



 RAINCATCHERSM

HVACR EQUIPMENT MANUFACTURERS

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Coronavirus Update

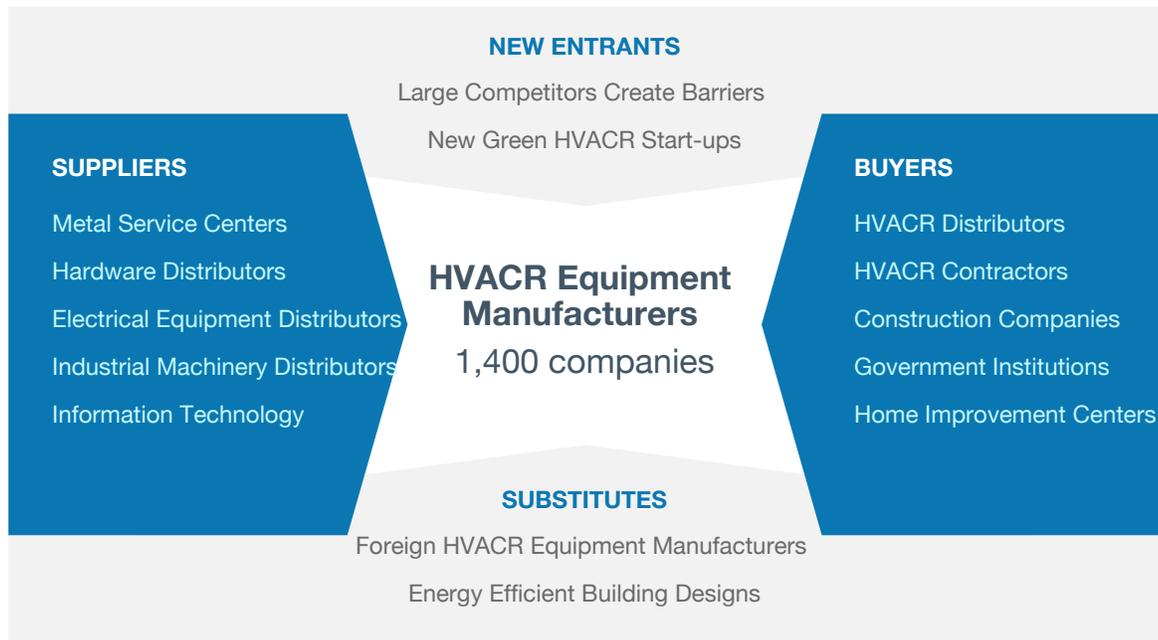
Jan 2, 2022 -- Court Unblocks Vaccination Mandate, Appeal Expected

- A federal appeals court panel reversed on December 17 several lower court rulings that blocked the Biden administration's vaccine mandate which requires workers at US companies with at least 100 employees to be vaccinated against COVID-19 or be tested weekly. The ruling could affect some 84 million workers. The mandate was to take effect on January 4, but the Occupational Safety and Health Administration suspended in late November efforts to implement and enforce it. Experts say that it is not clear when the requirement might be put in place. Several Republican state attorneys general and conservative groups said that they will appeal the decision to the US Supreme Court.
- Workers have been quitting their jobs at high rates in recent months, according to the US Bureau of Labor Statistics, but quitting in manufacturing is not as high as in the low-pay service sectors. It has accelerated, however, as factories race to poach one another's workers and increase production as supply-chain issues reshuffle the global manufacturing landscape. Nick Bunker, economist at the jobs site Indeed, said the numbers were a reflection of the options workers have in the current economic market, with job openings outnumbering unemployed workers and people reevaluating what they want to do.
- Two new studies have found that the coronavirus is evolving to spread more efficiently through air. HVACR equipment manufacturers may benefit from attempts to address the problem by upgrading HVACR systems. Most researchers now agree that the coronavirus is mostly transmitted through large droplets that quickly sink to the floor and through much smaller ones, called aerosols, that can float over longer distances indoors and settle directly into the lungs, where the virus is most harmful. The studies found that the ultra-transmissibility of the variants may come down to a mix of factors. It may be that lower doses of the variants are required for infection, or that the variants replicate faster, or that more of the variant virus is exhaled into aerosols – or all three. “Given that it seems to be evolving towards generating aerosols better, then we need better containment and better personal protection,” said Don Milton, an aerosol expert at the University of Maryland who led the research.
- Supply chain experts say that it will take at least six months to alleviate intermodal congestion that stretches from Asian ports, across the Pacific to US ports, and on to railroads and their inland terminals. Railroads have experienced congestion for months at inland intermodal terminals, particularly in the Chicago area. Shippers have been slow to pick up their containers, and are keeping them longer for unloading at warehouses and distribution centers, which has created a shortage of chassis. Railroads say their intermodal networks have capacity to handle current volumes, but only if all links in the supply chain are working relatively smoothly.
- Capital project budgets will continue to stay mostly on hold until COVID-19 stabilizes, according to Mike Star, chairman of the board for the Mechanical Service Contractors of America. Commercial HVACR sales are unlikely to recover significantly until capital project expenditures increase. Hunter Botto, president of the Plumbing-Heating-Cooling Contractors – National Association, agrees the commercial market is a challenge but notes that there will be opportunities for contractors to develop an expertise in providing air filtration and indoor air quality services, which are in high demand right now.
- The coronavirus pandemic is changing demand patterns for HVACR equipment. The residential and commercial construction sectors saw major declines in the late winter/early spring 2020 as states shut down most construction projects. Both sectors bounced back going into the summer as those restrictions were lifted. Then in the mid-summer, the sectors started to diverge, with residential construction spending continuing to increase while the commercial sector lagged. Lodging construction, for example, decreased 23% from February to November 2020, according to the US Census Bureau. General contractors are mostly pessimistic about the outlook for the commercial sector, according to the 2021 AGC-Sage Construction Hiring and Business Outlook Survey. They are most negative about retail construction, followed by lodging and private office, higher education, and public building.
- Employment in the US HVAC and commercial refrigeration equipment manufacturing industry increased 1.9% year over year in October 2021 but was down 1.6% from the pre-pandemic month of October 2019.
- Inadequate ventilation can potentially contribute to an environment where COVID-19 is more easily spread by airborne transmission, according to guidance released by the Centers for Disease Control and Prevention (CDC). Exposure to respiratory droplets carrying the virus is the main way people contract COVID-19, according to the CDC. Updated guidance says the virus can spread through airborne particles that can linger in the air for minutes or hours, even among people who are more than 6 feet

apart under certain circumstances.

- US production of ventilation, heating, air-conditioning and refrigeration equipment decreased 1.5% year over year in November 2021 but was up 15.5% from the pre-pandemic month of November 2019.
- US shipment volume of residential electric water heaters increased 4.5% year over year in October 2021, according to the Air-Conditioning, Heating, and Refrigeration Institute. Shipment volume increased for residential gas water heaters (+4.1%), decreased for commercial gas water heaters (-8.9%), and decreased for commercial electric water heaters (-4.9%). Shipment volume decreased for warm-air gas furnaces (-7.5%) but increased for warm-air oil furnaces (+0.5%). Shipment volumes decreased for central air conditioners and air-source heat pumps (-4.9%) compared to a year ago. Year over year changes may be distorted by the large, pandemic-related shipment changes during 2020.

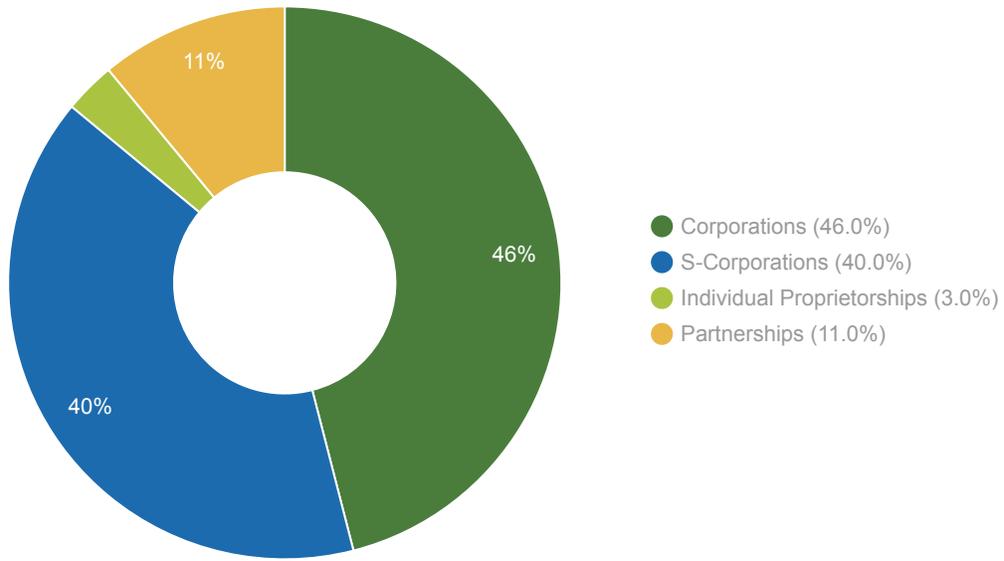
Industry Structure



The average HVAC and refrigeration equipment manufacturer operates a single plant, has 93 employees, and generates about \$31-32 million in annual revenue.

- The HVAC and refrigeration equipment manufacturing industry consists of about 1,400 companies, employs 133,500 workers and generates \$45 billion annually.
- The industry is somewhat concentrated, as the 20 largest companies represent 53% of industry revenue.
- Large companies include Carrier Corporation, Goodman (part of Daikin Group of Japan), Trane (part of Ingersoll-Rand), Johnson Controls, Lennox International, and Rheem.

Industry Demographics



Source: US Census Bureau



Female Owned

8.0%



Minority Owned

9.0%



Veteran Owned

10.0%

Source: Census Bureau

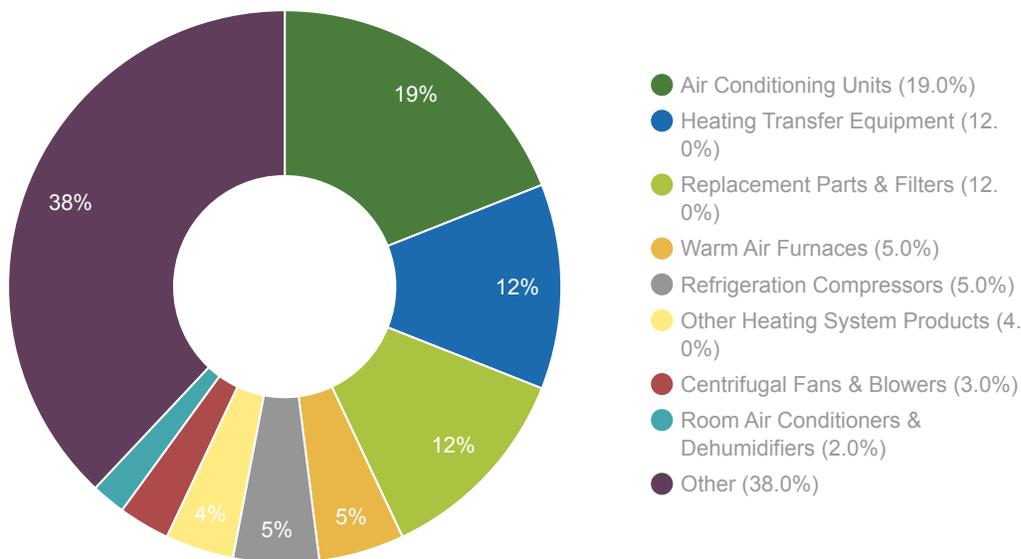
How Firms Operate

Products and Operations

HVAC and refrigeration (HVACR) equipment manufacturers produce and sell heating, ventilation and air conditioning systems for residential and nonresidential buildings, as well as commercial and industrial refrigeration and freezer equipment.

- Major product categories include commercial and industrial fans, blowers and air purification equipment, heating equipment, air conditioning and warm air heating equipment, and commercial and industrial refrigeration equipment.
- Air purification equipment includes electrostatic precipitation equipment, furnace filters, air scrubbing systems, and dust and fume collection equipment.
- Heating equipment includes baseboard heaters, non-electric space heaters, wood stoves, gas fireplaces, solar heating systems, swimming pool heaters, and heating boilers.
- Air conditioning and warm air heating equipment includes air conditioner window units, air conditioning and warm air heating combination systems, heat pumps, dehumidifiers, humidifiers, and warm air furnaces.
- Commercial and industrial refrigeration equipment includes refrigerated lockers, refrigerated display cases, drinking fountains, ice making machines, freezing equipment, and snow making equipment.

HVACR Equipment Manufacturers Revenue



Source: US Census Bureau

While the design and components of HVACR equipment vary with the specific type of product (ventilation, air purification, heating, cooling, or refrigeration) and application (residential or commercial), the manufacturing process and raw materials are similar across all products. Primary raw materials include steel, copper, and aluminum sheets, tubing, and structural shapes; plastic resins and shapes; and electronic components. Firms may produce parts for components from raw materials or outsource the production of standard parts to other manufacturers.

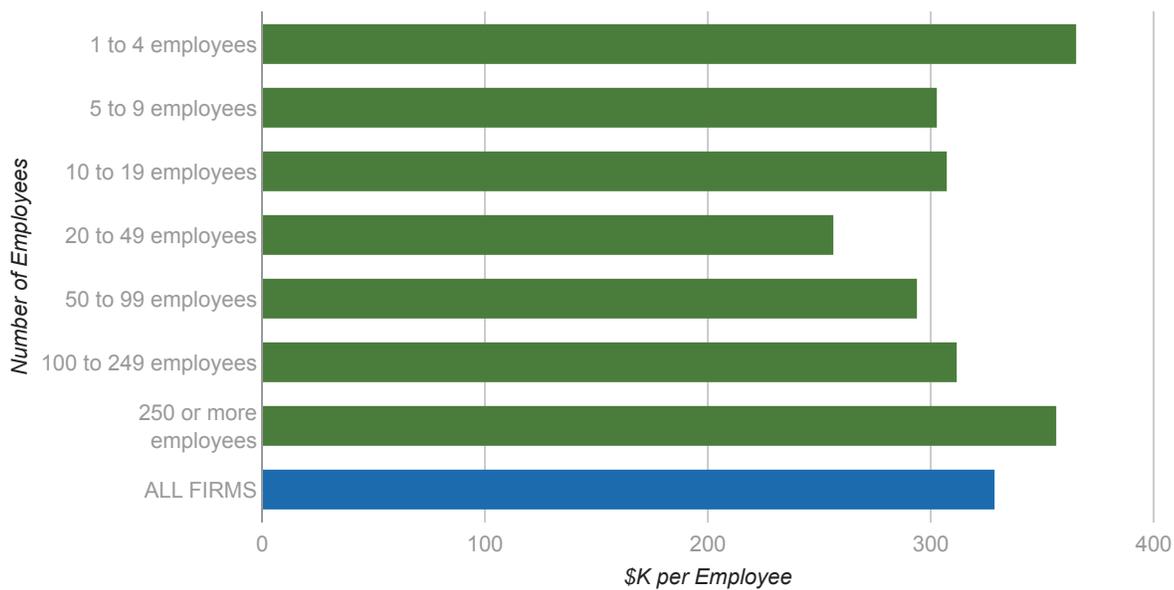
Sheet metal and structural steel shapes are cut, formed, punched, drilled, sheared, and bent in work cells to create encasements and parts for HVAC components, such as air conditioning units. CNC (Computer Numeric Control) machines are programmed to produce the parts needed. These parts go through a cleaning process to remove dirt and grease and then may go through a powder coating system, which uses robotic sprayers to coat parts with a paint-like dry powder, then passes them through an oven to permanently bake the powder onto the metal.

Heat exchangers for air conditioning systems are produced by bending copper or aluminum tubing into coils and attaching the tubing to an aluminum plate for an evaporator or using it standalone for a condenser. The tubing is connected to a pump which circulates fluid for heating and cooling air. Fans and electronic controls are added and the entire assembly is covered by a sheet metal encasement. The unit undergoes a performance test after final assembly to ensure that it operates to efficiency specifications.

HVACR equipment manufacturers invest in research and development to create new product designs with lower costs and improved energy efficiency. Environmental regulations often dictate changes in product designs, such as the replacement of freon as a working fluid with ammonia or water. Large firms must develop products that can operate and comply with regulations in international markets.

Firms employ sales staff to sell directly to independent installer dealers, as well as large construction contractors, building owners, and food service companies. They may also sell through wholesalers, distributors, and retailers. They may invest in advertising and marketing programs to build brand awareness and also offer cooperative advertising, rebates, or other financial incentives to customers to spur sales.

Revenue per Employee by Establishment Size



Source: US Census Bureau

Profit Drivers

Growing Market Share

HVACR equipment manufacturers compete for sales in residential and commercial markets with other domestic and foreign manufacturers. Large firms, such as Carrier and Trane, invest in national advertising and marketing programs to build brand awareness among homeowners and commercial construction contractors. Firms may also provide cooperative advertising programs and financial incentives to local HVAC contractors to promote sales. Brand awareness and incentives are important as replacement sales of older HVAC systems is a key driver of market share.

Successful New Product Development

HVACR equipment manufacturers must keep up with evolving environmental and energy efficiency regulations that affect their product designs. Firms also compete with products from other manufacturers on the basis of the energy efficiency, reliability, and sustainability of their products. Increasing demand for green buildings that is driving development of new HVAC products that support LEED certification standards.

Effectively Managing Inventory

HVACR equipment manufacturers face somewhat seasonal demand and variable raw material costs, so they must effectively manage both finished goods and raw material inventories. Since demand is influenced by construction activity and weather conditions, firms must build inventory prior to peak selling periods, while avoiding having excess inventory when demand slows. They invest in sophisticated inventory management systems linked to production and order management systems to help manage inventory levels.

Improving Operational Efficiency

Competition can make it difficult for HVACR equipment manufacturers to raise prices, so they typically rely on productivity improvements to maintain or increase profitability. Firms invest in information systems and automated equipment to improve production efficiency and reduce overhead expenses.

Global Perspective

Global Market Size

The global HVACR equipment manufacturing market was valued at about \$398 billion in 2020 and is expected to rise 3.4% in 2021 to \$412 billion, according to The Business Research Company. Between 2021 and 2025, the industry is projected to experience average annual growth of 7%, reaching a value of more than \$545 billion. Asia Pacific is the largest regional HVACR equipment manufacturing market with 62% of the worldwide market. North America is the second-largest regional market with a 22% share.

Large Companies

COMPANY	HOME COUNTRY
Carrier Global Corporation	US
Daikin Industries, Ltd.	Japan
Gree Electric Appliances, Inc.	China
Johnson Controls International plc	Ireland
Lennox International Inc.	US
LG Electronics, Inc.	South Korea
Midea Group Co., Ltd.	China
Mitsubishi Electric Corporation	Japan
Samsung Electronics Co., Ltd.	South Korea
Trane Technologies PLC	Ireland

Key Global Trends

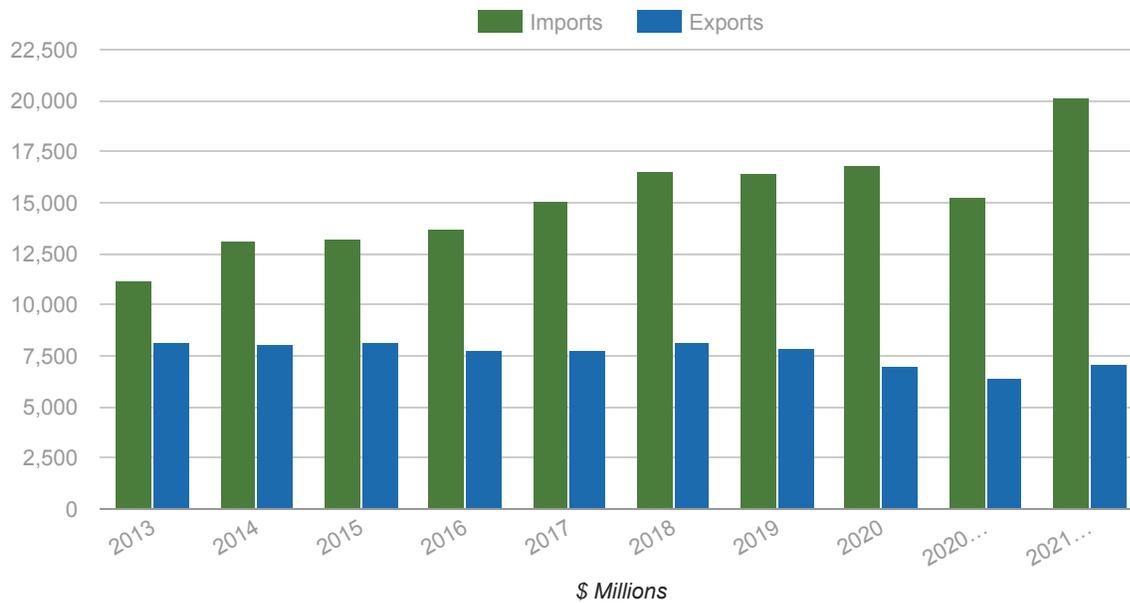
Construction Spending to Rebound – Construction is a key driver of demand for HVACR equipment, and worldwide construction spending is forecast to decline 2.5% in 2020 due to the COVID-19 pandemic, according to Fitch Solutions. Spending will rebound an estimated 4.1% in 2021, marking the fastest annual growth in more than 20 years. Latin America saw the biggest dip in construction activity in 2020 with a decline of 11% as government restrictions slowed projects in countries including Mexico, Argentina, and Peru. However, Latin America will see the strongest regional return to growth in 2021 with a rise of 7%. Led by China, Asia will see the most construction spending in 2021 with a total of more than \$2.1 trillion - about 2% over 2020. Europe and North America are expected to each see construction improve by just over 1% in 2021. Sub-Saharan Africa will rise nearly 1% while the Middle East and North Africa region will grow less than 0.5%.

COVID-19 to Drive Indoor Air Quality Investments – Efforts to mitigate the spread of the coronavirus in indoor settings is expected to boost global demand for ventilation and air quality monitoring equipment. EPA and World Health Organization (WHO) guidelines suggest that frequently replacing indoor air with fresh or sterilized air can reduce the spread of the coronavirus inside buildings. Intensified cleaning regimens may also contribute to poor indoor air quality. Global demand for air quality monitoring equipment is forecast to rise 7% per year through 2029, according to Future Market Insights. Together, North America and Europe account for about 70% of worldwide demand. However, poor air quality in parts of Asia, especially China and India, are projected to drive strong growth in the region. While air quality monitoring equipment cannot detect the presence of coronavirus, IoT-enabled sensors can monitor data including carbon dioxide level (which rises as humans gather in tight spaces) and humidity, and determine when conditions are favorable for COVID-19 transmission.

Ecommerce to Drive Refrigeration Equipment Demand – Steady ecommerce grocery sales are expected to increase the need for refrigerated warehouse space, according to commercial real estate firm CBRE. The lockdowns and restrictions resulting from the COVID-19 pandemic created a global increase in ecommerce, including groceries. Industry watchers expect the worldwide shift to grocery ecommerce to stay in place – and even rise further – after the pandemic subsides. In China, where the spread of COVID-19 has been relatively well-contained, online grocery sales hold a 25% market share, according to research firm Kantar Group. Online grocery also saw huge growth in the US and Europe. Industry experts suggest most grocery ecommerce has been fulfilled through retail stores, which can squeeze margins in a low-margin business. More grocery firms are projected to invest in refrigerated warehouses for more cost-controlled and efficient ecommerce fulfillment operations.

International Trade

HVACR Equipment Imports and Exports

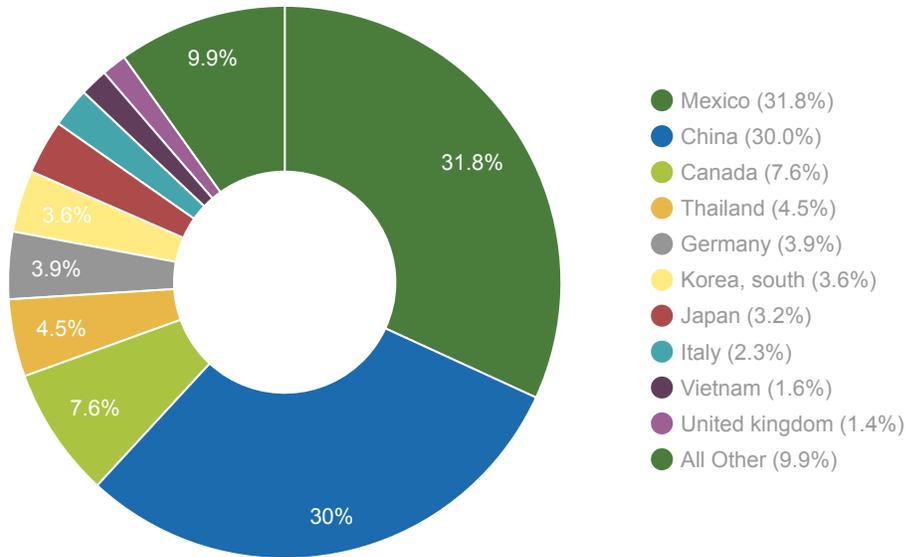


HVACR Equipment Year-to-Date Trade Data

NOVEMBER 2021	VALUE (\$MILLIONS)	% CHANGE
Imports	\$20,117	23.75%
Exports	\$7,159	10.24%
Trade Balance	-\$12,958	

Imports by Country

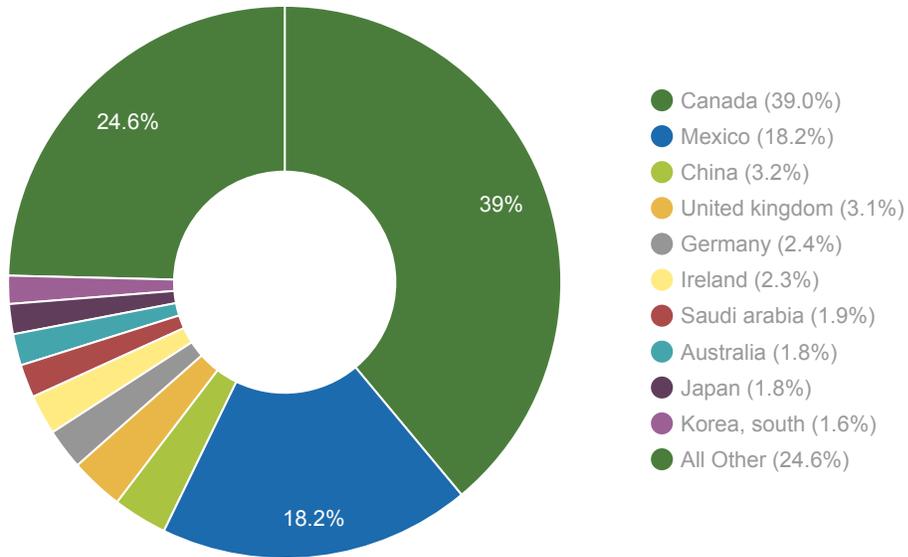
HVACR Equipment Imports



COUNTRY	YEAR 2020	% IMPORTS
Mexico	\$5,373,151,642	31.85%
China	\$5,061,381,976	30.0%
Canada	\$1,287,685,333	7.63%
Thailand	\$763,874,679	4.53%
Germany	\$662,405,068	3.93%
Korea, south	\$609,992,403	3.62%
Japan	\$533,981,509	3.17%
Italy	\$392,100,796	2.32%
Vietnam	\$275,453,439	1.63%
United kingdom	\$244,072,983	1.45%
All Other	-	9.87%

Exports by Country

HVACR Equipment Exports



COUNTRY	YEAR 2020	% EXPORTS
Canada	\$2,729,370,631	38.96%
Mexico	\$1,277,519,928	18.23%
China	\$222,248,025	3.17%
United kingdom	\$218,448,642	3.12%
Germany	\$166,979,374	2.38%
Ireland	\$163,950,773	2.34%
Saudi arabia	\$136,014,792	1.94%
Australia	\$128,912,420	1.84%
Japan	\$123,201,931	1.76%
Korea, south	\$115,152,365	1.64%
All Other	-	24.62%

Industry Trends

Trends are affected by the COVID-19 pandemic.

Changes in revenue, employment, business practices, trade and forecasts are occurring rapidly and data reporting by the government lags the changes. We are tracking changes in the “Coronavirus Update” chapter for those industries most affected and on our [Covid-19 Updates Webpage](#).

Growth in HVAC Shipments

HVAC shipments by US manufacturers have been on the rise. Shipments of gas warm air furnaces decreased 2.6% to 3.3 million units in 2020, after rising 0.7% in 2019, 9% in 2018, 6.5% in 2017 and 4.6% in 2016, according to AHRI. Shipments of central air conditioners jumped 10.3% to 5.9 million units, after increasing 0.7% in 2019, 4.1% in 2018, 5.8% in 2017 and 7.8% in 2016. Shipments of heat pumps rose 9.9% to 3.4 million units, following growth of 5.8% in 2019, 12.2% in 2018, 7.8% in 2017 and 7.1% in 2016.

Evolving Environmental Regulation

HVACR equipment manufacturers face evolving environmental regulations that affect their product designs. The Kigali Amendment to the Montreal Protocol was agreed to in 2016 to reduce emissions of hydrofluorocarbons (HFCs) that contribute to global warming, and took force in January 2019 after ratification by 65 countries. It requires replacing HFCs as a refrigerant in HVACR systems. HVACR manufacturers supported ratification, as the adoption of new refrigerant technology is expected to provide a competitive advantage to US manufacturers, reducing imports and boosting exports.

Eco-friendly Products

In addition to changing environmental regulations, the adoption of green building standards is causing HVACR equipment manufacturers to develop new eco-friendly models. These new models are more energy efficient, perform better mechanically, and last longer than older models. Some models incorporate solar power, passive heating and cooling elements, and variable refrigerant flow. The demand for green buildings is expected to double every three years due to their lower operational costs compared to traditional buildings.

Expanding Data Collection and Analysis

Software plays an expanding role in HVAC system design and maintenance. Intelligent building automation systems use sensors and software controls to improve energy efficiency and air quality. Firms are also using Internet of Things (IoT) sensors to monitor an HVAC unit's condition, usage patterns, and maintenance needs. The large amounts of data generated by sensors and service technicians is forcing manufacturers to invest in “big data” analytical tools and data analysis experts to identify opportunities for improved product designs.

Mobile-Enabled Controls

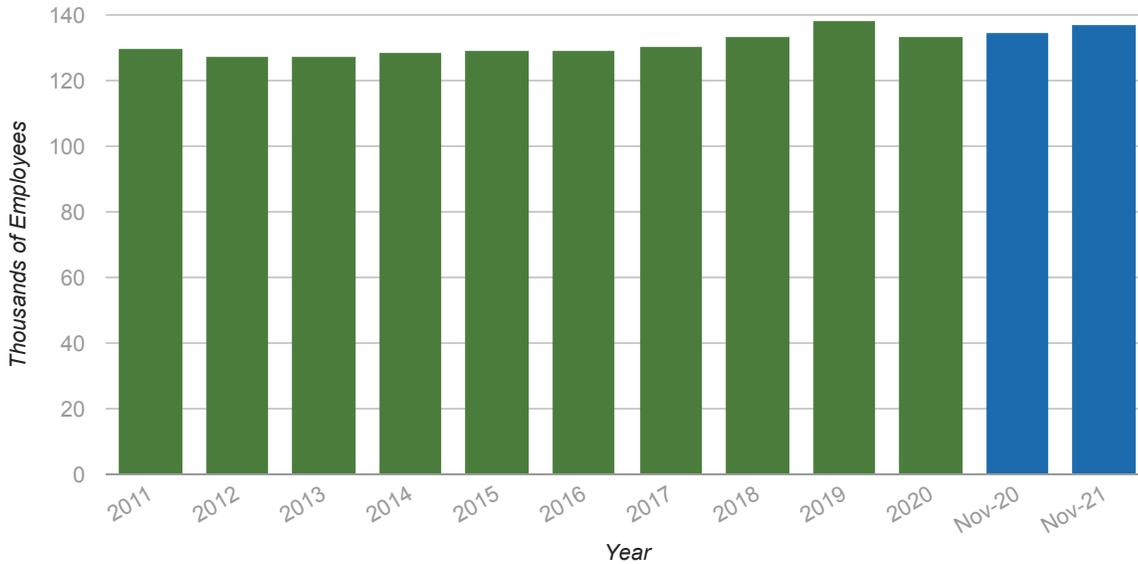
Residential HVAC systems are incorporating Wi-Fi enabled thermostats and smartphone apps that allow homeowners to remotely monitor and adjust temperature settings. These mobile apps may also allow control of security systems and lighting systems. Besides providing convenient control for homeowners, mobile controls also allow service technicians to remotely monitor equipment and adjust settings.

Employment and Wage Trends

Employment by HVACR equipment manufacturers increases

Overall employment by HVACR equipment manufacturers changed 1.9% in November compared to a year ago, according to the latest data from the Bureau of Labor Statistics.

HVACR Equipment Manufacturers Employment

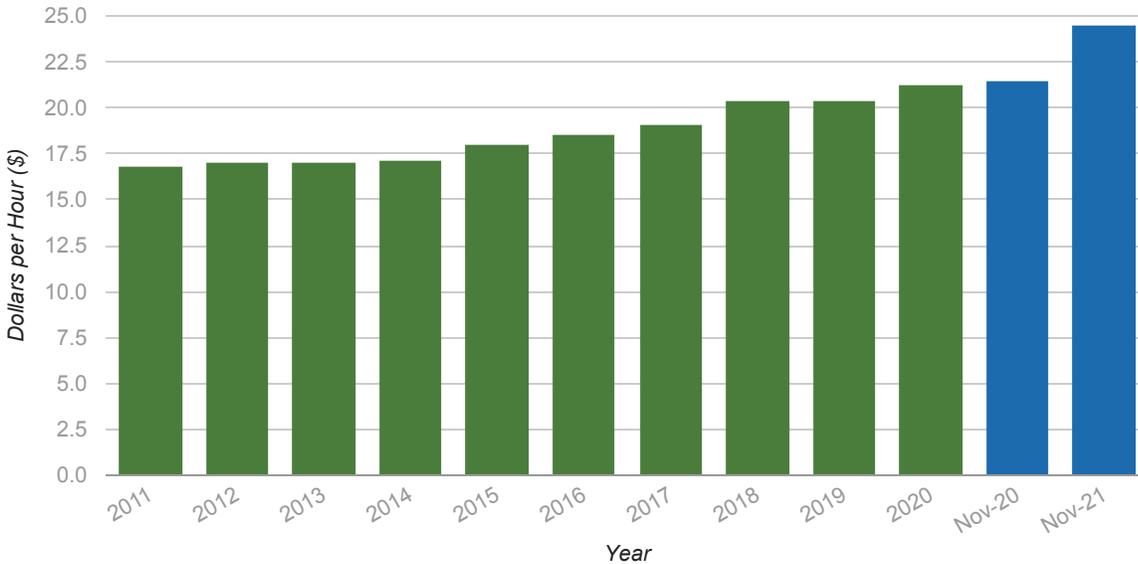


Source: Bureau of Labor Statistics

Wages at HVACR equipment manufacturers rise

Average wages for nonsupervisory employees at HVACR equipment manufacturers were \$24.49 per hour in November, a 14.1% change compared to a year ago.

Average Wages for Nonsupervisory Employees



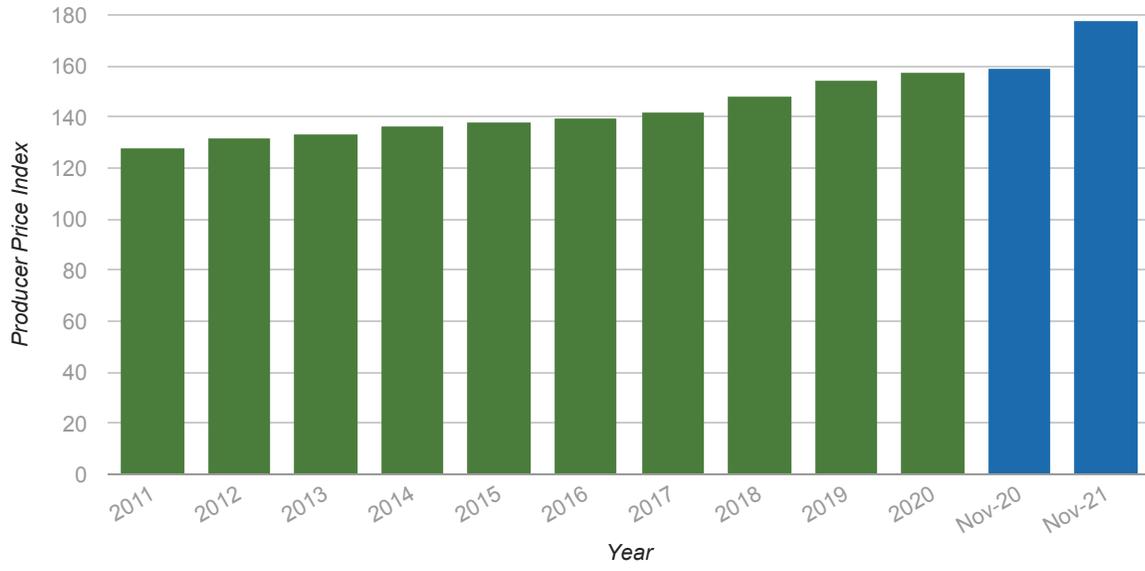
Source: Bureau of Labor Statistics

Price Trends

Producer Prices for HVACR equipment manufacturers rise

The Producer Price Index for HVACR equipment manufacturers changed 11.87% in November compared to a year ago, according to the latest data from the Bureau of Labor Statistics.

Producer Price Index for HVACR equipment manufacturers



Source: Bureau of Labor Statistics

Credit Underwriting and Risks



Business Exit Rates: 1.5 Much lower than US average for all businesses

Cyclical Sensitivity: 9.0 Very high sensitivity

Barriers to Entry: 2.6 Very high initial capital; very high regulatory/technical barriers; high concentration

External Risk: 6.5 High external risk

Industry Outlook: 6.9 Lower than GDP; severe cyclical risk

Financial Summary: 5.0 Low margins; high liquidity; low leverage

Key Metrics

METRIC	VALUE	COMPARISON
Performance During 2007–2009 Recession	-68.8%	0.0% GDP
Business Exit Rate 2019–2020	4.87%	9.0% All Industries
Compound Annual Growth Forecast (2020–2025)	4.21%	6.1% GDP
SBA 7(a) Default Rate by Number of Loans (2010–2019)	3.11%	3.82% All Industries
SBA 7(a) Default Rate by Gross Loan Amount (2010–2019)	1.52%	1.21% All Industries

Underwriting Considerations

- Collateral is typically AR and inventory. Analyze AR and inventory Day trends and compared to the industry average. Get a current AR aging analysis. Look for concentrations and AR over 90 Days. Inventory report highlighting WIP and sale inventory.
- Manufacturers can have higher leverage and tighter liquidity which causes a problem for when the economy turns. Make sure the balance sheet is in good condition.
- How has the company kept up with technical innovations and hiring staff that understands the evolving technology?

Industry Risks

Dependence on Construction Activity

Demand for HVAC and refrigeration equipment is driven by new residential and commercial construction activity. The construction sector is cyclical and new construction can fall sharply during a weak economy. While new installations are the most sensitive to difficult economic conditions, replacement of existing systems can also decline as homeowners and commercial building owners focus on repairing, rather than replacing, older systems.

Variable Material Costs

HVACR equipment manufacturers purchase sheet metal, copper tubing, other metal and plastic parts, and electronic components to produce their products. The prices of these commodities are dependent on global market conditions and can vary widely from year to year. For example, sheet metal prices can rise by over 5% in a single year. At the same time, HVACR equipment prices have risen by less than 5% per year. Companies must carefully manage raw material costs to maintain their gross margins.

Energy Efficiency Regulations

HVACR equipment manufacturers are forced to keep up with evolving regulations to promote energy efficiency. The US Department of Energy (DOE) issued standards for roof top commercial air conditioners calling for a 13% increase in energy efficiency in 2018-2022 and increases of up to 30% starting in 2023. DOE also changed the metric for measuring energy efficiency from Seasonal Energy Efficiency Ratio (SEER), which measures a machine's performance on the hottest or coldest day of the year, to Integrated Energy Efficiency Ratio (IEER), which assesses performance over an entire season. Achieving higher IEER ratings will require equipment redesign by manufacturers.

Competition from Imports

Domestic manufacturers compete with foreign HVACR equipment manufacturers, who account for about 31% of the US market. HVAC and refrigeration equipment imports rose 44% between 2012 and 2017 and 9.5% in 2018, fell 0.3% in 2019, then rose 2.3% in 2020. The largest import sources are China, Mexico, and Canada, followed by Thailand, Germany and South Korea. Foreign manufacturers enjoy lower labor costs than domestic manufacturers, but are vulnerable to changes in trade policies between countries.

Availability of HVACR Installers

A shortage of skilled HVACR installers could limit growth for equipment manufacturers. Manufacturers typically rely on HVACR contractors to sell and install residential and commercial systems for new construction and building upgrades. Jobs for HVACR mechanics and installers are expected to grow 4% from 2019 to 2029 according to the Bureau of Labor Statistics, in line with the growth for all occupations. This growing demand, combined with the retirement of "baby boomer" technicians, will likely result in a shortage of qualified technicians. This potential shortage is also driven by the evolving skills required of technicians as HVAC systems use more electronic components and become more complex.

Company Risks

Keeping Up with Technical Innovation

HVACR equipment manufacturers must continually develop new models of their products to meet market requirements and remain competitive. Demand for more energy efficient and sustainable HVACR systems is forcing manufacturers to redesign products and incorporate more computerized control into their systems. As systems become more sophisticated, manufacturers who fail to keep up with new technologies risk declining sales and lower margins.

Competing with Large Companies

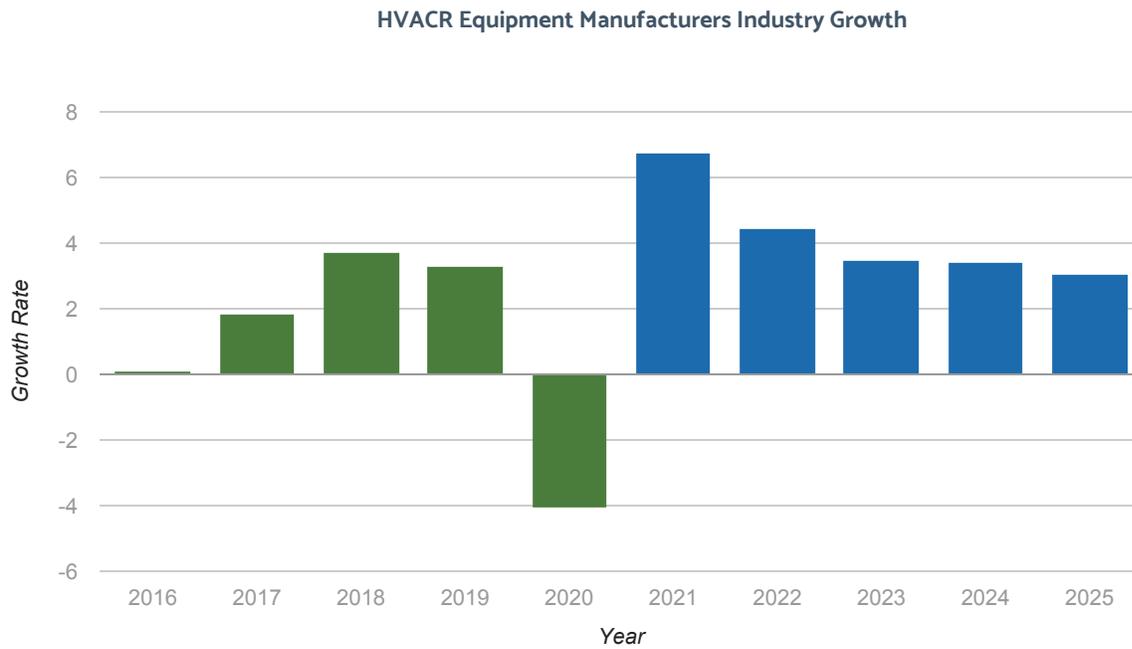
The leading HVACR equipment manufacturers consist of subsidiaries of large conglomerates, such as Carrier, Trane (Ingersoll-Rand) and Goodman (Daikin Group). The top 20 manufacturers represent about 53% of the US market for HVACR equipment. Small HVACR equipment manufacturers may have difficulty competing with these large companies due to their economies of scale in purchasing, manufacturing, and marketing.

Industry Forecast

Sales for the US HVAC equipment manufacturers industry are forecast to grow at a 4.21% compounded annual rate from 2020 to 2025, slower than the growth of the overall economy.

Vertical IQ forecasts are based on the Inforum inter-industry economic model of the US economy. Inforum forecasts were prepared by the Interindustry Economic Research Fund, Inc.

Last Update: August 2021



Source: Interindustry Economic Research Fund, Inc.

Working Capital

Sell and invoice

Firms sell HVACR equipment through wholesalers, distributors, and retailers and may also sell directly to a network of independent installer dealers, as well as large construction contractors, building owners, and food service companies. They may offer cooperative advertising, rebates, or other financial incentives to customers to spur sales. Firms typically invoice and recognize revenue when products are shipped to customers and control and title passes to them.

Some firms also offer installation, maintenance, and repair services. These services are invoiced when completed. Revenue from extended warranties is recognized over the term of the warranty period.

82% of fabricated metal product manufacturers said they go to their accountant or bookkeeper for cash flow advice, while 11% turn to their banker, 66% turn to a colleague, and 12% do not seek advice, according to a survey of small businesses by Barlow Research Associates.

Source: Barlow Research Associates.

Collect

Firms typically offer credit terms to customers. Collection periods average 48 to 53 days sales and receivables average about 27-28% of total assets. Installer dealers and construction contractors can be slow to pay, as they don't get paid by their customers until installation is complete.

Manage Cash

Cash flow is driven by sales and shipments, which can vary depending on economic and weather conditions. Construction of new residential and commercial buildings drives new HVAC equipment sales and can be cyclical with economic activity and interest rates. Replacement sales of existing HVAC units typically rise during warmer than normal summers and colder than normal winters. Likewise, demand for replacement units falls during cooler summers and warmer winters.

Gross margins average about 32-33% of sales. Gross margins are affected by changes in raw material prices, such as steel, copper, and aluminum. Prices for these commodities can be volatile, depending on global demand and supply. Inventory levels also affect cash flow and average 67 to 72 days and 25-26% of total assets.

Pay

Payroll costs average 9-10% of sales and wages for production workers average about \$20 per hour. Rent averages just over 1% of sales and advertising averages about 1%. Other expenses include warranty costs and freight and distribution costs. Payables average 36 to 40 days.

Report

After-tax net profit averages 4-5%. Firms track their average gross margin to measure production efficiency. They also monitor capacity utilization, which averages about 71-77% for machinery manufacturers. On the sales side, firms track unit volume and average selling price by product and model. They also monitor their market share by product type.

Cash Management Challenges

Cash Shortfalls Due to Demand Swings

HVACR equipment manufacturers may face periods of lower demand when new construction activity slows or when unseasonable

weather affects replacement of existing systems. Cooler than normal summers or warmer than normal winters can depress demand for HVAC systems. With high fixed costs for production equipment, firms may experience temporary cash shortfalls during these slowdowns in demand.

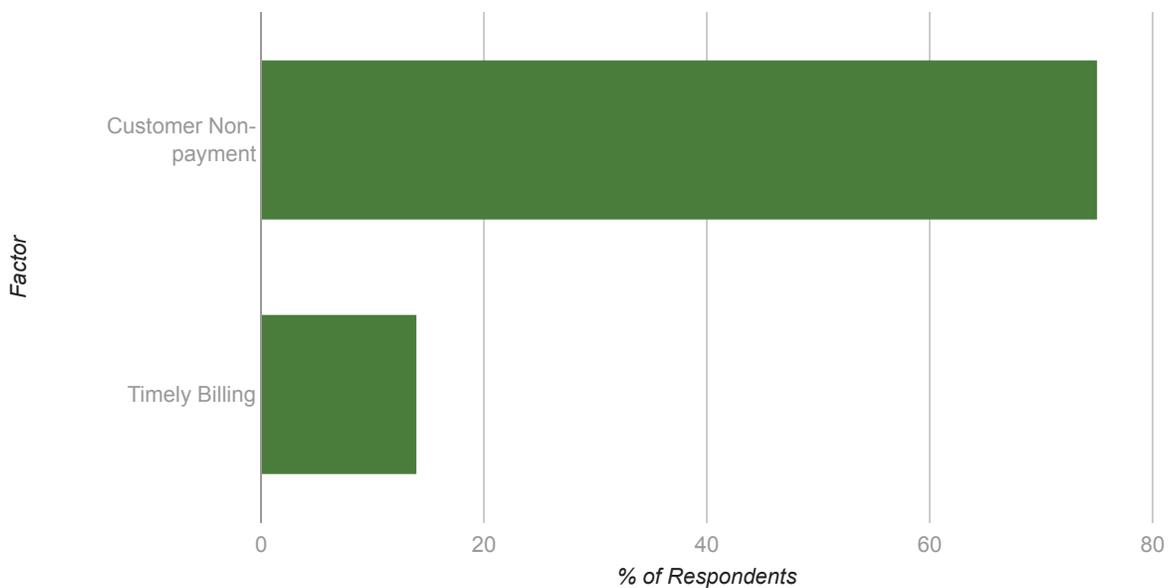
Managing Variable Raw Material Costs

Raw materials used in HVACR equipment include steel, copper, plastic, and electronic components. Prices of metals vary with global supply and demand, while plastic prices are tied to oil prices. To maintain their gross margins, firms manage variability in raw material prices through contracts with suppliers and use of commodity futures contracts.

Timely Collection from Wholesalers and Contractors

HVACR manufacturers sell products through wholesalers and directly to networks of HVAC contractors and large construction companies. These customers can be slow to pay. Customers may delay paying for equipment until it is installed and they get paid by their customers.

Factors Causing Cash Flow Stress: Fabricated Metal Product Manufacturers



Source: Barlow Research Associates

Capital Financing

Projects that require capital financing include the purchase of property, buildings, equipment, machinery, and technology and information systems. Large firms have significant investments in production facilities and distribution warehouses.

Production facilities feature computer numerical control (CNC) metalworking machines, such as milling machines, punch presses, band saws, drills, welders, benders, and fasteners. Firms may also use injection molding machines to form plastic parts or may outsource production of these parts and standard metal parts, such as brackets. Firms invest in powder coating systems consisting of conveyor systems, robotic spray arms and ovens to prepare metal parts for assembly.

HVACR equipment manufacturers rely on computers and information systems to manage day-to-day operations. Specialized software systems integrate information from marketing, sales, production, quality control, warehousing, distribution, purchasing, inventory management, finance, and accounting.

Because the HVACR equipment market is mature, acquisitions are a common source of growth. Many of the largest companies are subsidiaries of larger conglomerates with international operations.

Examples of Equipment Purchases



CNC Milling Machine

\$50,000 and up

A tool used to machine solid materials. There are two types of milling machines: horizontal or vertical, depending on the orientation of the “spindle” which rotates and holds the cutting tools. CNC milling machines (also known as machining centers) use a vertical spindle and may have multiple axis movement (up to 5 axes).



Metalworking Machinery

\$5,000 and up

Include cutters, benders, presses, drills, punches, welders, and fasteners used to process components and build finished machines. Price varies with the complexity of the machine. Tube rolling machine with console is shown in picture.



Injection Molder

\$100,000 - 300,000

Produces plastic parts by injecting melted plastic into a clamp that contains a mold. The end shape produced is the reverse image of the mold. Highly versatile and can produce parts with great detail. Price varies depending on size of part and volume produced.



Information Systems

\$2,000 and up

Computers run computer-aided design (CAD) and computer-aided manufacturing (CAM) software for designing and building machinery to customers' specifications.

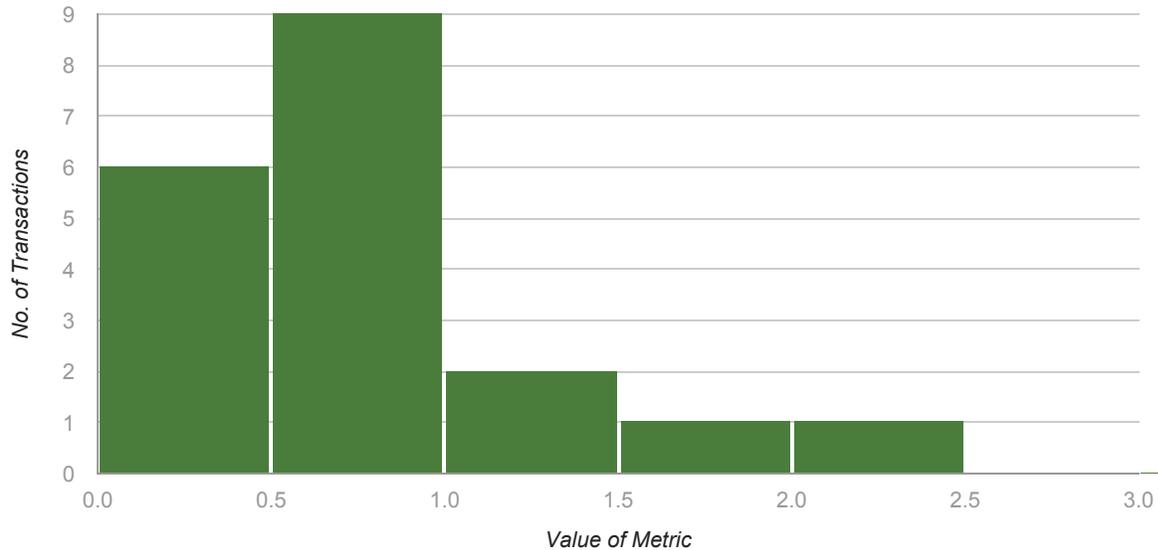
Business Valuation

This data on business valuations is supplied by DealStats, an online database with the most complete financial details on nearly 36,000 acquired companies. These companies are mostly small and medium-sized private firms.

Summary Valuation Data for HVACR Equipment Manufacturers

	MEDIAN	MEAN	# TRANSACTIONS	DATES
Price to Net Sales	0.62	0.77	19	02/20/1998–03/31/2021
Price to Gross Profits	1.72	2.36	18	02/20/1998–03/31/2021
Price to EBITDA	5.24	6.29	12	02/20/1998–03/31/2021
Price to EBIT	5.5	19.68	15	02/20/1998–03/31/2021

Click on the metric below to see a distribution of transactions for the industry:



Source: DealStats

Count: 19

Min: 0.07

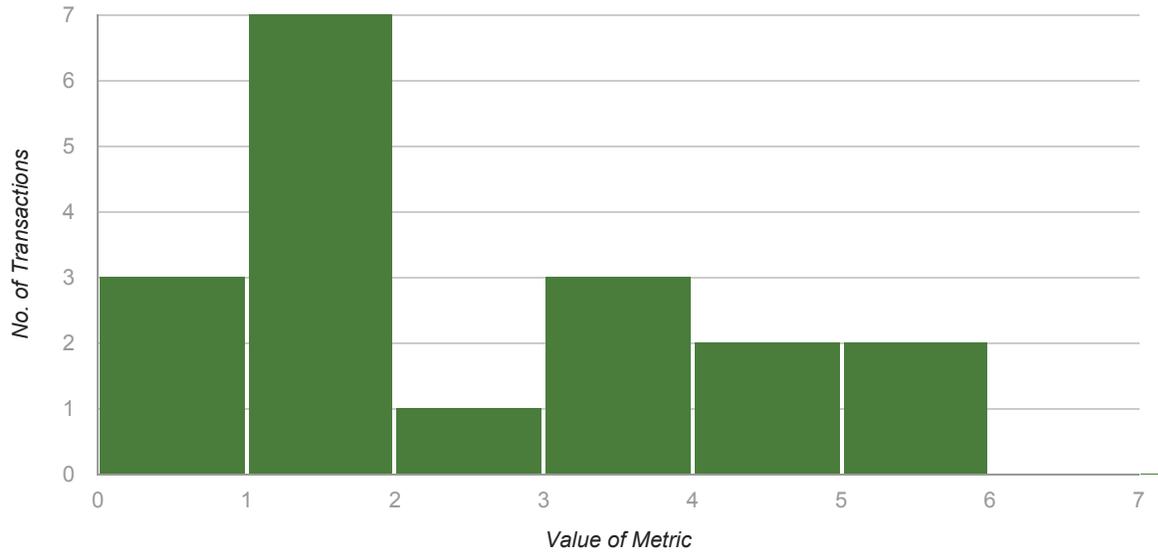
Max: 2.15

Mean: 0.77

Median: 0.62

Price to Sales = Selling Price/Net Sales

Date range: 02/20/1998 - 03/31/2021



Source: DealStats

Count: 18

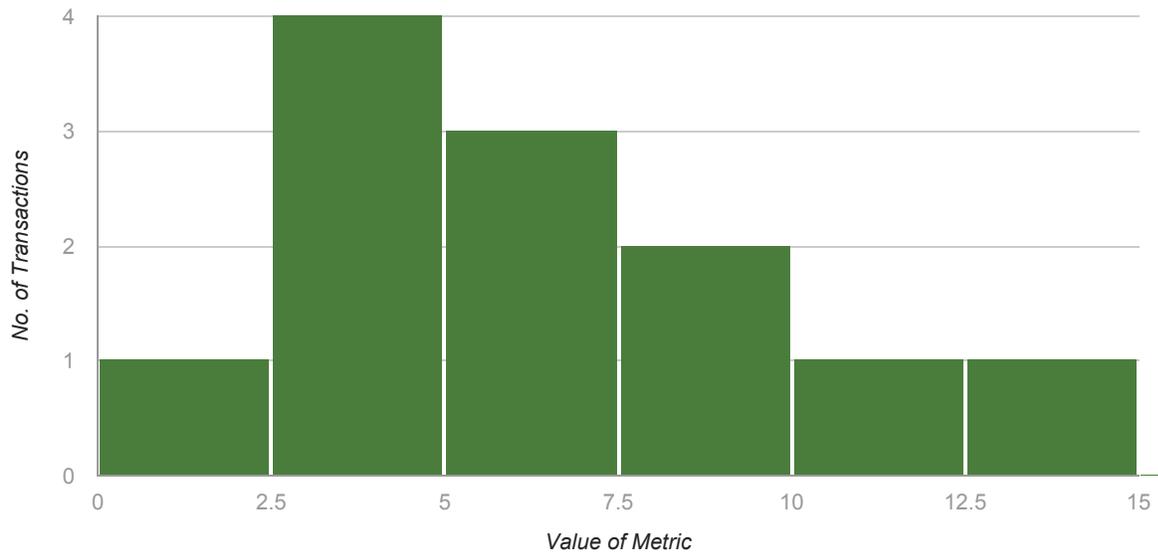
Min: 0.14

Max: 5.52

Mean: 2.36

Median: 1.72

Price to Gross Profit = Selling Price/Gross Profit
Date range: 02/20/1998 - 03/31/2021



Source: DealStats

Count: 12

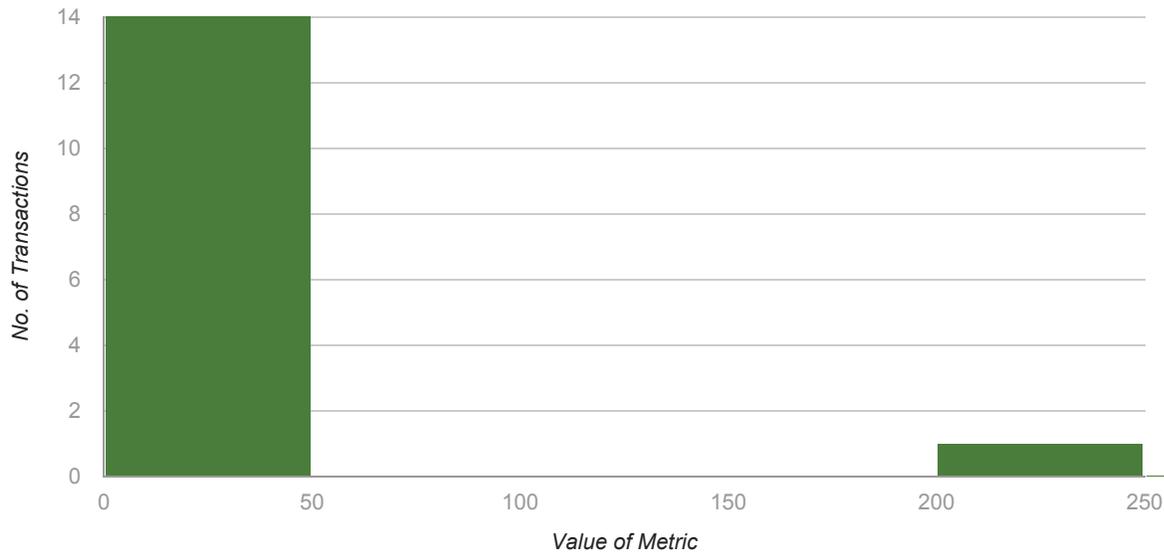
Min: 2.11

Max: 12.5

Mean: 6.29

Median: 5.24

Price to EBITDA = Selling Price/Operating Profit + Depreciation & Amortization
Date range: 02/20/1998 - 03/31/2021



Source: DealStats

Count: 15

Min: 2.23

Max: 200.22

Mean: 19.68

Median: 5.5

Price to EBIT = Selling Price/Operating Profit

Date range: 02/20/1998 - 03/31/2021

Selling Price, also known as MVIC (Market Value of Invested Capital) is the total consideration paid to the seller and includes any cash, notes and/or securities that were used as a form of payment plus any interest-bearing liabilities assumed by the buyer. The MVIC price includes the noncomplete value and the assumption of interest-bearing liabilities and excludes (1) the real estate value and (2) any earnouts (because they have not yet been earned, and they may not be earned) and (3) the employment/consulting agreement values. In an Asset Sale, the assumption is that all or substantially all operating assets are transferred in the sale. In an Asset Sale, the MVIC may or may not include all current assets, non-current assets and current liabilities (liabilities are typically not transferred in an asset sale).

Source: DealStats 2019 (Portland, OR; Business Valuation Resources LLC). Used with permission. DealStats is available at <https://www.bvresources.com/learn/dealstats>

Financial Benchmarks

The following financial benchmark data is based on annual financial statements submitted by member institutions of the Risk Management Association from Q2 of the first year listed through Q1 of the following year.

Financial Ratios (HVACR Equipment Manufacturers, Industry-wide)

MEASURE	2018-19	2019-20	2020-21
Current Ratio [?]	1.72	1.83	1.73
Quick Ratio [?]	.90	.91	.99
Days Inventory [?]	67.0	72.0	72.0
Days Receivables [?]	53	48	54
Days Payables [?]	39.0	36.0	32.0
Pre-tax Return on Revenue [?]	4.95%	4.88%	8.70%
Pre-tax Return on Assets [?]	7.78%	7.80%	13.65%
Pre-tax Return on Net Worth [?]	18.27%	18.68%	37.60%
Interest Coverage [?]	7.50	6.80	10.47
Current Liabilities to Net Worth [?]	.78	.74	.94
Long Term Liabilities to Net Worth [?]	0.57	0.65	0.81
Total Liabilities to Net Worth [?]	1.35	1.40	1.76
<i>Number of Firms Analyzed</i>	236	207	124

Income Statement (HVACR Equipment Manufacturers, Industry-wide)

ITEM	2018-19	2019-20	2020-21
Revenue	100.0%	100.0%	100.0%
Cost of Sales	68.09%	67.6%	66.96%
Gross Margin	31.91%	32.4%	33.04%
Officers Compensation	1.05%	0.9%	0.79%
Salaries-Wages	9.2%	10.64%	8.2%
Rent	1.4%	1.57%	1.05%
Taxes Paid	1.7%	1.99%	1.87%
Advertising	1.01%	1.18%	1.51%
Benefits-Pensions	2.4%	2.76%	2.28%
<i>Number of Firms Analyzed</i>	236	207	124

ITEM	2018-19	2019-20	2020-21
Repairs	0.35%	0.41%	0.56%
Bad Debt	0.16%	0.19%	0.16%
Other SG&A Expenses	6.38%	5.17%	6.64%
EBITDA	8.26%	7.59%	9.98%
Amortization-Depreciation	2.33%	2.21%	2.86%
Operating Expenses	25.98%	27.02%	25.92%
Operating Income	5.94%	5.38%	7.12%
Interest Expense	1.08%	1.02%	0.95%
Other Income	-0.14%	-0.11%	-1.23%
Pre-tax Net Profit	5.0%	4.47%	7.4%
Income Tax	0.47%	0.25%	0.19%
After Tax Net Profit	4.53%	4.22%	7.21%
<i>Number of Firms Analyzed</i>	236	207	124

Balance Sheet (HVACR Equipment Manufacturers, Industry-wide)

ASSETS	2018-19	2019-20	2020-21
Cash	10.49%	11.48%	17.09%
Receivables	27.73%	27.32%	25.96%
Inventory	25.42%	25.74%	21.84%
Other Current Assets	3.96%	3.81%	3.57%
Total Current Assets	67.6%	68.35%	68.46%
Net Fixed Assets	17.47%	15.79%	17.31%
Net Intangible Assets	10.16%	9.84%	9.75%
Other Non-Current Assets	4.78%	6.02%	4.48%
<i>Total Assets</i>	100.0%	100.0%	100.0%
LIABILITIES			
Accounts Payable	13.89%	14.55%	12.27%
Loans/Notes Payable	10.68%	13.99%	11.95%
Other Current Liabilities	16.21%	16.43%	16.12%
<i>Number of Firms Analyzed</i>	236	207	124

LIABILITIES

Total Current Liabilities	40.78%	44.96%	40.34%
Total Long Term Liabilities	20.54%	18.93%	20.75%
Total Liabilities	61.32%	63.89%	61.09%
Net Worth	38.68%	36.11%	38.91%
Total Liabilities & Net Worth	100.0%	100.0%	100.0%
<i>Number of Firms Analyzed</i>	236	207	124

Vertical IQ financial benchmark data is based on data provided by the Risk Management Association (RMA) and Powerlytics, Inc. RMA's Annual Statement Studies provide comparative industry financial benchmarks based on financial statements of small and medium business clients of RMA's member institutions. Additional detail on income statement line items is provided using Powerlytics financial benchmarks, which are based on reporting submitted to the IRS. Additional detail on these data sources can be found at [RMA](#) and [Powerlytics](#).

Quarterly Insight

4th Quarter 2021

HFC Rule Finalized

The Environmental Protection Agency has finalized a rule that largely phases out the use of hydrofluorocarbons (HFCs) in HVACR equipment. Experts say that HFCs, which are the basis for most cooling technology, have up to 11,700 times the warming potential of carbon dioxide. The EPA's new rule oversees the phase-out of HFCs over the next 15 years, giving manufacturers increasingly smaller allowances each year. There are also safeguards in place to make sure that manufacturers don't illegally import HFCs beyond the limits allotted to them, which was a big problem in the European Union, where HFC reduction targets are already in place. The requirement becomes active in 2022, when the industry is allowed to use 90% of its current allotment of HFCs in producing new appliances and maintaining old ones.

3rd Quarter 2021

Construction Starts Decreased In June

Total construction starts, a driver of demand for HVACR equipment, decreased 7% in June compared to the prior month but increased 15% year over year for the first half of 2021, according to Dodge Data & Analytics. All three major sectors (residential, nonresidential building, and nonbuilding) decreased from the prior month. "Unabated materials price inflation has driven a significant deceleration in single family construction," said Richard Branch, Chief Economist for Dodge Data & Analytics. "Lumber futures have eased in recent weeks, but builders are unlikely to see much relief over the short-term, meaning that building costs will continue to negatively influence the housing industry. On the other hand, the nascent recovery in nonresidential buildings has continued on as projects pile up in the planning stages. These mixed signals coming from both residential and nonresidential construction starts suggest that recovery from the pandemic will remain uneven in coming months as rising materials prices and labor shortages weigh on the industry."

2nd Quarter 2021

Firms Increase 2021 Sales Growth Projections

Strong home sales boosted Q1 2021 earnings for HVACR equipment manufacturers and led most to raise their outlook for the year. Carrier's first quarter sales increased 21% year over year, and organic sales were up 17%. Carrier has revised its full-year outlook to include sales growth of 7% to 10%, up from 6% to 8%, and organic sales growth of 5% to 8%, up from 4% to 6%. Johnson Controls announced a 3% year-year-over-year sales increase on a reported basis and a 1% organic increase. The company raised its 2021 full-year guidance for organic revenue growth to be up mid-single digits year-over-year.

1st Quarter 2021

Commercial Systems Being Upgraded as Leases Turn

Demand for HVACR equipment is likely to increase as architecture firms get more requests to upgrade HVAC systems in commercial buildings. High-density filtration is a common request from office building owners, as are ion technology and UV lighting in HVAC systems. Landlords are asking for Minimum Efficiency Reporting Values air filters rated between 11 to 13. The higher the number, the greater the ability for filters to capture small particles. Ion technology in HVACR systems use an ion rod that spins in the ductwork. The rod ionizes the molecules in the air and neutralizes viruses and bacteria. Much of the work on HVACR equipment is being done when building leases turn, which happens every 5, 7, or 10 years, depending on the contract.

4th Quarter 2020

Construction Starts Drop

Total construction starts, a driver of demand for HVACR equipment, fell 18% in September compared to the prior month and were down 14% year over year for the first nine months of 2020, according to Dodge Data & Analytics. Nonresidential starts decreased 26% during the first nine months of 2020; nonbuilding, which includes infrastructure projects, was down 18%; residential starts gained 1%. “The economic recovery has lost momentum and is showing strain since support provided to consumers and businesses from expanded unemployment insurance benefits and the Paycheck Protection Program have expired. The worsening budget crisis for state and local areas has also slowed growth in public project starts, particularly in the face of a somewhat uncertain outlook for federal infrastructure spending programs. The road to recovery will continue to be uneven and fraught with potholes until a vaccine is developed and widely adopted across the U.S.,” said Richard Branch, Chief Economist for Dodge Data & Analytics.

3rd Quarter 2020

New Orders Rebound

Orders for heating, ventilation, air-conditioning, and refrigeration equipment declined 4.7% during the first seven months of 2020 but rose 6.4% year over year in July, according to the US Census Bureau. Orders declined 6.5% in July compared to June, but were up 19% compared to May. Growth in orders reflects strong equipment sales: Heating, Air-conditioning & Refrigeration Distributors International (HARDI) reports that the average sales performance by HARDI distributors rose 8.4% in July and 24.3% in June.

2nd Quarter 2020

Industry Seeks Mexico Quarantine Intervention

US HVACR equipment companies with production plants in Mexico asked federal officials to work with Mexican officials in allowing their facilities to remain operational during Mexico’s quarantine. Nonessential businesses that continued to operate were subject to sanctions, forced closure and potential lawsuits. Mexico’s quarantine was extended to May 30th. Demand for refrigeration equipment since the outbreak has been high, so sales opportunities could be lost due to lower production from Mexican facilities.

1st Quarter 2020

Residential Construction Increase Expected

Strong growth in housing starts in late 2019 and continuing economic strength have spurred The Federal National Mortgage Association, commonly known as Fannie Mae, to revise its housing forecast for 2020. The government-sponsored mortgage guarantor now predicts housing starts to jump 10% in 2020, with 1 million new homes hitting the market by 2021. Doug Duncan, chief economist and senior vice president at Fannie Mae, says that builders will be working throughout 2020 to replenish inventories drawn down by the recent surge in new home sales.

Industry Terms

BTU

British Thermal Unit: Describes an air conditioning unit's cooling capacity

HCFC

Hydrochlorofluorocarbons. Also known as R-22, a refrigerant that contains ozone-destroying chlorine.

HFC

Hydrofluorocarbons, a refrigerant containing hydrogen, fluorine, and carbon. Better for ozone layer than HCFC, but still a contributor to global warming

IEER

Integrated Energy Efficiency Ratio: measures energy efficiency of HVAC units over an entire season

Kigali Amendment

International agreement reached in 2016 to phase out the use of HFCs as a refrigerant

LEED

Leadership in Energy and Environmental Design: Internationally recognized green building certification system

SEER

Seasonal Energy Efficiency Rating: Measure of energy efficiency for HVAC units on the hottest or coldest day of the year

Web Links

[The Air Conditioning/Heating/Refrigeration News](#)

News, trends, and statistics.

[Air-Conditioning, Heating, and Refrigeration Institute](#)

Statistics – equipment sales trends from trade association

[Plumbing-Heating-Cooling Contractors Association](#)

Government issues, training, and trends from trade association.

Related Profiles

Hardware, Plumbing & HVAC Distributors

NAICS: 4237 SIC: 5072, 5074, 5075, 5078

HVAC & Plumbing Contractors

NAICS: 238220 SIC: 1711

Industrial Machinery Manufacturers

NAICS: 3332 SIC: 355x

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