U.S. Ranks 4th for VRF

Contributed by BSRIA Worldwide Market Intelligence

BRACKNELL, BERKSHIRE, U.K.—The United States is the fourth-biggest market for variable refrigerant flow (VRF) technology following China, Japan and South Korea, according to *BSRIA World Air Conditioning Report 2021-102181*, which was released in April. Globally the VRF market reached U.S. $12 billion in 2020, with a contraction of 4% compared to 2019 levels due to the impact of COVID-19.

VRF traditionally has been installed in light commercial and medium-size projects up to 300 kW (85 ton) capacity range. However, in the last decade the increase of mini-VRF sales (<20 kW [6 ton]) enabled its rapid penetration in the residential market. As of 2020, 55% of global VRF sales was comprised of mini-VRF, by volume. This trend is also seen in the U.S., where today around 24% of VRF sales are for residential applications.

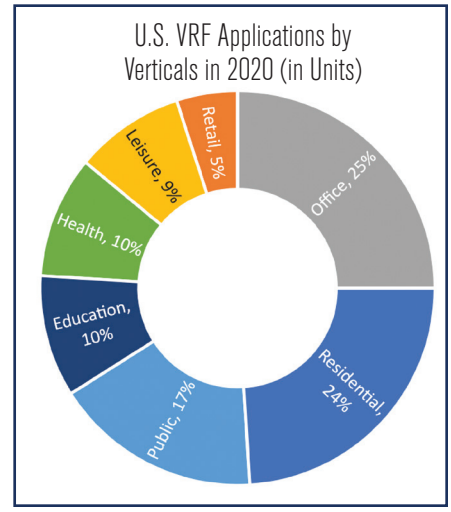
The VRF market is a relatively mature market in Asia and Europe, but still relatively new in the Americas and Middle East, India and Africa.

In the Middle East, VRF units have been taking market share from rooftop units where they are traditionally installed in residential villas. In Asia and Europe, they have been taking the market share from multi-splits, rooftops, ducted single splits and scroll compressor chillers.

The U.S. market reached U.S. $657 million in 2020 and has seen significant growth in the last 10 years, with 19% growth in value terms (compound annual growth rate [CAGR]) between 2009 and 2019. In the U.S., VRF technology is taking share from traditional U.S. ducted units, packaged terminal air conditioner and residential and light commercial rooftops units, but less so replacing scroll chillers, due to the limited significance of this market.

The global success of VRF products can be attributed to factors such as its energy efficiency, especially at part load compared to conventional HVAC systems; its flexibility in zonal control, delivery of simultaneous heating and cooling; heat recovery and ease of installation with no ductwork required. However, initial capital cost could be a deterring factor when it comes to decision making. Therefore, a life-cycle cost exercise should be carried out for a better comparison.

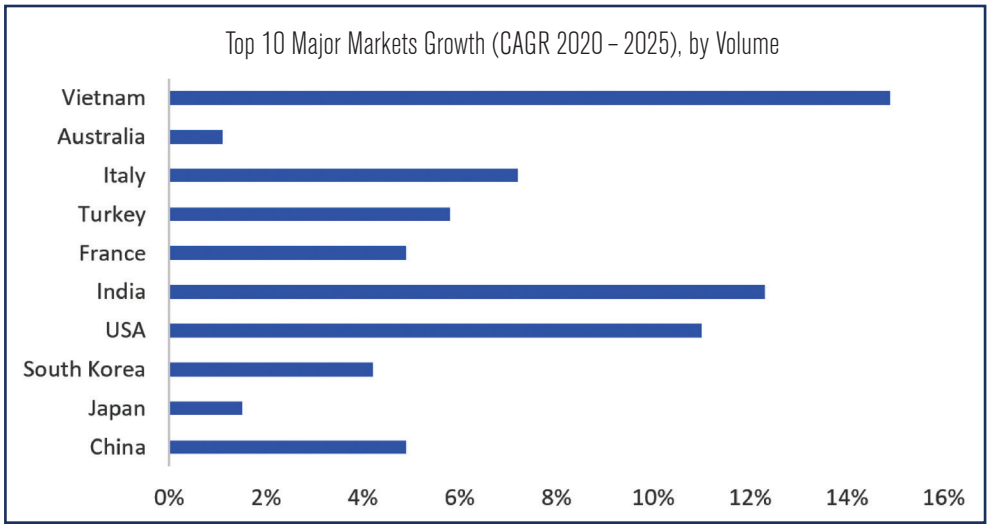
The range of applications vary hugely, from a single-family home to offices, data centers, hospitality, hospitals, etc. However, for VRF systems larger than 20 kW (6 kW), offices is a significant application. Outside the U.S., retail and hotels are also key applications for VRF, but this is less significant in the U.S. due to continued success of packaged terminal air conditioner units, which is unique to the North American market. In recent years, there has been an increasing adoption of VRFs in residential application and in the U.S., particularly in townhouses.



The monitoring of single-dwelling energy use through submetering allows landlords to charge each tenant for their energy use and in China, where the up-market properties are sought after with a preinstalled air-conditioning unit, this has encouraged the use of mini-VRFs. This trend has also been seen in other cities, for example in London. As the effects of climate change drive change for shorter and milder winters, a VRF unit's ability to heat and cool efficiently meets this demand between seasons.

VRF is not the only Asia technology seeing growth in the U.S. There is also an increase in ductless split systems replacing traditional ducted splits technology; however, this is still from a low base.

Following the financial crises of 2008, several years had fewer large construction projects where large-capacity HVAC systems were specified. During these years, VRF technology was particularly popular



with refurbishment projects as well as small- to medium-size new build projects. VRF was one of the few solutions that continued to see growth.

The opportunities in the VRF market encouraged traditional air-conditioning product suppliers to merge with VRF suppliers to offer a complete product range to stay competitive in the market. As a result, there have been a number of global alliances and acquisitions to ensure major companies could present a full portfolio to the market and take advantage of the strengths of solutions combined with a local sales network.

In North America, the partnership between Carrier and Midea was announced in September 2017 in the residential ductless HVAC business. The partnership allowed Carrier to penetrate the growing ductless split market while allowing Midea access to the distribution channel. Another partnership was formed in January 2018 between Trane and Mitsubishi Electric for ductless splits and VRF products in the U.S. and selected Latin American countries.

The challenge for the VRF market is the decreasing demand from the hospitality and office sectors. As a rule of thumb, around one-third of VRF sales tend to come from these sectors in major markets; in the U.S. these two sectors comprised 34% of sales in 2020.

Another challenge is the global warming potential (GWP) of the working fluid that is being used in VRF units. R-410A has a GWP of 2,088 and is being phased out in VRFs in Europe. It is being replaced with R-32 refrigerant, which has a GWP of 677. China, which accounts for around 67% of the world's VRF market, is also rapidly replacing R-410A with R-32. The latest BSRIA world air-conditioning study showed just over 50% of units sold used R-32, whereas in the U.S., the sales of R-32 refrigerants in VRF sales were negligible.

Although 2021 will be a challenging year for the VRF market in the U.S. because there will not be the double-digit growth rates seen in the past, the market is nevertheless expected to see good growth, bearing in mind the maturity of the U.S. air-conditioning market.

Most markets are recovering from the impact of COVID-19, with the VRF market globally set to see 5.4% growth (CAGR 2020–2025). Expected CAGR growth for the U.S. for 2020–2025 is around 8%.

For further details on the VRF market, contact BSRIA or visit their website: www.bsria.com ■

Focus on Low Carbon

DOE Lays Out Plan to Cut Buildings' Energy, Emissions

WASHINGTON, D.C.–In May, the U.S. Department of Energy (DOE) announced actions to cut buildings' energy and emissions footprints, including an initiative that will focus on clean and efficient heating and cooling. The program, called the Initiative for Better Energy, Emissions, and Equity (E3), could advance the research, development and deployment of clean heating and cooling systems like heat pumps, advanced water heaters, low-to-no global warming potential refrigerants and smarter HVAC diagnostic tools. *Source: DOE*

White House: How to Modernize Buildings

WASHINGTON, D.C.–The Biden administration is investing in new initiatives to improve building energy efficiency, modernize American buildings and be a net zero economy by 2050. One initiative is the U.S. Department of Energy's grid-interactive efficient buildings "road map" that includes recommendations to integrate buildings with solar and wind power through demand management and storage. Download the report: https://tinyurl.com/xvsun2se *Source: Smart Cities Dive*