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Heating, Ventilation, Air Conditioning & Refrigeration (HVAC R) Market in Saudi Arabia

A knowledge paper prepared for



Contents

- 03 | **Foreword**
- 04 | **Executive Summary**
- 05 | **Saudi Vision 2030**
- 06 | **Saudi Arabia Economic Outlook**
- 08 | **HVAC Market Overview**
- 15 | **Refrigeration Market Overview**
- 20 | **Market Dynamics**
- 25 | **Market Trends & Developments**
- 26 | **Policy & Regulatory Landscape**
- 30 | **Case Studies**
- 32 | **Way Forward**
- 34 | **About Us & Disclaimer**

Foreword

Saudi Arabia is one of the leading countries in the Gulf Cooperation Council (GCC) region. In 2018, the Kingdom had one of the highest GDPs (USD782.48 billion) in the region. Geographically, a large part of the country is an arid desert. The Kingdom witnesses extreme heat with temperatures reaching to around 50°C for much part of the year. The economy of Saudi Arabia is largely dependent on oil exports that constitute about 75% of budget revenues and 90% of export earnings. The Government of Saudi Arabia wants to make the Saudi economy less dependent on oil in the future. Presently, the private sector in Saudi Arabia accounts for around 40% of the Nominal GDP.

Moreover, the Government of Saudi Arabia has implemented new rules to promote energy efficiency, especially for HVAC R systems, which consume the largest share of electricity in the country. Thus, there is growing demand for more efficient cooling solutions from residential and commercial construction sectors along with surging demand for the replacement of old cooling systems. As a result, Saudi Arabia is emerging as one of the largest markets for indoor cooling and refrigeration in the region.

HVAC R systems market in Saudi Arabia stood at USD3.65 billion in 2018 and exhibited a CAGR of 10.52% during 2014-2018, The market is forecast to grow at a CAGR of 11.89% during 2019-2024. The total HVAC R market in the country represents close to 2.02% of the global HVAC R market.

Saudi Arabia is experiencing huge demand for more efficient cooling systems, as utilities represent close to one-third of per capita expenditure in the country. Some of the leading companies in the country are Carrier, LG Shaker, Zamil, Samsung, Gree and Daikin. The central region including the territories of Ha'il, Qasim and Riyadh represents more than a third of the country's HVAC R market, while the sparsely populated northern region (Jawf and Northern borders) represents approximately a tenth of the market.

Executive Summary

Heating, Ventilation, Air Conditioning, and Refrigeration (HVAC R) is a system that performs cooling and/or heating for residential, commercial, industrial and institutional buildings. The system also provides fresh air to dilute interior airborne contaminants. For varied industrial applications, different types of air conditioning systems are available in the market such as split-system, packaged-system, heat pumps, window air conditioners and chilled water systems.

Global HVAC market stood at over USD150 billion in 2018 and is projected to cross USD250 billion by 2024, exhibiting a CAGR of 8.39% during 2019-2024. With increasing food wastage across the world, governments across the globe are taking initiatives to reduce food wastage, which is anticipated to fuel the refrigeration market during forecast period.



Global HVAC market is segmented by product type i.e. direct expansion systems and centralized air conditioning systems. The direct expansion systems segment captured the largest share in global HVAC market in 2018, whereas the central air conditioning systems segment is expected to exhibit the fastest growth rate of 8.65% during 2019-2024. The growth in the demand for central air conditioning systems is primarily on account of expanding commercial and industrial sectors in emerging economies like India and China. HVAC market, globally, is highly competitive and fragmented with the presence of many global and regional level players. Japan-based Daikin Systems, one of the major market players in global HVAC market, accounted for a revenue share of over 10.22% in 2018, followed by UTC.

HVAC R market in Saudi Arabia reached USD3.65 billion in 2018, backed by increasing number of infrastructure and construction projects in different cities such as Riyadh, Makkah, and Eastern Region. Other contributing factors include the country's hot and arid climate and the Government's efforts towards the efficient use of energy.

Global HVAC market stood at over USD150 billion in 2018 and is projected to cross USD250 billion by 2024



Saudi Vision 2030

Aims at diversifying the country's economy by investing and promoting non-oil based sectors.

Key Goals and Objectives of Vision 2030



- To increase the public investment fund's assets from **USD159.89 billion in 2016 to USD1,865.40 billion by 2030.**
- To increase the share of non-oil based exports from **16% in 2016 to 50% by 2030.**
- To increase the share of Foreign Direct Investment (FDI) in GDP from **3.8% in 2016 to 5.7% by 2030.**
- To increase the private sector contribution from **40% in 2016 to 65% of GDP by 2030**, thereby opening up different sectors for private sector players.
- Vision 2030 also plans to attract **36 million** pilgrims a year to the country's holy places.

Key Initiatives to Achieve Vision 2030

- Saudi Arabia aims to set up a sovereign wealth fund amounting to around USD2 trillion to support the development projects associated with the Vision 2030.
- FDI worth USD1 trillion is anticipated to flow in the country during 2017-2032, thereby boosting the private sector growth.

National Transformation Program 2020

- To build the capabilities required to achieve the goals of "Vision 2030," the National Transformation Program 2020 (NTP) was launched as a vision realization program (VRP), involving 24 government agencies.
- NTP 2020 is aims to improving economic enablers, enhancing standard of living, and achieving governmental operational excellence. In addition, there are 433 initiatives in NTP 2020 under eight themes such as healthcare, social empowerment, labor market, and tourism.



Saudi Arabia Economic Outlook

Regardless of falling oil costs, Saudi Arabia will pay its citizens cost-of-living allowances. The budget will boost spending even as Saudi Arabia attempts to close its budget deficit, indicating Riyadh’s priority to urge growth in an economy hurt by lower oil prices. State spending will increase by more than 7 percent next year to 1.106 trillion riyals (\$295 billion) from 1.030 trillion riyals.

The Government of Saudi Arabia is facing several challenges, especially in controlling the fiscal debt, diversifying government revenues and in minimizing dependence on oil. Non-oil based sectors have shown growth in their revenues as government focuses on reducing oil dependence, which is an important contributor to the country’s GDP. The large budget indicates that KSA is expecting significant revenue growth in the years to come. Declining crude oil prices have led to increased investments in the non-oil sector, through various initiatives like the National Transformation Program (NTP) 2020, undertaken to drive the institutional capacity and capabilities needed to achieve Saudi Arabia’s Vision 2030.

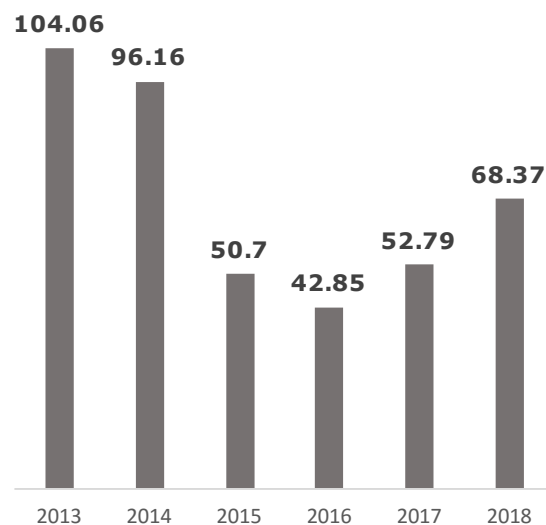


**Saudi Arabia GDP, 2013-2018
(USD Billion)**



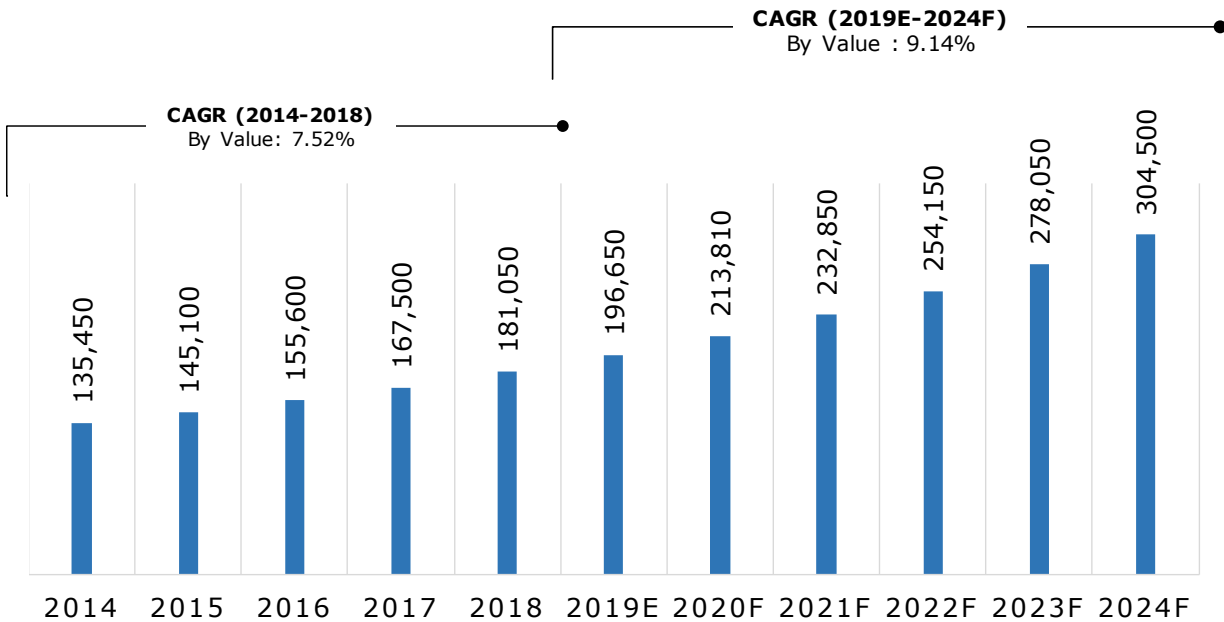
Source: World Bank

**Saudi Arabia Crude Oil Prices,
2013-2018 (USD/bbl)**



Source: World Bank

Global HVAC R Market Size, By Value, 2014-2024F (USD Million)



Source: TechSci Research

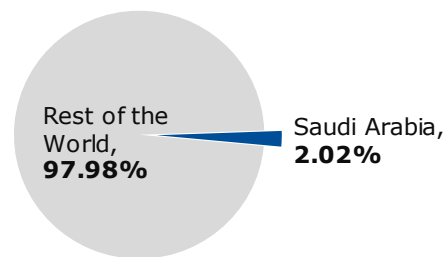
Saudi Arabia HVAC R Current Scenario

The Saudi Arabia HVAC R market valued at USD3,655.80 million in 2018, and projected to grow at a CAGR of 11.89% during 2019-2024. This growth is highly attributed to the recovering economy and increasing focus on infrastructural development in the country.

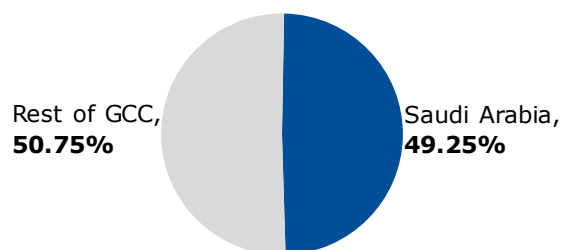
In 2018, Northern & Central region of Saudi Arabia accounted for the largest share i.e., 40.85% in the Saudi Arabia HVAC R market, owing to the increasing construction projects for commercial and residential buildings.

Saudi Arabia captured a 49.25% share in the HVAC R market in overall GCC countries including the UAE, Bahrain, Saudi Arabia, Oman, Qatar and Kuwait. Saudi Arabia is one of the fast growing and strong economies in the GCC, occupying almost 46.90% share in GCC GDP in 2017.

Share of Housing Units in Saudi Arabia, By Area, 2018



Saudi Arabia HVAC R Market Share in Total GCC Market, By Value, 2018



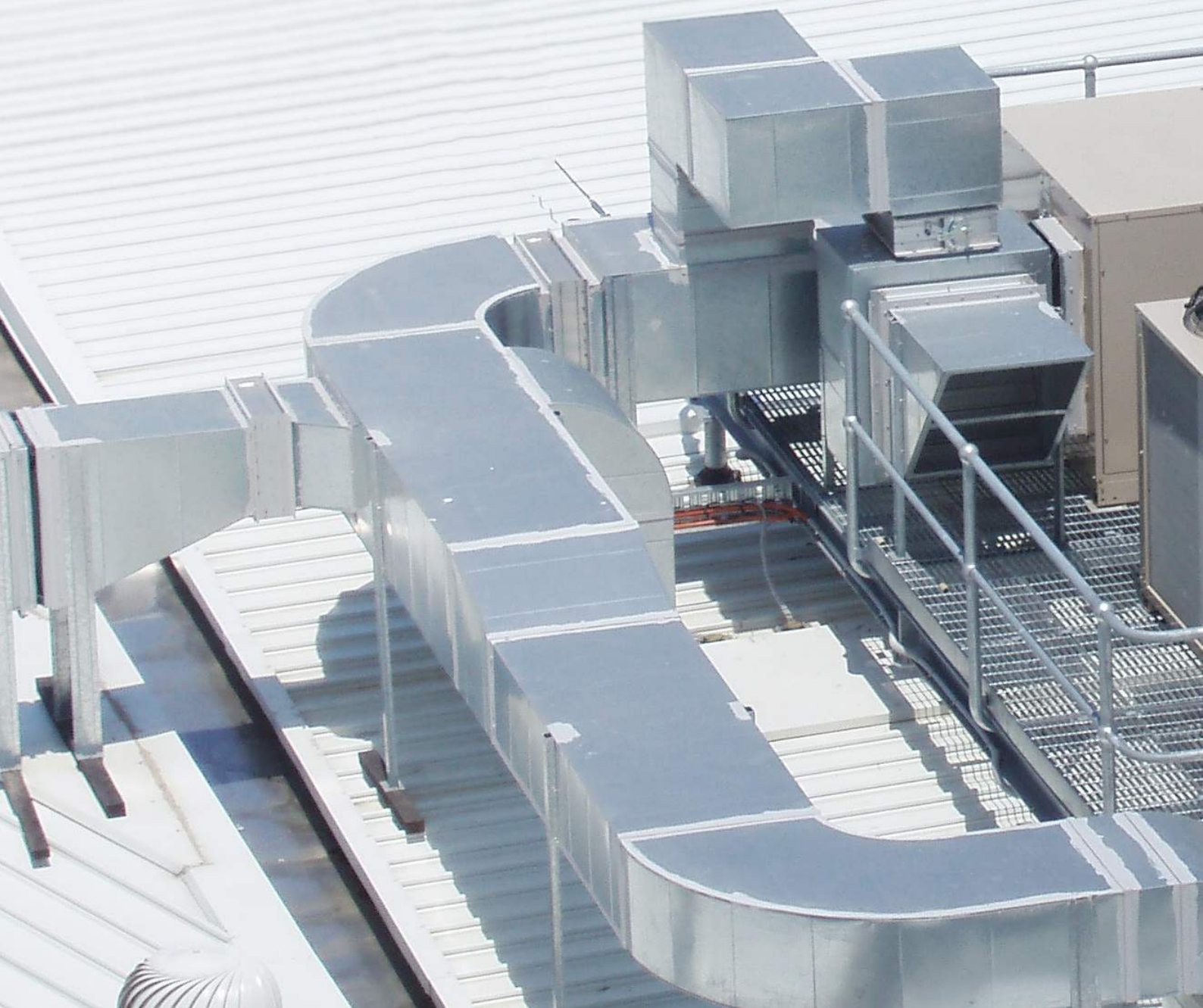
Source: TechSci Research

HVAC Market Overview

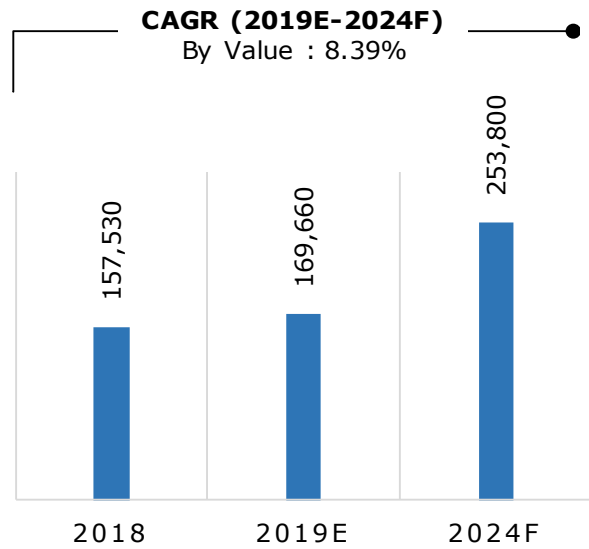
Global HVAC Current Scenario

Global HVAC market is forecast to grow from USD157,530 million in 2018 to USD253,800 million by 2024. Some of the equipment of HVAC include heat pumps, furnaces, humidifiers, air conditioners and air handling units. The demand for air handling units such as air purifiers is increasing rapidly with growing pollution levels across the globe. Strong growth in the hospitality and travel & tourism industries across the world is boosting the demand for HVAC systems, globally.

Global travel & tourism industry registered a CAGR of 15.79% during 2016-2018 and its contribution to the global GDP also increased from 10.20% in 2016 to 11.70% in 2018. The travel & tourism industry plays an important role in the global HVAC market, as travel & tourism industry players generates huge demand for HVAC systems in order to provide comfort to domestic and international tourists.

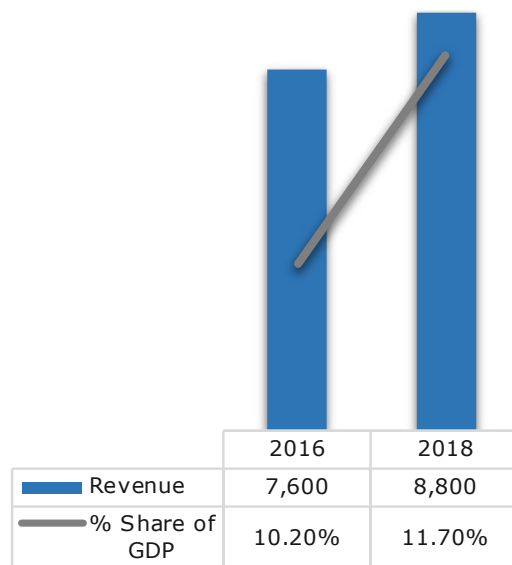


Global HVAC Market Size, By Value, 2018, 2019E & 2024F (USD Million)

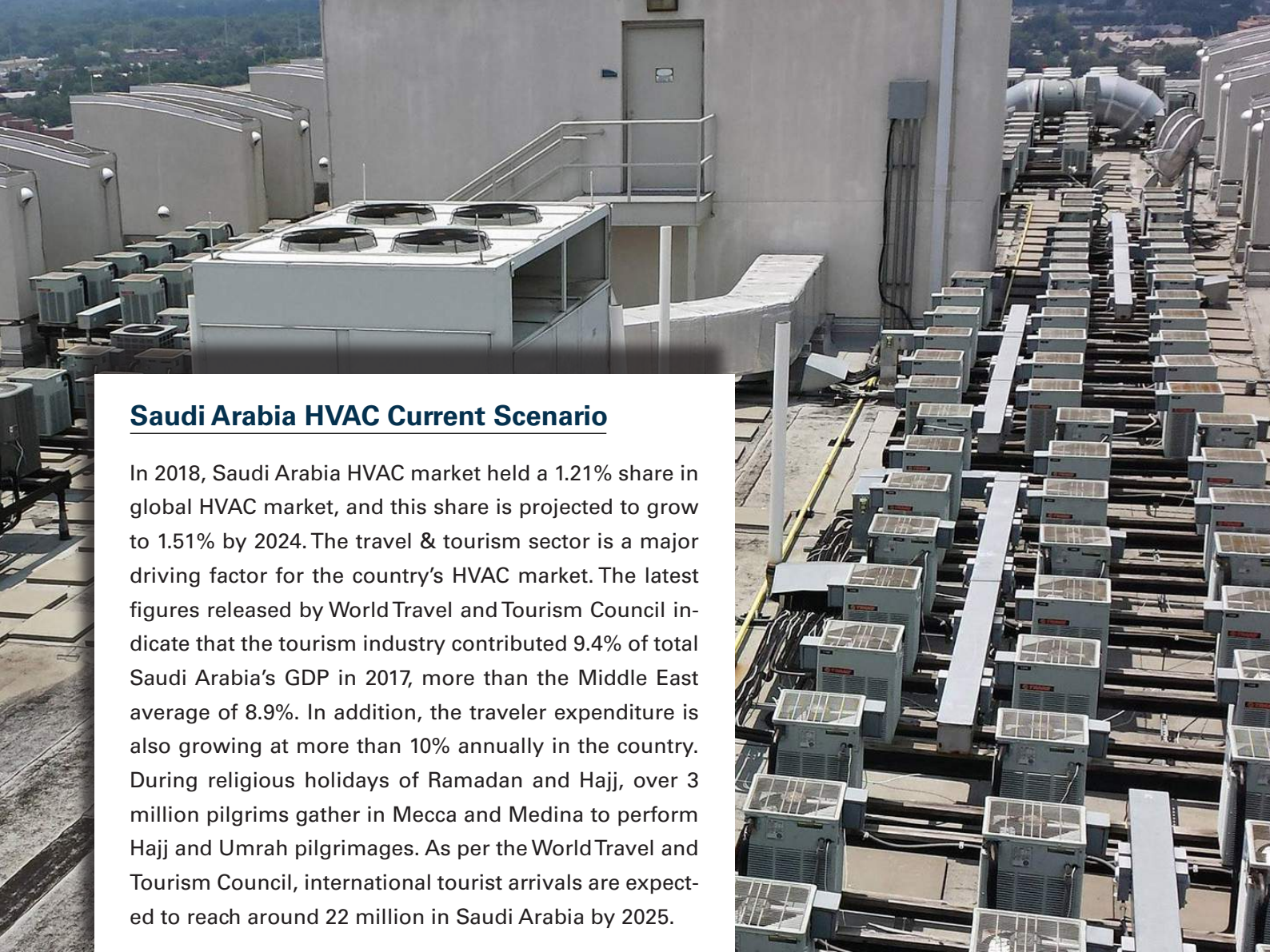


Source: TechSci Research

Revenue from Travel & Tourism Industry and % Contribution to Global GDP, 2016 & 2018 (USD Billion)



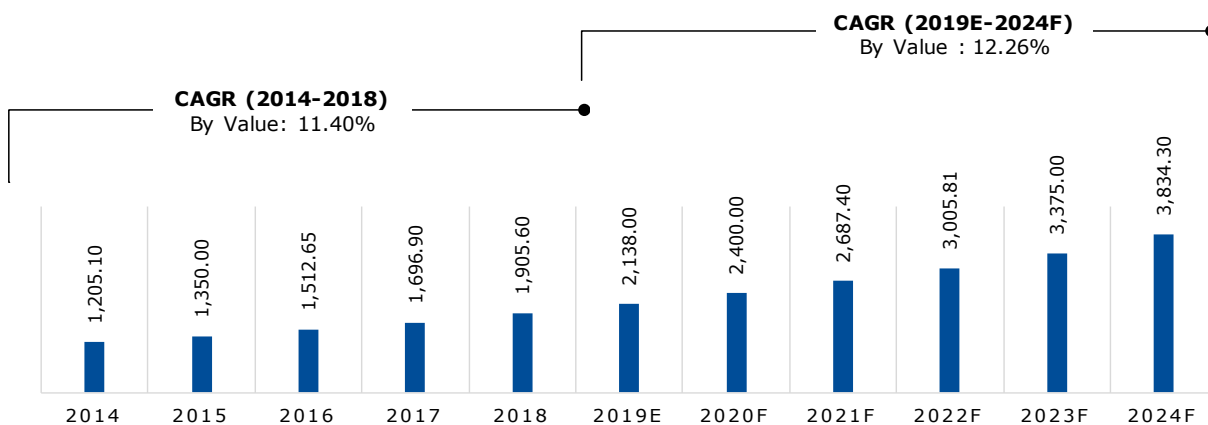
Source: World Tourism Organization & TechSci Research



Saudi Arabia HVAC Current Scenario

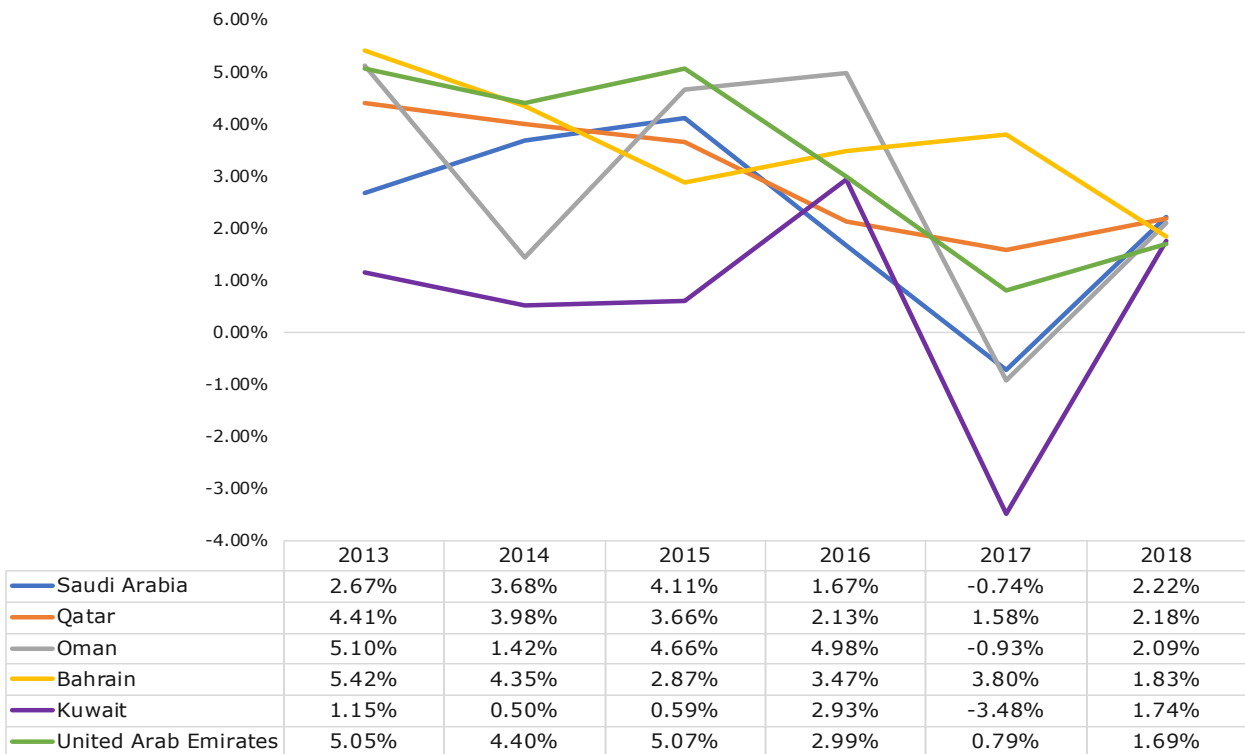
In 2018, Saudi Arabia HVAC market held a 1.21% share in global HVAC market, and this share is projected to grow to 1.51% by 2024. The travel & tourism sector is a major driving factor for the country's HVAC market. The latest figures released by World Travel and Tourism Council indicate that the tourism industry contributed 9.4% of total Saudi Arabia's GDP in 2017, more than the Middle East average of 8.9%. In addition, the traveler expenditure is also growing at more than 10% annually in the country. During religious holidays of Ramadan and Hajj, over 3 million pilgrims gather in Mecca and Medina to perform Hajj and Umrah pilgrimages. As per the World Travel and Tourism Council, international tourist arrivals are expected to reach around 22 million in Saudi Arabia by 2025.

Saudi Arabia HVAC Market Size, By Value, 2014-2024F (USD Million)



Source: TechSci Research

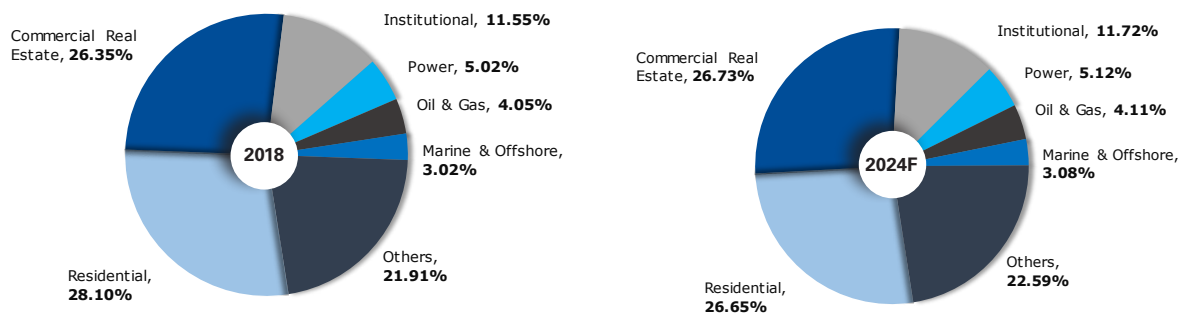
Percentage Change in GDP (Constant Prices) of GCC Member Countries, 2013-2018



Source: General Authority of Statistics and International Monetary Fund

Saudi Arabia is a strong and fast-growing economy in the Middle East region. With increasing oil prices, the economy of GCC countries is recovering. Moreover, the economy of Saudi Arabia is shifting towards non-oil sector, as the fluctuation in oil prices in 2015, negatively impacted the GDP growth of all of GCC countries as shown in the below graph. The government of Saudi Arabia is targeting to increase the contribution of non-oil sector in GDP from around 57% in 2016 to 70% in 2020. As of 2018, oil & gas industry contributes around 40% to Saudi Arabia’s GDP.

Saudi Arabia HVAC Market Share, By End-User, By Value, 2018 & 2024F



Others include Automotive, Data Centers, Cold Storage, etc.
Source: TechSci Research

Residential sector dominated Saudi Arabia HVAC market in 2018, accounting for a 28.10% share, followed by commercial and real estate industry. The number of smart buildings is increasing in the GCC countries, especially in the UAE and Saudi Arabia, owing to the convenience and energy efficiency they provide. Moreover, increasing commercial registrations are positively influencing the demand for HVAC systems in Saudi Arabia. For instance, Riyadh and Makkah jointly accounted for around 52% share in total commercial registrations in the country in 2018.

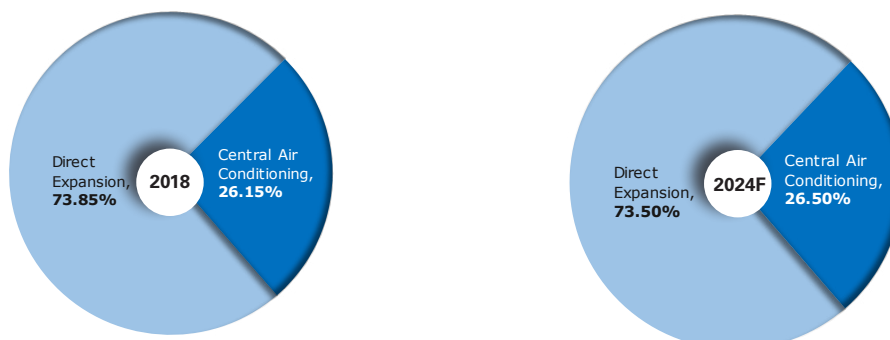
Moreover, market players are constantly introducing new products in the market and enhancing their product portfolio to boost their customer base. For example, in 2017, Carrier, one of the major HVAC system provider, launched AquaForce 30XV air-cooled screw chiller, XPower variable refrigerant flow system (VRF) and Airovision 39HQM air-handling unit in Saudi Arabia.

Building Permits Issued By Municipalities in Saudi Arabia, 2018

Regions	Total Number of Units	Number of Permits	% Share of Permits
Al-Riyadh	87614	23735	26.75%
Makkah Al-Mokarramah	103815	15753	17.76%
Madinah Al-Monawarah	19077	11620	13.10%
Eastern Region	33155	10278	11.59%
Al-Qaseem	31041	7439	8.39%
Aseer	31233	6820	7.69%
Hail	9388	3429	3.87%
Northern Borders	6652	2505	2.82%
Tabuk	8426	1916	2.16%
Al-Jawf	3395	1844	2.08%
Jazan	6883	1777	2.00%
Najran	3127	976	1.10%
Al-Baha	2573	621	0.69%
Total	346379	88713	100.00%

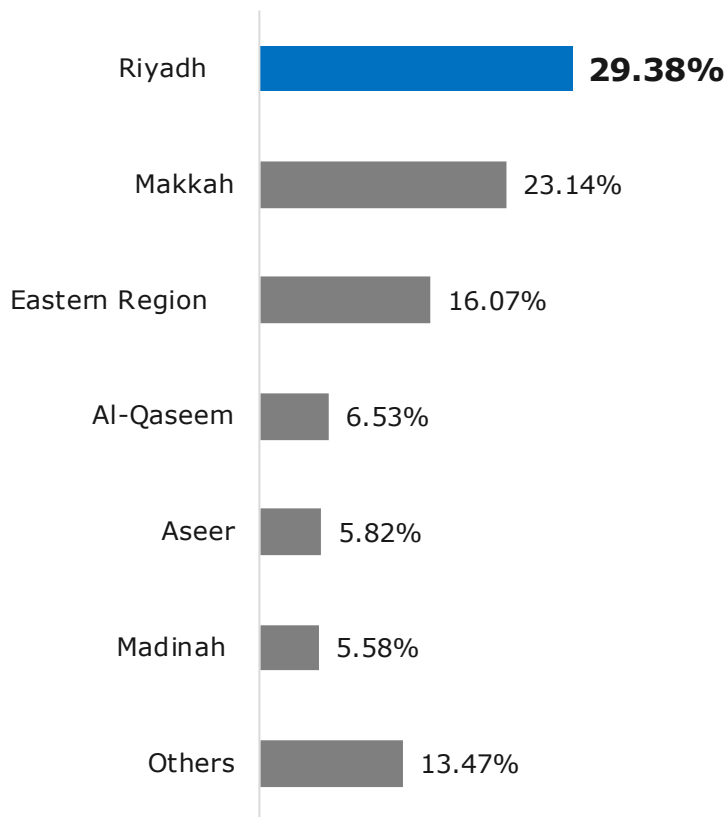
Source: Ministry of Municipal and Rural Affairs

Saudi Arabia HVAC Market Share, By Product Type, By Value, 2018 & 2024F



Source: TechSci Research

Share of Commercial Registrations in Saudi Arabia, By Region, 2018



Source: Ministry of Municipal and Rural Affairs



Share of Housing Units in Saudi Arabia, By Area, 2018

Project	Location	Cost	Status
Al-Diriyah Festival City	Riyadh	USD1.6 billion	Approved in 2016
Jazan Economic City (JEC)	Jazan	USD26.72 billion	Expected to complete in 2037
Pilgrim City (Dar Al-Hijrah)	Madinah	USD14.7 billion	Under Construction
Al-Faisaliya City Project	Makkah	USD25 billion	Under Construction
Riyadh Metro	Riyadh	USD6.7 million	Expected to complete in 2022
Qiddiya Entertainment City	Qiddiya	-	first phase expected to complete in 2022
NEOM- Megacity	Neom	USD500 billion	Expected to complete in 2025

Source: TechSci Research



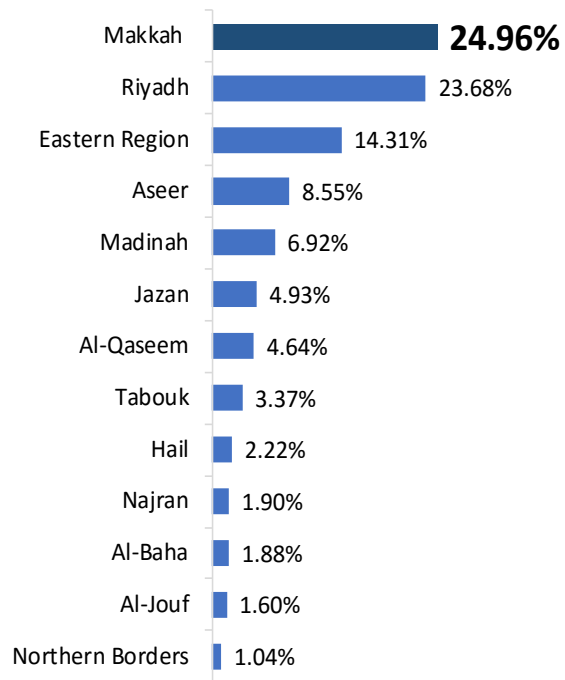
Saudi Arabia's King Abdullah Economic City (KAEC) and King Abdullah Financial District (KAFD) are among the most ambitious projects in the world.

The USD100 billion KAEC project would be home to 2 million people and one of the world's biggest deep-water ports, which is expected to attract global business and tourism in Saudi Arabia.

Qiddiya Entertainment City is another major transformational project, including theme parks, water parks, motor sports, hotel resorts and heritage events, which is expected to positively impact the demand for HVAC systems in the country. Moreover, companies such as Hitachi and Daikin are launching new products and technologies supported by Saudi Standards, Meteorology and Quality Organization (SASO) regulations to cater to growing demand in the Middle Eastern country.

Share of Housing Units in Saudi Arabia, By Area, 2018

Total Housing Units
3.60 Million



Source: General Authority of Statistics

Saudi Arabia Average Weekly Operational Hours of Electrical Energy Use, 2018

Use Type	Number of Equipment Used	Average Operation Hours / Week	
		Winter	Rest of the Year
Heating	6,695,129	48	05
Water Heating	12,781,294	75	21
Air Conditioning	32,646,304	20	56
Lighting	231,305,019	53	55
Cooking	3,381,270	09	10
Food Preservation	8,512,342	167	167
Total	295,321,358	67	63

Source: Saudi Arabia Household Energy Survey 2018

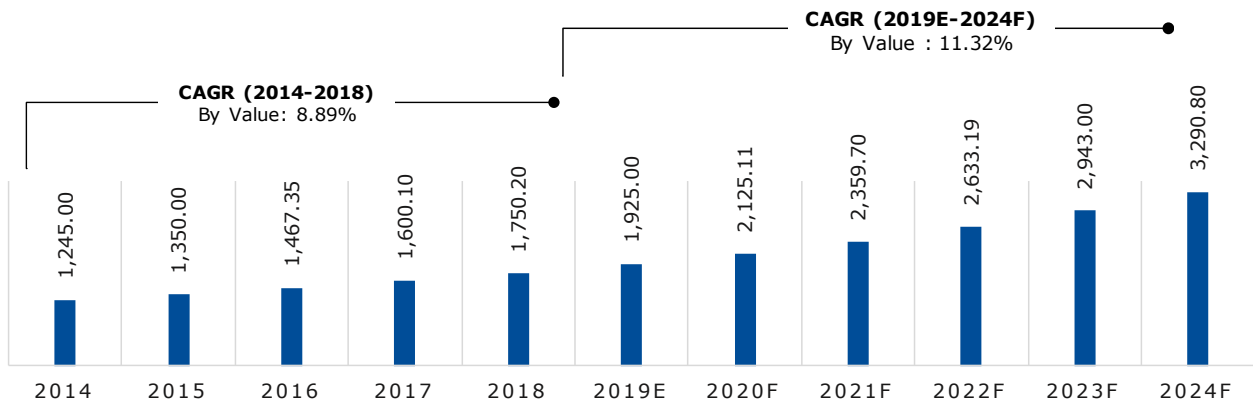


Refrigeration Market Overview

In 2018, Saudi Arabia refrigeration market was valued at USD1,750.20 million and is projected to grow at a CAGR of 11.32% during the forecast period. Increasing government initiatives towards reducing food wastage are majorly driving the country's refrigeration market. The Ministry of Environment, Water and Agriculture (MEWA) ranked Saudi Arabia number one in food wastage in the world. In one year, approximately 30% of the total food produced is wasted, which roughly costs around USD13 billion.

To reduce this food wastage, in 2018, the General Sports Authority signed a deal with the Saudi Food Bank, aimed at promoting the preservation of food and reducing food wastage. This program is expected to target more than 100 hotels and restaurants in the country.

Saudi Arabia Refrigeration Market Size, By Value, 2014-2024F (USD Million)



Source: TechSci Research

Saudi Arabia experiences extreme climatic conditions, with temperatures often shooting up to 50°C during peak summer. This significantly impacts the usage of electric energy and food consumption behavior of the population.

Hence, the operation of refrigeration systems plays an essential role in maintaining the comforts of daily life.

Saudi Arabia Annual Consumption Expenditure in Domestic Market, 2017 (USD Million)

Gross Rent, Fuel & Power

68,547

Food, Beverages & Tobacco

60,943

Transport & Communication

46,544

Recreation, Entertainment
Education & Cultural Services

31,503

Furnitures, Furnishing &
Households Equipment

23,034

Clothing & Footwear

16,963

Medical Care & Health Expenses

5,659

Other Goods & Services

18,918

Source: General Authority for Statistics, KSA



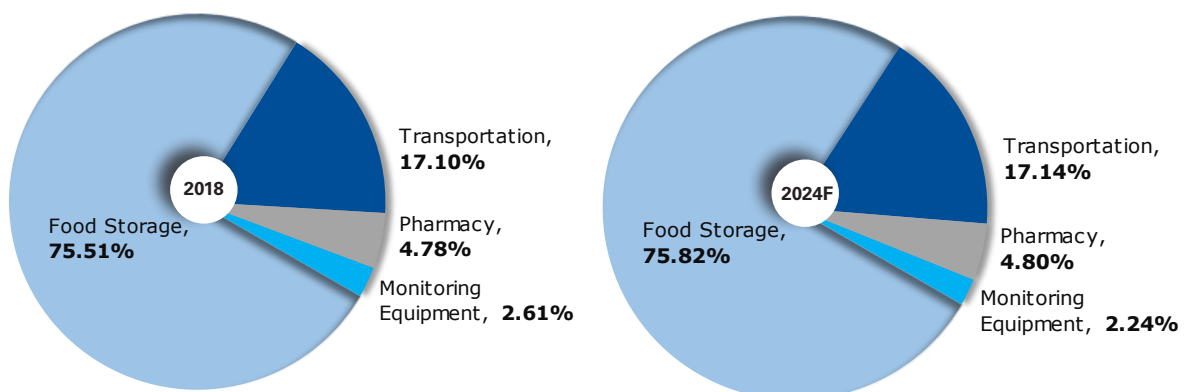
In 2018, food storage application accounted for a 75.51% share in Saudi Arabia refrigeration market. Food storage and pharmacy come under the cold storage application. The food storage application majorly includes storage of food products such as milk, meat, vegetables and fruits. As the country largely depends on the import of food products from other countries, these food items are required to be stored at a proper temperature for keeping them safe and consumable for a longer period. Furthermore, the demand for healthy and hygienic food products is also gaining momentum across Saudi Arabia. Refrigeration system provide a suitable temperature for the prolonged sustenance of food products.



Saudi Arabia has a comparatively good network of logistics infrastructure and connection to global markets, which is facilitated by a number of land borders, seaports and airways. Along with the growing GDP, demand for temperature-controlled transportation is also increasing, thereby propelling the refrigeration market in Saudi Arabia.

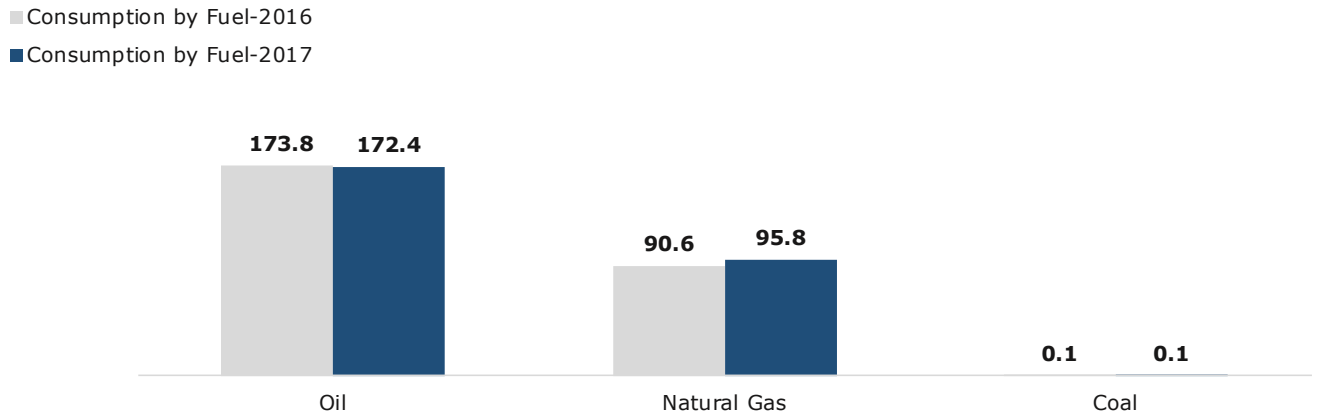


Saudi Arabia Refrigeration Market Share, By Application, By Value, 2018 & 2024F



Source: TechSci Research

Energy Consumption By Fuel in Saudi Arabia, 2016-2017 (Million Tonnes of Oil Equivalent)



Source: BP Stats

Saudi Arabia Energy Prices, 2015 and 2018

Product	Pricing Unit	2015	2018
Natural Gas	USD per mmbtu	0.70-0.80	1-1.50
Gasoline	USD per Liter	0.15-0.21	0.35-0.55
Light Crude	USD per Barrel	4-4.50	6.10-6.60
Heavy Crude	USD per Barrel	2.50-2.75	4.20-4.55
Diesel (Industry)	USD per Barrel	9-9.21	16.10-16.20
Diesel (Transport)	USD per Liter	0.05-0.10	0.10-0.15

Source: TechSci Research





Market Dynamics Drivers

Increasing Demand for Food & Beverages

High dependency on the import of food items coupled with growing population in Saudi Arabia is increasing the demand for frozen food products, keeping in mind the perishability and hygiene aspects associated with these food items. As a result, demand for HVAC R for the cold storage of food products such as frozen meat & poultry, snacks products, fruits & vegetables, etc., would also grow in the coming years. In 2017, sales of food & beverages in Saudi Arabia crossed USD2.5 billion. EU is one of the major trade partners of Saudi Arabia for food products. As of 2016, some of the major food exports to Saudi Arabia include Germany (12.5%), UAE (10.34%) and Ireland (7.19%).



Saudi Arabia Agri-food Exports to EU, 2017 (%)

Product	Exports
Fatty Acids and Waxes	74.30%
Tropical Fruit, Fresh or Dried, Nuts and Spices	10%
Sugar, Other Than Beet & Cane	2.90%
Pasta, Pastry, Biscuits and Bread	2.90%
Raw Hides, Skins and Furskins	1.40%
Others	8.50%

Saudi Arabia Agri-food Imports from EU, 2017 (%)

Product	Exports
Infant Food and Other Cereals, Flour, Starch or Milk Prepara-	12.80%
Wheat	12.50%
Cereals, Other Than Wheat and Rice	12.10%
Cigars and Cigarettes	7.10%
Preparations of Vegetables, Fruit or Nuts	6.30%
Others	49.20%

Source: EU Commission Directorate-General for Agriculture and Rural Development

Extreme Climatic Conditions

Saudi Arabia experiences extreme climatic conditions, i.e. very high temperature during the day and a sudden fall in temperature during the night. Moreover, annual rainfall in Saudi Arabia is very less and humidity levels are very high. In summers, temperature reaches 53°C, while in winters maximum daytime temperature is around 20°C. As a result, climatic conditions are driving the HVAC R systems market in the country. Saudi Arabia is one of the world’s largest markets in terms of imports volume.

Moreover, growing demand for refrigeration systems with eco-friendly technologies, particularly Hydro Chloro Fluoro Carbon (HCFC) - free refrigerants such as R134A and R410A, which are energy efficient as well as eco-friendly, is being witnessed in the country’s refrigeration market. The replacement market of HCFC - free refrigerants is expected to aid growing refrigeration market in Saudi Arabia during the forecast period.

Saudi Arabia Average Monthly Temperature, 2015-2017 (Degree Celsius)

Month	Temperature (C)	Month	Temperature (C)
January	15.94	July	33.45
February	18.30	August	33.81
March	21.10	September	31.40
April	25.75	October	26.85
May	30.51	November	21.78
June	32.87	December	17.29

Source: World Bank

Rising Demand for Replacement and Retrofitting of HVAC R Systems

Over the years, Saudi Arabia has been focusing on the construction and service sectors. The total value of construction projects across the GCC crossed USD2.8 trillion in 2018, with Saudi Arabia leading the lot with more than USD1 trillion worth of construction projects. Moreover, in 2017, oil & gas projects in GCC stood at more than USD700 billion, out of which, around half of the projects are at the construction stage. Growing focus on sustainability across the country is leading to the adoption of various energy consumption trends to suit the high levels of power demand resulting from extremely high temperatures. Air conditioners are the major electricity consumers in Saudi Arabia, accounting for approximately 70% of the total electricity consumption. Replacement demand for HVAC products, especially residential air conditioning units, is also aiding the growth of HVAC market in the country. Consumers are replacing their old air conditioning units with energy efficient air conditioners. As the construction industry is booming in Saudi Arabia backed by increasing focus towards economic development, Northern region being the country’s highly populated area is at the top in building

construction and other infrastructure projects. For instance, in 2018, Riyadh and Makkah jointly accounted for around 48-49% share in total housing units in the country. Additionally, of the total housing units in Saudi Arabia, more than 60% were owned and 37%-38% were rented, as of 2018.

In order to increase the number of housing units by 30%-40%, the Saudi Arabia government is allowing the reconstruction of old buildings. Moreover, the government has allowed house and building owners to add more floors to their buildings. For instance, in 2018, municipalities issued more than 88,000 building permits. As a result, demand for HVAC R systems would grow in Saudi Arabia during the forecast period. Additionally, financial service providers are offering credit facilities to develop and reconstruct new houses.

Growing Building Automation & Control Systems Market

Building automation system, also referred as smart building or intelligent building, is a distributed control system, which is specially designed to control and monitor security, mechanical, HVAC and humidity control systems in a building. The complete control of the building and the entire facility is autonomous, which is the major purpose of building automation systems. Implementation of stringent rules and regulations by the Government across Saudi Arabia to increase energy efficiency in construction industry is anticipated to boost the HVAC R market during the forecast period.

Moreover, increasing awareness about workplace safety and security and growing consumer interest towards smart and green buildings is fueling the growth of building automation systems market, which in turn is boosting demand for HVAC R systems in smart buildings. For instance, Zamil ITG initiated a pilot project in 2016 to make Zamil Industrial's HVAC products "Smart" by connecting chillers to the internet using an "Internet of Things" platform, enabling the prediction of situations from accumulated data and providing automated alarms for service and maintenance over time and facilitate new services. In addition, Smart Mobile App development has become part of the Zamil ITG portfolio and new initiatives have been taken for Apps that facilitate real-time engagement.



Expanding Travel & Tourism Industry

Saudi Arabia is witnessing significant growth in domestic tourism as well as international visitors. For instance, Saudi Arabia's rank in the Travel & Tourism Competitiveness Index has improved and reached 63 in 2017 with a score of 3.82 compared to the highest score of 5.43. Furthermore, Government of Saudi Arabia has also prioritized the tourism industry in the Saudi Arabia Vision 2030 economic diversification plan. Makkah is the major spot for religious tourists, where millions of people come to perform Hajj and Umrah pilgrimages.

In 2016, the Ministry of Hajj was renamed as the Ministry of Hajj and Umrah to attract more religious tourism in the country. In addition, in 2018, the Saudi Arabia government announced to issue tourist visas electronically, which is expected to increase the tourist count to 30 million per year by 2030. These activities are propelling the demand for HVAC R systems in Saudi Arabia as well as increasing the GDP contribution of the tourism industry, thereby resulting in the country's economic development.



Market Dynamics Challenges

Increasing Government Regulations for HVAC R to Maintain Environment Sustainability

HVAC R systems are the biggest feeders of energy and the biggest contributors to global warming. Hence, it comes as no surprise that local governments of the Middle East and North Africa region are regulating the power usage by built structures. As is prevalent across the globe these days, Saudi Arabia is also working to decrease its electricity requirements by introducing new energy efficiency standards and labels, aimed at reducing its energy consumption over the next 20 years.

Institutions such as the Saudi Energy Efficiency Center, which are engaged in the development of new stan-

standards for air conditioners, have been enforced since 2014. Energy consumption is growing faster than GDP in Saudi Arabia, pushing the total energy requirement. The main reason for this is complete dependence of the country's development on energy-intensive industries, as well as on electricity-intensive lifestyles.

High Level of Competition

Saudi Arabia HVAC R market is highly fragmented and competitive with the presence of numerous global and domestic players. Moreover, companies are competing on various grounds such as product price, geographical coverage, product portfolio and after sales service. The need to offer high-quality and low-cost products is crucial for manufacturers along with the compliance of stringent government regulations. To cope up with the high level of competition, companies are differentiating their products with different marketing pricing strategies.

This competition is resulting in pressure on manufacturers and suppliers, which have turned to different strategies such as strategic partnerships, new product launches and consolidations. For instance, in February 2019, Daikin launched Daikin Perfera FTXM-NDEU18-046, an air-to-air heat pump, which is equipped with R-32 refrigerant technology.

Rising Concerns associated with Frozen and Refrigerated Food

Although frozen foods offer a convenient food option, excessive consumption of frozen food, especially frozen snacks, lead to various problems such as high blood pressure and heart and kidney disorders. Increasing dependence of people, especially youngsters and working couples, on such food items may prove to be harmful to their health in the long run. Added preservatives also make food unfit for intake, specifically for those suffering from obesity, diabetes and heart diseases. Added colors and preservatives are responsible for kidney failures, especially in younger people.

Further, frozen vegetables and fruits are deficient in Vitamin B and C, and levels of polyphenolic substances are lower in frozen food items in comparison to fresh food products. Polyphenolic substances serve as antioxidants, protect cells from damage. Frozen foods contain high levels of sodium, which can increase the risk of high blood pressure and heart diseases. As per dietary guidelines, a human body should not consume more than 2,300 mg of sodium daily and people who are more than 40 years old should not consume more than 1,500 mg daily. Rising awareness about the disadvantages of additives and preservatives present in frozen food items is challenging the growth of Saudi Arabia frozen food market, thereby directly affecting the country's HVAC R market.



Market Trends & Developments

Growing Focus towards District Cooling Systems

In Saudi Arabia, the district cooling system market is projected to reach USD1 billion during the forecast period. District cooling systems generate hot/chilled water at a central plant and pipe that out to buildings for heating and cooling purposes.

These systems consume almost 50% less energy as compared to other cooling systems, hence, reducing the overall energy consumption and cost of consumers. In Saudi Arabia, almost 70% of the entire power is consumed by air conditioning systems. Thus, customers are focusing more towards energy-efficient air conditioning systems which would further aid the growth in demand for district cooling systems in the country. For instance, in 2018, SNC-Lavalin, an engineering company, signed a deal worth USD42 million to increase its district cooling capacity by a fifth at JODC's district cooling plant in Makkah.

Phasing Out of HCFC Refrigerants

Hydrochlorofluoro Carbons (HCFC) are the gases majorly used for refrigeration and air conditioning applications in the industries. However, these gases are phased-out under Montreal Convention, as these gases are one of the major factors resulting in the depletion of ozone layer. Many developed countries have decided to reduce their consumption of HCFC gases by 2020. In addition, developing countries started the phasing-out process in 2013, and are taking initiatives to completely eliminate the usage of HCFC by 2030. In Saudi Arabia, consumption of HCFC reduced from 1,750 ODP tonnes in 2011 to 1,306 ODP tonnes in 2015, with the volume expected to reduce to 880 ODP tonnes by 2020. This decrease in consumption can impact the profitability and product portfolio of the market players.

Increasing Adoption of Inorganic Refrigerants

Given the high temperatures in Saudi Arabia, it becomes pertinent that cold chain must be maintained while transportation and storage of food. Besides this, it plays a significant role in many other industries such as pharmaceutical, natural gas production and chemicals. Inorganic refrigerants consist of inorganic compounds which do not contain a carbon-hydrogen bond and are used primarily as refrigerants such as R718, 717 and 744. Majority of these refrigerants are non-toxic, environment friendly, inexpensive and non-flammable. Demand for major applications of inorganic refrigerants such as commercial refrigerants, transportation refrigerants, industrial refrigerants, chillers & hydronic heat pumps, etc., is increasing, resulting in high demand for cooling products such as refrigerators.

Policy & Regulatory Landscape

The energy efficiency rating is used for labelling products. The cooling capacity for air conditioners at different test conditions should be less than or equal to 70000 Btu/h (20000W). Saudi Standards, Metrology and Quality Organization (SASO) has modified the Saudi standard No. 2663/2012 "Energy Labelling and Minimum Energy Performance Requirements for Air-Conditioners", by adding the national modifications that have been approved in SASO Council Board in 2014, i.e., SASO2663/2014.

Rising Concerns associated with Frozen and Refrigerated Food

EER Limits (Tested Value) (Btu/h)/w at T1	Star Rating	EER Limits (Tested Value) (Btu/h)/w at T1	Star Rating
EER ≥ 18.1	10	13.4 > EER ≥ 12.4	7.5
18.1 > EER ≥ 16.8	9.5	12.4 > EER ≥ 11.5	7
16.8 > EER ≥ 15.6	9	11.5 > EER ≥ 10	6
15.6 > EER ≥ 14.5	8.5	10 > EER ≥ 9.7	5
14.5 > EER ≥ 13.4	8		

Star Rating has to be applied starting from 3 stars and above only.

Source: Saudi Standards, Metrology and Quality Organization

Saudi Arabia Mandatory Energy Efficiency Ratio, 2015

Air Conditioner Appliance Type	Cooling Capacity Limit (CC) (Btu/h) At testing conditions T1 (35°C)	Mandatory EER (Btu/h)/wattPhase 1: 7 September 2014		Mandatory EER (Btu/h)/wattPhase 2: 1 January 2015	
		T1 (35°C)	T3 (46°C)	T1 (35°C)	T3 (46°C)
Window Type	CC ≤ 18,000	8.5	6.12	9.8	7.06
	18,000 < CC ≤ 24,000	8.5	6.12	9.7	6.98
	24,000 < CC ≤ 70,000	8.5	6.12	8.5	6.12
Split Type and Other Types	CC ≤ 70,000	9.5	6.84	11.5	8.28

Source: Saudi Standards, Metrology and Quality Organization

VAT Implementation in GCC

VAT Law defines the introduction of VAT outlined in the Unified Agreement for VAT of the Cooperation Council for the Arab States of the Gulf. It was officially applied on 1st January 2018. VAT in Saudi Arabia is applied to businesses conducting economic activity and taxable persons. The standard VAT rate is 5% and it will be applied on food, clothes, electronics and gasoline, phone, water, electricity bills, hotel reservations, etc. VAT in Saudi Arabia is aimed to accelerate the economic development by utilizing the collected tax for infrastructure and development activities.

Rules that companies should follow for EER labelling

- The companies that have not been issued certificates as per the new standard were allowed to use their EER labels till 6th September 2013.
- Companies that had been issued the new EER certificates could use their EER Labels as per the expiry date mentioned in the certificate at no additional charge.
- The validity for EER Labels certificates/license was decreased from a period of 2 years to 1 year.
- The testing reports were mandated to be issued from an accredited laboratory according to ISO 17025 within the scope of EER testing.
- A safety test report must be part of the application documents for EER label approval.
- There were 13 insulation standards issued by SASO which covered 10 insulation products in 2015 which are as follows: Extruded Polystyrene, Expanded Rigid Polystyrene, Spray-applied polyurethane foam, Rigid polyisocyanurate (PIR), Polyurethane (PUR), Mineral wool, Rock wool, Cellular glass (CG), Perlite Loose Fill Insulation and Vermiculite Loose Fill Insulation.
- SASO is in the process of developing standards for some secondary insulation products.
- ISO 14001 standard addresses various aspects of environmental management. The standard provides tools for organizations, including air conditioner manufacturers to identify and control their operational impact on the environment.
- ISO 18001 is an international occupational health and safety management system specification. The standard is intended to help organizations in addressing and controlling occupational, health and safety risks.
- SASO is on its way to obtain an international accreditation in ISO 14001 Environmental Management Systems certification.

Minimum Energy Performance Standard

The Minimum Energy Performance Standard (MEPS) requirements for large capacity air conditioners in the scope of this Standard shall be greater than or equal to the values listed in the tables below and obtained as per the testing and rating requirements at T1 temperatures. All units should also be tested under the T3 temperature (46°C) for reference. In addition, the operability needs to be checked at the maximum cooling capacity (52°C).

Minimum Energy Performance Standard (MEPS) for Air Conditioners, 2016

Air Conditioner ApplianceType	Product in SASO Large AC(BTU/h)	Testing method	EER (BTU/(W.h))
Air Conditioners, Air Cooled	≤ 70,000 (excluding window, split ducted, and split non-ducted)	ANSI/AHRI 210/240	11.2
	> 70,000 and ≤135,000	ANSI/AHRI 340/360	11.2
	> 135,000 and ≤ 240,000	ANSI/AHRI 340/360	11.0
	> 240,000 and ≤ 760,000	ANSI/AHRI 340/360	10.0
	> 760,000	ANSI/AHRI 340/360	9.7
Air Conditioners, Water Cooled	≤ 70,000	ANSI/AHRI 210/240	12.1
	> 70,000 and ≤135,000	ANSI/AHRI 340/360	12.1
	> 135,000 and ≤ 240,000	ANSI/AHRI 340/360	12.5
	> 240,000 and ≤ 760,000	ANSI/AHRI 340/360	12.4
	> 760,000	ANSI/AHRI 340/360	12.2

Source: Saudi Standards, Metrology and Quality Organization

Minimum Energy Performance Standard (MEPS) for Air Conditioners, 2016 (Contd.)

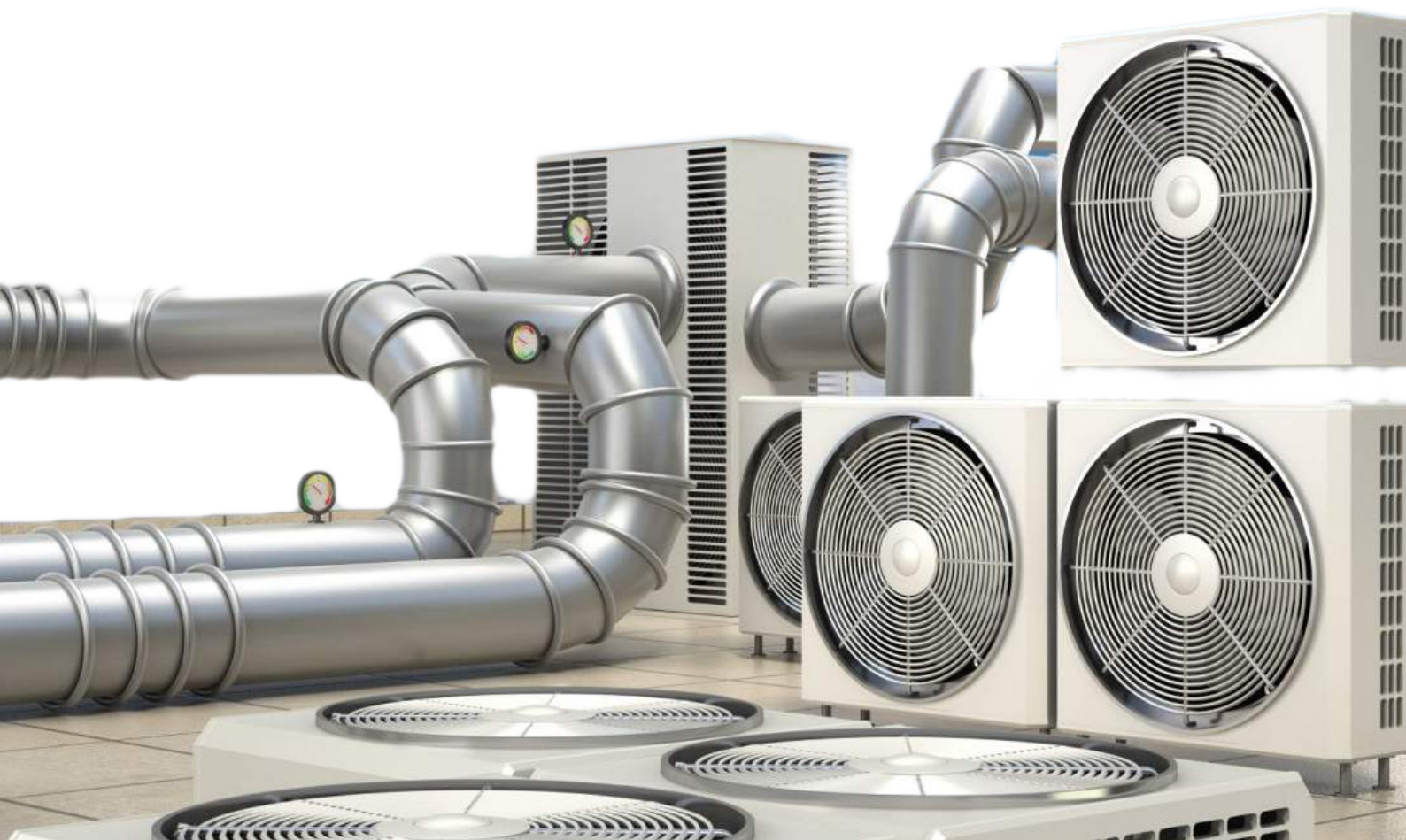
Air Conditioner ApplianceType	Product in SASO Large AC(BTU/h)	Testing method	EER (BTU/(W.h))
Air Conditioners, Air Cooled	≤ 70,000	ANSI/AHRI 210/240	12.1
	> 70,000 and ≤135,000	ANSI/AHRI 340/360	12.1
	> 135,000 and ≤ 240,000	ANSI/AHRI 340/360	12.1
	> 240,000 and ≤760,000	ANSI/AHRI 340/360	11.9
	> 760,000	ANSI/AHRI 340/360	11.7

Source: Saudi Standards, Metrology and Quality Organization

Minimum Energy Performance Standard (MEPS) for Air Conditioners, 2016 (Contd.)

Air Conditioner ApplianceType	Product in SASO Large AC(BTU/h)	Testing method	EER (BTU/(W.h))
Air Cooled Chillers	≤ 1,800,000	ANSI/AHRI 550/590	10.1
	> 1,800,000		10.1
Air Conditioners, Air Cooled	≤ 900,000		16.0
	> 900,000 and ≤ 1,800,000		16.7
	> 1,800,000 and ≤ 3,600,000		18.2
	> 3,600,000 and ≤ 7,200,000		19.7
	> 7,200,000		21.4
Water Cooled Electrically Operated, Centrifugal	≤ 3,600,000		19.7
	> 3,600,000 and ≤ 7,200,000		21.4
	> 7,200,000 and ≤ 14,400,000		21.4
	> 14,400,000		21.4

Source: Saudi Standards, Metrology and Quality Organization



Case Study

King Abdulaziz Centre

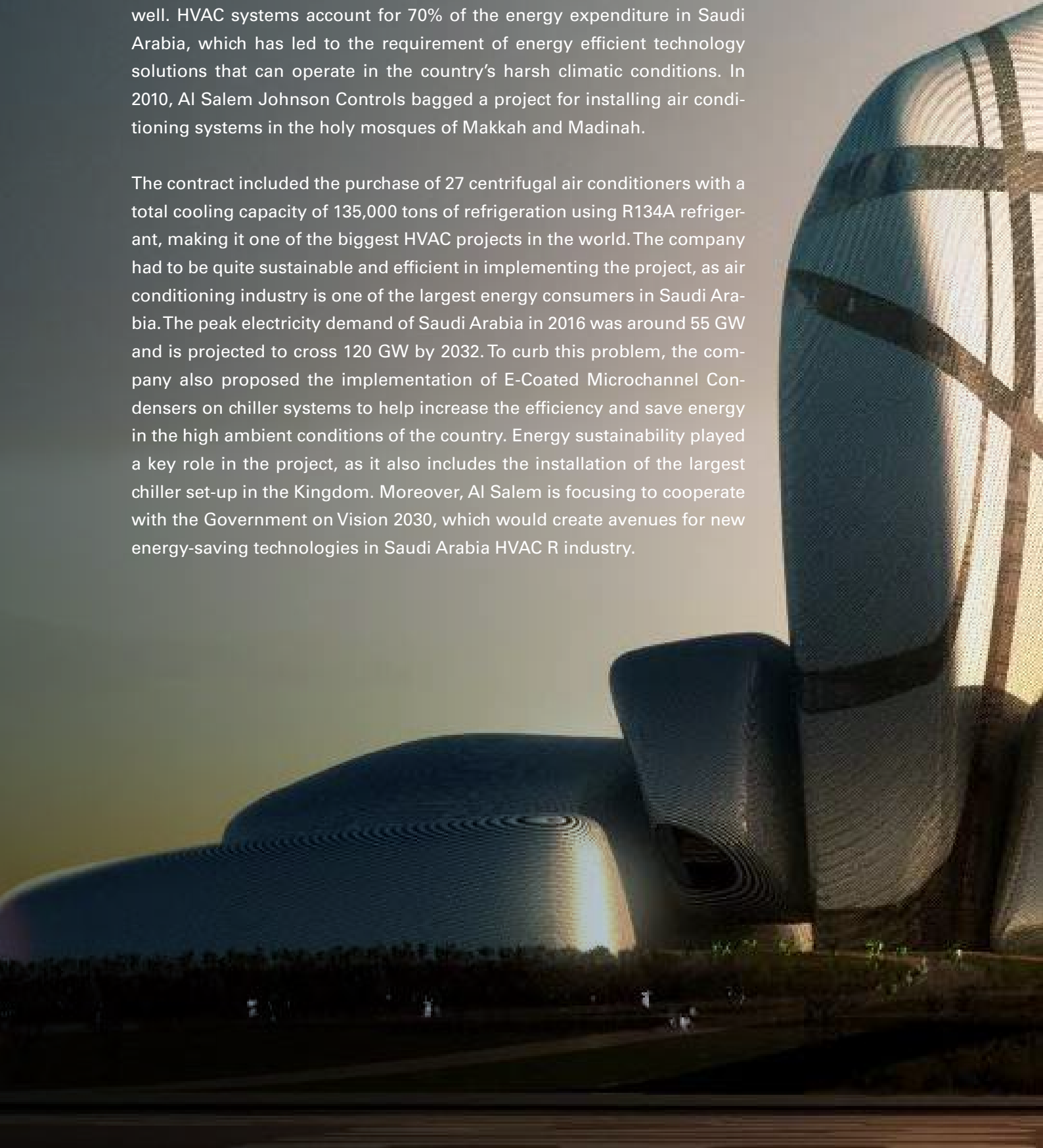
The King Abdulaziz Centre for World Culture is a bold new initiative funded by oil company Saudi Aramco to promote cultural development within the Kingdom of Saudi Arabia. The structure located in Dhahran in the Eastern Province will provide for a wide range of cultural activities and include facilities such as a document archive, library, learning center, art and history museum, and performing arts facility. Air Enterprises, which had the responsibility of developing the engineering and design for the HVAC system, also received the opportunity to provide HVAC solutions. The company had to come up with a solution which would cater to the HVAC requirements of the different sections of the structure, keeping energy efficiency and product lifespan in mind while considering the extreme climatic conditions in the country. The company utilized the thermal energy recovery wheel to treat the air, which utilizes rotating honeycomb-shaped air pockets to absorb and dissipate heat from the outside air, cooling it and reducing the humidity before introducing it to the air conditioning system, where it undergoes final cooling and conditioning before entering the building's occupied space.

This addresses the problem of maintaining air quality in the structure while conserving energy. Air Enterprises further addressed the problem by fabricating its components in aluminum, which does not rust and corrode. However, constant maintenance and care will be required for the parts installed, as the vigorous temperature and humidity shift can warp the metal, leading to leakage and building control issues. Air Enterprises finished the shipment of the final material to the country in September 2013 and began the supervision of on-site construction in October 2013. The project became operational in 2018.

Al Salem Johnson Controls

Saudi Arabia is majorly an oil & natural gas economy, with more than 50% of its economy being driven by oil catering to the energy requirements as well. HVAC systems account for 70% of the energy expenditure in Saudi Arabia, which has led to the requirement of energy efficient technology solutions that can operate in the country's harsh climatic conditions. In 2010, Al Salem Johnson Controls bagged a project for installing air conditioning systems in the holy mosques of Makkah and Madinah.

The contract included the purchase of 27 centrifugal air conditioners with a total cooling capacity of 135,000 tons of refrigeration using R134A refrigerant, making it one of the biggest HVAC projects in the world. The company had to be quite sustainable and efficient in implementing the project, as air conditioning industry is one of the largest energy consumers in Saudi Arabia. The peak electricity demand of Saudi Arabia in 2016 was around 55 GW and is projected to cross 120 GW by 2032. To curb this problem, the company also proposed the implementation of E-Coated Microchannel Condensers on chiller systems to help increase the efficiency and save energy in the high ambient conditions of the country. Energy sustainability played a key role in the project, as it also includes the installation of the largest chiller set-up in the Kingdom. Moreover, Al Salem is focusing to cooperate with the Government on Vision 2030, which would create avenues for new energy-saving technologies in Saudi Arabia HVAC R industry.



Way Forward

In many countries in the GCC region including Saudi Arabia, residential, commercial, hospitality and retail sectors are expected to continue to generate demand for HVAC R systems in coming years. Moreover, with the Government of Saudi Arabia focusing on diversifying the economy away from oil, the country's focus on services and industry is growing, which in turn would aid the construction industry, consequently strengthening the HVAC R market.

Saudi Arabia has one of the highest population growth rates (2.2%) among the GCC countries, with urban population concentrated in the three key cities of Riyadh, Jeddah and Dammam, which are anticipated to generate huge demand for HVAC R systems during forecast period. Additionally, with modern day phenomena like global warming and global accords like the Paris Convention on Sustainability of Environment, focus on energy efficient HVAC R systems is set to expand, which would encourage HVAC R companies to focus on the research & development of new technologies.

This is expected to have a role over effect on the economy and further spur demand from retail customers. A case in point is that of LG Appliances, which has developed innovations like its 'Multi-V' line of ACs, which can operate in temperatures up to 54 degree Celsius, making it ideal for the Gulf region. For the coastal areas, the company has developed a corrosion free line, which can cope with high salinity ocean air. Moreover, there are ambitious government plans to build a mega city called 'NEOM' connecting Jordan and Egypt with an area of 10,230 square miles being entirely run on renewable energy. There are many other mega projects underway in the country. With Saudi Government diversifying its revenue sources, pressure on HVAC R companies to come up with energy efficient new technologies would grow, as they try to remain competitive. Thus, the market players are recommended to invest in becoming future ready and set up strong R&D bases. They should also increase their manufacturing capacities in the country, with the centers of production situated close to the main population centers.



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TechSci Research – North America

708 Third Avenue, Manhattan,
New York, United States

Email: sales@techsciresearch.com

Tel: +1- 646- 360- 1656

TechSci Research – Europe

54, Oldbrook, Bretton,
Peterborough, United Kingdom

Email: sales@techsciresearch.com

TechSci Research – Asia-Pacific

B- 44, Sector -57, Noida,
National Capital Region, U.P. - India

Tel: +91-120-4523900

Email: sales@techsciresearch.com

www.techsciresearch.com

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