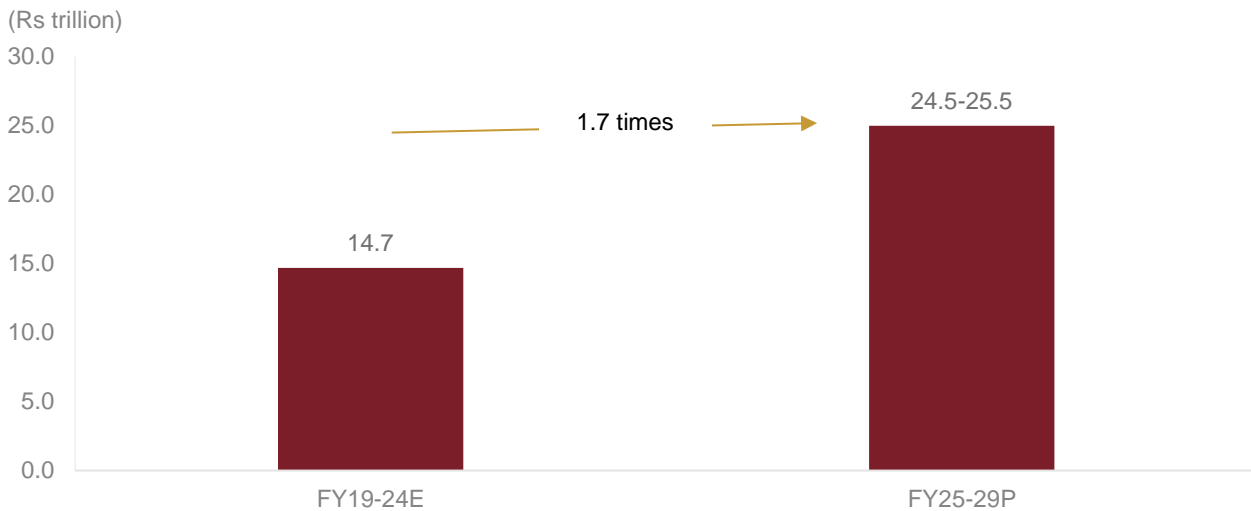
CRISIL MI&A expects investments in the power sector to see a rise of 1.7 times increasing, from Rs 14.7 trillion from fiscal 2019 to fiscal 2024, to Rs 24.5 – 25.5 trillion during fiscal 2025 to 2029. In the power sector, the generation segment drives investments with capacity additions aimed at clean energy, followed by distribution investments due to the Revamped Distribution Sector Scheme (RDSS) scheme and transmission investments.

Over the next four fiscals, between fiscal 2025 to 2029, investments in a generation will be led by renewable energy capacity additions, followed by investments in conventional generation and flue gas desulfurization (FGD) installations, indicating a shift in investment flow towards enhancing clean energy supply. Further, investments in new coal-based plants to meet the fast-growing peak load demand and increased installation of emission-controlling FGD equipment in thermal stations, will further bolster the investments.

Investments in distribution are expected to rise, on the back of the reforms-based and results-linked Revamped Distribution Sector Scheme (RDSS) envisaged over fiscal 2023 to 2026, coupled with the government's thrust on improving electricity access and providing 24x7 power to all.

Investments in the transmission segment are driven by upcoming interstate transmission system (ISTS) and green energy corridor projects. Further, the need for a robust transmission system to support generation additions, renewable energy push, and rural electrification will fuel the investments. In addition, the Government of India is planning to interconnect its national grid with neighbouring nations for effective resource utilisation which is also expected to drive investments in the segment.

Overall investments in Indian power sector

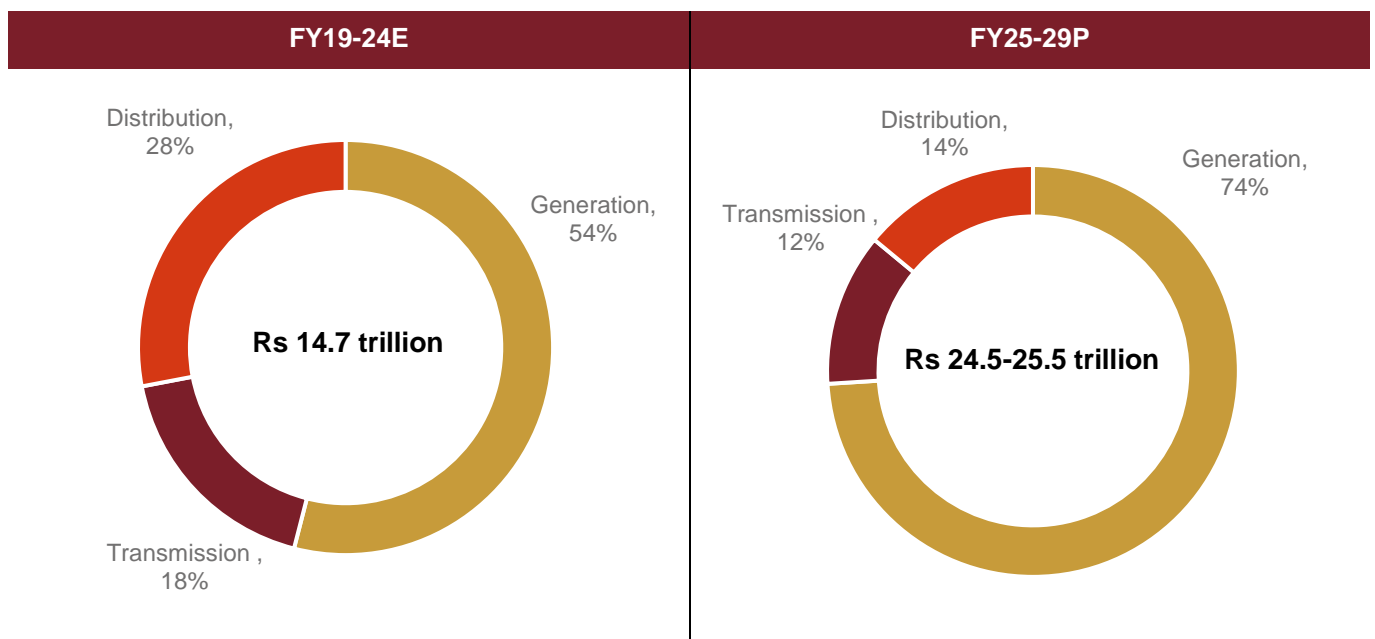


Note: The numbers do not include private sector investments in the distribution sector. Numbers include RE generation capacity being set up for 2.7-3 MTPA green hydrogen by 2030
Source: CRISIL MI&A

Generation segments continue to form the highest share in overall power infrastructure

Investments of Rs 24.5-25.5 trillion are expected in the power sector over fiscals 2025 to 2029. Generation segment to drive investments with large scale clean energy additions expected followed by distribution and transmission investments.

Segment-wise investment in power sector



Note: The numbers do not include private sector investments in the distribution sector. Numbers include RE generation capacity being set up for 2.7-3 MTPA green hydrogen by 2030
Source: CRISIL MI&A

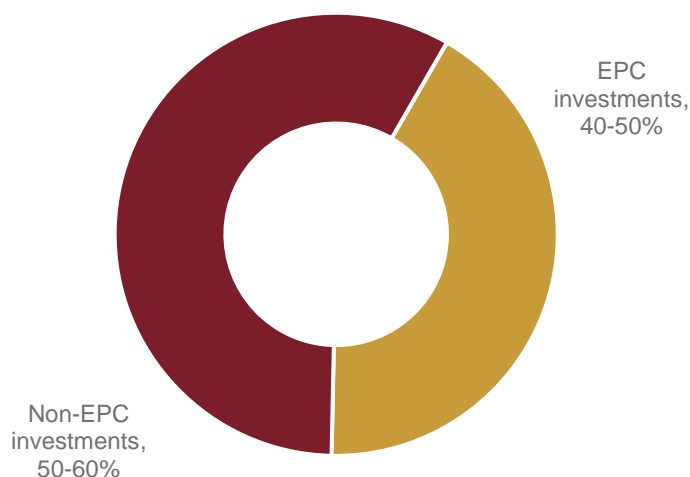
EPC projects make up 40-50% of investments in the power sector

In the power sector, EPC refers to a variety of activities which include design, construction of power plants, substations, transmission lines, procurement of equipment, machinery and materials etc. Projects in the Indian power sector is usually allotted via three primary routes namely EPC, Public Private Partnership (PPP) or the project is executed in-house by the internal teams. Largely, projects are given out via EPC and PPP route barring a few brown field projects which are taken up in-house by power companies.

Indian power EPC sector has witnessed strong growth over the last few years, driven by the increasing demand for electricity, government initiatives, and rising investments in the sector. Specifically, from the construction point of view, activities involve buildings, chimney, cooling tanks, land development, roads & boundary walls, erection and fabrication, substations, foundation for different machinery and material handling, etc. Most of the small and mid-sized projects in the sector happen via the EPC route, while some bigger projects happen via PPP route on an itemized basis. Some brownfield expansions also happen in-house using internal teams by the companies.

CRISIL MI&A estimates that out of the total investments flowing in the power sector in the country, 40-50% are coming via EPC mode of projects.

EPC investments in the power construction sector



Source: CRISIL MI&A

Working capital cycle in power sector varies across generation, transmission and distribution segments.

Power sector is characterised with distinct working capital cycles in generation, transmission and distribution segments.

Working capital cycle analysis



Generation Segment:

Receivables mainly include dues from discoms on account of energy sold to them, coal stocks form the majority share in inventories (for coal-based power plants) and payments due to raw material providers contribute to payables.



Transmission Segment:

In the transmission segment, charges levied and to be received from the users of the transmission network are key receivables while spares or equipment towards incomplete transmission projects form the majority proportion of inventories.



Distribution Segment:

Distribution companies owe payables to generators, service providers (EPC and other contractors) and towards consumer deposits while receivables for them are on account of delayed payments from power consumers.

Source: CRISIL MI&A

Stronger players such as the central generation entity big power players can effectively manage receivables due to a larger and diversified portfolio, with most of the capacity tied up in firm PPAs. NTPC also maintains Letter of Credits (LCs) at 105% of the average monthly billing and is party to Tripartite Agreements (TPAs) signed amongst the state governments, Government of India, and Reserve Bank of India for recovery of payment dues in case of default from state distribution utilities.

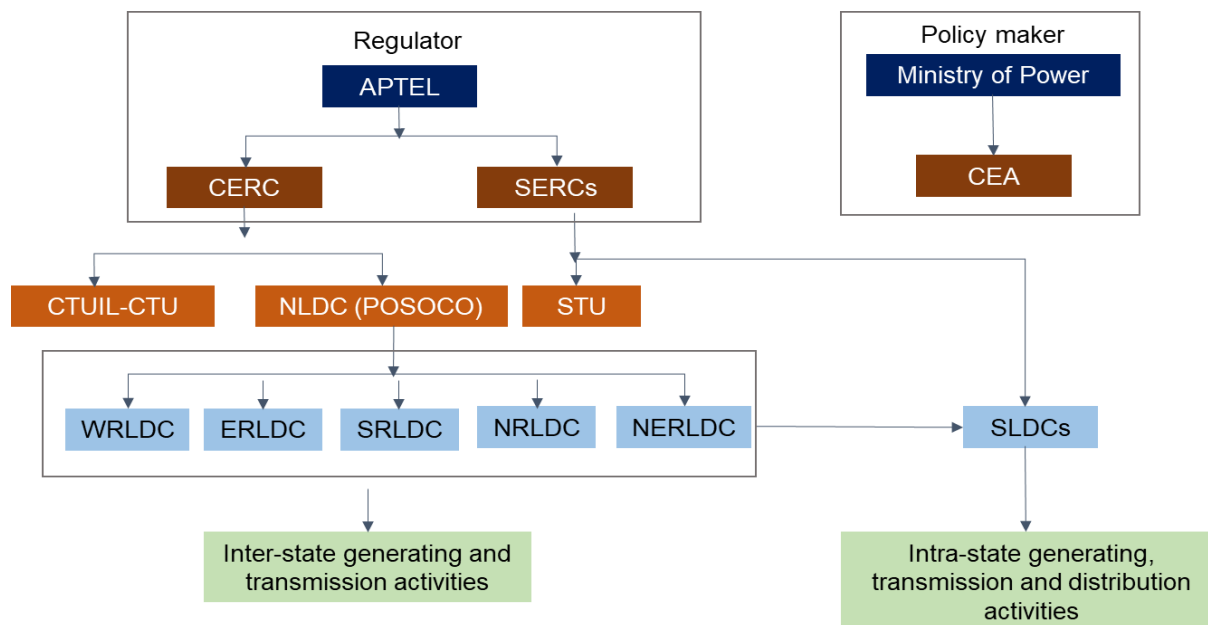
However, smaller entities, especially in the private sector, are more vulnerable to receivables being significantly delayed. Concentration of PPAs with one or two counterparties, heightens the risk. While those with untied capacity must also face the vagaries of the short-term power market.

5.4 Regulatory environment

Regulating authorities and agencies in Indian power sector

The sector is highly regulated, with various functions being distributed between multiple implementing agencies. The three chief regulators for the sector are: the Central Electricity Regulatory Commission (CERC), the Central Electricity Authority (CEA), and the State Electricity Regulatory Commissions (SERCs).

Institutional and structural framework



Note: APTEL - The Appellate Tribunal for Electricity; CERC- Central Electricity Regulatory Commission; CEA - Central Electricity Authority; CTUIL: Central Transmission Utility of India Limited; WRLDC - Western Regional Load Dispatch Centre; ERLDC - Eastern Regional Load Dispatch Centre; SRDLC - Southern Regional Load Dispatch Centre; NLDC: National Load Dispatch Centre, NRLDC - Northern Regional Load Dispatch Centre; NERLDC - North-Eastern Regional Load Dispatch Centre; POSOCO: Power System Operation Corporation, SLDC - State Load Dispatch Centre; CTU - Central Transmission Utility; STU - State Transmission Utility

Source: CRISIL MI&A

The Ministry of Power (MoP) works in close coordination with the CERC and CEA. While the CERC's role is more of a regulator for approving tariffs of central utilities, approving licenses, etc., the CEA is primarily a technical advisor focused on planning, i.e., estimating power demand and generation and transmission capacity.

Overview of key schemes in Indian power sector

Generation

India is committed 500 GW of non-fossil capacities by 2030 as a part of its climate commitment goals. To achieve those goals and to drive the solar capacity additions in the country, GoI has introduced various schemes.

Scheme for Harnessing and Allocating Koyala (Coal) Transparently in India (SHAKTI)

SHAKTI policy aimed at alleviating stress on account of non-availability of domestic coal. The new coal allocation policy for the power sector, was introduced in 2017 which proposes to replace the old linkage allocation policy with more transparent bidding-based linkages. It segregates coal-based power plants in India in the six categories and stipulates different mechanisms to provide fuel supply to plants not having coal linkages.

The biggest beneficiaries of the policy will be those private sector developers who have long-term PPAs and letters of assurance (LoA), since they would get linkages at the notified price. This would keep their generation cost low and ensure increased plant availability with assured fuel supply.

Jawaharlal Nehru National Solar Mission (JNNSM)

JNNSM was launched as part of India's National Action Plan on Climate Change (NAPCC) in 2010. This mission aims at establishing solar power in India. The mission was launched with a target of 20 GW grid connected solar power generation capacity by 2022. However, in June 2015, this target was increased to 100 GW. The 100 GW solar power capacity has been divided into rooftop solar electricity generation (40 GW) and large and medium-scale grid-connected solar projects (60 GW).

Ultra-Mega Solar Parks

In December 2014, MNRE introduced a scheme to establish a minimum of 25 solar parks and Ultra Mega Solar Power Projects, adding over 20 GW of installed solar power capacity, which was later increased to 40 GW to develop a minimum of 50 solar parks of 500 MW and above capacity each by the financial year 2019-20. Later, in July 2018, the Ministry of New and Renewable Energy (MNRE) extended the timeline to develop solar parks and ultra-mega solar projects totalling 40 GW from 2019-20 to 2021-22. As on October 2023, 50 Solar Parks with an aggregate capacity of 37.5 GW have been sanctioned in 12 States in the country.




The Central Government provides financial support for the construction of these solar parks. According to MNRE, such projects can be set up by any CPSU, state PSU, other state government organizations, or their subsidiaries or a joint venture between two or more entities.


State solar policies

Till 2011-12, only Gujarat and Rajasthan had a state solar policy. Post the success of Gujarat state solar policy, various states such as Andhra Pradesh, Tamil Nadu, Karnataka, Madhya Pradesh and Telangana have also announced solar policies and have invited bids to set up solar projects in past years.

5.5 Key growth drivers and threats in the power EPC

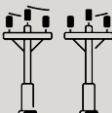


Key growth drivers in the power EPC

Key growth drivers	Description
 <p>Government push towards reducing coal imports</p>	At present, India depends on coal imports along with its domestic production to meet the power demand in the country. In order to reduce the dependence on imports, the government is planning to increase the domestic coal production aiming to increase availability and reduce dependence on imported coal. This would lead to infrastructure growth, in turn boosting the EPC segment
 <p>Increase focus on renewable energy</p>	India has set a goal of 500 GW of non-fossil fuel-based capacity by 2030. In line with this, India has made a significant shift in its energy landscape towards Renewable energy (RE) with more than 70% of new capacity addition came from RE in fiscal 2024. Further additions of renewable energy infrastructure coupled with government support through schemes such as JNNSM and Ultra mega solar parks would further aid the growth in EPC industry
 <p>Development of T&D infrastructure</p>	In December 2023, CEA has notified the draft National Electricity Plan (Volume II) for transmission which is under finalisation. The tentative transmission line and capacity addition as per the draft NEP is estimated to increase by ~1.2 times to 580,293 ckm by fiscal 2027 from 485,544 ckm in fiscal 2024. Similarly, transmission line capacity is expected to increase

	to 685,293 ckm by fiscal 2032 while the substation capacity is expected to rise by ~1.3 times. This will aid the growth of projects in EPC segment of transmission and distribution.
 <p>Rising power demand</p>	Power demand is directly linked to GDP. With rising India's GDP coupled with other factors such as urbanisation, rise in population, rise in industrial output the power demand is expected to see a growth of 5-7% between fiscal 2025 and 2029. In order to meet the rising demand, the power sector is expected to see a capacity addition from 442 GW in fiscal 2024 to 700-710 GW in fiscal 2029. This addition of capacities will further aid the construction under power EPC industry.

Source: CRISIL MI&A

Key challenges in the power EPC

Key challenges	Description
 <p>Distribution- Achilles heel in the Indian power sector</p>	Distribution is the final and critical link in the power sector value chain. However, the financial position of the distribution sector has significantly deteriorated over the past decade owing to irregular tariff hikes, high AT&C losses, and delays in subsidy payments by state governments. This has adversely impacted power offtake by distribution companies (discoms). Though government has implemented schemes such as RDSS, Late payment surcharge (LPS) scheme. The impact of these on the distribution sector needs to be monitored. Any further losses would hinder the infrastructure development in the sector.
 <p>Cost overruns and delays</p>	Regulatory complexities specially for land acquisition, permissions/approvals required from multiple agencies may lead to delay in project execution and increased operational costs. Similarly, due to increase in material costs, improper estimation can result in cost overruns. Significant cost overrun may affect the project returns.
 <p>Market competition</p>	The market competition in the EPC sector is intense, characterized by a multitude of competitors competing for the same projects. This coupled with rising input costs will make it difficult for the EPC players to further pass on the costs to their customers. Further, staying abreast of with technologies in power generation and storage poses a significant challenge, necessitating ongoing investments in research and development to remain competitive in the market.

Source: CRISIL MI&A

6 Peer benchmarking

In this section, CRISIL MI&A has analysed some key players operating in the power cables, conductors and power EPC industry in India. Data has been obtained from publicly available sources, including annual reports and investor presentations of listed players, regulatory filings, rating rationales, and/or company websites and social media pages.

Note: The competitive landscape peers mentioned is not an exhaustive list and is an indicative list. Peers have been selected basis the product and service offerings and comparable revenue range.

Overview of peers considered

Company Name	Year of incorporation	Description
Lumino Industries Limited	2005	Lumino Industries has an experience over 30+ years in the Indian power sector. The company is an integrated engineering, procurement and construction (EPC) player with inhouse manufacturing for conductors and power cables catering to the power transmission, distribution, and electrification sector. Lumino Industries Ltd. has received the UL certification under the Thermoset-insulated wire category for model numbers XHHW, XHH and XHHW-2
Apar Industries Limited	1989	Apar Industries is a part of the Apar Group, which has presence in the electrical and power sector. Apar Industries Limited is into the production of conductors, transformer oils, polymers, etc. The company caters to various sectors including power transmission, telecommunication, and the automotive industry, etc.
Bajel Projects Limited¹	2022	Bajel Projects Limited (BPL), which was previously a division of Bajaj Electricals Limited, primarily focuses into Engineering, Procurement, and Construction (EPC) sector. The company is structured into four primary business segments: Power Transmission, Power Distribution, Monopoles, and International EPC. The company also provide solutions to in feeder separation process and irrigation projects, and other comprehensive turnkey projects.
JSK Industries Private Limited	2005	JSK Industries was incorporated in 2005 offers range of aluminium and aluminium alloy rods and conductors, primarily catering to the high voltage power transmission sector.
Kalpataru Projects International Limited	1981	Kalpataru Projects, a subsidiary of the Kalpataru Group, is an EPC player in India. The company execute and delivers infrastructure development projects, encompassing power transmission and distribution, railway systems, and civil engineering initiatives, etc.
K E C International Limited	2005	KEC International is a company of the RPG Group. KEC International is engineering, procurement, and construction (EPC) company, having its presence in segments such as power transmission and distribution railways, water management, and civil infrastructure, etc.
KEI Industries Limited	1992	KEI Industries is into manufacturing of electrical cables, including high voltage, extra-high voltage, instrumentation, and house wiring cables, etc. The company has presence in multiple industries such as construction, utilities, and infrastructure, etc.
Sterlite Power Transmission Limited	2015	Sterlite Power Transmission Limited is a part of the Vedanta group. Sterlite Power is a power transmission developer and solutions provider and provides multiple solutions including solutions in upgrading, uprating and strengthening power delivery networks

Company Name	Year of incorporation	Description
Universal Cables Limited	1945	Universal Cables Limited provides range of products within cables as well as capacitors segment. Its cables and capacitors are known by the brand name "UNISTAR".

Note: Year of incorporation as per MCA website

1 Bajel Projects Limited, incorporated in 2022 was formerly a wholly owned subsidiary of Bajaj Electricals Ltd (BEL). In September 2023, the Engineering & Projects (E&P) or the EPC business of BEL was demerged into Bajel

Source: Company websites, CRISIL MI&A

6.1 Operational parameters

Product portfolio

Company Name	Cables	Conductors	Power EPC	Others ²
Lumino Industries Limited	✓	✓	✓	Solar EPC and O&M and Railway EPC
Apar Industries Limited	✓	✓	✓	Speciality oil, Polymers, lubricants, etc
Bajel Projects Limited	✗	✗	✓	Lighting Poles and Masts, Monopoles, etc
JSK Industries Private Limited	✓	✓	✓	IT- Cyber Security, Digital Substation, Photonics, etc
Kalpataru Projects International Limited	✗	✗	✓	EPC for Urban Infrastructure and Railways businesses, Buildings & Factories businesses, etc
K E C International Limited	✓	✗	✓	Oil and Gas Pipelines EPC, Civil EPC, etc
KEI Industries Limited	✓	✓	✓	Stainless steel wires, etc
Sterlite Power Transmission Limited	✓	✓	✓	Telecom related services/ EPC
Universal Cables Limited	✓	✓	✓	Capacitors, etc

Note:

¹Cables includes wires

²Not exhaustive but only an indicative list

Source: Company websites, CRISIL MI&A

Presence across Transmission and Distribution EPC

Company Name	Transmission	Distribution
Lumino Industries Limited	✓	✓
Apar Industries Limited	✓	✓
Bajel Projects Limited	✓	✓

Company Name	Transmission	Distribution
JSK Industries Private Limited	✘	✘
Kalpataru Projects International Limited	✓	✓
K E C International Limited	✓	✓
KEI Industries Limited	✓	✓
Sterlite Power Transmission Limited	✓	✘
Universal Cables Limited	✓	✘

Source: Company websites, CRISIL MI&A

Geographical presence (fiscal 2024)

Company Name	International Presence ¹
Lumino Industries Limited	National: 29 states & UTs International: 16 countries
Apar Industries Limited	National: 28 states + 8 UTs International: 140+ countries
Bajel Projects Limited	National: 25 states International: 2 countries
JSK Industries Private Limited	National: Yes International: N.A.
Kalpataru Projects International Limited	National: 24 states International: 45 countries
K E C International Limited	National: 25 states International: 35 countries
KEI Industries Limited	National: Pan India International: 60+ Countries
Sterlite Power Transmission Limited ⁴	National: Yes International: Yes
Universal Cables Limited	National: Pan India International: 19 countries

Note:

N.A.: Not available

¹Represents markets served by entity as disclosed in fiscal 2024 annual report by respective companies

²As disclosed by respective companies in their annual report

³As per Lumino Industries Limited annual report, exports stood at 0.3% in FY24. Formulae used- Revenue from international region/ (Revenue from international+ domestic regions)

³As per Sterlite Power Transmission Ltd fiscal 2023 report, the company exports to 70+ countries. Formula used for calculating exports: External turnover outside India/ (external turnover outside India+ within India)

Source: Company websites, CRISIL MI&A

Manufacturing facilities and capacity

Company Name	Manufacturing Facilities (FY24)	Manufacturing Capacity ¹² (FY22)	Manufacturing Capacity ¹² (FY23)	Manufacturing Capacity ¹² (FY24)	Manufacturing Capacity ¹² (H1FY25)
Conductors and Cables focused players					
Lumino Industries Limited	1 ⁵	Cables and Conductors: 30,000 MT	Cables and Conductors: 35,000 MT	Cables and Conductors: 40,000 MT	Cables and Conductors: 40,000 MT
Apar Industries Limited	Cables & Telecom: 2 Conductors: 4 Polymers: 1 Oil & Lubricants: 3 Total: 10 ¹	Conductors: 180,000 MT Polymers: 10,000MT	Conductors: 180,000+ MT Alloys / HEC / HTLS: 3,120 Kms per month Polymers: 10,000MT	Conductors: 210,000 MT Cables: 6,81,780 KM Alloys / HEC / HTLS: 5,722 Kms per month Polymers: 35,000MT per month	N.A.
JSK Industries Private Limited	1 ²	N.A.	N.A.	Conductors³: Multi Strand (upto 61 strand): 48,000 kms, Seven Strand: 1,90,000 kms Wire Rods³: EC, Alloy & De-oxi Flipped Coils: 68,400 MT	N.A.
KEI Industries Limited	6+2 ⁴	Cables: 125,200 km House Wires/Winding wires: 1,332,000 km Communication cable: 28,800 kms Stainless steel: 9,000 MT	Cables: 125,200 km House Wires/Winding wires: 1,332,000 km Communication cable: 28,800 kms Stainless steel: 9,000 MT	Cables: 141,400 km House Wires/Winding wires: 1,818,400 km Communication cable: 28,800 kms Stainless steel: 9,000 MT	Cables: 192,700 km House Wires/Winding wires: 2,308,000 km Communication cable: 28,800 kms Stainless steel: 9,000 MT
Sterlite Power Transmission Limited	Conductors: 4 ⁶ OPGW: 1 Cables: 1	Conductors: ~162,000 MTPA HPC: ~12,000 KM/Year OPGW 18,000 km/Year	Conductors: ~132,000 MTPA (45,000 miles/year) HPC: ~45,000 MTPA (15,500 miles/Year) OPGW ~20,000 km/Year (12,427 miles/Year)	Conductors: 132,000 MTPA (45,000 miles/year) HPC: ~45,000 MTPA (15,500 miles/Year) OPGW ~24,000 km/Year (14,912 miles/Year)	N.A.

Company Name	Manufacturing Facilities (FY24)	Manufacturing Capacity ¹² (FY22)	Manufacturing Capacity ¹² (FY23)	Manufacturing Capacity ¹² (FY24)	Manufacturing Capacity ¹² (H1FY25)
Universal Cables Limited	2 ⁷	N.A.	N.A.	XLPE Insulated Medium Voltage Power cables of all types and voltage grades: ~6000 KMs/ annum ⁸	N.A.
EPC focused players					
Bajel Projects Limited	3	N.A.	N.A.	Galvanising: 60,000+ MTPA ⁹	N.A.
KEC International Limited	Cables: 2 ¹⁰ Transmission Tower: 6 ¹¹	Global Consolidated manufacturing capacity: 4,22,200 MTPA <ul style="list-style-type: none"> • Transmission Tower, Poles and Hardware: 3,62,200 MTPA • Railway Structures: 48,000 MTPA • Solar Structures: 12,000 MTPA • Power Cables: ~40,000 km per annum • Instrumentation Cables: 3,600 km per annum • Optical Fibre Cables: 8,00,000 fibre km per annum • Copper Telecom Cables: 6,00,000 conductor km per annum • Catenary Conductor: 2,040 MTPA • Contact wire: 3,240 MTPA 	Global Consolidated manufacturing capacity: 4,22,200 MTPA <ul style="list-style-type: none"> • Transmission Tower, Poles and Hardware: 3,62,200 MTPA • Railway Structures: 48,000 MTPA • Solar Structures: 12,000 MTPA • Power Cables: ~42,000 km per annum • Instrumentation Cables: 3,600 km per annum • Optical Fibre Cables: 8,00,000 fibre km per annum • Copper Telecom Cables: 6,00,000 conductor km per annum • Catenary Conductor: 2,040 MTPA • Contact wire: 3,240 MTPA 	Global Consolidated manufacturing capacity: 4,32,200 MTPA <ul style="list-style-type: none"> • Transmission Tower, Poles and Hardware: 3,72,200 MTPA • Railway Structures: 38,000 MTPA • Telecom Tower Structures & Cuplock Scaffolding facility: 12,000 MTPA • Solar Structures: 10,000 MTPA Cables: 69,430 MT <ul style="list-style-type: none"> • Power Cables: ~42,150 km per annum • Instrumentation Cables: 3,600 km per annum • Optical Fibre Cables: 8,00,000 fibre km per annum • Copper Telecom Cables: 	N.A.

Company Name	Manufacturing Facilities (FY24)	Manufacturing Capacity ¹² (FY22)	Manufacturing Capacity ¹² (FY23)	Manufacturing Capacity ¹² (FY24)	Manufacturing Capacity ¹² (H1FY25)
				6,00,000 conductor km per annum <ul style="list-style-type: none"> Catenary Conductor: 2,040 MTPA Contact wire: 3,240 MTPA 	
Kalpataru Projects International Limited	2	Tower Structure Fabrication: 2,40,000 MTPA	Tower Structure Fabrication: 2,40,000 MTPA	Tower Structure Fabrication: 2,40,000 MTPA	N.A.

Note:

N.A.: Not Available

The manufacturing facilities mentioned in the above table may not be exclusively allocated to the manufacturing of the specific product and may be used for the production/ manufacturing of other products as well.

¹As per Apar Industries Ltd, fiscal 2024 annual report, company has four manufacturing facilities related to conductors and two related to cables and telecom. In total, the company has 10 manufacturing facilities. Installed capacity for cables as per rating rationale dated September 2024

²As per rating rationale dated February 2024

³As per JSK Industries website accessed in October 2024

⁴As per KEI Industries Ltd fiscal 2024 annual report, the company has six manufacturing plants and two backward integration plants for PVC Compound

⁵As per Lumino Industries Ltd website accessed in January 2025

⁶As per fiscal 2023 annual report, Sterlite Power Transmission Limited has four manufacturing assets in Silvassa, Jharsuguda and Haridwar.

⁷As per fiscal 2024 annual report

⁸As per disclosure dated March 2024

⁹Only the capacity details of galvanising was available in the annual report, the capacity details for manufacturing of lattice structures, steel tubular poles, lighting poles and masts were not available, hence has not been included in the table

¹⁰As per KEC International Ltd fiscal 2024 annual report, total manufacturing plants of the company stands at eight and global manufacturing capacity (Tower, Poles, Hardware, Structures for Railways & Solar) is 4,32,200 MTPA

¹¹The company has 6 transmission tower manufacturing facilities, 3 in India, 1 each in UAE, Brazil and Mexico

¹²Manufacturing capacity details may not be exhaustive as capacity details are not entirely reported by all the peers

Source: Company websites, CRISIL MI&A

Order Book*

Company Name	Order Book as on 31 March 2022 (Rs. million)	Order Book as on 31 March 2023 (Rs. million)	Order Book as on 31 March 2024 (Rs. million)	Order Book as on 30 September 2024 (Rs. million)
Lumino Industries Limited	EPC: 1,765.71 Manufacturing: 1,256.23	EPC: 21,638.07 Manufacturing: 542.22	EPC: 18,257.89 Manufacturing: 1,147.77	EPC: 14,585.37 Manufacturing: 3,449.89
Apar Industries Limited	Conductors: 30,790.00 Cables Segment: N.A.	Conductors: 51,240.00 Cables Segment: 12,210.00	Conductors: 68,850.00 Cables Segment: 14,360.00	Conductors: 66,150.00 Cables Segment: 17,830.00

Company Name	Order Book as on 31 March 2022 (Rs. million)	Order Book as on 31 March 2023 (Rs. million)	Order Book as on 31 March 2024 (Rs. million)	Order Book as on 30 September 2024 (Rs. million)
Bajel Projects Limited	~8,000.00 ¹	16,000.00 ²	35,978.80	N.A.
JSK Industries Private Limited	N.A.	13,212.00 ³	17,774.00 ⁴	N.A.
Kalpataru Projects International Limited	Total - 327,630.00 Oil & Gas: 19,310.00 Railways: 26,110.00 Urban Infra & Water: 91,500.00 T&D: 110,810.00 B&F^: 79,900.00	Total - 459,170.00 Oil & Gas: 16,660.00 Railways: 37,470.00 Urban Infra: 30,020.00 T&D: 164,790.00 B&F^: 85,470.00 Water: 124,760.00	Total - 584,150.00 Oil & Gas: 90,310.00 Railways: 39,850.00 Urban Infra: 30,330.00 T&D: 206,780.00 B&F^: 110,210.00 Water: 106,670.00	Total - 606,310.00 Oil & Gas: 84,740.00 Railways: 35,690.00 Urban Infra: 26,440.00 T&D: 222,690.00 B&F^: 131,560.00 Water: 105,190.00
K E C International Limited	237,160.00	305,530.00	296,440.00	340,880.00
KEI Industries Limited	24,687.00	34,123.00	35,978.00	39,333.00
Sterlite Power Transmission Limited [%]	N.A.	52,000.00 ⁵	Products: 56,430.00 ⁶ MSI Business: 8,270.00 ⁶	N.A.
Universal Cables Limited [%]	12,970.00 ⁷	13,800.00 ⁸	EPC and cables: 13,233.40 ⁶	N.A.

Note:

N.A.: Not Available

* Please note that the above numbers may not be the total order book data for some companies

1 Order book value as per rating rationale dated July 2023

2 Order book value as per rating rationale dated September 2024

3 Order book value as on 03.12.2022 as per rating rationale dated January 2023

4 Order book value as on 31.12.2023 as per rating rationale dated February 2024

^ Building and Factories

5 Order book as per ratings rationale dated October 2023

6 Order book as per ratings rationale dated July 2024

7 Order book value as on 30.09.2022 as per rating rationale dated December 2022

8 Order book as per ratings rationale dated July 2023

Source: Annual reports, CRISIL MI&A

6.2 Financial parameters

Segmental revenue

Company Name	Details of key business activities/ products and services sold by company (accounting for at least 90% of the turnover)	Revenue contribution ** FY24
Lumino industries Limited ³	1. Supply of Manufactured goods & Others	44%
	2. EPC Projects & other services	56%
Apar Industries Limited	3. Manufacturing of AAC/ AAC/ ACSR Conductors	48%
	4. Manufacturing of Transformer & Speciality Oils	29%
	5. Manufacturing of Power/ Telecom Cable	23%
	6. Manufacturing of Polymer	1%
Bajel Projects Limited	1. Engineering, Procurement and Construction of Power Transmission and Power Distribution Infrastructure	100%
JSK Industries Private Limited	1. Manufacture of basic Metals ¹	100%
Kalpataru International Limited	1. Transmission & Distribution (provides solutions related to power transmission lines and sub-stations)	32%
	2. Buildings & Factories (execute civil works, design & build composite works, structural works, finishing works, utilities, and area development)	29%
	3. Water (designs and builds water intake, pipeline laying, treatment, storage, supply, distribution, and operation & maintenance of projects)	21%
	4. Railways (services include overhead electrification, traction substations, station buildings, railway track laying, earthwork, workshops, signalling & telecommunication (S&T), power systems, and civil works associated with railway networks and composite railway projects)	9%
	5. Oil & Gas (undertakes EPC contracting for cross-country pipelines, terminals, and gas gathering stations for the oil and gas sector across diverse territories)	5%
	6. Urban Infrastructure (offers EPC services for the design and construction of highways, bridges & flyovers, airports, metro rail corridor stations, transit terminals & hubs)	4%
K E C International Limited	1. Construction/erection and maintenance of power and transmission lines	43%
	2. Construction of railways	17%
	3. Construction of other civil engineering projects	25%
	4. Manufacturing of electric wires and cables	7%
	5. Others ^{@@}	8%
KEI Industries Limited	1. Manufacturing and selling of Wires and Cables	90%
	2. Manufacturing and selling of Stainless-Steel Wires	3%
	3. Turnkey Projects / Engineering, Procurement and Construction (EPC)* Projects Segment	7%

Company Name	Details of key business activities/ products and services sold by company (accounting for at least 90% of the turnover)	Revenue contribution** FY24
Sterlite Power Transmission Limited	1. Power product solution and power transmission infrastructure ²	100%
Universal Cables Limited	1. Manufacturing of power (Electrical) and other Cables, Wires and related turnkey projects	95%
	2. Others ^{@@}	5%

Note:

**Revenue contribution is considered as disclosed in the respective company's annual report and have not been reclassified by CRISIL

@@The company has not provided 100% revenue breakup of key business activities/ products and services sold by company. Therefore, the remaining revenue, has been classified as "Others"

* Excluding Cables

¹As per JSK Industries Pvt Ltd. fiscal 2024 annual report, aluminium wire formed 100% of the company's revenue from operation

²As per Sterlite Power Transmission Ltd., the company has only one operating segment which is power product solution and power transmission infrastructure. Hence, its revenue contribution is considered as 100%

³For Lumino Industries Ltd. The segmental revenue contribution is based on gross revenue which is inclusive of inter unit revenue of Rs. 5,282.67 million. The inter unit revenue is subtracted from gross revenue to arrive at the Revenue from Operations

The percentages may not add up to 100% due to rounding off

Source: Company annual reports, filings, CRISIL MI&A

Revenue from operations

Company Name (Rs million)	FY22	FY23	FY24	H1FY25	CAGR (FY22-24)
Lumino Industries Limited	6,040.11	7,602.12	14,073.15	9,476.21	52.64%
Apar Industries Limited	93,165.70	143,363.00	161,529.80	86,550.20	31.67%
Bajel Projects Limited* ^{\$}	N.A.	6,636.86	11,692.12	11,744.31	N.A.
JSK Industries Private Limited*	12,082.63	19,814.42	18,301.84	N.A.	23.07%
Kalpataru Projects International Limited	147,773.80	163,614.40	196,264.30	95,165.30	15.24%
K E C International Limited	137,422.60	172,817.10	199,141.70	96,252.00	20.38%
KEI Industries Limited	57,269.91	69,081.74 ¹	81,040.80 ¹	43,401.45 ¹	18.96%
Sterlite Power Transmission Limited [^]	N.A.	32,786.46	49,178.94	N.A.	N.A.
Universal Cables Limited	18,135.39	22,019.51	20,206.68	11,268.17	5.56%

Note:

N.A.: Not Available

*On standalone basis

^{\$} company incorporated in January 2022

[^]The company demerged its infrastructure business ('Infra') into its subsidiary company, Sterlite Grid 5 Limited ('SGL5') in fiscal 2024 and released reclassified financials only for fiscals 2023 and 2024. So, the financials for fiscal 2022, would not be comparable to fiscals 2023 and 2024.

Revenue from operations is as per respective companies' annual report

¹ Revenue from operations from income from continuing operations

Source: Company websites, CRISIL MI&A

- Lumino Industries Ltd is the fastest growing player in the conductors, power cables and power EPC industry in terms of revenue from operations CAGR between fiscals 2022 and 2024, among the peers considered

Operating EBITDA

Company Name (Rs million)	FY22	FY23	FY24	H1FY25	CAGR (FY22-24)
Lumino Industries Limited	524.47	394.82	1,426.94	1,009.38	64.95%
Apar Industries Limited	5,478.50	12,269.40	15,223.10	7,330.70	66.69%
Bajel Projects Limited*\$	N.A.	(408.71)	104.15	238.93	N.A.
JSK Industries Private Limited*	190.28	755.76	736.76	N.A.	96.78%
Kalpataru Projects International Limited	11,895.60	13,695.40	16,285.70	8,171.50	17.01%
K E C International Limited	9,035.00	8,297.30	12,145.70	5,906.10	15.94%
KEI Industries Limited	5,887.45	7,020.14	8,375.37	4,351.64	19.27%
Sterlite Power Transmission Limited^	N.A.	3,980.01	4,696.92	N.A.	N.A.
Universal Cables Limited	1,229.04	1,853.66	1,616.92	788.48	14.70%

Note:

N.A.: Not Available

*On standalone basis

\$ company incorporated in January 2022

^The company demerged its infrastructure business ('Infra') into its subsidiary company, Sterlite Grid 5 Limited ('SGL5') in fiscal 2024 and released reclassified financials only for fiscals 2023 and 2024. So, the financials for fiscal 2022, would not be comparable to fiscals 2023 and 2024.

Formula used: Revenue from operations- Total expenses+ Finance expenses+ Depreciation and amortisation expenses

Source: Company websites, CRISIL MI&A

- Among the considered peers, Lumino Industries Ltd had been the third fastest growing player between FY22-24 in terms of Operating EBITDA

PAT

Company Name (Rs million)	FY22	FY23	FY24	H1FY25	CAGR (FY22-24)
Lumino Industries Limited	337.37	193.98	866.34	643.11	60.25%
Apar Industries Limited ¹	2,567.30	6,377.20	8,251.10	3,964.10	79.27%
Bajel Projects Limited*\$	N.A.	(15.81)	42.87	91.83	N.A.

Company Name (Rs million)	FY22	FY23	FY24	H1FY25	CAGR (FY22-24)
JSK Industries Private Limited*	52.94	501.36	396.49	N.A.	173.67%
Kalpataru Projects International Limited	5,350.60	4,350.20	5,159.00	2,095.10	-1.81%
K E C International Limited	3,320.80	1,760.30	3,467.80	1,729.80	2.19%
KEI Industries Limited	3,760.15	4,773.42	5,807.33	3,050.61	24.28%
Sterlite Power Transmission Limited ^{1^}	N.A.	1,834.43	2,301.27	N.A.	N.A.
Universal Cables Limited	749.26	1,181.52	1,082.25	238.67	20.18%

Note:

N.A.: Not Available

*On standalone basis

\$ company incorporated in January 2022

[^]The company demerged its infrastructure business ('Infra') into its subsidiary company, Sterlite Grid 5 Limited ('SGL5') in fiscal 2024 and released reclassified financials only for fiscals 2023 and 2024. So, the financials for fiscal 2022, would not be comparable to fiscals 2023 and 2024.

¹ Profit / (loss) for the year from continuing operations

Source: Company websites, CRISIL MI&A

- Among the considered peers, Lumino Industries Ltd had been the third fastest growing player between FY22-24 in terms of PAT

Operating EBITDA Margin

Company Name	Operating EBITDA %			
	FY22	FY23	FY24	H1FY25
Lumino Industries Limited	8.68%	5.19%	10.14%	10.65%
Apar Industries Limited	5.88%	8.56%	9.42%	8.47%
Bajel Projects Limited* ^{\$}	N.A.	-6.16%	0.89%	2.03%
JSK Industries Private Limited*	1.57%	3.81%	4.03%	N.A.
Kalpataru Projects International Limited	8.05%	8.37%	8.30%	8.59%
K E C International Limited	6.57%	4.80%	6.10%	6.14%
KEI Industries Limited	10.28%	10.16%	10.33%	10.03%
Sterlite Power Transmission Limited [^]	N.A.	12.1%	9.55%	N.A.
Universal Cables Limited	6.78%	8.42%	8.00%	7.00%

Note:

N.A.: Not Available

*On standalone basis

\$ company incorporated in January 2022

[^]The company demerged its infrastructure business ('Infra') into its subsidiary company, Sterlite Grid 5 Limited ('SGL5') in fiscal 2024 and released reclassified financials only for fiscals 2023 and 2024. So, the financials for fiscal 2022, would not be comparable to fiscals 2023 and 2024.

Revenue from operations as is as per respective company's' annual report

Formulae used are as follows:

Operating EBITDA % = Operating EBITDA / Revenue from operations

Source: Company websites, CRISIL MI&A

- Among the considered peers, Lumino Industries Ltd had the second highest operating EBITDA margin of 10.14% in FY24
- As of H1FY25, Lumino Industries Ltd. had the highest operating EBITDA margin of 10.65% among the considered peers for which data was available

PAT Margin

Company Name	PAT %			
	FY22	FY23	FY24	H1FY25
Lumino Industries Limited	5.47%	2.51%	6.07%	6.63%
Apar Industries Limited	2.75%	4.44%	5.08%	4.55%
Bajel Projects Limited* ^{\$}	N.A.	-0.22%	0.36%	0.77%
JSK Industries Private Limited*	0.44%	2.51%	2.15%	N.A.
Kalpataru Projects International Limited	3.60%	2.65%	2.62%	2.19%
K E C International Limited	2.41%	1.02%	1.74%	1.79%
KEI Industries Limited	6.55%	6.88%	7.12%	6.97%
Sterlite Power Transmission Limited [^]	N.A.	5.57%	4.64%	N.A.
Universal Cables Limited	4.09%	5.32%	5.29%	2.10%

Note:

N.A.: Not Available

*On standalone basis

^{\$} company incorporated in January 2022

[^]The company demerged its infrastructure business ('Infra') into its subsidiary company, Sterlite Grid 5 Limited ('SGL5') in fiscal 2024 and released reclassified financials only for fiscals 2023 and 2024. So, the financials for fiscal 2022, would not be comparable to fiscals 2023 and 2024.

Formulae used are as follows:

PAT% = PAT / Total income

Source: Company websites, CRISIL MI&A

- Among the considered peers, Lumino Industries Ltd had the second highest PAT margin of 6.07% in FY24

RoE%

Company Name	FY22	FY23	FY24
Lumino Industries Limited ^{&}	10.63%	5.56%	21.52%
Apar Industries Limited	16.50%	32.30%	27.01%
Bajel Projects Limited* ^{\$}	N.A.	N.A.	0.76%

Company Name	FY22	FY23	FY24
JSK Industries Private Limited*	1.55%	13.57%	9.58%
Kalpataru Projects International Limited	22.62%	13.87%	13.24%
K E C International Limited	10.37%	5.18%	9.53%
KEI Industries Limited	19.26%	20.22%	20.26%
Sterlite Power Transmission Limited^	N.A.	N.A.	16.64%
Universal Cables Limited	6.17%	8.47%	6.62%

Note:

N.A.: Not Available

*On standalone basis

\$ company incorporated in January 2022

^The company demerged its infrastructure business ('Infra') into its subsidiary company, Sterlite Grid 5 Limited ('SGL5') in fiscal 2024 and released reclassified financials only for fiscals 2023 and 2024. So, the financials for fiscal 2022, would not be comparable to fiscals 2023 and 2024.

& Standalone financials have been used for FY21 in the calculation of Average Tangible Net worth for FY22 as consolidation was not applicable in FY21

Formulae used are as follows:

RoE%: PAT / Average of Tangible net worth

Tangible net worth: Total equity- intangible assets - Intangible Assets under Development

H1FY25 - Not applicable - not meaningful for periods that are not a full financial year

Source: Company websites, CRISIL MI&A

- Among the peers considered, Lumino Industries Ltd had the second highest RoE% in FY24 of 21.52%.

RoCE%

Company Name	FY22	FY23	FY24
Lumino Industries Limited&	11.95%	7.73%	19.60%
Apar Industries Limited	26.31%	51.05%	43.79%
Bajel Projects Limited*\$	N.A.	N.A.	5.32%
JSK Industries Private Limited*	5.26%	22.00%	19.35%
Kalpataru Projects International Limited	16.0%	14.89%	15.85%
K E C International Limited	13.57%	10.89%	15.15%
KEI Industries Limited	24.12%	26.09%	27.49%
Sterlite Power Transmission Limited^	N.A.	N.A.	11.31%
Universal Cables Limited	6.32%	8.72%	6.88%

Note:

N.A.: Not Available

*On standalone basis

\$ company incorporated in January 2022

^The company demerged its infrastructure business ('Infra') into its subsidiary company, Sterlite Grid 5 Limited ('SGL5') in fiscal 2024 and released reclassified financials only for fiscals 2023 and 2024. So, the financials for fiscal 2022, would not be comparable to fiscals 2023 and 2024.

& Standalone financials have been used for FY21 in the calculation of Average Capital Employed for FY22 as consolidation was not applicable in FY21

Formulae used are as follows:

Consulting

RoCE%: (Operating EBITDA + Other Income - Depreciation and Amortisation cost) / (Average of Capital Employed)
Capital employed: Tangible net worth + Total borrowings (Long Term Borrowings + Short Term Borrowings)
H1FY25 - Not applicable - not meaningful for periods that are not a full financial year
Source: Company websites, CRISIL MI&A

- Among the peers considered, Lumino Industries Ltd had the third highest RoCE% of 19.60% in FY24

Asset Turnover Ratio

Asset turnover ratio	FY22	FY23	FY24
Lumino Industries Limited ^{&}	11.70	12.98	18.80
Apar Industries Limited	7.32	10.24	9.76
Bajel Projects Limited* ^{\$}	N.A.	N.A.	10.12
JSK Industries Private Limited*	6.09	9.66	8.33
Kalpataru Projects International Limited	5.27	5.28	5.72
K E C International Limited	6.78	7.74	8.27
KEI Industries Limited	7.63	8.45	8.17
Sterlite Power Transmission Limited [^]	N.A.	N.A.	5.91
Universal Cables Limited	0.68	1.48	6.38

Note:

N.A.: Not Available

*On standalone basis

^{\$} company incorporated in January 2022

[^]The company demerged its infrastructure business ('Infra') into its subsidiary company, Sterlite Grid 5 Limited ('SGL5') in fiscal 2024 and released reclassified financials only for fiscals 2023 and 2024. So, the financials for fiscal 2022, would not be comparable to fiscals 2023 and 2024.

& Standalone financials have been used for FY21 in the calculation of Average Gross Block for FY22 as consolidation was not applicable in FY21

Formulae used are as follows:

Asset turnover ratio: Revenue from operations / Average Gross Block

Gross Block = Gross value of Property, Plant and Equipment + Gross value of Right-of-use

H1FY25 - Not applicable - not meaningful for periods that are not a full financial year

Source: Company websites, CRISIL MI&A

- Among the peers considered, Lumino Industries Ltd had the highest asset turnover ratio of 18.80 in FY24

Tangible Network

Company Name (Rs. million)	FY22	FY23	FY24	H1FY25
Lumino Industries Limited	3,381.27	3,591.93	4,458.55	5,093.37
Apar Industries Limited	17,135.90	22,350.40	38,736.30	41,037.20
Bajel Projects Limited* ^{\$}	N.A.	5,573.60	5,661.72	5,832.75
JSK Industries Private Limited*	3,444.31	3,945.82	4,330.76	N.A.
Kalpataru Projects International Limited	26,153.10	36,563.70	41,390.30	42,126.00
K E C International Limited	33,255.50	34,704.10	38,038.90	47,711.80

KEI Industries Limited	21,334.46	25,874.79	31,467.27	34,565.31
Sterlite Power Transmission Limited [^]	N.A.	14,673.87	12,990.23	N.A.
Universal Cables Limited	12,946.30	14,963.39	17,748.04	18,206.69

Note:

N.A.: Not Available

*On standalone basis

\$ company incorporated in January 2022

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Formulae used are as follows:

Tangible net worth: Total equity- intangible assets - Intangible Assets under Development

Source: Annual reports, CRISIL MI&A

Net Debt

Company Name (Rs. million)	FY22	FY23	FY24	H1FY25
Lumino Industries Limited	1,353.53	1,280.29	3,098.11	5,965.82
Apar Industries Limited	255.00	NM	NM	345.90
Bajel Projects Limited* ^{\$}	N.A.	NM	NM	NM
JSK Industries Private Limited*	NM	NM	NM	N.A.
Kalpataru Projects International Limited	25,149.20	26,225.90	28,772.10	39,788.00
K E C International Limited	26,007.70	28,502.90	35,390.40	35,544.40
KEI Industries Limited	NM	NM	NM	694.98
Sterlite Power Transmission Limited [^]	N.A.	31,736.17	1,636.04	N.A.
Universal Cables Limited	6,897.34	6,534.52	7,634.79	8,168.29

Note:

N.A.: Not Available

*On standalone basis

\$ company incorporated in January 2022

[^]The company demerged its infrastructure business ('Infra') into its subsidiary company, Sterlite Grid 5 Limited ('SGL5') in fiscal 2024 and released reclassified financials only for fiscals 2023 and 2024. So, the financials for fiscal 2022, would not be comparable to fiscals 2023 and 2024.

NM: Not meaningful as net debt of the company is coming out to be negative because of Cash and cash equivalents and Bank balances exceeding the total borrowings

Formulae used are as follows:

Net Debt: Total borrowings (Long Term Borrowings + Short Term Borrowings) – Cash and cash equivalents – Bank balances other than cash and cash equivalents

Source: Annual reports, CRISIL MI&A

Net Debt / Equity

Company Name	FY22	FY23	FY24	H1FY25
Lumino Industries Limited	0.40	0.36	0.69	1.17
Apar Industries Limited	0.01	NM	NM	0.01

Bajel Projects Limited* ^{\$}	N.A.	NM	NM	NM
JSK Industries Private Limited*	NM	NM	NM	N.A.
Kalpataru Projects International Limited	0.96	0.72	0.70	0.94
K E C International Limited	0.78	0.82	0.93	0.74
KEI Industries Limited	NM	NM	NM	0.02
Sterlite Power Transmission Limited [^]	N.A.	2.16	0.13	N.A.
Universal Cables Limited	0.53	0.44	0.43	0.45

Note:

N.A.: Not Available

*On standalone basis

^{\$} company incorporated in January 2022

[^]The company demerged its infrastructure business ('Infra') into its subsidiary company, Sterlite Grid 5 Limited ('SGL5') in fiscal 2024 and released reclassified financials only for fiscals 2023 and 2024. So, the financials for fiscal 2022, would not be comparable to fiscals 2023 and 2024.

NM: Not meaningful as net debt of the company is coming out to be negative because of Cash and cash equivalents and Bank balances exceeding the total borrowings

Formulae used are as follows:

Net Debt: Total borrowings (Long Term Borrowings + Short Term Borrowings) – Cash and cash equivalents – Bank balances other than cash and cash equivalents

Net Debt / Equity: Net Debt / Tangible Networkth

Tangible net worth: Total equity- intangible assets

Source: Annual reports, CRISIL MI&A

Net Debt / Operating EBITDA

Company Name	FY22	FY23	FY24
Lumino Industries Limited	2.58	3.24	2.17
Apar Industries Limited	0.05	NM	NM
Bajel Projects Limited* ^{\$}	N.A.	NM	NM
JSK Industries Private Limited*	NM	NM	NM
Kalpataru Projects International Limited	2.11	1.91	1.77
K E C International Limited	2.88	3.44	2.91
KEI Industries Limited	NM	NM	NM
Sterlite Power Transmission Limited [^]	N.A.	7.97	0.35
Universal Cables Limited	5.61	3.53	4.72

Note:

N.A.: Not Available

*On standalone basis

^{\$} company incorporated in January 2022

For Bajel projects Ltd, For FY23, both net debt and Operating EBITDA is negative, which resulted in Net debt / Operating EBITDA coming out to be positive, Hence, we have shown it as NM: Not Meaningful

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NM: Not meaningful as net debt of the company is coming out to be negative because of Cash and cash equivalents and Bank balances exceeding the total borrowings

Formulae used are as follows:

Net Debt: Total borrowings (Long Term Borrowings + Short Term Borrowings) – Cash and cash equivalents – Bank balances other than cash and cash equivalents

Tangible net worth: Total equity- intangible assets - Intangible Assets under Development

H1FY25 - Not applicable - not meaningful for periods that are not a full financial year

Source: Annual reports, CRISIL MI&A

About CRISIL Limited

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