

Assessment of welding consumables, wear plates and heavy engineering market in India

December 2023

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1. Macroeconomic assessment

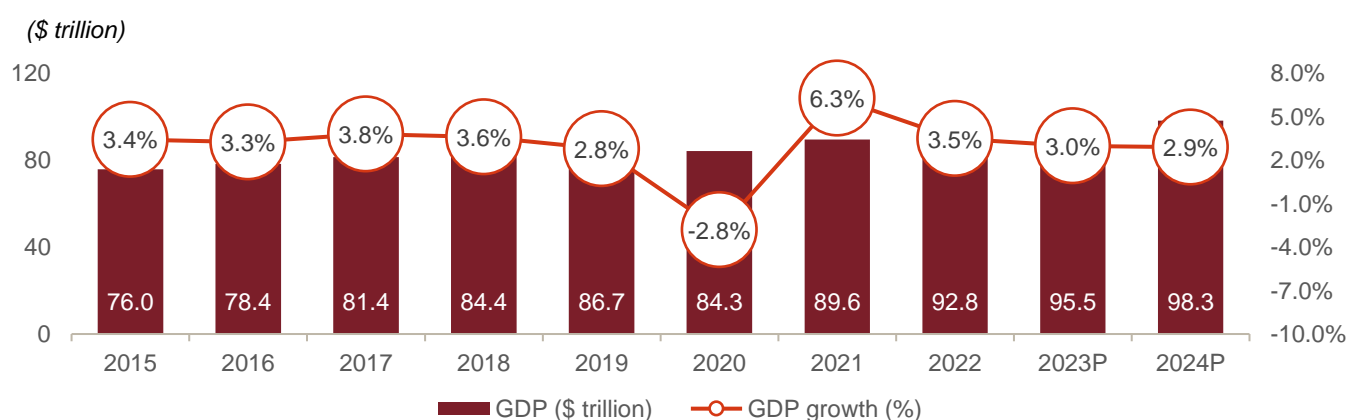
1.1 Global macroeconomic assessment

Global gross domestic product (GDP) growth is estimated at 3.0% in 2023 and 2.9% 2024 amid the Russia-Ukraine conflict, elevated inflation, and financial sector distress.

As per the International Monetary Fund’s (IMF) October 2023 update, global gross domestic product (GDP) growth is expected to moderate from 3.5% in 2022 to 3.0% in 2023 and in 2.9%2024. The latest estimate is 0.1 percentage point lower for 2024 compared with IMF’s previous forecast in July, mainly due to the long-term consequences of the pandemic, the war in Ukraine, and increasing geoeconomic fragmentation. Economic slowdown compared with 2022 is expected to be mainly driven by distress in financial systems, broadening inflationary pressures, the Russia-Ukraine conflict and a slowdown in China. According to the IMF, the growth forecast for 2023 reflects the rise in central bank rates to fight inflation, especially in advanced economies as well as the impact of the war in Ukraine. The decline in growth in 2023 is driven by advanced economies; with stronger services activity offset by weaker manufacturing, as well as idiosyncratic factors. On average, these economies are expected to have broadly stable growth in 2024 with a pickup in 2025. By contrast, emerging market and developing economies, on average, are projected to see stable growth over 2022–24, with a slight pickup in 2025, although with sizable shifts across regions.

As per the IMF update, achieving sustained disinflation has been the top priority for most economies amid the cost-of-living crisis. With tighter monetary conditions and lower growth potentially affecting the stability of financial and debt markets, reopening of the Chinese economy would safeguard the recovery and ease supply chain bottlenecks.

Trend and outlook for global GDP (2015-2024P)



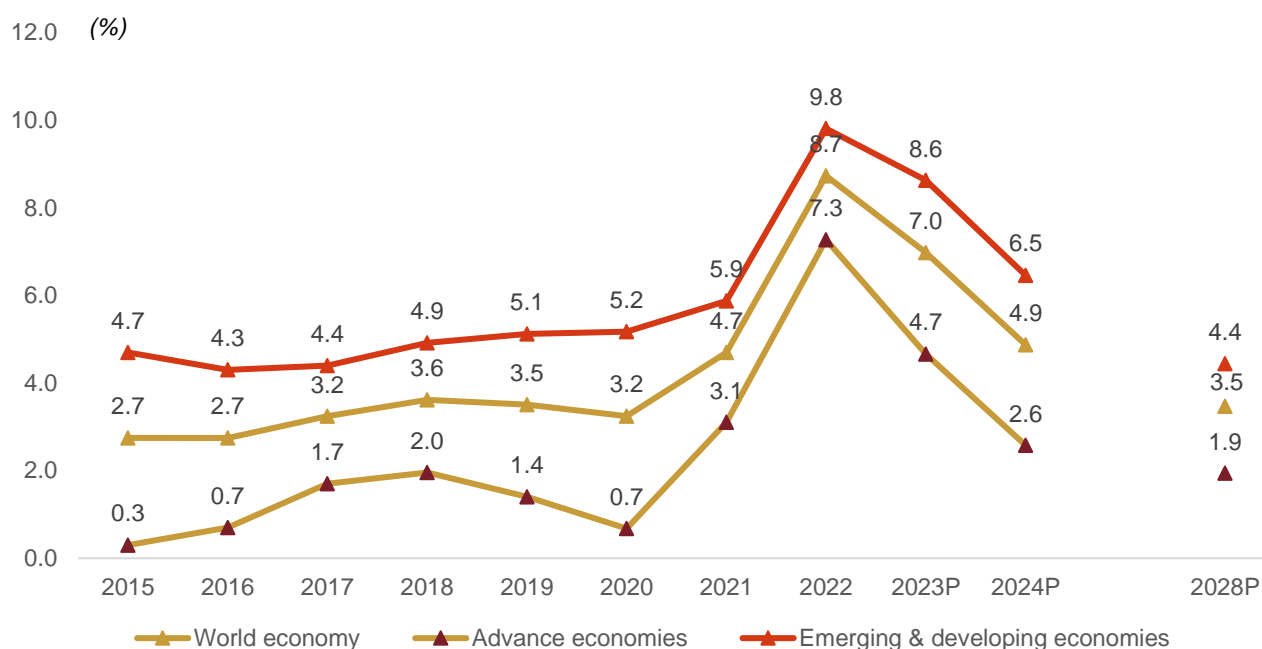
Note: P: Projection

Source: IMF economic database, World Bank national accounts data, OECD national accounts data, CRISIL MI&A

Global inflation declining but remain elevated amid financial sector distress

As per the IMF, while inflation has been declining from mid-2022, it remains elevated. The monetary policy stance of central banks is expected to remain restrictive for longer in the medium term to tackle sticky inflation. IMF estimates inflation for 2023 at 4.7% in advanced economies and 8.6% in emerging market and developing economies. This is 0.1 and 0.5 percentage points higher than projected in IMF’s January 2023 forecast for advanced economies and emerging economies, respectively. Gradual resolution of supply-demand imbalances and a modest pickup in labour supply are expected in the baseline, easing price inflation eventually.

Trend and outlook on consumer prices



Note: P: Projection
Source: IMF, CRISIL MI&A

Global per capita GDP

Global GDP per capita logged 3.4% compound annual growth rate (CAGR) between 2017 and 2022, as per IMF data while India’s GDP expanded at ~4.1% CAGR between 2017 and 2022.

Per capita GDP at current prices for key economies- \$ per capita

©	2017	2018	2019	2020	2021	2022	2023P	2024P	CAGR 2017-2022
US	59,879	62,788	65,077	63,577	70,160	76,343	80,412	83,063	5.0%
Euro area	36,939	39,865	39,001	37,915	42,404	40,819	44,566	46,926	2.0%
UK	40,667	43,378	42,797	40,347	46,422	45,461	48,913	40,667	2.3%
China	8,760	9,849	10,170	10,525	12,572	12,670	12,541	13,156	7.7%
Japan	38,903	39,850	40,548	40,133	39,933	33,854	33,950	34,555	-2.7%
India	1,958	1,974	2,050	1,913	2,238	2,392	2,612	2,848	4.1%
World	10,906	11,457	11,500	11,077	12,468	12,895	13,333	13,872	3.4%

Source: IMF, CRISIL MI&A Research

India remains one of the world’s fastest growing economies in 2022 among key nations

India was one of the fastest-growing economies in 2018 and 2019. In 2020, all countries, including developed ones such as the United States (US) and the United Kingdom (UK), except China, saw their GDP contracting due to the pandemic impact. India’s GDP shrank 5.8% in fiscal 2021 (financial year: April-March). In 2021, GDP growth of all major economies rebounded as economic activities resumed and also due to the low base of 2020. Among the major economies, India, with a growth rate of ~9.1%, was the fastest growing economy in 2021, followed by China at 8.4%. The country also overtook the UK as the fifth-largest economy in the world in the April-June quarter of

2022 and registered GDP growth of 6.8% in 2022. India is expected to grow faster than China in 2023 and 2024 and its GDP is expected to grow 6.1% in 2023 and 6.3% in 2024 as per the IMF forecast.

Real GDP growth by geographies- %

Regions	2017	2018	2019	2020	2021	2022	2023P	2024P
US	2.3	2.9	2.3	-2.8	5.9	2.1	2.1	1.5
Euro area	2.6	1.8	1.6	-6.1	5.4	3.5	0.7	1.2
Canada	3	2.8	1.9	-5.1	5.0	3.4	1.3	1.6
UK	2.4	1.7	1.6	-11.0	7.6	4.1	0.5	0.6
China	6.9	6.8	6.0	2.2	8.4	3.0	5.0	4.2
Japan	1.7	0.6	-0.4	-4.3	2.1	1.0	2.0	1.0
India*	6.8	6.5	3.9	-5.8	9.1	7.2	6.3	6.3
World	3.8	3.6	2.8	-2.8	6.3	3.5	3.0	2.9

Note: P: Projection as per IMF update

*Numbers for India are for financial year (2020 is fiscal 2021 and so on) and as per IMF forecast. CRISIL GDP forecast for India: 9.1% in fiscal 2022, 7.2% in fiscal 2023 and 6.0% in fiscal 2024

Source: IMF economic database, World Bank national accounts data, OECD national accounts data, CRISIL MI&A Research

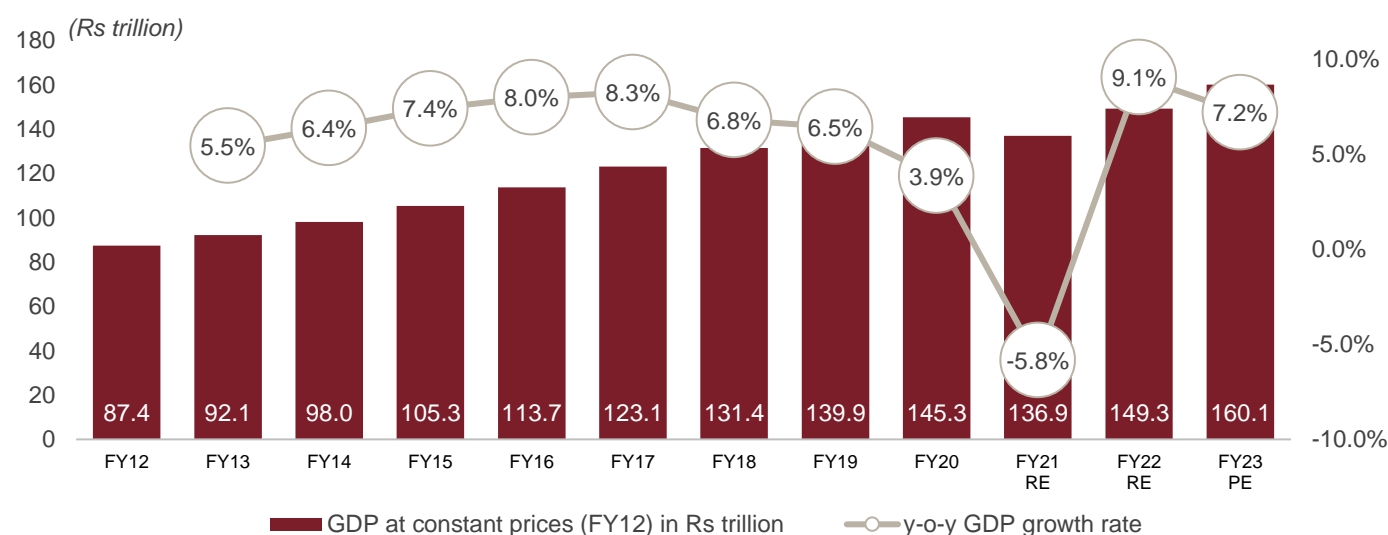
1.2 India's macroeconomic assessment

India's GDP logged 5.7% CAGR between fiscals 2012 and 2023

India's GDP increased at 5.7% CAGR over the past 11 years, from Rs 87 trillion in fiscal 2012 to Rs 160 trillion in fiscal 2023.

India's economy recovered from the pandemic-related stress in fiscal 2022, following resumption of activity and easing of restrictions. However, it faced geopolitical pressures in the final quarter, resulting in higher inflation. Resumption of economic activity and healthy trade flow led to robust 9.1% GDP growth in fiscal 2022 after it had declined 5.8% in fiscal 2021.

Real GDP growth in India (new series)



Note: PE: provisional estimates; RE: revised estimates

Source: Provisional estimates of national income 2022-23, Central Statistics Office (CSO), MoSPI, CRISIL MI&A

GDP grew at a robust rate of 7.2% in fiscal 2023

While the Indian economy's recovery continues to gather pace after the pandemic, there are several risks. Global growth is projected to slow with central banks in major economies withdrawing easy monetary policies to tackle high inflation. This would imply lower demand for India's exports. Together with high commodity prices, especially oil, this may lead to a trade shock for the country. High commodity prices, along with depreciating rupee, indicate higher imported inflation.

The second quarter and third quarter of fiscal 2023 data reflected how the global slowdown had begun to spill over to the Indian economy. However, the economy displayed resilience in the fourth quarter to end the fiscal strongly, at 7.2% growth for the complete fiscal.

India's GDP in real terms is expected to grow at 6% in fiscal 2024

While domestic demand has stayed relatively resilient so far, it would be tested this fiscal with industrial activity weakening due to the global slowdown. Domestic interest rates are rising slower than in advanced nations, and bank lending rates have reached the pre-pandemic five-year average. This is expected to moderate domestic demand, particularly in interest-sensitive industries such as housing and automobiles.

Also, rural income prospects remain dependent on the vagaries of the weather. Therefore, the increasing frequency of extreme weather events remains a key monitorable. While lower demand for the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) jobs is an encouraging sign for the rural economy from a job perspective, depressed wages are a matter of concern for rural demand. Besides the global slowdown, a forecast of El Niño, which disturbs the monsoon, is a key risk to monitor which could hit rural incomes.

Because of these factors, CRISIL projects GDP growth to slow to 6% this fiscal, with risks to the downside.

India's gross value added continues to record healthy growth

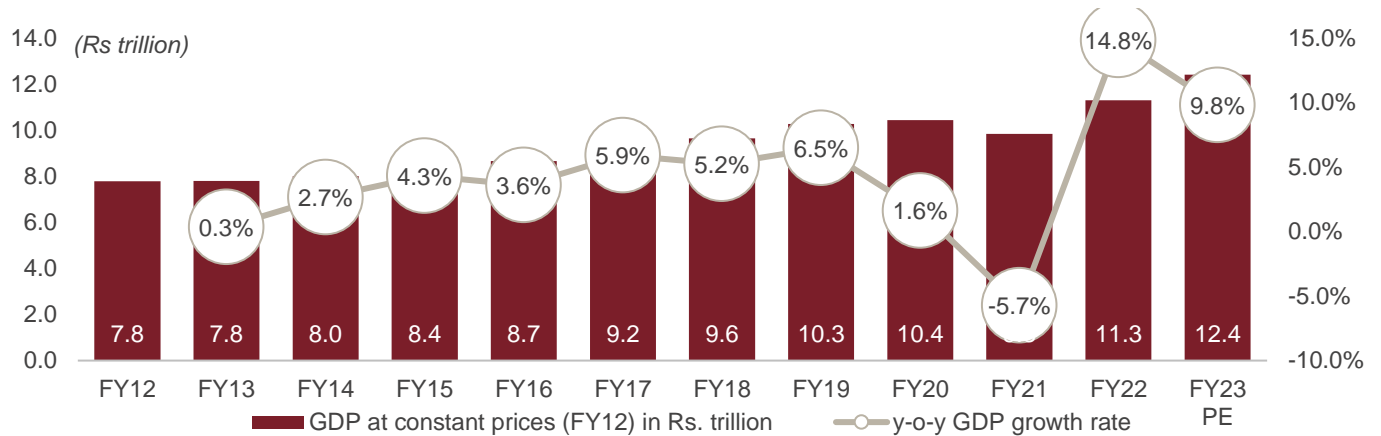
On the supply side, gross value added (GVA) grew 7% in fiscal 2023 as per provisional estimates (compared with 8.8% growth in fiscal 2022). In absolute terms, real GVA was Rs 147.6 trillion in fiscal 2023, up from Rs 138.0 trillion in fiscal 2022.

GVA at constant fiscal 2012 prices

Rs trillion	FY21RE	FY22RE	FY23PE	Share in GVA FY23	Annual growth in FY23
Agriculture, forestry and fishing	20.8	21.5	22.3	15%	4.0%
Mining and quarrying	2.9	3.1	3.2	2%	4.6%
Manufacturing	23.3	25.8	26.2	18%	1.5%
Utility services	2.9	3.2	3.4	2%	9.0%
Construction	9.8	11.3	12.4	8%	10.0%
Trade, hotels, transport, communication and services related to broadcasting	21.6	24.6	28.0	19%	14.0%
Financial, real estate and professional services	29.6	31.0	33.2	22%	7.1%
Public administration, defence and other services	16.0	17.6	18.8	13%	7.2%
GVA at basic prices	126.8	138.0	147.6	-	7.0%

RE: revised estimate, PE: provisional estimate
Source: CRISIL MI&A Research

Construction GVA at constant fiscal 2012 prices



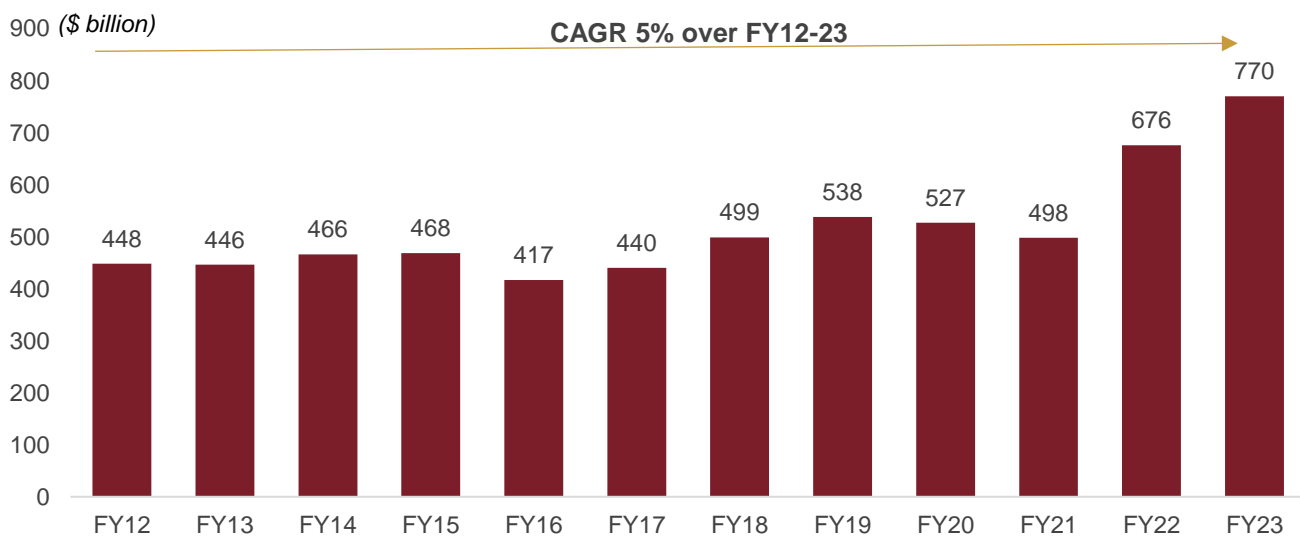
Source: CRISIL MI&A Research

Construction GVA at constant prices grew at 4.3% CAGR from fiscal 2012 to 2023, with a dip in contribution to the overall GVA from 9.6% in fiscal 2012 to 8% in fiscal 2023.

India’s exports increased at 5% CAGR between fiscals 2012 and 2023

India achieved all-time high annual exports of \$770 billion in fiscal 2023, up 13.84% from \$676 billion in fiscal 2022. Merchandise and services exports clocked a steady 5% CAGR during the period. The steady rise in exports can be attributed to India becoming a major manufacturing hub for key products as well as the central government’s push for local manufacturing of key goods.

Trend in India’s exports (merchandise + services)

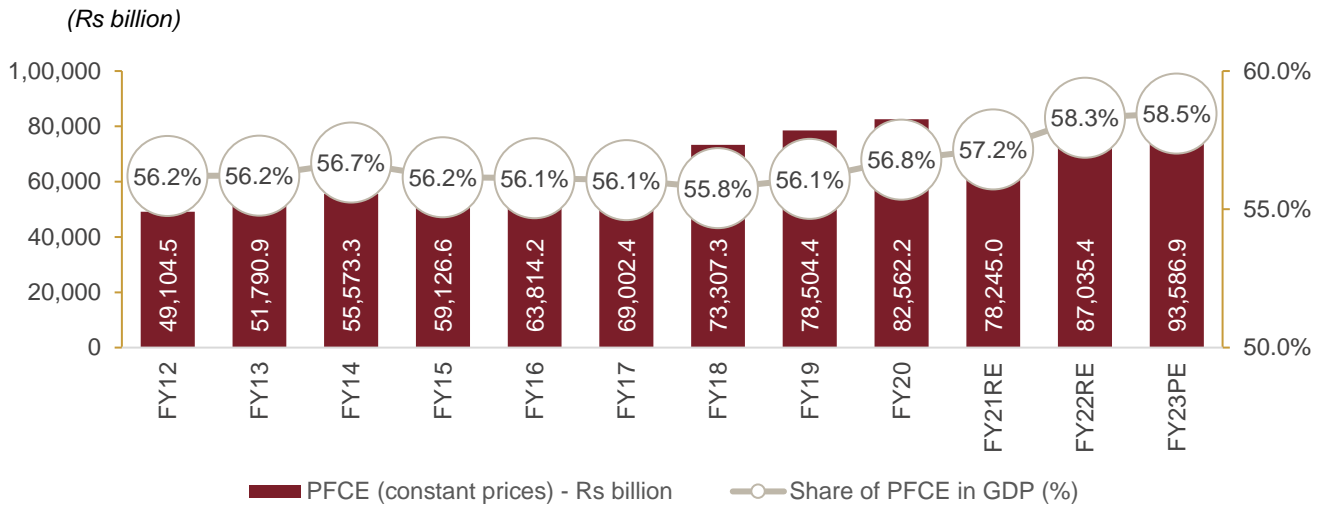


Source: Ministry of Commerce, CRISIL MI&A

1.3 PFCE to maintain dominant share in India's GDP

Private final consumption expenditure (PFCE) at constant prices clocked 6% CAGR between fiscal 2012 and 2023, maintaining its dominant share in the GDP pie at 58.5%, or ~Rs 93,587 billion. It registered 7.5% on-year growth in fiscal 2023. Factors contributing to growth included good monsoons, wage revisions due to the implementation of the Pay Commission's recommendations, benign interest rates, and low inflation.

PFCE (at constant prices)



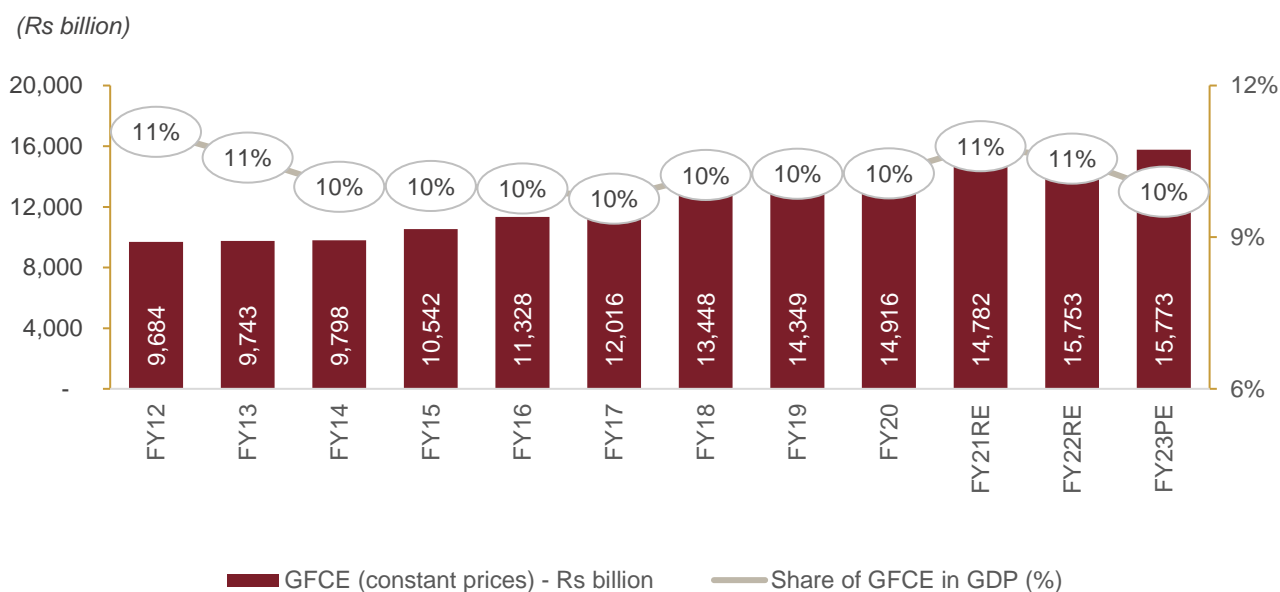
Note: PE: provisional estimates; RE: revised estimates

Source: MoSPI, CRISIL MI&A

1.4 GFCE maintains ~10-11% share in India's GDP

Government final consumption expenditure (GFCE) at constant prices clocked 4.5% CAGR between fiscal 2012 and 2023, maintaining ~10% share in the GDP pie, or ~Rs 15,773 billion. It grew 0.13 % on-year in fiscal 2023

GFCE (at constant prices)



Note: PE: provisional estimates; RE: revised estimates

Source: MoSPI, CRISIL MI&A

India saw robust growth in per capita income in recent fiscals

India's per capita income, a broad indicator of living standards, rose from Rs 63,462 in fiscal 2012 to Rs 98,374 in fiscal 2023, at 4.1% CAGR. Per capita income increased by 7.6% and 6.3% in fiscal 2023 and 2022. Growth was led by better job opportunities, propped up by overall GDP growth. Moreover, population growth remained stable at ~1% CAGR.

Per capita net national income at constant prices

	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21RE	FY22RE	FY23PE	CAGR FY12-23
Per capita net national income (Rs)	63,462	65,538	68,572	72,805	77,659	83,003	87,586	92,133	94,270	86,054	92,583	98,374	4.1%
On-year growth (%)		3.3	4.6	6.2	6.7	6.9	5.5	5.2	2.3	-8.7	7.6	6.3	-

Note: RE: revised estimates, PE: provisional estimates

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

India's per capita GDP grows faster than global average

Global GDP per capita clocked 1.8% CAGR between 2012 and 2022, as per World Bank data. Meanwhile, India's corresponding figure registered 5.5% CAGR.

Per capita GDP at current prices

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	CAGR 2012-2022
India per capita GDP at current prices (\$)	1,434	1,438	1,560	1,590	1,714	1,958	1,974	2,050	1,913	2,238	2,389	5.2%
World per capita GDP at current prices (\$)	10,576	10,738	10,899	10,157	10,209	10,747	11,290	11,330	10,896	12,282	12,647	1.8%

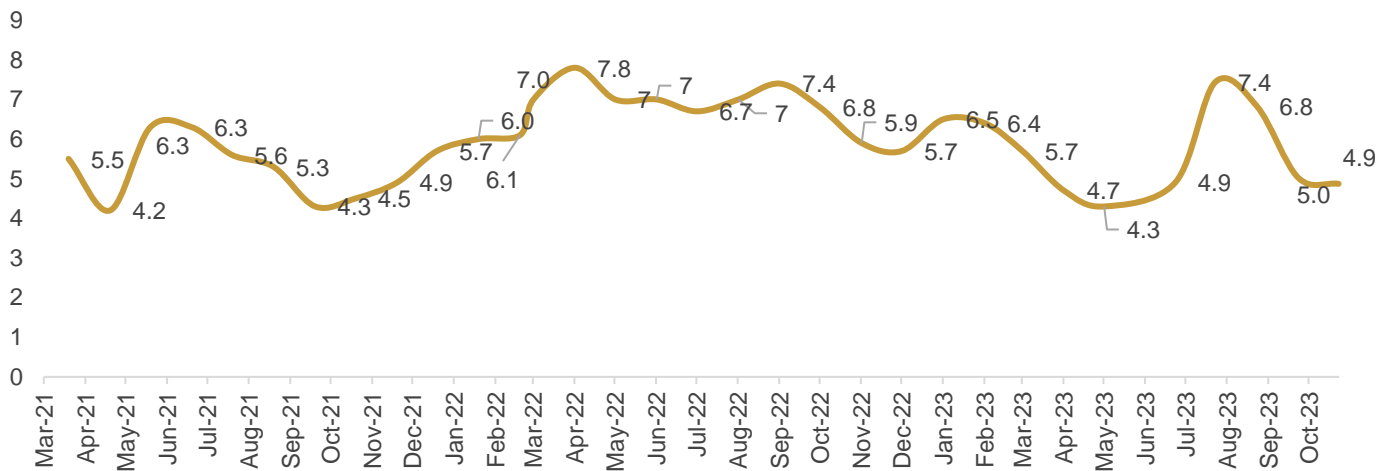
Source: World Bank, CRISIL MI&A

1.5 Review of Consumer Price Index (CPI)

India’s consumer price inflation (CPI) dropped a mild 15 basis points (bps) to 4.87% in October from 5.02% in September 2023, led by a broad-based decline in core and fuel inflation. Food inflation remained steady despite mixed underlying trend. The decline in core inflation (to 4.3% from 4.5% in September) was a result of lower input-cost pressure on producers and, hence, on retail prices. Food inflation was steady — as vegetable prices softened, while pulses prices hardened — near 20% and cereal price inflation remained at ~11%. Spices hit 23%. Meanwhile, fuel inflation declined mildly, as it benefitted from a drop in retail LPG prices.

CPI inflation – Near-term trend

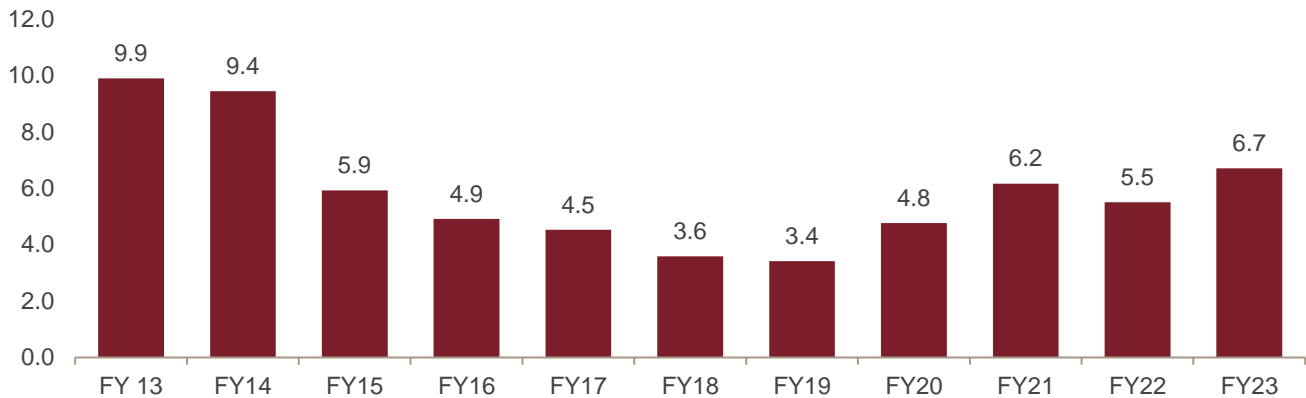
(on-year %)



Source: Provisional estimates for Jul-23 MoSPI, CSO, CRISIL MI&A Research

Annual CPI inflation on year % growth remains at the higher side of the RBI’s target band

(on-year %)



Note: P: Projected

Source: Ministry of Commerce and Industry, MoSPI, CSO, CRISIL MI&A

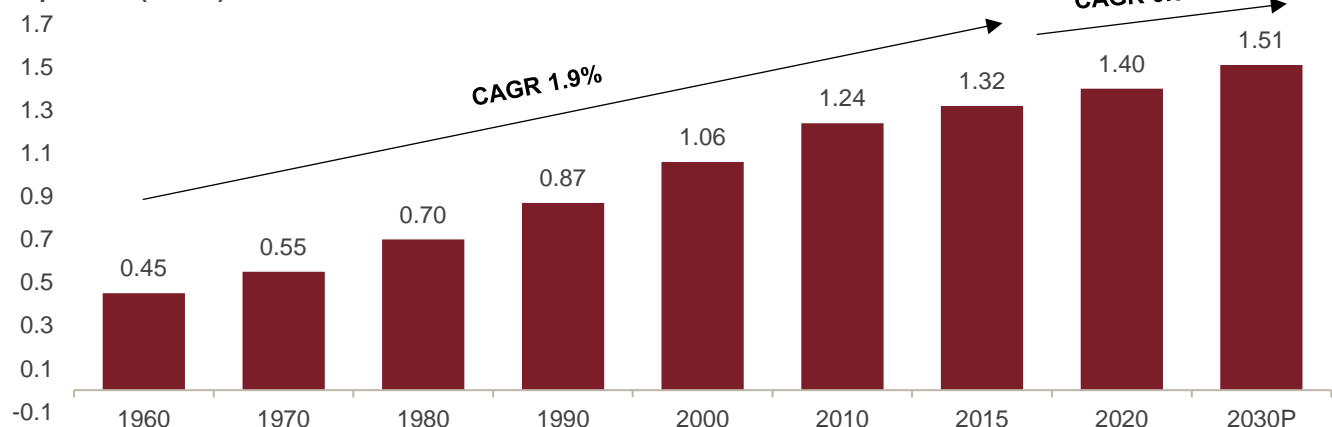
1.6 India’s population is projected to log 0.8% CAGR between 2020 and 2030

India’s population grew to ~1.2 billion according to Census 2011, at 1.9% CAGR during 2001-2011. As per the 2010 Census, the country had ~246 million households.

According to the United Nation’s (UN) World Urbanization Prospects, 2022 revision, India and China, two of the most populous countries, accounted for nearly 36% of the world’s population in 2021. The report projects India’s population to increase at 0.8% CAGR from 2020 to 2030 to reach 1.5 billion. According to the UN estimate, India surpassed China to become the most populous country in April 2023 with 1.425 billion people.

India’s population growth

Population (billion)



Note: P: projected

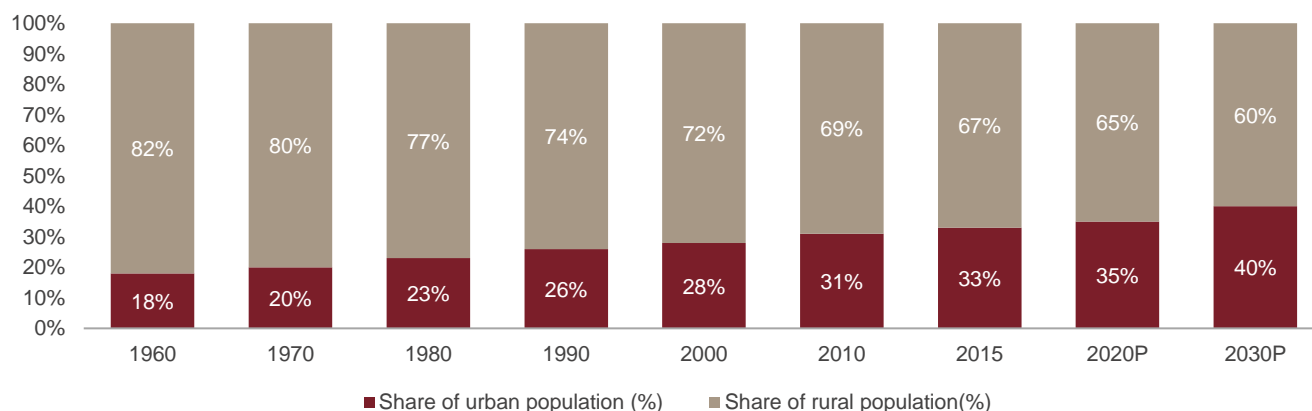
Source: UN Department of Economic and Social Affairs, World Population Prospects 2022, CRISIL MI&A Research

Urbanisation to reach ~40% by 2030

India’s urban population has been rising over the years and stood at ~31% of the total population in 2010. The rising trend is expected to continue. The UN report has projected that nearly 40% of the country’s population will live in urban areas by 2030.

People from rural areas move to cities for better job opportunities, education, and quality of life. The entire family or only a few individuals (generally an earning member or students) may migrate, while the other members continue living in rural house.

India's urban vs. rural population-%



P: Projected

Source: World Urbanization Prospects: The 2018 Revision, United Nations; CRISIL MI&A

Indian population's median age to rise to 30.9 years by 2030

According to the UN, the global median age rose to ~30 years in 2020 from ~20 years in 1970. This is lower than the median age in developed countries such as the US (37.5 years) and the UK (39.5 years).

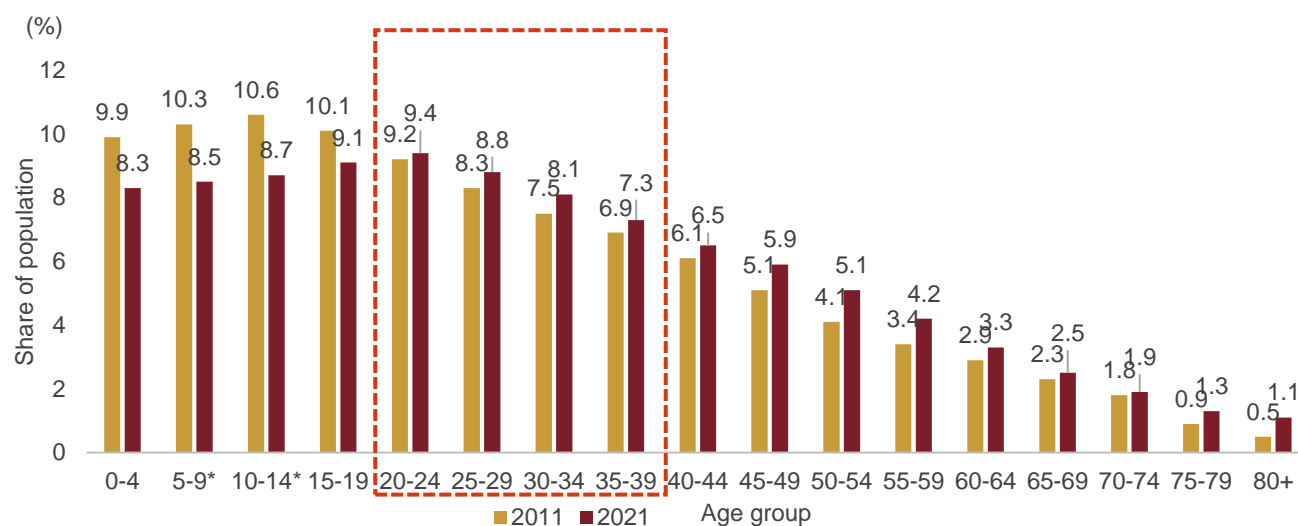
Interestingly, India's median age is 27.3 years, indicating a favorable demographic dividend. Furthermore, it is the lowest among its BRIC peers: Brazil (32.4 years), Russia (37.4 years), and China 38.6 years. This trend is expected to continue up to 2030, implying strong potential for an increase in income, and basic and healthcare spending, with a large proportion of the population being employed. Median age is expected to reach 30.9 years, indicating higher mid-age working population.

Median age trend across key countries

Country	1970	1990	2010	2015	2020	2030P
Brazil	17.3	21.5	28.2	30.3	32.4	36.5
China	18.0	23.7	34.1	35.6	37.4	42.7
India	18.3	20.0	24.0	25.5	27.3	30.9
Russian Federation	29.7	32.2	36.9	37.6	38.6	42.1
UK	33.2	34.8	38.5	39.0	39.5	41.6
US	27.2	31.8	36.1	36.6	37.5	39.7
World	20.3	23.0	27.3	28.5	29.7	32.1

Source: United Nations, Department of Economic and Social Affairs, Population Division (2022); World Population Prospects 2022, CRISIL MI&A

About 32% of the Indian population is in the 20-39 years age group



Source: Census 2011, CRISIL MI&A

Census 2011 pegged India’s population at 1.2 billion; ~51% males and ~49% females. About half of the population was in the 20-60 age bracket. Of this, ~32% was 20-39 years old and projected to rise to ~34% by 2021.

India’s youth to account for ~39% of its population by 2030

As per the United Nations’ 2022 Revision of World Population Prospects, India’s youth (0-24 years) accounted for nearly half its population in 2010, significantly higher than that of some of its peers: Brazil at 42.5%, China at 35.1%, and the Russian Federation at 29.7%. The fact that ~31% of the population is aged below 15 indicates that a high proportion of country’s young population is expected to remain so in the coming years.

This share is, in fact, expected to reach ~39% by 2030, and remain higher than Brazil’s 31.5%, China’s 25.4%, and the Russian Federation’s 27.7%. This also indicates higher proportion of population entering the workforce.

Age-wise population break-up for key countries

Country	0-14 years	15-24 years	25-49 years	50-69 years	70+ years	Total
Brazil						
2010	24.8%	17.7%	37.6%	15.6%	4.4%	100%
2020	20.8%	15.6%	38.3%	19.5%	5.8%	100%
2030P	18.2%	13.3%	37.4%	22.6%	8.4%	100%
China						
2010	18.5%	16.6%	40.3%	19.0%	5.7%	100%
2020	18.0%	11.4%	37.6%	25.5%	7.5%	100%
2030P	13.1%	12.3%	34.0%	28.6%	12.0%	100%
India						
2010	31.0%	19.1%	33.9%	12.9%	3.1%	100%
2020	26.1%	18.2%	36.2%	15.5%	3.9%	100%
2030P	22.3%	16.2%	38.0%	17.9%	5.5%	100%
Russian Federation						

Country	0-14 years	15-24 years	25-49 years	50-69 years	70+ years	Total
2010	15.2%	14.6%	37.2%	23.2%	9.8%	100%
2020	17.7%	9.8%	37.4%	25.5%	9.7%	100%
2030P	15.4%	12.4%	33.8%	25.2%	13.3%	100%
UK						
2010	17.6%	13.1%	34.8%	22.9%	11.6%	100%
2020	17.8%	11.6%	32.5%	24.4%	13.7%	100%
2030P	15.4%	12.2%	31.9%	24.5%	15.9%	100%
US						
2010	19.9%	14.1%	34.1%	22.8%	9.1%	100%
2020	18.5%	13.1%	33.0%	24.7%	10.7%	100%
2030P	16.4%	12.5%	33.2%	23.0%	14.8%	100%

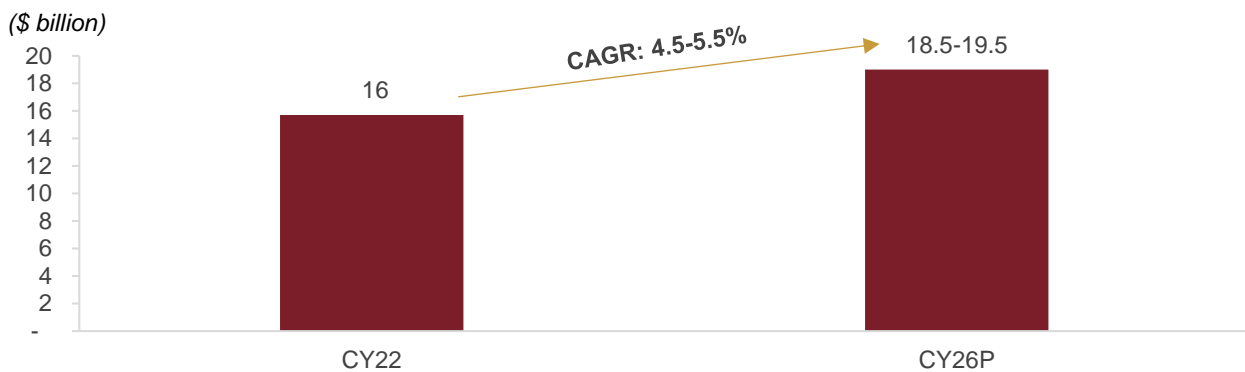
P: Projected

Source: United Nations, Department of Economic and Social Affairs, Population Division (2022); World Population Prospects 2022, CRISIL MI&A

2. Assessment of welding consumables industry

Welding consumables are used across industries to manufacture essential products. In the welding process, the selection of appropriate welding consumables, such as electrodes and wire, holds immense significance. These seemingly small components play a vital role in ensuring welds of exceptional quality and durability. They impact the strength, integrity, and appearance of the final weld.

2.1.1 Global welding consumables industry



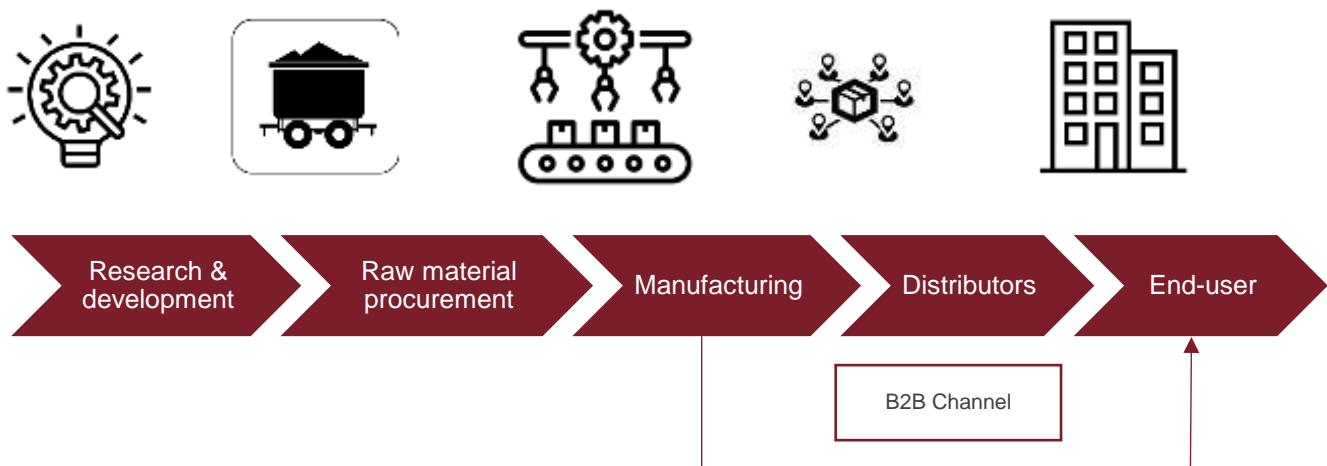
Note: E: Estimated, P: Projected

Source: International Market Analysis Research and Consulting Group (IMARC) welding consumable market report

The global welding consumables market was estimated at ~\$15.7 billion in calendar year (CY) 2022, and is projected to grow to ~\$18.5-19.5 billion in CY26, at a CAGR of ~5 %.

Growth of the welding consumables industry is driven by the automotive, construction, oil and natural gas, and commercial aerospace end-use industries. Wide acceptance and implementation of automated welding techniques, which resulted in a diverse array of welding solutions, will further drive growth. Rise in urban population along with increasing technological advancement in various industries will contribute as well. However, challenges do exist; for instance, in developing countries adoption of welding consumables is slow due to lack of skills and limited capital.

2.1.2 Value chain of global welding consumable market



2.1.3 Share of global welding consumables market by region

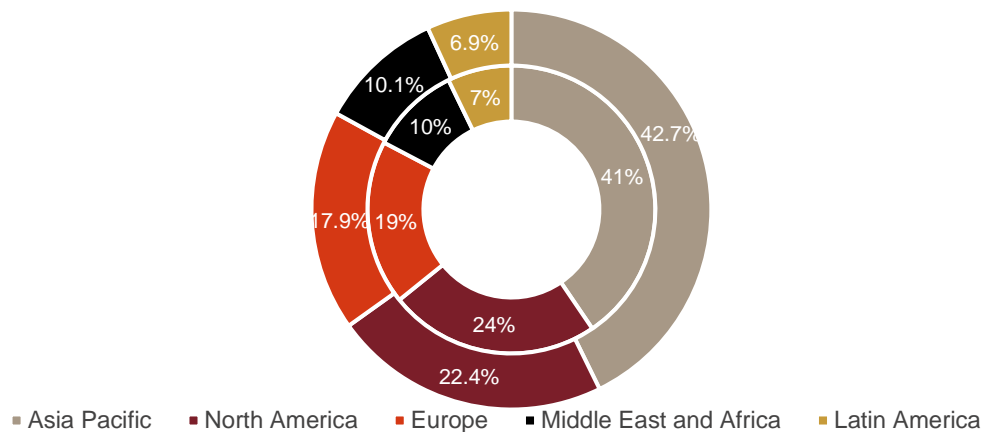
In the welding consumables market, the Asia-Pacific region has the highest share, with around 41% contribution in global welding consumables market. With the availability of cheap manufacturing in Asian countries, such as China and India, many global industrial players make their production facilities in this region, leading to higher demand for welding consumables.

North America has the second biggest market for welding consumables after Asia, due to the presence of large automotive and component manufacturers. Europe’s market share in the welding consumable market is about 18% in 2023, with Germany, the UK and France driving market growth. In Germany, the welding consumables market is promoted by the boost in the housing sector.

In the Middle East and Africa region, growth is led by construction in GCC countries, such as the UAE, Qatar, and Saudi Arabia. In this region, key end industries with high consumption of welding consumables are construction and automobile.

Latin American countries, such as Argentina, Mexico, Colombia, Brazil, Venezuela, where oil and gas is a key industry, are creating a demand for welding consumables market. In some of the countries, the rise in the automobile sector due to improving economies is also promoting the market.

Region-wise share in global welding consumables market



Note: Inner circle – CY22; Outer circle – CY25P

UK is included in Europe

Source: International Market Analysis Research and Consulting Group (IMARC) welding consumable market report

2.1.4 Share of global welding consumables market by end use industry

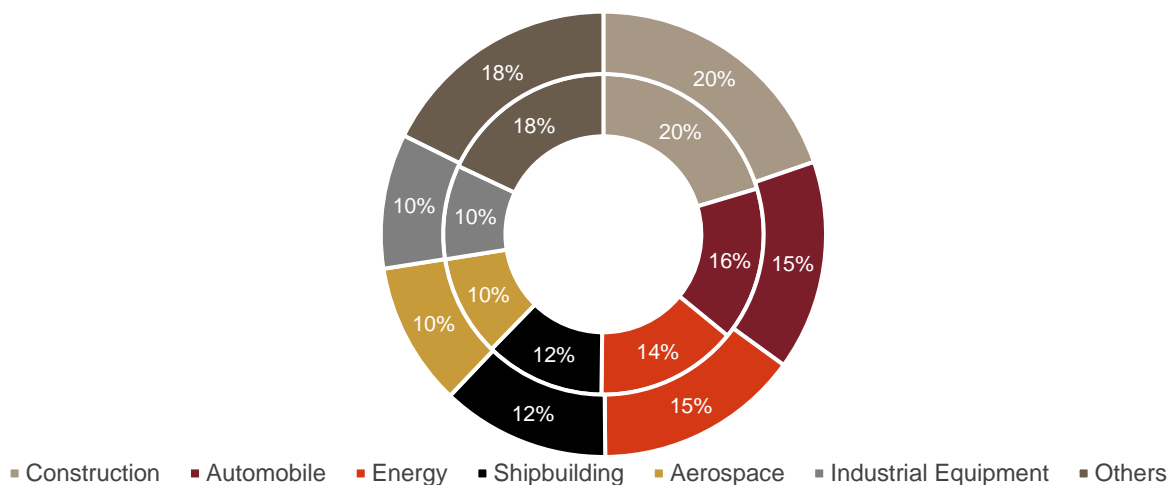
Among the key end use industry for welding consumables market, the construction industry captures a key portion of the market. Growth of construction projects across countries, such as China, India, and the US, in sectors such as housing, education, healthcare, and social infrastructure will facilitate growth in the welding consumables market.

In the automobiles industry, welding consumables play a key role for the manufacturing of vehicle parts with high quality and light weight. New automobile designs and new safety features in the automobile sector would drive growth in the welding consumables market.

In the energy industry, welding increases the strength of the oil and gas pipes. So, a rise in new oil and gas pipelines globally will drive growth in the welding consumables market. Along with the oil and gas industry, welding plays a key role in power generation industry as well. So, as countries such as China and India invest in thermal power industry for power generation, spending in the welding consumable market would likely grow.

In other sectors, such as shipbuilding, aerospace, and industrial equipment, investments in production facilities for new plants and maintenance, along with rising demand for aircraft, ships, and other industrial equipment, would drive growth in the welding consumables market.

Industry-wise share in global welding consumables market



Note: Inner circle – CY22; Outer circle – CY25P

Source: International Market Analysis Research and Consulting Group (IMARC) welding consumable market report

2.1.5 Key drivers and trends in the global welding industry

- With rising urbanization and disposable income in the developing countries, a lot of investment is expected in the infrastructure sector. Not only in construction sector, industrial sector in developing countries is also emerging and growing at a healthy rate. As welding is a key component of construction and industrial sector, growth in these industries is expected to boost the consumption and, in turn, growth of welding consumables market
- As demand for energy increases globally, there would be a rise in oil and natural gas pipeline infrastructure. Welding plays a key role in oil and natural gas pipeline infrastructure, as transportation of these fuels requires joining of many pipes through welding. So, with the rising demand for energy due to increasing population, industrialization and mobility, investments in the oil and gas industry would support growth in the welding consumables market.
- The automotive sector is witnessing strong growth in both developed and developing countries, driven by economic growth, rising population and investment in infrastructure across these countries. Also, the automotive sector is witnessing a rise in the use of welding techniques, due to the growing demand for customized products. So, demand in the automobile sector will promote growth of the welding consumables market.

2.1.6 Impact of Covid-19 on the global welding industry

Like other industries, the global welding industry too got impacted by Covid-19 on both demand and supply sides. On the supply side, the industry faced many challenges, such as lack of labour, global and domestic supply chain disruptions. These supply chain disruptions resulted in delays in sourcing of key raw materials along with distribution of end products.

From the demand side, due to lack of uncertainty and low demand across industries, such as automotive and construction, due to lockdowns and dip in economies, demand for welding consumables sector, in turn, dipped, affecting most key welding consumable manufacturers in the market.

2.2.1 Welding consumables market in India

Manufactures in India heavily rely on welding consumables as a primary technique for joining metals, as no other method offers such wide-ranging benefits. Welding consumables, which are materials that facilitate the joining of two metal or alloys, are critical components of welding operations, as the quality and strength of the joint in welding is dependent on them. As different welding consumables have different properties and characteristics, selection of consumables vary according to the type of metals that are being welded, the process used in welding, and the application of the final products.

An overview of the key sub sectors in the welding consumables market

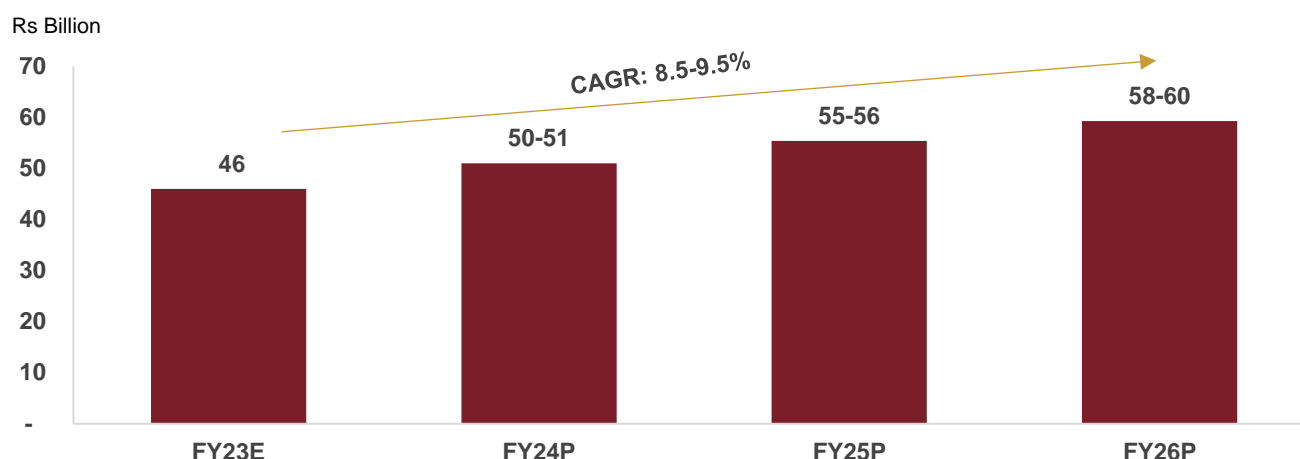
Sub-sector	Sector overview
Filler wires	<ul style="list-style-type: none"> Filler wires are used to secure strong joints between two metals, as these wires melt and flow in the middle of the two metals and form a joint Solid wire, flux-cored wire and metal cored wire are some of the common types of filler wires
Welding electrodes	<ul style="list-style-type: none"> In the welding circuit, welding electrodes serve the purpose of conducting electrical current to the workpiece Electrodes sometimes also act as filler metal, such as in manual arc welding and gas metal arc welding in the form of consumable electrodes. There are three key types of electrodes-bar electrodes, light-coated electrodes, and shielded arc electrodes
Flux	<ul style="list-style-type: none"> It is used to prevent contamination by oxygen and other contaminants of molten weld metal Apart from preventing oxidation of the molten weld metal, it is also used to provide additional heat during welding operation and improve the quality of high strength welds

Welding consumables are used extensively in the infrastructure sector in construction of roads, bridges, ports and airports. Also, welding consumables form a key component for constructing and maintaining plants across industries, such as power, cement, railways and automotive.

2.2.2 Market size of the welding consumables industry in India

Welding consumables market in India is estimated at around Rs 46 billion in fiscal 2023, with fiscal 2026 projections around Rs 58-60 billion. Due to the rise in demand for improved infrastructure, a lot of investment is happening in infrastructure development, such as construction of roads, bridges, ports and airports. This investment in infrastructure is one of the key growth drivers for the welding consumables sector, because welding is indispensable in the construction industry, as it provides strong and reliable joining solutions for structural components.

Trend in welding consumables market in India



Note: E — estimated, P — projected

Source: CRISIL MI&A

Also, expansion of industries such as heavy engineering, energy, oil & gas, shipbuilding, railways, power, transportation, and automotive, promotes growth of the welding consumables sector due to construction and maintenance of plants in these industries. As India aims to become a global manufacturing hub, growth in the manufacturing sector will lead to a rise in the welding consumables sector. Government initiatives such as National Infrastructure Pipeline, in which about Rs 111 lakh crore is to be invested in infrastructure during fiscals 2020 to 2025 in sectors such as heavy engineering, roads, urban infra, and railways, along with industrial reforms, such as 'Make in India' and 'Atmanirbhar Bharat', will support growth in the welding consumables sector.

2.2.3 Key product segments in the Indian welding consumables industry

1. Filler wire

These wires/metals are used to secure a strong bond between the two metal joints during the welding process. When heated, these metals melt to flow into the space between the two close fittings, forming a joint. Filler wires contribute to the reinforcement and durability of weld joints, minimizing the risk of cracking when the metal joint is subjected to stress or strain. Filler wires are available in various configurations, based on need of MIG, TIG and SAW welding procedures.

Common types of filler wires are **solid wires, flux-cored wires and metal-cored wires**. A solid wire, which is typically a continuous solid wire, is often coated with copper to prevent oxidation, enhance electrical conductivity, and extend the lifespan of the welding contact tip. Flux-cored wires use electric arc fuse for joining two pieces of metal together. These wires protect the welds from contamination and oxidation. A metal-cored wire consists of a tubular wire that is filled with metallic powder, alloys, and arc stabilizers. Its utilization provides advantages, such as increased duty cycles, faster travel speeds, reduced fume emissions, and enhanced cost-effectiveness.

There are many types of filler wire metal, with each metal serving a purpose and use. Mild steel, widely employed in welding, finds extensive applications for joining various base materials, including carbon steel and low-alloy steel. Stainless steel demands a more robust alloy with increased tensile strength compared with mild steel. Tungsten inert gas (TIG) and plasma arc welding employ a distinct type of filler metal, distinct from other welding processes.

Filler metals are frequently utilized to achieve a more seamless weld deposit and mitigate porosity problems. One approach is to select a filler metal with a chemical composition matching that of the base material, ensuring similarity in characteristics between the weld pool, weld deposit, and base material, thereby minimizing post-welding concerns, such as cracking and distortion in the final product arising from disparities in properties.

2. Welding electrodes

A welding electrode is a metallic rod that contains two distinct metals, wires, or filler materials. When connected from a welding machine to the base metal, it undergoes melting due to the intense electrical heat, facilitating the joining of two separate metal parts with a strong and seamless result.

Types of welding electrodes include bar electrodes, light coated electrodes, and shielded arc electrodes. Bare electrodes, which lack any form of coating, are primarily utilized in applications, where a coated electrode is unnecessary. Lightly coated electrodes are an enhanced variant of bare electrodes, featuring a thin layer of coating that measures a few tenths of a millimeter in thickness. Shielded arc electrodes have a layer of heavy coating. These electrodes are utilized to achieve high-quality welding metal by preventing the formation of oxides and nitrides through a substantial coating layer.

The utilization of these electrodes enhances the melting speed, thereby expediting the welding process. Coating of electrodes provides insulation, allowing their usage at high currents. These electrodes enable an effortless execution of overhead and vertical welding tasks. Also, the electrodes are protected from contamination due to coating.

2.2.4 An overview of key regulations in the welding consumable industry in India

The Indian welding consumables industry is regulated by key laws and certifications, which are required to set key standard and specifications for various products in the industry. One of the key regulations for operating in this industry is to get ISO certifications from Bureau of Indian Standards (BIS). A summary of key certifications for the welding consumables industry is as follows:

1. IS 2879:1998

This certification encompasses the specifications for mild steel billets, blooms, cast billet ingots, and wire rods intended for use as core wire in metal arc welding electrodes. For this certification, the chemical composition of specimen is analysed for each element and material structure of the specimen is tested for the allowed tolerance. The steel used for the electric rod shall be provided in the form of billets, cast billet ingots, or wire rods, with sizes as specified by the purchasers. While manufacturing, sufficient reduction and discard shall be made from each ingot to ensure freedom from piping, segregation, and other harmful effects.

2. IS 10631:1983

This standard outlines the specifications for stainless steel in the form of billets and wire rods, which are utilized in the manufacturing of welding electrode core wire. The stainless steel used for the core wire of electrodes shall be provided in the form of billets or rolled wire rods, with sizes as specified by the purchaser. Electric melting process shall be used to manufacture steel. Chemical composition of specimen is analysed for each element and material structure of the specimen is tested the allowed tolerance.

3. IS 9857:1990

This standard encompasses the requirements and testing procedures for single-core flexible cables utilized in welding circuits. For the certification, annealing, conductor resistance, thickness of covering and high voltage water immersion test is conducted.

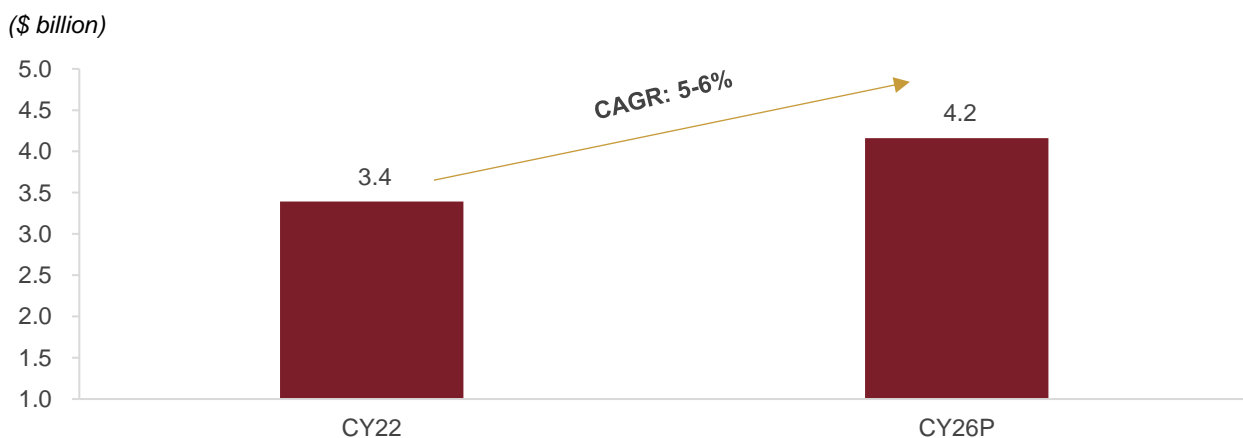
4. IS 15789: 2008

This standard provides specifications for continuous flux-cored electrodes used in metal arc welding, with or without shielding gas. The electrodes are designed to deposit carbon or carbon-manganese steel weld metal, which possess a tensile strength of up to 610 MPa. Chemical analysis, radiographic soundness test, all weld metal tensile strength, Charpy V-Notch Impact Test, fillet weld notch test, transverse tensile test, longitudinal bend test and diffusible hydrogen test are conducted for this certification. Upon conducting an on-site visit to the manufacturing premises, the Bureau evaluates the manufacturing infrastructure, production process, quality control measures, and testing capabilities. Based on a successful assessment, the Bureau grants a license to the manufacturer.

3. An assessment of the wear plates industry

3.1.1 Global wear plates market

Globally, wear plates play an essential role in plants across industries in protecting key equipment, increasing efficiency by reducing the frequency of part replacements and providing cost-saving benefits. The global wear plates market is estimated around \$3.4 billion for calendar 2022, with calendar 2026 projections around \$4.2 billion at ~5-6% CAGR. The demand of construction equipment and the need to protect key mining equipment is driving growth in the wear plates sector globally. Also, growing application of wear plates in the mining industry to prevent abrasion and increasing lifespan of mining equipment is driving growth in the market.



Note: E — estimated, P — projected

Source: International Market Analysis Research and Consulting Group (IMARC) wear plates market report

3.1.2 Share of global wear plates market by region

Asia contributes the highest in the consumption of wear plates market globally, as it is the largest coal mining region in the world. To protect key mining equipment, wear plates are used and are in demand in the region.

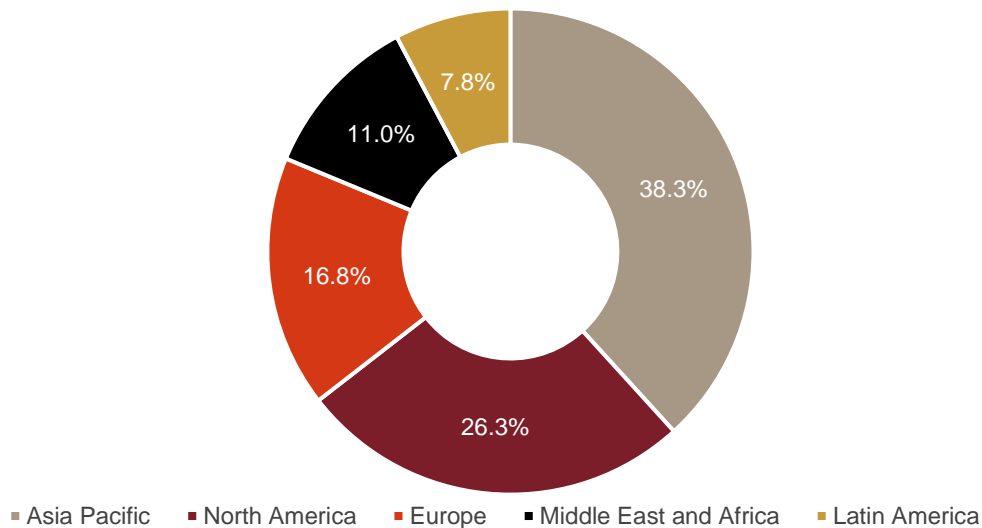
In Europe, several infrastructure projects, especially in the transportation sector, are creating demand for wear plates in the region. Additionally, in this region, a lot of mining activity for minerals, such as iron ore, zinc and gold, also create demand for wear plates in the region.

In North America, there is a surge in mining activities in countries, such as Canada, for copper, nickel and cobalt. These mining activities, along with infrastructure development in the region, are fueling the demand for wear plates.

In Latin America, increasing urbanization and population are promoting the demand for commercial as well as residential construction in the region. The rise in such construction programs will create demand for the wear plates sector.

In the Middle East, exploration, and extraction of key minerals, such as oil, natural gas and gold, are the key components of their economy with substantial investments. These activities would require wear plates to protect key components, thus promoting the wear plate market. Also, a lot of infrastructure investment is happening in the Middle East region - such as the Neom project - to boost the economy, thus also enabling growth in the wear plates sector.

Region wise share in global wear plates market-CY22



Note- UK is included in Europe

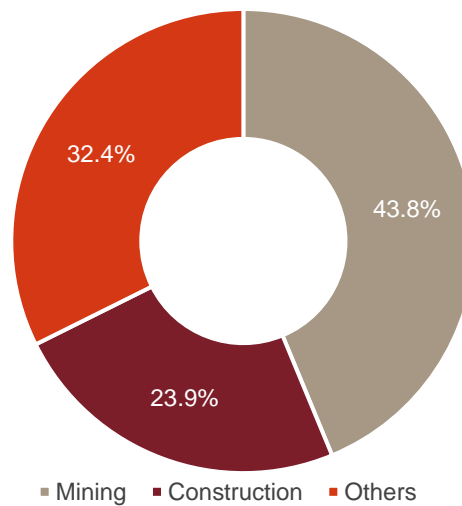
Source: International Market Analysis Research and Consulting Group (IMARC) wear plates market report

3.1.3 Share of global wear plates market, by end-use industry

Mining and construction industry are the key contributors to the consumption of the wear plates globally. During mining, while transporting ore material, loading and unloading leads to abrasion in wear plates. This way wear plates form a key part of the mining industry and investments in the mining sector globally will push consumption of wear plates. Also new technological developments in wear plates used in mining operations also create demand for these plates.

Globally, the construction sector attracts investments due to rising urbanisation, population and growing industrialisation. These investments in the construction sector led to demand for construction equipment and machinery. These machineries require wear plates to prevent abrasion and for a longer life span. Thus, the rise in the construction sector is one the key factor driving growth in the wear plates industry

Industry-wise share in the global wear plates market, CY22



Source: International Market Analysis Research and Consulting Group (IMARC) wear plates market report

3.1.4 Key drivers and trends in the global wear plates industry

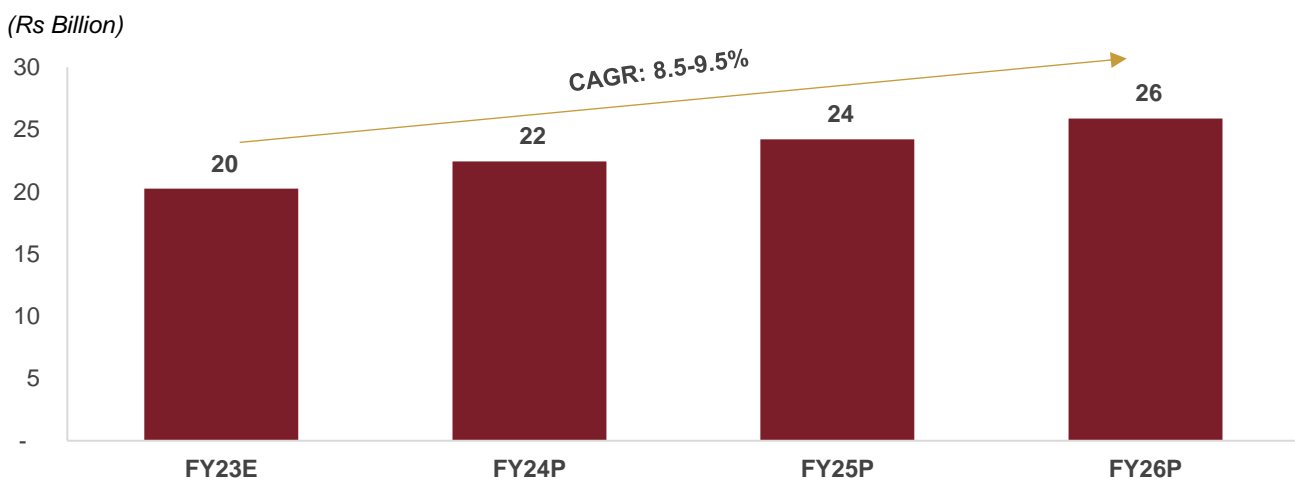
- As the mineral resources play a key role in the world economy, the mining sector globally is expected to witness high investments in the sector. With these investments in the mining sector, a portion would be in upgrading and maintaining the mining equipment. As wear plates protect mining equipment against abrasion, these plates would play a key role in the mining industry and thus would attract high consumption in this sector
- As the global economy grows, various economies in the world would invest heavily on infrastructure development, due to rising urbanisation and increasing industrialisation. With the investment in the construction industry, protecting construction machinery and equipment against abrasion would be vital. Since wear plates play a key role in extending the life of construction machinery and equipment, these plates would see a constant demand from the construction sector.
- In the wear plates market, key innovations, such as laser cladding, plasma transferred arc and advance casting methods, are promoting wear plates with increased durability. Similarly, other advancements in technology in the wear plates sector, would attract new customers in these sectors looking for high-performance wear plates with customised options. Similarly, adopting new composite materials, such as wear-resistant composite materials over traditional wear plates would offer new opportunities for this market, as these composite materials offer advantages, such as being lightweight, increased customizability and lower maintenance requirement.

3.2.1 Indian wear plates market

Wear plates serve as a safeguard to vulnerable surfaces from harsh abrasion or impact, when encountering other surfaces. Key application of wear plates is where friction between two components or material leads to deterioration. As these plates are replaceable components, they protect value equipment against excessive wear and potential damage. Wear plates are used in a variety of industries, such as construction, mining, energy and power, railways, and quarries, as these plates reduce downtime from damaged equipment, cost of part replacements and maintenance for the uninterrupted use of equipment and machines. Key players operating in the wear plates market in India are Jindal Steel, AM/NS and Diffusion Engineers.

3.2.2 Market size of wear plates market in India

The wear plates market in India is estimated at around Rs 20 billion in fiscal 2023 and is expected to grow at a CAGR of 8.5-9.5% to ~Rs 26 billion in fiscal 2026. Wear plates are an essential part of various industries, such as power plants, steel mills, quarrying and cement, as these plates protect key components of these industry. As India continues to undergo rapid industrialisation, each of these industries would grow and require wear plates to protect their equipment and machinery. Additionally, as investments in the Indian infrastructure market will grow, the construction industry will promote the consumption of wear plates for long and durable equipment and machines. Also, increased focus by the mining industry to improve the lifespan of mining equipment will also lead to a stronger the wear plates sector.

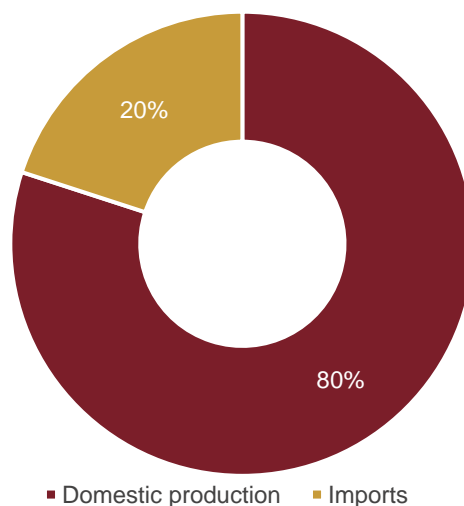


Note: E — estimated, P — projected

Source: CRISIL MI&A

Other key industries where wear plates are used, such as cement and power, saw a rise in investments in fiscal 2023. Investments in these sectors, due to a rise in infrastructure and demand for power, created a lot a demand for the wear plates sector. Machinery in powerplants and cement industries use wear plates in maintenance as well in in setting up of new plants to promote a longer lifespan of the plant equipment.

Wear plates market in India split by domestic production and imports, FY23



Source: CRISIL MI&A

Indian domestic consumption of wear plates in fiscal 2023 was met by 80% domestic production and 20% by imports. A few years ago, the contribution of imports in the market was higher, but with the rise in the number of Indian manufacturers of wear plates, the sector's imports declined. CRISIL expects a further rise in domestic production, with even lesser share of imports in the sector.

3.2.3 Recent trends in wear plates market

Utilisation of wear plates extends the operational lifespan of business materials, leading to a substantial increase in business profitability. Following are the key emerging trends in the wear plates sector:

1. Laser shock processing

This is one of the key technological trends in the wear plate sector. This technique involves generating and manipulating shockwaves in metallic materials, thereby improving surface properties to combat crack growth, wear, and stress corrosion cracking. By employing computational models, this method optimises the entire design and production processes, ultimately producing industrial wear plates with exceptional resistance.

2. Use of wear resistant coatings

Though majority of wear plate manufacturers use cold spray process, achieving the desired volume ratio of hard materials within the wear-resistant coating materials poses a challenge. Developments in coating powders and high particle velocities enabled increased incorporation of hard materials, resulting in coatings with higher hardness and improved wear performance.

3. Rising demand from OEMs

Original equipment manufacturers (OEMs) are increasingly favoring wear plates over traditional alternatives. The shift is driven by the superior performance and enhanced durability of wear plates, which lead to improved equipment lifespan and reduced maintenance expenses. This growing preference highlights the significant advantages wear plates offer in various industries and applications.

4. Assessment of heavy engineering capital goods industry

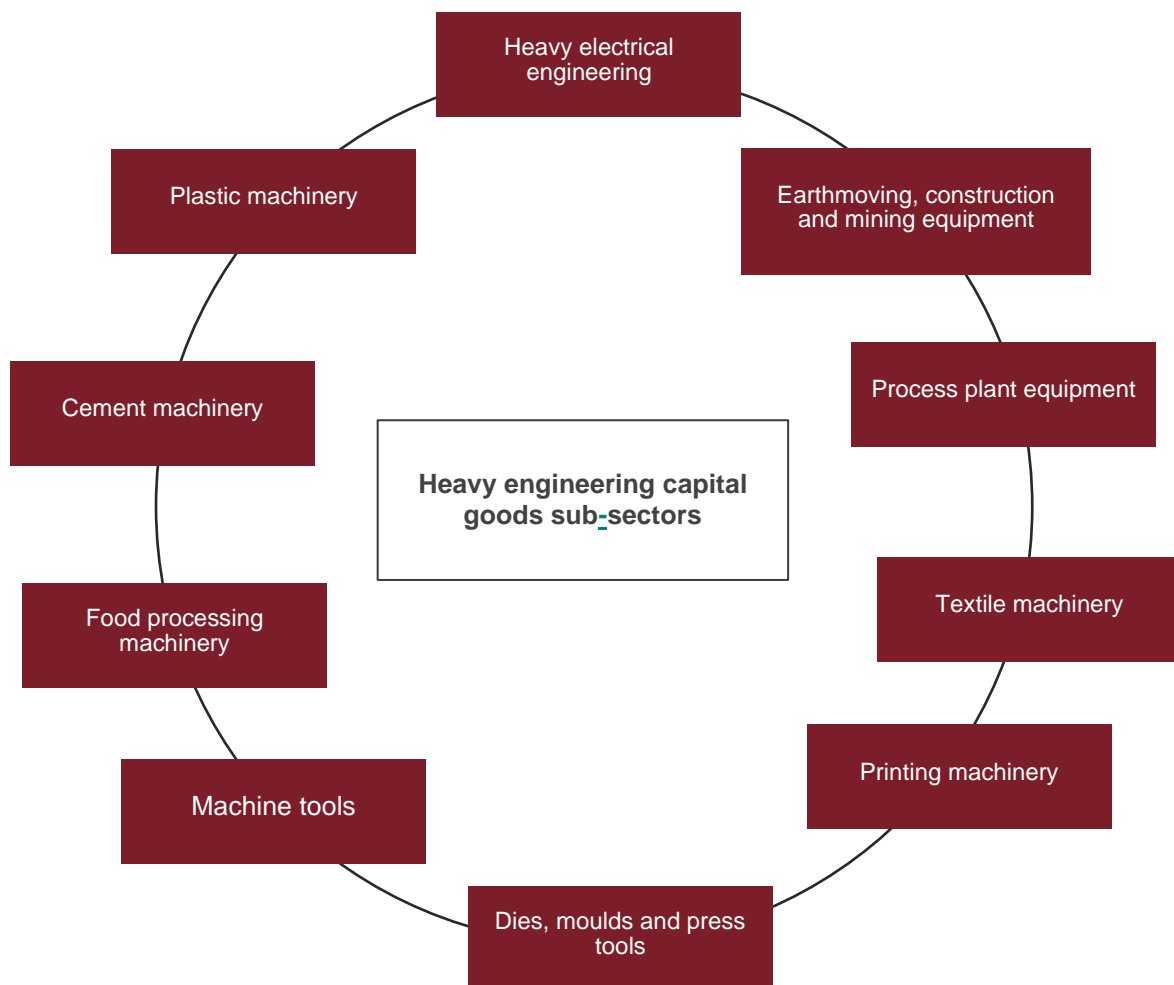
Domestic heavy engineering capital goods industry estimated at Rs 2,650-2,750 billion as of fiscal 2023

India's engineering sector is divided into two segments: heavy and light engineering. This classification is based on the nature of the product and the technology used for processing. Heavy engineering includes manufacturing and assembly of industrial machinery and plant equipment for various end-use sectors.

Equipments are designed and manufactured to suit end-use applications for industries such as fertilizer, textile, chemical, refinery, petrochemical, and oil and gas, as well as for the thermal and nuclear power sector.

On the other hand, light engineering includes sub-sectors, manufacturing everything from basic to sophisticated equipment. Light engineering products (components, parts, and small equipment) find application in automobiles, industrial machinery, power, oil and gas, fertilizers, steel, refineries, petrochemicals, cement, and railways sectors; and serve as inputs for the heavy engineering capital goods sectors.

Heavy engineering capital goods industry in India includes the following sub-sectors, as per CRISIL



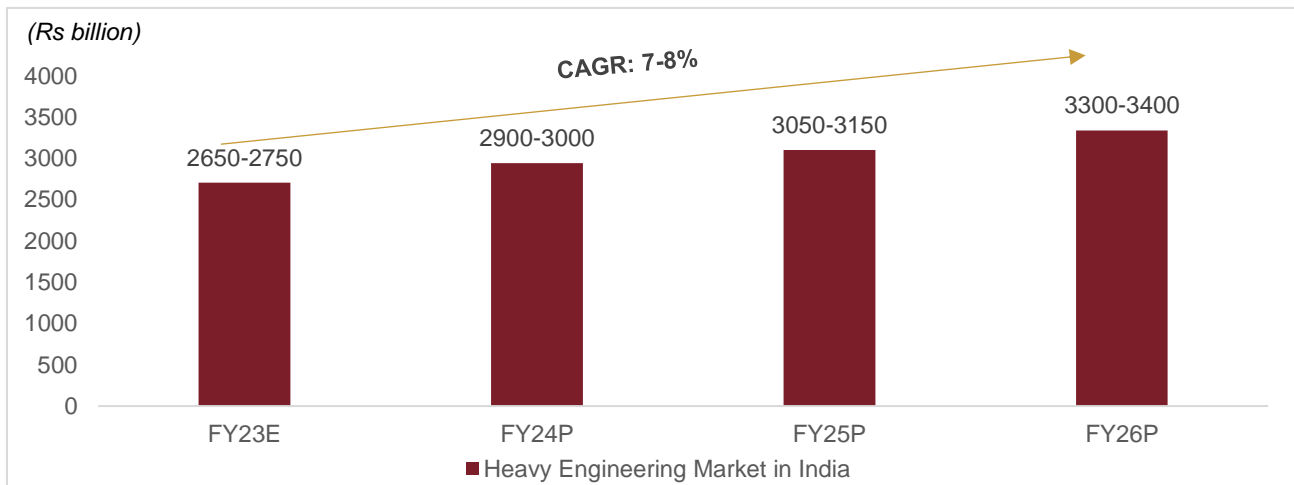
Overview of key sub-sectors

Sub-sector	Overview
Heavy electrical engineering	<ul style="list-style-type: none"> A key manufacturing sector, catering to the needs of the energy, power and other industrial sectors Major equipment, like boilers, generators, turbines, transformers, and switch gears and related accessories, are manufactured in this sector The performance of this sector is closely linked to the country's power capacity addition programme
Earthmoving, construction and mining equipment	<ul style="list-style-type: none"> Manufactures backhoe loaders, compactors, mobile cranes, pavers, batching plants, crawler crane, transit mixer, concrete pump, tower cranes, hydraulic excavators, dumpers, mining shovel, walking draglines, dozers, wheel loaders, graders, drilling equipment, tunnelling machine, etc
Process plant equipment	<ul style="list-style-type: none"> Caters to industries such as oil and gas, chemical, pharmaceuticals, fertilisers, etc
Textile machinery	<ul style="list-style-type: none"> Majority of textile machinery manufacturers in the country are small and medium enterprises (SMEs) Key textile machines: weaving, spinning, winding, processing and synthetic fibre machines High-end technology machines other than in the spinning segment are mostly imported
Printing machinery	<ul style="list-style-type: none"> Majority of printing machinery manufacturers are SMEs Key printing machines: web offset printing, UV coating curing, flexographic printing, screen printing, wire stitching and lamination machines
Dies, moulds, and press tools	<ul style="list-style-type: none"> Consists of commercial tool makers engaged in design, development, and manufacturing of tooling in the country. Along with commercial tool makers, several government tool rooms-cum-training centres are also operational Key tool room locations: Mumbai, Bengaluru, Chennai, Pune, Hyderabad, and Delhi NCR
Machine tools	<ul style="list-style-type: none"> Supplies machinery to the entire manufacturing sector. It is dominated by SMEs with an annual turnover ranging Rs 3-5 billion Machine tools currently manufactured are general/special purpose machines, standard computer numerical control (CNC) machines, gear cutting, grinding, medium size machines, electrical discharge machining (EDM), presses, press brakes, pipe bending, rolling, and bending machines
Food processing machinery	<ul style="list-style-type: none"> Dominated by SMEs Key machines: peelers, sorters, graders, pulpers, grinders, mixers, cookers, fryers, dryers, pulverisers, soymilk machines, food grain and coffee millers, ovens, forming-filling- sealing machine, milking and dairy machines, and juicers
Cement machinery	<ul style="list-style-type: none"> India is the world's second-largest cement producer after China, with ~8% share in global cement production and cement capacity of ~569 million tonne as of fiscal 2022 Cement manufacturing machines include raw mill, cement crusher, cement mill, cement kiln, cement cooler, cement dryer, cement silo, and cement packer
Plastic machinery	<ul style="list-style-type: none"> Key machines: injection moulding, blow moulding and extrusion moulding machines

Source: Ministry of Heavy Industries, CRISIL MI&A

4.1 Domestic Heavy engineering capital goods industry projected to grow 7-8% over fiscals 2023-26

Market size of Heavy engineering capital goods Industry in India, FY23 to FY26



E: Estimated; P: Projected

Source: Ministry of Heavy Industries, IEEMA, CRISIL MI&A

India's heavy engineering capital goods industry is estimated to be Rs 2,650-2,750 billion as of fiscal 2023, and is projected to clock a CAGR of 7-8% over fiscals 2023-26 to reach Rs 3,300-3,400 billion. Heavy electrical engineering, earthmoving, construction and mining machinery, and process plant equipment are the largest segments. The industry is expected to continue to expand on the back of rising manufacturing and construction activities.

Technological advancements, foreign direct investment (FDI), and strong government initiatives are the key growth drivers of the manufacturing sector, which will propel the heavy engineering capital goods industry as well. We expect demand for heavy engineering components to get a boost from end-use sector growth on account of improvement in the ease of doing business, the Production Linked Incentive (PLI) scheme, as well as investments in infrastructure and supportive government policies. Rising demand from key end-use sectors and material capacity addition in the cement sector will further support growth.

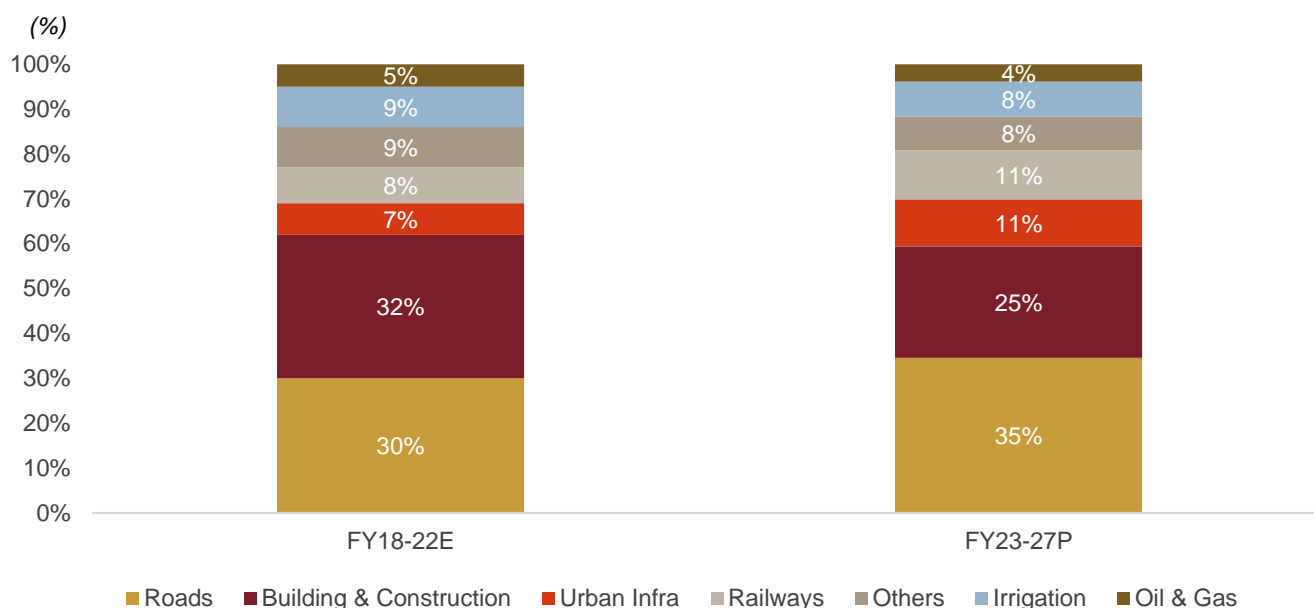
4.2 Greenfield and brownfield capacity expansion to drive demand in the medium term

The heavy engineering capital goods sector, being closely associated with the manufacturing and infrastructure sectors, is of strategic importance to gauge the health of the economy. Growth in the manufacturing sector is tied to sectors such as infrastructure, power, steel, automotive, oil and gas, consumer durables, etc. Demand for heavy engineering plant and equipment components comes from capacity additions in textile, consumer product manufacturing, power, mining, oil and gas, refinery, steel, and automotive and other industrial segments.

Growth in construction spend will be propelled by the infrastructure segment over the medium to long term, as the building construction and industrial sector records steady growth rate.

For the industrial sector, spending will be driven by the PLI scheme, a time-bound scheme by the Government of India that rewards companies in the range of 5-15% of their annual revenue based on the companies meeting pre-decided targets for incremental production and/or exports and capex over a base year. The same will translate into increased demand for heavy engineering capital goods.

Construction spends (Rs billion) – fiscal 2018 to 2027



P: Projected

Source: CRISIL MI&A

Capacity additions in the conventional power generation segment expected to increase to 46-48 GW (excluding renewables) over fiscals 2024-29

Capacity additions in the conventional power generation segment are expected to increase to 46-48 GW (excluding renewables) over fiscals 2024-29, driven by higher-than-decade average power demand. Fresh project announcements are limited as players are opting for the inorganic route for expansion given the availability of assets at reasonable valuations, with ~24 GW of stressed power assets awaiting debt resolution.

CRISIL expects 50-55% of the 46-48 GW conventional capacity additions over fiscals 2024-29 to be coal-based, led by a large number of planned projects and the fact that coal remains the most widely available and cheapest among the conventional sources of power. Nuclear power capacity additions of 6-7 GW are also expected to come up during the period as ongoing projects at Kakrapar, Kalpakkam, and Rajasthan are nearing completion.

The contribution of the private sector, being riddled with debt from past capacity additions, is likely to remain low over the next five years, largely limited to potential acquisition of stalled under-construction coal projects in the absence of new project announcements. Central and state sectors are expected to drive capacity additions, accounting for 59-61% and 32-34% of the conventional capacity additions, respectively.

Installed generation capacity across fuels reached 416 GW last fiscal, on the back of healthy renewable capacity additions of ~54 GW over fiscals 2018-22. It is expected to reach 700-704 GW by fiscal 2029, as renewable capacity is expected to be ~380 GW. Storage-based capacity, consisting of pumped hydro and battery energy storage systems, is likely to reach 24-25 GW by fiscal 2029, driven by PSP and BESS capacity additions of 8.5-8.7 GW and 19-20 GW, respectively, over fiscals 2024-29.

4.3 Positive policy and robust FDI support India’s engineering and manufacturing industries

The domestic engineering and manufacturing industries have attracted the interest of foreign players, as these enjoy advantages in terms of production cost, technology and innovation, as well as consumer demand. FDI in India has risen over the past five years. FDI, which brings in long-term capital for capex and supports revenue growth, increased 2.2 times over fiscal 2018-23 compared with fiscal 2013-17.

The government has encouraged foreign investments by permitting 100% FDI under the automatic route for the heavy engineering industry (except for countries with land borders with India). FDI in manufacturing segments will strengthen demand for heavy engineering capital goods. Further, the sector does not require an industrial license. Quantum of payment for technology transfer, design and drawing, royalty, etc. to the foreign collaborator is not restricted. There are no restrictions on imports-exports as well.

FDI inflows (Rs billion) – fiscal 2013 to 2023

Sector	FY13-17	FY18-23	Increase in FDI inflows (times)
Construction (infrastructure) activities	81	1,441	17.7
Electrical equipment	232	366	1.6
Power	269	348	1.3
Food processing	386	321	0.8
Industrial machinery	160	147	0.9
Textiles	86	120	1.4
Mining	83	85	1
Cement and gypsum products	173	19	0.1
Machine tools	21	15	0.7
Earthmoving machinery	14	13	0.9
Sugar	10	3	0.3
Total FDI inflows ¹	10,125	21,921	2.2

1: Total FDI inflows across all industries

Source: DPIIT, CRISIL MI&A

Supportive government schemes and policy intervention to boost heavy engineering sector

Overview of Production Linked Incentive (PLI) Scheme

Launched in March 2020, the PLI scheme focuses on 14 sectors with an incentive outlay of Rs 1.97 trillion (~\$ 26 billion) to strengthen the production capabilities of the economy. These sectors include auto components, automobile, aviation, chemicals, electronic systems, medical devices, metal and mining, pharmaceuticals, renewable energy, specialty steel, telecom, textiles and apparel, food processing, and white goods.

Sectors that are covered by the PLI scheme and have seen an increase in FDI inflows over fiscals 2022-23 are drugs and pharmaceuticals (+46%), food processing (+26%), and medical devices (+91%). As of June 2023, 733 applications have been approved in 14 sectors with an expected investment of Rs 3.65 trillion.

As many as 176 MSMEs – in sectors such as bulk drugs, medical devices, pharmaceuticals, telecom, white goods, food processing, textiles, and drones – have benefited from the PLI scheme. Actual investment of Rs 625 billion

has been realized till March 2023, resulting in incremental production/sales over Rs 6.75 trillion and employment generation of ~3,25,000.

Exports got a Rs 2.56-trillion boost till fiscal 2023. Incentive amount of ~Rs 29 billion was disbursed last fiscal under the PLI scheme for eight sectors – large-scale electronics manufacturing (LSEM), IT hardware, bulk drugs, medical devices, pharmaceuticals, telecom and networking products, food processing, and drones and drone components. The strong supply-side push to the manufacturing sector will push greenfield and brownfield expansion, resulting in growth of the heavy engineering industry.

Overview of key schemes for the heavy engineering capital goods industry

Scheme	Overview
<p>Scheme for Enhancement of Competitiveness in the Indian Capital Goods Sector - Phase I</p>	<ul style="list-style-type: none"> • Launched in November 2014, the objective of the scheme was to address various constraints faced by the sector • Advanced Centres of Excellence were set up at IITs, IISc and CMTI in partnership with the industry to develop strategic technology and machinery • 4 Industry 4.0 Centres are imparting awareness and support to MSMEs for smart manufacturing capabilities, 15 common engineering facilities centres have been created for high tech-skilling and a 530-acre specialized Machine Tool Industrial Park has been established • Under this scheme, 33 projects with budgetary support of Rs 5.83 billion and a total outlay of Rs 9.96 billion were sanctioned. These aimed at addressing technology gaps, infrastructural requirements, and developmental needs of the sector
<p>Scheme for Enhancement of Competitiveness in the Indian Capital Goods Sector - Phase II</p>	<ul style="list-style-type: none"> • The phase II was launched for aiding Common Technology Development and Services Infrastructure. The scheme has a financial outlay of Rs 12.07 billion with budgetary support of Rs 9.75 billion, and industry contribution of Rs 2.32 billion • The scheme is an extension of phase I. A total of 27 projects with project cost of Rs 9.1 billion have been approved so far under the Phase-II • This phase has the following six components: <ul style="list-style-type: none"> – Identification of technologies through technology innovation portals (TIPs) – Setting up of new advanced CoEs and augmentation of the existing centres – Promotion of skilling in the capital goods sector – creation of skilling packages – Setting up of common CEFCs and expansion of the existing centres – Expansion of the existing testing and certification centres – Setting up of industry accelerators for technology development

Source: Ministry of Heavy Industries, CRISIL MI&A Research

5. Key growth drivers supporting the heavy engineering capital goods, welding consumables and wear plates industries in India

5.1 Rising contribution of manufacturing sector in overall GVA to support growth of heavy engineering capital goods, welding consumables and wear plates industries in India

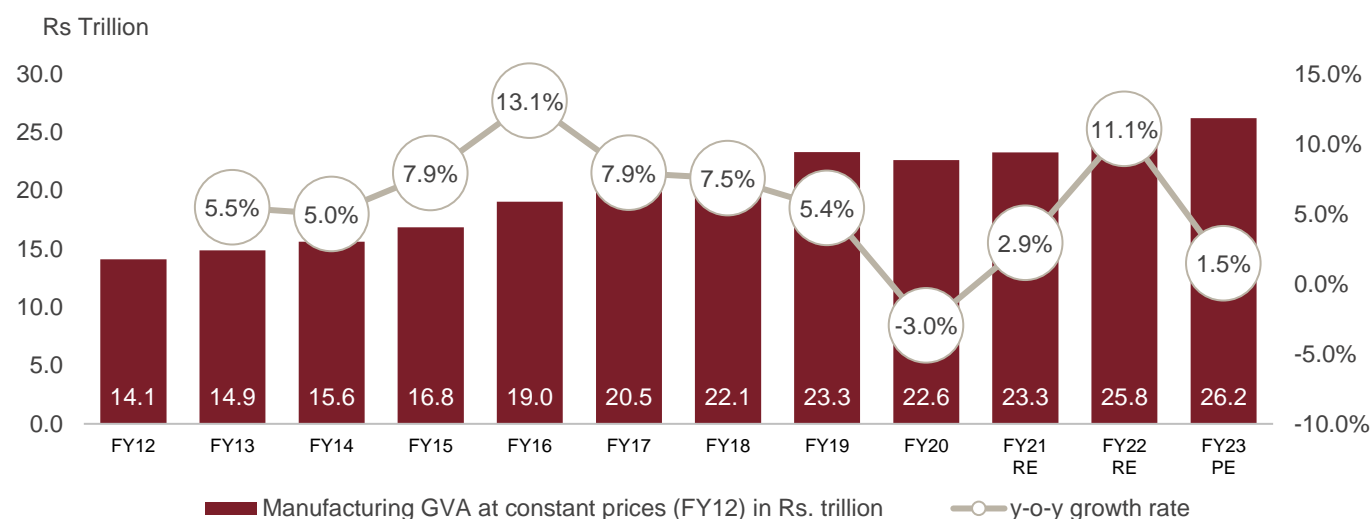
Contribution from the manufacturing sector in total GVA at basic prices increased from 17.4% in fiscal 2012 to 18.7% in fiscal 2022, logging a CAGR of 6.2%. Domestic demand remains the primary driver of the growth in manufacturing, supported by capex push and easing inflationary pressures on consumers.

Manufacturing	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21R E	FY22R E
Manufacturing contribution (% of GVA)	17.4%	17.4%	17.2%	17.3%	18.1%	18.1%	18.4%	18.3%	17.1%	18.3%	18.7%

RE: revised estimate, PE: provisional estimate

Source: CRISIL MI&A

Manufacturing GVA at constant prices (FY12 base year)



Source: CRISIL MI&A

5.2 Rising demand from key end-use industries to support demand for heavy engineering capital goods, welding consumables and wear plates

Sector	Key trends
Steel	<ul style="list-style-type: none"> Steel demand increased 13.3% in fiscal 2023 because of the infrastructure push, strong housing projects and pent-up demand from the auto sector This fiscal, robust demand from allied sectors and a capex push by the government will boost domestic demand 7-9%
Power	<ul style="list-style-type: none"> Power demand surged in the first quarter of last fiscal on the back of a nation-wide severe heatwave, apart from continued momentum in the economic activity. As a result, power demand registered a 9.6% on-year growth in the fiscal despite a high base in the previous two consecutive years Power demand is projected to clock a CAGR of 5.0-5.5% in the medium term, supported by economic growth recovery and improved reach and quality of power supply
Cement	<ul style="list-style-type: none"> Cement demand grew a healthy ~12% last fiscal, supported by tailwinds from strong demand for rural housing and infrastructure This fiscal, the infrastructure segment is expected to be the major demand driver, led by a ~24% rise in the Centre's budgeted spending in key segments over revised estimate for fiscal 2023
Auto components	<ul style="list-style-type: none"> The auto components industry saw a robust 24-26% growth last fiscal owing to economic recovery (GDP growth of ~6.8%), buoyant demand from OEMs and the replacement market This fiscal, the industry revenue is poised for a double-digit growth led by the OEM segment
Construction equipment	<ul style="list-style-type: none"> Last fiscal, the construction equipment industry showed a whopping 26% rise driven by a 23% growth in volume. The sales volume hit an all-time high with a pick-up in infrastructure construction and mining in the backdrop of economic recovery and introduction of newer machinery complying with the BS-IV For this fiscal, volume growth projected is 14-16% with price rises accounting 2% growth as OEMs raise prices attributable to the input cost inflation coupled with increased cost for meeting new emission norms applicable from April 1, 2021.
Sugar	<ul style="list-style-type: none"> Industrial consumption that accounted for ~64% of total domestic sugar consumption in sugar season 2022 (October-September) is expected to rise a steady 3% each in 2023 and 2024 seasons, led by a pick-up in demand from segments such as hotels, restaurants and cafes (HORECA), non-alcoholic beverages, and chocolates and confectionery Household consumption that accounted for ~36% of the total domestic consumption in the sugar season 2022 is expected to rise ~1.5% in 2023 and 2024 seasons owing to increasing population and because sugar is already a highly penetrated product.

Source: CRISIL MI&A

5.3 Key government initiatives to further support growth in heavy engineering and capital goods, welding consumables and wear plates industries








National Infrastructure Pipeline (NIP) - The National Infrastructure Pipeline (NIP) planned for fiscals 2019-2025 is a government initiative to provide world-class infrastructure to citizens in a bid to improve their quality of life. It aims to improve project preparation and attract investments into the infrastructure sector. To draw up the NIP, a high-level task force was constituted under the chairmanship of the Secretary, Department of Economic Affairs (DEA), Ministry of Finance.

Lack of robust infrastructure is often recognised as the primary constraint to a developing nation's growth. In India, the government is taking various steps to forge partnerships between the public and private sectors to build infrastructure. The NIP is a step in that direction. To achieve seamless working and productivity in other business sectors and India's ambitious goal to be a \$5 trillion economy by 2025, strong infrastructure growth is essential. In particular, *the success of India's manufacturing sector* and the focus on Make in India are directly influenced by

how strong the backbone of India's infrastructure is. There is a constant need for government intervention, solid funding and constant monitoring of projects. Growing urbanisation, increasing working-age population, shift to a services-based economy and climate change are some of the factors that will give a further boost to India's infrastructure sector, in turn, amplifying the need for the NIP.

As of August 2023, the NIP had an outlay of 9,158 projects in 57 sub-sectors with a capital cost estimate of USD 1,365.5 billion. Overview of NIP opportunities in select sectors is given below.

Overview of NIP opportunities in select sectors

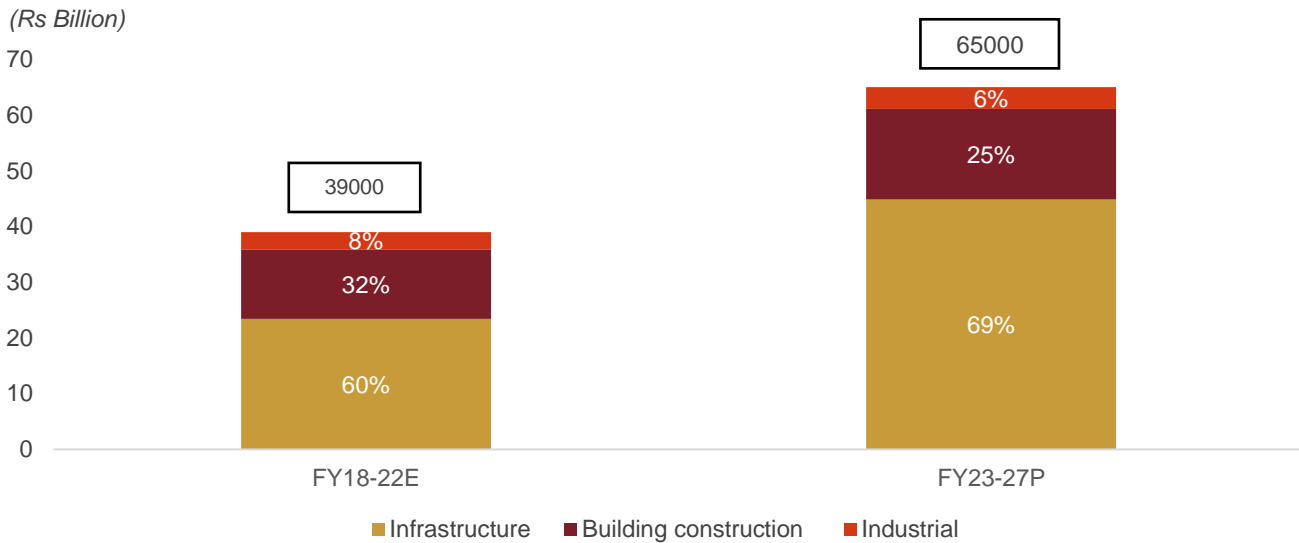
Sector		Number of opportunities / projects	Total worth of opportunities (USD billion)
Inland waterways		27	USD 57.4 billion
Logistics infrastructure		42	USD 52.61 billion
Electricity generation		367	USD 280.7 billion
Telecommunication		30	USD 63.14 billion
Steel		6	USD 48.12 billion
Oil & gas		106	USD 80.74 billion
Roads & highways		3,559	USD 444.51 billion

Source: NIP, CRISIL MI&A

5.4 Increase in construction activities to boost welding consumables growth

Rising urbanization, increasing disposable income and a growing economy are expected to lead to higher demand for housing and infrastructure projects, including airports, railways, bridges, roads etc., which, in turn, can increase construction and support demand for welding consumables.

Overall construction investments



Source: CRISIL MI&A

Led by the infrastructure segment, construction capex is expected to have risen 15-17% on-year in fiscal 2023 to Rs. 10.5-10.7 lakh crore. The rise was in keeping with the government’s focus on infrastructure. The central and state budget allocations to capex are on the rise to meet the infrastructure build out outlined in the NIP. Although fiscal 2022 had seen challenges due to the second wave of coronavirus and other minor challenges such as irregular monsoon in certain states, it is estimated to have risen a sharp 35-40% to Rs 9.1-9.3 lakh crore on a low base of fiscal 2021. Construction investments are expected to have grown in fiscal 2022 due to low base of fiscal 2021, when lockdowns to arrest the Covid-19 spread had impacted the sector.

CRISIL MI&A expects the building and construction sector to grow 4-6% fiscal 2024, compared to 10-14% in fiscal 2023, with the real estate segment seeing a slowdown in demand because of a rise in inventory in key cities. The increase in execution of deferred projects and government schemes, such as PMAY, will support.

Between fiscals 2023 and 2027, the sector capex is expected to rise to Rs 16-16.5 lakh crore, about 30% higher than Rs 12-12.5 lakh crore spent between fiscals 2018 and 2022.

CRISIL MI&A expects construction investment in the industrial segment to be Rs 4.0-4.1 lakh crore between fiscals 2023 and 2027, up 30% over the investment during fiscals 2018-2022. The reason for the projected rise is inclusion of the PLI scheme in the capex investments of the industrial sector. While the PLI scheme covers 13 sectors, we have only included three capex intensive sectors — auto and auto components, textiles and specialty steel — in our estimates.

Higher investments in infrastructure will support the demand for wear plates. Industries such as cement, steel, power etc. would see more investments in manufacturing plants to meet the growing demand for products used in infrastructure projects. These investments would also create demand for wear plates.

5.5 Rising demand for customisation

Rising demand for customized products and solutions, driven by the need to meet specific and precise application requirements is expected to further drive growth for engineering equipment and wear plates sectors. As industries seek specialized solutions, the market for tailor-made products is expanding to cater to these diverse demands.

5.6 Repairs and maintenance

Repair and maintenance of machinery, plant and construction equipment driven by higher utilization levels is expected to support demand for welding consumables.

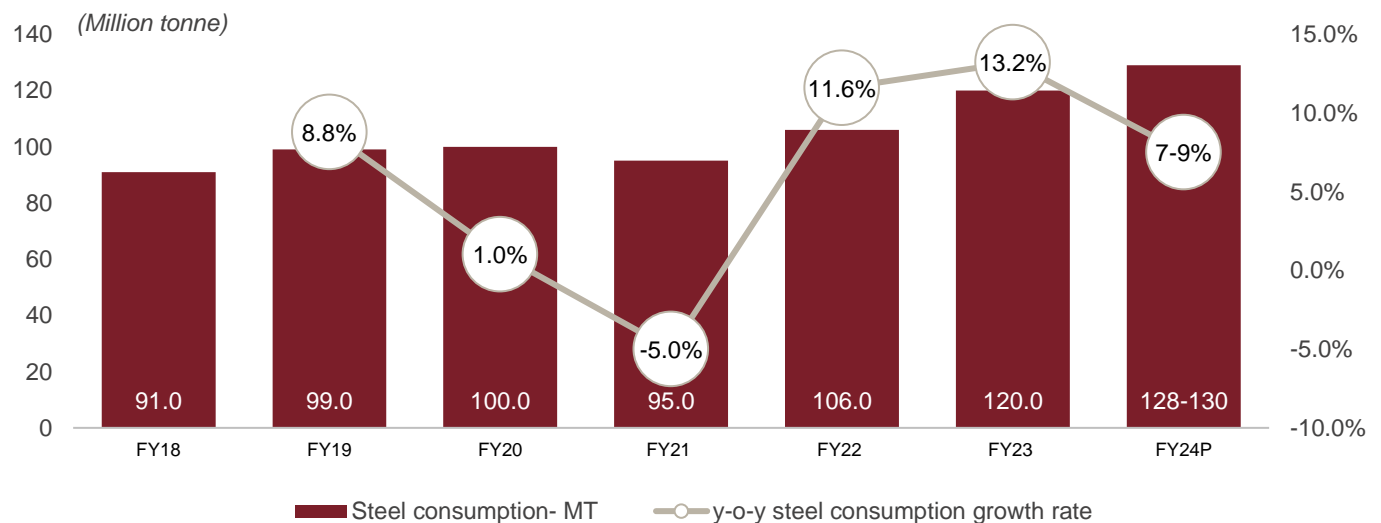
6. Overview of key end-use industries

6.1 Steel Industry in India

Ever since the industrial revolution of the 18th century, steel has been crucial to economic growth. It finds applications in diverse sectors such as infrastructure, automobiles, manufacturing, and construction, greatly contributing to GDP growth.

Last fiscal, the Indian steel industry grew 13% to ~120 MT. The growth projection for this fiscal is 7-9%. The healthy growth for this fiscal is expected to be driven by a sharp 11-13% growth in the infrastructure sector and a decent 5-7% expansion in the housing driven by government housing construction and private demand. The automobile production is expected to rise 6-8% driven by both passenger and commercial vehicles.

Steel consumption in India

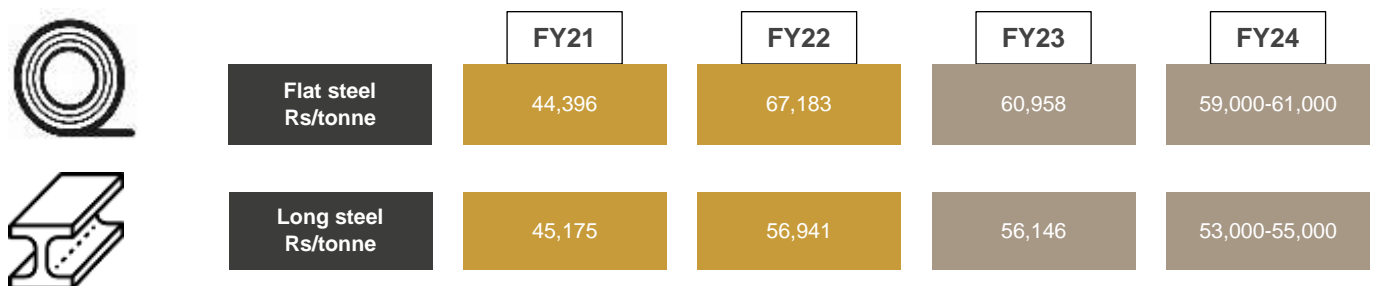


Note: E — estimated, P — projected

Source: CRISIL MI&A

The key end-use segments of the steel industry are building and constructions, infrastructure and automotive. The building and construction industry accounts for 35-40% of total steel demand, followed by infrastructure (25-30%) and automotive sector (8-10%).

Price variations across flat & long steel



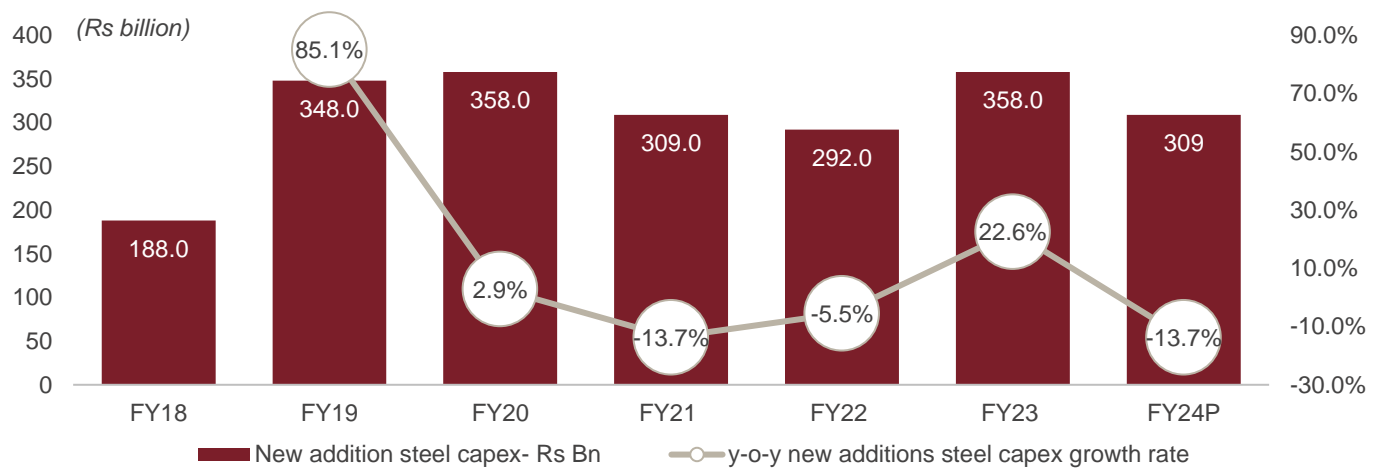
Source: CRISIL MI&A

During fiscals 2021 and 2022, the growth in the steel industry was led by an increase in both volume and price. However, in the last and this fiscals, price moderation would limit the sector's growth.

Steel capex

CRISIL MI&A expects new additions capex in the steel industry to have been ~ Rs 358 bn in fiscal 2023. For this fiscal, the projection is at Rs 309 bn. The planned expansions by large players are majorly in the BF-BoF route.

Steel capex



Note: P — projected

Source: CRISIL MI&A

Some other capacity additions are in the pipeline too as integrated steel plants (ISPs) have submitted their proposal for expansion. However, such additions are subject to getting necessary approvals from various government departments and ministries.

Key trends and drivers Indian steel industry

Fiscal 2023 proved to be a tumultuous year for the steel sector as the Russia-Ukraine conflict that started in the last quarter of fiscal 2022 pushed up the prices of coking coal, iron ore, pig iron and steel. Prices of all these commodities hit new all-time highs, hurting the domestic demand. The prices directly impacted the procurement decisions of the players in the end-use segments in the first quarter of fiscal 2023.

However, the remaining months of the fiscal saw a strong recovery with the domestic prices correcting swiftly after the government curbed exports of finished steel. Further, the post-monsoon demand revival and festival season also boosted the demand growth.

In fiscal 2023, demand growth stood at 13.3%, with the flat segment seeing a 16.6% growth and the non-flat segment 10.6%.

The factors that will support the healthy domestic demand this fiscal are as follows:

- The long steel segment to augur well on infrastructure push and housing executions
- Relief expected in flat steel as semi-conductor shortage is steadily alleviating. Further, healthy growth in urban housing is expected to boost demand for flats (used in applications such as railings, doors, staircases and outdoor construction)

The healthy domestic demand growth projected this fiscal will be driven by a sharp 11-13% growth in infrastructure and a decent 5-7% rise in housing driven by government housing construction, and private demand. The automobile production is expected to increase 6-8% driven by both passenger and commercial vehicle production.

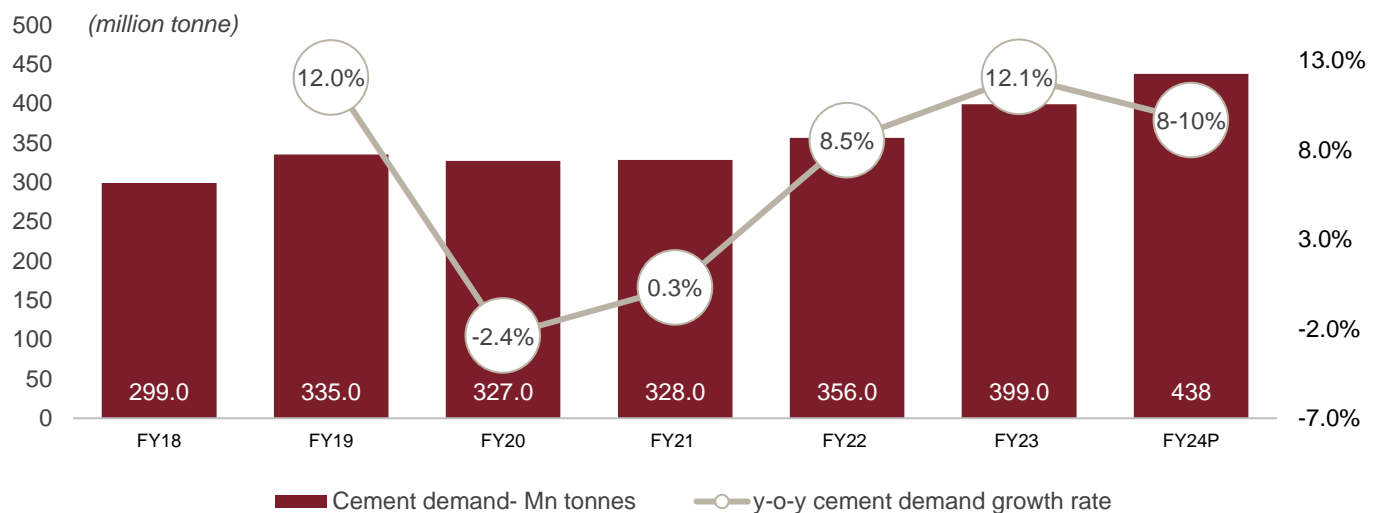
6.2 Cement Industry in India

The cement industry, one of India's oldest sectors, plays a crucial role in the country's economic development and contributes significantly to the nation's GDP. In fiscal 2023, domestic cement demand was estimated at ~399 MT, up 12% on-year. For this fiscal, the growth is projected at 8-10%.

High construction costs had impacted demand in the early months of fiscal 2023 but witnessed some cooling off in the second half. The demand was supported by strong demand for rural housing and infrastructure. The individual housing segment, especially rural, which was expected to bear the brunt of inflation in the early months of the fiscal, fared well in the second half amid cooling construction costs, higher rural income owing to healthy yields and increase in crop prices. Overall, these factors supported demand growth from the rural housing segment. Infrastructure continued the strong growth, led by the government's spending, primarily via its flagship schemes, such as PM Gati Shakti and the NIP.

This fiscal, the infrastructure sector is expected to be a major demand driver, led by a ~24% rise in the Centre's budget allocation for key segments. The highest traction is expected from roads, where the total outlay for the Ministry of Road Transport and Highways (MoRTH) and the National Highways Authority of India rose 25% and 15%, respectively.

Cement demand in India



P-Projected

Source: CRISIL MI&A

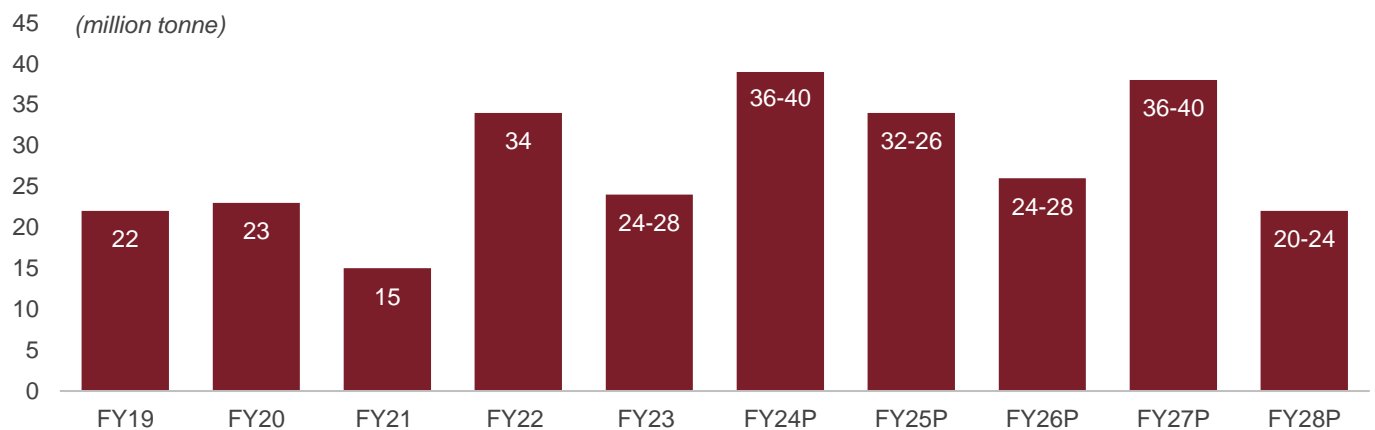
The end-use mix of the cement industry comprises the housing (57-59%), infrastructure (27-29%), and industrial/commercial (13-15%) segments. Post the pandemic, demand for real estate and urban housing shot up in fiscal 2021 as work-from-home mandate boosted the demand for spacious homes. With incomes stabilizing, customers started preferring home ownership to rental. A decline in the cost of buying also supported. The housing segment growth is expected to moderate over fiscals 2024-2028 on a high base but will remain a key contributor backed by a lower concretization rate in the country.

Cement capex

Cement capex in the country was estimated at ~Rs 1.270 lakh crore during fiscals 2018-2023. It is expected to see a healthy growth during fiscals 2024 and 2025.

Last fiscal, the cement industry is estimated to have added 24-28 MT capacity (including grinding and integrated units) as against ~34 MT added in fiscal 2022. The decline in capacity addition was because of heightened cost pressure that impacted players' profitability and cash accruals. Capacity addition is expected to pick up this fiscal as we expect 36-40 MT to be added. CRISIL estimates that overall installed capacity will reach 630-635 MT by this fiscal end.

Cement capacity addition



Note: P-Projected

Source: CRISIL MI&A

CRISIL expects large and mid-sized players to add bulk of the capacities (~88%) until fiscal 2028, as they are financially in a better position to overcome the challenges. Large companies will be able to fund capex through internal accruals. Also, their comfortable gearing levels give them the financial flexibility to raise debt, if required.

Key trends and drivers

- Housing:** Cement demand from housing to be driven by affordable and rural housing. A 12.5% increase in allocation to PMAY-G in the Union Budget for 2023-24 over revised estimate for fiscal 2023 and government impetus on completions ahead of 2024 elections will support the rural housing demand.

Urban housing growth is expected to be driven largely by a pick-up in PMAY-U construction this fiscal as the scheme is on the verge of completion.

- Infrastructure:** Within infrastructure, roads have been the largest contributor to cement demand, followed by the railways, irrigation and urban infrastructure. There is a sharp rise in infrastructure capex in this fiscal's budget. The highest traction is expected from roads, where the total outlays for the MoRTH and the National Highways Authority of India have risen 25% and 15%, respectively. Along with the MoRTH, total budget outlay for the Ministry of Railways has also risen 15% for fiscal 2024 over the revised estimate for fiscal 2023. While there is no relief in terms of duty changes, the surge in capital outlays will boost demand in the coming fiscal.
- Industrial & commercial segments:** Cement demand from the industrial and commercial segments is expected to grow a healthy 8-10% on-year this fiscal on two consecutive years of healthy bases. The

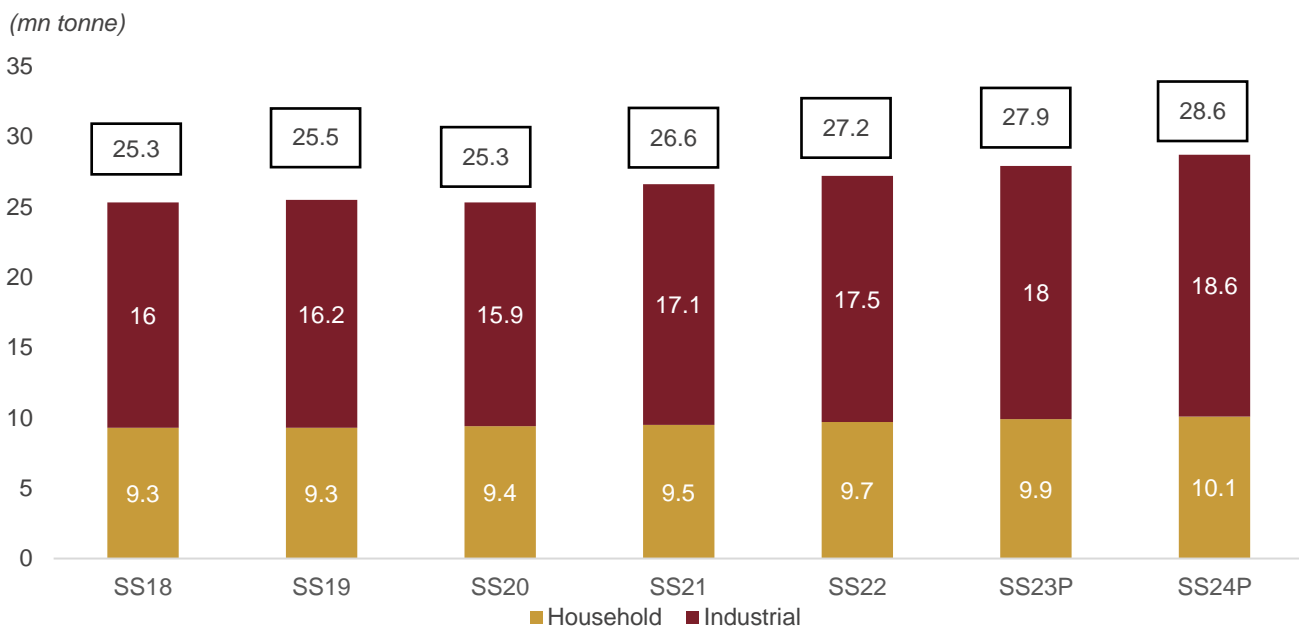
depressed utilizations and stretched financials of players during the pandemic forced the companies to defer their capex planned for fiscals 2021 and 2022 to fiscals 2023 and 2024. The move was aimed at conserving cash in uncertain times. Hence, the players have announced fresh rounds of capex, which will be implemented in upcoming fiscals.

6.3 Sugar Industry in India

The sugar industry is a crucial agro-based sector. It directly affects the livelihoods of approximately 50 million farmers and around 500,000 workers employed in sugar mills, primarily in rural areas. In sugar season 2023 (October-September), sugar consumption is expected to increase ~3% to 27.9 MT from 27.2 MT in sugar season 2022. Industrial consumption that accounted for ~64% of the domestic sugar consumption in sugar season 2022 is expected to rise a steady 3% each in 2023 and 2024 seasons, led by a pick-up in demand from the hotels, restaurants, and cafes (HORECA), non-alcoholic beverages, and chocolates and confectionery segments.

Household consumption that accounted for ~36% of domestic consumption in sugar season 2022 is expected to rise ~1.5% with the population increasing in 2023 and 2024 seasons as sugar is already a highly penetrated commodity.

Domestic sugar consumption



P: Projected

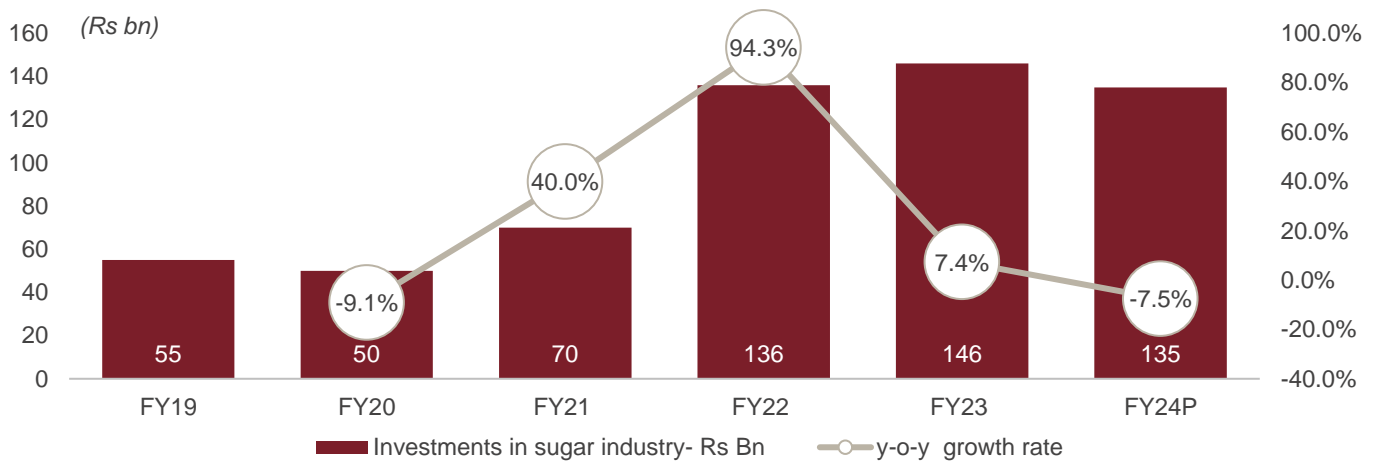
Source: CRISIL MI&A

The HORECA segment is a major consumer of sugar at an industrial level, with changing food habits and increasing number of social gatherings propelling growth. Also, consumption of soft drinks has increased with rising disposable incomes. The chocolate and confectionary spaces are growing as well with premiumization in gifting. Owing to these factors, industrial consumption of sugar is expected to grow at ~3% on-year in SS 2023 as well as SS 2024.

Capital expenditure in domestic sugar industry

CRISIL MI&A estimates investments in the sugar industry rose 7% on-year in fiscal 2023, to Rs 146 billion, with the projection for fiscal 2024 at Rs 135 billion.

Investments in sugar industry



P: Projected

Source: CRISIL MI&A

Cane acreage also rose ~5% on-year in SS 2023 due to expectation of an above normal monsoon, lowest arrears of producers in the past five years, and the government increasing fair and remunerative price to Rs 305/quintal (10.25% recovery) from Rs 290/quintal (10.00% recovery) in SS 2022. In fact, in SS 2024, area under sugarcane cultivation is estimated to have increased a further ~1.5%. Also, yields that fell sharply in SS 2023 owing to unseasonal rains in Maharashtra and Karnataka, are expected to improve, supporting higher cane availability. A further 3% hike in cane realization and two consecutive years of low arrears have encouraged farmers to cultivate sugarcane during the current season as well.

Key trends and drivers in India's sugar industry

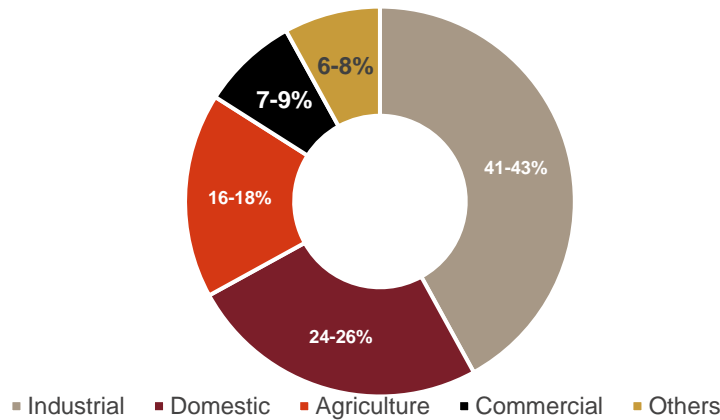
- HORECA segment is the major sugar consumer, led by changing food habits and increasing number of social gatherings
- Rising disposable income will lead to increased consumption of soft drinks, chocolates, and confectionary, and, therefore, demand for sugar by those sectors
- However, household demand will be determined by prices of alternative sweeteners, i.e., jaggery and kandsari, and growth in the country's population

6.4 Power industry in India

For India to sustain its economic growth trajectory, sufficient generation capacity and well-developed power infrastructure are critical. Power demand surged in the first quarter of fiscal 2023, owing to a severe heatwave in the country, apart from continued momentum in economic activity. As a result, power demand rose 9.6% on-year in fiscal 2023 despite a high base in the two consecutive preceding years. CRISIL MI&A expects the power sector to grow at 4-6% on-year in fiscal 2024 to 1,591 BUs from 1,512 BUs in fiscal 2023 on continued push towards urbanization and growing population.

In terms of consumption, industrial and domestic segments dominated at 41-43% and 24-26% respectively, in fiscal 2021, followed by agriculture and commercial.

Segment-wise power consumption in fiscal 2021



Source: CRISIL MI&A

In fiscal 2023, demand from the commercial and industrial segments, which declined 6.8% on-year in fiscal 2021 following outbreak of the pandemic, grew 10.0% on-year, led by broad-based recovery. Even in fiscal 2021, power demand from the industrial and commercial sectors, recovered strongly in the second half owing to lifting of restrictions and healthy revival in consumer sentiment on the back of the festive season and pent-up demand.

In fiscal 2024, power demand from the industrial segment is expected to rise 5-5.5% on-year, driven by sustained consumer sentiment and restarting of the capex cycle.

Also, demand from the agriculture sector, which rose 11% on-year in fiscal 2023, is expected to grow 5.5-6% in fiscal 2024 on a high base. The rise will be led by reduced power cuts, segregation of agricultural and non-agricultural feeders, and solarization of distribution feeders.

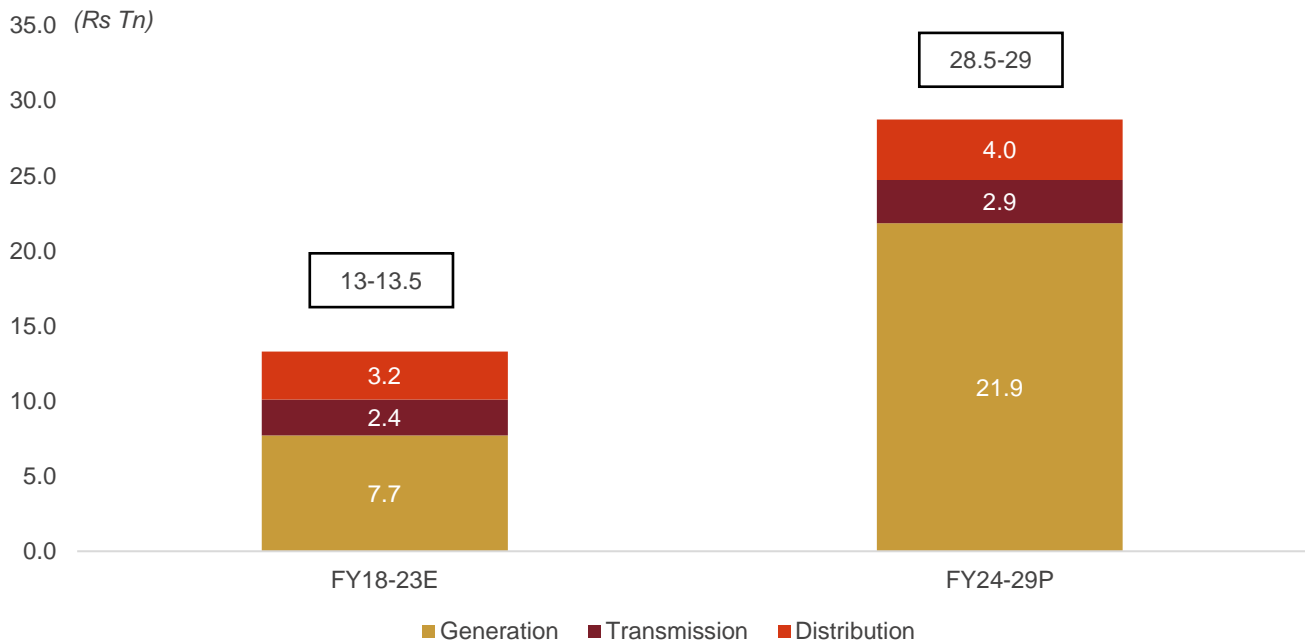
Electricity demand from the commercial segment also recovered fully in fiscal 2023, growing a strong 10% on-year vs. a decline of 26% on-year in fiscal 2021 on the back of offices and educational institutions reopening.

In fact, in the long term, CRISIL MI&A expects power demand from the commercial segment to improve on account of rising urbanization, which will lead to growth in hospitals, educational institutions, malls, and offices.

Capital expenditure in Indian power industry

CRISIL MI&A expects investments of Rs 28.5-29 trillion in the power sector over fiscal 2024 to 2029. Within the space, though, the share of investments in generation is projected to increase, while that of distribution is expected to decrease vis-à-vis fiscal 2018 to 2023 share.

Segment-wise break-up of total investments



E: Estimated, P: Projected
Source: CRISIL MI&A

To be sure, investments in the generation segment are expected more than double to ~Rs 22 trillion over next six years, driven by renewable and conventional capacity additions of 225-230 GW. While the share of distribution in the sector pie is expected to shrink, still investments are projected to increase 30% over the period to Rs 4 trillion, owing to reform-based and result-linked Revamped Distribution Sector Scheme, which runs from fiscal 2023 to 2026. Transmission sector investments will grow ~8% to Rs 2.6 trillion, led by upcoming interstate transmission system and Green Energy Corridor projects.

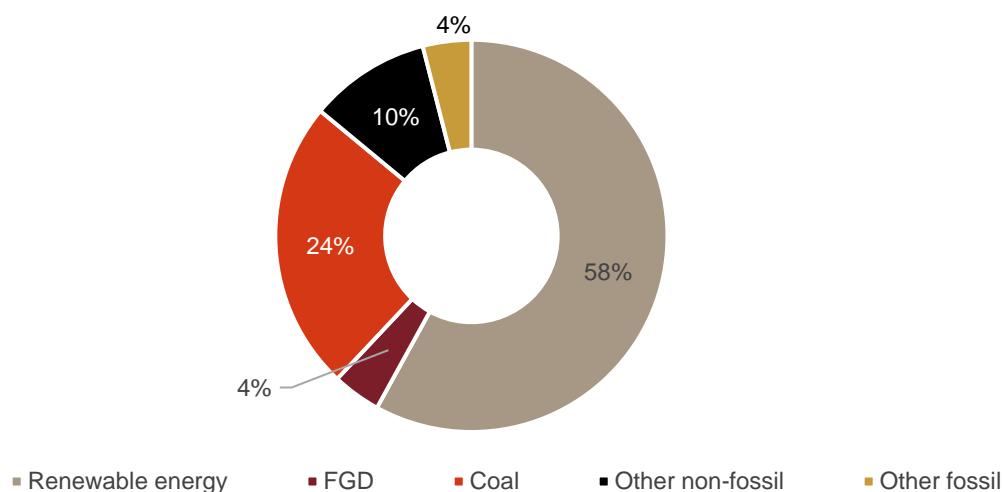
Renewable energy to account for majority share of power generation investments

Over the next six years, investments in generation will be led by renewable energy capacity additions, followed by conventional generation and flue gas desulfurization (FGD) installations, as the shift towards clean energy generation gains momentum.

Renewable capacity additions of 165-170 GW are expected over fiscals 2024 to 2029, while conventional sources will comprise a mere ~929 GW. In fact, investments in renewable energy capacities, which are expected to triple over the next six years, in line with capacity additions, will constitute over 77% of overall generation investments.

Investment split across power generation sector

Fiscals 2018 to 2023E



E: Estimated

Source: CRISIL MI&A

Investments in the segment will be bolstered by conventional generation investments over the next six years as new coal-based power plants to meet fast-rising peak load demand, and increased installation of emission controlling FGD equipment in thermal stations.

5.4.3 Key trends and drivers in India's power industry

- Macroeconomic factors:** Aatmanirbhar Bharat relief package, government spending on infrastructure through the National Infrastructure Pipeline, commissioning of dedicated freight corridors, expansion of the services industry, rapid urbanisation, and rising farm incomes from agriculture-related reforms are key factors increasing power demand. Also, policy initiatives, such as the PLI scheme and low corporate tax rates, among others, have supported large scale manufacturing in the country, further boosting power demand
- Railway electrification:** The government aims to achieve 100% electrification of the Indian Railways by December 2023 in a bid to become net-zero greenhouse gas emitter by 2030. However, the works have seen some delays because of pandemic-induced lockdowns, as well as sluggish pace of execution. That said, the Railways has been allocated a capital outlay of Rs 2.4 lakh crore in Union Budget 2023-24, the highest ever allocation to the national transporter; this continues the trend followed last year, wherein gross budgetary support was Rs 1.37 lakh crore. This is expected to provide impetus to the sector, in terms of establishing of new lines, doubling existing lines, and electrification of existing lines. Hence, the power sector is forecast to see majority of incremental demand from railway electrification of ~27 BUs on average annually. A further increase will be offset by decrease in energy consumption in electrifying per km route, owing to improvement in energy efficiency
- Metro projects:** Electricity consumption of the urban metro system is mainly from electricity consumption for train traction and station operation. Metro rail has seen substantial proliferation in India in recent years, and the rate of growth is projected to increase 2-3x going forward, as several cities look to set up metro rails to meet their daily mobility requirements. Currently, ~78 km of metro routes is operational across nine cities, and ~987 km of metro lines are under construction, with a further 245 km proposed. Electricity consumption from this is expected to add 4-5 BUs of incremental power every year. Hence, the metro segment, which currently

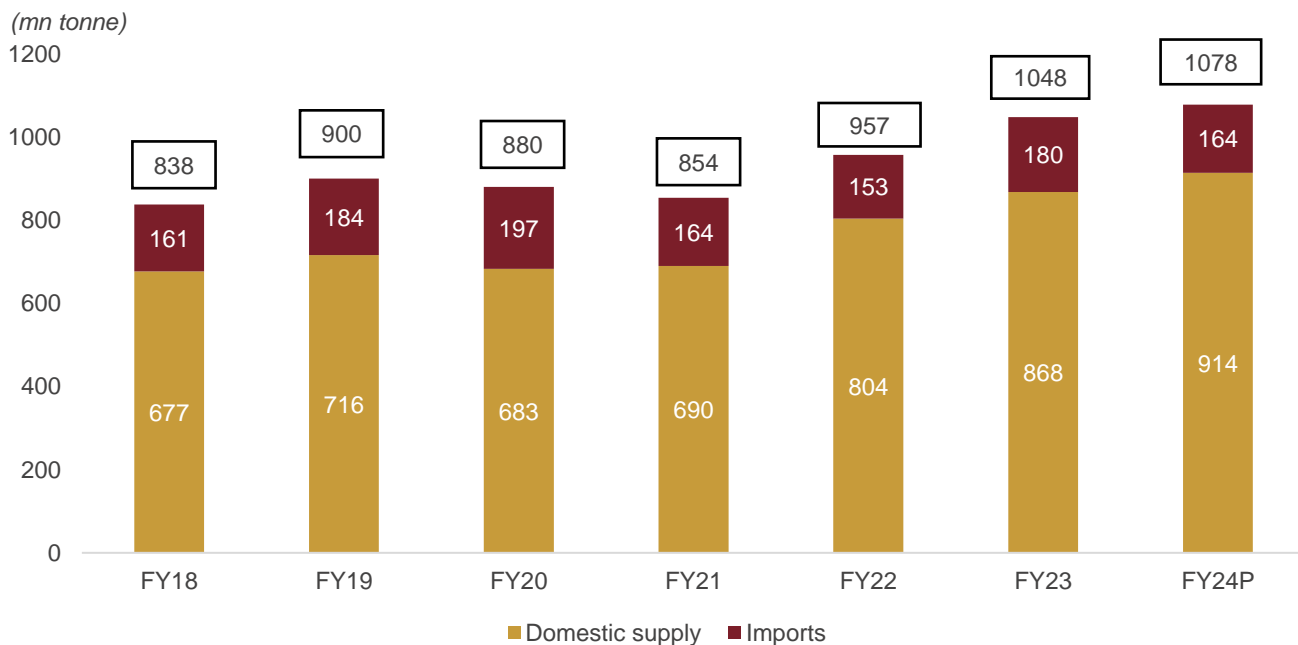
constitutes a marginal share of the total incremental demand, is expected to increase with the large quantum of upcoming projects

- Electric vehicles:** Under the National Electric Mobility Mission plan, the government is promoting EVs through demand-side incentives, in terms of subsidies, promoting setting up of charging infrastructure, and encouraging research and development in battery technology, power electronics, battery management, system integration, etc. CRISIL MI&A projects that, adoption of EVs will add upto 90 BUs of power demand between fiscal 2024 and 2029, an average of 14.8 Bus per year in the same period.

6.5 Coal industry in India

Coal is one of the key sources of energy in India. Within the space, non-coking coal demand in India was ~1,048 million tonne in fiscal 2023, with imports contributing ~180 million tonne to the total. In fiscal 2023, non-coking coal consumption rose ~9.1% on-year on a high base of fiscal 2022, during which consumption is estimated to have risen 12.0% on-year. Surge in power demand by 8.5% and 9.6% in fiscals 2022 and 2023, respectively, have pushed demand for coal at all-time highs to ensure uninterrupted power supply in the country.

Split of domestic supply and import of non-cooking coal



P: Projected

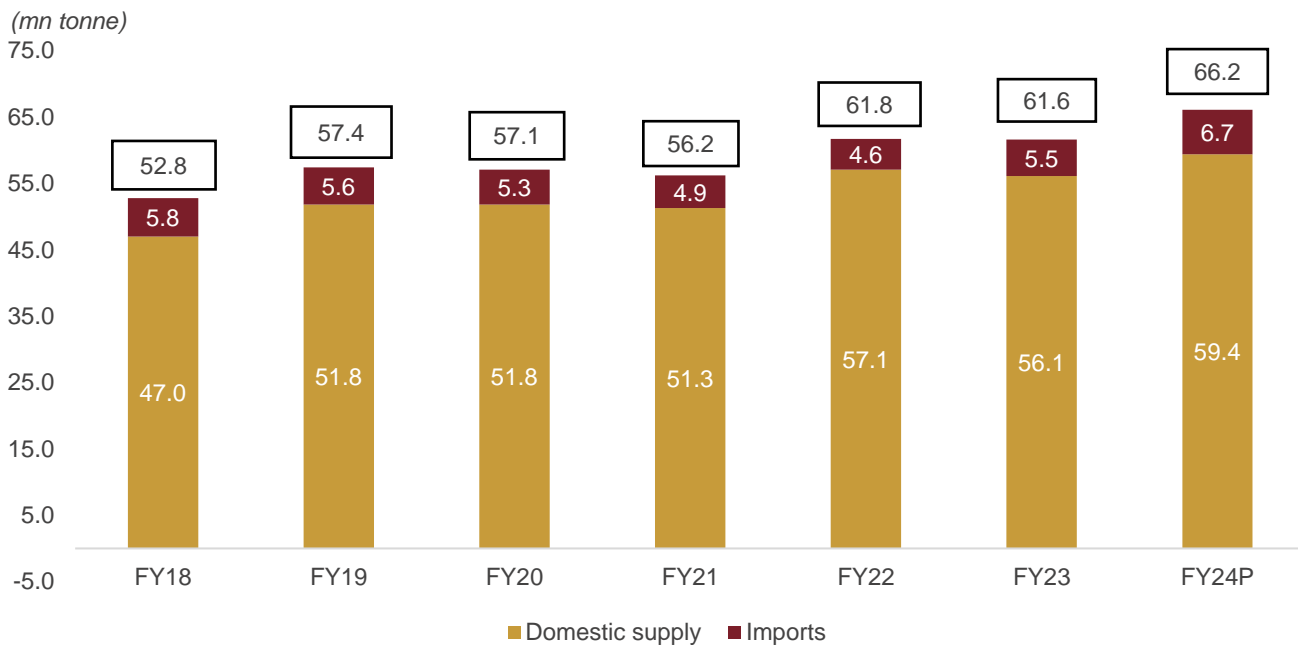
Source: CRISIL MI&A

Coal-based power generation, which accounted for ~70% of non-coking coal consumption in fiscal 2022, rose ~10% on-year in fiscal 2023 to 1,145 BUs over a high base. To support this surge, imports by power plants increased 107% in the fiscal to 56 MT from 27 MT in fiscal 2022. But in fiscal 2024, power generation from renewable sources is expected to increase ~14.5% on-year to ~240 MU, while that from coal is expected to rise only ~3.0% to ~1,180 MU.

Hence, CRISIL MI&A expects demand for non-coking coal by power plants to rise only 1.0-2.0% in fiscal 2024. Also, in January 2023, the government directed all central, state and independent power plants to blend 6% of their coal requirement from April 2023 to September 2023. Consequently, CRISIL MI&A expects imports by power plants to increase to ~61 MT in the current fiscal from 56 MT in fiscal 2023. That said, in the first two months

of the current fiscal, imports by coal-based power plants decreased 3% on-year, declining a sharper 11% on-year in May 2023. This can be attributed to a 1.3% on-year decrease in power demand in the first two months of 2024, thus reducing the need for power plants to import thermal coal. In fact, coal stocks at power plants grew 23.6% on-year to 72 MT in the first two months of fiscal 2024.

Split in domestic supply and imports for cooking coal



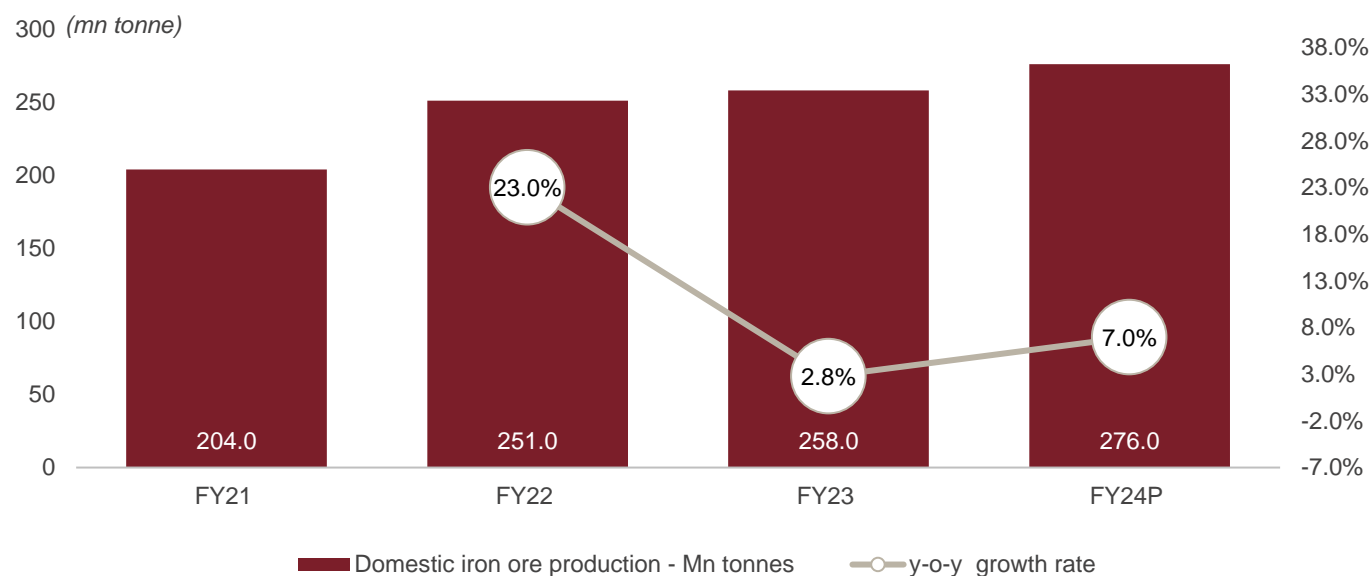
P: Projected
Source: CRISIL MI&A

In the case of coking coal, consumption accounted for ~7% share of overall coal consumption in fiscal 2022 and 2023 (62 MT in fiscals 2022 and 2023, respectively), majorly sourced by steel players for production. However, coking coal production has been historically low, owing to inferior quality of resources and difficulties in mining operations in the country. Because of this, steel players have had to rely on imported coking coal, which accounts for 90-92% of the total consumption share.

6.6 Iron ore industry in India

Iron ore is the basic raw material used in the manufacture of pig iron, steel, sponge iron and alloy steel. The iron ore mines are discovered through exploration; once the location, quality and quantity of the ore body along with its value is decided, extraction starts. Based on their excavation method, mining techniques can be classified into two main types: surface mining and underground mining. The mining techniques are decided on the basis of proximity of iron ore to the surface. Underground mining is used if the ores are deep inside the earth and surface/opencast mining if they are near the surface. India has the sixth largest iron ore reserves in the world, with total crude iron ore reserve of 8,100 million metric tonne, with iron content of 5,200 million metric tonne. Odisha has the largest iron reserves, with substantial reserves in Karnataka, Chhattisgarh, Goa, Jharkhand and West Bengal as well. In fiscal 2023, India estimated to have mined 258 MT of iron ore, of which ~237 MT was consumed domestically and ~21 MT was exported, with negligible imports, indicating sufficient domestic supply.

Domestic iron ore production



P: Projected

Source: CRISIL MI&A

In the first half of fiscal 2022, prices rose as demand improved. Global iron ore prices soared again, leading to price hikes by miners in the merchant market, post which CRISIL saw a correction in domestic iron ore prices on a free fall of global iron ore prices. However, in early-2022, the price trend reversed yet again, which narrowed the gap between global landed and domestic prices to nearly 5-10% currently from 45-50% last quarter.

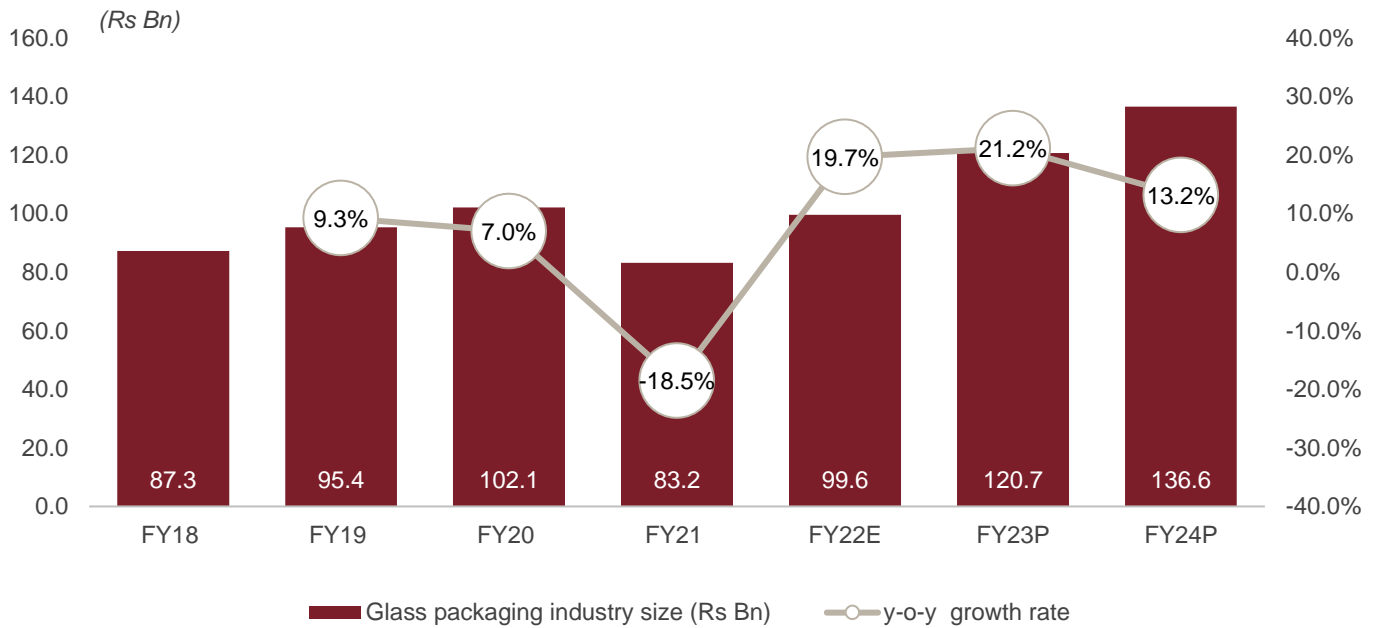
Prices averaged Rs 4,062 per tonne in fiscal 2023, 34% lower than in fiscal 2022, owing to the government levying export duty on iron ore and pellets (50% export duty), which made exports unviable, thereby substantially increasing domestic supply. In FY23, India produced 258 MT of iron ore, of which ~237 MT was consumed domestically and ~21 MT was exported, with negligible imports indicating sufficient supply to the domestic market in the fiscal. With major merchant and captive miners planning production ramp-ups, prices are expected to continue correcting.

6.7 Glass packaging industry in India

Glass packaging is one of the ecofriendly solutions for packaging industry. Packaging made from glass is safe for environment, health, and taste. As glass is nonporous, the flavor of food products remain intact as no interactions happens between glass and products. The glass packaging can be used in variety of packaging applications as preprocessed glass can be bend into any shape.

Indian glass packaging industry was valued at Rs 99.6 Bn for fiscal 2022, growing at 19.7% y-o-y. For fiscal 2023, CRISIL MI&A estimate the market to grow at 21.2% y-o-y growth to reach a value of Rs 120.7 Bn led by volume growth in alcoholic beverages.

Glass packaging industry size



Source: CRISIL MI&A

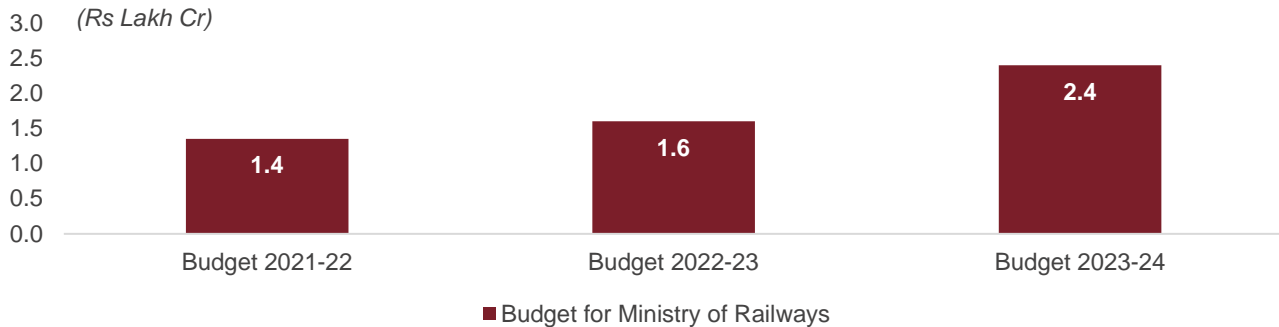
Key end use industries for glass packaging sector are alcoholic beverages, food products, non-alcoholic beverages and pharmaceuticals. Among these key end use industries, alcoholic beverages and food product industries have majority share of 44-47% each. Non-alcoholic beverages industry occupies a market share of 5-10% while pharmaceutical industry has a market share of 0-5%. For fiscal 2024 CRISIL MI&A projects growth for the sector around ~ 13.2% as for alcoholic beverages industry, glass packaging is expected to remain the primary packaging material.

6.8 Railways

Railways plays a key role in growth of Indian economy as it plays a key role of integrating markets and increasing trade along with creating more than a million jobs. Railway enables the transportation for people and goods to even remote areas in the country. Also, as railway travel, typically, is cheaper than air travel for large distances, a large population of the country depends on railway for long distance travel.

CRISIL MI&A expects a 12-14% rise in investments in railways in fiscal 2024 led by rise in budget allocation for railways, implementation of high value projects such as the Mumbai-Ahmedabad Bullet train, gaining traction in station redevelopment and completion of the freight corridor. The rise is post an expected rise of 32-34% rise in investments in Railways in fiscal 2023 owing to government focus on completion of DFC projects, traction in high-speed rail, investment in newer avenues such as Vande Bharat trains and rising focus on station redevelopment program

Budget for Ministry of Railways



Source: Ministry of Finance, CRISIL MI&A

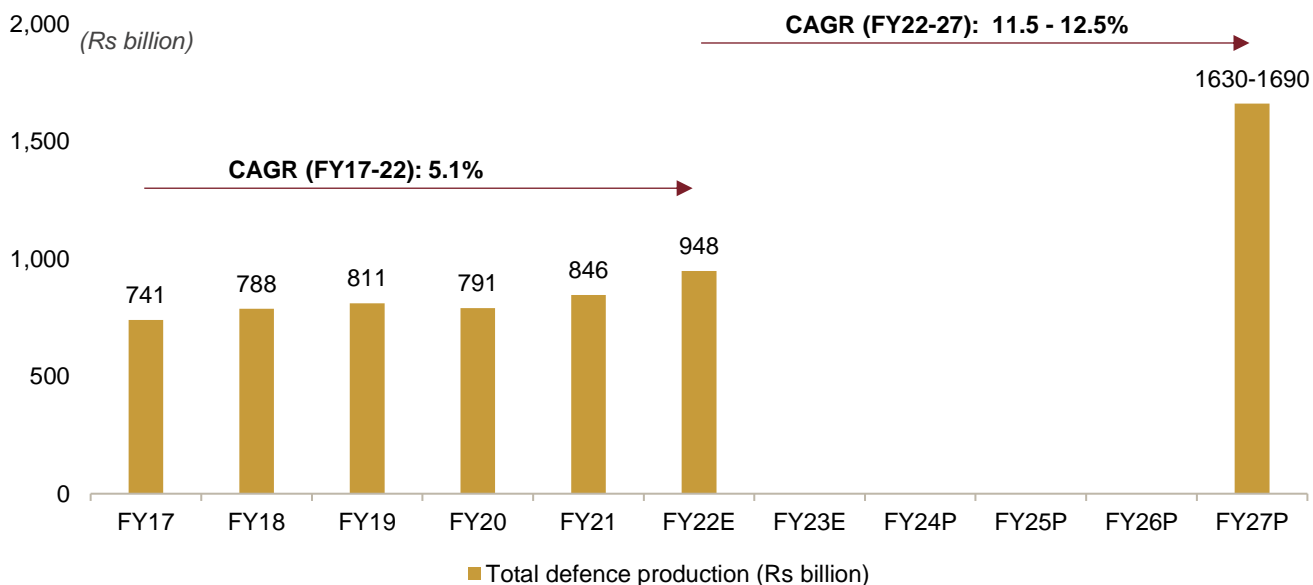
Construction spends in Railways

The central government announced a capital outlay of Rs 2.4 lakh crore for the Indian Railways in the Union Budget 2024 which is 50% higher than the preceding year's revised estimate of Rs 1.6 lakh crore. The optimistic rise is due to planned investments in manufacture of 400 new generation Vande Bharat trains and development of 100 PM Gati Shakti cargo terminals for multimodal logistics during the next three years.

6.9 Defense industry in India

Over the past few years, indigenous defence production has been a key priority for the government. Various measures have been introduced to encourage the domestic defence industry. This includes, raising the FDI limit to 74% from 49%, DAP-2020 (which focuses on domestic procurement), PILs, simplification of industrial licensing, the IDEX scheme, SRIJAN portal, reforms in the offset policy, transfer of technologies, etc.

Total defence production in India, FY17-27P



Note: E: estimated, P: projected

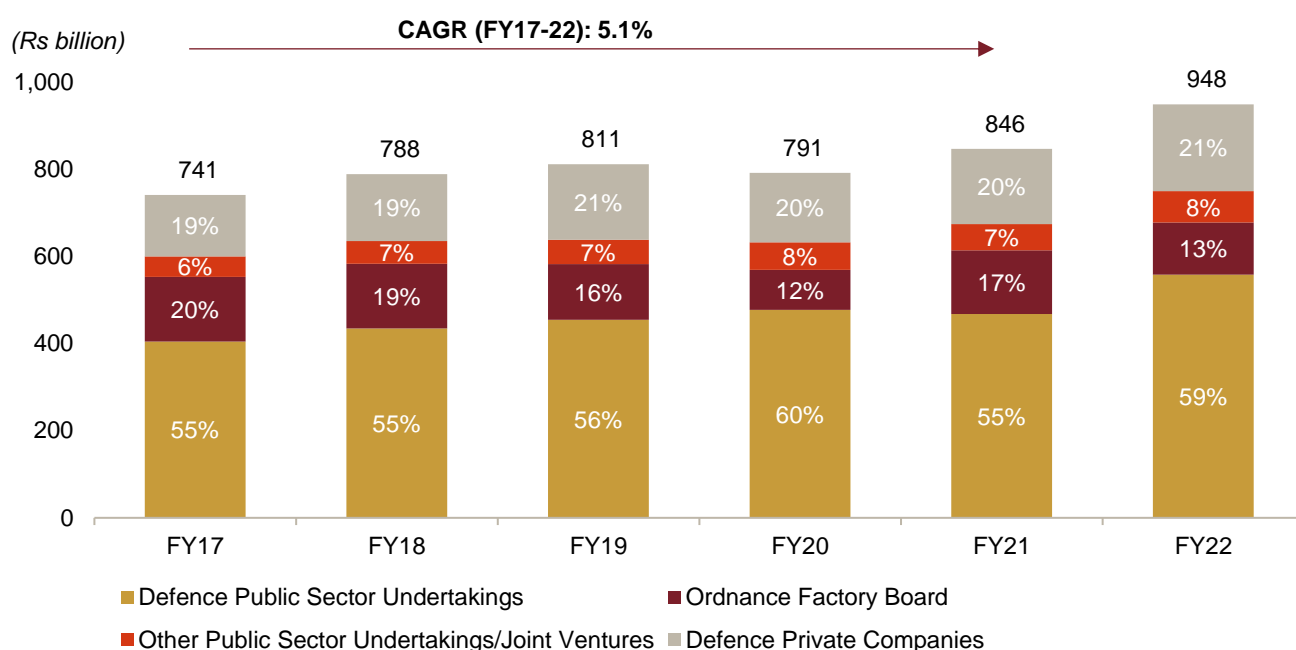
Source: MoD, CRISIL MI&A

Defence production in India totalled Rs 948 billion in fiscal 2022, up at a CAGR 5.1% over fiscals 2017-22. It is expected to grow at 11.5-12.5% over fiscals 2022-27 to Rs 1,630-1,690 billion. It will be supported by policy reforms mentioned in the previous section, strong impetus on the private sector’s involvement, and infrastructure development (defence corridors in Uttar Pradesh and Tamil Nadu). The government has set a target of \$5 billion exports and corresponding \$22 billion defence production by 2025. The capital expenditure (capex) planned by the DPSUs will also boost domestic production.

Private sector in defence production

As of FY22, DPSUs held the largest share in the defence production at 59%, followed by private companies (21%), Ordnance Factory Board (OFB; 13%), and other PSUs/ JVs (8%).

Segment-wise share of total defence production in India



Source: MoD, CRISIL MI&A

Supported by policy support, the private sector has been growing at a slightly higher growth rate (7.1% over fiscals 2017-22) than DPSUs (6.7%). Over fiscals 2021-22, 85 new defence industrial licences were issued to the private sector. As of October 2022, the government has issued 595 industrial licences to 366 companies operating in the defence sector. Out of these, 113 companies covering 170 defence industrial licences have commenced production. Validity of the licences has been increased from 3 years to 15 years. PILs have opened new avenues of defence production for private companies and widened their scope to capture market share.

OFBs de-grew 4.3% over fiscals 2017-22, due to the conversion of OFB production units into seven DPSUs with 41 units, with effect from October 1, 2021.

7. Competitive landscape assessment

In this section, CRISIL MI&A has compared key players in the domestic heavy engineering, wear plates and welding consumable industries. Data has been sourced from publicly available information, including annual reports and investor presentations of listed players, regulatory filings, rating rationales, and/or company websites. The financials in the competitive section have been re-classified by CRISIL MI&A, based on annual reports and filings by the players.

7.1 Overview of key players

The welding equipment, wear plates and heavy engineering industries comprise both organized and unorganized players, some of key players in these industries are listed below.

Company name	Year established
ISGEC Heavy Engineering Ltd	1993
Esab India Ltd	1987
Ador Welding Ltd	1951
Ewac Alloys Ltd	1962
Diffusion Engineers Ltd	1982
AIA Engineering LTD	1978

Source: CRISIL MI&A, company website and annual reports, secondary research

7.2 Key financial parameters

7.2.1 Operating income

Players	Revenue (operating income in Rs mn)			On-year growth (FY21-FY22)	On-year growth (FY22-FY23)	CAGR growth %(FY21-FY23)
	FY21	FY22	FY23			
ISGEC Heavy Engineering Ltd	54265	54763	63990	1%	17%	9%
Esab India Ltd	6864	8971	10908	31%	22%	26%
Ador Welding Ltd	4493	6627	7789	47%	18%	32%
Ewac Alloys Ltd	2056	2389	2689	16%	13%	14%
Diffusion Engineers Limited	1554	2049	2550	32%	24%	28%
AIA Engineering Ltd	28815	35665	49088	24%	38%	31%

Note: Diffusion data basis financials provided by client

Source: CRISIL MI&A, company website, company filings

Operating income – Revenue from operations which includes sales of products & services and other operating revenues

7.2.2 OPBDIT

Players	OPBDIT in Rs mn			On-year growth (FY21-FY22)	On-year growth (FY22-FY23)	CAGR growth % (FY21- FY23)
	FY21	FY22	FY23			
ISGEC Heavy Engineering Ltd	101	64	127	-37%	100%	12%
Esab India Ltd	891	1229	1867	38%	52%	45%
Ador Welding Ltd	278	629	917	127%	46%	82%
Ewac Alloys Ltd	252	346	282	37%	-19%	6%
Diffusion Engineers Limited	209	233	283	12%	21%	16%
AIA Engineering Ltd	7328	7847	13404	7%	71%	35%

Note: Diffusion data basis financials provided by client

Source: CRISIL MI&A, company website, company filings

7.2.3 OPBDIT margin

Players	OPBDIT (% of total income)		
	FY21	FY22	FY23
ISGEC Heavy Engineering Ltd	9%	6%	7%
Esab India Ltd	13%	14%	17%
Ador Welding Ltd	6%	9%	12%
Ewac Alloys Ltd	12%	14%	10
Diffusion Engineers Limited	14%	11%	11%
AIA Engineering Ltd	25%	22%	27%

Note: Diffusion data basis financials provided by client

Source: CRISIL MI&A, company website, company filings

7.2.4 EBITDA

Players	EBITDA (Rs mn)			On-year growth (FY21-FY22)	On-year growth (FY22-FY23)	CAGR growth % (FY21-FY23)
	FY21	FY22	FY23			
ISGEC Heavy Engineering Ltd	5116.1	3254.3	4673.2	-36%	44%	-4%
Esab India Ltd	939	1255.7	1944.8	34%	55%	44%
Ador Welding Ltd	287.7	649.2	942.2	126%	45%	81%
Ewac Alloys Ltd	270.4	351.9	310.4	30%	-12%	7%
Diffusion Engineers Ltd	202.1	268.0	348.0	33%	30%	31%
AIA Engineering Ltd	8184	8655	14605	6%	69%	34%

Note: Diffusion data basis financials provided by client

N.M- Not Mentionable

Source: CRISIL MI&A, company website, company filings

EBITDA- Earnings before interest, tax, depreciation, and amortization

7.2.5 EBITDA margin %

Players	EBITDA margin (% of total income)		
	FY21	FY22	FY23
ISGEC Heavy Engineering Ltd	9%	6%	7%
Esab India Ltd	14%	14%	18%
Ador Welding Ltd	6%	10%	12%
Ewac Alloys Ltd	13%	15%	11%
Diffusion Engineers Ltd	13%	13%	13%
AIA Engineering Ltd	28%	24%	29%

Note: Diffusion data basis financials provided by client
Source: CRISIL MI&A, company website, company filings

7.2.6 Profit after tax

Players	Profit after tax (Rs mn)			On-year growth (FY21-FY22)	On-year growth (FY22-FY23)	CAGR growth % (FY21-FY23)
	FY21	FY22	FY23			
ISGEC Heavy Engineering Ltd	2530	1150	2055	-55%	79%	-10%
Esab India Ltd	593	843	1357	42%	61%	51%
Ador Welding Ltd	-104	452	593	NM	31%	NM
Ewac Alloys Ltd	154	288	-71	88%	-125%	NM
Diffusion Engineers Ltd	117	170	221	46%	30%	38%
AIA Engineering Ltd	5657	6196	10565	10%	71%	37%

Note: Diffusion data basis financials provided by client
Source: CRISIL MI&A, company website, company filings

7.2.7 Profit after tax %

Players	PAT (% of total income)		
	FY21	FY22	FY23
ISGEC Heavy Engineering Ltd	5%	2%	3%
Esab India Ltd	9%	9%	12%
Ador Welding Ltd	-2%	7%	8%
Ewac Alloys Ltd	5%	5%	-3%
Diffusion Engineers Ltd	8%	8%	8%
AIA Engineering Ltd	19%	17%	21%

Note: Diffusion data basis financials provided by client
Source: CRISIL MI&A, company website, company filings

7.2.8 RoCE-%

Players	RoCE		
	FY21	FY22	FY23
ISGEC Heavy Engineering Ltd	14.5	7.8	10.6
Esab India Ltd	27.7	45.8	73.2
Ador Welding Ltd	-2	23.6	27.1
Ewac Alloys Ltd	20	38.9	-8.4
Diffusion Engineers Ltd	14.6	16.9	18.0
AIA Engineering Ltd	17.7	17.1	25.1

Note: Diffusion data basis financials provided by client
Source: CRISIL MI&A, company website, company filings

ROCE (%) = Profit before interest/ (Average tangible net worth+ Total debt+ deferred tax liability).

ROCE indicates the ability of a company's management to generate returns for both debt holders and equity holders. The higher the ratio, more efficiently is the capital being employed by the company to generate returns

7.2.9 Gearing ratio

Players	Gearing		
	FY21	FY22	FY23
ISGEC Heavy Engineering Ltd	0.5	0.6	0.5
Esab India Ltd	0	0	0
Ador Welding Ltd	0.1	0	0.0
Ewac Alloys Ltd	0.2	0	0.0
Diffusion Engineers Ltd	0.2	0.2	0.3
AIA Engineering Ltd	0.0	0.0	0.0

Note: Diffusion data basis financials provided by client
Source: CRISIL MI&A, company website, company filings

Gearing (times) = total debt/ Net worth

Gearing compares a company's total debt to shareholders equity

7.2.10 RoE-%

Players	RoE		
	FY21	FY22	FY23
ISGEC Heavy Engineering Ltd	13	5.5	9.2
Esab India Ltd	19.9	33.6	54.1
Ador Welding Ltd	-4.1	17.4	19.6
Ewac Alloys Ltd	15.2	29.4	-7.7
Diffusion Engineers Ltd	11.7	15.1	16.9
AIA Engineering Ltd	14.3	13.8	20.3

Note: Diffusion data basis financials provided by client
Source: CRISIL MI&A, company website, company filings

ROE (%) = PAT/ Average tangible net worth

ROE measures the profitability of equity funds invested in the Company

7.2.11 Working capital ratio

Players	Working capital ratio		
	FY21	FY22	FY23
ISGEC Heavy Engineering Ltd	1.5	1.5	1.5
Esab India Ltd	1.7	1.5	1.7
Ador Welding Ltd	1.9	1.9	2.5
Ewac Alloys Ltd	1.3	1.5	1.5
Diffusion Engineers Ltd	3.0	2.7	4.0
AIA Engineering Ltd	11.5	9.4	8.1

Note: Diffusion data basis financials provided by client
Source: CRISIL MI&A, company website, company filings

Working capital ratio – current assets/current liabilities

Key Observations.

- Among the players considered, Diffusion Engineers Ltd had the third highest CAGR of 28% for operating income between FY21-23, behind Ador welding Ltd with 32% CAGR and AIA Engineering Ltd with 31% CAGR for FY21-23.
- For profit after tax, Diffusion Engineers Ltd had the second highest CAGR of 38%, among the players considered, between fiscal 2021-23, behind Esab India Ltd with 51% CAGR.
- Among the players considered, Diffusion Engineers Ltd had the fourth highest CAGR growth of 31% for EBITDA between fiscal 2021-23 .

7.2.12 Exports

Company name	Exports
	FY23 (Rs Mn)
ISGEC Heavy Engineering Ltd	10900
Esab India Ltd	1099
Ador Welding Ltd	314.2*
Ewac Alloys Ltd	NA
Diffusion Engineers Ltd	347.2
AIA Engineering LTD	27538.4

NA: Not available

* - Export data is for fiscal 2022

Source: CRISIL MI&A, company website and annual reports, secondary research

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