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January 2025

The Heat is On:

Innovation, Stability, and Growth in the HVAC Industry

WHITEPAPER

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THE INVESTMENT OPPORTUNITY IN HVAC AND INDUSTRIALS

This whitepaper provides a comprehensive overview of the HVAC industry, a key pillar of the broader industrial sector. It explores the industry's core components, historical evolution, and current growth trajectory. The paper also examines leading companies that have shaped the market and presents an investment case highlighting opportunities and trends driving long-term value in this essential sector

ABOUT ADVISORSHARES

AdvisorShares: Pioneering Innovation in Actively Managed ETFs

AdvisorShares is a pioneer in the actively managed ETF space, committed to delivering innovative financial strategies that empower investors with exclusive access to leading portfolio strategists and institutional money managers.

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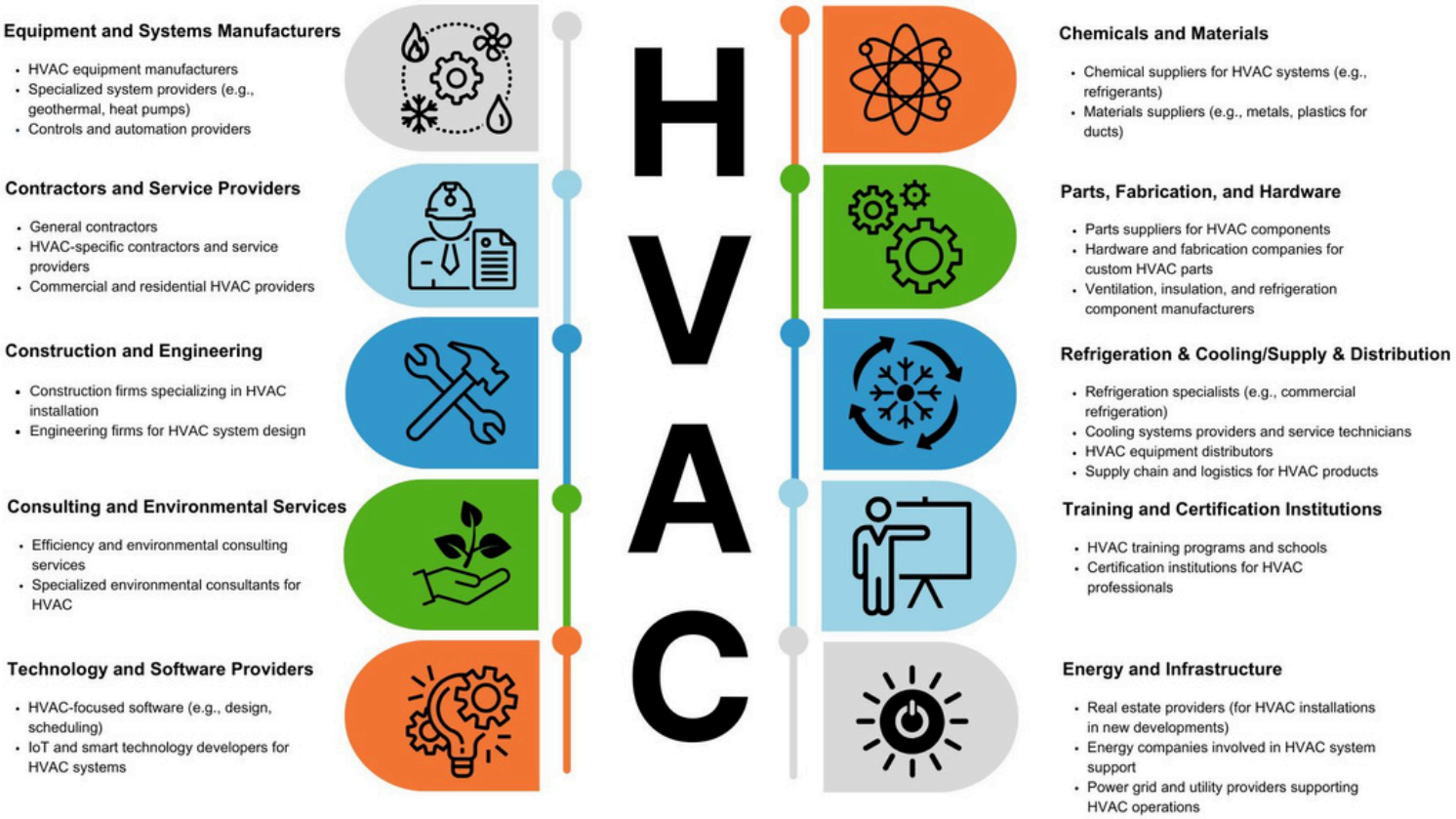
The HVAC Industry

In a world where overall health and well being, indoor comfort, air quality, and energy efficiency are paramount, heating, ventilation, and air conditioning (HVAC) systems stand at the forefront of technological advancement and necessity. Far more than just temperature regulators, modern HVAC systems are the invisible force creating healthy, efficient, and adaptive environments across residential, commercial, and industrial spaces. Behind every cool breeze, every clean breath, and every energy-efficient building is an intricate network of HVAC technologies, driving comfort and sustainability forward. HVAC components and services that are essential to modern infrastructure include but are not limited to:

- Chemicals and Materials
- Contractors and Services
- Consulting and Environmental Services
- Technology and Software
- Energy and Infrastructure
- Training and Certification
- Construction and Engineering
- Refrigeration and Cooling Supply and Distribution
- Parts, Fabrication, and Hardware
- Equipment and Systems Manufactures

More detailed information about these HVAC components and services can be found in *Figure 1* below with expanded definitions.

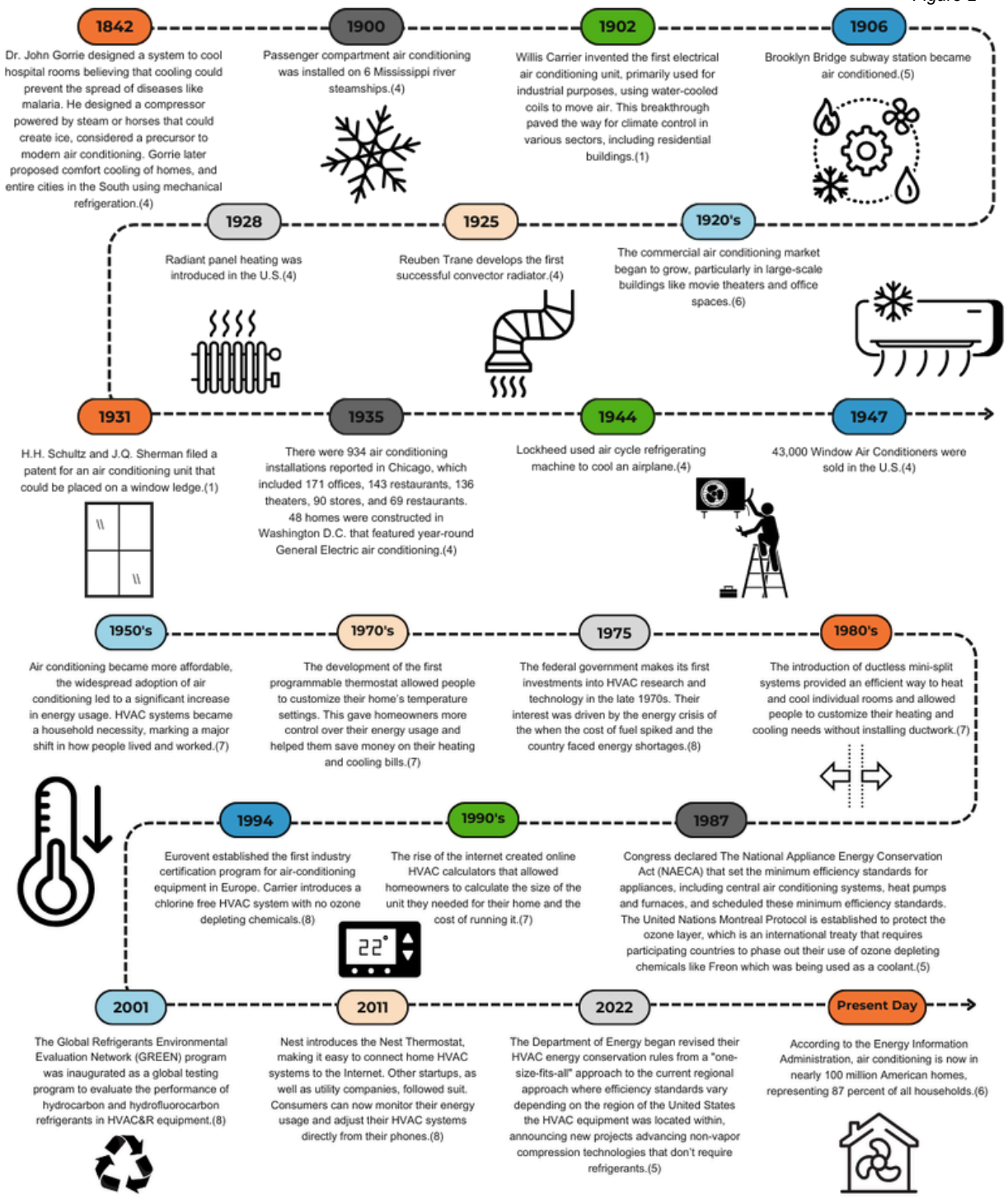
Figure 1



History of HVAC

The origins of HVAC can be traced back to ancient civilizations where rudimentary methods were used to control indoor climate. Ancient Egyptians dampened towels that were hung in doorways of homes to create a cooling effect through evaporation by using wind blowing through the hanging cloths to create a chilled breeze, reducing the temperature in their homes.(1) The Romans employed hypocaust systems to heat their bathhouses using a network of pipes beneath floors.(2) Koreans used a similar method during the Iron Age called the Ondol to heat houses.(3) The modern HVAC industry began to take shape in the late 19th and early 20th centuries with the development of mechanical ventilation and air conditioning systems.

Figure 2



The Industrial Revolution marked a significant turning point for HVAC technology (1870). The rapid growth of factories and urban areas led to increased demand for better indoor air quality and climate control. Steam engines and mechanical ventilation systems became crucial in maintaining the working conditions necessary for industrial productivity. During this period (1902), innovations such as the development of central heating systems and the use of steam radiators gained popularity. The introduction of electric power (1902) further revolutionized HVAC systems, enabling more efficient and controlled heating and cooling solutions.(1)

The post-World War II era (1945) ushered in a golden age for the HVAC industry. Economic prosperity and technological advancements led to widespread adoption of air conditioning in homes, offices, and public buildings. The 1950s and 1960s saw the development of new refrigerants, more efficient compressors, and the introduction of central air conditioning systems. Consumer demand for comfort and convenience fueled innovation, resulting in mass production and affordability of residential HVAC systems. This period also saw the emergence of professional organizations and standards that helped shape the industry, such as the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). (4)

In recent decades (1990), the HVAC industry has embraced the digital revolution, integrating smart technologies to enhance efficiency and user control. Modern HVAC systems are equipped with advanced sensors, thermostats, and connectivity features that allow for remote monitoring and management. Today, HVAC systems have evolved to prioritize energy efficiency, smart technology integration, environmentally friendly mandates, and sustainability which has driven the development of green HVAC solutions, including geothermal heat pumps, solar-powered systems, and advanced air filtration technologies. The integration of Internet of Things (IoT) devices has also enabled predictive maintenance and real-time diagnostics, reducing downtime and operational costs. (9)

HVAC's Role in Capital Goods

HVAC systems are an integral part of the capital goods group within the industrial sector, particularly in the building products and construction engineering subsectors. These systems are crucial for modern infrastructure projects, contributing to various industries in the following ways:

- **Building Products:** HVAC systems are essential components of any modern building. From homes to skyscrapers, efficient climate control is non-negotiable, making HVAC systems indispensable.
- **Construction and Engineering:** HVAC installations are often coordinated with structural and engineering design in both new construction and renovation projects. The rise in energy-efficient and green building certifications (such as LEED) has also increased the demand for advanced HVAC systems, which are crucial for meeting sustainability standards.

HVAC systems play a critical role in industrial applications, ensuring optimal conditions for manufacturing processes, product quality, and worker safety. In sectors such as pharmaceuticals.....

food processing, and electronics, precise temperature and humidity control are essential for maintaining product integrity and compliance with regulatory standards.

Advanced HVAC solutions are also used in cleanrooms, data centers, and laboratories where air purity and climate control are paramount. By providing a comfortable and controlled environment, HVAC systems contribute to increased productivity, reduce energy consumption, and enhance overall operational efficiency in industrial settings. HVAC is closely tied to construction cycles, with increased construction activity driving demand for new HVAC systems and equipment. The trend toward smart and energy-efficient buildings has pushed HVAC to the forefront of construction technologies.

The Case for Investing in HVAC Stocks

The HVAC industry has seen significant stock performance growth over recent decades, fueled by urbanization, rising energy costs, and environmental regulations. Several HVAC companies have become key players in the capital goods group, contributing to investor interest. Prominent HVAC firms have seen strong performance due to:

- Increased demand for energy-efficient systems.
- Ongoing construction booms, particularly in emerging markets.
- Government initiatives promoting environmental sustainability and aging infrastructure leading to investments in upgrading older HVAC systems.
- Ongoing diverse revenue streams through multi-faceted services (installation, maintenance, repair, hardware design, indoor air quality improvement, and energy efficiency), and across a wide range of price points.

HVAC Stock Performance

The companies represented in the following graphs and tables were selected based on two primary criteria: (1) over 80% of their business revenue is derived from HVAC operations, ensuring alignment with the industry focus, and (2) they possess the longest collective history in the sector, providing a robust foundation for comparison and trend analysis. The time periods (1/1/2010 to 12/31/2024, 1/1/2015 to 12/31/2024, 1/1/2021 to 12/31/2024, and 1/1/2024 to 12/31/2024) were chosen to capture performance over long-term, mid-term, short-term, and most recent trends, allowing for a comprehensive understanding of both historical patterns and recent developments.

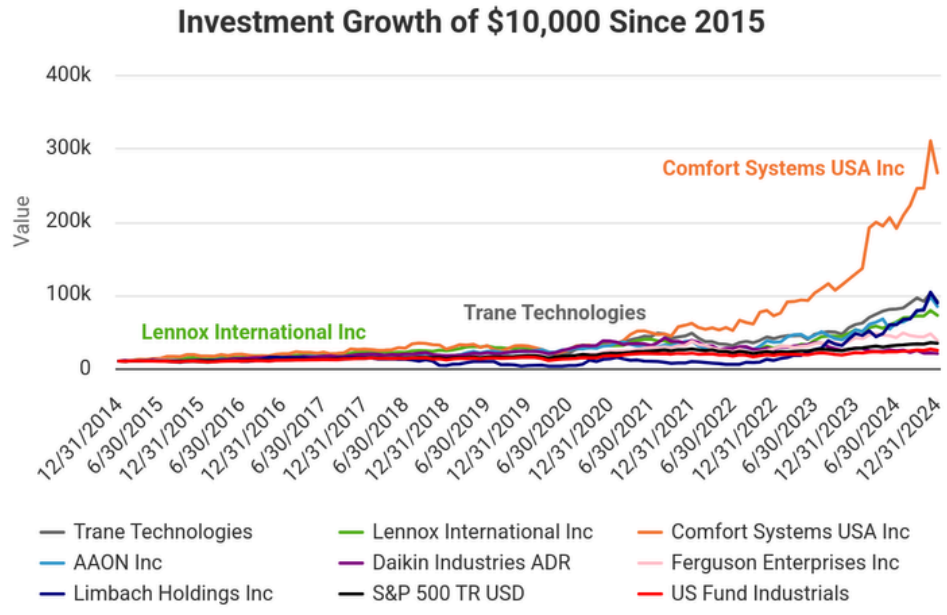
From 2010 to present, HVAC-related stocks delivered notable returns, driven by technological innovations and strong demand in commercial, residential, and industrial settings. The COVID-19 pandemic further accelerated investments in advanced HVAC systems due to heightened awareness of air quality and ventilation in public spaces, resulting in systems being designed with features like advanced air filtration, UV germicidal irradiation, and improved ventilation rates to promote healthier indoor environments and reduce the spread of airborne contaminant...

Figure 3

Return % Since 2010	Return (Annualized After 1 Year)	Cumulative Return
Comfort Systems USA Inc	27.94	3,926.49
AAON Inc	26.66	3,364.93
Lennox International Inc	21.68	1,799.00
Trane Technologies	20.95	1,633.41
S&P 500 TR USD	13.88	602.68
US Fund Industrials	11.85	436.60

Source: Morningstar Direct as of 1/1/2010 to 12/31/2024

Figure 4



Return % Since 2015	Return (Annualized After 1 Year)	Cumulative Return
Comfort Systems USA Inc	38.85	2,564.11
Lennox International Inc	21.87	622.65
Trane Technologies	24.76	814.16
Limbach Holdings Inc	24.46	792.34
AAON Inc	23.75	742.77
Ferguson Enterprises Inc	14.28	280.03
Daikin Industries Ltd	7.34	103.07
S&P 500 TR USD	13.10	242.54
US Fund Industrials	9.41	145.74

Source: Morningstar Direct as of 1/1/2015 to 12/31/2024

Figure 5

Return % Since 2021	Return (Annualized After 1 Year)	Cumulative Return
Comfort Systems USA Inc	69.30	721.48
Limbach Holdings Inc	62.29	593.76
AAON Inc	28.24	170.42
Trane Technologies	28.07	169.04
Lennox International Inc	23.65	133.73
Carrier Global Corp	17.58	91.11
Ferguson Enterprises Inc	12.71	61.36
Daikin Industries Ltd	-14.07	-45.48
S&P 500 TR USD	13.58	66.40
US Fund Industrials	8.98	41.05

Source: Morningstar Direct as of 1/1/2021 to 12/31/2024

Figure 6

Return % Since 2024	Return (Annualized After 1 Year)	Cumulative Return
Comfort Systems USA Inc	106.89	106.89
Limbach Holdings Inc	88.12	88.12
AAON Inc	59.88	59.88
Trane Technologies	52.97	52.97
Lennox International Inc	37.27	37.27
Carrier Global Corp	20.25	20.25
Ferguson Enterprises Inc	-8.62	-8.62
Daikin Industries Ltd	-26.70	-26.70
S&P 500 TR USD	25.02	25.02
US Fund Industrials	13.99	13.99

Source: Morningstar Direct as of 1/1/2024 to 12/31/2024

Calendar Year Returns

Figure 7

Performance as of 12/31/2024	2024	2023	2022	2021	2020	2015	2010	2005	2000	1995	Inception Date	Inception to 12/31/2024
Comfort Systems USA Inc	106.89	79.62	16.97	88.98	6.73	67.72	8.68	20.11	-71.19	-	6/27/1997	13.55
Limbach Holdings Inc	88.12	336.79	15.67	-27.01	226.19	2.75	-	-	-	-	8/11/2014	23.62
AAON Inc	59.88	47.86	-4.56	19.85	35.71	4.65	46.92	12.32	23.04	-50.88	1/3/1991	25.31
Trane Technologies	52.97	47.36	-15.36	41.01	42.87	-10.60	32.78	2.02	-22.67	13.84	6/1/1972	10.82
Lennox International Inc	37.27	89.54	-24.95	19.70	13.79	32.97	22.79	41.01	-12.35	-	7/29/1999	16.68
Carrier Global Corp	20.25	41.48	-22.69	45.30	-	-	-	-	-	-	3/19/2020	45.73
Ferguson Enterprises Inc	-8.62	55.06	-27.14	56.30	31.88	-1.39	-	-	-	-	2/20/2013	14.21
Daikin Industries ADR	-26.70	8.16	-32.71	2.20	58.97	14.66	-	-	-	-	2/14/2013	11.32
S&P 500 TR USD	*25.02*	*26.29*	*-18.11*	*28.71*	*18.40*	*1.38*	*15.06*	*4.91*	*-9.10*	*37.58*	*1/3/1928*	*11.12*
US Fund Industrials	*13.99*	*21.76*	*-15.07*	*19.66*	*15.56*	*-4.85*	*29.99*	*10.02*	*9.06*	*36.78*	*5/1/1984*	*10.48*

*Source: Morningstar Direct. *Since Inception performance is as of each individual company's listed inception date through 12/31/2024 and is annualized.*

Metrics

Figure 8

	Ticker	Inception Date	GICS Sector	Shares Outstanding (mil)	Market Cap (mil)	Earnings Per Share	P/E Ratio Long	P/E Ratio	P/E Ratio FWD	PEG Ratio
AAON Inc	AAON	1/3/1991	Industrials	81	10,030	2.28	51.61	54.12	-	-
Carrier Global Corp	CARR	3/19/2020	Industrials	897	60,213	3.83	40.15	39.48	22.22	1.25
Daikin Industries ADR	DKILY	2/14/2013	Industrials	2,928	34,091	88.40	20.75	20.65	16.05	1.56
Ferguson Enterprises Inc	FERG	2/20/2013	Industrials	201	34,199	8.33	20.84	20.46	18.15	1.46
Comfort Systems USA Inc	FIX	6/27/1997	Industrials	36	15,631	13.07	32.45	33.60	26.46	-
Lennox International Inc	LII	7/29/1999	Industrials	36	22,033	21.05	28.95	29.38	26.53	2.12
Limbach Holdings Inc	LMB	8/11/2014	Industrials	11	1,097	2.18	39.24	44.65	28.99	2.41
Trane Technologies	TT	6/1/1972	Industrials	225	84,830	10.78	33.85	34.55	30.12	2.70

Source: Morningstar Direct as of 12/31/2024

Recent & Projected Growth of the HVAC Industry

The industry's projected growth is bolstered by significant legislative initiatives aimed at fostering investment in manufacturing. "Three major federal programs, alongside billions of dollars in private megaprojects, are already in motion, with additional investments anticipated. The Inflation Reduction Act (IRA) allocates $369 billion in tax credits for clean energy and climate-related projects, which could potentially catalyze over $1 trillion in private sector spending over the next decade."(11)

Recent Summary of Major Acts Supporting Manufacturing

Figure 9

Legislation	Total Funding	Timeline	Key Markets
Infrastructure Investment and Jobs Act (2021)	$550 Billion	5 Years	Roads, bridges, rail, power/grid, broadband, water infrastructure, climate change
Inflation Reduction Act (2022)	$369 Billion (Tax credits could lever up to $1 trillion in spending)	10 Years	Energy, Climate Change
CHIPS Act (2022)	$258 Billion	5-10 Years	Semiconductor
Private Spending/Onshoring	$100's of Billion of Large Projects	N/A	Technology, Automotive, Energy, ect.

Note: IIJA Total Funding refers to new spending, total bill is $1.2 trillion; IRA Total funding refers to climate/energy investments only; CHIPS Total Funding refers to manufacturing investments and R&D; Private spending includes corporate investment to support secular trends including automotive electrification as well as on-shoring.

Source: Bloomberg Intelligence

According to Bloomberg, Organic Sales Growth for some of the industry leaders will increase substantially from 2024 to 2025.(11)

Organic Sales and Operating Margin Outlook

Figure 10

Source: Bloomberg Intelligence

Industry	Organic Sales Growth (%) 2024E	Organic Sales Growth (%) 2025E	Adj. Operating Margin (%) 2024E	Adj. Operating Margin (%) 2025E
Honeywell	2.9	6.1	21.0	21.1
GE Vernova	5.5	6.2	2.5	6.2
Illinois Tool Works	(0.4)	2.6	26.6	26.5
Johnson Controls	4.0	4.7	16.1	12.6
Carrier	4.0	5.9	15.9	16.9
Trane Technologies	11.2	7.7	17.6	18.1
Dover Corp	0.8	4.7	21.5	22.5

Additionally, as Bloomberg reported non-residential spending has increased dramatically and is forecasted to continue this trend into 2025.(11)

American Institute of Architects' (AIA) Nonresidential-Spending Forecast vs Actuals

Figure 11

Growth (yoy%)	2021 (%)	2023 (%)	2023 (%)	2024 (%) Forecast (Jul 24)	2024 (%) Forecast (Jan 24)	Chg. from Prior (bps)	2025 (%) Forecast (Jul 24)	2025 (%) Forecast (Jan 24)	Chg from Prior (bps)
Non-Residental	7.5	15.5	17.4	7.4	4.0	340	2.0	1.2	80
Commercial	5.4	20.2	1.5	-0.1	-0.7	60	1.3	0.2	110
Office	-5.8	14.5	2.8	2.8	-1.7	450	1.0	-0.7	170
Retail/Other Comm'l	24.4	21.6	0.4	-1.8	-1.2	-60	0.3	-0.4	70
Hotel	-27.4	36.7	2.6	-0.3	7.4	-770	6.6	5.9	70
Industrial	6.7	15.0	32.6	13.7	8.9	480	0.1	-0.8	90
Institutional	8.8	10.7	10.3	10.7	5.1	560	4.1	3.1	100
Healthcare	7.4	11.1	10.5	7.3	3.6	370	4.0	3.5	50
Education	9.0	11.3	16.7	10.1	5.8	430	4.4	3.9	50
Religious	-6.2	-5.2	23.3	12.5	1.1	1140	0.8	1.0	-20
Amusement	16.7	12.0	-0.6	11.7	3.7	800	3.9	3.1	80

Note: Current forecast is from July 2024 release; prior forecast is January 2024. Commercial office construction includes data centers. Commercial Retail and other includes warehouses.

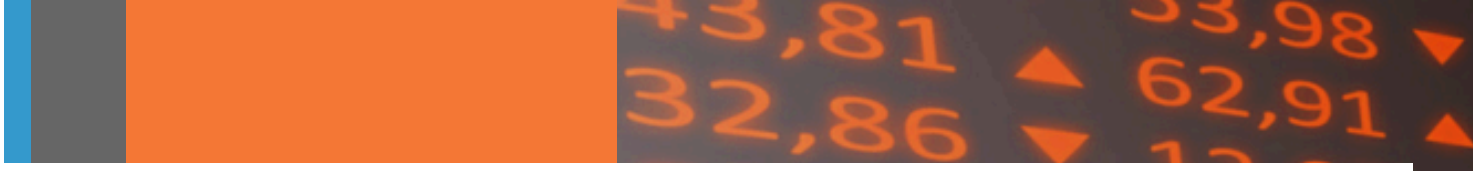
Source: Bloomberg Intelligence

Projected Growth

The global HVAC market is projected to continue its growth especially in developing countries, driven by several key factors:

- **Urbanization:** As populations grow in developing countries, so does the demand for housing and commercial infrastructure, driving the need for HVAC systems.
  - By 2050, nearly two-thirds of households worldwide could have air conditioning, with China, India, and Indonesia accounting for half of these units.(10)
  - 87% of homes in the United States and Japan already have at least one AC unit, only 8% of homes in the world's hottest regions — home to 2.8 billion people — currently have access to air conditioning. This gap indicates substantial growth potential as HVAC technology becomes increasingly accessible in developing markets.(12)

- **HVAC and the Environment:**
  - HVAC systems significantly influence global warming through both indirect and direct emissions. Indirect emissions primarily stem from the electricity required to power HVAC equipment, as a majority of this energy is derived from fossil fuels. This makes energy efficiency critical in minimizing environmental impact. Technologies that enhance system efficiency, such as advanced refrigerants can lead to substantial reductions in energy consumption and associated emissions.(13)



- Direct emissions occur when refrigerants, many of which have high Global Warming Potential (GWP), are released into the atmosphere. Advances in HVAC design, including improved containment and recycling of refrigerants, have mitigated these emissions. Low-GWP refrigerants and tighter system seals are essential for reducing this footprint.(14)
- Addressing the environmental challenges posed by HVAC systems requires an integrated approach. Transitioning to more energy-efficient systems, adopting environmentally friendly refrigerants, and expanding the use of renewable energy sources can collectively reduce both direct and indirect emissions. These measures not only align with sustainability goals but also support broader efforts to combat climate change.

- **Sustainability Initiatives:** Increasing government regulations related to energy efficiency, renewable energy, and carbon emissions are pushing for the adoption of eco-friendly HVAC technologies. (14)
  - Renewable energy sources have gained popularity in the HVAC industry as a sustainable alternative to conventional heating and cooling methods.
  - Geothermal and solar HVAC systems harness the power of the earth's natural heat or sunlight, offering reduced environmental impact and potential long-term cost savings
  - Innovative HVAC systems are increasingly designed to integrate with renewable energy sources such as solar panels. These systems can store excess energy in batteries or operate during peak generation times, further reducing reliance on fossil fuels and contributing to sustainability objectives.(15)
  - Investing in an energy-efficient HVAC system can lead to substantial reductions in utility expenses, with potential savings ranging from 20% to 40% based on the efficiency rating of the system and home-specific factors like size and insulation. For instance, transitioning to a modern, high-efficiency furnace or air conditioner may result in annual cost savings of several hundred dollars when compared to outdated systems.(16)
  - Further improvements in energy efficiency and cost-effectiveness can be achieved by ensuring proper installation, optimizing ductwork, sealing air leaks, and enhancing home insulation. These measures can collectively contribute up to a 20% reduction in heating and cooling expenditures. Selecting ENERGY STAR-certified equipment and collaborating with experienced professionals ensures optimal performance and maximized benefits over the long term.(19)

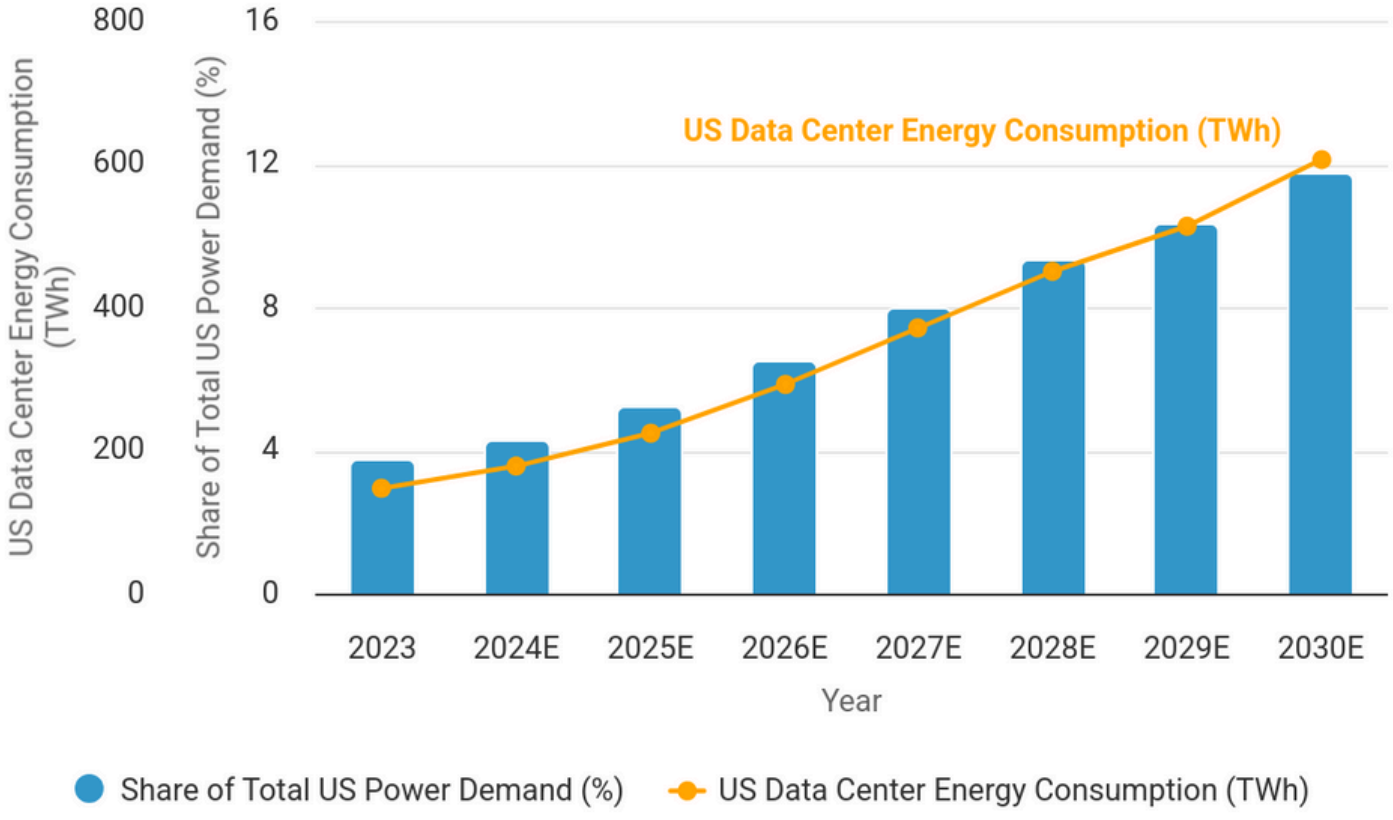
- **Technological Advancements:** Smart HVAC systems, featuring automated climate control, IoT integration, advanced refrigerants, and updated sensors, are rapidly becoming standard in both residential, commercial, and industrial settings.(9)
  - Variable Refrigerant Flow (VRF) technology allows for precise control of temperature in different zones of a building, making it particularly effective in large commercial spaces with varying cooling and heating needs.(15)
  - Smart Home HVAC systems incorporate smart thermostats and advanced controls, enabling users to optimize energy usage in real time. Features such as remote monitoring, adaptive algorithms, and learning-based temperature adjustments can reduce energy...

- ....consumption by up to 20%, significantly lowering operational costs.(13) These advanced systems can adapt to occupancy patterns and weather conditions, optimizing energy usage and enhancing occupant comfort and satisfaction.
- IoT is transforming HVAC maintenance through predictive analytics. Sensors embedded in systems monitor performance metrics, allowing early detection of inefficiencies or potential failures. This reduces downtime, extends equipment lifespan, and cuts maintenance costs. (13)
- The development of low-Global Warming Potential (GWP) refrigerants has played a pivotal role in reducing the environmental footprint of HVAC systems. These refrigerants not only have a lower impact on global warming compared to traditional options but also improve system efficiency. This dual benefit supports both environmental and economic goals, as lower energy requirements translate to reduced emissions and cost savings.(15)

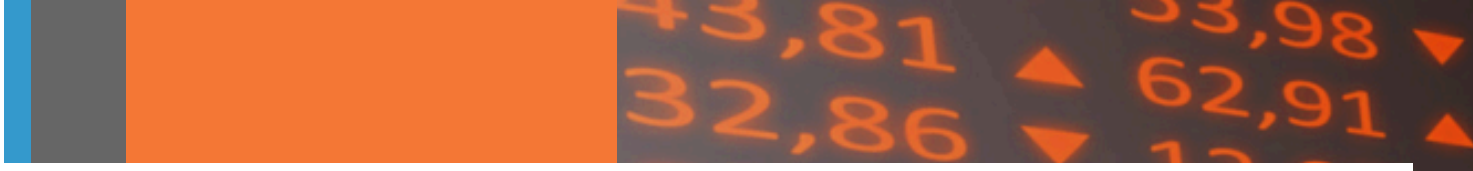
- **Rising Energy Demand of Data Centers:** The rapid growth of digitalization and AI technologies is driving a surge in data centers worldwide, particularly in the U.S., which accounts for over 32% of global data centers and is projected to be the fastest-growing market through 2030; however, cooling solutions—responsible for 40% of a data center's energy consumption(17)—are critical to managing the significant heat generated, with U.S. electricity demand for data centers expected to rise by 23% between 2024 and 2030 (from 147 to 606 terawatt-hours).(18)

US Data Center Energy Consumption

Figure 12



Source: McKinsey & Company. For illustrative purposes only. Revenue estimates are not a guarantee and may not be relied upon. Favorable revenue growth may not translate to favorable fund performance.



- **Upgrades & Servicing:** In mature markets like the U.S. and parts of Europe, demand for modernizing older buildings with more energy-efficient HVAC systems is on the rise.
  - HVAC installation and repair account for around 60% of industry revenue. The average lifespan of an HVAC unit ranges between 10 and 20 years.(21)
  - It is recommended that home HVAC units be serviced at least once per year.(22)

Summary

The HVAC industry plays a vital role in the broader capital goods group, particularly in the sectors of building products and construction. As sustainability and smart technologies drive forward the construction and engineering landscape, HVAC systems will remain at the core of modern infrastructure. According to industry reports, the global HVAC market is estimated to reach $367 billion by 2030, largely due to increased construction activities and stricter environmental regulations globally.(20) The growth trajectory for HVAC stocks and the projected expansion of the industry highlights the investment potential for companies and investors involved in these markets.

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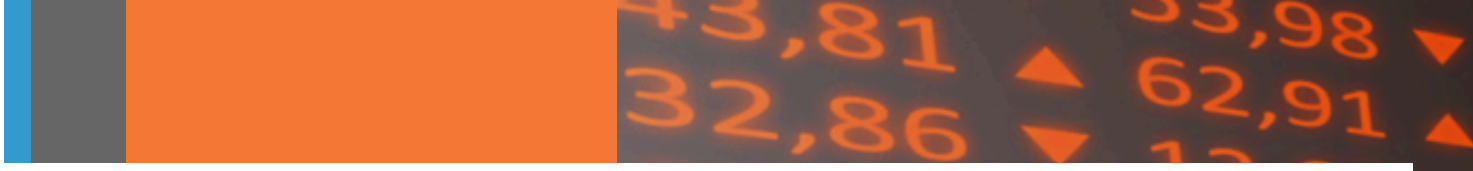

Definitions:

- **Price-to-Earnings (P/E) Ratio**
  - The P/E ratio is a valuation metric that compares a company's current share price to its earnings per share. It reflects how much investors are willing to pay per dollar of earnings and is used to evaluate whether a stock is overvalued or undervalued relative to its peers or historical trends.
  - Formula: P/E= Market Price Per Share/Earnings Per Share (EPS)
  - A higher P/E ratio may indicate growth expectations, while a lower P/E could suggest undervaluation or lower growth prospects.
- **P/E Ratio Long (Trailing P/E)**
  - The trailing P/E ratio uses a company's earnings over the previous 12 months (also known as trailing twelve months or TTM). It reflects past performance and is often used to assess whether the company's current valuation aligns with its historical profitability.
  - Formula: Trailing P/E=Current Share Price/EPS over the last 12 months
- **P/E Ratio Forward**
  - The forward P/E ratio uses projected earnings for the next 12 months instead of historical earnings. This metric helps investors gauge a company's future growth potential and compare it with peers or industry benchmarks.
  - Formula: Forward P/E=Current Share Price/Estimated EPS for the next 12 months
- **Price/Earnings-to-Growth (PEG) Ratio**
  - The PEG ratio adjusts the P/E ratio by accounting for a company's expected earnings growth rate. It provides a more nuanced view of a stock's valuation, balancing current earnings with future growth expectations.
  - Formula: PEG=P/E Ratio/Earnings Growth Rate (as a percentage)
  - A PEG ratio below 1 may indicate undervaluation, while a PEG ratio above 1 could suggest overvaluation relative to the company's growth prospects.

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