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Role Of HVAC & Industrial Refrigeration in Shaping Resilient Ecosystem

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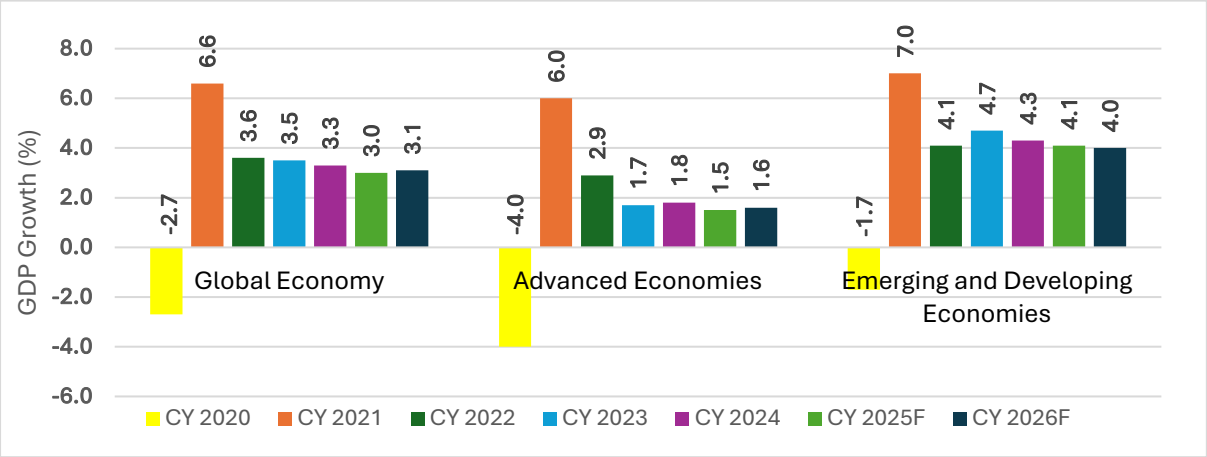
1. Global Macroeconomic Scenario

The global economy is expected to grow 3.0% in CY 2025, down from 3.3% in CY 2024, and rise slightly to 3.1% in CY 2026, reflecting trade tensions, policy uncertainties, and regional structural challenges. Headline inflation is projected to ease to 4.2% in CY 2025 and 3.6% in CY 2026, supported by tighter monetary policies, improving labour markets, and easing supply disruptions. Global trade growth is set to moderate to 2.6% in CY 2025 and 1.9% in CY 2026, amid trade barriers and geopolitical instability.



F – Forecast, Source – IMF World Economic Outlook July 2025

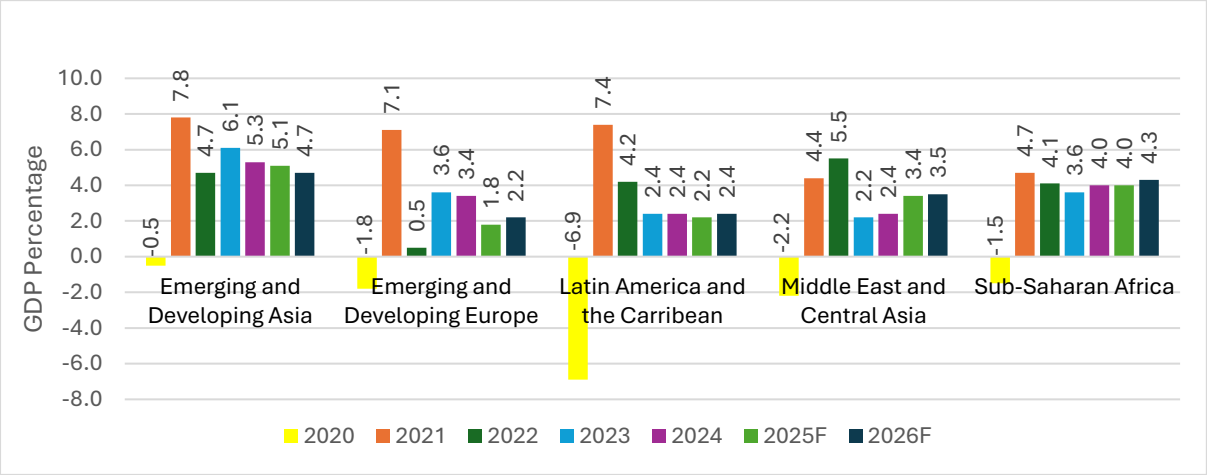
Advanced Economies are projected to slow, with GDP growth at 1.5% in CY 2025 and 1.6% in CY 2026. The U.S. is expected to expand by 1.9% in CY 2025 and 2.0% in CY 2026, supported by resilient consumer spending despite fiscal and trade pressures. The Euro Area faces subdued growth at 1.0% in CY 2025, Japan's growth is forecast at 0.7% in CY 2025, reflecting weak domestic demand, while the U.K. is projected to grow at 1.2%.

Emerging Markets and Developing Economies are expected to maintain moderate expansion, with GDP growth of 4.1% in CY 2025 and 4.0% in CY 2026. China's growth is projected at 4.8% in CY 2025, slightly higher than previously expected, constrained by real estate sector weakness and soft consumer demand. India is projected to grow at 6.4% in CY 2025 and CY 2026, driven by robust rural consumption, infrastructure investment, favourable demographics, and digitalisation.

Global commodity prices remain volatile, with oil projected to decline 13.9% in CY 2025 (after a 1.8% drop in CY 2024) and recover moderately in CY 2026; non-fuel commodities are expected to rise 7.9% in CY 2025. Overall, the outlook shows slowing growth and easing inflation, with India emerging as a relative growth leader due to macroeconomic stability, favourable demographics, and investment-led expansion.

GDP Growth Across Major Regions

GDP growth across major global regions shows varied trends, with emerging economies outperforming advanced ones but facing uneven recovery paths.



Source-IMF World Economic Outlook July 2025 update.

In Emerging and Developing Asia, growth is projected to moderate from 5.3% in CY 2024 to 5.1% in CY 2025, before declining slightly to 4.7% in CY 2026. India is expected to grow at 6.4% in CY 2025, supported by resilient rural consumption and sustained infrastructure investment, while China's growth is likely to decelerate to 4.8%, amid real estate concerns and weak domestic demand.

Sub-Saharan Africa is projected to grow at 4.0% in CY 2025, maintaining the same pace as CY 2024, and is expected to accelerate slightly to 4.3% in CY 2026, supported by better weather conditions and improved supply chains.

In the Middle East and Central Asia, the economy is forecasted to expand at 3.4% in CY 2025, up from 2.4% in CY 2024, and further strengthen to 3.5% in CY 2026, driven by stabilization in oil production and ongoing economic reforms.

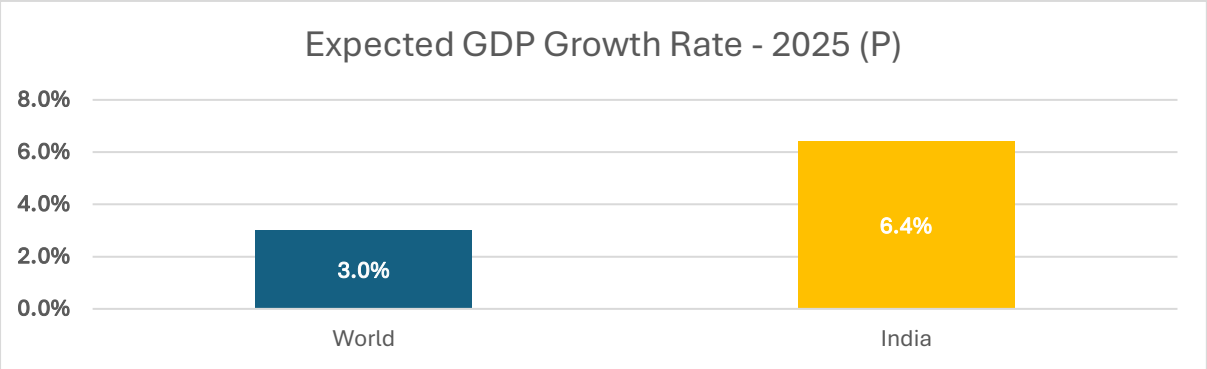
For Latin America and the Caribbean, modest growth of 2.2% is forecast for CY 2025, slightly below 2.4% in CY 2024, with expectations of a rebound to 2.4% in CY 2026, helped by stronger macroeconomic management across key economies.

Emerging and Developing Europe remains subdued, with growth estimated at 1.8% in CY 2025, down from 3.5% in CY 2024, expected to rise modestly to 2.2% in CY 2026. The region continues to face structural manufacturing challenges, particularly in major economies like Germany.

Overall, while global growth is expected to remain steady at 3.0% in CY 2025, regional disparities persist, influenced by a combination of domestic challenges, external geopolitical tensions, and fluctuating commodity prices.

2. India's Macroeconomic Scenario

2.1 Gross Domestic Product (GDP)



Note: P-Projection; Source: IMF – World Economic Outlook, July 2025

India's GDP is projected to grow 6.4% in CY 2025, more than twice the global rate of 3.0%, supported by strong domestic demand, structural reforms, and infrastructure investment. In FY24-25, India's GDP at constant prices is estimated at INR 187.97 lakh crore, growing 6.5% over FY23-24. Since FY2005, India's growth has consistently outpaced the global average. India became the fourth-largest economy in June 2025 and is projected to become the world's third-largest economy by 2030, with an estimated GDP of USD 7.3 trillion.

Source: PIB, Provisional Est. of GDP 2024-25 (May 30, 2025); Press Release-June 16, 2025

2.2 Gross Value Added (GVA)

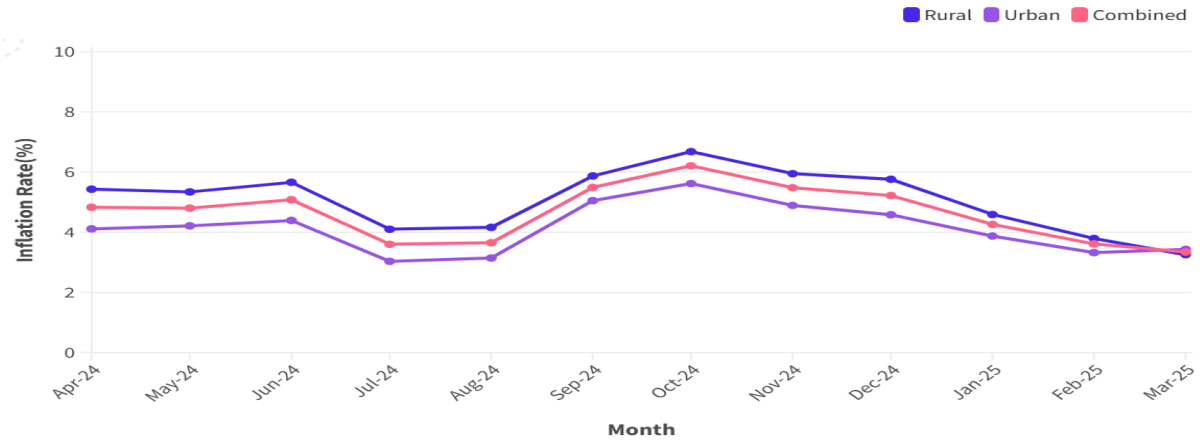
GVA is the measure of the value of goods and services produced in an economy. GVA gives a picture of the supply side whereas GDP represents consumption.

Sector-wise growth in GVA at constant (2011-12) prices (in %)	FY 2024 (FRE)	FY 2025 (PE)
Primary	2.7	4.4
Secondary	11.4	6.1
Tertiary	9.0	7.2

Source: PIB, Provisional estimates of GDP 2024-25 released on May 30th, 2025

In FY25, India's GVA growth was supported by stronger secondary and services sector performance, alongside a recovery in the primary sector. Sectoral growth at constant (2011-12) prices was: Primary 4.4% (FY24: 2.7%), aided by agriculture and allied activities; Secondary 6.1% (FY24: 11.4%), driven by manufacturing, construction, and utilities; and Tertiary 7.2% (FY24: 9.0%), led by trade, transport, finance, real estate, and professional services. Overall, FY25 GVA growth reflected a rebound in manufacturing and sustained services momentum.

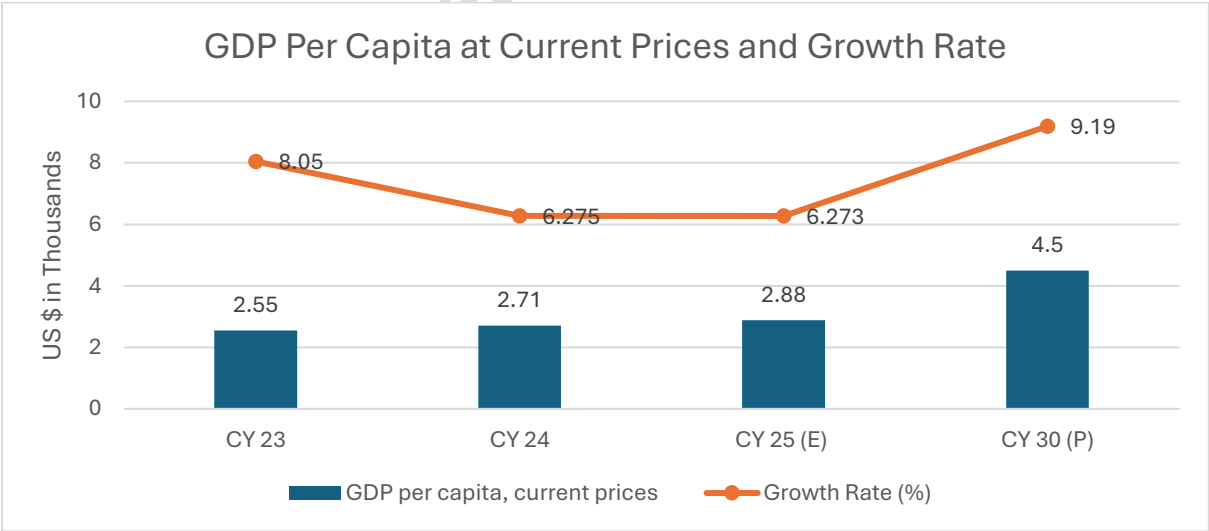
2.3 Consumer Price Index (CPI)



Source: - MOSPI, RBI - Annual Report-Inflation, Money and Credit Dated May 29th, 2025,

In FY25, India's CPI-based inflation averaged **4.6%**, the lowest since FY19, reflecting improved price stability post-COVID, with March 2025 recording **3.34%**, the lowest monthly rate since August 2019. This moderation was supported by the RBI's pro-growth monetary policy and government measures in food markets, including strategic releases from buffer stocks, which eased supply-side pressures. Looking ahead, CPI inflation for FY26 is projected around 4%, supported by recent repo rate cuts and an accommodative monetary stance, providing a favourable environment for economic growth.

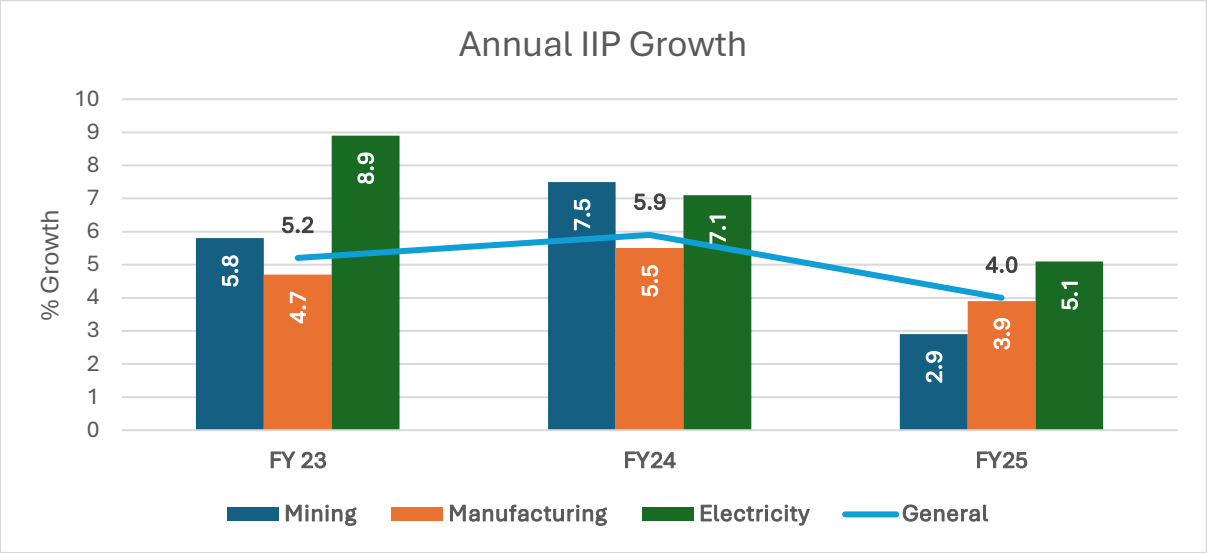
2.4 India Per Capita GDP Forecast



Note: E = Estimated, P = Projected Source: IMF Data Mapper, World Economic Outlook April 2025, India, GDP Per Capita

Per capita GDP growth for India is estimated at 9.19 % CAGR between CY2025-CY2030. Increased individual incomes are expected to create additional discretionary spending, which may be beneficial for the sector.

2.5 IIP Growth – Index of Industrial Production

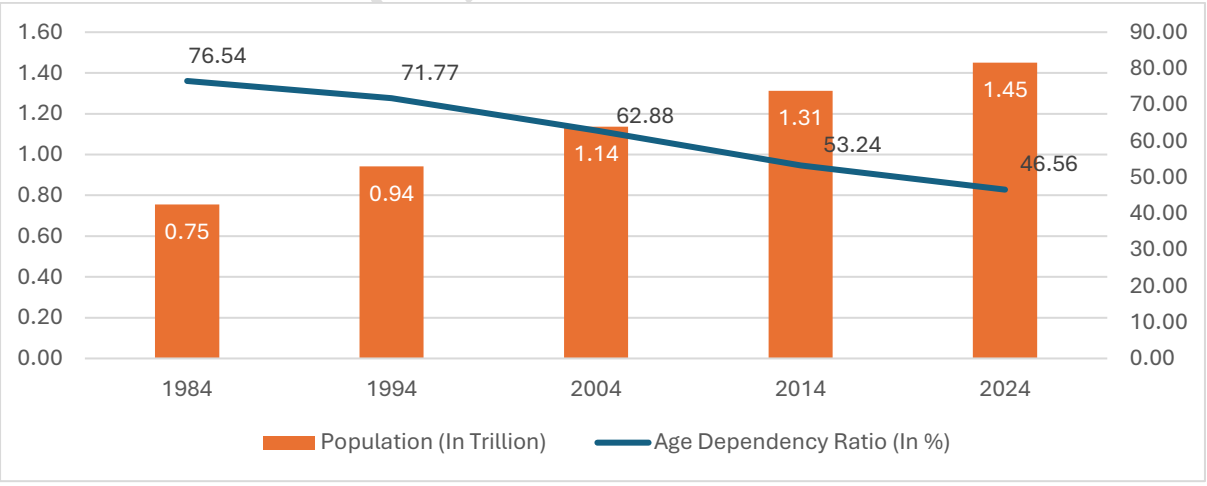


Source: Ministry of Statistics & Programme Implementation (MOSPI)

India's industrial sector, as measured by the IIP, grew 4.0% in FY25, down from 5.9% in FY24 and 5.2% in FY23, reflecting softer industrial momentum amid global headwinds and tighter financial conditions. Manufacturing (77.6% weight) expanded 3.9%, mining 2.9%, while electricity remained stable at 5.1%. The slowdown highlights moderating domestic demand and spillovers from a weaker global industrial cycle.

2.6 Overview on Key Demographic Parameters

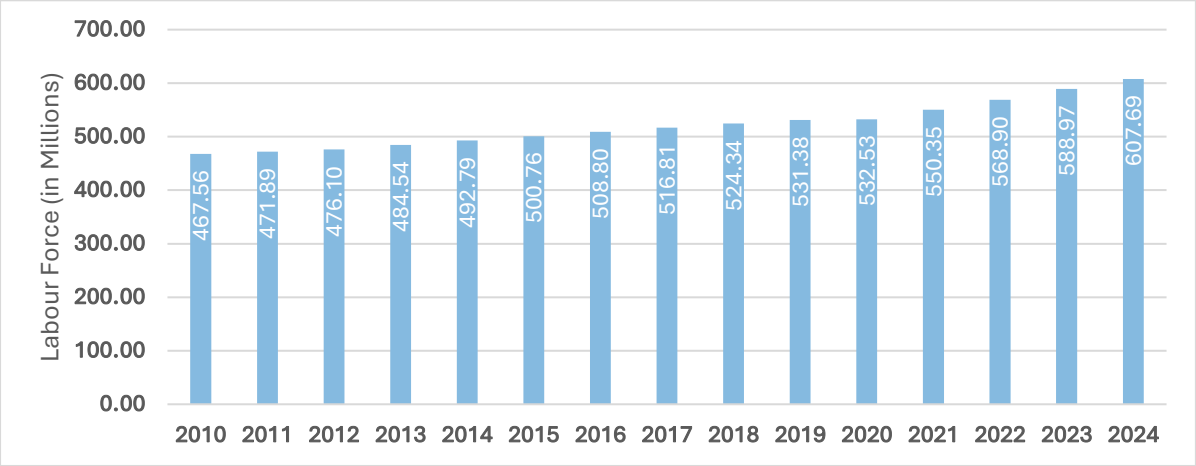
Population growth and Age Dependency



Source: World Bank Database, Infomerics Analytics & Research

India's population reached ~1.45 billion in 2024, making it the world's most populous country. The age dependency ratio declined from 76.5% in 1984 to 46.6% in 2024, reflecting a larger working-age population. This demographic trend provides a demographic dividend, supporting higher productivity, savings, investment, and long-term consumption growth.

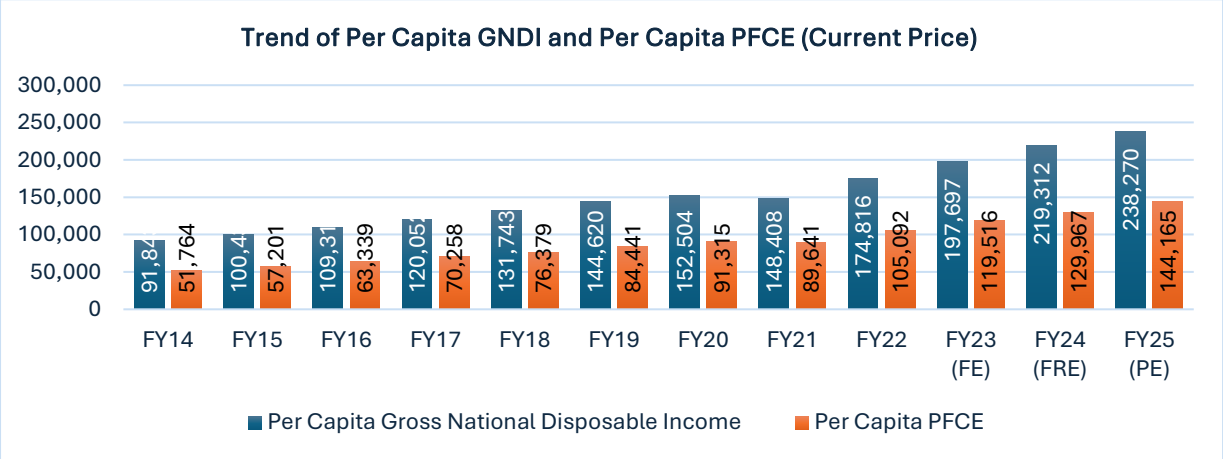
Labour Force in India



Source: World Bank Database, Infomerics Analytics & Research

India's labour force expanded from 467.56 million in 2010 to 607.69 million in 2024, registering a CAGR of 1.89%. This reflects the steady rise in the working-age population and the country's economic progress. The Labour Force Participation Rate (LFPR) stood at 45.1% in 2024, reflecting both opportunities and challenges in employment absorption.

Disposable Income and Consumer Spending



Note: Data in Rs. Crore, FE – Final Estimates, FRE – First Revised Estimates, PE – Provisional Estimate; Source: PIB, *Provisional estimates of GDP 2024-25 released on May 30th, 2025*

GNDI represents the total income available to a nation's residents for consumption and saving after accounting for income transfers with the rest of the world. In FY25, per capita GNDI grew 8.6% (FY24: 10.9%), indicating higher income available for consumption and savings. This supported growth in Private Final Consumption Expenditure (PFCE), which rose 10.9% in FY25 (FY24: 8.7%). These trends reflect strong consumer confidence and resilient domestic demand, reinforcing consumption as a key driver of India's economic expansion.

2.7 Union Budget FY25-26 Highlights

The Union Budget FY 2025–26, presented by Finance Minister Nirmala Sitharaman, focuses on stimulating growth, enhancing infrastructure, and fostering inclusive development across agriculture, MSMEs, innovation, and exports.

- **Capital Expenditure & Infrastructure:** ₹11.21 lakh crore (3.1% of GDP) allocated to infrastructure, including rural development, manufacturing, and skill-building. The Urban Challenge Fund (₹1 lakh crore) will finance 25% of bankable urban projects.
- **Support for MSMEs**: Credit Guarantee cover enhanced to ₹10 crore, unlocking ₹1.5 lakh crore over five years. A ₹10,000 crore Fund of Funds will provide equity support to startups and high-growth MSMEs in sectors like electronics and renewable energy.
- **Tax Reforms & Disposable Income:** Tax-free threshold raised to ₹12 lakh; reduced rates in the new regime aim to boost disposable income, savings, and investment.
- **Agriculture & Exports:** Increased agricultural credit and initiatives to improve productivity, alongside export facilitation through selective customs duty reductions.
- **Urban Development:** Allocation to the Ministry of Housing and Urban Affairs increased to ₹96,777 crore, supporting the Urban Challenge Fund, PM SVANidhi loans, Pradhan Mantri Awas Yojana, and Urban Rejuvenation Mission.

Overall, the budget combines short-term consumption support with long-term sustainability, fostering inclusive growth and creating opportunities for financial sector expansion.

2.8 Concluding Remarks about Macroeconomic Scenario

Global growth faces challenges from geopolitical tensions, commodity volatility, high interest rates, inflation, financial market instability, and climate change. Despite this, India is well-positioned, with GDP projected at 6.4% in 2025, outperforming the global forecast of 3.0% (IMF). Strengths include robust domestic demand, government capital expenditure support, moderating inflation, growing technology investments, and improving business confidence. India's manufacturing potential is reinforced by government initiatives, a skilled workforce, and a dynamic startup ecosystem. High-frequency indicators—PMI, E-way bills, bank credit, toll and GST collections—remain positive. Public investment of ₹11.21 lakh crore in FY25, along with healthy rural demand, strong private investment intentions, and policy-driven infrastructure spending, underpin India's economic resilience and investment cycle.

3. Industry Definition and Scope – HVAC & Industrial Refrigeration Equipment Manufacturing

HVAC and industrial refrigeration have evolved from utility support systems into strategic enablers of food security, pharma integrity, chemical processing, and retail logistics. The industry now spans energy-efficient compressors, advanced controls, natural refrigerants, safety compliance, and sustainability-focused retrofits, positioning refrigeration as central to reducing food loss, ensuring product quality, and advancing ESG goals.

In India, the sector is being reshaped by demand for organized food processing, cold-chain infrastructure programs, pharma compliance, and the Kigali-driven refrigerant phase-down. Customers increasingly expect integrated, digital, and energy-efficient solutions with lifecycle service support.

Emerging Indian manufacturers and system integrators are filling the gap between fragmented local players and global OEMs, offering turnkey ammonia/CO_2/HFO systems, cold rooms, blast freezers, and process cooling equipment. Their hybrid manufacturing–EPC models cater to dairy, seafood, QSR, chemicals, and pharma, expanding into Tier II/III hubs and export clusters where reliability, compliance, and cost efficiency are critical.

Differentiators include institutional client retention, sector-specific customization, and consistent performance across sites. To scale further, these firms must deepen digital monitoring, workforce skilling in natural refrigerants, ESG-led safety and leakage control, and global brand positioning.

Within this framework, chillers play a distinct role in high-efficiency process cooling and comfort applications across concrete, plastics, F&B, and utilities—where energy performance, lifecycle reliability, and sector adaptability define competitiveness. Integrated, tech-enabled, and compliance-oriented players are best placed to capture value from India's cold-chain formalization and global refrigerant transition.

4. Market Segmentation

The HVAC and industrial refrigeration sector is a critical enabler of food safety, pharma integrity, process efficiency, and energy optimization across supply chains. It encompasses refrigeration systems, HVAC solutions, smart controls, and sustainable refrigerant technologies, increasingly driven by digitization and ESG compliance.

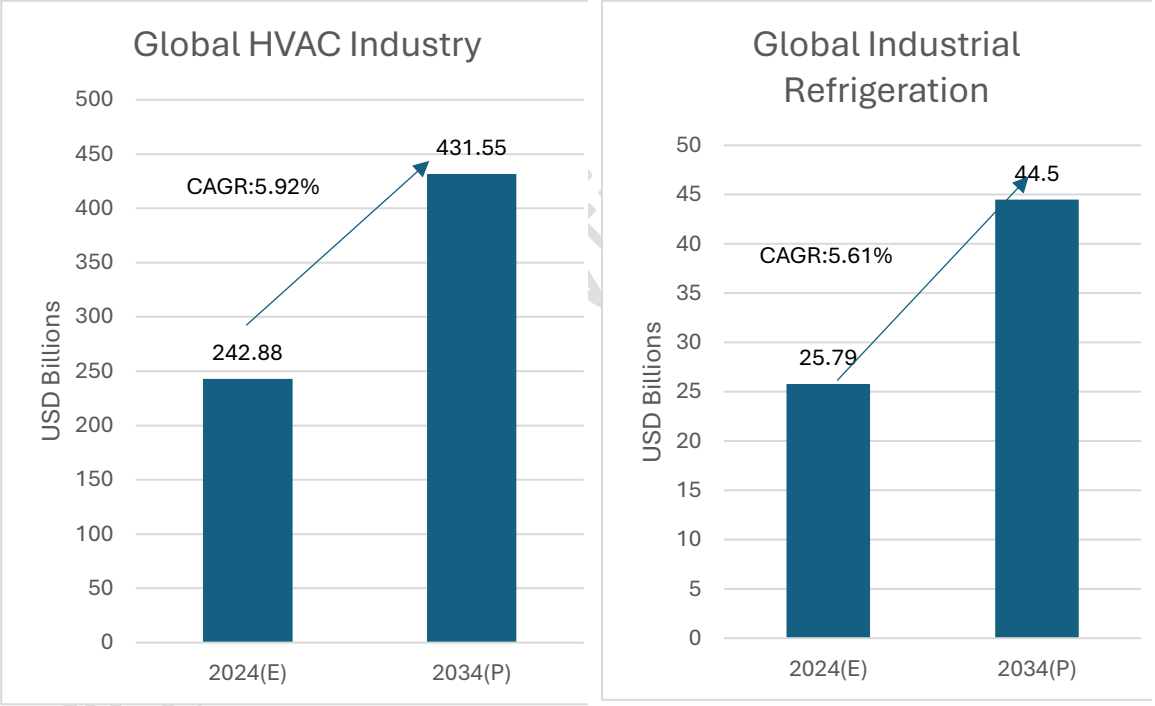
Category	Details
Equipment & Technology	Industrial refrigeration (ammonia/CO_2/HFO), blast freezers, cold rooms, modular units, process chillers; centralized HVAC (AHUs, chillers, VRF/VRV, rooftop units); IoT/PLC-enabled monitoring, predictive maintenance, and low-GWP retrofits.
End-Use Sectors	Food and Agriculture, Pharma and Healthcare, Industrial and Chemical (such as petrochemicals and breweries), Retail and Quick Service Restaurants (QSRs), Cold-Chain Logistics and Warehousing , and Commercial and Institutional Facilities, including airports, malls, and offices.
Delivery Models	OEM manufacturing & EPC, component supply, turnkey contracting with O&M, and aftermarket/service solutions including retrofits and energy optimization.
Emerging Trends & Value-Added Services	Digital/IoT-enabled refrigeration, AI predictive maintenance, blockchain cold-chain traceability, energy-efficient and green systems, ESG compliance audits, and cold-chain-as-a-service for SMEs and Agri clusters

The sector's growth is driven by regulatory compliance (Kigali Amendment), formalization of cold chains, digital adoption, and the push toward sustainable, energy-efficient, end-to-end solutions

5. Global and Indian Industry Outlook

5.1 Global HVAC and Industrial Refrigeration Industry

The Global HVAC Market was estimated at USD 242.88 billion in 2024 and is forecasted to expand to USD 431.55 billion by 2034, growing at a CAGR of 5.92%. Growth drivers include rapid urbanization, tightening energy-efficiency mandates, and climate-conscious infrastructure transitions, which are reshaping demand across commercial, industrial, and residential segments. The increasing outsourcing of HVAC operations through performance-linked service models is further reinforcing long-term industry momentum and capital deployment.



Source: Infomerics Analytics & Research; E-Estimated P-Projected

The Industrial Refrigeration estimated for USD 25.79 billion in 2024 and is projected to reach USD 44.50 billion by 2034, expanding at a CAGR of 5.61%. This subsegment is anchored by demand from food processing, pharmaceuticals, and temperature-controlled logistics, while adoption of digital monitoring, automation, and energy-efficient systems is further accelerating its role as a mission-critical enabler of supply-chain resilience.

5.2.1 Growth Drivers

The HVAC & industrial refrigeration sector is rapidly evolving toward digitally integrated, energy-efficient, and sustainability-aligned solutions. Key growth drivers include:

- **Technological Integration:** IoT, AI, cloud monitoring, and automation enhance efficiency, predictive maintenance, and traceability; blockchain/RFID strengthen cold-chain logistics.
- **Sustainability & ESG:** Kigali Amendment, F-gas phase-downs, and net-zero targets drive natural refrigerants and energy-efficient designs; green certifications and corporate ESG frameworks reinforce compliance and competitiveness.
- **Cold-Chain Expansion:** Rising demand for perishables, pharma, and biologics fuels investment in storage, distribution, and last-mile refrigeration, supported by e-commerce, vaccines, and government incentives.
- **Outsourcing & Service Models:** Lifecycle management via performance-based contracts and SLAs reduces total cost of ownership and transfers operational risk to specialized providers.

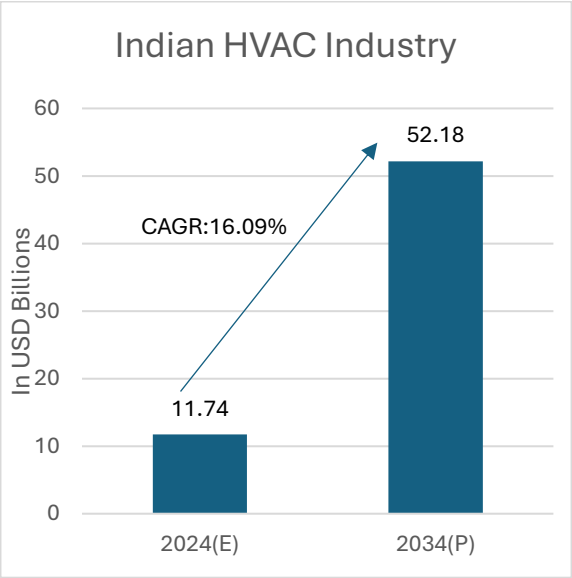
5.2.2 Regional Insights:

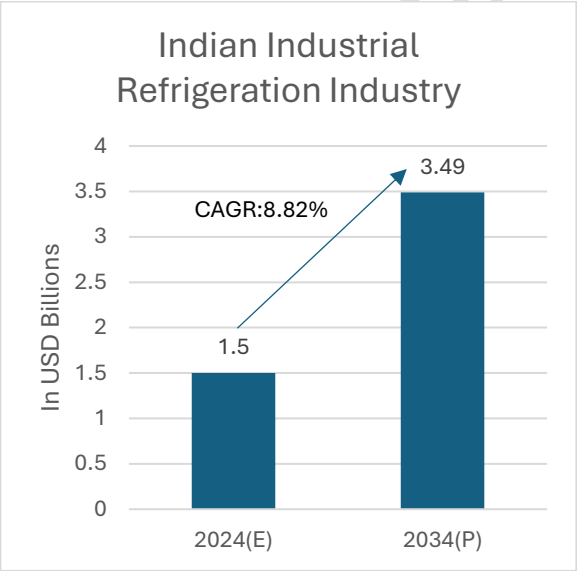
- **APAC:** Fastest growth; led by China and India; urbanization, food processing, e-commerce, and pharma drive demand.
- **North America:** Mature, tech-enabled cold chains; focus on efficiency, sustainable refrigerants, and IoT monitoring.
- **Europe:** Sustainability leader; strict F-gas rules, carbon neutrality targets, and digital retrofits.
- **MEA:** GCC infrastructure and high temperatures spur demand; governments prioritize food security.
- **Latin America:** Growth from agriculture exports and pharma cold chains; constrained by infrastructure gaps and high costs.

The sector is transitioning from equipment-centric models to integrated, digitally governed, and ESG-aligned solutions. Digitally mature OEMs and service providers are best positioned to capture global cold-chain opportunities and meet evolving sustainability and automation standards.

5.3 Indian HVAC & Industrial Refrigeration Industry

The Indian HVAC industry has evolved from a discretionary urban utility to a nationwide necessity, spanning residential, commercial, and industrial sectors. Valued at USD 11.74 billion in 2024, it is projected to reach USD 52.18 billion by 2034 (CAGR 16.09%), driven by urbanization, green building mandates, data centers, climate adaptation, and infrastructure projects including Smart Cities, metros, airports, and healthcare facilities. Energy-efficient, IoT-enabled, and performance-linked centralized HVAC systems are increasingly preferred, aligning with global climate-conscious standards.





Source: Infomerics Analytics & Research; E-Estimated , P-Projected.

The Indian industrial refrigeration market, estimated at USD 1.50 billion in 2024 and projected to reach USD 3.49 billion by 2034 (CAGR 8.82%), is becoming critical for food security, pharma integrity, and agribusiness competitiveness. Growth is fueled by cold-chain demand across food processing, dairy, horticulture, seafood, QSRs, and vaccine logistics. The sector is shifting from fragmented, standalone assets to integrated solutions spanning pre-cooling, refrigerated transport, pack-houses, distribution hubs, and last-mile storage. Digitally monitored, SLA-bound systems with predictive maintenance and green refrigeration technologies are replacing informal operators, institutionalizing India's cold-chain and aligning it with global standards.

5.3.1 Integrated Cold-Chain Platforms

India's HVAC & industrial refrigeration sector is shifting from fragmented operators to integrated, tech-enabled cold-chain platforms. Structured players now offer bundled services across refrigeration assets, cold storage, reefer transport, and energy optimization, driven by:

- Demand for single-point accountability in food, pharma, and e-commerce supply chains.
- Need for compliance-ready vendors (FSSAI, GDP, ESG).
- Reliance on IoT-driven predictive maintenance, temperature monitoring, and energy-efficient retrofits.

5.3.2 In-House vs. Outsourced Operations

Cold-chain models are divided between:

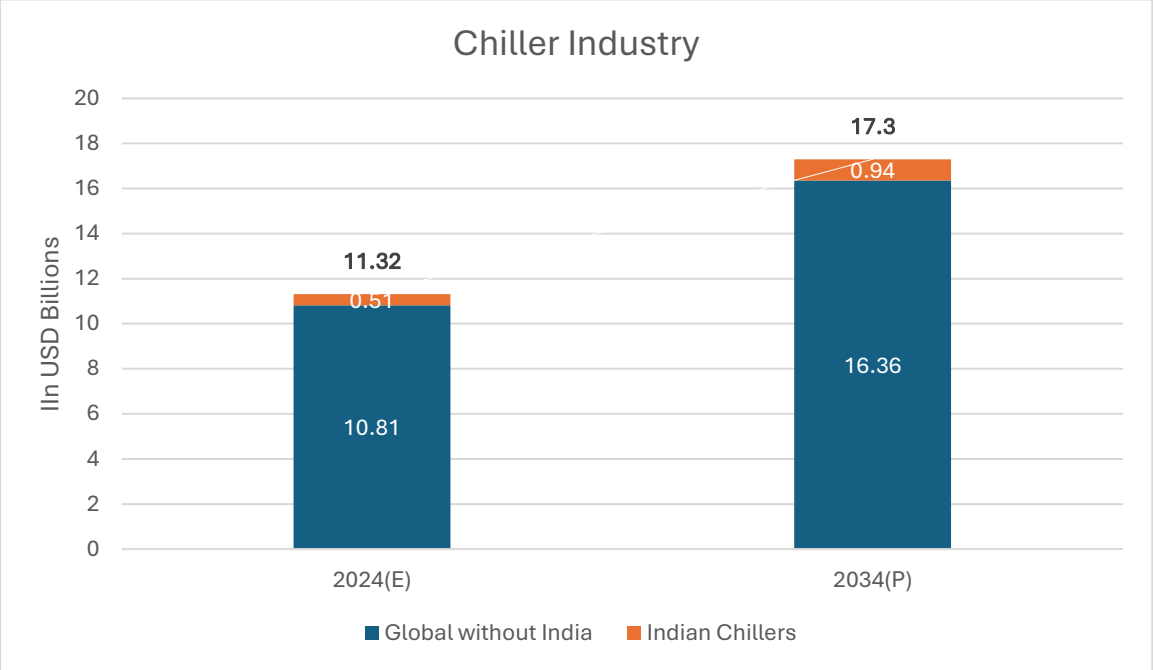
- **In-House:** Captive cold storage and distribution by large retailers, pharma, or exporters; offers control but is capex-intensive and less scalable.
- **Outsourced Integrated Services:** Third-party operators providing consolidated storage, transport, and energy management; favoured for:
    - Economies of scale and operational efficiency.
    - Expertise in regulatory compliance, temperature mapping, and audits.
    - Real-time monitoring via IoT dashboards, GPS tracking, and blockchain audit trails.
    - Flexibility to meet evolving ESG, food safety, and labor standards.

5.3.3 Cold-Chain as a Strategic Enabler

Cold-chain expansion supports India's service and manufacturing sectors, boosting export competitiveness and domestic consumption. Key drivers include processed foods, dairy, seafood, agri-exports, biopharma, vaccines, organized retail, e-grocery, and multimodal logistics. As services contribute over half of India's GVA, digitally governed, energy-efficient cold-chain platforms are central to enabling continuity, compliance, and cost efficiency for high-value perishables.

5.4. Chiller Market Landscape

The global chiller market was valued at USD 11.32 Billion in 2024 and is projected to reach USD 17.3 Billion by 2034 (CAGR 4.24%), with Asia-Pacific—led by China and India—driving growth. Demand is supported by industrialization, Smart City infrastructure, commercial real estate, and process industries such as plastics, chemicals, and F&B, as well as high-load applications like data centres and airports. Centrifugal, screw, and scroll chillers dominate, while natural refrigerant and magnetic-bearing chillers gain traction for sustainability and lifecycle efficiency.



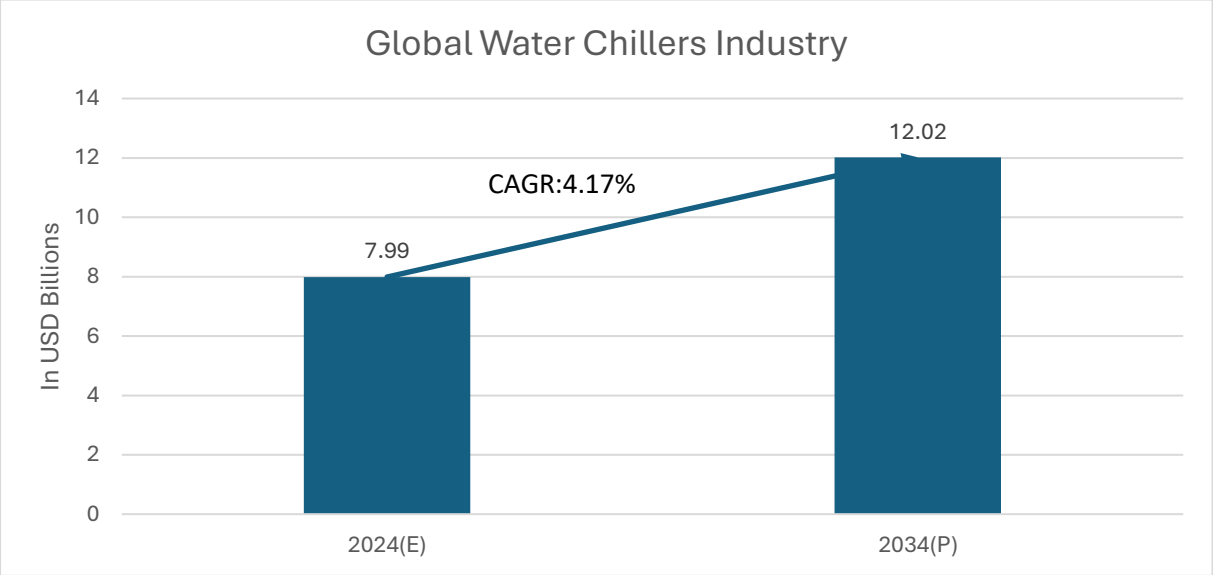
Source: Infomerics Analytics & Research

The Indian chiller market is estimated at USD 0.51 B in 2024, growing to USD 0.94 B by 2034 (CAGR 6.32%), outpacing global growth. Key segments include commercial real estate (IT parks, airports, hospitals, malls), industrial process cooling (plastics, chemicals, concrete, heavy manufacturing), and F&B (dairies, breweries, cold-chain facilities). Regulatory drivers such as BEE efficiency norms and Kigali-compliant refrigerant transitions, combined with policy catalysts like the Smart Cities Mission and industrial corridor development, are shaping the market.

Regional hotspots include Western India (Maharashtra, Gujarat) for plastics, chemicals, and pharma; Southern India (Tamil Nadu, Karnataka, Telangana) for IT/ITES, data centers, and automotive; and Northern India (Delhi NCR, Punjab, Haryana) for airports, healthcare, dairy, and cold-chain processing. Adoption of digitally enabled chillers, green refrigerants (HFOs, CO_2 blends), and lifecycle service contracts is accelerating, while Tier II/III cities are emerging growth nodes driven by organized retail, QSR expansion, and agro-processing clusters.

5.4.1 Water Chiller Market

The global water chiller market was estimated at USD 7.99 Billion in 2024 and is projected to reach USD 12.02 Billion by 2034 (CAGR 4.17%). Water chillers, circulating water or water/glycol, are preferred for high-capacity, centralized applications due to superior energy efficiency, load stability, lower noise, and extended lifespan. They are widely used in district cooling, data centres, pharmaceuticals, and large commercial real estate.



Source: Infomerics Analytics & Research

Types of Water Chillers:

- **Centrifugal:** Large-scale infrastructure (airports, metros, district cooling) for efficiency at scale.
- **Screw:** Industrial process cooling (plastics, chemicals, automotive, F&B) valued for robustness and partial load handling.
- **Scroll & Absorption:** Smaller-scale applications (healthcare, hospitality, commercial facilities) emphasizing footprint and maintenance simplicity.

Global demand is driven by energy-efficient designs, low-GWP refrigerants (HFOs, CO_2 blends), and IoT-enabled monitoring and predictive maintenance, aligning with ESG and lifecycle service models.

In India, water chillers are expected to outpace global growth due to hyperscale data centres, pharma and life sciences compliance upgrades, and F&B cold-chain expansion. Policy catalysts—including Smart Cities, BEE efficiency norms, and Kigali-compliant refrigerants—further support adoption, establishing water chillers as a structural growth segment within the broader chiller industry.

6. Market Dynamics

6.1 Key Growth Drivers

The industry is poised for robust expansion, driven by structural demand, regulatory tailwinds, and ESG-linked compliance. Growth is anchored in temperature-controlled logistics, organized retail, pharma/vaccine cold chains, and cross-sector industrial cooling.

1. **Food & Agri Cold-Chain Expansion:** Investments in warehousing, packhouses, and multi-temperature reefer fleets reduce 20–25% post-harvest losses. Tier I/II cold hubs consolidate farmer-to-market and processor-to-retailer supply lines, sustaining demand for industrial refrigeration systems.
2. **Pharma, Biotech & Vaccine Refrigeration:** COVID-19 permanently elevated vaccine and biologics distribution as national infrastructure. Ultra-low temperature freezers, validated storage, and GDP-compliant cold-chain systems are critical for biopharma expansion and export compliance.
3. **Government Programs & Incentives:** Schemes such as PMKSY, Mega Food Parks, PLI, and Gati Shakti support integrated cold-chain infrastructure, multimodal logistics, and temperature-controlled distribution hubs, stimulating long-term demand.
4. **Energy-Efficient & Low-GWP Refrigerants:** Kigali Amendment and India Cooling Action Plan drive adoption of natural refrigerants (ammonia, CO_2) and HFO blends. Operators increasingly deploy VFD-driven compressors, heat recovery, and energy-efficient systems, combining compliance with cost savings.
5. **Retail, QSR, E-Grocery & Export Demand:** Expansion of organized retail, cloud kitchens, and e-grocery platforms (Blinkit, Zepto, Amazon Fresh) fuels compact, modular cold-room and smart refrigeration adoption. Export hubs for seafood, fruits, dairy, and meat require temperature-compliant, traceable logistics, reinforcing cold-chain infrastructure.
6. **Digital Integration, ESG & Chillers as Strategic Nodes:** IoT monitoring, AI predictive maintenance, and centralized visibility enable SLA-bound operations. ESG-linked green warehouses and LEED compliance drive sustainability adoption. Chillers serve dual roles in comfort cooling and industrial processes, becoming core equipment for urban infrastructure, industrial growth, and regulatory compliance.

6.2 Threats & Challenges

The industry faces structural and operational bottlenecks that could limit scalability, efficiency, and profitability, particularly in India's fragmented Tier II/III cold-chain landscape.

1. **Inflation, Input Volatility & Regulatory Compliance:** Raw material (copper, aluminum, steel) and energy cost fluctuations, coupled with volatile refrigerant prices, increase operational expenses. Transitioning from high-GWP refrigerants to natural or low-GWP alternatives (Kigali Amendment) adds R&D, retrofitting, and certification costs. Compliance with food, pharma, and ESG standards (HACCP, GMP, FSSAI, LEED) further raises operational overheads.

2. **Talent & Workforce Constraints:** Scarcity of certified refrigeration engineers and service technicians, combined with reliance on subcontracted AMC personnel, constrains installation timelines, SLA compliance, and service reliability. Attrition and overseas migration exacerbate skill shortages, particularly in industrial, pharma, and QSR segments.

3. **Market Fragmentation & Pricing Pressure:** Unorganized players dominate small cold rooms, display chillers, and SME segments, competing aggressively on price without meeting efficiency, safety, or compliance standards. Limited awareness of lifecycle cost benefits in Tier II/III markets slows adoption of high-performance chillers, VRF systems, and integrated cold-chain solutions, compressing margins for organized OEMs.

4. **Technology & Integration Gaps:** Slow adoption of IoT-enabled monitoring, predictive maintenance, and AI-driven energy optimization restricts digital penetration. End-to-end coordination challenges between equipment, storage, transport, and logistics providers delay project execution. Chillers face additional risks from high capital intensity, global competition, compliance burdens, and potential technology displacement by low-GWP or renewable-integrated solutions.

7. Government Initiatives and Policy Support

India's policy environment is reinforcing modernization and institutionalization of the HVAC, Industrial Refrigeration, and chiller industry, driving demand for efficient, standardized, and sustainable solutions. Key initiatives include:

1. **Infrastructure & Cold-Chain Capital Expenditure:** Union Budget FY2025–26 allocates ₹11.21 lakh crore (~3.1% of GDP) to logistics parks, industrial corridors, healthcare, food processing clusters, and warehousing. PMKSY and Mega Food Parks provide 35–50% subsidies for cold-chain projects, while PM Gati Shakti and the National Logistics Policy support multi-modal logistics, last-mile refrigerated transport, and integrated storage hubs.

2. **Energy Efficiency, Refrigerant Transition & Renewable Integration:** NCAP, ECBC, BEE star labeling, and Kigali Amendment commitments drive adoption of low-GWP and natural refrigerants (ammonia, CO_2, HFO blends), inverter-driven compressors, solar-powered units, and high-efficiency chillers. FAME-II and state EV policies incentivize electric refrigerated vans, enabling low-emission last-mile logistics.

3. **Compliance & Sectoral Regulations:** Mandatory standards—FSSAI, HACCP, GMP, WHO-GDP—support validated cold-chain storage for food, pharma, and exports. Labour code reforms reinforce workplace safety in industrial refrigeration. Policy-driven replacement cycles and compliance mandates sustain recurring demand for advanced HVAC and chillers.

4. **Sector-Specific & Regional Growth Drivers**: PMMSY and allied schemes bolster fisheries and agri-processing cold storage. Rising services sector growth, e-commerce grocery, QSRs, and export competitiveness in perishables fuel demand for industrial chillers and modular refrigeration across Tier I–III cities. Key regional hotspots include Western India (plastics, chemicals, pharma), Southern India (IT, data centers, automotive), and Northern India (airports, healthcare, dairy).

India's policy framework simultaneously de-risks demand for organized OEMs, enables adoption of both mass-market SME-scale units and premium, compliance-ready systems, and raises entry barriers for unorganized players.

8. Technology & Digital Transformation

India's HVAC & Industrial Refrigeration sector is rapidly evolving, driven by rising energy costs, stricter environmental and food safety regulations, and demand for reliable temperature-controlled logistics. The industry is shifting from reactive, manual operations toward predictive, IoT-enabled, and sustainability-linked systems, particularly in industrial and commercial chillers. Key digital transformation drivers include:

1. **Digital Backbone & IoT Integration:** Building Management Systems (BMS), CAFM, and CMMS are increasingly deployed to map equipment lifecycle, schedule predictive maintenance, track chillers and compressors in real-time, and ensure temperature and energy audit compliance. Sensor-integrated IoT networks monitor temperature, humidity, IAQ, energy loads, and refrigerant leaks, enabling predictive alerts and SLA-bound operational integrity.

2. **Automation, Robotics & Mobile-First Operations:** Automated storage/retrieval systems, pallet-handling robots, drone-based thermal inspections, and airflow management optimize energy loads, ensure uniform temperature, and reduce human error. Mobile-enabled workflows allow geo-tagged service logs, digital compliance checklists, remote diagnostics, and QR/barcode tracking for spare parts, enhancing agility in pharma and food cold chains.

3. **Data Analytics, SLA Governance & ESG Capabilities:** Advanced analytics support real-time SLA monitoring, predictive maintenance, energy benchmarking, and AI-driven load optimization. ESG-linked digital tools—including smart meters, carbon tracking, and Montreal Protocol/LEED compliance dashboards—enable energy efficiency, emission reduction, and regulatory alignment, increasingly becoming differentiators for OEMs and service providers.

4. **Emerging Technologies & Next-Gen Innovation:** Digital twins for cooling load simulation, AR for technician training, blockchain for end-to-end cold-chain traceability, and edge computing for on-site autonomous control are gaining traction. Tier II/III city adoption is accelerating alongside industrial corridors, logistics hubs, and food processing clusters, positioning integrated digital solutions as central to long-term, compliance-ready, and high-value contracts across food, pharma, retail, and logistics ecosystems.

9. PESTLE Analysis of the Industry

A comprehensive PESTLE (Political, Economic, Social, Technological, Legal and Environmental) analysis helps evaluate the external macro-environmental factors influencing the Industry. These factors significantly shape industry dynamics, demand patterns, business models, and investment opportunities in the medium to long term.

Factor	Description	Impact on HVAC & Industrial Refrigeration Industry
Political	• ₹11.21 lakh crore infrastructure spend (FY2026) – logistics, industrial corridors, hospitals, warehousing. • PMKSY & Mega Food Parks: 35–50% cold-chain subsidies. • PM Gati Shakti & National Logistics Policy: multi-modal cold hubs, reefer corridors. • PMMSY: fisheries cold storage expansion. • India Cooling Action Plan aligns cooling with Kigali Amendment.	• Sustains structural demand in food, pharma, healthcare, logistics. • Subsidy-driven OEM opportunities (ripening chambers, blast freezers, reefer units). • Raises entry barriers favoring organized, policy-aligned players.
Economic	• Cold-chain CAGR ~14–15% (FY2025–30): food processing, pharma exports, e-grocery, QSRs. • High upfront investment & input inflation affect SMEs/OEM margins. • Formalization via GST, labour codes, subsidy-linked funding. • Rising disposable incomes boost frozen, packaged, premium foods.	• Expands demand across Tier II/III cities & export clusters. • Margins drive investment in energy-efficient designs. • Supports leasing, pay-per-use, PPP-driven models.
Social	• Post-COVID surge: food safety, pharma-grade storage, hygiene-compliant logistics. • Middle-class consumption: frozen foods, dairy, seafood, QSRs. • Urbanization & e-commerce increase last-mile cold transport. • FPOs/cooperatives seeking cold-chain access. • Rising ESG, traceability, safety awareness	• Boosts modular cold rooms, reefer trucks, small rural packhouses. • Strengthens recurring demand for IoT-enabled, compliance-ready equipment. • Builds premium market for branded OEMs.
Techno-logical	IoT & AI-enabled predictive maintenance, remote monitoring. • Low-GWP refrigerants (ammonia, CO_2, hydrocarbons) transition.	• Advanced R&D + energy-efficient compressors create compliance advantage. • IoT/automation adoption drives recurring aftermarket

	• EV-compatible refrigerated vans under FAME-II & state policies. • Solar/hybrid refrigeration in rural cold-chain. • Automation: ASRS & robotics in large cold storages.	revenue. • Green tech enables rural penetration & ESG differentiation.
Legal	• FSSAI, HACCP, GMP/WHO-GDP, ODS & HFC regulations. • Energy efficiency mandates: BEE, ECBC. •Labour code compliance. • Export compliance: EU/US FDA standards.	• Raises compliance costs, favours structured OEMs. • Fuels demand for high-spec, export-ready solutions. • Informal players lose share.
Environ-mental	• Kigali Amendment: 85% HFC phasedown by 2047. • MoEFCC energy audits, refrigerant disposal norms, and climate risk mitigation. • ESG reporting and green building ratings (LEED, IGBC) for warehouses/logistics hubs.	• Drives R&D toward natural refrigerants and circular cooling. • Expands market for solar-powered, energy-efficient systems. • Positions sustainable OEMs for preferential global/export access and institutional adoption.

Policy subsidies, food security initiatives, refrigerant transitions, and ESG mandates are formalizing India's HVAC & Industrial Refrigeration cold-chain ecosystem. OEMs with energy-efficient, natural refrigerant, IoT-integrated, and EV-compatible portfolios can capture Tier II/III mass-market growth and premium export-driven demand. With 2047 refrigerant commitments and logistics integration, the sector is shifting from fragmented, low-cost supply to technology-led, compliance-driven, and investment-intensive growth—creating long-term opportunities for structured, R&D-driven, policy-aligned OEMs.

10. Competitive Landscape

India's HVAC & Industrial Refrigeration industry is fragmented but consolidating, comprising multinational OEMs, large Indian manufacturers, regional assemblers, and specialist component providers. The sector is shifting from standalone equipment sales to **integrated, service-oriented models** that combine manufacturing, installation, aftermarket servicing, and AMC contracts, driven by client demand for **TCO optimization, compliance, and reliability**. Multinationals (Daikin, Carrier, Trane) dominate premium metro-centric projects with advanced VRF systems, chillers, and green refrigerants, while large Indian manufacturers (Blue Star, Voltas, Kirloskar) leverage local production, government-linked projects, and energy-efficient solutions. Mid-sized regional players and niche component providers focus on cost-effective, customizable solutions and increasingly offer integrated project delivery.

10.1 Key factors shaping competition

Competition is shaped by energy efficiency, low-GWP refrigerants, aftermarket services, digital integration (IoT, AI, predictive maintenance), ESG and regulatory compliance, workforce skilling, and cost-value positioning. Tier II/III markets are price-sensitive, whereas metro projects demand high efficiency and compliance. Strategic partnerships, M&A, and alignment with initiatives such as PMKSY, PLI, and ICAP further define market positioning. Overall, the industry is evolving from price-led, equipment-centric competition to compliance-driven, service-oriented, and technology-enabled models, with competitive advantage hinging on R&D in green technologies, lifecycle service capabilities, end-to-end cold-chain integration, and regulatory readiness.

10.2 Competitive Strategies

The Indian HVAC & Industrial Refrigerant Equipment industry is undergoing structural transformation, driven by climate imperatives, food security, regulatory tightening, and demand for energy-efficient, lifecycle-managed solutions. Market leaders are adopting integrated, service-oriented strategies, bundling equipment, IoT-enabled monitoring, AMC contracts, and retrofitting to simplify procurement and secure multi-year revenues. Vertical-specific customization caters to healthcare/pharma, food/agri, retail/e-commerce, and data centres, enhancing stickiness and ESG-compliant tender qualification. Digital enablement—IoT sensors, AI-driven load optimization, remote monitoring, and mobile-enabled operations—is becoming a baseline for high-value RFPs. Sustainability and ESG differentiation through low-GWP refrigerants, green building compliance, carbon tracking, and energy-saving guarantees is now procurement-critical. Contracting innovation with energy-performance and SLA-based outcome models de-risks clients while locking long-term alignment. Leaders are also pursuing geographic and segment diversification, expanding into Tier II/III cities and

emerging verticals like EV battery cooling and renewable-linked cold chains, often leveraging government PPP schemes. Overall, the sector is consolidating around energy-efficient, digitally integrated, lifecycle-managed delivery models, where firms combining technology, compliance, ESG alignment, and operational agility are best positioned to capture long-term, high-value contracts across pharma, food, logistics, and retail ecosystems.

10.3 Barriers to Entry

India's HVAC & Industrial Refrigeration Equipment industry, while growing on rising urbanization, food security priorities, and climate-driven demand, remains structurally insulated by high capital intensity, regulatory complexity, and technical specialization. Establishing a credible platform requires substantial investment in precision manufacturing, R&D, IoT-enabled controls, and cold-chain infrastructure, creating steep entry barriers for under-capitalized players. Compliance with multi-tiered energy, refrigerant, safety, and food standards, combined with institutional procurement that favours proven track records, lifecycle-optimized solutions, and trust-based contracts, further limits new entrants. The sector also demands a skilled, certified workforce, geographically distributed service networks, and scalable last-mile cold-chain logistics, along with ESG-aligned, digitally enabled systems and integration with global supply chains. As a result, incumbents with integrated manufacturing, distribution, and service capabilities are strategically insulated, while institutional clients prioritize reliability, regulatory compliance, and lifecycle cost efficiency over low-cost, untested entrants.

10.4 Consolidation Trends in HVAC & Industrial Refrigerant Industry

India's HVAC & Industrial Refrigeration Equipment industry is undergoing structural consolidation, driven by scale manufacturing, refrigerant transition, energy-efficiency mandates, digital integration, and lifecycle-oriented service models. M&A activity and platform roll-ups, often backed by private equity or global HVAC majors, are enabling mid-market and regional players to expand geographically into Tier II/III cities, acquire niche capabilities in cold storage and ammonia-based systems, and diversify into green refrigerants and energy-efficient HVAC solutions. Client demand is shifting toward bundled, end-to-end solutions—combining design, supply, installation, AMC contracts, IoT-enabled monitoring, and energy optimization—forcing fragmented equipment, logistics, and service providers to integrate into full-stack platforms. Stricter compliance, refrigerant phase-outs, and ESG-linked procurement are accelerating the exit of informal players, while organized incumbents with digital platforms, predictive maintenance dashboards, and cold-chain visibility gain institutional and multinational client advantage. Global partnerships, technology transfers, and JV rationalizations further enhance operational scale and regulatory alignment, positioning consolidated, digitally enabled, and ESG-compliant firms to capture high-value contracts and dominate both commercial and cold-chain markets.

10.5 Key Industry Players

The Indian HVAC & Industrial Refrigeration Equipment industry is characterized by a dual structure of global technology leaders with Indian operations and domestic companies with strong execution capabilities. Global majors bring advanced compressors, controls, and sustainable refrigerant technologies, while Indian firms excel in EPC projects, modular solutions, and last-mile cold-chain integration, creating a competitive landscape that is technologically progressive and locally adaptive.

Global Leaders with Indian Operations	Domestic Indian Players
Danfoss (India): Supplies compressors, drives, valves, and refrigeration solutions; strong after-sales and channel network; focuses on food processing, pharma, cold storage, and retail; competitive edge lies in energy-efficient product roadmap and application engineering. **Copeland (India):** Specializes in compressors, condensing units, and controls; strong OEM partnerships; targets food retail, QSRs, cold rooms, and light industrial refrigeration; lifecycle digital offerings and reliability are key differentiators. **BITZER (India):** Offers semi-hermetic reciprocating & screw compressors, condensing units, and heat exchangers; known for high-efficiency compressors, low-GWP readiness, and aftermarket support; serves food, beverage, pharma, and cold storage sectors. **Carrier Transicold (India):** Transport refrigeration leader; reefer units and nationwide service network; growth focus on food & pharma logistics; SLAs and uptime programs are competitive advantages. **Johnson Controls (India):** Provides chillers, industrial refrigeration systems, and building automation; system integration plus ESG/EHS compliance; targets enterprise accounts in food & beverage, pharma, data centers, and healthcare. **GEA Group (India Operations):** Supplies ammonia-based industrial refrigeration, screw compressors, and turnkey process cooling; strong presence in dairy, breweries, and pharma.	**Blue Star Ltd.:** Turnkey cold rooms, pharma/food storage, process chillers; pan-India installation & AMC network; brand trust and EPC + lifecycle service depth. **RINAC India Ltd.:** Modular cold rooms, ripening chambers, packhouses, blast freezers; strong domain expertise in food/agri cold chains; leverages PMKSY and SME + institutional projects. **Kirloskar Pneumatic Company Ltd. (KPCL):** Industrial refrigeration packages, ammonia/CO_2 systems, compressors; local manufacturing and process integration strength; project-led sales in food, beverage, dairy, and cold stores. **Rockwell Industries Ltd.:** Commercial refrigeration, vaccine/medical cold storage, display units; volume manufacturing for MSMEs; channel-driven sales and after-sales expansion. **Elanpro:** Cold rooms, commercial freezers, display chillers, medical/pharma refrigeration; nimble domestic OEM with mid-scale customizable solutions; focuses on hospitality, QSR, healthcare, and retail. **Voltas (Tata Group**): Industrial cold storage, food & dairy plants, HVAC and cold-chain EPC execution; leverages Tata credibility, group synergies, and institutional contracts for integrated project delivery.

10.6 Company Positioning – Fx Multitech Limited

FX Multitech Limited ("FX Multitech" or "the Company") traces its origins to 1994 as Fx Multitech Engineering, a partnership in Ahmedabad, Gujarat. In March 2008, it was incorporated as Fx Multitech Private Limited, taking over the partnership operations, and in 2024, converted to a public limited company. Over the years, FX Multitech has emerged as a leading distributor and integrator of industrial refrigeration and HVAC solutions in India, partnering with global OEMs including Danfoss, Roller Germany, Gomax Italy, Karyer, Kuzuflex, and Thermax. Its portfolio spans compressors, condensing units, evaporators, and allied components serving mission-critical applications across diverse industries.

Strengthening forward integration, FX Multitech acquired a 51% stake in Everest Chillers Private Limited in 2025. Everest, an OEM specializing in industrial chillers and process cooling, brings proprietary BTE (Built-in Tank Evaporator) technology, energy-efficient designs, and IoT-enabled platforms, accelerating FX Multitech's transition from component distribution to end-to-end system solutions for domestic and select international markets.

FX Multitech, through its FX–Everest collaboration, differentiates itself with engineering specialization in concrete batching, plastics cycle-time reduction, and food-grade hygienic cooling, and Everest's technology achieves 0.5–0.6 kW/ton efficiency versus the 0.8–1.0 kW/ton industry average, with 25–35% longer lifecycle. The company leverages penetration into underserved Tier II/III industrial clusters and IoT-enabled predictive maintenance for client retention and recurring revenue. Its core capabilities include integrated offerings combining global OEM components, Everest chillers, and turnkey cooling systems, supported by IoT-based service contracts, energy-efficient and ESG-compliant designs, and flexible solutions across cold-chain, pharmaceuticals, food & beverage, industrial plants, and commercial HVAC. Operating in a moderately fragmented market alongside global players (Carrier, Johnson Controls, Daikin, Trane) and domestic competitors (Voltas, Blue Star), FX–Everest stands out for superior efficiency and lifecycle cost performance.

Growth strategies focus on high-value verticals—including cold storage, logistics, pharma, food & beverages, chemicals, plastics, textiles, and export packaging—with exports to Southeast Asia, Middle East, and Africa. Key levers include scalable, certified manufacturing, recurring IoT-enabled revenues, R&D in next-generation refrigerants and energy-efficient designs, direct and distributor-led channel strategies, and ESG-driven premium positioning. This integrated platform positions FX Multitech to transition from a premium component distributor to a comprehensive industrial refrigeration and HVAC solutions provider, strengthening margins, unlocking recurring revenue, consolidating market leadership, and expanding its export footprint.

10.7 SWOT Analysis

Strengths	Weaknesses
• Integrated full-stack delivery & engineering depth: Combines OEM manufacturing, global component distribution, turnkey execution, IoT-enabled monitoring, AMC contracts, and custom solutions for niche industrial applications and Tier II/III clusters. • Efficiency & sustainability differentiation: BTE and advanced chillers achieve 25–45% energy savings, solar-backed operations, ESG-aligned portfolios, enabling premium pricing. • Dual-market orientation & recurring revenues: Domestic import-substitution focus, export readiness, and multi-year IoT-enabled AMC contracts enhancing revenue visibility. • Sectoral diversification: Serving cold-chain, pharma, F&B, chemicals, plastics, and commercial HVAC, providing resilience against cyclical slowdowns.	• Capital & capacity constraints: Working capital-intensive operations, regional OEM production limits, and reliance on global technology partners. • Limited visibility & reach: B2B-focused branding, nascent global penetration, and uneven digital adoption (IoT & predictive maintenance)..
Opportunities	**Threats**
• Structural demand growth: Cold-chain expansion, process industry uptick (pharma, chemicals, plastics), and infrastructure modernization favor organized, integrated players. • Digital & ESG monetization: IoT monitoring, predictive maintenance, energy efficiency, and low-carbon solutions unlock recurring revenues and premium pricing. • Export & market expansion: Rising demand in Southeast Asia, Middle East, Africa, supported by regulatory and government schemes (PMKSY, PLI) for cold-chain and industrial refrigeration..	• Market & operational risks: Raw material volatility, OEM relationship disruption, high domestic and multinational competition. • Technological & compliance challenges: Risk of displacement by alternative cooling technologies, ESG norms, refrigerant phase-outs, safety regulations, and export dependency fluctuations.

11. Future Outlook

The HVAC and Industrial Refrigeration industries are undergoing structural expansion, driven by rapid urbanization, climate imperatives, and rising demand for energy-efficient infrastructure. Globally, the HVAC market is projected to grow from USD 206.28 billion in 2024 to USD 342.87 billion by 2034, at a CAGR of 5.14%, with the chiller market rising from USD 11.32 billion to USD 16.32 billion (CAGR 4.24%) and the water chiller segment from USD 7.99 billion to USD 12.02 billion (CAGR 4.17%). India is expected to outpace global growth, with the HVAC market expanding from USD 11.74 billion in 2024 to USD 52.18 billion by 2034 (CAGR 16.09%) and the domestic chiller market increasing from USD 0.51 billion to USD 0.94 billion (CAGR 6.32%). Future demand will be led by green-certified buildings, data centres, hospitals, airports, metro projects, and smart city infrastructure, with IoT-enabled, AI-driven predictive maintenance systems becoming standard, enhancing efficiency and lifecycle cost optimization.

Industrial refrigeration, critical for the food supply chain, pharmaceuticals, and agricultural exports, is projected globally to grow from USD 21.2 billion in 2024 to USD 34.62 billion by 2034 (CAGR 5.02%), while India's market is expected to nearly double from USD 1.50 billion to USD 3.49 billion (CAGR 8.82%), anchored in cold-chain infrastructure spanning pre-cooling units, refrigerated transport, integrated distribution centres, and last-mile delivery. Regional chiller demand is concentrated in Western India (plastics, chemicals, pharma), Southern India (IT, data centres, automotive), and Northern India (airports, healthcare, dairy), complementing broader cold-chain growth.

Over the next decade, emphasis on energy-efficient designs, ESG compliance, digital integration, and traceability systems will ensure reliability and sustainability across the value chain. Policy support—including BEE star labelling, NCAP, Kigali-aligned refrigerant transitions, and infrastructure capex—will further reinforce structured growth, favouring organized OEMs and technology-led players. Collectively, HVAC and Industrial Refrigeration—including chillers—are positioned for sustained global and domestic expansion, underpinned by urbanization, climate resilience, food security, and healthcare modernization, with India poised for robust double-digit growth and targeted regional adoption of high-performance chillers.

For Infomerics Analytics & Research Pvt Ltd

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