



Industry Report
on
Industrial HVAC Industry in India

March 2026

Ravita Engineering Services Ltd

© Dun & Bradstreet All rights reserved.

D&B and D-U-N-S are registered trademarks of Dun & Bradstreet.

All other product names and brand names are trade names, service marks, trademarks, or registered trademarks of their respective owners.

Disclaimer

*This study has been undertaken through extensive secondary research, which involves compiling inputs from publicly available sources, including official publications and research reports. Estimates provided by Dun & Bradstreet (“**Dun & Bradstreet**”) and its assumptions are based on varying levels of quantitative and qualitative analysis including industry journals, company reports and information in the public domain.*

Dun & Bradstreet has prepared this study in an independent and objective manner, and it has taken all reasonable care to ensure its accuracy and completeness. We believe that this study presents a true and fair view of the industry within the limitations of, among others, secondary statistics, and research, and it does not purport to be exhaustive. The results that can be or are derived from these findings are based on certain assumptions and parameters/conditions. As such, a blanket, generic use of the derived results or the methodology is not encouraged.

Forecasts, estimates, predictions, and other forward-looking statements contained in this report are inherently uncertain because of changes in factors underlying their assumptions, or events or combinations of events that cannot be reasonably foreseen. Actual results and future events could differ materially from such forecasts, estimates, predictions, or such statements.

The recipient should conduct its own investigation and analysis of all facts and information contained in this report is a part and the recipient must rely on its own examination and the terms of the transaction, as and when discussed. The recipients should not construe any of the contents in this report as advice relating to business, financial, legal, taxation or investment matters and are advised to consult their own business, financial, legal, taxation, and other advisors concerning the transaction.

Table of Contents

Abbreviations.....	6
Global Macroeconomic Scenario.....	8
Global Economic Overview.....	8
Historical and Projected GDP Growth.....	8
Global Economic Outlook.....	9
Global Growth Projection.....	11
India Macroeconomic Analysis.....	13
Historical GDP and GVA Growth trend.....	13
Sectoral Contribution to GVA and annual growth trend.....	14
Annual and Quarterly: Investment & Consumption Scenario.....	16
Growth Outlook.....	20
Key Growth/Demographic Drivers for Economic Growth.....	22
Government focus on infrastructure development.....	22
Development of Domestic Manufacturing Capability.....	23
Strong Domestic Demand.....	23
India's Per capita GDP trends.....	25
Increasing Urbanization.....	26
Rural Vs Urban Working Population Age Group.....	27
Foreign Direct Investment Trend in India.....	29
Industry Overview.....	30
Insight on HVAC System Focus on key components.....	30
Insight on complexity of HVAC systems.....	32
Various levels of complexity of HVAC system based on consumer segment.....	32
HVAC Industry value chain:.....	33
Brief insight on the HVAC EPC Lifecycle.....	34
Insight on the role of system integrators in HVAC market.....	35
Brief insight on industrial refrigeration.....	36
Market Scenario: HVAC Industry (CAPEX & OPEX).....	36

Insight on EPCIC (Engineering, Procurement, Construction, and Installation/Commissioning) model in HVAC projects:	42
Market Scenario: HVAC EPC I&C Industry	43
India HVAC EPC I&C Market by Project Location.....	45
India HVAC EPC I&C Market by End User Industry	46
HVAC Operations & Maintenance (O&M) Industry	48
Market Scenario: HVAC O&M Industry	49
India HVAC O&M Market by Project Location Segment.....	50
India HVAC O&M Market by End User Industry	52
Key Demand Drivers	53
Environmental factors.....	54
Demographic factors	55
Government regulations on building codes & energy efficiency benchmarks.....	55
Government flagship programs and their impact	56
Urbanization.....	56
Rapid industrialization	57
Demand from Existing Customer Base: Onshore Installations & Assets	58
Insight on Integrated Facility Management (IFM) in onshore HVAC assets.....	58
Analysis of key factors driving the demand for IFM services in HVAC segment.....	60
Demand from Existing Customer Base: Offshore Oil & Gas Installations	60
Insight on offshore oil & gas installations.....	60
Status of offshore oil & gas infrastructure in India	63
Insight on HVAC solution in offshore oil & gas infrastructure	64
Insight on objectives & role played by HVAC system in offshore oil & gas infrastructure	66
Demand from Existing Customer Base: Data Center	67
Insight on Data center scenario in India	67
Current scenario & expected growth forecast in data center landscape in India	67
Key factors driving expansion of data center infrastructure in India.....	69
Insight on HVAC solutions used in data center infrastructure:	70

Demand from Emerging Customer Segments	72
Analysis of key factors driving the demand for EPC HVAC projects across select industry segments:.....	72
Regulatory Landscape	76
Analysis of key regulatory policies/programs impacting the HVAC landscape in India.....	76
Emerging Trends & Developments	78
Proliferation of digital technologies & its impact on HVAC landscape	78
Key Threats & Challenges	81
Brief analysis of the key threats & challenges in HVAC EPC segment in India	81
Competitive Landscape	83
Analysis of key factors shaping competition in the sector	84
Analysis of entry barriers / other factors	85
Company Profile: Ravita Engineering Services Limited.....	86

Abbreviations used

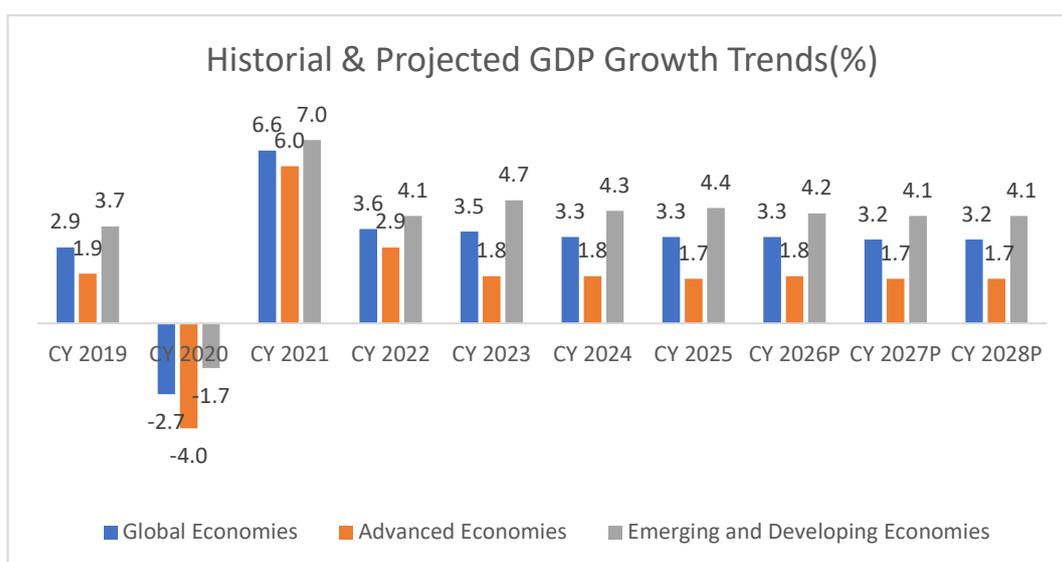
GDP	Gross Domestic Product
GVA	Gross Value Added
IIP	Index of Industrial Production
PFCE	Private Final Consumption Expenditure
GFCF	Gross fixed capital formation
WPI	Wholesale Price Index
CPI	Consumer Price Index
y-o-y	Year on Year
m-o-m	Month on Month
IMF	International Monetary Fund
RBI	Reserve Bank of India
MOSPI	The Ministry of Statistics and Programme Implementation
Est., Adv. Est	Estimated, Advance Estimates
P, F	Projected, Forecast
USD	US Dollar
INR	Indian Rupee
Mn, Bn, Tn, Cr	Million, Billion, Trillion, Crore
PLI	Production Linked Incentive
NSO	National Statistics Office
IT	Information Technology
GST	Goods and Service Tax
UPI	Unified Payments Interface
RBI	Reserve Bank of India
CAGR	Compound Annual Growth Rate
FDI	Foreign Direct Investment
HWCs	Health and Wellness Centres
BIM	Building Information Modeming
EBITDA	Earnings Before Interest, Taxes, Depreciation, and Amortisation.
PAT	Profit After Tax
ROA	Return on Assets
ROCE	Return on Capital Employed
R&D	Research and Development
EPC	Engineering, Procurement & Construction
HAM	Hybrid Annuity Model
NHAI	National Highway Authority of India
NHDP	National Highway Development Project
PMAY	Pradhan Mantri Awas Yojana
NIP	National Infrastructure Pipeline
HVAC	Heating, Ventilation, and Air Conditioning
CY	Calendar Year
WEO	World Economic Outlook
G7	Group of Seven
EU	European Union
U.S.	United States
Q1 / Q2 / Q3 / Q4	Quarter 1 / Quarter 2 / Quarter 3 / Quarter 4

y/y	Year-on-year
USMCA	United States–Mexico–Canada Agreement
MW	Megawatt
NCR	National Capital Region
DPDPA	Digital Personal Data Protection Act
VRF	Variable Refrigerant Flow
BMS	Building Management System
AHU	Air Handling Unit
VAV	Variable Air Volume
IAQ	Indoor Air Quality
HEPA	High-Efficiency Particulate Air
UV	Ultraviolet
GWP	Global Warming Potential
OEM	Original Equipment Manufacturer
EPCIC	Engineering, Procurement, Construction, and Installation/Commissioning
O&M	Operations and Maintenance
PLC	Programmable Logic Controller
SCADA	Supervisory Control and Data Acquisition
CRAC	Computer Room Air Conditioner
CRAH	Computer Room Air Handler
AI	Artificial Intelligence
IoT	Internet of Things

Global Macroeconomic Scenario

Global Economic Overview

Global growth is projected to remain resilient at 3.3 percent in 2026 and at 3.2 percent in 2027. The forecast reflects a slight upward revision for 2026 and no change for 2027 compared with that in the October 2025 World Economic Outlook (WEO)¹. This steady performance on the surface results from the balancing of divergent forces. Headwinds arising from shifting trade policies are offset by tailwinds from rapidly expanding technology-related investment—particularly in artificial intelligence (AI)—with the impact more pronounced in North America and Asia than in other regions. Additionally, fiscal and monetary support, broadly accommodative financial conditions, and strong private-sector adaptability continue to underpin global economic resilience.



Source – IMF Global GDP Forecast Release January 2026

*Note CY 2028 projection is taken from October 2025(World Economic Outlook)

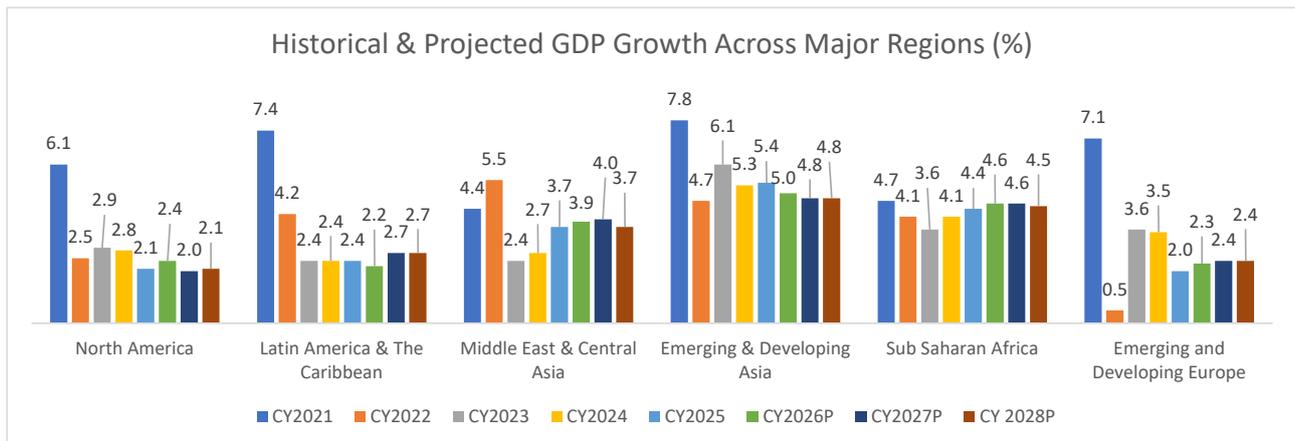
Note: Advanced Economies and Emerging & Developing Economies are as per the classification of the World Economic Outlook (WEO). This classification is not based on strict economic criteria and has evolved over time. It comprises 40 countries in the Advanced Economies category, including the G7 (the United States, Japan, Germany, France, Italy, the United Kingdom, and Canada) and selected Eurozone members (Germany, Italy, France, etc.). The group of emerging and developing economies (156) comprises all economies not classified as Advanced Economies (e.g., India, China, Brazil, Malaysia).

Historical and Projected GDP Growth

GDP growth across major regions was mixed trend during 2024–25. While growth in several regions—including Emerging and Developing Asia as well as Latin America and the Caribbean—is expected to slow further in 2026, performance remains uneven across geographies. In Emerging and Developing Asia (comprising economies such as India, China, Indonesia, and Malaysia), GDP growth is projected to moderate to 5.4% in 2026, compared with 5.3% in the previous year. Similarly, in Latin America and the Caribbean,

¹ <https://www.imf.org/-/media/files/publications/weo/2026/january/english/text.pdf>

growth is expected to ease to 2.2% in 2026, before rebounding to 2.7% in 2027 as countries in the region approach potential output from differing cyclical positions.



Source-IMF World Economic Outlook January 2026 update.

*Note CY 2028 projection is taken from October 2025(World Economic Outlook)

By contrast, growth in the Middle East and Central Asia is projected to accelerate, rising from 3.7% in 2025 to 3.9% in 2026 and further to 4.0% in 2027. This acceleration is supported by higher oil output, resilient domestic demand, and ongoing structural reforms. Likewise, growth in Sub-Saharan Africa is expected to strengthen, rising from 4.4% in 2025 to 4.6% in both 2026 and 2027. However, according to the IMF World Economic Outlook, growth is projected to moderate slightly to 4.5% in 2028, driven by ongoing macroeconomic stabilization and reform efforts in several key economies. Meanwhile, in Emerging and Developing Europe, the sharp slowdown to 2.0% in 2025 is expected to reverse, with the region’s economies projected to expand at an average rate of 2.3% in 2026 and 2.4% in both 2027 and 2028. Across most regions, this recovery also reflects the diminishing effects of recent shifts in global trade policies.

Global Economic Outlook

Since the October 2025 World Economic Outlook (WEO), trade tensions have continued to ease, although they remain subject to occasional flare-ups. A dispute between China and the United States over exports controls of semiconductors and rare earth minerals was followed by a truce that reduced bilateral tariffs until November 2026 and introduced a pause on export controls.

In addition, US authorities removed tariffs on some agricultural products for all countries, offsetting the higher tariffs on certain sectors that were previously announced and are now in effect. As a result, the overall US effective tariff rate remains broadly unchanged from the level assumed in the October 2025 WEO although changes for specific countries are significant. The US Supreme Court is widely expected to deliver a decision in early 2026 regarding the president’s use of the International Emergency Economic Powers Act. At the same time, newly signed bilateral trade and other agreements, often including substantial investment and purchase commitments with limited public disclosure, have added further complexity. Although policy uncertainty has declined since October, it remains considerably higher than in January 2025.

Global growth in the third quarter of 2025 decelerated to 2.4 percent on an annualized basis, exceeding expectations; however, upside surprises in some countries were offset by downside surprises in others. In France, a boost from aerospace exports lifted growth to 2.2 percent, whereas in Germany, falling exports continued to weigh on activity, thereby leaving real GDP unchanged between the second and third quarters. Meanwhile, Japan's economy contracted by 2.3 percent, as private and government consumption partially offset the contraction driven by declines in private residential investment and exports. At the same time, China's growth decelerated to 2.4 percent (according to staff estimates), with weak domestic demand—particularly in the housing sector—only partly offset by resilient exports.

In contrast, growth in the United States accelerated to 4.3 percent, supported by a pickup in technology investment and expenditure, which is estimated to have added approximately 0.3 percentage point to average annualized GDP growth during the first three quarters of 2025, thereby offsetting the drag from the federal government shutdown in the final quarter of the year. In addition, there are indications that technology-related investment also contributed to economic activity in Spain and the United Kingdom, although the scale of this contribution was smaller than that observed in the United States.

India- European Union Free Trade Agreement:

India and the EU concluded a landmark Free Trade Agreement (FTA) on 27 January 2026 during the 16th India EU Summit to deepen and stabilise bilateral trade, building on an already strong economic relationship reflected in USD 136.54 billion of goods trade in FY25. The agreement enhances market access, reduces trade frictions, and improves predictability for cross-border commerce, supporting India's export-led growth by granting preferential access to over 99% of its exports while integrating Indian industries more closely into European value chains and providing the EU with a reliable and diversified supply base. A key feature of the agreement is the elimination or reduction of tariffs on 96.6% of EU goods exports, potentially doubling EU exports to India and saving up to USD 4.79 billion annually in duties, along with significant tariff reductions across sectors such as automobiles (from 110% to 10% under a quota), machinery, chemicals, pharmaceuticals, and select agri-food products, while also easing tariffs on alcoholic beverages and other goods over phased timelines. By establishing clearer rules, streamlining procedures, and strengthening compliance and dispute resolution mechanisms, the FTA reduces administrative uncertainty and encourages long-term investment and sourcing decisions. Overall, the agreement is expected to expand market opportunities, improve price competitiveness, enhance consumer choice, and drive deeper trade integration, positioning both regions to scale exports and strengthen their presence in global value chains.

The U.S. India Trade Deal:

The U.S. India Trade Deal 2026 establishes a framework to enhance bilateral trade by reducing tariffs, improving market access, and strengthening supply chain integration, thereby supporting industrial growth and investment flows between the two countries. However, from a broader macroeconomic perspective, geopolitical developments such as the Iran Israel US conflict have a more immediate and significant impact on industrial activity, particularly through volatility in global energy prices and disruptions in supply chains. Rising

energy costs and uncertainty in crude oil supply can increase input costs for manufacturing and infrastructure projects, potentially affecting project viability and timelines. These factors are especially relevant for the industrial HVAC sector, as fluctuations in energy prices and industrial output directly influence demand for HVAC systems across manufacturing facilities, commercial infrastructure, and large-scale projects in India.

Global Growth Projection

At a broader level, the global growth is expected to remain steady, as momentum in high-tech sectors is projected to slow, yet still continue to partly offset the drag elsewhere. While tariffs and elevated uncertainty are expected to weigh on the level of activity, their impact on growth is projected to fade during 2026, 2027 and 2028. At 3.3 percent in 2026 and 3.2 percent in 2027 and 2028, global growth is therefore expected to decelerate slightly from the estimated 3.3 percent recorded in 2025. Compared with the October 2025 World Economic Outlook (WEO), the forecast for 2026 has been revised upward by 0.2 percentage point, whereas the forecast for 2027 remains unchanged. Nevertheless, there are significant revisions for some countries, with changes occurring in different directions.

Growth in advanced economies is projected at 1.8 percent in 2026 and 1.7 percent in 2027 and 2028. In the United States, economic activity is expected to expand by 2.4 percent in 2026, supported by fiscal policy and a lower policy rate, while the impact of higher trade barriers gradually wanes. This 0.3 percentage point upward revision relative to October reflects a stronger-than-expected GDP outturn in the third quarter of 2025, a rebound in activity in the first quarter of 2026 compared with the fourth quarter of 2025 following the end of the federal government shutdown, and the associated carryover effects. Looking ahead, growth in the United States is projected to remain solid at 2.0 percent in 2027, supported by a near-term fiscal boost from tax incentives for corporate investment under the One Big Beautiful Bill Act of 2025. Although technology-driven momentum is expected to moderate, it is still projected to provide a partial offset to lower immigration and moderating consumption.

In the euro area, growth is expected to remain steady at 1.3 percent in 2026 and to increase modestly to 1.4 percent in 2027. The slightly faster growth in 2027 reflects projected increases in public spending, particularly in Germany, alongside continued strong performance in Ireland and Spain. Overall, the forecast remains broadly unchanged from October, with the subdued growth outlook reflecting unresolved structural headwinds. The impact of the planned increase in defense spending is expected to materialize only in subsequent years, as commitments to reach target levels are phased in gradually through 2035. Compared with other regions, the euro area benefits less from the recent technology-driven investment boost. In addition, the lingering effects of persistently higher energy prices following Russia's invasion of Ukraine are expected to continue weighing on manufacturing, with additional pressure stemming from the real appreciation of the euro relative to the currencies of countries exporting similar products. In Japan, growth is projected to moderate from 1.1 percent in 2025 to 0.7 percent in 2026 and to 0.6 percent in 2027 and 2028. This marks a small upward revision relative to the October figure, reflecting in part the fiscal stimulus package announced by the new government.

In emerging market and developing economies, growth is projected to hover just above 4.0 percent in 2026, 2027, and 2028. Relative to the October forecast, China's growth in 2025 has been revised upward by 0.2 percentage point to 5.0 percent, reflecting the implementation of stimulus measures and additional policy bank lending for investment. Growth in China for 2026 has also been revised upward by 0.3 percentage point to 4.5 percent, as a result of lower effective US tariff rates on Chinese goods following the yearlong trade truce agreed in November, alongside stimulus measures assumed to be implemented over a two-year period. However, the economy's growth rate is expected to decelerate to 4.0 percent in 2027, as structural headwinds increasingly weigh on activity.

Key factors impacting Global Macroeconomic landscape

- Geopolitics remains a defining global risk factor. Ongoing conflict between Russia and Ukraine, heightened tensions in the Middle East, and increasing U.S. geopolitical actions involving countries such as Venezuela, Nigeria, and even regions like Greenland are amplifying systemic uncertainty. These developments are disrupting energy markets and reshaping global supply chains. At the same time, resource nationalism and strategic competition for rare earth minerals have moved from abstract concerns to day-to-day operations.
- The period of frictionless trade shaped by free trade agreements has given way to a stronger push toward regionalization and nearshoring. Geopolitical fragmentation and tariff uncertainty continue to challenge global trade flows.
- Technology adoption and sustainability have become core strategic priorities. Organizations are advancing digital transformation by embedding AI, automation, and cybersecurity into their operations to enhance productivity and safeguard critical assets. AI adoption is emerging as a visible driver of optimism, particularly within the information and communications sectors.

India Macroeconomic Analysis

The International Monetary Fund (IMF) has revised upward India's economic growth for 2025 by 0.7 percentage point to 7.3%. In its World Economic Outlook update, the IMF stated that the upward revision reflects strong growth momentum in the fourth quarter of the current fiscal year. At the same time, the IMF projects India's growth at 6.4 percent in CY 2026, noting that despite the expected moderation, India is expected to remain a key driver of growth among emerging market and developing economies. In addition, the IMF expects inflation in India to return to near-target levels following a marked decline in 2025, driven by subdued food prices, which is expected to provide further support to domestic demand. However, the IMF cautioned that AI-driven productivity gains could lead to a pullback in investment and tighter global financial conditions, resulting in spillover effects for emerging economies.

Country	CY 2020	CY 2021	CY 2022	CY 2023	CY 2024	CY 2025	CY 2026 P	CY 2027 P	CY 2028 P
India ²	-5.8%	9.7%	7.6%	9.2%	6.5%	7.3%	6.4%	6.4%	6.5%
China	2.3%	8.6%	3.1%	5.4%	5.0%	5.0%	4.5%	4.0%	4.0%
United States	-2.2%	6.1%	2.5%	2.9%	2.8%	2.1%	2.4%	2.0%	2.1%
Japan	-4.2%	2.7%	0.9%	1.4%	-0.2%	1.1%	0.7%	0.6%	0.6%
United Kingdom	-10.3%	8.6%	4.8%	0.4%	1.1%	1.4%	1.3%	1.5%	1.4%
Russia	-2.7%	5.9%	-1.4%	4.1%	4.3%	0.6%	0.8%	1.0%	1.1%
Germany	-4.1%	3.9%	1.8%	-0.9%	-0.5%	0.2%	1.1%	1.5%	1.2%

Source: World Economic Outlook, January 2026

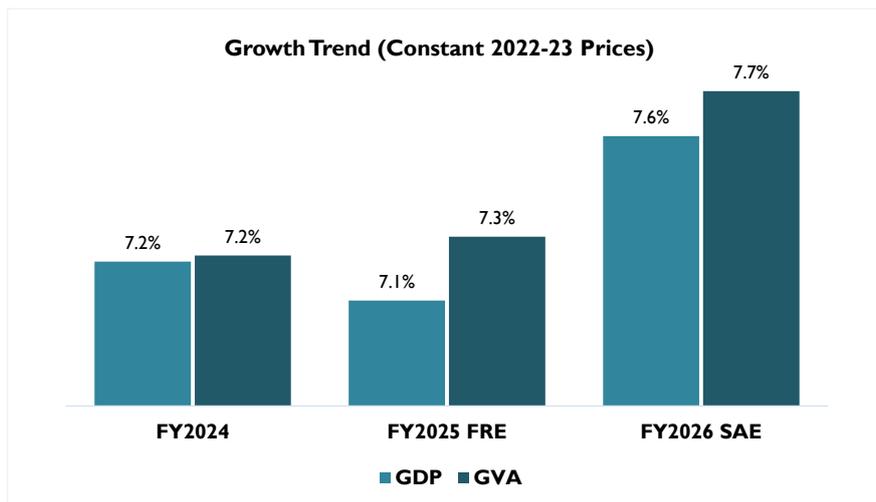
*Note CY 2028 projection is taken from October 2025(World Economic Outlook)

India's strong GDP growth outlook, rising capital expenditure, and stable inflation environment are expected to drive increased investments in infrastructure, real estate, and industrial development, which are key demand drivers for HVAC systems. Higher industrial activity, expansion of commercial spaces, and growth in sectors such as manufacturing, data centers, and urban infrastructure are likely to accelerate the need for efficient climate control and ventilation solutions. Additionally, supportive policy measures and improving domestic demand are expected to boost construction and engineering activities, thereby increasing demand for HVAC systems and related engineering services across India.

Historical GDP and GVA Growth trend

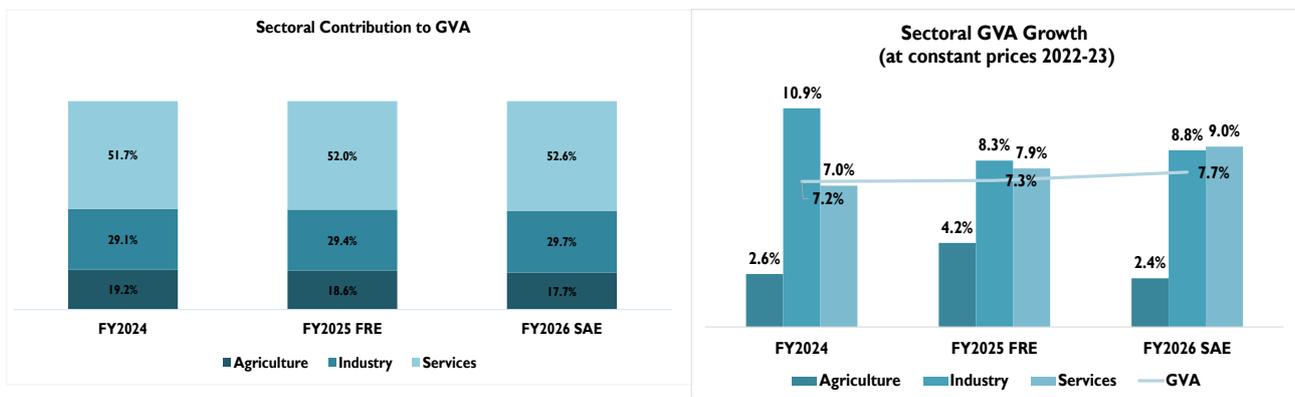
India's Real GDP for FY 2025–26 is estimated at INR 322.58 lakh crore, marking a growth of 7.6% over FY 2024–25. Real GVA is projected at INR 294.40 lakh crore, growing 7.7% year-on-year. These figures indicate steady economic expansion, supporting investment and industrial activity. The trend underscores a favourable environment for infrastructure and HVAC-related demand.

² For India, data and projections are presented on a fiscal year (FY) basis, with FY 2024/25 (starting in April 2024) shown in the 2024 column. India's growth projections are 6.4 percent for 2026, 6.4 percent for 2027 and 6.5% for 2028 based on calendar year



Source: Ministry of Statistics & Programme Implementation (MOSPI), National Account Statistics: FY2025, FRE is First Revised Estimate, SAE is Second Advance Estimate

Sectoral Contribution to GVA and annual growth trend



Source: Ministry of Statistics & Programme Implementation (MOSPI), CMIE Economics Outlook
FRE is First Revised Estimate, SAE is Second Advance Estimate

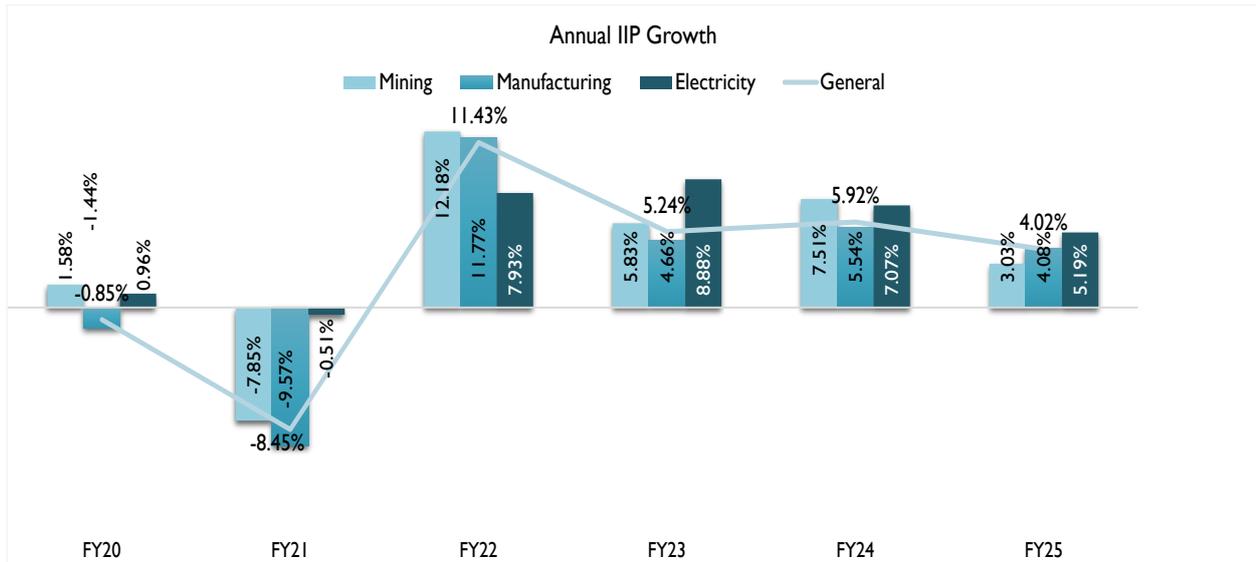
Sectoral analysis of GVA reveals that the industrial sector experienced steady growth momentum in FY 2026, recording a 7.7% y-o-y growth against 7.3% year-on-year growth in FY 2025. Within the industrial sector, growth moderated across sub sector with mining, and construction activities growing by 4.08%, and 7.08% respectively in FY 2026, compared to 11.69%, and 7.30% in FY 2025. Growth in the utilities sector too moderated to 1.52% in FY 2026 from 2.87% in the previous year. The industrial sector's contribution to GVA moderated marginally from 29.4% in FY 2025 to 29.7% in FY 2026.

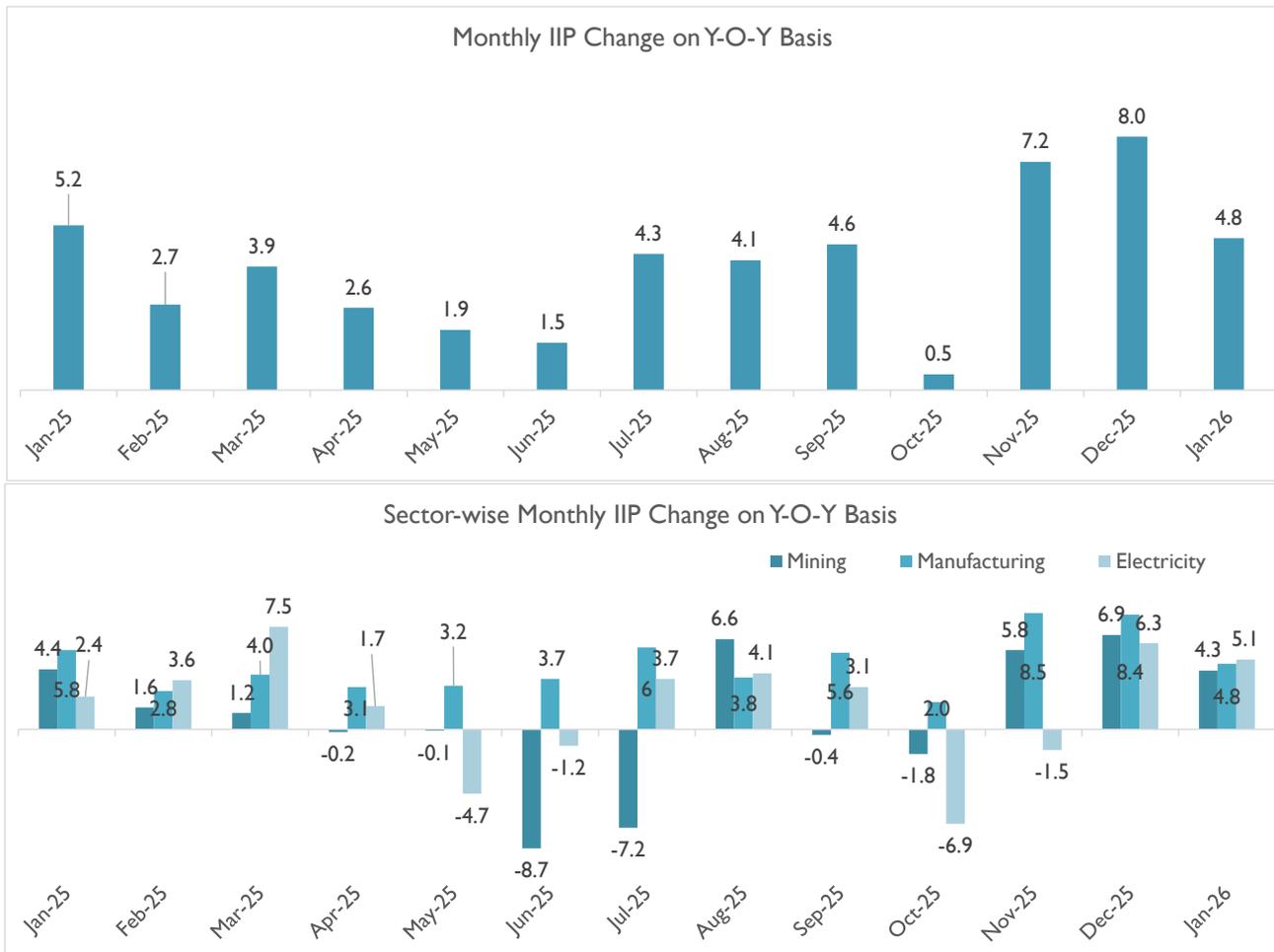
The services sector continued to be the main driver of economic growth. It expanded by 9.0% in FY 2026 from 7.9% in FY 2025. The services sector retained its position as the largest contributor to GVA, rising from 51.7% in FY 2024 to 52% in FY 2025, with a further increase to 52.6% in FY 2026.

The agriculture sector saw an acceleration in growth, increasing from 2.66% in FY 2024 to 4.18% in FY 2025, before moderating to 2.42% in FY 2026. However, its contribution to GVA declined marginally from 19.2% in FY 2024 to 17.7% in FY 2026. Overall, Gross Value Added (GVA) growth rose to 7.7% in FY 2026 from 7.3% in FY 2025.

Annual & Monthly IIP Growth

Industrial sector performance as measured by the IIP index exhibited moderation in FY 2025, recording a 4.02% y-o-y growth against 5.92% increase in the previous year. The manufacturing index showed moderation, increasing by 4.08% in FY 2025 compared with 5.54% in FY 2024. The mining sector index also moderated, growing 3.03% in FY 2025 compared with 7.51% in previous years, while the Electricity sector index moderated by 5.19% in FY 2025 compared with 7.07% in the previous year.



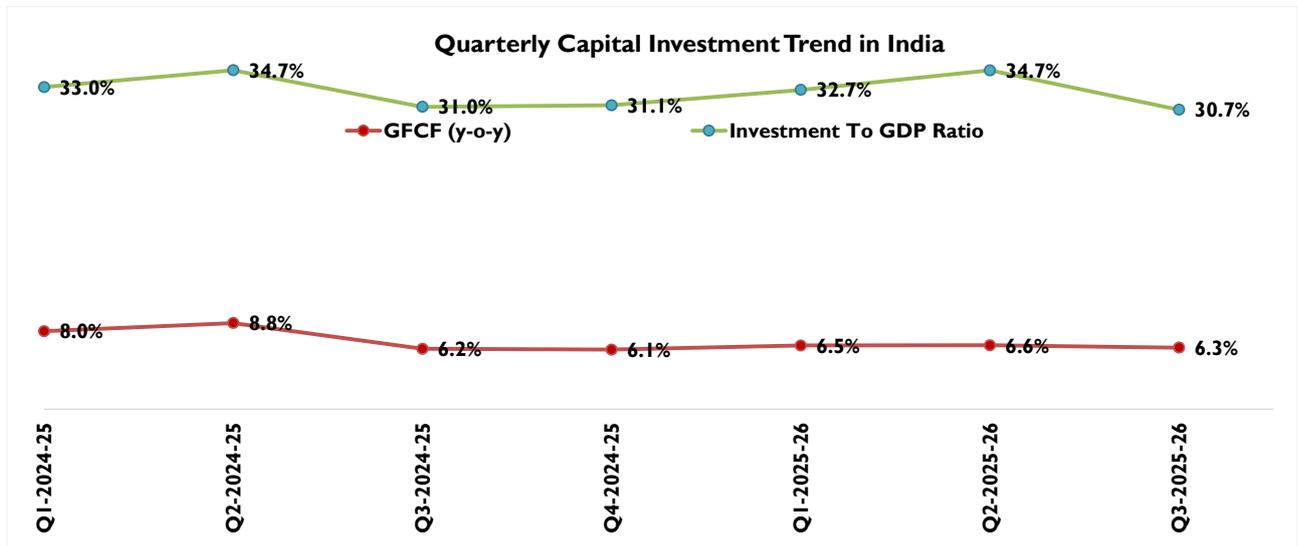
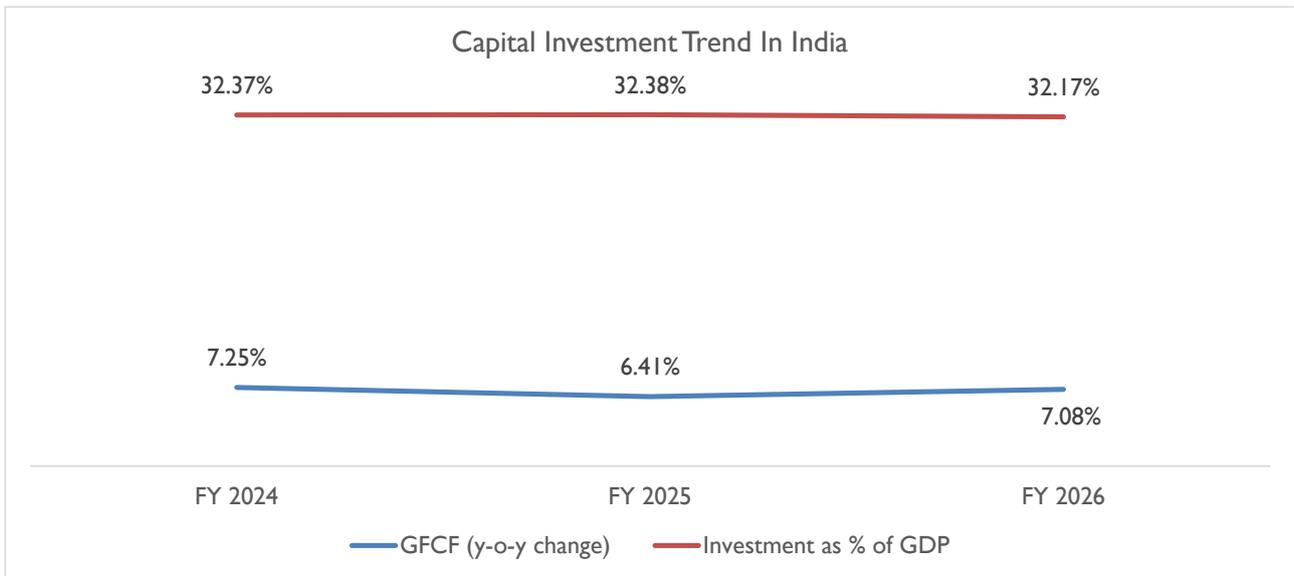


Source: Ministry of Statistics & Programme Implementation (MOSPI)

The IIP growth rate for the month January 2026 is 4.8% which was 8.0% in the month of December 2025. The growth rates of the three sectors, Mining, Manufacturing and Electricity for the month of January 2026 were 4.3%, 4.8% and 5.1% respectively.

Annual and Quarterly: Investment & Consumption Scenario

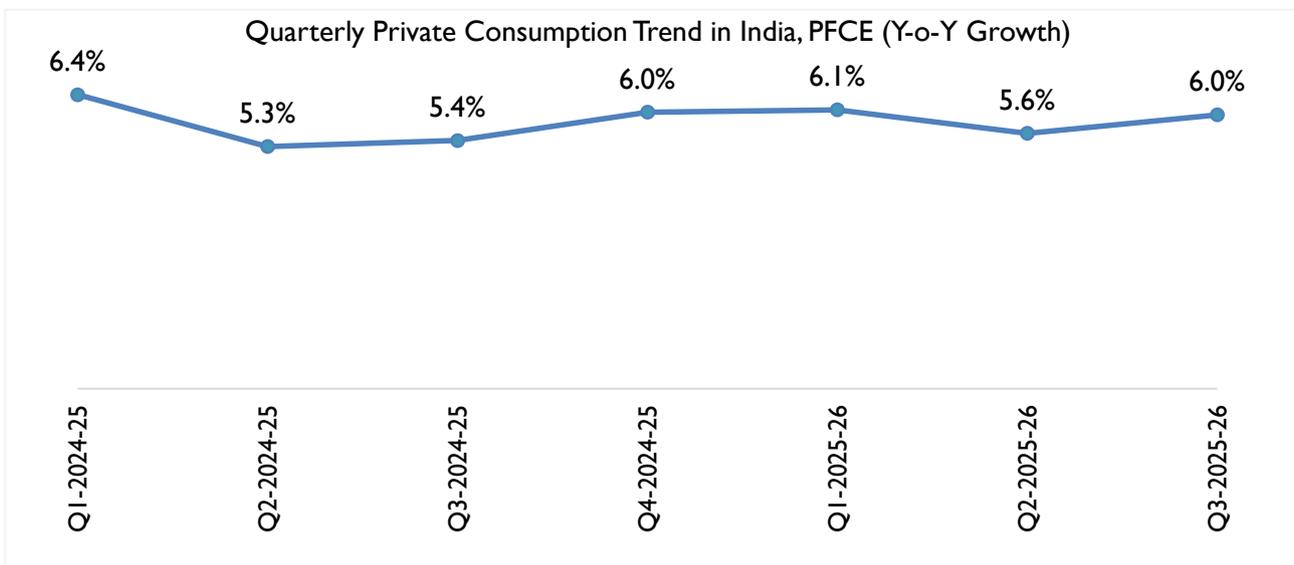
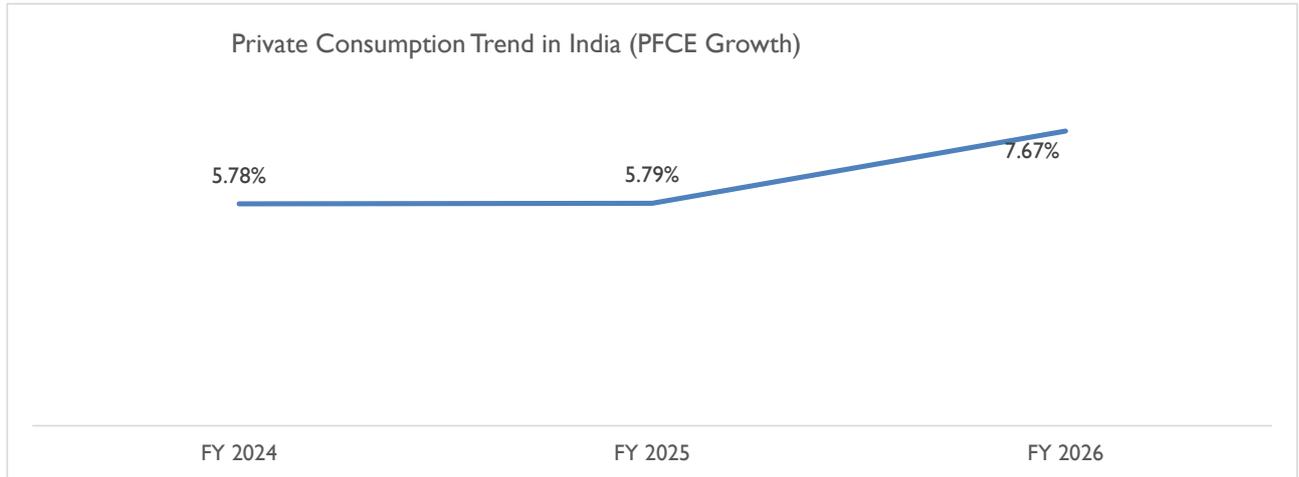
Other major indicators, such as Gross Fixed Capital Formation (GFCF), a measure of investment, increased during FY 2026, registering 7.08% year-on-year growth compared with 6.41% in FY 2025, bringing the GFCF-to-GDP ratio to 32.17%.



Source: Ministry of Statistics & Programme Implementation (MOSPI), CMIE Economics Outlook

On a quarterly basis, India’s capital investment indicators display a pattern of moderate but uneven momentum. The Investment-to-GDP ratio remained above 30% throughout the period but shifted within a narrow and cyclical band—rising from 33.0% in Q1 FY 2024-25 to 34.7% in Q2, before softening to 31.0% and 31.1% in Q3 and Q4, respectively. The ratio recovered to 32.7% in Q1 FY 2025-26 and 34.7% in Q2, before easing to 30.7% in Q3, indicating fluctuating capital deployment across quarters. Meanwhile, GFCF (y-o-y) growth also exhibited volatility. After rising to 8.8% in Q2 FY 2024-25, growth moderated to 6.2% in Q3 and 6.1% in Q4, reflecting a deceleration in both government and private investment activity. Growth improved marginally to 6.5% in Q1 FY 2025-26 and 6.6% in Q2, but eased to 6.3% in Q3, signalling a plateauing in investment momentum. Overall, the data suggests that while investment levels remain healthy, quarterly volatility persists, underscoring the dependence on fiscal spending patterns and the still-gradual recovery of private capital expenditure.

Private Consumption Scenario



Sources: MOSPI, CMIE Economics Outlook

Private Final Consumption Expenditure (PFCE) is a practical proxy for household spending, observed growth in FY 2026 relative to FY 2025. Quarterly Private Final Consumption Expenditure (PFCE) has reported 6.0% growth rate during Q3 of FY 2025-26 as compared to the 5.6% growth rate in the corresponding period of the previous financial year.

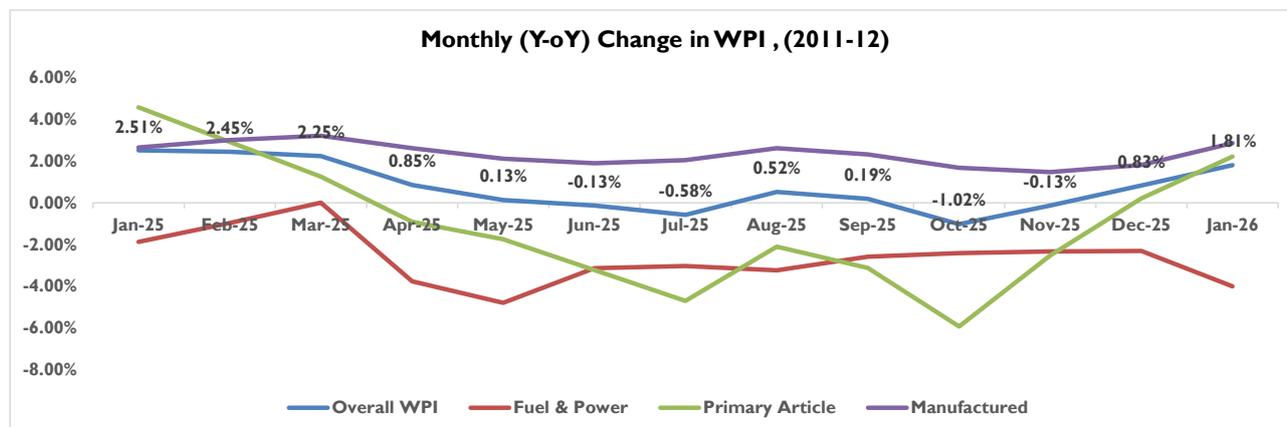
Inflation Scenario

The annual rate of inflation based on All India Wholesale Price Index (WPI) number is 1.81% (provisional) for the month of January 2026 (over January 2025). Positive rate of inflation in January 2026 is primarily due to increase in prices of manufacture of basic metals, other manufacturing, non-food articles, food articles and textiles etc.

Primary Articles (Weight 22.62%): - The index for this major group decreased by 0.15 % from 194.2 (provisional) for the month of December 2025 to 193.9 (provisional) in January 2026. The Price of food articles (-1.79%) and minerals (-0.47%) decreased in January 2026 as compared to December 2025. The Price of non-food articles (5.32%) and Crude Petroleum & Natural Gas (4.27%) increased in January 2026 as compared to December 2025.

Fuel & Power (Weight 13.15%): - The index for this major group decreased by 1.62% from 148.3 (provisional) for the month of December 2025 to 145.9 (provisional) in January 2026. The Price of electricity (-2.91%) and mineral oils (-1.68%) decreased in January 2026 as compared to December 2025. The Price of coal (0.73%) increased in January 2026 as compared to December 2025.

Manufactured Products (Weight 64.23%): - The index for this major group increased by 1.30% from 145.6 (provisional) for the month of December 2025 to 147.5 (provisional) in January 2026. Out of the 22 NIC two-digit groups for manufactured products, 19 groups witnessed an increase in prices, and 3 groups witnessed a decrease in prices. Some of the important groups that showed month-over-month increase in prices were manufacture of basic metals; food products; textiles; other manufacturing and electrical equipment etc. some of the groups that witnessed a decrease in prices were manufacture of pharmaceuticals, medicinal chemical and botanical products; machinery and equipment and furniture in January, 2026 as compared to December, 2025.



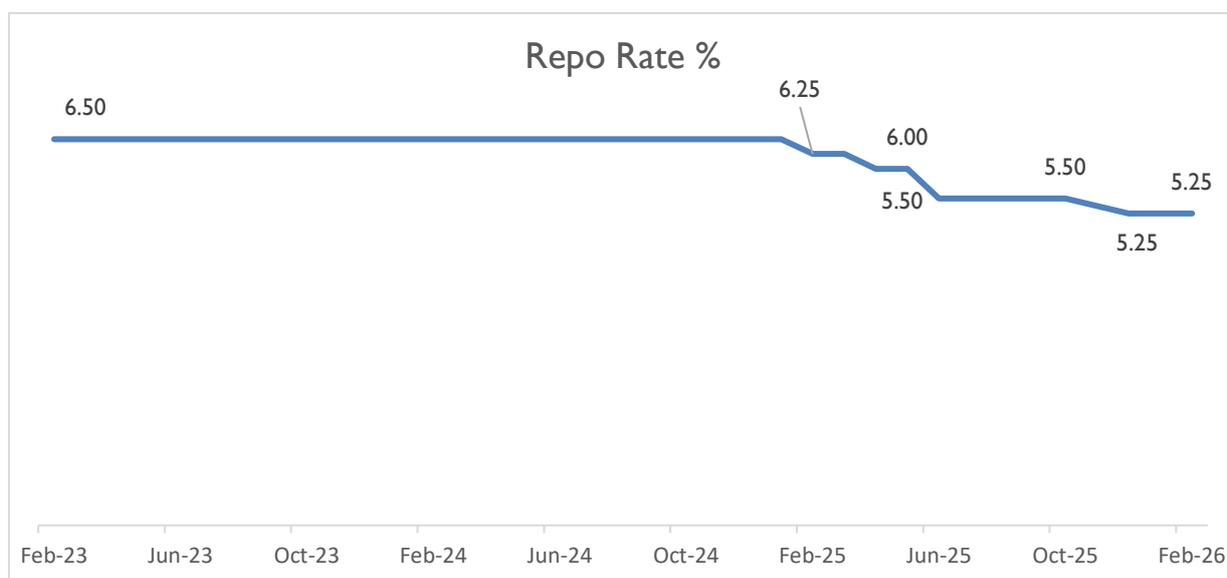
Monthly Consumer Price Index (Base year 2024)													
	Jan-25	Feb-25	Mar-25	Apr-25	May-25	Jun-25	Jul-25	Aug-25	Sep-25	Oct-25	Nov-25	Dec-25	Jan-26
Rural	101.81	101.33	101.34	101.81	101.78	102.39	103.34	103.84	103.8	103.85	104.16	104.19	104.59
Urban	101.49	101.3	101.47	101.49	102.06	102.66	103.36	103.6	103.66	103.61	103.83	103.98	104.3
India	101.67	101.32	101.39	101.67	101.9	102.51	103.35	103.74	103.74	103.74	104.01	104.1	104.46

Source: MOSPI, Office of Economic Advisor

With effect from January 2026, the National Statistics Office (NSO) introduced a revised CPI series with base year 2024=100, drawing revised item weights from the Household Consumption Expenditure Survey (HCES) 2023-24. Under the new series, the weight of food and beverages has been reduced from 45.86% to 36.75%, while housing (including water, electricity, gas, and other fuels) has been expanded to 17.67%. CPI inflation

under the new series stood at 2.75% (provisional) for January 2026, with rural inflation at 2.73% and urban inflation at 2.77%, well within the RBI's target band of 2–6%.

On the monetary policy front, the RBI had cumulatively raised the repo rate by 250 basis points between May 2022 and February 2023, bringing it to 6.50%, where it was held steady through January 2025 to anchor inflationary expectations. With inflation moderating below target and growth requiring support, the RBI's Monetary Policy Committee (MPC) commenced an easing cycle in February 2025, delivering a cumulative 125 basis points of rate cuts through four reductions — 25 bps each in February 2025, April 2025, and December 2025, and a larger 50 bps cut in June 2025 — interspersed with pauses in August and October 2025. The repo rate currently stands at 5.25%, following the MPC's decision to hold rates unchanged at its February 2026 meeting, the most aggressive easing cycle since 2019.



Sources: CMIE Economic Outlook

Growth Outlook

The Union Budget 2026–27 sets out a quantitatively strong push to build resilient supply chains and develop next-generation industrial capacity. The record ₹12.2 trillion capital expenditure outlay is aimed at easing logistics bottlenecks and enhancing India's cost competitiveness. Employment measures extend across both urban and rural India in one sweep. In cities and large towns, capex is channelled into “connectors” such as the seven proposed high-speed rail corridors and upgraded Tier-2 and Tier-3 infrastructure, thereby creating construction, logistics, and service jobs while cutting commute times. In smaller towns and villages, jobs creation is expected to be supported by mega textile parks, the Mahatma Gandhi Gram Swaraj Initiative's push for khadi and handloom, training for tourist guides, and new waterways and coastal shipping. Together, these steps broaden the wage base instead of providing a short-term bump.

Strategic supply chains also receive a significant push. Dedicated rare earth corridors in Odisha, Kerala, Andhra Pradesh, and Tamil Nadu; customs exemptions for capital goods used in critical mineral processing and battery cells; and the India Semiconductor Mission 2.0 aim to pull manufacturing deeper into components and materials. If executed well, these measures could reduce import dependence in magnets, batteries, and

chip inputs and lift the share of higher-productivity manufacturing jobs — thereby raising household incomes durably.

The conclusion of the India–EU FTA negotiations mark a major strategic milestone, as it offers near-universal market access for 99.5% of India’s exports by value and integrates India more deeply into a USD 24 trillion economic bloc. By providing duty-free entry for key labour-intensive sectors, expanding services access, and establishing a mobility framework for Indian professionals, the agreement strengthens India’s export competitiveness, supports high-value job creation, and ensures a predictable, rules-based environment for long-term trade and investment flows.

Similarly, the India–Oman CEPA creates a comprehensive framework covering goods, services, investment, and regulatory cooperation. With bilateral trade at USD 10.61 billion in FY 2024–25, the CEPA grants India 100% duty-free access across 98.08% of Oman’s tariff lines (99.38% of export value) from Day One. This access expands opportunities across engineering goods, pharmaceuticals, agriculture, chemicals, electronics, textiles, marine products, and gems & jewellery, while a calibrated exclusion list helps protect sensitive domestic and MSME-linked sectors.

Global and domestic macroeconomic trends indicate steady economic growth, rising capital expenditure, and increasing investments in infrastructure, manufacturing, and urban development. Government-led initiatives such as large-scale capex programs, expansion of transportation networks, industrial corridors, and trade agreements (e.g., India EU FTA, U.S. India deal) are expected to accelerate construction activity, industrial output, and commercialization of real estate. Additionally, growth in sectors such as data centers, pharmaceuticals, electronics, and commercial infrastructure supported by technology investments and supply chain diversification further strengthens the demand outlook for built environments.

These developments are directly linked to increased demand for HVAC systems and engineering services, as modern infrastructure requires energy-efficient climate control, ventilation, and integrated building solutions. The expansion of commercial spaces, industrial facilities, and urban housing, coupled with stricter energy efficiency norms and sustainability goals, is expected to drive adoption of advanced HVAC technologies. Furthermore, rising investments in smart buildings, green infrastructure, and high-tech industries are likely to boost demand for specialized engineering, procurement, and construction (EPC) services, thereby supporting long-term growth in the HVAC and broader engineering services market.

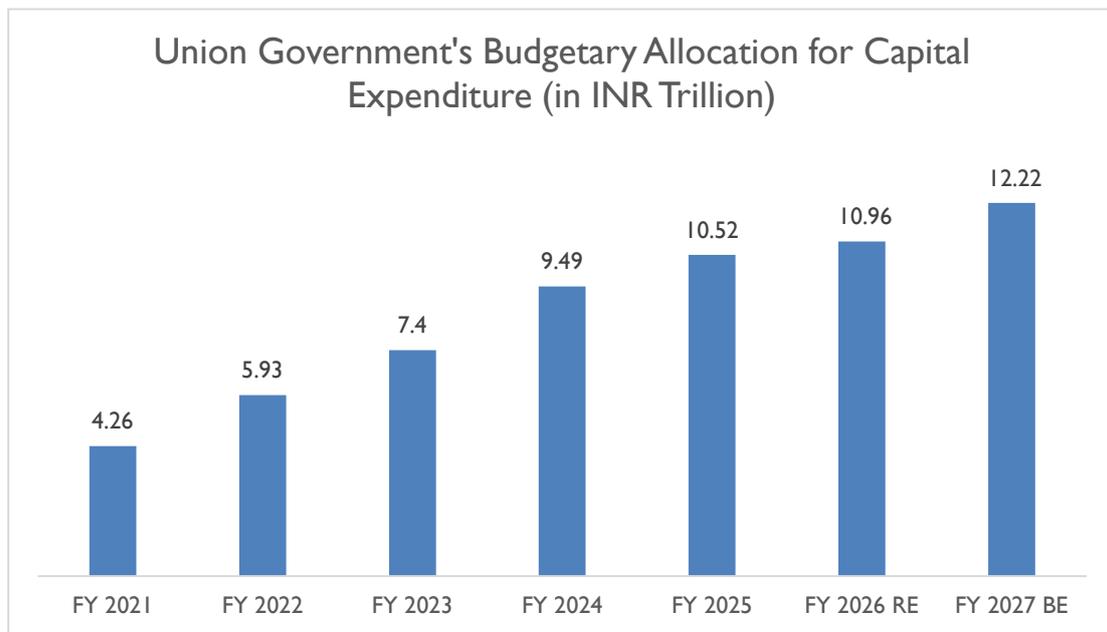
Key Growth/Demographic Drivers for Economic Growth

Government focus on infrastructure development

The infrastructure sector has received a strong boost in Budget FY27, marked by a record Rs 12.2 Trillion public capital expenditure allocation, reinforcing the government's focus on making assets more efficient and sustainable. The introduction of the landmark Infrastructure Risk Guarantee Fund aims to provide partial credit guarantees to lenders and revitalise private sector participation in large-scale projects. By lowering project risk premiums and easing borrowing costs, this mechanism is likely to help crowd in private capital and accelerate construction phase financing across the sector. The transport and logistics sector, in particular, will buoy infrastructure growth. Railways have received a substantial boost in allocation, which will help support the planned development of seven new high speed rail corridors and a Dinuki-Surat DFC, which aims to cut logistics costs and improve national connectivity. Moreover, the rollout of 20 new National Waterways, new ship repair hubs and a scheme to double the share of coastal and inland water transport from 6.0% to 12.0% by 2047 will together build a greener, more efficient multimodal freight network. Urban transformation continues through targeted development of Tier 2 and Tier 3 cities – with populations over 50 lacs– alongside the creation of City Economic Regions, each supported by multiyear challenge-based financing to establish new growth hubs and reduce pressure on metros. A broader ecosystem of reforms strengthens medium term sector prospects. The government aims to scale domestic construction and infrastructure equipment manufacturing, reducing import dependence and improving execution capability in tunnelling, metro construction and road building machinery. The monetisation of CPSE assets will be accelerated through dedicated REIT structures, helping unlock liquidity for redevelopment and new project pipelines. Additional support flows through region specific initiatives, such as industrial corridor expansion, and tourism development in cultural and Buddhist heritage zones will further reinforce construction demand.

Together, these measures will strengthen India's infrastructure ecosystem through higher public investment, improved risk mitigation tools and wider multimodal connectivity – creating a constructive environment for sustained growth in construction, logistics and urban development.

These infrastructure initiatives are expected to drive demand for HVAC systems and engineering services, as modern transport hubs, industrial corridors, and urban development projects require energy-efficient climate control, advanced ventilation, and integrated building solutions. Expansion of commercial, industrial, and mixed-use spaces under these programs will further accelerate adoption of specialized HVAC technologies and engineering, procurement, and construction (EPC) services, creating a strong growth opportunity for the HVAC sector.



Union Budget, Government of India

Development of Domestic Manufacturing Capability

The Government launched Production Linked Incentive (PLI) scheme in early 2020, initially aimed at improving domestic manufacturing capability in large scale electronic manufacturing and gradually extended to other sectors. At present it covers 14 sectors, ranging from medical devices to solar PV modules. The PLI scheme provides incentives to companies on incremental sales of products manufactured in India. This incentive structure is aimed to attracting private investment into setting up manufacturing units and thereby beef up the domestic production capabilities. The overall incentives earmarked for PLI scheme is estimated to be INR 2 trillion. If fully realizing the PLI scheme would have the ability to add nearly 4% to annual GDP growth, by way of incremental revenue generated from the newly formed manufacturing units.

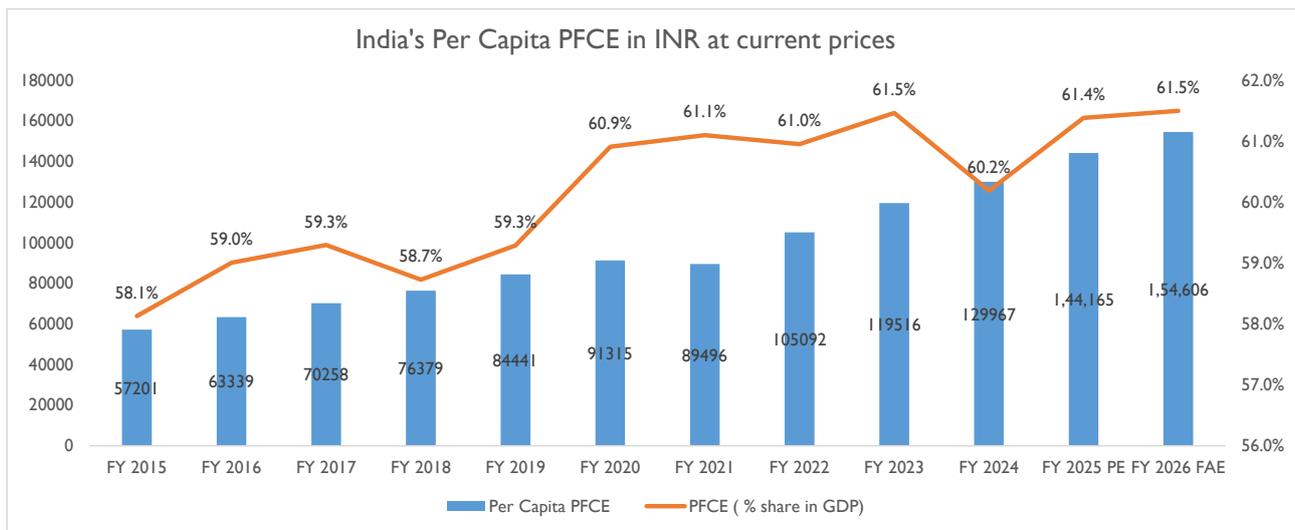
These initiatives under the PLI scheme are expected to positively impact the HVAC and engineering services sector as well. As domestic manufacturing capacity expands, demand for locally produced HVAC equipment, industrial cooling systems, and building automation solutions is likely to increase. Additionally, new manufacturing facilities will require installation, maintenance, and engineering support, creating growth opportunities for EPC services and specialized HVAC solutions across industrial and commercial projects.

Strong Domestic Demand

Domestic demand has traditionally been one of the strong drivers of Indian economy. After a brief lull caused by Covid-19 pandemic, the domestic demand is recovering. Consumer confidence surveys by Reserve Bank / other institutions are points to an improvement in consumer confidence index, which is a precursor of improving demand. India has a strong middle-class segment which has been the major driver of domestic demand. Factors like fast paced urbanization and improving income scenario in rural markets are expected to accelerate domestic demand further. This revival is perfectly captured by the private final consumption expenditure (PFCE) metric. The PFCE at current prices is on steady rise from FY 2022 onwards. Between FY

2015-26, PFCE in India has improved by nearly 2.5 times its share in GDP has increased from 58.1% to about 61.5% in FY 2026 (as per the first advance estimates).

The recovery and growth of domestic demand is expected to directly support the HVAC and engineering services market. Rising consumption, higher disposable incomes, and increasing urbanization are driving expansion of residential, commercial, and industrial spaces, which in turn fuels demand for energy-efficient HVAC systems, ventilation solutions, and integrated building services. Additionally, increased consumer spending encourages investment in modern infrastructure, smart buildings, and climate-controlled facilities, creating growth opportunities for engineering, procurement, and construction (EPC) services across India.

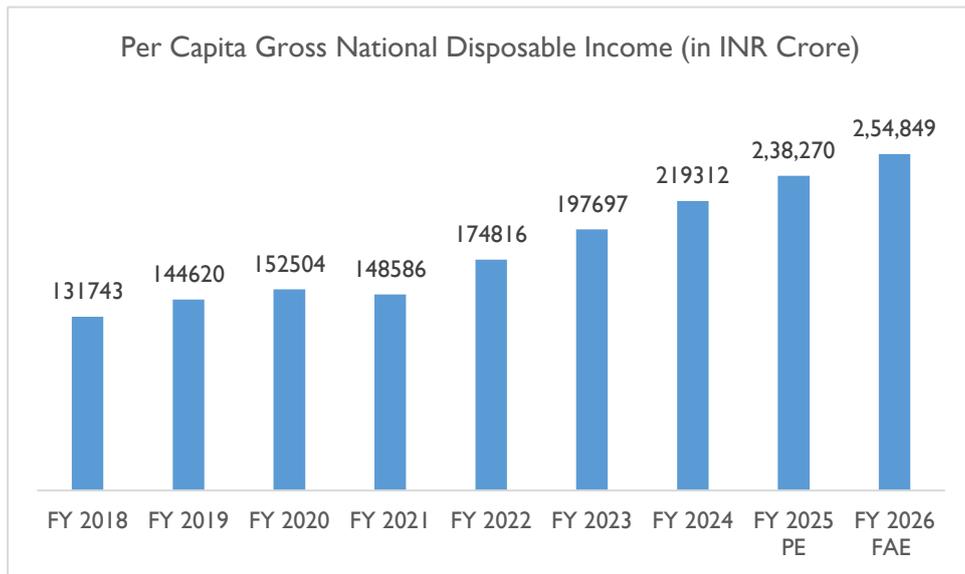


Source: Ministry of Statistics & Programme Implementation (MOSPI)

There are two factors that are driving this domestic demand: One the large pool of consumers and second the improvement in purchasing power.

- The share of middle class increased from nearly 14% in 2005 to nearly 30% in 2021 and is expected to cross 60% by 2047³. This expanding middle class household segment is fuelling India's growth story and would continue to play a key role in propelling India's economic growth.
- Consumer driven domestic demand is majorly fuelled by this growth in per capita income. As per National Statistics Office (NSO) As per National Statistics Office (NSO), India's per capita net national income (at constant prices) stood at INR 1,21,968 crore in FY 2026 against INR 1,14,710 crore in FY 2025 and INR 87,586 in FY 2018. This increase in per capita income has impacted the purchasing pattern as well as disposable income. The disposable income during the FY 2018-26 has increased from INR 131,753 to INR 2,54,849 increasing at CAGR 9.2%.

³ As per the survey conducted by People Research on India's Consumer Economy. Households with annual income in the range of INR 5 – 30 lakh is considered as middle-class households.

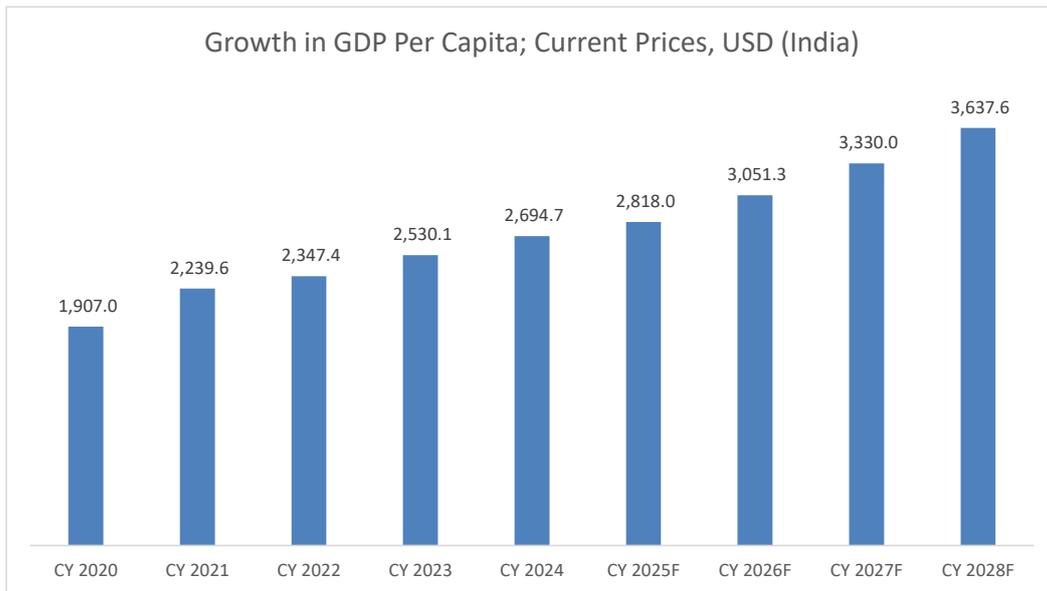


Source: Ministry of Statistics & Programme Implementation (MOSPI)

India's Per capita GDP trends

India is poised to become the world's third-largest economy with a projected GDP of USD 5 trillion within the next three years, driven by ongoing reforms. As one of the fastest-growing major economies, India currently holds the position of the fifth-largest economy globally, following the US, China, Japan, and Germany. By 2027-28, it is anticipated that India will surpass both Germany and Japan, reaching the third-largest spot. This growth is bolstered by a surge in foreign investments and a wave of new trade agreements with India's burgeoning market of 1.4 billion people. The aviation industry is witnessing unprecedented orders, global electronics manufacturers are expanding their production capabilities, and suppliers traditionally concentrated in southern China's manufacturing hubs are now shifting towards India.

To achieve its vision of becoming the world's third-largest economy by 2027-28, India will need to implement transformative industrial and governmental policies. These policies will be crucial for sustaining the consistent growth of the nation's per capita GDP over the long term.

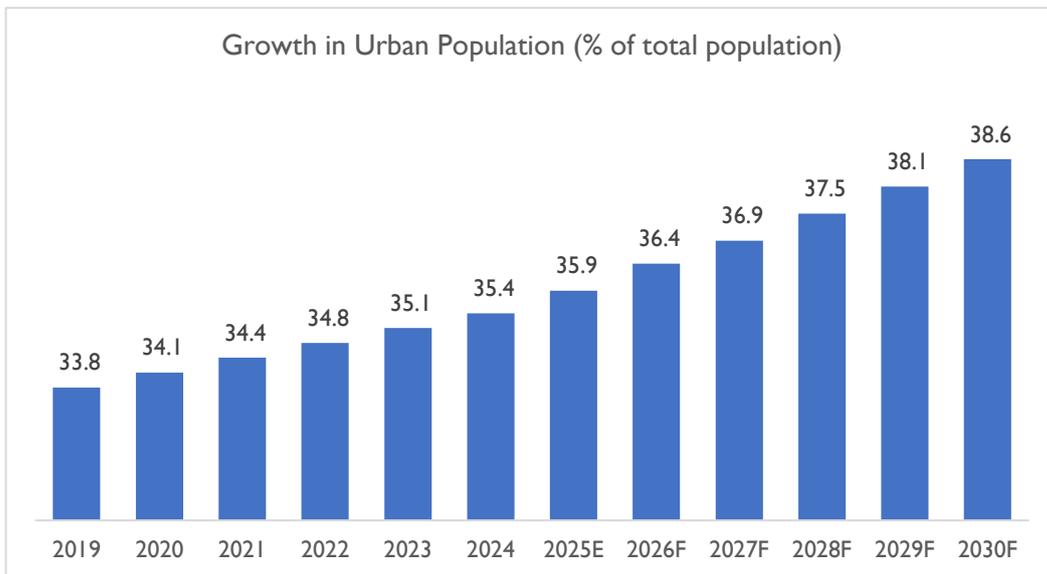


Source: IMF

From CY 2024-30, India’s per capita GDP is projected to grow at a compound annual growth rate of 7.8%. This growth will be driven by the service sector, which now accounts for over 50% of India's GDP, marking a significant shift from agriculture to services.

Increasing Urbanization

As per the handbook of urban statistics 2022, India's urban population has been on a steady rise, with urban dwellers accounting for over 46.9 crores in 2021, is projected to soar to over 55.8 crores by 2031 and further exceed to 60 crores by 2036.



Source: World Bank, ⁴ D&B Research and Estimates

⁴<https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS?end=2022&locations=IN&skipRedirection=true&start=1960&view=chart>

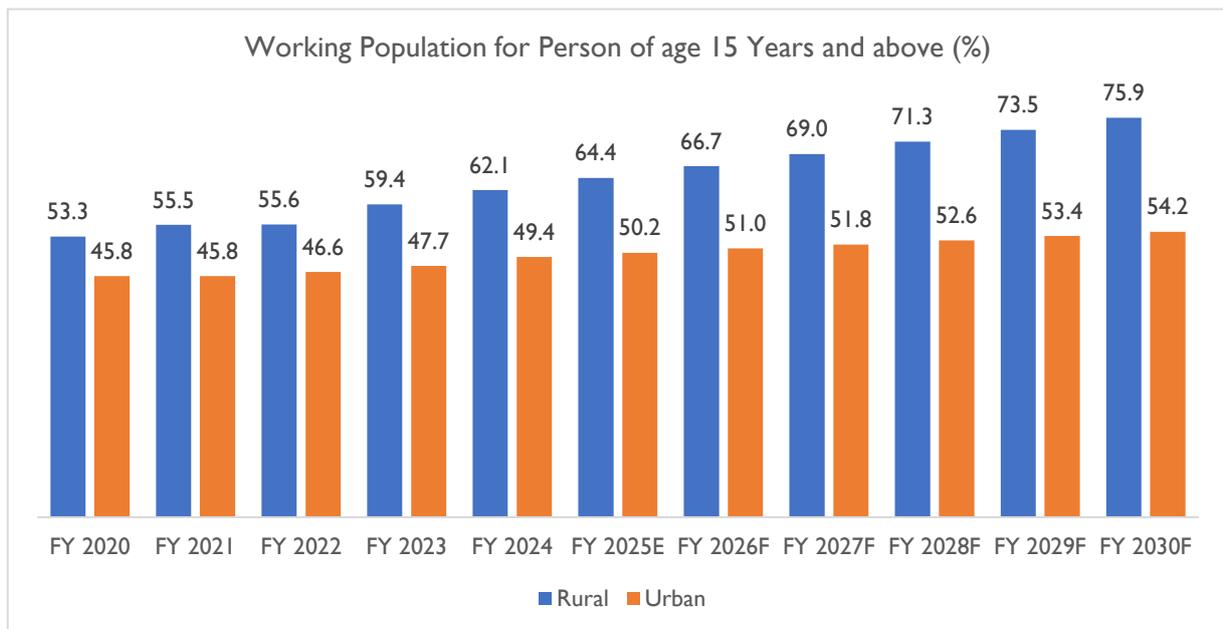
The share of urban population in total population has been quickly escalating. In 2019, 33.81% of the total population was urban. By 2024, it has reached to 35.38%, showing an increment of 1.15% in span of five years. The share of urban population is further forecasted to cross 40% by 2030. This increase in urban population is set to demand drastic changes in infrastructure development. Cities are a major driver for the construction industry. With cities expanding rapidly, there will be an increased need for improved housing, water supply, sewage systems, and electricity. Urban planning will need to account for higher population densities, necessitating the development of smart cities with integrated technology for efficient management of resources and services. The Smart Cities Mission targeted at 100 cities is aimed at improving the quality of life through modernized/ technology driven urban planning. This transformation will also require significant investment in public health, education, and recreational facilities to enhance the quality of urban living. The surge in urban population will also propel demand for improvement in multimodal transport infrastructure for freight and passenger travel requirement.

The rapid urbanization across India is expected to significantly boost demand for HVAC systems and engineering services. As cities expand and population density rises, there will be increased construction of residential, commercial, and industrial buildings, all of which require modern climate control, ventilation, and energy-efficient solutions. Smart city initiatives and integrated urban planning will further drive adoption of advanced HVAC technologies, building automation, and sustainable infrastructure solutions. Additionally, investments in public utilities, transport, and recreational facilities will create opportunities for specialized engineering, procurement, and construction (EPC) services, thereby supporting long-term growth in the HVAC and broader engineering services market.

Rural Vs Urban Working Population Age Group

As India continues to experience economic growth and development, the working population in both rural and urban areas is increasing. In case of urban population, this growth is marked from a share of 45.8% in FY20 to 49.4% in FY24, whereas in rural areas, it grew from 53.3% in FY20 to 62.1% in FY24.

This growth is driven by a combination of factors, including demographic changes, economic policies, and the expansion of various industries. The rise in employment opportunities across sectors such as agriculture, manufacturing, services, and information technology has contributed to the overall increase in the working population, thereby fostering economic stability and enhancing the standard of living for many Indians.



Source: Periodic Labour Force Survey (PLFS) Annual Report 2023-2024, D&B Research and Estimates

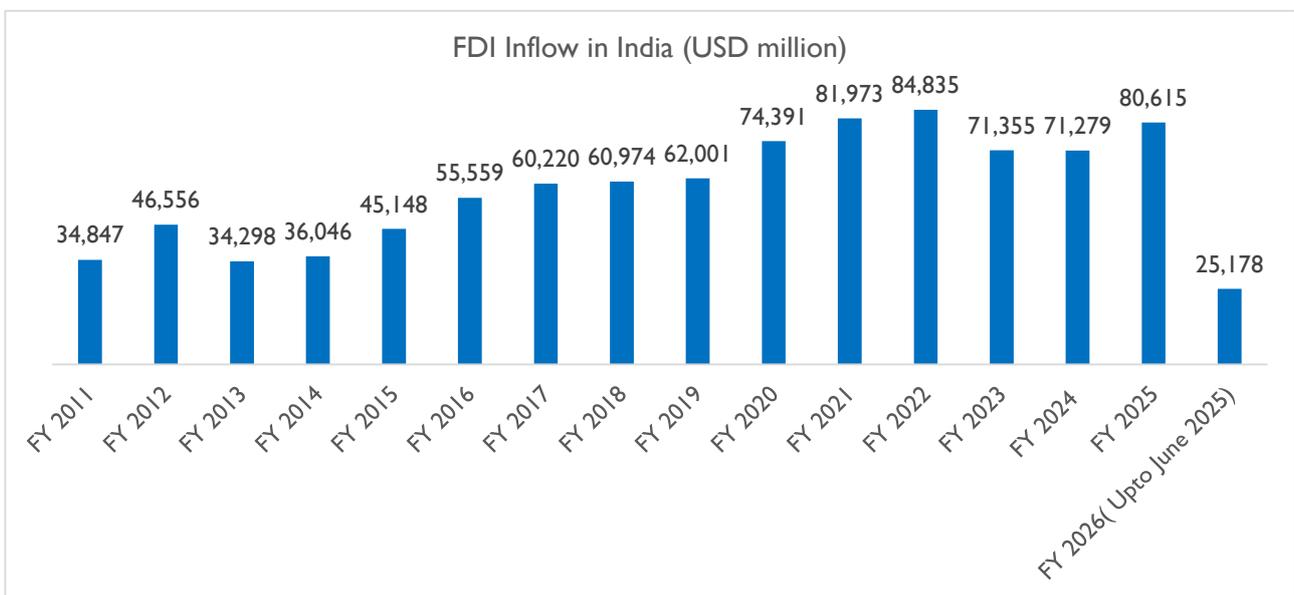
In urban areas, the working population is growing rapidly due to the proliferation of jobs in sectors like IT, finance, retail, and healthcare. Additionally, the development of infrastructure, such as improved transportation networks and housing, has made urban centers more accessible and desirable for the working population. In rural areas, the working population remains substantial, primarily due to the dominance of the agricultural sector. Government initiatives aimed at rural development, such as improved access to education and skill development programs, have also played a crucial role in enhancing employment prospects in these regions. The dominance of the rural working population over their urban counterparts can be attributed to the agricultural sector's labour-intensive nature ensures a consistent demand for human labor despite advancements in mechanization, sustaining employment rates in rural areas.

Key HVAC and Engineering Demand Drivers in India:

- **Industrial Activity Growth-** Expansion in manufacturing hubs and industrial parks drives demand for HVAC systems to maintain controlled environments.
- **Commercial Real Estate Expansion-** Rising office, retail, and mixed-use developments increase requirements for efficient climate control, ventilation, and integrated building solutions.
- **Energy Efficiency Norms-** Stricter government regulations on energy consumption and emissions promote adoption of advanced, energy-efficient HVAC technologies.
- **Urbanization & Smart Cities-** Rapid urban population growth and smart city initiatives boost demand for modern HVAC solutions in residential, commercial, and public infrastructure.
- **Infrastructure & Public Capital Expenditure-** Government investment in transport corridors, industrial zones, and urban infrastructure expands construction activity, indirectly increasing HVAC and engineering services demand.
- **Data Center Growth-** Rising number of data centers with high cooling and environmental control requirements is a significant driver for specialized HVAC solutions.

Foreign Direct Investment Trend in India

FDI inflow in India has observed a steady increase between FY 2013 till FY 2022 while it witnessed a decline of 15% in FY 2023 and of -0.1% in FY 2024 due to several factors, including the ongoing conflict between Russia and Ukraine, changes in US monetary policy, and other global uncertainties. However, the country has received substantial FDI inflow between from April 2000-December 2024. This increasing FDI can be attributed to the new investment facilitation measures like the National Single-Window System (NSWS), which streamlines the approval and clearance process for investors, entrepreneurs, and businesses sectoral along with PLI schemes, emerging growth prospects in tier-2 and tier-3 cities. Further, tax compliance for startups and foreign investors have been simplified where the Income Tax Act, 1961 has been amended in 2024 to abolish angel tax and to reduce income tax rate chargeable on income of a foreign company.



Sources: Department for Promotion of Industry and Internal Trade

- As per World Investment report 2025, India ranking improved by one position to rank 15th place for global FDI destinations, attracting USD 27.6 billion as an FDI destination in 2024, up from 16th in 2023.
- India ranked as the 4th largest recipient of greenfield projects with 1,080 greenfield projects in 2024 announcements, as per the World Investment Report 2025.

Industry Overview

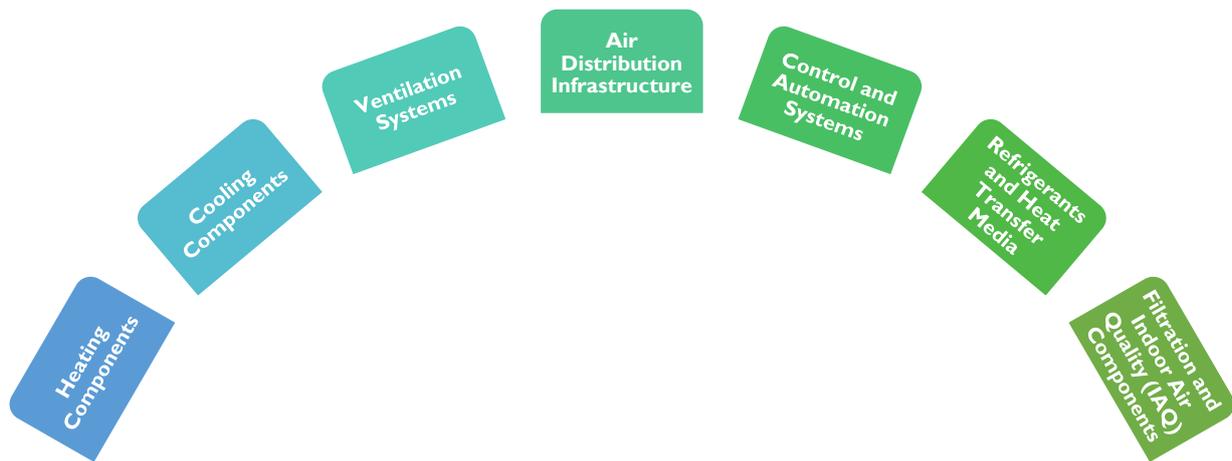
Heating, Ventilation, and Air Conditioning (HVAC) systems are essential building services designed to regulate indoor temperature, humidity, and air quality to ensure occupant comfort and safety. These systems integrate heating units, cooling equipment, ventilation mechanisms, and control systems to maintain desired indoor environmental conditions across residential, commercial, and industrial spaces. HVAC systems play a critical role not only in comfort management but also in supporting health outcomes by filtering pollutants, controlling moisture levels, and ensuring adequate air circulation, which is especially important in densely occupied or enclosed environments.

Modern HVAC systems are increasingly driven by energy efficiency, automation, and sustainability considerations. Advances such as variable refrigerant flow (VRF) systems, smart thermostats, building management systems (BMS), and high-efficiency chillers enable precise control of energy consumption while reducing operational costs. In parallel, regulatory standards and green building certifications have encouraged the adoption of eco-friendly refrigerants, energy-efficient equipment, and heat recovery solutions. These developments align HVAC design with global goals for reducing carbon emissions and improving overall building energy performance.

The demand for HVAC systems continues to grow due to rapid urbanization, expanding commercial infrastructure, industrial development, and rising awareness of indoor air quality. Sectors such as data centers, healthcare facilities, manufacturing units, and large commercial complexes rely heavily on advanced HVAC solutions to maintain stringent environmental conditions. As climate variability increases and comfort expectations rise, HVAC systems are evolving from basic temperature-control solutions into intelligent, integrated platforms that balance comfort, efficiency, and sustainability.

Insight on HVAC System Focus on key components

Heating, Ventilation, and Air Conditioning (HVAC) systems comprise a set of interlinked functional components that collectively regulate indoor temperature, airflow, humidity, and air quality across residential, commercial, and industrial buildings. Rather than operating as a single unit, HVAC systems integrate heating and cooling equipment, air movement infrastructure, control mechanisms, and filtration elements to deliver consistent thermal comfort and safe indoor environments. Advances in energy efficiency, automation, and indoor air quality management have increased the complexity and importance of these components, particularly in large and high-occupancy facilities. The following section focuses on the key functional elements and critical sub-systems that make up the HVAC segment, providing technical depth beyond the broader component classification covered elsewhere in the report.



- Heating Components:** Heating elements such as boilers, furnaces, and heat pumps generate or transfer heat to maintain indoor thermal comfort. These systems use electricity, gas, or renewable energy sources and are selected based on climate conditions, building size, and energy efficiency requirements. In commercial and industrial applications, centralized heating systems are preferred for scalability and operational efficiency. The adoption of high-efficiency and low-emission heating technologies is increasing due to energy regulations and sustainability goals.
- Cooling Components:** Cooling components include chillers, compressors, condensers, evaporators, and cooling towers that remove heat from indoor environments. They are critical in warm climates and in facilities such as data centers, hospitals, and manufacturing units where temperature control is essential. Centralized chilled-water systems dominate large buildings, while split and packaged units are common in smaller facilities. Technological advancements such as variable-speed compressors and inverter-based systems are improving energy efficiency and reducing operating costs.
- Ventilation Systems:** Ventilation systems ensure the circulation of fresh air and removal of stale or contaminated air. Key elements include air handling units (AHUs), exhaust fans, ducts, dampers, and louvers. Proper ventilation supports indoor air quality, humidity control, and regulatory compliance, especially in high-occupancy buildings. Energy recovery and heat recovery ventilation systems are increasingly adopted to reduce energy losses while maintaining airflow standards.
- Air Distribution Infrastructure:** Air distribution components deliver conditioned air efficiently across occupied spaces. These include duct networks, diffusers, grilles, registers, and plenums that control airflow direction and volume. Well-designed air distribution improves thermal comfort, reduces energy losses, and minimizes noise. Zoning systems allow different areas within a building to be conditioned independently, improving efficiency in large or mixed-use facilities.
- Control and Automation Systems:** Control systems regulate HVAC operations through sensors, thermostats, controllers, and building management systems (BMS). These systems monitor temperature, humidity, air quality, and occupancy to optimize performance in real time. Advanced automation enables predictive maintenance, energy optimization, and remote monitoring. Controls are increasingly integrated with smart building platforms and IoT technologies, making them a critical value-added component of modern HVAC systems.

- **Refrigerants and Heat Transfer Media:** Refrigerants and heat transfer fluids enable the cooling and heating process by absorbing and releasing heat. The HVAC industry is transitioning toward low-global-warming-potential (GWP) refrigerants in response to environmental regulations. In centralized systems, chilled water and glycol-based fluids are commonly used for efficient heat transfer. The choice of refrigerants directly affects system efficiency, safety, and regulatory compliance.
- **Filtration and Indoor Air Quality (IAQ) Components:** IAQ components such as air filters, HEPA filters, UV germicidal systems, and air purifiers remove pollutants and improve indoor air quality. These elements are increasingly important due to rising awareness of health, pollution, and workplace safety. Commercial buildings, healthcare facilities, and industrial spaces often deploy multi-stage filtration systems. IAQ components enhance occupant well-being and position HVAC systems as health-focused infrastructure rather than purely comfort solutions.

Insight on complexity of HVAC systems

Various levels of complexity of HVAC system based on consumer segment

The complexity of HVAC systems varies significantly across consumer segments, driven by differences in scale, usage intensity, regulatory requirements, and performance expectations. Residential HVAC systems represent the lowest level of complexity, typically comprising split or window air conditioners, small heat pumps, or basic ventilation units. These systems are designed for ease of installation, limited zoning, and minimal automation, with controls often restricted to thermostats or remote-based operation. Energy efficiency and upfront cost are primary decision factors, while system integration and advanced monitoring remain limited.

Commercial HVAC systems exhibit a higher degree of complexity due to larger floor areas, variable occupancy patterns, and the need for precise environmental control. Office buildings, retail malls, hotels, and educational institutions commonly deploy centralized chilled-water systems, air handling units (AHUs), variable air volume (VAV) systems, and advanced ventilation infrastructure. These systems incorporate zoning, demand-based airflow, energy recovery, and integration with building management systems (BMS) for real-time monitoring and optimization. Compliance with energy codes, indoor air quality standards, and sustainability certifications further increases system design and operational complexity.

At the highest level, industrial and specialized HVAC systems are highly complex, engineered solutions tailored to process requirements rather than occupant comfort alone. Manufacturing facilities, data centers, healthcare institutions, and cleanrooms require continuous operation, tight temperature and humidity tolerances, redundancy, and advanced filtration or contamination control. These systems often integrate precision cooling, backup power interfaces, predictive maintenance, and digital twins or IoT-enabled monitoring platforms. The complexity in this segment is driven by risk mitigation, regulatory compliance, and the high cost of system failure, making HVAC a mission-critical infrastructure component rather than a support function.

HVAC Industry value chain:

The HVAC industry value chain encompasses a sequence of interdependent activities, from initial project conceptualisation and system design to equipment manufacturing, on-site installation, and final testing and commissioning. Each stage plays a critical role in determining system efficiency, reliability, compliance, and lifecycle performance. The value chain involves multiple stakeholders, including consultants, OEMs, EPC contractors, and commissioning specialists, whose coordination is essential for successful project execution. Increasing system complexity, energy-efficiency requirements, and digital integration have heightened the importance of seamless collaboration across the value chain, making HVAC projects more engineering- and execution-intensive than traditional building services.



- **Project Development & Design**

This stage involves assessing building requirements, load calculations, system sizing, and HVAC design based on end-use, climate conditions, and regulatory standards. Consultants and design engineers play a critical role in selecting appropriate system configurations, energy-efficient technologies, and compliance with building codes and sustainability norms. Decisions taken at this stage directly influence capital costs, energy consumption, and long-term system performance. Increasingly, digital tools such as Building Information Modelling (BIM) and energy simulation software are used to optimise system design and integration with overall building architecture.

- **OEM / Equipment Suppliers**

OEMs manufacture and supply core HVAC equipment such as chillers, air conditioners, heat pumps, air handling units, compressors, ventilation systems, and control solutions. This segment is technology-driven, with competition centred on energy efficiency, reliability, refrigerant innovation, and lifecycle cost advantages. OEMs also provide after-sales support, warranties, and sometimes design assistance, making them strategic partners in large projects. Product standardisation, regulatory compliance, and supply-chain efficiency are key success factors at this stage.

- **Construction & Installation**

Engineering, Procurement, and Construction (EPC) players are responsible for system procurement, on-site installation, ducting, piping, electrical integration, and coordination with other building services. This stage requires strong project management capabilities to ensure adherence to design specifications, timelines, and budgets. EPC contractors act as the link between design intent and physical execution, often managing

multiple vendors and subcontractors. Installation quality at this stage has a significant impact on system efficiency, reliability, and operational costs.

- **Testing & Commissioning**

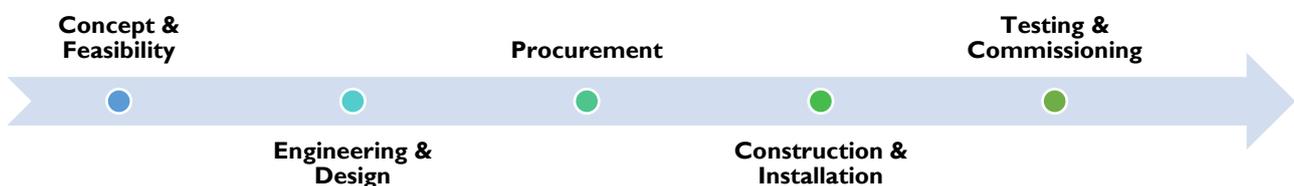
Testing and commissioning ensure that installed HVAC systems perform as per design parameters and regulatory requirements. Activities include performance testing, airflow balancing, control system calibration, safety checks, and integration with building management systems. Proper commissioning reduces operational risks, improves energy efficiency, and extends equipment life. EPC stakeholders, along with OEM representatives and consultants, typically collaborate during this phase. Increasing emphasis on commissioning reflects the growing complexity of HVAC systems and the need for optimal performance from day one.

- **Operations & Maintenance (O&M) / Recurring Revenue**

Beyond design, equipment supply, and installation, HVAC systems generate significant recurring revenue through O&M contracts. This includes preventive maintenance, performance monitoring, repair services, and energy optimization over the lifecycle of the system. Highlighting O&M emphasizes the long-term revenue potential for HVAC providers, strengthens customer relationships, and ensures optimal system performance while supporting sustainability and energy efficiency goals.

Brief insight on the HVAC EPC Lifecycle

The HVAC EPC lifecycle encompasses all stages from initial project conception to final system commissioning, ensuring that systems are technically sound, cost-efficient, and compliant with regulations. It begins with feasibility assessment, where project requirements, site conditions, and energy goals are evaluated. Detailed engineering and design translate these assessments into optimized technical plans coordinated with other building systems. Procurement and construction ensure timely sourcing and accurate installation of equipment, ducting, and controls. Finally, testing and commissioning validate performance, energy efficiency, and occupant comfort, minimizing post-handover issues and ensuring reliable operation. Each stage is interlinked, with early decisions directly influencing project scope, cost, and lifecycle efficiency.



- **Concept & Feasibility:** This stage involves evaluating project requirements, site conditions, building usage, and climatic factors to determine HVAC system feasibility. Load calculations, preliminary system options, and budget estimates are developed to assess technical and financial viability. Regulatory compliance, energy efficiency targets, and sustainability goals are also reviewed at this stage. Early risk identification helps avoid design changes during execution. Decisions taken here define the overall scope and complexity of the HVAC project.

- **Engineering & Design:** Engineering and design translate feasibility outcomes into detailed technical plans. This includes system sizing, equipment selection, ducting and piping layouts, and control strategies. HVAC designs are coordinated with architectural, electrical, and fire-safety systems to ensure seamless integration. Energy modelling and simulation tools are increasingly used to optimise performance. Design accuracy at this stage is critical for cost control and operational efficiency.
- **Procurement:** Procurement focuses on sourcing HVAC equipment, materials, and control systems from approved OEMs and vendors. EPC players evaluate suppliers based on cost, quality, energy efficiency, delivery timelines, and compliance with specifications. Effective procurement planning helps mitigate supply-chain risks and price volatility. Contract management and logistics coordination are essential to align deliveries with construction schedules. Procurement decisions directly influence project cost and system reliability.
- **Construction & Installation:** This stage involves on-site installation of HVAC equipment, ductwork, piping, insulation, and electrical systems. EPC contractors manage coordination among multiple trades to ensure adherence to design specifications and safety norms. Quality control and progress monitoring are critical to avoid rework and delays. Installation efficiency impacts system performance and lifecycle costs. Proper execution at this stage ensures smooth transition to commissioning.
- **Testing & Commissioning:** Testing and commissioning validate system performance against design and regulatory requirements. Activities include airflow balancing, temperature and humidity testing, control system calibration, and safety checks. Integration with building management systems is also verified. This stage ensures energy efficiency, occupant comfort, and operational reliability. Successful commissioning reduces post-handover issues and ensures readiness for full-scale operation.

Insight on the role of system integrators in HVAC market

System integrators play a critical role in modern HVAC projects by bridging the gap between individual equipment vendors, building management systems (BMS), and overall project requirements. They ensure seamless integration of HVAC components such as chillers, air handling units, VRF/VRV systems, sensors, and control devices into a unified, automated solution. This integration allows building operators to monitor and control temperature, airflow, energy consumption, and maintenance needs in real time, improving operational efficiency and occupant comfort. System integrators also coordinate with architects, electrical engineers, and fire-safety teams to ensure the HVAC system works harmoniously with other building services. Beyond technical integration, system integrators provide value through energy optimization and data-driven maintenance solutions. By leveraging IoT sensors, predictive analytics, and smart control algorithms, they can identify inefficiencies, reduce energy consumption, and anticipate equipment failures before they impact operations. This proactive approach not only lowers operational costs but also extends the lifecycle of HVAC assets, making system integrators indispensable partners for building owners and EPC contractors.

Furthermore, system integrators often support large-scale or complex projects, including commercial complexes, hospitals, airports, and industrial facilities, where multiple HVAC systems must work in concert. They manage interoperability challenges, vendor coordination, and compliance with local regulations, energy

standards, and sustainability targets. With growing demand for smart buildings and energy-efficient solutions, the role of system integrators is becoming increasingly strategic, positioning them as key enablers in the evolving HVAC market.

Brief insight on industrial refrigeration

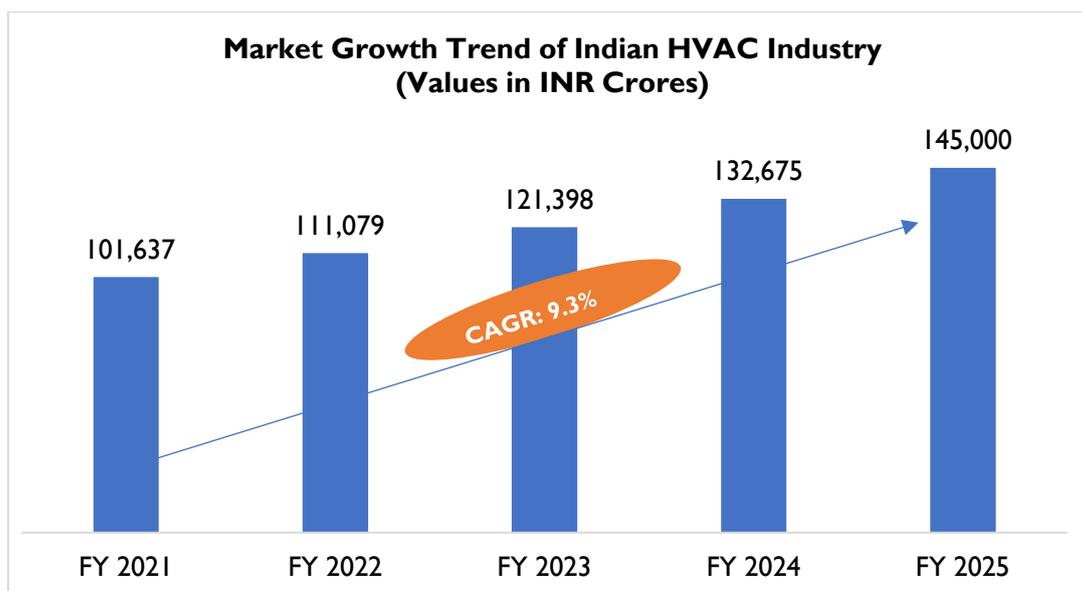
Industrial refrigeration refers to large-capacity, continuous cooling systems used to maintain controlled low-temperature environments for industrial processes, storage, and logistics. Unlike comfort HVAC systems designed for human comfort, industrial refrigeration is **process-critical infrastructure** focused on preserving product quality, ensuring safety, and supporting uninterrupted operations in temperature-sensitive industries. Industrial refrigeration is widely deployed across cold storage and warehousing, food and beverage processing, dairy, meat and seafood, pharmaceuticals and vaccines, chemicals, ice plants, breweries, and large retail distribution networks. Typical applications include **blast freezing, chilled storage rooms, process cooling, controlled atmosphere storage, and refrigerated transport support infrastructure**. These systems often operate 24x7 and are engineered for high reliability due to the high financial and safety impact of temperature excursions.

The refrigeration ecosystem typically includes equipment such as compressors (screw/reciprocating/centrifugal), condensers (air-cooled or water-cooled), evaporators, chillers, cooling towers, pumps, insulated piping, valves, and advanced control systems. Refrigerants may vary depending on capacity and compliance requirements, with industrial systems increasingly shifting toward lower global warming potential (GWP) refrigerants and natural refrigerants in select applications. Modern industrial refrigeration projects also integrate automation through PLC/SCADA and centralized monitoring to improve energy efficiency, enable predictive maintenance, and ensure compliance with safety standards. From a services perspective, industrial refrigeration creates strong demand for engineering design, EPC/EPCIC execution, installation, commissioning, and long-term operations & maintenance (O&M). Given the high energy intensity of refrigeration loads, customers increasingly prioritize system optimization, heat recovery, insulation performance, leak prevention, and uptime assurance, making industrial refrigeration a high-value and recurring opportunity within the broader industrial HVAC and cooling services market.

Market Scenario: HVAC Industry (CAPEX & OPEX)

Estimated Market Size of Industrial HVAC Segment in India & Historical Growth Trend

The Indian industrial HVAC market has demonstrated steady, broad-based expansion over the last five years, supported by rising industrial capex, growing demand for energy-efficient cooling/heating systems, and increasing HVAC penetration across manufacturing, commercial-industrial facilities, and large infrastructure projects. As per the estimate, the market size increased from INR 101,637 crores in FY2021 to INR 145,000 crores in FY2025, reflecting a healthy CAGR of ~9.3% over the period and highlighting sustained momentum despite macro uncertainties.



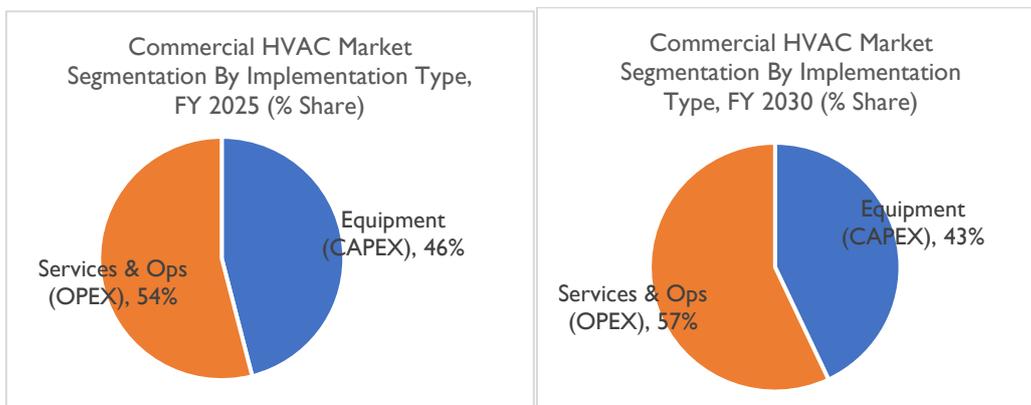
The market grew consistently year-on-year, indicating a strong recovery and increasing HVAC adoption across industrial end-users. Growth remained stable in the later years as well, with the market reaching INR 145,000 crores (FY2025). Overall, the market added ~INR 43,363 crores of incremental value over five years, underlining a structurally expanding demand base rather than a one-time cyclical spike. The graph indicates a smooth upward trajectory with no sharp dips, suggesting that industrial HVAC demand is increasingly becoming a “must-have” utility investment driven by compliance needs, operational efficiency, worker comfort, and higher focus on uptime in critical industrial environments. The consistent rise also signals that market growth is likely being supported by multiple end-use segments (industrial plants, warehouses, large campuses, and specialized cooling applications), creating a stable long-term growth outlook.

⁵ Market Definition: This study covers the overall Indian HVAC market, spanning the Commercial, Industrial, and Residential segments across both CAPEX (Equipment Sales) and Services & Ops (OPEX & O&M). However, the deep-dive analysis is restricted to Commercial and Industrial applications, excluding Residential.

1. CAPEX (Capital Expenditure) – The “One-Time” Spend Refers to the procurement of new assets for Greenfields (new projects) or Brownfields (major expansions). Primary Equipment: Chillers (Air/Water Cooled), VRF Systems, Packaged Units. Ancillary Systems: Cooling Towers, Pumps, Piping, Ducting, Valves. Project Engineering: Design, Supply, Installation, Testing & Commissioning (SITC).

2. OPEX (Operational Expenditure) – The “Recurring” Spend refers to the ongoing cost to keep the asset running efficiently over its 15–20-year lifecycle. Maintenance (AMC): Comprehensive or Non-Comprehensive contracts for repairs and spares. Technical Operations: Monthly fees for 24/7 on-site operators (manpower) to manage the plant. Retrofit & Upgrades: Mid-life investments to replace compressors, motors, or controls for energy efficiency (without buying a whole new machine). Consulting: Energy Audits, Air Quality Testing, and Validation services

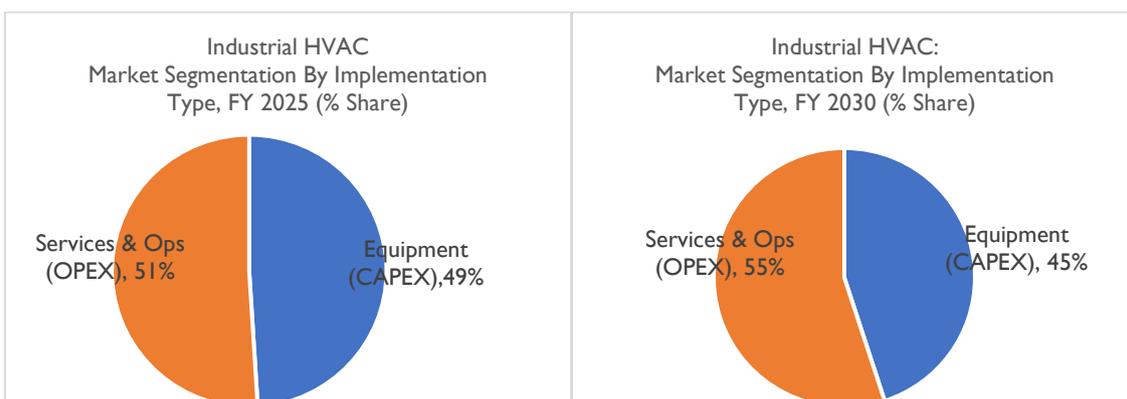
Commercial HVAC Market Segmentation By Implementation Type:



Source: D&B Primary Research Estimates

The charts for the Commercial HVAC Market by implementation type show that in FY2025, Services & Operations (OPEX) account for 54% of the market, higher than Equipment (CAPEX) at 46%, indicating that commercial facilities are placing increasing importance on maintenance, lifecycle management, and operational support. By FY2030, the OPEX share rises further to 57%, while CAPEX decreases to 43%, highlighting a clear shift toward service-driven expenditure as the installed base of HVAC systems grows and the focus on system reliability, energy efficiency, and continuous operations becomes more pronounced. Overall, the trend suggests that while equipment investment remains significant, O&M services are becoming the dominant component of commercial HVAC spending over time.

Industrial HVAC Market Segmentation By Implementation Type:

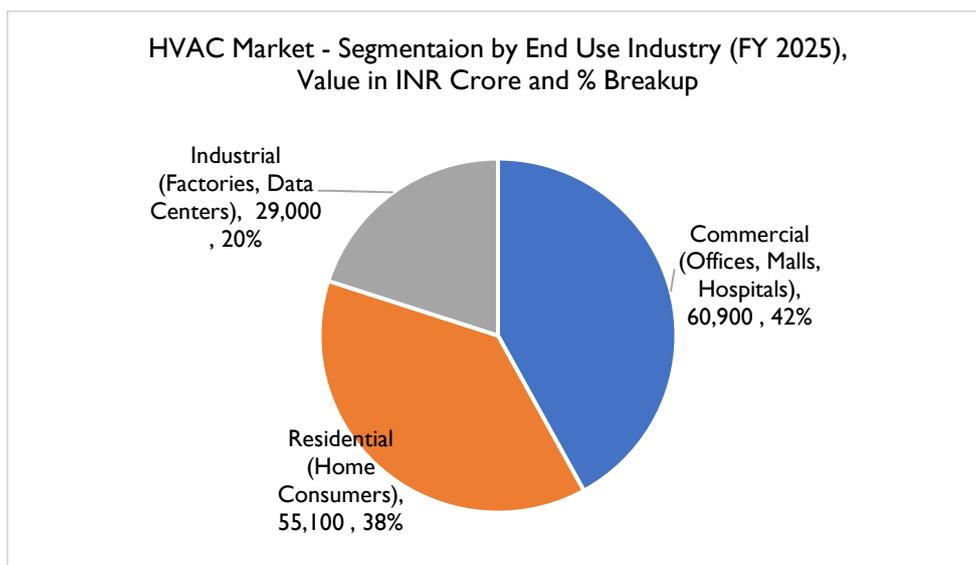


Source: D&B Primary Research Estimates

The industrial HVAC market is showing a gradual shift from equipment-heavy investments (CAPEX) towards service-oriented operations (OPEX). In FY2025, equipment accounts for 49% of the market, while services and operations make up 51%, indicating near parity between one-time capital expenditures and recurring operational spending. By FY2030, this trend becomes more pronounced, with equipment share declining to 45% and services & operations rising to 55%, reflecting increasing industry emphasis on long-term maintenance, energy efficiency services, and managed solutions over standalone equipment sales. This shift highlights the growing importance of service-driven revenue models in industrial HVAC.

Market Segmentation (for the Latest Year): By End Use Industry

The Indian HVAC market in FY2025 shows a diversified demand base across end-use industries, with consumption led by commercial and residential applications, while industrial HVAC forms a smaller but strategically important share. As per the segmentation, Commercial end-users account for the largest portion at ~42%, followed closely by Residential at ~38%, and Industrial at ~20%. This mix highlights that HVAC demand in India is largely driven by urban infrastructure development and consumer adoption, while industrial demand is increasingly linked to high-reliability and specialized cooling requirements.



Source: D&B Research Estimates

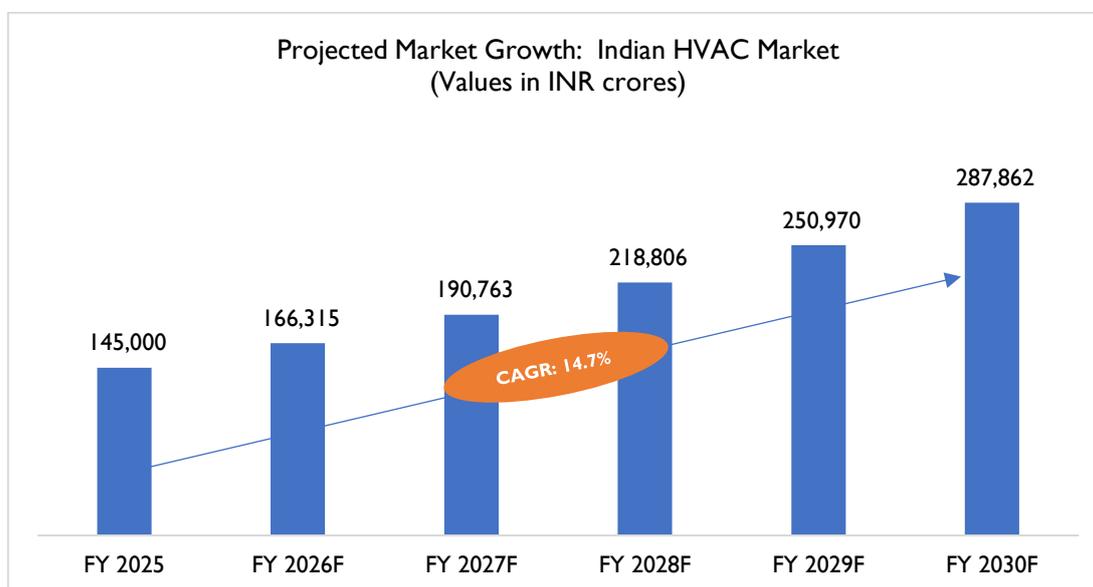
The **Commercial segment INR 60,900 Cr (42%)** dominates the market, supported by rising HVAC installations in **offices, malls, hospitals, educational institutions, and large public buildings**, where centralized and energy-efficient cooling systems are essential for occupant comfort and operational continuity. The **Residential segment INR 50,100 Cr (38%)** remains a strong contributor, driven by **higher household penetration of air-conditioners**, increasing disposable incomes, rapid urbanization, and the expansion of affordable housing in Tier I/II/III cities.

Meanwhile, the **Industrial segment INR 29,000 Cr (20%)** covering **factories and data centers** represents a comparatively smaller share but is typically characterized by **higher-value, engineered HVAC solutions**, including precision cooling, cleanroom HVAC, and mission-critical systems requiring

uptime, redundancy, and lifecycle service support. Overall, the FY2025 split suggests that while **volume demand is anchored in commercial and residential markets**, the **industrial HVAC segment offers higher complexity and premiumization opportunities**, making it a critical focus area for players operating in EPC/MEP services, precision cooling, and industrial-grade HVAC solutions.

Expected growth in Industrial HVAC Segment in India (next 5 years)

The industrial HVAC segment in India is expected to witness strong growth over the next five years, supported by accelerating investments in industrial expansion, warehousing and logistics infrastructure, and mission-critical cooling requirements across data centers and high-value manufacturing. As per the estimates, the market is projected to increase from INR 145,000 crores in FY2025 to INR 287,862 crores by FY2030, reflecting a robust CAGR of ~14.7% over the forecast period. This growth trajectory indicates a shift toward higher capacity addition and premiumization, with increasing adoption of energy-efficient and engineered HVAC solutions.



Source: D&B Research Estimates, *F= Forecasted

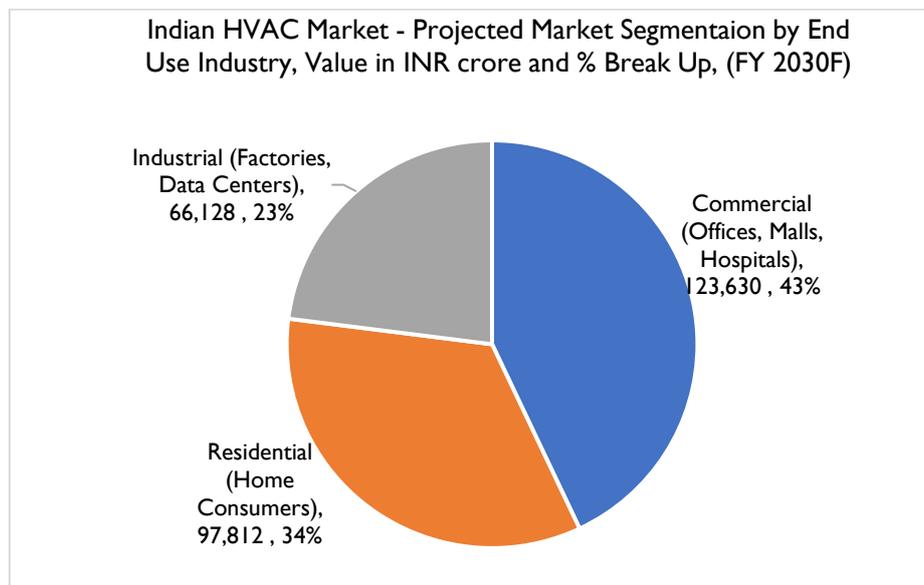
The market is expected to grow steadily year-on-year, supported by continued industrial capex cycles and increased demand for reliable HVAC infrastructure. The upward momentum is further visible in the later years, with the market projected to touch **INR 287,862 crores in FY2030**. Overall, this implies an incremental market addition of **~INR 142,862 crores** between FY2025 and FY2030F, underlining a significant expansion in addressable opportunity for HVAC OEMs, EPC players, and service providers.

The projected growth suggests that industrial HVAC demand will be driven not only by new installations (greenfield/brownfield projects), but also by rising requirements for **precision cooling, higher uptime, energy optimization, and lifecycle service support**. As industrial users increasingly prioritize operating efficiency and reliability, the segment is expected to remain a high-growth, high-value opportunity within the broader HVAC market in India.

Market Segmentation (at the end of the forecast period): By End Use Industry

The **expected end-use segmentation of the Indian HVAC market in FY2030F** indicates a continued dominance of **commercial and residential demand**, while the **industrial segment is projected to expand its share**, reflecting increasing HVAC requirements from factories, large-scale infrastructure, and data centers. As per the forecast mix, **Commercial applications account for ~43%**, followed by **Residential at ~34%**, and **Industrial at ~23%**. This shift highlights that while comfort cooling remains the largest volume driver, industrial HVAC is expected to gain importance due to higher investment intensity and mission-critical cooling needs.

In the **Commercial segment INR 1,23,630 Cr (43%)**, growth is expected to be driven by rising HVAC penetration across **offices, malls, hospitals, and institutional buildings**, supported by ongoing urban infrastructure development and increasing preference for centralized and energy-efficient systems. Commercial HVAC demand is also expected to remain resilient due to recurring upgrades, retrofits, and compliance-driven investments in ventilation and indoor air quality.



Source: D&B Research Estimates

The **Residential segment INR 97,812 Cr (34%)** continues to represent a significant share, supported by improving affordability, increasing AC penetration, and growth in housing across Tier I/II/III cities. However, the slightly lower share versus commercial indicates that while residential volumes will expand, the market mix may gradually shift toward higher-value applications such as commercial and industrial systems.

The **Industrial segment INR 66,128 Cr (23%)** is expected to strengthen meaningfully by FY2030F, driven by rising demand for engineered HVAC solutions in **factories, process industries, and data centers**. Industrial HVAC typically requires higher specification systems with greater reliability, redundancy, and energy optimization, which supports a larger value contribution over time. Overall, the FY2030F segmentation suggests a gradual shift toward **more complex and higher-value HVAC applications**, reinforcing long-term opportunities for HVAC OEMs, EPC players, and lifecycle service providers.

Insight on EPCIC (Engineering, Procurement, Construction, and Installation/Commissioning) model in HVAC projects:

The **EPCIC (Engineering, Procurement, Construction, and Installation/Commissioning)** model in HVAC projects is an expanded delivery framework that integrates not only design, procurement, and construction responsibilities, but also the **complete installation and commissioning scope** as a defined and accountable phase. While the traditional **EPC model** typically covers engineering, equipment/material procurement, and construction execution, the EPCIC model extends responsibility to include **system installation, testing, balancing, commissioning, and performance handover**, which are critical in HVAC projects where output quality is measured through operational performance rather than just completion of civil/mechanical works.

A key differentiation is that EPCIC places greater emphasis on **end-to-end functional readiness** of HVAC systems. HVAC performance depends heavily on installation quality, ducting integrity, insulation, airflow balancing, controls integration, and commissioning protocols. Under EPCIC, the contractor is responsible for delivering a **fully operational HVAC system**, including verification of parameters such as cooling capacity, temperature stability, airflow distribution, pressure differentials, and energy performance benchmarks, depending on the facility type.

EPCIC is particularly relevant for **complex and mission-critical HVAC environments** such as data centers, pharmaceutical facilities, hospitals, cleanrooms, and industrial plants, where commissioning is not a formality but a key risk-control and compliance requirement. By integrating installation and commissioning into the project delivery model, EPCIC reduces coordination gaps between design, execution, and performance testing, improves accountability, and enhances reliability of system outcomes. As HVAC projects become more technology-intensive and performance-driven, EPCIC is increasingly preferred over EPC for ensuring **single-point responsibility** and smoother project-to-operations transition.

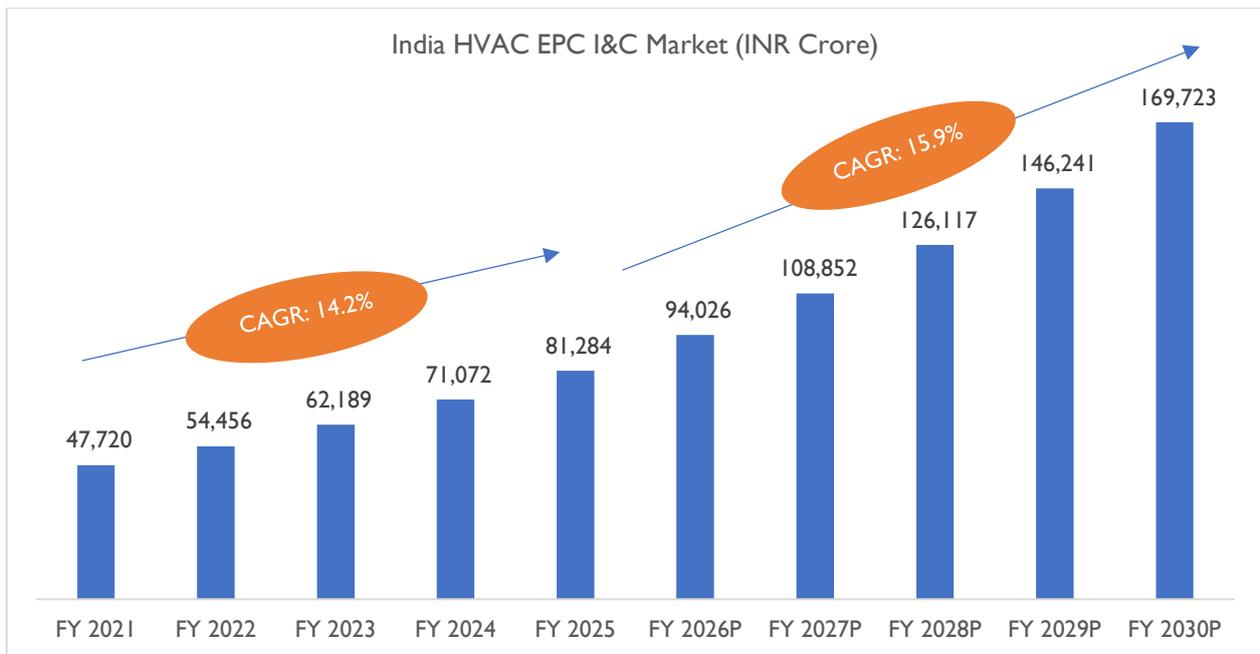
The EPCIC model in HVAC projects is executed through structured phases to ensure the system is delivered as a **fully functional, performance-tested, and operationally ready installation**. The key phases are as follows:

1. **Engineering (Design & Planning Phase):** This phase includes detailed HVAC system design based on project requirements such as cooling load calculations, ventilation planning, equipment sizing, ducting and piping layout, insulation design, and integration planning with electrical and control systems. It also covers preparation of technical drawings, specifications, BOQ, and execution methodology.
2. **Procurement (Sourcing & Supply Phase):** Procurement involves vendor finalization, technical evaluation, and purchase of major HVAC equipment and materials such as chillers, AHUs, cooling towers, pumps, ducts, piping, valves, insulation, and control systems. This phase also includes logistics planning, quality checks, and timely delivery coordination to meet project schedules.

3. **Construction (Site Execution & Infrastructure Readiness Phase):** Construction covers all on-site activities required to enable HVAC installation, including civil and structural supports, equipment foundations, utility routing, shaft and plant room readiness, and coordination with other trades. It ensures the facility is prepared for mechanical and electrical HVAC integration.
4. **Installation (Mechanical & Electrical Integration Phase):** Installation includes positioning and mounting of HVAC equipment, ducting and piping works, electrical cabling, panel connections, and control wiring. It also includes insulation, cladding, vibration isolation, and alignment activities to ensure safe and efficient system operation.
5. **Commissioning (Testing, Balancing & Performance Validation Phase):** Commissioning is the final and most critical phase where HVAC systems are tested for performance and safety. This includes pressure testing, flushing, duct leakage testing, air and water balancing, calibration of sensors and controls, functional testing of BMS integration, and verification of system parameters such as airflow, temperature stability, and energy performance before handover.

Market Scenario: HVAC EPC I&C Industry

The EPCIC (Engineering, Procurement, Construction, Installation and Commissioning) model represents a comprehensive project execution framework widely adopted in large-scale HVAC infrastructure projects. Under this model, a single contractor or consortium is responsible for delivering the entire project lifecycle from system design and engineering to procurement of equipment, construction and installation of mechanical and electrical components, and final testing and commissioning of the HVAC system. This integrated approach ensures seamless coordination between various project stages, reduces interface risks among multiple vendors, and enables better control over project timelines, costs, and quality standards. EPCIC contracts are commonly used in complex infrastructure environments such as data centers, industrial facilities, commercial complexes, offshore installations, and large institutional buildings where HVAC systems require high reliability and precise environmental control.



Source: D&B Primary Research Estimates; P-Projected

Historical Market Trend (FY2021–FY2025)

The HVAC EPC I&C market in India has demonstrated steady growth over the past few years, supported by expanding infrastructure development, increasing industrial investments, and rising demand for climate control solutions across commercial and industrial sectors. The market size increased from approximately INR 47,720 crore in FY2021 to INR 81,284 crore in FY2025, reflecting a compound annual growth rate (CAGR) of around 14.2% during the period. This growth has been primarily driven by rapid expansion in sectors such as commercial real estate, pharmaceuticals, electronics manufacturing, and large industrial facilities, all of which require integrated HVAC project execution capabilities. In addition, the increasing scale and complexity of projects have encouraged project owners to adopt EPCIC contracts that offer a single-point responsibility structure for project delivery.

Market Outlook and Growth Forecast (FY2025–FY2030)

Looking ahead, the HVAC EPCIC market is expected to witness strong expansion as infrastructure investments continue to accelerate across multiple sectors of the Indian economy. The market is projected to grow from approximately INR 81,284 crore in FY2025 to about INR 1,69,723 crore by FY2030, representing an estimated CAGR of around 15.9% over the forecast period. This growth outlook is supported by increasing investments in data centers, industrial manufacturing facilities, commercial buildings, and energy infrastructure, all of which require sophisticated HVAC systems and integrated project execution capabilities. Additionally, the rising adoption of energy-efficient building standards, increasing demand for precision cooling solutions, and the expansion of high-technology industrial sectors are expected to further strengthen the demand for EPCIC-based HVAC project delivery models in the coming years.

India HVAC EPC I&C Market by Project Location (INR Crore)												
Value in INR Crore	FY21	FY22	FY23	FY24	FY25	FY26 (P)	FY27 (P)	FY28 (P)	FY29 (P)	FY30 (P)	CAGR 21-25 (%)	CAGR 25-30 (%)
Onshore	31,345	35,639	40,522	46,073	52,385	60,190	69,159	79,463	91,303	1,04,908	13.7%	14.9%
Offshore	9,275	10,244	11,315	12,499	13,805	15,421	17,227	19,246	21,500	24,020	10.5%	11.7%
Data Centre	7,100	8,573	10,352	12,500	15,094	18,415	22,466	27,408	33,438	40,795	20.7%	22.0%

Source: D&B Primary Research Estimates

Current and Historical Market Analysis (FY2021–FY2025)

During the historical period, the **onshore segment remained the dominant contributor to the HVAC EPC I&C market**, supported by the broad base of land-based infrastructure projects such as industrial manufacturing facilities, commercial buildings, pharmaceuticals, and institutional infrastructure. The steady growth of this segment reflects the continued expansion of industrial activity and commercial real estate development in India. Compared with other segments, onshore projects typically involve large-scale HVAC installations across multiple facility types, resulting in a stable and consistently expanding demand for EPC and instrumentation integration services.

The **offshore segment recorded comparatively moderate growth**, largely reflecting the cyclical investment patterns in the oil and gas sector. HVAC systems in offshore installations are essential for maintaining safe working environments and protecting sensitive equipment in marine conditions. However, the pace of expansion in this segment tends to be influenced by global energy prices, offshore exploration activity, and capital expenditure cycles of oil and gas companies, resulting in a relatively gradual market expansion compared with other segments.

In contrast, the **data centre segment emerged as the fastest-growing component of the HVAC EPC I&C market during the period**, reflecting the rapid expansion of India’s digital infrastructure. The growth of hyperscale cloud facilities, increasing enterprise data storage requirements, and rising internet penetration have significantly accelerated investments in large-scale data centre infrastructure. As these facilities require highly reliable and precision-controlled cooling environments, they have become a key driver of demand for advanced HVAC instrumentation and control systems, leading to a faster growth trajectory compared with traditional infrastructure segments.

Future Market Outlook (FY2025–FY2030)

Looking ahead, the **onshore segment is expected to maintain its leading position within the HVAC EPC I&C market**, driven by continued infrastructure expansion across manufacturing, commercial real estate, healthcare, and institutional sectors. As India continues to focus on industrial development, urban

infrastructure expansion, and modernization of commercial facilities, demand for integrated HVAC systems with advanced control and monitoring capabilities is expected to remain strong. The increasing adoption of energy-efficient building standards and automation-enabled facility management is also likely to further support growth in this segment.

The **offshore segment is expected to grow steadily over the forecast period**, supported by ongoing exploration and development activities in offshore oil and gas fields and the modernization of existing marine infrastructure. HVAC systems in offshore environments are critical for operational safety and equipment protection, and the increasing complexity of offshore installations is expected to sustain demand for specialized HVAC engineering and control systems. However, the growth pace is likely to remain relatively moderate compared with other segments due to the capital-intensive nature of offshore energy projects and their sensitivity to global energy market conditions.

Meanwhile, the **data centre segment is projected to witness the strongest growth momentum in the coming years**, driven by the rapid expansion of India's digital economy. Increasing adoption of cloud computing, artificial intelligence workloads, fintech platforms, and digital services is leading to significant investments in hyperscale and colocation data centres across major metropolitan regions. These facilities require high-density, precision cooling solutions and advanced automation systems to maintain uninterrupted operations and energy efficiency, making them one of the most important growth drivers for the HVAC EPC I&C market during the forecast period.

India HVAC EPC I&C Market by End User Industry

India HVAC EPC I&C Market by End User Industry (INR Crore)												
Sectors	FY21	FY22	FY23	FY24	FY25	FY26 (P)	FY27 (P)	FY28 (P)	FY29 (P)	FY30 (P)	CAGR 21-25 (%)	CAGR 25-30 (%)
Data Centre	7,100	8,573	10,352	12,500	15,094	18,415	22,466	27,408	33,438	40,795	20.7%	22.0%
Hotel	3,520	3,951	4,435	4,979	5,588	6,342	7,199	8,170	9,273	10,525	12.2%	13.5%
Hospitals	5,065	5,888	6,845	7,957	9,250	10,869	12,771	15,006	17,632	20,717	16.2%	17.5%
Shipping	2,760	3,029	3,324	3,649	4,004	4,444	4,933	5,476	6,078	6,747	9.7%	11.0%
Airport	4,115	4,825	5,657	6,633	7,777	9,216	10,921	12,941	15,335	18,172	17.2%	18.5%
Integrated Facility	6,760	7,690	8,747	9,949	11,318	13,016	14,968	17,213	19,795	22,765	13.8%	15.0%
Oil and Gas (Platforms and rigs)	6,515	7,215	7,991	8,850	9,801	10,977	12,294	13,770	15,422	17,273	10.7%	12.0%
Others	11,885	13,285	14,838	16,555	18,452	20,747	23,300	26,133	29,268	32,729	11.6%	12.1%

Source: D&B Primary Research Estimates

Current and Historical Market Analysis (FY2021-25)

During the historical period, the HVAC EPC I&C market witnessed broad-based growth across multiple end-user industries, reflecting increasing infrastructure development and rising adoption of climate-controlled environments in critical facilities. Among the segments, data centre infrastructure emerged as the most dynamic contributor, with the market expanding to more than double its FY2021 level by FY2025, highlighting the rapid expansion of India's digital ecosystem and the growing requirement for high-precision cooling environments. The strong growth in this segment reflects increasing investments by hyperscale cloud operators, colocation providers, and large enterprises seeking reliable digital infrastructure across major metropolitan regions.

Healthcare and airport infrastructure also recorded strong momentum during the period. The hospital segment expanded by over 80% between FY2021 and FY2025, reflecting increasing investments in tertiary healthcare facilities, expansion of private hospital chains, and rising demand for advanced climate-controlled environments in operation theatres and critical care units. Similarly, the airport segment witnessed significant expansion as passenger traffic recovery and airport modernization projects accelerated infrastructure development. Meanwhile, industries such as hospitality, integrated facilities, and offshore energy installations contributed to steady market expansion, supported by growth in commercial real estate developments, corporate office infrastructure, and modernization of marine and energy facilities.

Future Market Outlook (FY2025–FY2030)

Over the forecast period, the HVAC EPC I&C market is expected to experience sustained expansion across most end-user industries, with digital infrastructure likely to remain the strongest growth driver. The data centre segment is projected to witness a sharp rise in market size, expanding by nearly three times its FY2021 level by the end of the decade, reflecting strong investments in hyperscale facilities and colocation infrastructure. As India's data consumption continues to grow rapidly and global technology companies expand their presence in the country, demand for precision cooling and advanced environmental control systems is expected to accelerate significantly.

The healthcare and airport sectors are also expected to remain key contributors to future demand, driven by large-scale infrastructure upgrades and expansion projects. The hospital segment is projected to more than double its market size over the forecast period, reflecting continued investment in modern healthcare infrastructure and increasing emphasis on infection control, air quality management, and controlled operating environments. Similarly, airport infrastructure development across major metropolitan hubs as well as emerging regional airports is expected to generate significant demand for HVAC systems designed to handle large passenger volumes and complex terminal environments.

Other segments such as integrated facilities, hospitality, and industrial infrastructure are expected to witness steady growth, supported by increasing urbanization and expansion of commercial and mixed-use developments. Integrated facility environments including large corporate campuses, technology parks, and institutional infrastructure are projected to approach the INR 20,000 crore mark before the end of the

decade, reflecting the growing demand for centralized climate control systems across large facilities. Meanwhile, segments such as shipping and offshore installations are expected to expand at a relatively gradual pace, influenced by investment cycles in marine infrastructure and offshore energy development. Overall, the diversification of end-user industries is expected to support balanced growth in the HVAC EPC I&C market in the coming years.

HVAC Operations & Maintenance (O&M) Industry

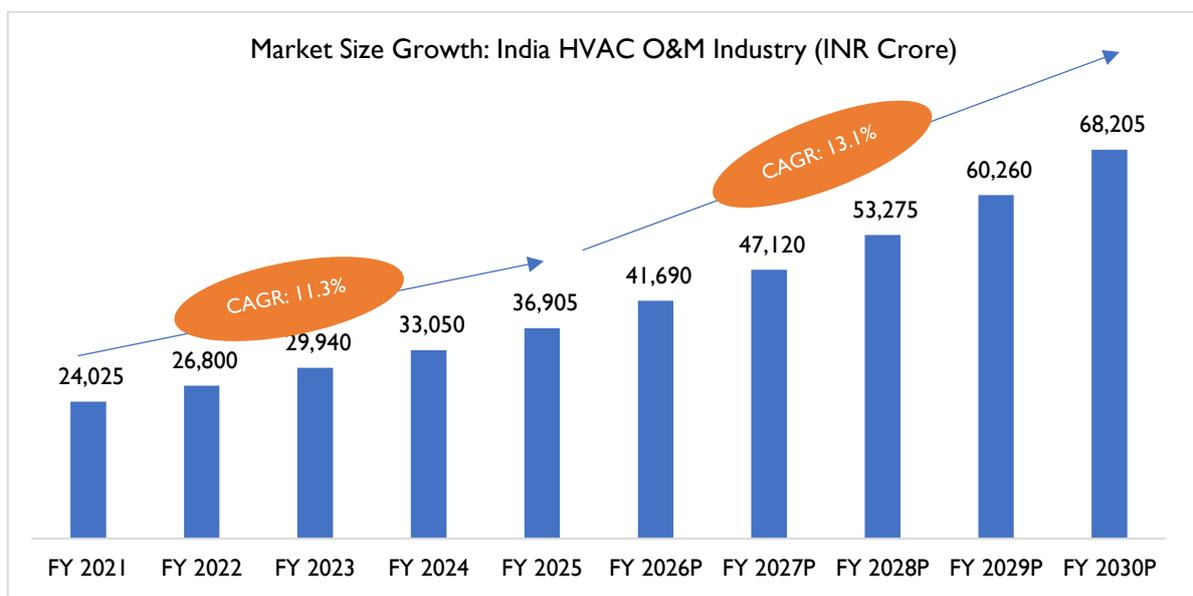
The HVAC Operations and Maintenance (O&M) industry encompasses the ongoing management, servicing, and performance optimization of heating, ventilation, and air conditioning systems after their installation and commissioning. These services are essential to ensure that HVAC systems continue to function efficiently, maintain stable indoor environmental conditions, and operate reliably throughout their lifecycle. The scope of HVAC O&M typically includes routine inspections, preventive and corrective maintenance, system performance monitoring, equipment servicing, and periodic replacement of critical components.

O&M contracts are typically **annuity-like**, with clients paying on a recurring basis for continuous services. Additionally, the billing model is largely **manpower-driven**, with costs linked to the staff deployed and hours worked for maintenance activities.

Effective maintenance practices play an important role in minimizing operational disruptions, improving energy efficiency, and extending the lifespan of installed equipment. HVAC O&M services are widely required across commercial buildings, industrial facilities, hospitals, hospitality infrastructure, data centres, airports, marine installations, and other large infrastructure assets where uninterrupted climate control is essential for operational continuity.

Market Scenario: HVAC O&M Industry

The HVAC O&M market has expanded alongside the growing installed base of HVAC systems across infrastructure sectors in India. As large facilities increasingly depend on reliable environmental control for operational efficiency, organizations are placing greater emphasis on structured maintenance programs and long-term service contracts to ensure consistent system performance. The rising complexity of modern HVAC installations, combined with increasing energy efficiency requirements and operational reliability standards, is expected to drive sustained demand for specialized HVAC maintenance and lifecycle management services across multiple end-user industries.



Source: D&B Primary Research Estimates; P - Projected

O&M services are typically delivered through **annual maintenance contracts (AMCs), multi-year service agreements, and integrated facility management contracts**, providing clients with predictable and recurring support. The **pricing models** are largely **manpower-driven**, based on deployed staff and hours worked, though some contracts incorporate fixed fees per equipment or performance-linked charges tied to energy efficiency or uptime guarantees. Service providers in this segment operate depending on contract complexity, manpower utilization, and the adoption of technology-enabled services. HVAC O&M contracts vary in structure and complexity. Pricing is often manpower-driven, with some contracts tied to performance or energy efficiency outcomes. Margins differ by contract type, with standard maintenance contracts providing moderate profitability, while technology-enabled and specialized services, such as predictive maintenance and digital monitoring, typically achieve higher returns.

Current and Historical Market Analysis (FY2021-25)

The HVAC O&M industry in India has witnessed steady expansion during the historical period, reflecting the growing installed base of HVAC systems across industrial, commercial, and institutional infrastructure. As new buildings, manufacturing facilities, and technology infrastructure are developed, the requirement for ongoing HVAC maintenance services increases correspondingly. Over the period from **FY2021 to FY2025**, the market expanded from approximately **INR 24,025 crore to INR 36,905 crore**, representing a **compound annual growth rate (CAGR) of around 11.3%**. This growth has been primarily supported by rising demand for facility management services, increasing complexity of HVAC systems, and greater emphasis on maintaining operational efficiency and system reliability.

Future Market Outlook (FY2025–FY2030)

Looking ahead, the HVAC O&M industry is expected to witness continued growth as India’s infrastructure base continues to expand and the installed stock of HVAC systems increases across sectors. The market is projected to grow from approximately **INR 36,905 crore in FY2025 to around INR 68,205 crore by FY2030**, reflecting an estimated **CAGR of about 13.1%** during the forecast period. Growth in this segment is likely to be driven by increasing demand for professional maintenance services, expansion of commercial and industrial infrastructure, and the rising adoption of energy-efficient building management practices. In addition, the growing emphasis on predictive maintenance, energy optimization, and digital monitoring solutions is expected to further strengthen the role of HVAC O&M services in ensuring long-term operational efficiency of climate control systems.

India HVAC O&M Market by Project Location Segment

India HVAC O&M Market by Project Location (INR Crore)												
Value in INR Crore	FY21	FY22	FY23	FY24	FY25	FY26 (P)	FY27 (P)	FY28 (P)	FY29 (P)	FY30 (P)	CAGR 21-25 (%)	CAGR 25-30P (%)
Onshore	16,775	18,610	20,650	22,500	24,965	28,010	31,425	35,260	39,560	44,385	10.5%	12.2%
Offshore	5,470	6,060	6,720	7,450	8,260	9,265	10,395	11,655	13,070	14,660	10.9%	12.2%

Data Centre	1,780	2,130	2,570	3,100	3,680	4,415	5,300	6,360	7,630	9,160	19.9%	20.0%
--------------------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------

Current and Historical Market Analysis (FY2021–FY2025)

During the historical period, the **onshore segment remained the largest contributor to the HVAC O&M market**, supported by the extensive installed base of HVAC systems across industrial and commercial infrastructure. The steady growth of this segment reflects the increasing number of operational facilities requiring routine maintenance and lifecycle management of HVAC equipment. As industries and commercial real estate continue to expand, the demand for long-term service contracts and facility management solutions has strengthened the growth of the onshore O&M market.

The **offshore segment also recorded stable growth during the period**, supported by ongoing operations and maintenance requirements of offshore oil and gas infrastructure. Since offshore facilities operate in harsh environmental conditions and require strict safety standards, regular servicing and system reliability are essential. This creates consistent demand for HVAC maintenance services to ensure safe and controlled working environments for offshore personnel and equipment.

In contrast, the **data centre segment witnessed the fastest expansion within the HVAC O&M market**, reflecting the rapid development of India’s digital infrastructure ecosystem. The increasing number of hyperscale data centres, rising cloud computing adoption, and growing digital services have significantly increased the demand for continuous monitoring and maintenance of high-precision cooling systems. As a result, data centres have emerged as one of the most dynamic segments within the HVAC O&M industry.

Future Market Outlook (FY2025–FY2030)

Looking ahead, the HVAC O&M market across all project locations is expected to witness continued expansion, supported by the growing installed base of HVAC infrastructure and increasing emphasis on efficient asset management. The **onshore segment is expected to maintain its leading position**, driven by the expansion of industrial facilities, commercial infrastructure, and institutional buildings that require long-term maintenance and operational support for HVAC systems.

The **offshore segment is projected to grow steadily**, supported by ongoing offshore oil and gas production activities and the need to maintain existing marine infrastructure. HVAC systems in offshore

environments play a critical role in ensuring operational safety and equipment reliability, and this is expected to sustain demand for specialized maintenance services over the coming years.

Meanwhile, the **data centre segment is expected to record the strongest growth momentum within the HVAC O&M market**, driven by the continued expansion of digital infrastructure and increasing investments in hyperscale and colocation data centres. As these facilities operate continuously and require highly reliable cooling environments, demand for specialized HVAC maintenance, system monitoring, and energy optimization services is expected to grow significantly during the forecast period.

India HVAC O&M Market by End User Industry

India HVAC O&M Market by Project Location (INR Crore)												
Sectors	FY21	FY22	FY23	FY24	FY25	FY26 (P)	FY27 (P)	FY28 (P)	FY29 (P)	FY30 (P)	CAGR 21-25 (%)	CAGR 25-30P (%)
Data Center	1,780	2,130	2,570	3,100	3,680	4,415	5,300	6,360	7,630	9,160	19.9%	20.0%
Hotel	1,325	1,465	1,615	1,790	1,985	2,225	2,490	2,765	3,070	3,410	10.6%	11.4%
Hospitals	3,925	4,355	4,830	5,360	5,945	6,670	7,485	8,400	9,425	10,575	10.9%	12.2%
Shipping	2,625	2,910	3,230	3,580	3,970	4,455	5,000	5,610	6,295	7,065	10.9%	12.2%
Airport	1,635	1,815	2,010	2,230	2,475	2,775	3,115	3,495	3,920	4,400	10.9%	12.2%
Integrated Facility	2,190	2,425	2,685	2,980	3,305	3,705	4,155	4,660	5,225	5,855	10.8%	12.1%
Oil and Gas (Platforms and rigs)	2,845	3,150	3,490	3,870	4,290	4,810	5,395	6,045	6,775	7,595	10.8%	12.1%
Others	7,700	8,550	9,510	10,140	11,255	12,635	14,180	15,940	17,920	20,145	10.0%	12.3%

Current and Historical Market Analysis (FY2021–FY2025)

During the historical period, the HVAC O&M market across end-user industries expanded steadily, reflecting the growing installed base of HVAC infrastructure across commercial, institutional, and industrial facilities. The **“others” category remained the largest contributor throughout the period**, representing a broad mix of commercial buildings, manufacturing facilities, and institutional infrastructure where long-term maintenance contracts are typically required to ensure reliable HVAC system performance. This segment alone expanded by nearly **1.5 times over the five-year period**, indicating the increasing scale of built infrastructure requiring structured operations and maintenance services.

Among the key sectors, **hospitals and shipping infrastructure also represented significant contributors to the HVAC O&M market**, reflecting the critical nature of climate-controlled

environments in these facilities. Healthcare infrastructure continued to expand due to rising demand for medical services, resulting in higher maintenance requirements for ventilation systems, air filtration, and temperature-controlled environments. Meanwhile, the shipping and marine segment maintained stable growth supported by port infrastructure upgrades and modernization of maritime facilities. At the same time, **data centre facilities recorded the fastest growth among the segments**, more than doubling their market size during the period, driven by the rapid expansion of digital infrastructure and the increasing requirement for continuous cooling system monitoring and servicing.

Future Market Outlook (FY2025–FY2030)

Looking ahead, the HVAC O&M market across end-user industries is expected to expand significantly as the installed base of HVAC systems continues to grow across infrastructure sectors. The **data centre segment is projected to remain the fastest-growing category**, with the market expected to expand by nearly **two-and-a-half times its FY2021 level by FY2030**. This rapid expansion reflects the continuous operation requirements of data centre facilities, where HVAC systems must operate with extremely high reliability, creating strong demand for preventive maintenance, monitoring, and lifecycle management services.

The **hospital and airport segments are also expected to witness strong growth in HVAC maintenance demand**, supported by the expansion of healthcare infrastructure and modernization of airport terminals. As hospitals increasingly adopt advanced ventilation systems and strict indoor air quality standards, the need for regular inspection, calibration, and maintenance of HVAC systems is expected to rise significantly. Similarly, airport infrastructure expansion and rising passenger traffic will require large HVAC installations to operate efficiently across terminals, passenger areas, and operational zones, supporting long-term service contracts and maintenance programs.

Meanwhile, sectors such as integrated facilities, hospitality, offshore installations, and marine infrastructure are expected to contribute to stable growth in the HVAC O&M market. These segments are projected to experience steady expansion as commercial real estate developments, corporate campuses, and hospitality infrastructure continue to expand across urban centers. Additionally, offshore platforms and maritime facilities will continue to require specialized HVAC maintenance services due to their demanding operational environments. Overall, the diversification of end-user industries and the increasing scale of installed HVAC infrastructure are expected to drive consistent growth in the HVAC O&M services market in the coming years.

Key Demand Drivers

Demand for HVAC installation services in India is being driven by structural trends such as rising temperatures and extreme heat events, improving income levels and lifestyle expectations, rapid urbanization and expansion of commercial infrastructure, and steady growth in industrial activity requiring specialized HVAC systems. In parallel, government-led energy efficiency regulations and green building initiatives are accelerating the adoption of efficient HVAC solutions and upgrades, supporting sustained demand for installation, commissioning, and related services across sectors.

Environmental factors

India's HVAC installation and maintenance demand is increasingly being shaped by **climate-linked temperature rise and more frequent extreme heat events**, which are intensifying cooling requirements across industrial, commercial, and institutional infrastructure. The India Meteorological Department (IMD) reports a **statistically significant long-term warming trend of ~0.68°C per 100 years (1901–2024)**, supported by rising maximum and minimum temperatures. In CY 2024, heatwave conditions were observed across multiple regions, including **most parts of the east coast in April, northwest India in May, and northern and central India in June**, indicating a widening geographic spread and longer duration of high-heat periods. These shifts are structurally increasing the need for higher-capacity HVAC systems, more reliable cooling performance, and continuous upkeep to maintain uptime and indoor environmental stability.

The impact of rising temperatures is also visible in electricity demand patterns, reinforcing the importance of energy-efficient HVAC deployment. The International Energy Agency (IEA) estimates that in India, **each 1°C increase in outdoor temperature in 2024 was associated with a ~7 GW increase in peak electricity demand**, and this sensitivity could rise to **12 GW per degree by 2030** without efficiency interventions. Under severe conditions, temperature anomalies exceeding **4°C** could add **~47 GW of peak load**, placing significant pressure on grid stability and energy costs. Reflecting this stress, the Government of India reported a **record maximum power demand of 250 GW in May 2024**, driven by weather-related loads and rising consumption. These dynamics are accelerating demand for **high-efficiency HVAC installations**, optimized system design, and performance-focused maintenance to reduce energy intensity while ensuring cooling reliability during peak periods.

In parallel, rising heat exposure is translating into higher penetration of cooling equipment and expansion of the installed HVAC base, which increases recurring service requirements. Bureau of Energy Efficiency (BEE) data indicates that **air-conditioner sales increased from 84 lacs units in 2021–22 to 109 lacs units in 2023–24**. Industry reports forecast a further growth of **10–15% in 2025**, implying that AC sales could reach approximately **120–125 lacs units** during the year, highlighting strong growth in cooling adoption. As HVAC deployments expand, facility owners increasingly require professional support across the full lifecycle, ranging from installation and commissioning to preventive maintenance, energy optimization, and retrofitting, making climate shift a key structural driver for HVAC services demand in India.

Demographic factors

Rising living standards and improving income levels are structurally increasing demand for **climate-controlled indoor environments** across both residential and commercial segments, thereby accelerating the need for HVAC installation services. India's strong macroeconomic growth outlook supports this trend, with **real GDP estimated to grow by 7.4% in FY 2026**, compared to **6.5% in FY 2025**, reflecting continued expansion in economic activity and purchasing power. As households and businesses upgrade to higher-quality infrastructure and comfort standards, air-conditioning and ventilation are increasingly viewed as essential utilities rather than discretionary additions, particularly in urban and high-density markets.

This shift is also supported by global consumption patterns in cooling, indicating sustained long-term growth in HVAC penetration. The International Energy Agency (IEA) estimates that the **global stock of air conditioners in buildings will rise to 5600 crores by 2050**, up from **1600 crores today**, implying the equivalent of **10 new ACs sold every second for the next 30 years**. This reflects a structural global transition toward air-conditioned living and working spaces, driven by rising incomes, urbanization, and evolving expectations for comfort and productivity. For India, these trends translate into a growing installed base of HVAC systems across homes, offices, retail spaces, healthcare facilities, and institutional buildings, directly increasing demand for installation, commissioning, and long-term maintenance services.

Government regulations on building codes & energy efficiency benchmarks

Government regulations and energy efficiency benchmarks are increasing demand for **advanced HVAC solutions with higher efficiency, better control logic, and integrated energy-saving features**, particularly across large commercial and institutional buildings. Regulatory provisions increasingly require adoption of certified and energy-efficient technologies and system-level enhancements. For instance, compliance requirements specify that **solar water heating systems shall comply with IS 12976 and shall be minimum BEE 3-star rated**, strengthening the shift toward standardized and efficient thermal systems in building infrastructure.

In addition, building efficiency benchmarks are driving adoption of **heat recovery systems using waste heat from air/water-cooled condensers**, as well as **air-to-water or water-to-water heat pumps**, which support reduced energy consumption and improved system performance. Such measures increase the scope of HVAC installations beyond conventional cooling by incorporating integrated efficiency technologies, thereby raising engineering complexity and demand for specialized execution.

Regulations are also tightening requirements related to **temperature control and zoning**, directly influencing HVAC system design and controls integration. Guidelines specify that **each zone served by HVAC conditioning equipment shall have individual temperature control** for energy saving. Further, where HVAC equipment cannot be turned off for operational reasons, the **room temperature set-point shall be automatically increased to a higher default value of 27°C or higher** for energy saving. These provisions accelerate demand for HVAC systems equipped with modern controls, automation,

and zone-based management, increasing the need for professional installation, commissioning, and long-term performance support services

Government flagship programs and their impact

Government flagship programs and green building initiatives are strengthening demand for HVAC solutions by driving a shift toward **energy-efficient building design, performance benchmarking, and compliance-led upgrades** across large commercial and institutional assets. A key structural driver is the **Energy Conservation Building Code (ECBC)**, which sets minimum energy performance standards for new commercial buildings with a **connected load of 100 kW or contract demand of 120 kVA or more**. This expands the base of buildings that must adopt compliant energy systems—where HVAC typically accounts for one of the largest and most controllable loads—thereby increasing demand for efficient HVAC design, supply, and installation.

In parallel, the **Bureau of Energy Efficiency (BEE)** strengthens market adoption through its **Star Rating Programme**, which benchmarks buildings based on actual energy performance and assigns **1–5-star ratings**. High-rated buildings typically integrate advanced HVAC systems, efficient controls, and optimized operating practices, creating demand not only for HVAC installation but also for commissioning, system integration, and performance optimization services. Importantly, ECBC implementation has gained traction at the state level, with **Andhra Pradesh emerging as a leading state in terms of ECBC-compliant buildings approved**, reflecting active regulatory enforcement and accelerating demand for compliant HVAC execution capabilities.

Further, government mandates and programs are driving energy upgrades in existing public infrastructure, translating policy intent into direct replacement and modernization opportunities for HVAC systems. For example, initiatives aimed at improving energy performance have supported outcomes such as **Chandigarh’s Paryavaran Bhawan achieving a 5-star energy efficiency rating**, illustrating how government-led efficiency programs create measurable demand for HVAC upgradation and high-performance building systems.

Urbanization

Rapid urbanization in India is structurally expanding the requirement for **climate-controlled indoor environments**, directly supporting higher demand for HVAC installation across commercial and institutional infrastructure. By **2050**, India is expected to add around **33. crores new urban residents**, roughly equivalent to the current population of the United States. Accommodating this scale of urban growth will require nearly **10 crores new homes**, along with major expansion in supporting infrastructure such as transport, water, power, and public services. This large-scale urban buildout is expected to increase the footprint of HVAC deployment across residential, commercial, and public facilities.

The pace of urban expansion is already evident in population projections, with India’s urban population estimated to reach **54.27 crores by 2025**, rising further to **67.55 crores by 2035**, and approaching **nearly 90 crores by 2047**. This sustained migration and settlement growth is driving higher demand for modern

office spaces, retail centers, healthcare infrastructure, education facilities, hospitality, and public buildings segments where HVAC systems are increasingly essential for occupant comfort, productivity, and regulatory compliance.

Alongside population growth, the physical scale of urban infrastructure is expanding rapidly. The urban built-up area across India's eight largest cities has **nearly doubled over the past three decades**, increasing from approximately **2,136 sq. km in 1995 to about 4,308 sq. km in 2025**. This expanding-built environment translates into a larger installed base of HVAC systems across commercial real estate and leisure spaces, increasing demand for HVAC installation, commissioning, and long-term maintenance services to support continuous operations in high-occupancy urban facilities.

Rapid industrialization

India's rapid industrialization is emerging as a key structural driver for HVAC installation services, as modern industrial facilities increasingly require **specialized ventilation, cooling, and air-quality systems** to ensure safe operations, stable production conditions, and regulatory compliance. Industrial output grew by **more than 5.80% in FY 2023–24** over the previous year, while total estimated employment in the sector recorded a robust growth of **5.92% in FY 2023–24**, indicating expanding industrial capacity and higher utilization across manufacturing ecosystems. This growth momentum has continued into 2025, with recent figures reflecting steady industrial production growth of around **4%**, supported by manufacturing-led expansion of approximately **4.8%** in key months. As industrial activity rises, both greenfield capacity additions and brownfield modernization projects are accelerating, increasing the addressable market for HVAC engineering and execution services.

Unlike commercial buildings where HVAC is largely comfort-driven, industrial HVAC demand is primarily **process-driven and risk-sensitive**, requiring customized system design and higher installation complexity. Industrial environments often generate high heat loads, airborne contaminants, and humidity fluctuations, making controlled ventilation and thermal stability critical for operational efficiency and worker safety. As factories adopt automation, precision manufacturing, and higher throughput operations, HVAC systems are increasingly required to deliver **consistent airflow, filtration, pressure control, and temperature stability**, while also supporting energy efficiency objectives. This shift strengthens demand for advanced HVAC installations such as large-scale air handling units (AHUs), industrial exhaust and make-up air systems, ducting and insulation works, process cooling solutions, and integrated control systems for continuous monitoring and optimization.

The impact is particularly strong across India's key GVA-contributing industries—**basic metals, motor vehicles, chemicals and chemical products, food products, and pharmaceuticals**—as these segments have HVAC requirements that are both operationally critical and compliance-linked. For instance, basic metals and chemical plants require robust ventilation and heat management due to high-temperature processes and hazardous emissions, while automotive manufacturing and component plants increasingly depend on controlled environments for paint shops, assembly lines, and testing areas. Similarly, food

processing units require hygiene-driven ventilation and humidity control to maintain product safety and shelf life, while pharmaceutical facilities rely on tightly controlled HVAC systems for contamination control, clean areas, and stable production conditions. As these industries scale production and expand capacity, demand rises not only for new HVAC installations but also for periodic retrofits, balancing, and system upgrades to meet changing production needs and energy efficiency benchmarks.

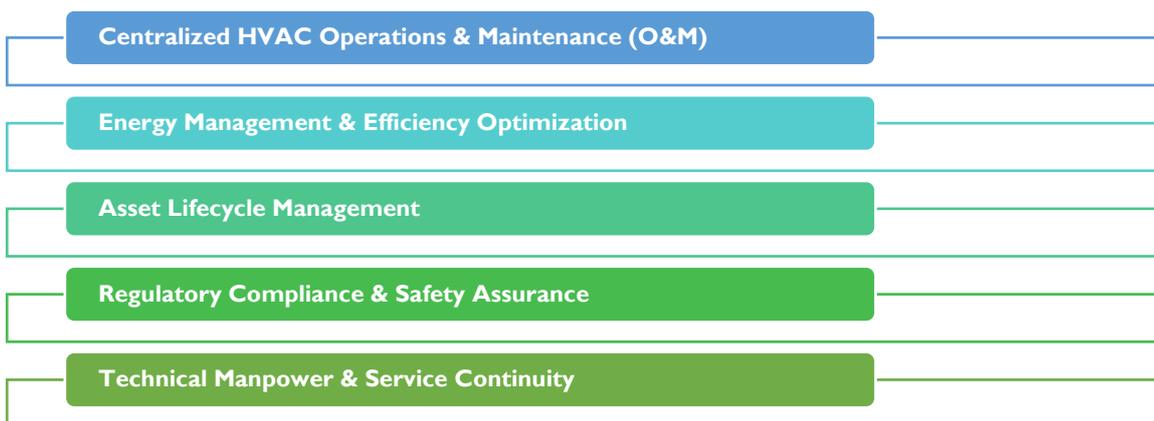
Overall, India's industrial growth trajectory is directly translating into higher demand for **specialized HVAC installation, commissioning, and maintenance services**, supported by expanding industrial output, rising employment, and sustained manufacturing-led production growth. This makes rapid industrialization a strong and long-term demand driver for HVAC EPC players and industrial HVAC service providers across the country.

Demand from Existing Customer Base: Onshore Installations & Assets

Insight on Integrated Facility Management (IFM) in onshore HVAC assets

Integrated Facility Management (IFM) plays a critical role in ensuring the efficient, reliable, and compliant operation of onshore HVAC assets across industrial facilities, commercial buildings, hospitals, data centers, and institutional infrastructure. Given that HVAC systems account for a substantial share of energy consumption and are central to occupant safety and operational continuity, IFM adopts a holistic, lifecycle-oriented approach that integrates HVAC operations with broader facility management functions. By combining centralized monitoring, preventive maintenance, energy optimization, digital tools, and skilled manpower deployment, IFM transforms HVAC systems from standalone mechanical utilities into strategic infrastructure assets that support long-term performance, cost efficiency, and regulatory compliance.

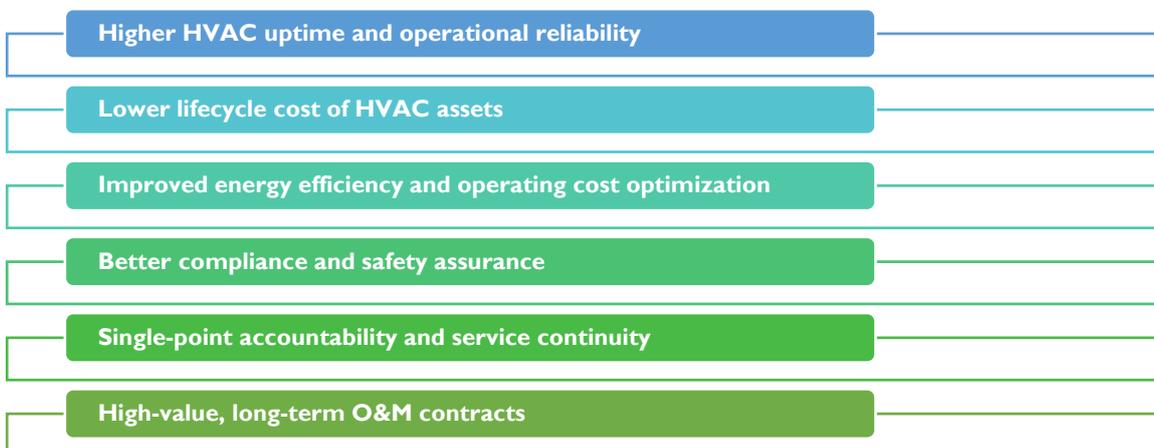
Key Aspects & Features:



- **Centralized HVAC Operations & Maintenance (O&M):** IFM enables centralized oversight of HVAC systems such as chillers, air handling units, and ventilation networks, ensuring standardized maintenance practices, faster fault detection, reduced downtime, and consistent performance across onshore facilities. Advanced monitoring platforms and predictive maintenance tools help detect potential faults early, reducing unplanned downtime by up to 20- 25%.

- **Energy Management & Efficiency Optimization:** Through integrated monitoring and control of HVAC equipment, IFM supports load optimization, peak demand management, and improved energy efficiency. Facilities can achieve energy savings of 10–15% through optimized operations, predictive load balancing, and AI-assisted system adjustments. This is particularly critical in data centers and hospitals where HVAC energy consumption is substantial.
- **Asset Lifecycle Management:** IFM frameworks track HVAC asset condition, maintenance history, and remaining useful life, enabling proactive refurbishment, retrofitting, or replacement. This minimizes unplanned breakdowns, reduces capital expenditure shocks, and supports cost-effective lifecycle decisions, ensuring HVAC assets deliver optimal performance over their lifespan.
- **Regulatory Compliance & Safety Assurance:** IFM integrates HVAC operations with fire safety, indoor air quality (IAQ), and occupational health requirements. Centralized monitoring and documented corrective actions ensure compliance with statutory standards and enhance safety, particularly in sensitive environments like hospitals and data centers.
- **Technical Manpower & Service Continuity:** Deployment of trained HVAC engineers and technicians under IFM ensures timely preventive maintenance, rapid breakdown response, and uninterrupted HVAC performance. The model supports manpower-driven O&M, enabling robust service contracts and ensuring 24×7 operational continuity.

Key Benefits



- **Higher HVAC uptime and operational reliability:** Structured preventive maintenance and advanced monitoring reduce unplanned downtime, ensuring stable HVAC performance in HVAC-intensive facilities.
- **Lower lifecycle cost of HVAC assets:** Lifecycle tracking, planned maintenance, and predictive interventions reduce emergency repair costs, extend equipment life, and optimize refurbishment or replacement decisions.

- **Improved energy efficiency and operating cost optimization:** Continuous monitoring, load optimization, and AI-driven controls reduce energy consumption and enhance HVAC system performance.
- **Better compliance and safety assurance:** IFM ensures adherence to fire safety, IAQ, and occupational standards through structured monitoring, documentation, and corrective action.
- **Single-point accountability and service continuity:** IFM consolidates multiple technical services under defined SLAs, improving coordination, accountability, and uninterrupted operations across multi-site facilities.
- **High-value, long-term O&M contracts:** The 24×7 operational requirement and technical intensity of HVAC assets create opportunities for sustained, high-value maintenance agreements for service providers.

Analysis of key factors driving the demand for IFM services in HVAC segment

The demand for Integrated Facility Management (IFM) services in the HVAC segment is being structurally driven by the **rapid expansion of cooling requirements and tightening regulatory and efficiency expectations** across onshore infrastructure. India's national cooling demand is projected to increase by nearly **eight times by FY 2037–38 compared to FY 2017–18**, indicating a substantial rise in HVAC deployment across commercial, industrial, and institutional assets. This expanding installed base significantly increases the need for **lifecycle services**, including installation support, continuous operations and maintenance, and system optimization, which are typically delivered through IFM frameworks.

In parallel, **recent updates in building codes and energy efficiency regulations**, including the Energy Conservation and Sustainable Building Code (ECSBC) and related standards, are expanding compliance obligations related to HVAC performance and energy efficiency. These requirements necessitate **structured performance monitoring, documentation, reporting, and corrective action**, increasing the preference for integrated management models over fragmented maintenance contracts.

Further reinforcing IFM adoption, the Government of India's **India Cooling Action Plan (ICAP)** sets an explicit target to **reduce overall cooling demand by 20–25% by FY 2037–38**, even as absolute cooling demand continues to rise. Achieving this dual objective requires **systematic monitoring, preventive maintenance, and continuous optimization of HVAC systems**, positioning IFM as a critical service model for meeting efficiency, compliance, and cost-control objectives over the long term.

Demand from Existing Customer Base: Offshore Oil & Gas Installations

Insight on offshore oil & gas installations

Offshore oil and gas installations are among the most complex and environment-sensitive industrial assets, operating in harsh marine conditions with stringent safety, reliability, and regulatory requirements. These installations require highly specialized mechanical, electrical, HVAC, automation, and utility infrastructure to

support continuous operations, personnel safety, and asset integrity. HVAC systems form a critical enabling layer across offshore platforms, FPSOs, and subsea-linked facilities, as they directly influence operational uptime, safety compliance, and equipment performance.

India's offshore hydrocarbon infrastructure is primarily concentrated in key producing regions such as the **Western Offshore (Mumbai High and Bassein fields)** and the **Eastern Offshore (Krishna-Godavari and Cauvery basins)**, which collectively account for a significant share of the country's crude oil production. The presence of a large installed base of offshore assets, combined with continued exploration and development activities, underpins sustained demand for maintenance, retrofit, and system upgrades across these installations.

During FY2024–25, offshore drilling activity remained active, with a total of **131 offshore wells drilled**, comprising **39 exploratory wells and 92 development wells**. While this data reflects the scale of offshore operations and ongoing field development, it does not directly represent the number of offshore rigs or platforms, as individual rigs are typically deployed across multiple wells over a given period. Nevertheless, the level of offshore drilling activity indicates continued utilization and operational intensity of offshore infrastructure, thereby supporting demand for associated systems such as HVAC.

Offshore Drilling Activity Snapshot (FY 2024–25)

Particulars	Offshore
Exploratory Wells	39
Development Wells	92
Total Wells Drilled	131

Source: Director General of Hydrocarbons (DGH)

Key Components & Infrastructure in Offshore Installations

Offshore oil and gas infrastructure broadly comprises the following core systems, each with specific HVAC and thermal management requirements:

- **Production & Processing Modules:** These modules house equipment for crude oil and gas separation, compression, dehydration, and treatment. They generate significant heat loads and operate continuously under high pressure and temperature conditions.
 - Enclosed processing areas require **forced ventilation, hazardous-area HVAC systems, and temperature control** to ensure safe operating conditions.
 - HVAC systems must be **explosion-proof (ATEX/IECEx compliant)** and designed to prevent accumulation of flammable gases.
 - Precise airflow and pressurization are critical to protect personnel and sensitive instrumentation.

- **Power Generation & Utility Systems:** Offshore platforms are typically self-powered, using gas turbines, diesel generators, and auxiliary power systems.
 - Power generation rooms require **high-capacity ventilation and cooling** to manage thermal loads from turbines, generators, transformers, and switchgear.
 - HVAC systems support **electrical rooms, control panels, UPS rooms, and battery rooms**, where temperature and humidity control are essential for reliability.
 - Redundancy and continuous operation drive demand for **robust HVAC installation and preventive maintenance services**

- **Living Quarters & Life-Support Infrastructure:** Personnel accommodation blocks (living quarters) are critical components of offshore installations, often housing hundreds of workers for extended rotations.
 - HVAC systems ensure **thermal comfort, humidity control, and indoor air quality** in sleeping areas, kitchens, hospitals, and recreational spaces.
 - Specialized **fresh air handling units, filtration systems, and pressurization controls** are used to protect occupants from toxic gas ingress.
 - HVAC performance directly impacts worker health, safety, and productivity, making it a high-priority system.

- **Control Rooms & Instrumentation Areas:** Control rooms serve as the operational nerve centers of offshore facilities, integrating SCADA, DCS, and safety systems.
 - These spaces require **precision cooling** to maintain stable temperatures for electronic equipment.
 - HVAC systems must operate continuously with **tight temperature and humidity tolerances**.
 - Any HVAC failure can compromise monitoring and control functions, reinforcing the need for **high-reliability design and O&M contracts**.

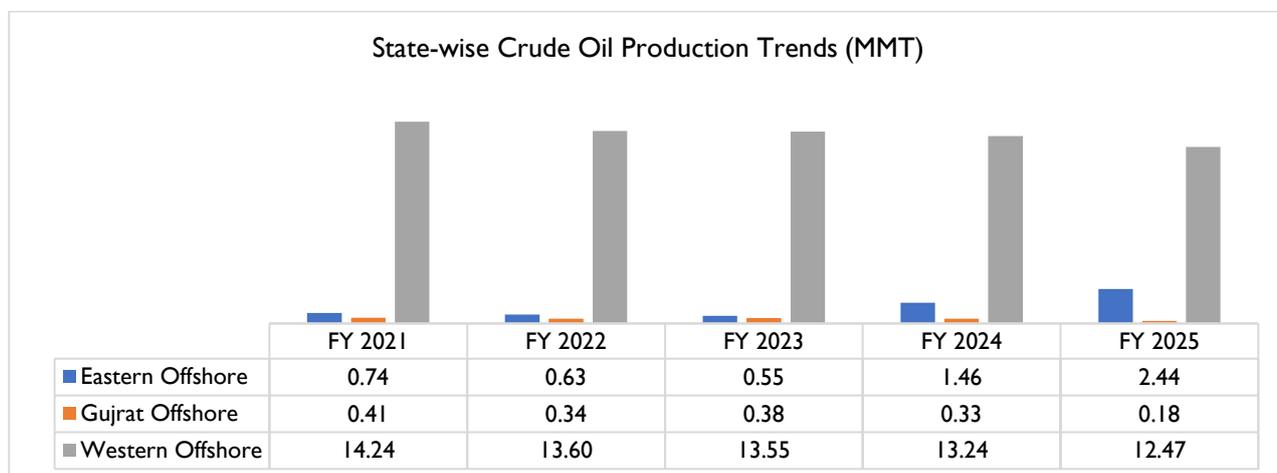
- **Safety, Fire & Hazard Management Systems:** Offshore installations operate under extreme safety regulations due to the risk of fire, explosion, and toxic gas exposure.
 - HVAC systems are integrated with **fire detection, gas detection, and emergency shutdown systems**
 - Pressurization and smoke extraction systems are used to maintain **safe escape routes and refuge areas**.
 - Emergency ventilation and purge systems require **specialized engineering and regular testing**, increasing lifecycle service demand

Offshore oil and gas installations represent a structurally strong and long-term source of demand for HVAC installation and services, as these assets operate continuously in harsh marine environments and are subject to stringent safety and regulatory standards. HVAC systems are integral to maintaining safe operating conditions across production modules, power generation units, control rooms, and living quarters, where temperature control, ventilation, pressurization, and air quality directly impact personnel safety and equipment reliability. The corrosive offshore environment, combined with explosion-risk zoning and redundancy requirements, necessitates specialized HVAC design, high-quality installation, and frequent inspection and maintenance, increasing both upfront EPC scope and recurring O&M demand. In addition, the long operational life of offshore platforms often extending beyond two decades drives sustained requirements for preventive maintenance, system upgrades, and retrofitting, positioning offshore oil and gas installations as a high-value, lifecycle-driven demand segment for industrial HVAC service providers.

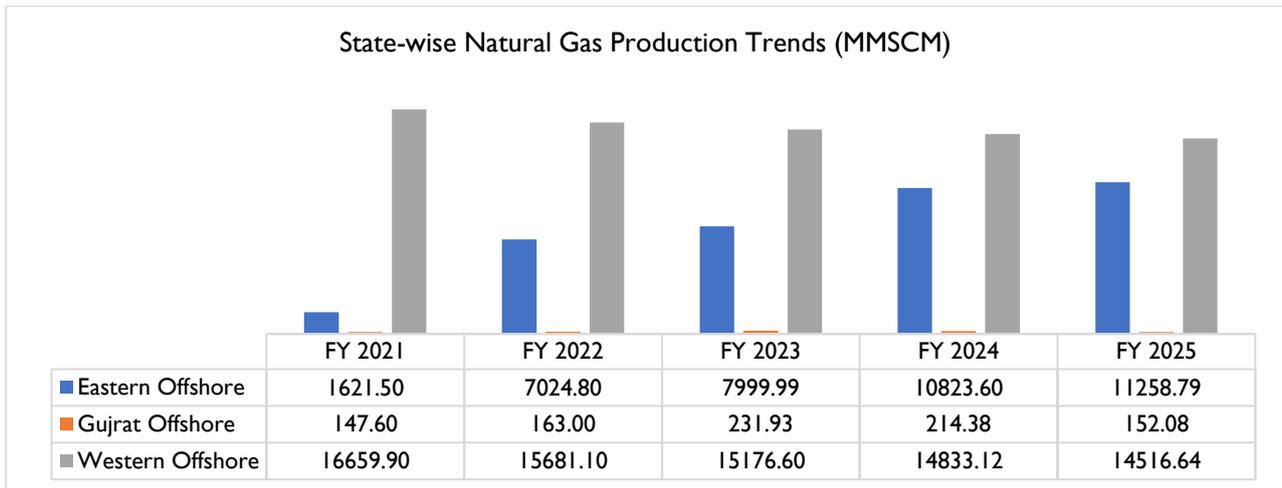
Status of offshore oil & gas infrastructure in India

India's offshore oil and gas infrastructure is currently characterized by a highly concentrated but structurally shifting production profile, as evidenced by the divergent trends across western offshore, eastern offshore, and Gujarat offshore regions. The data clearly indicates that while the western offshore region remains the backbone of India's offshore hydrocarbons output, its crude oil and natural gas production has shown a gradual decline between FY 2021 and FY 2025, reflecting the maturity of legacy offshore assets and natural reservoir depletion. This trend suggests that western offshore infrastructure is increasingly transitioning from a **growth phase** to a **maintenance- and life-extension-driven operational phase**.

In contrast, the eastern offshore region exhibits a sharp turnaround, particularly from FY 2024 onward, with both crude oil and natural gas production rising materially after several years of relatively low output. This shift indicates the ramping up of newer offshore developments and enhanced utilization of existing eastern offshore infrastructure, pointing to a selective expansion strategy rather than broad-based offshore growth. The data implies that eastern offshore assets are moving into a production scaling phase, which typically requires incremental investments in processing modules, utilities, power systems, and associated HVAC and ventilation infrastructure to support higher throughput and operational intensity.



Source: Ministry of Petroleum and Natural Gas



Source: Ministry of Petroleum and Natural Gas

Meanwhile, **Gujarat offshore production remains comparatively small and volatile**, with declining crude oil output and modest fluctuations in natural gas production. This pattern suggests limited incremental offshore investment in the region, with activity largely confined to **maintenance of existing installations rather than capacity expansion**. Gujarat offshore assets appear to play a **supporting role** in India’s offshore ecosystem, contributing marginal volumes without driving large-scale infrastructure additions.

Overall, the data highlights a **dual-track offshore infrastructure landscape** in India: a mature western offshore segment focused on asset integrity, reliability, and operational continuity, alongside a re-emerging eastern offshore segment where production growth is driving **targeted infrastructure upgrades and new installations**. This evolving mix underscores a shift away from large greenfield offshore developments toward **brownfield optimization, selective capacity ramp-up, and lifecycle asset management**, shaping the nature of demand for engineering, utilities, and support systems across India’s offshore oil and gas sector.

Insight on HVAC solution in offshore oil & gas infrastructure

In offshore oil & gas installations, HVAC scope is typically split between EPC/EPCIC-driven project work and long-term O&M/IFM service work. EPC/EPCIC scope includes **front-end engineering and design, equipment sizing and selection, procurement of marine-grade HVAC packages (AHUs, ventilation fans, ducting, filtration units, dampers, chilled water systems)**, installation and integration with electrical and control systems, testing, balancing, and commissioning to achieve operational readiness. Post-commissioning, the HVAC scope shifts into recurring O&M/IFM activities such as preventive and breakdown maintenance, filter and belt replacement, coil cleaning, corrosion control, vibration checks, performance monitoring, spare parts management, calibration of sensors and controls, and periodic system optimization, ensuring continuous compliance with safety requirements and uninterrupted ventilation/cooling for critical offshore zones.

HVAC solutions deployed offshore are specifically engineered to manage **air quality, temperature control, pressurization, and hazard mitigation** across production areas, control rooms, electrical rooms, and living quarters, ensuring continuous operations under extreme marine conditions.

- **Air Handling Units (AHUs)** form the core of offshore HVAC systems and are designed for **heavy-duty, marine-grade applications**. These AHUs are typically corrosion-resistant, explosion-proof, and capable of handling high latent and sensible heat loads generated by rotating equipment and enclosed process modules. They are deployed across process areas, accommodation blocks, and control rooms to provide controlled ventilation, cooling, and humidity management, often operating continuously with high redundancy to meet uptime and safety requirements.
- **Advanced filtration systems** are integral to offshore HVAC design due to the presence of **salt-laden air, hydrocarbons, toxic gases, and particulate contaminants**. Multi-stage filtration—ranging from coarse and fine filters to high-efficiency particulate air (HEPA) or gas-phase filtration in sensitive zones is used to protect both personnel and equipment. These systems also play a critical role in preventing the ingress of flammable or toxic gases into enclosed spaces, supporting compliance with offshore safety and environmental norms.
- **Pressurization and hazardous area ventilation systems** are deployed to maintain positive pressure in critical spaces such as control rooms, electrical rooms, and emergency shelters. By preventing the entry of combustible gases, these HVAC configurations are tightly integrated with gas detection and fire protection systems, making them essential components of offshore risk management architecture.

In addition, **integrated control and monitoring systems** are increasingly embedded within offshore HVAC infrastructure. These systems link HVAC operations with platform-wide automation, safety, and energy management frameworks, enabling real-time monitoring of airflow, temperature, pressure, and filtration performance. Integration with distributed control systems (DCS) and safety instrumented systems (SIS) enhances operational reliability and allows predictive maintenance in environments where manual intervention is costly and logistically challenging.

Overall, HVAC solutions in offshore oil and gas infrastructure are **highly specialized, safety-critical, and engineering-intensive**, requiring customized design, precision installation, and continuous monitoring. The complexity and regulatory sensitivity of these systems significantly increase both capital expenditure and long-term maintenance requirements, reinforcing offshore oil and gas installations as a high-value demand segment for industrial HVAC installation, integration, and lifecycle services.

Insight on objectives & role played by HVAC system in offshore oil & gas infrastructure

In offshore oil and gas installations, HVAC systems serve a mission-critical role that extends well beyond thermal comfort, directly supporting operational safety, asset reliability, and regulatory compliance. Operating in confined spaces with continuous hydrocarbon processing, offshore facilities require HVAC systems to manage heat loads, control air quality, and maintain safe pressure differentials under harsh marine and hazardous conditions. As offshore assets function on a 24×7 basis and often in remote locations, HVAC systems are designed as high-reliability utilities, integral to the overall safety and operational architecture of the platform.

Key objectives and roles of HVAC systems include:

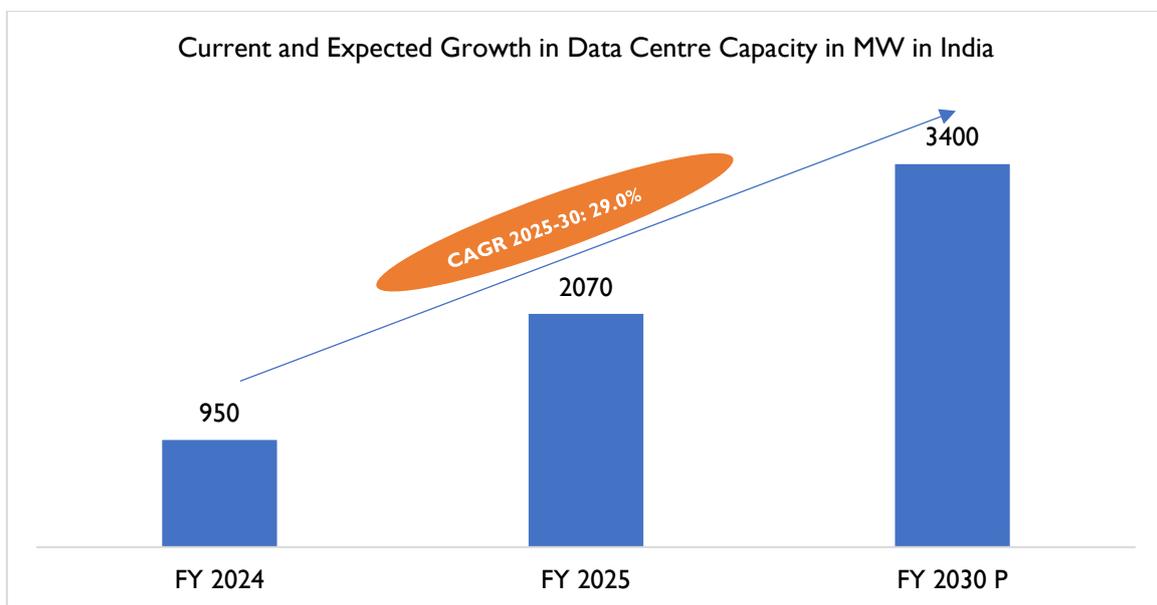
Personnel safety and health	HVAC systems ensure adequate ventilation, temperature control, and air filtration in living quarters, control rooms, and workspaces, protecting personnel from heat stress, toxic gases, and poor air quality.
Hazard mitigation and explosion risk control	By maintaining pressurization in critical areas and enabling rapid ventilation or purging, HVAC systems help prevent the ingress and accumulation of flammable gases, supporting fire and gas safety strategies.
Protection of critical equipment and electronics	Precise temperature and humidity control is essential in control rooms, electrical rooms, and instrumentation areas to prevent equipment failure and ensure uninterrupted monitoring and automation.
Operational continuity and uptime assurance	Continuous HVAC operation supports stable process conditions and minimizes unplanned shutdowns, which is particularly critical given the high cost of offshore downtime.
Regulatory and environmental compliance	HVAC systems are designed to meet stringent offshore safety, marine, and environmental standards, including requirements related to ventilation, air changes, and emergency response readiness.
Energy efficiency and system optimization	Efficient HVAC design and intelligent control systems help manage the high energy intensity of offshore operations by optimizing airflow, cooling loads, and ventilation cycles, thereby reducing operating costs while maintaining safety and reliability standards.

Demand from Existing Customer Base: Data Center

Insight on Data center scenario in India

India's data center industry is witnessing strong growth, driven by rapid digitization, rising internet and data consumption, cloud adoption, and increasing demand for secure and reliable digital infrastructure. Development is concentrated in major hubs such as Mumbai, Bengaluru, and NCR due to strong connectivity, power availability, and ecosystem readiness, while emerging locations like Hyderabad, Chennai, Pune, and Kolkata are also gaining traction. **Data centers have extensive HVAC infrastructure and require intensive operations & maintenance (O&M) to ensure 24x7 uptime, leading to high-value and long-term maintenance contracts.** The sector is supported by improving policy focus, greater enterprise adoption of cloud and AI workloads, and rising investments by both established operators and new entrants, positioning India as a key growth market for data center capacity expansion over the medium term.

Current scenario & expected growth forecast in data center landscape in India



Source: D&B Primary & Secondary Research

The above data illustrates India's rapidly expanding data center capacity between FY 2024 and FY 2030. Beginning at 950 MW in FY 2024, the capacity sees a moderate increase to 2070 MW by FY 2025. From there, growth intensifies significantly, with capacity projected to reach 3,400 MW by FY 2030P. This reflects a strong compound annual growth rate (CAGR) of 29.0% from FY 2025 to FY 2030P. India's data center industry is expanding rapidly, driven by increasing digital consumption, favourable demographics, and proactive government policies. Strategic development is concentrated in major tech hubs like Mumbai, Bangalore, and the National Capital Region (NCR), thanks to factors such as affordable land, a skilled workforce, and reliable power infrastructure.

While these cities have traditionally led in data center growth, other regions including Hyderabad, Pune, Chennai, and Kolkata are now witnessing heightened activity. This geographical diversification is supported by greater internet penetration, rising AI-driven workloads, and robust policy support. Government initiatives

have played a critical role in this momentum. The infrastructure status conferred on the data center sector, along with the 2020 Draft Data Center Policy, has encouraged investment by easing access to global funding and lowering utility costs. The Digital Personal Data Protection Act (DPDPA), 2023, further enhances the regulatory framework, enabling seamless data governance and secure cross-border data flows while fostering trust in the ecosystem.

The sector is witnessing massive investment, with an estimated INR 50,000–5,5000 crores expected between FY 2025–27. This surge is fueled by a digital explosion and data localization initiatives. Currently, India's data center capacity is largely dominated by a few key players NTT Global Data Centers, STT Global Data Centers, CtrlS Data Centers, Sify Technologies, and Nxtra Data Limited who together accounted for 85% of the operational capacity as of March 2024. However, to meet growing demand, new entrants such as **Yotta**, **Digital Connexion**, **Lumina CloudInfra**, **CapitaLand**, and **Digital Edge** have entered the market with large-scale investments, further diversifying the landscape.

At the state level, targeted incentives are accelerating regional development. States like Uttar Pradesh, West Bengal, Maharashtra, Telangana, Karnataka, and Tamil Nadu have introduced a range of benefits, including capital and land subsidies, stamp duty and electricity duty exemptions, and dual power grid access. These policy interventions are opening new avenues for growth and cementing India's position as a leading destination for data center investments. With this strong foundation, the industry is expected to attract over USD 100 billion in investment by 2027.

Key factors driving expansion of data center infrastructure in India

Supportive Government Policies and Regulatory Frameworks

- The Indian government has played a pivotal role in fostering data center growth by granting the sector infrastructure status, which improves access to financing and regulatory support. The Draft Data Center Policy (2020) offers incentives like land allocation and single-window clearances. Moreover, the Digital Personal Data Protection Act (DPDPA), 2023, encourages local data storage, creating sustained demand for domestic data center infrastructure.

Accelerated Digital Transformation

- India is undergoing rapid digital transformation across sectors such as finance, healthcare, education, and e-commerce. Government programs like Digital India are accelerating digital adoption, increasing the need for secure and scalable IT infrastructure. This surge in digital services is directly increasing demand for local data storage and processing capabilities.

Exponential Data Growth

- The explosion of digital content through streaming, social media, online gaming, and smart devices is generating vast volumes of data. Technologies like AI, IoT, and big data analytics are also contributing to this surge. This exponential increase in data generation necessitates robust and localized data center infrastructure to manage and process the growing data load.

5G Rollout and Low-Latency Requirements

- The ongoing deployment of 5G networks is enabling low-latency, high-speed connectivity. This has intensified the need for edge data centers that process data closer to the end user to support real-time applications such as smart cities, autonomous vehicles, and AR/VR technologies.

Power Availability and Renewable Energy Integration

- Data centers require stable and high-capacity power supply, which is increasingly accessible in cities like Mumbai, Chennai, and Bengaluru. Simultaneously, there's a growing focus on green energy adoption, with operators investing in solar, wind, and hybrid solutions to power facilities sustainably and meet ESG (environmental, social, governance) goals.

Robust Investment Ecosystem

- India's data center market is attracting significant capital from global and domestic investors. Tech giants like Amazon Web Services (AWS) and Microsoft have committed large-scale investments. Domestic firms such as AdaniConneX, Yotta Infrastructure, and Reliance Jio are also aggressively expanding, creating a highly competitive and well-funded ecosystem.

Insight on HVAC solutions used in data center infrastructure:

1. Precision Cooling Systems (CRAC & CRAH)

Precision cooling systems such as Computer Room Air Conditioners (CRAC) and Computer Room Air Handlers (CRAH) form the backbone of traditional data center cooling architectures. These systems are designed to maintain tight temperature and humidity tolerances, which are essential for protecting sensitive IT equipment.

Key characteristics driving demand include:

- Continuous operation requirements, often **24x7x365**, resulting in higher installation complexity and long-term maintenance demand
- Increased deployment in large colocation and hyperscale facilities where reliability and redundancy are critical
- Rising retrofitting activity, as operators upgrade older air-cooled facilities to improve energy efficiency and airflow control

As data center capacity expands, the scale and redundancy of CRAC/CRAH installations increase proportionately, directly supporting sustained demand for HVAC engineering, installation, and lifecycle services.

2. Advanced Cooling Systems (Liquid, Evaporative & Hybrid Cooling)

The rapid increase in **rack power densities**, particularly from AI, cloud, and high-performance computing workloads, is pushing the limits of conventional air-based cooling. As a result, data centers are increasingly adopting **advanced cooling technologies** to manage higher heat loads efficiently.

This shift is reflected in:

- Growing adoption of **liquid-based cooling systems**, which offer superior heat transfer efficiency compared to air cooling and are better suited for high-density server environments
- Deployment of **indirect evaporative cooling and hybrid cooling architectures**, which combine multiple cooling methods to reduce energy consumption and improve thermal resilience
- Greater emphasis on cooling system design at the planning stage, increasing the scope of HVAC engineering, integration, and commissioning services

These advanced systems are more **design-intensive and maintenance-critical**, leading to higher value HVAC contracts and long-term service opportunities.

3. Airflow Management & Containment Solutions

In addition to core cooling equipment, **airflow management** has become a critical element of data center HVAC strategy. Poor airflow distribution can lead to hot spots, overcooling, and unnecessary energy consumption.

Key airflow management practices include:

- **Hot aisle and cold aisle containment systems**, which physically separate hot and cold air streams to improve cooling efficiency
- **Rack-level and in-row cooling solutions**, enabling targeted cooling for high-density zones
- Optimization of raised floor systems, ducting, and return air pathways to minimize thermal losses

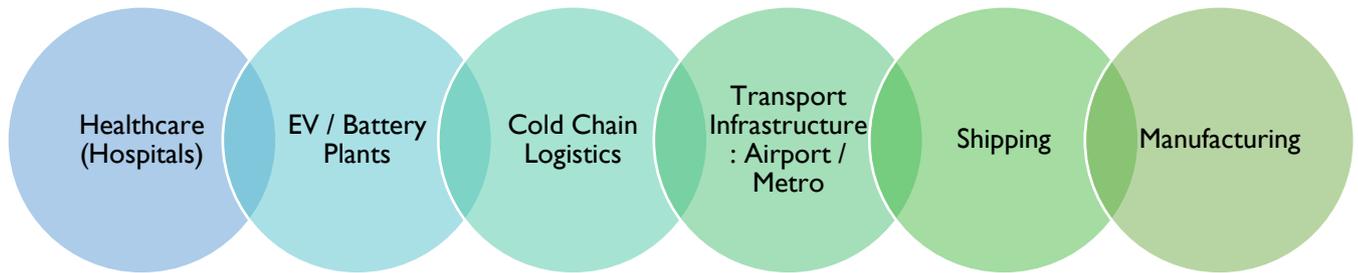
Effective airflow management reduces cooling load per rack and enhances the performance of installed HVAC systems, reinforcing the need for specialized HVAC design, installation, and periodic optimization services.

The rapid expansion of data center infrastructure in India is translating into sustained and high-value demand for HVAC installation and services, as cooling systems represent a mission-critical component of data center operations. Institutional studies indicate that cooling typically accounts for 30–40% of total data center energy consumption, underscoring the scale and criticality of HVAC systems in these facilities (Uptime Institute). As server densities increase and operating temperature tolerances tighten, data centers are deploying larger, more efficient precision cooling systems, advanced hybrid and liquid-assisted cooling architectures, and engineered airflow management solutions, all of which significantly raise installation complexity and capital intensity.

In parallel, the need to maintain high uptime levels is driving long-term operations and maintenance (O&M) contracts, periodic retrofitting, and continuous performance optimization of HVAC systems to improve energy efficiency and power usage effectiveness (PUE), as emphasized by ASHRAE and the International Energy Agency. Collectively, these trends position data centers as a structurally strong and recurring demand driver for specialized HVAC EPC, commissioning, and lifecycle services in India's industrial HVAC market.

Demand from Emerging Customer Segments

Analysis of key factors driving the demand for EPC HVAC projects across select industry segments:



➤ Healthcare (Hospitals)

In India, HVAC systems are critical for hospitals because they directly influence patient safety, infection control, and medical equipment reliability. According to energy usage analysis, **the HVAC system accounts for the largest share of energy consumption in commercial buildings**, which includes hospitals, reflecting how central HVAC is in healthcare energy demand. Government reporting also shows that buildings contributed to over **33% of total electricity consumption**, with HVAC representing the highest component of this load, highlighting the importance of HVAC efficiency in hospitals. HVAC use cases in hospitals include **controlled ventilation for operating theatres, isolation and ICU pressure control systems, HEPA and particulate filtration, and temperature/humidity zoning**, all of which demand precise engineering, continuous monitoring, and commissioning support integral to sophisticated EPC projects. Improved HVAC operations in hospitals have been linked to **~10% energy savings** through performance optimization measures, underlining both operational and sustainability importance.

Investment in Infrastructure in the Healthcare sector

Investments in the hospital and medical infrastructure subsector are substantial, with the India Investment Grid listing over 1,150 ongoing and planned medical infrastructure projects worth nearly ₹2.7 lakh crore. These investments span new hospital construction, medical college upgradation, and other major healthcare facilities across key states such as Uttar Pradesh, Andhra Pradesh, West Bengal, Gujarat, and Delhi, among others.

In parallel, India aims to emerge as a global healthcare hub, with public health expenditure targeted at 2.5% of GDP, reinforcing long-term investment momentum in the sector. Flagship initiatives such as Ayushman Bharat envisage the establishment of 1,50,000 Health and Wellness Centres across urban and rural areas, significantly expanding the healthcare delivery footprint. Additionally, the National Health Mission (NHM) provides financial support for strengthening public health systems through hospital construction, infrastructure upgrades, and capacity enhancement.

➤ **EV / Battery Plants**

Although specific government statistics on HVAC use in EV/battery plants are limited, cooling and environmental control requirements in Indian manufacturing facilities are increasingly tied to broader national cooling demand dynamics. The **India Cooling Action Plan (ICAP)** indicates that cooling demand, including industrial cooling, is a priority for national energy planning due to rapid growth across sectors. In EV and battery manufacturing, HVAC systems support **precise temperature and humidity management for battery assembly, testing, and storage areas**, where tight environmental control is essential to maintain product quality and safety standards. As India's cooling demand rises and real-time controls and automation become prerequisites, these facilities increasingly demand integrated HVAC solutions delivered through full EPC contracts.

A major catalyst for industry expansion has been the Government of India's Production-Linked Incentive (PLI) Scheme for Advanced Chemistry Cell (ACC) Battery Storage, launched with an outlay of ₹18,100 crore. The scheme targets the establishment of 50 GWh of domestic cell manufacturing capacity, with 40 GWh already awarded as of early 2025. By 2027–28, India's total planned and installed domestic capacity is expected to reach 110–120 GWh, positioning the country as a competitive participant in the global supply chain. Beneficiary firms are required to invest a minimum of ₹225 crore per GWh and gradually increase domestic value addition from 25% to 60% over five years, fostering local manufacturing, technological development, and supply-chain resilience.

➤ **Cold Chain Logistics**

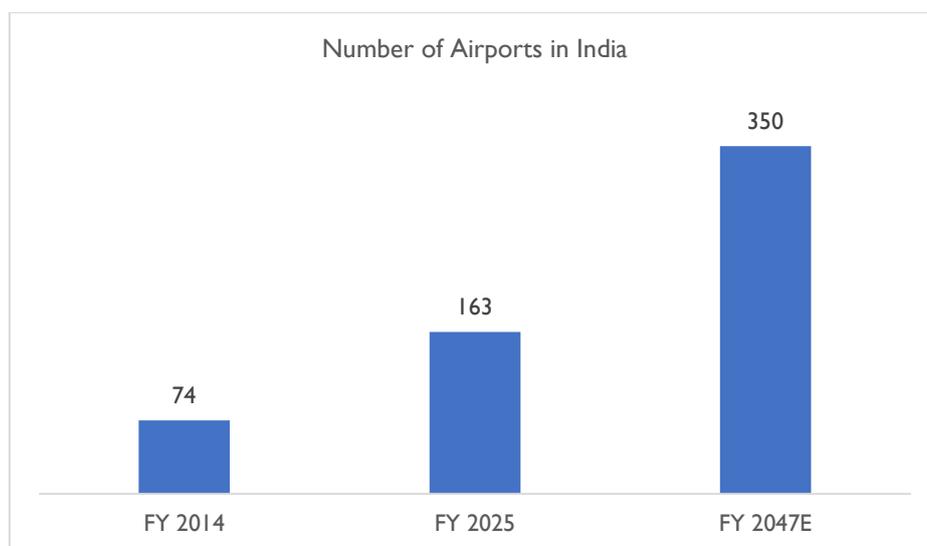
Cold chain infrastructure in India is a strategic priority for reducing post-harvest losses and improving food and pharmaceutical quality. According to government documents, **only about 15% of horticultural produce currently accesses cold storage, and less than 5% of produce is precooled or moved in a cold chain**, indicating major gaps in integrated cooling infrastructure that HVAC and refrigeration systems must address. The **India Cooling Action Plan (ICAP)** specifically targets growth and efficiency in cold chain and refrigeration, aiming to reduce cooling demand by **20- 25% by FY 2037- 38** through energy-efficient and integrated solutions. EPC HVAC projects in cold chain logistics typically include **multi-zone refrigerated storage, controlled humidity and temperature rooms, and IoT-enabled monitoring** to ensure product quality and regulatory compliance throughout the supply chain.

In July 2025, the Union Cabinet approved an additional allocation of **INR 1,920 crore** under the Pradhan Mantri Kisan Sampada Yojana (PMKSY), specifically earmarked for the Integrated Cold Chain and Value Addition Infrastructure (ICCVAI) Scheme. This enhancement increased the total outlay for the scheme to around **INR 6,520 crore** under the 15th Finance Commission cycle (up to March 2026), signalling a strong policy push to scale up cold chain infrastructure across the country. The expanded funding is intended to accelerate the development of integrated cold chain assets, including cold storages, pre-cooling facilities, packhouses, ripening chambers, and refrigerated transport, thereby improving farm-to-market linkages, reducing post-harvest losses, and strengthening temperature-controlled logistics capabilities. Collectively,

these measures are expected to catalyse private sector participation, drive capital investment in modern refrigeration and cooling systems, and support the long-term expansion of India's cold chain infrastructure ecosystem.

➤ **Transport Infrastructure: Airport / Metro**

Transport hubs such as airports and metro stations represent a significant application area for HVAC due to large volumes of passengers and extended operational hours. Government energy statistics show that the **buildings sector accounts for over 30% of India's total electricity use**, with space cooling, largely HVAC, being a major contributor to this consumption. In such infrastructure, HVAC systems are used for **high-capacity air handling and ventilation, zonal temperature control in terminals and concourses, humidity management, and integration with building automation systems** to manage energy use and passenger comfort efficiently. The scale of these facilities and the critical need for reliable climate control make EPC HVAC delivery essential in transport projects. India's airport infrastructure has expanded rapidly over the past decade, supported by sustained government investment and regional connectivity initiatives. The number of operational airports increased from **74 in 2014**, reflecting the baseline of the civil aviation network at the start of the period. By **2025, the total airport count reached 163**, more than doubling the network and significantly improving air connectivity across the country.



Source: PIB

Looking ahead, the Government of India has outlined an ambitious long-term roadmap for civil aviation infrastructure, targeting an expansion of the national airport network to around **350 operational airports** by **2047**. As part of this vision, approximately **50 new airports** are planned over the **next five years**, aimed at supporting rising passenger demand, improving regional connectivity, and strengthening the country's aviation ecosystem.

➤ **Shipping**

In maritime logistics and shipping, HVAC systems are crucial for both **crew/passenger comfort and cargo protection**, especially in refrigerated shipping containers (reefers), where temperature control directly

impacts freight quality. While detailed India-specific energy use data for maritime HVAC is not published in mainstream government energy reports, national cooling policy frameworks such as the **ICAP** include transport cooling as a key area for energy efficiency improvement, indicating its importance at a policy level. Indian ports and shipping infrastructure increasingly align with national cooling and energy efficiency objectives, requiring **automated HVAC controls, real-time monitoring, and resilient systems** to protect perishable goods and ensure crew comfort under varying oceanic conditions.

In the Union Budget 2025–26, the Government of India proposed the establishment of a Maritime Development Fund with a corpus of **INR 25,000 crore** to provide long-term financing support for the maritime sector, including shipping, ports, and allied infrastructure. The fund is designed to address capital-intensive requirements of maritime projects, improve access to patient capital, and enhance the competitiveness of India's shipping and port ecosystem. By facilitating sustained investment in port modernisation, fleet expansion, and associated maritime facilities, the fund is expected to accelerate the development of critical maritime infrastructure across the country.

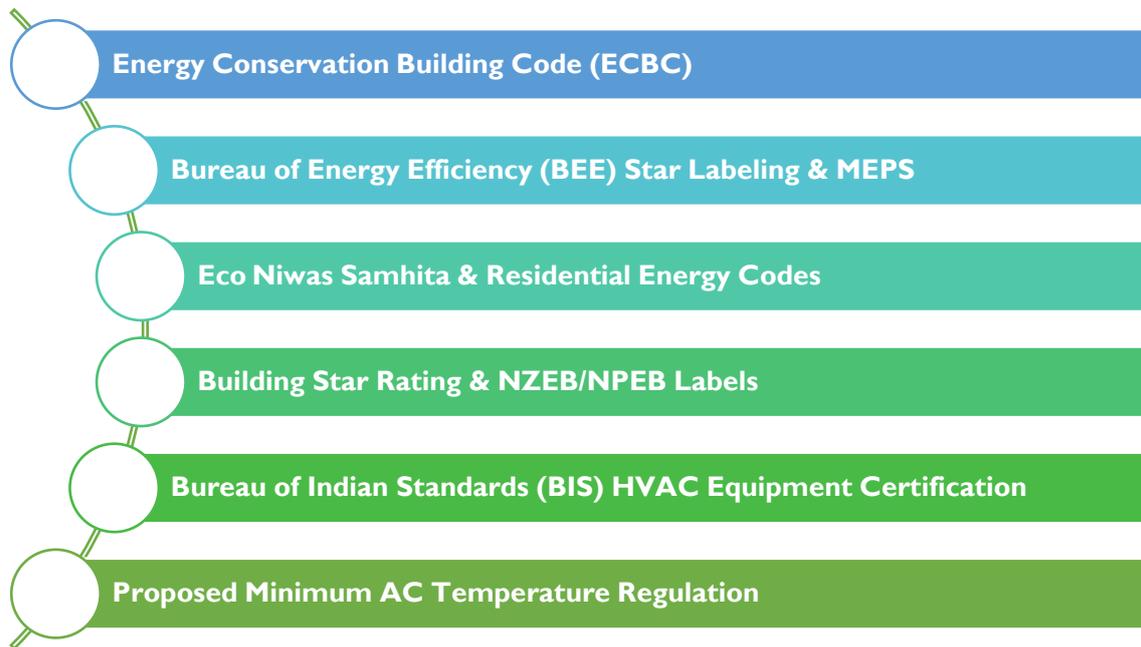
In addition, the Shipbuilding Financial Assistance Policy (SBFAP) 2.0 was extended in Budget 2025–26 with an outlay of approximately **INR 18,090 crore**. The policy aims to incentivise domestic shipbuilding by offsetting a portion of construction costs, thereby strengthening the capacity and global competitiveness of Indian shipyards. Continued financial support under SBFAP 2.0 is expected to drive investments in shipyard expansion, modernisation of production facilities, and development of supporting infrastructure, reinforcing India's long-term maritime and shipbuilding capabilities.

➤ **Manufacturing**

Manufacturing facilities in India, such as electronics, pharmaceuticals, and food processing plants, rely on HVAC systems for **environmental stability, process control, heat removal, and worker comfort**. Government energy reporting highlights that **the commercial and residential building sectors together account for about 33% of total electricity consumption**, with HVAC and related cooling technologies poised for significant growth as industrial and commercial activities expand. EPC HVAC projects in manufacturing may include **precise temperature and humidity control (e.g., cleanrooms), heat recovery systems, industrial ventilation, and smart controls** to improve energy performance. As India's cooling demand increases overall, HVAC systems in manufacturing are becoming integral to production efficiency and regulatory compliance, thereby driving EPC contracting activities.

Regulatory Landscape

Analysis of key regulatory policies/programs impacting the HVAC landscape in India



➤ **Energy Conservation Building Code (ECBC)**

The Energy Conservation Building Code (ECBC), developed by the Bureau of Energy Efficiency (BEE) under the Ministry of Power, sets minimum energy performance standards for commercial buildings, with a strong focus on HVAC systems, building envelope, lighting, and electrical systems. It applies to large buildings with connected loads ≥ 100 kW and mandates energy-efficient design, construction, and operation to reduce overall energy consumption and peak load stress. ECBC has also prompted state-level adoption and the development of ECBC-R (for residential buildings) in several states, expanding coverage to housing projects. By enforcing efficient HVAC design and operation practices, ECBC aims to lower long-term operating costs and greenhouse gas emissions from buildings. Compliance with ECBC is increasingly referenced in green building and infrastructure contracts, making it a central regulatory influence on HVAC system specification.

➤ **Bureau of Energy Efficiency (BEE) Star Labeling & MEPS**

The BEE Star Label program grades appliances including air conditioners based on energy efficiency (1- 5 stars), helping consumers distinguish high-performance products. The Minimum Energy Performance Standards (MEPS) embedded in this program ensure that products below a defined efficiency baseline cannot receive star ratings, thereby pushing manufacturers to improve designs. Recent regulatory updates are tightening MEPS for room ACs, with revised **Indian Seasonal Energy Efficiency Ratio (ISEER)** thresholds coming into effect in 2026- 27, aiming to align Indian AC efficiency with global best practices. These stricter standards are projected to lower peak electricity demand, reduce emissions, and save consumers and the grid substantial costs over the coming decade. The program's evolution continues to push HVAC manufacturers to innovate toward higher efficiency and integrate smart features.

➤ **Eco Niwas Samhita & Residential Energy Codes**

Eco Niwas Samhita is India's building energy code for residential projects, designed to complement ECBC by setting performance criteria for the building envelope and, increasingly, residential HVAC systems. **First introduced in 2018**, it emphasizes thermal comfort through optimized insulation, shading, and ventilation to reduce excessive cooling loads. Its expansion into Part-2 (focused on electro-mechanical systems including HVAC) aims to establish energy efficiency benchmarks for residential HVAC installations, promoting reduced energy consumption and better indoor environmental quality. Integration of these standards into municipal building bylaws helps enforce compliance at the local level. Over time, this code will exert growing influence on residential HVAC specifications and installation practices.

➤ **Building Star Rating & NZEB/NPEB Labels**

India's Star Rating Programme for buildings assesses energy performance on a 1- 5 scale based on actual energy consumption per square metre, encouraging high-performance HVAC and building systems in commercial and public buildings. Alongside this, the **Shunya Labeling Programme identifies Net Zero Energy Buildings (NZEB)** and **Net Positive Energy Buildings (NPEB)**, which achieve exceptional energy performance goals. These voluntary but prestigious labels incentivize property developers and owners to integrate advanced HVAC systems with renewable energy, smart controls, and efficient design strategies. Rated buildings often gain market recognition and can benefit from policy incentives or rebates, driving broader adoption of energy-efficient HVAC practices.

➤ **Bureau of Indian Standards (BIS) HVAC Equipment Certification**

The Bureau of Indian Standards (BIS) mandates quality, safety, and performance standards for various HVAC and related equipment through Indian Standards (IS). For example, IS 1391 outlines specification and compliance requirements for unitary air conditioners sold or imported into India, ensuring minimum performance and quality benchmarks are met. BIS certification (ISI mark) is compulsory in many cases and helps eliminate substandard products from the market, raising overall HVAC system reliability. Such standardization enhances consumer trust, reduces product failures, and supports long-term energy efficiency goals. Manufacturers must secure BIS certification to legally market HVAC products, impacting design, supply chain, and production planning.

➤ **Proposed Minimum AC Temperature Regulation**

To combat escalating electricity demand and peak load stress from widespread air conditioner use, the Government of India has proposed mandating a minimum thermostat setting of 20 °C for ACs sold in the country. This regulatory idea aims to shy buyers away from lower, highly-energy-intensive cooling settings, saving energy and reducing grid stress during hot seasons. While the proposal has generated debate, its intent aligns with broader national energy efficiency and climate goals, reinforcing the regulatory environment that influences HVAC system settings and user behaviour. If implemented, it could significantly shape product design and consumer usage norms.

Emerging Trends & Developments

Proliferation of digital technologies & its impact on HVAC landscape

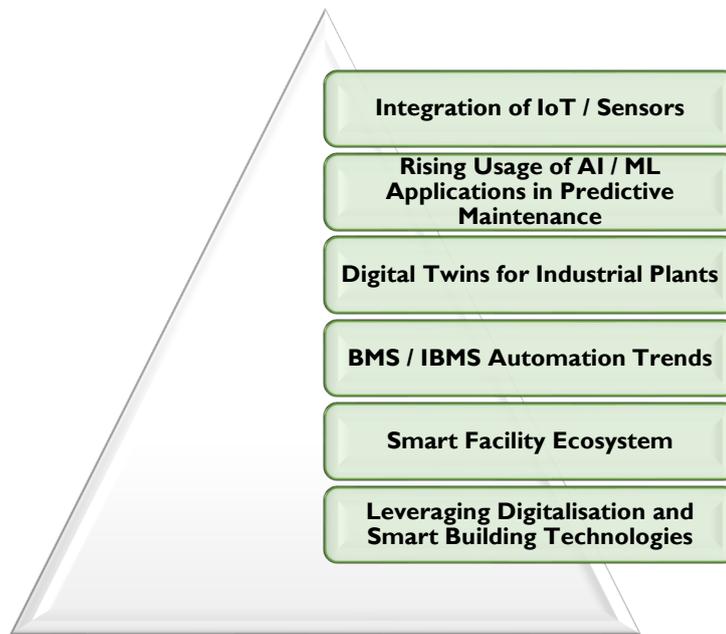
The HVAC industry is rapidly transforming from traditional mechanical systems to intelligent, digitally enabled ecosystems, driven by the integration of IoT, cloud platforms, sensors, and analytics. Connected HVAC systems equipped with real-time monitoring and automated control capabilities allow facility managers to dynamically adjust system operations in response to actual building use, ambient conditions, and occupancy patterns. Research shows that connected and automated control strategies can reduce cooling and heating loads by **7-10% and 6-8% respectively**, illustrating that digitalization directly contributes to reduced energy demand and operational costs in buildings.

Digital tools such as Building Information Modeling (BIM), simulation platforms, and digital commissioning suites further enhance design accuracy, coordination between trades, and compliance with energy codes (e.g., ECBC). These tools reduce errors and rework while enabling stakeholders to optimize HVAC layout and control strategies before installation begins. Studies also highlight that smart management technologies in buildings can cut overall energy use across HVAC and other systems by as much as **10% through digital building controls alone**, reinforcing the role of digital solutions in broader energy and sustainability goals.

Ultimately, the proliferation of digital technologies is catalysing a shift from reactive, manual maintenance models toward proactive, data-driven HVAC management. With continuous data flows from sensors and analytics, systems are increasingly capable of self-optimization, predictive functions, and integration with broader building controls enhancing comfort, reducing costs, and supporting climate and energy efficiency targets at both building and portfolio levels.

Impact on the HVAC Landscape

- Enables real-time monitoring and remote management of HVAC systems across facilities.
- Improves energy efficiency through data-driven optimization and automated controls.
- Reduces downtime and maintenance costs via predictive and condition-based maintenance.
- Enhances system design accuracy and project execution efficiency using digital tools.
- Supports integration with BMS/IBMS and smart building platforms.
- Drives a shift toward performance-based service and lifecycle-focused HVAC models.



- **Integration of IoT / Sensors:** The integration of IoT sensors into HVAC systems is enabling continuous, real-time data collection on indoor parameters such as temperature, humidity, air quality, and occupancy, making operational systems more responsive and efficient. Studies show that occupancy-informed HVAC control using sensors can **yield 8.1-10.8% savings in cooling energy by aligning system activity with actual use patterns**. These connected sensors also facilitate automated control adjustments, support remote diagnostics, and enhance system responsiveness resulting in optimized energy use and improved occupant comfort.

Its Impacts:

- Improves energy efficiency by optimizing HVAC operation based on real-time occupancy and load conditions.
 - Enables predictive maintenance through early fault detection and equipment health monitoring.
 - Enhances occupant comfort by maintaining consistent indoor environmental conditions.
 - Reduces operational and maintenance costs by minimizing downtime and manual inspections.
 - Supports centralized monitoring and control across multiple buildings or facilities. Strengthens compliance with energy efficiency and indoor air quality regulations.
- **Rising Usage of AI / ML Applications in Predictive Maintenance:** Artificial Intelligence and Machine Learning are being leveraged to enable **predictive maintenance** and **intelligent system control** in HVAC systems. Research indicates AI-driven control strategies can reduce HVAC energy consumption by up to 30- 40% in optimized environments compared to conventional control methods. Predictive capabilities allow early detection of system anomalies and forecast maintenance needs, reducing unplanned failures, extending equipment life, and decreasing reliance on reactive servicing.

- **Digital Twins for Industrial Plants:** Digital twin technology virtual replicas of physical HVAC systems that reflect real-time operational behavior provides valuable insights that improve system efficiency and reliability. Case studies in smart building management report that digital twin integration can result in measurable energy savings, with one example showing around 17% reduction in energy use when monitoring and control are optimized through digital twin systems. These platforms enable scenario testing, performance optimization, and advanced diagnostics without affecting live operations, making them particularly useful for large industrial facilities with complex HVAC demands.

- **Digitalisation, Smart Building Technologies and BMS/IBMS Automation trends driving structural shift in HVAC and electro-mechanical services industry:** The HVAC and electro-mechanical services industry is undergoing a structural shift from standalone mechanical systems to digitally enabled, integrated smart building infrastructure, driven by the adoption of IoT sensors, cloud connectivity, BMS/IBMS platforms, automation, and predictive analytics. Modern HVAC systems are increasingly designed for real-time monitoring, automated control, and data-driven optimisation, allowing facility managers to align performance with actual occupancy, ambient conditions, and usage patterns. This is materially improving energy efficiency, system reliability, and lifecycle performance, with connected control strategies shown to reduce cooling loads by 7–10% and heating loads by 6–8%, while digital controls alone can lower overall building energy consumption by up to 10%.
Digital tools such as Building Information Modeling (BIM), simulation platforms, and digital commissioning suites further enhance design accuracy, coordination between trades, and compliance with energy codes (e.g., ECBC). These tools reduce errors and rework while enabling stakeholders to optimize HVAC layout and control strategies before installation begins. Studies also highlight that smart management technologies in buildings can cut overall energy use across HVAC and other systems by as much as 10% through digital building controls alone, reinforcing the role of digital solutions in broader energy and sustainability goals. Importantly, when HVAC is integrated with adjacent building subsystems such as lighting through AI- and IoT-based controls, energy savings can reach 20–25%, highlighting that the industry’s next phase of value creation lies not just in equipment efficiency, but in delivering integrated, intelligent, and sustainability-led building solutions. In parallel, digital tools such as BIM, simulation platforms, and digital commissioning suites are enhancing design accuracy, reducing rework, improving trade coordination, and supporting compliance with energy codes, thereby extending the benefits of digitalisation from project execution to long-term building operations.

Key Threats & Challenges

Brief analysis of the key threats & challenges in HVAC EPC segment in India

The HVAC EPC segment in India faces multiple challenges, including shortages of skilled manpower, rapid technological changes, and rising expectations for energy-efficient and smart systems. EPC players must continuously upgrade capabilities while managing complex regulatory and certification requirements. At the same time, volatility in input costs and supply-chain disruptions puts pressure on project margins and timelines. Together, these factors increase execution risk and demand stronger workforce, technology, and cost-management strategies.



➤ **Challenges in Finding the Right Skill Set / Workforce**

One of the major challenges for HVAC EPC players in India is the shortage of adequately trained and certified technicians, engineers, and project managers. The industry demands specialized skills in system design, controls, commissioning, and energy efficiency, but formal training infrastructure and vocational programs remain limited. As a result, companies often rely on on-the-job training, which lengthens project timelines and can compromise quality. These skills gap also increases dependency on expatriate experts for complex jobs, raising labor costs. Addressing this issue requires stronger industry-academia collaboration and standardized certification pathways.

➤ **Evolving Technology and the Constant Need to Upgrade**

Rapid advancements in HVAC technologies such as IoT-enabled controls, AI-driven optimization, and high-efficiency equipment force EPC players to continuously upgrade their technical capabilities. Staying abreast of emerging systems demands recurring investment in training, tools, and software, which can strain smaller firms. Customers increasingly expect smart, energy-efficient, and integrated solutions, raising the bar for technical competence. Failure to adapt swiftly risks losing market share to more innovative competitors. Balancing innovation with cost-effective deployment remains a persistent challenge.

➤ **Input Cost Volatility**

HVAC projects are highly sensitive to fluctuations in raw material and equipment costs, including steel, refrigerants, electronics, and specialty components. Price volatility driven by global supply-chain disruptions, currency swings, and raw material shortages can erode project margins and complicate bidding accuracy. Long procurement cycles expose EPC contractors to risk if costs rise between contract signing and delivery. Hedging strategies and strategic supplier partnerships help but add financial complexity. Unanticipated cost escalations also affect pricing competitiveness and client trust.

➤ **Supply Chain Constraints and Lead-Time Risks**

Long lead times for critical HVAC equipment especially imported chillers, VRF systems, and advanced controls can delay project schedules. Dependence on a limited set of OEM vendors exacerbates risks during global logistics disruptions, port congestions, or geopolitical tensions. Delayed deliveries have cascading effects across construction activities, commissioning, and handover milestones. Finding alternative suppliers without compromising on quality adds complexity. Robust inventory planning and diversified sourcing strategies are essential but increase planning overhead.

➤ **Price-Sensitive Market and Competitive Pricing Pressures**

In India's largely price-sensitive construction market, clients often prioritize upfront cost over lifecycle value, putting pressure on EPC players to offer highly competitive bids. This can compress margins and limit the ability to invest in quality equipment, training, or innovation. Cost-driven choices by clients may lead to under-specification of systems that struggle to meet performance and efficiency expectations. Balancing cost control with optimal design and quality execution remains a persistent challenge in securing sustainable business growth.

Competitive Landscape

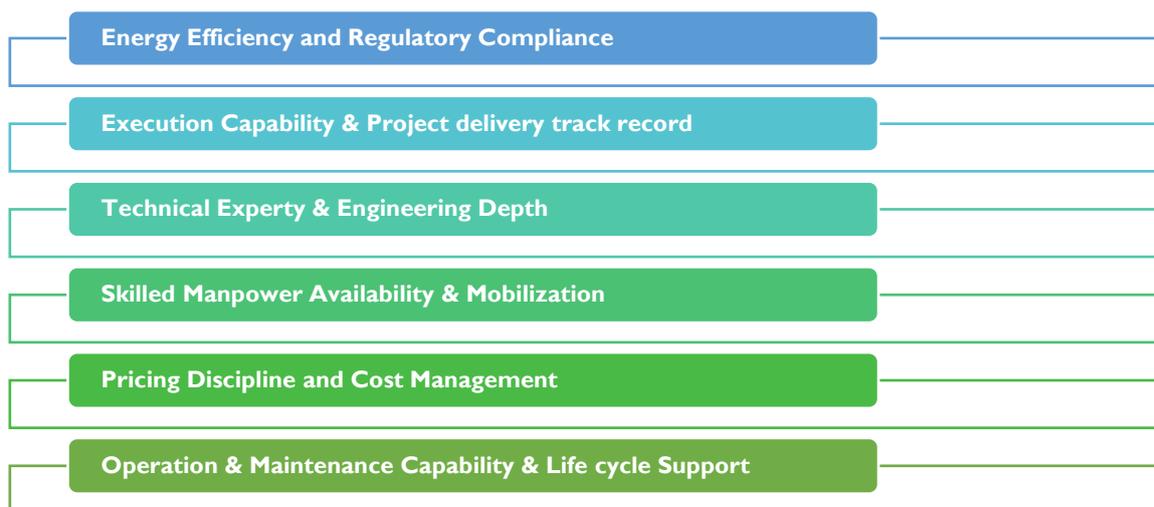
Ravita Engineering Services Ltd. operates in the specialized HVAC, MEP, and electro-mechanical engineering services space, focusing on end-to-end project execution, installation, commissioning, and operations & maintenance (O&M) across industrial, commercial, and infrastructure facilities. While the broader market includes multiple regional and national service providers offering HVAC, air-conditioning, refrigeration, and allied engineering services, there is no direct “apple-to-apple” peer that matches Ravita’s integrated execution and service model. This unique positioning allows Ravita to address complex engineering requirements, custom solutions, and lifecycle service contracts in a way that few others can.

The competitive environment is generally fragmented and relationship-driven, with contracts awarded based on prior execution experience, technical compliance, safety performance, and the ability to mobilize skilled manpower within tight project timelines. While some mid-sized service providers undertake project-specific HVAC and electro-mechanical works, and larger players focus on integrated system solutions, Ravita’s approach spans all stages of execution and post-installation maintenance. As a result, its competitiveness is defined less by price or product ownership and more by execution reliability, safety compliance, and the ability to deliver multi-site projects seamlessly.

In addition to execution-led contractors, engineering and design consultancy firms influence competitive dynamics indirectly. These MEP and project management consultants help define system specifications, shortlist vendors, and shape contractor selection, impacting how service providers like Ravita engage with clients. Though these consultants are not direct competitors, effective collaboration with them is critical to align execution with design requirements, ensuring successful project outcomes.

Overall, Ravita differentiates itself in a moderately to highly competitive market through its ability to offer integrated services, from installation and commissioning to O&M support, while maintaining high execution standards. The company’s strength lies in delivering reliable, safety-compliant, and technically robust solutions that foster long-term client relationships, making it a distinct and well-positioned player in a market where no direct peers provide a fully comparable service offering.

Analysis of key factors shaping competition in the sector



- **Energy Efficiency and Regulatory Compliance:**

Energy efficiency regulations such as BEE Star Ratings, ECBC, and Eco Niwas Samhita are increasingly shaping demand for HVAC services, including system design, installation, retrofitting, and maintenance. Service providers with strong capabilities in energy audits, compliance advisory, commissioning, and optimisation of HVAC systems gain a competitive edge across residential, commercial, and institutional projects. As regulations evolve, ongoing requirements for system upgrades, performance monitoring, and compliance certification are driving recurring service demand. Service players that proactively align with national energy policies and offer end-to-end compliance support are better positioned to secure long-term contracts, large institutional clients, and government-backed projects.

- **Execution Capability & Project Delivery Track Record:**

The ability to deliver HVAC and electro-mechanical projects within defined timelines, technical specifications and cost parameters remains the most critical competitive factor. Proven execution credentials in similar project environments significantly influence contractor selection.

- **Technical Expertise & Engineering Depth:**

In-house engineering capabilities, including system integration, design validation and on-site problem resolution, play a key role in differentiating service providers, particularly in projects involving customised or mission-critical requirements.

- **Skilled Manpower Availability & Mobilisation:**

As the sector is manpower-intensive, competition is shaped by the ability to deploy trained engineers, supervisors and technicians across multiple sites, while maintaining safety and quality standards.

- **Pricing Discipline & Cost Management:**

Competitive pricing is influenced by efficient labour management, subcontracting strategies and working capital discipline. Service providers with strong cost controls are better positioned to remain competitive without compromising execution quality.

- **Operations & Maintenance (O&M) Capability & Lifecycle Support:**

The ability to offer post-installation O&M services and long-term maintenance contracts has become an increasingly important competitive factor, supporting client retention and recurring revenue generation.

Analysis of entry barriers / other factors



Company Profile: Ravita Engineering Services Limited

Overview:

Ravita Engineering Services Limited, incorporated on 28th December 2007, is engaged in providing turnkey electro-mechanical engineering services for industrial, offshore, and data center environments. The Company undertakes design, engineering, procurement, installation, commissioning, and operations and maintenance (O&M) activities for HVAC, mechanical, electrical, and cooling systems.

The Company operates across three primary business segments, namely onshore, offshore, and data centre engineering. Its onshore operations cater to industrial plants, commercial buildings, and utility infrastructure, while offshore operations involve HVAC and mechanical systems for offshore oil and gas platforms and marine assets. In the data centre segment, the company provides precision cooling systems, including CRAH/CRAC units, chillers, and cooling towers, supporting continuous operations.

The company's service portfolio includes turnkey electro-mechanical project execution, HVAC services, automation and control solutions, operations and maintenance services, and integrated facility management. The company serves multiple end-use industries, including refinery, oil and gas, mining, defence, data centres, and marine. It operates with a workforce of over 350 personnel and follows a business model that includes project execution along with long-term O&M contracts.

The company's operations are organised into the following business segments:

- **Onshore Segment:** The onshore segment includes execution of electro-mechanical and HVAC-related works for industrial plants, commercial buildings, and utility infrastructure. The scope of services includes installation of HVAC systems, chillers, and compressors, along with mechanical and electrical installations across industrial and commercial facilities.
- **Offshore Segment:** The offshore segment involves provision of HVAC and mechanical systems for offshore oil and gas platforms and marine assets. The Company undertakes engineering and installation activities in environments that require adherence to safety and operational standards associated with offshore operations.
- **Data Centre Segment:** The data centre segment focuses on precision cooling and related infrastructure for data centre facilities. The scope includes installation of CRAH/CRAC systems, chillers, and cooling towers to support operational requirements of data centre environments.

Products and Services Offered:

Service Category	Key Components / Offerings
Turnkey Electro-Mechanical Projects	<ul style="list-style-type: none"> ▪ Heavy structural fabrication and piping (SS, MS, copper) ▪ Industrial piping networks (water, oil, gas) ▪ HVAC ducting and ventilation systems ▪ Installation of turbines, generators, rotary equipment ▪ Fire protection and suppression systems ▪ High and low voltage electrical panels
HVAC Services	<ul style="list-style-type: none"> ▪ Installation of chillers, cooling towers and VRV systems ▪ Operation and maintenance of HVAC equipment ▪ Centrifugal and screw chillers ▪ STP, ETP and WTP systems ▪ Air and water-cooled chillers and refrigeration system. ▪ District cooling systems
Automation & Control Solutions	<ul style="list-style-type: none"> ▪ SCADA and PLC-based control systems ▪ Automation of HVAC, firefighting and security systems ▪ Troubleshooting, repairs and predictive maintenance
Operations & Maintenance (O&M) Services	<ul style="list-style-type: none"> ▪ Marine engine and auxiliary equipment maintenance ▪ Diesel generator and turbine maintenance ▪ Boilers, compressors, pumps and HVAC systems maintenance ▪ Electrical systems (HT/LT panels, transformers, switchgear) ▪ Compliance with regulatory and energy audit requirements
Integrated Facility Management (IFM)	<ul style="list-style-type: none"> ▪ 24/7 monitoring and maintenance ▪ Asset tracking and preventive maintenance ▪ Technical manpower deployment (engineers, electricians, HVAC technicians) ▪ Emergency response and disaster management

Key Customer Segments Served

- **Oil & Gas:** Provision of HVAC systems, mechanical systems, and related engineering services for offshore platforms and onshore facilities.
- **Mining:** Execution of electro-mechanical and HVAC-related works for mining operations.
- **Defence:** Provision of electro-mechanical and HVAC systems for defence-related infrastructure.
- **Data Centres:** Provision of precision cooling systems, including CRAH/CRAC units, chillers, and cooling towers.
- **Marine:** Provision of HVAC and mechanical systems for marine assets and offshore environments.
- **Industrial Plants:** Execution of electro-mechanical and HVAC-related works for industrial facilities.
- **Commercial Buildings:** Execution of HVAC systems, chillers, compressors, and related mechanical and electrical installations.

- **Utilities:** Execution of electro-mechanical and HVAC-related works for utility infrastructure.

Key Strength:

- Consistency in delivery aligned with client specifications and operational requirements across projects, supported by established execution processes and adherence to defined technical and quality parameters.
- Approach centred on long-term client engagement through project execution and service continuity, including participation in both project implementation and subsequent maintenance activities.
- Capability development through training, skill enhancement, and adoption of industry practices, enabling the workforce to support execution requirements across different project environments.
- Governance framework based on ethical conduct, transparency, and regulatory compliance, with adherence to applicable standards and operational protocols.
- Execution capability across the project lifecycle, including design, engineering, procurement, installation, and commissioning, covering electro-mechanical and HVAC systems across industrial, offshore, and data centre applications.

Major Project	Location	Key Activities Executed
Raw Water Intake Pipeline Repair – Sasan UMPP	Sasan	Underwater defect identification, laying of carbon steel pipeline (OD 1219 mm), welding, thickness gauging, NDT testing (DPT, UT, RT), coating as per AWWA standards
Metro Barricading Board Work	Reliance Metro	Supply of mild steel, fabrication of barricading boards, application of primer and paint, stencilling, installation at designated locations
Temporary Access Bridge – Versova Bandra Sea Link	MSRDC (Reliance–Astaldi JV)	Design and fabrication of steel deck, NDT testing, shot blasting, marine coating, piling works, concrete deck slab casting, installation of steel and concrete decks
Structure Fabrication – Dahej Nagothane Ethane Pipeline	Kalpataru Power Transmission Ltd.	Fabrication and erection of structures, roofing works, skid fabrication and installation, chequered plate replacement, testing and commissioning