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Digitalization Accelerating

Contributed by BSRIA Worldwide Market Intelligence

BRACKNELL, BERKSHIRE, U.K.— The initial deployment and adoption of Internet of Things (IoT) technology was sluggish in the U.S., but the COVID-19 pandemic accelerated cloud adoption on a global scale, propelling IoT tech to an all-time high adoption rate.

BSRIA has monitored the development of digitalization and IoT in the HVAC&R sector for a decade. BSRIA has seen the level of Internet Protocol (IP) controllers steadily increase with the volume of BUS (an IoT communication protocol)-connected field devices and now the introduction of IoT-connected actuators.

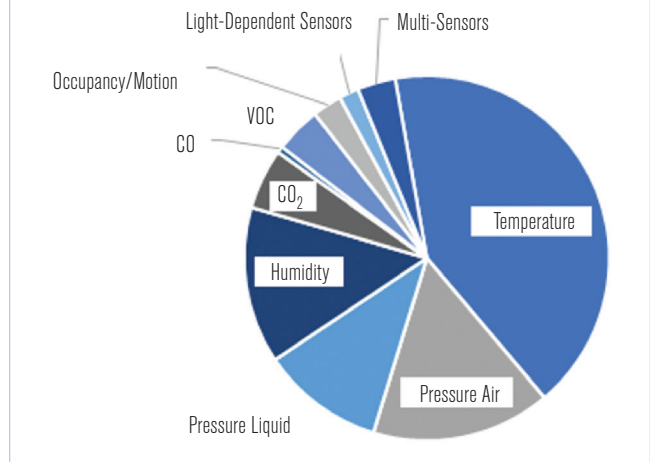
From the field up, air quality monitoring and CO₂ sensors recorded a steep progression, which has accelerated during the COVID-19 pandemic. Wireless and IoT utility increased as installation work had to be done on a large scale in a short amount of time, due to increased remote working, shopping, monitoring health and safety and more. After the onset of the COVID-19 pandemic triggered the initial rush, BSRIA foresees a stabilization of the growth rate for IoT products, but still benefiting from the cloud adoption and remote working trends.

There is a movement toward more connectivity, in particular on BUS-connected devices. This is aided by a market shift in commercial construction toward motorization and real-time response with the increased demand for IAQ and demand-controlled ventilation. On the IoT side of the market, the volume of sales remains low, but the product offering has increased. Blockchain is also making the business case for IoT more attractive.

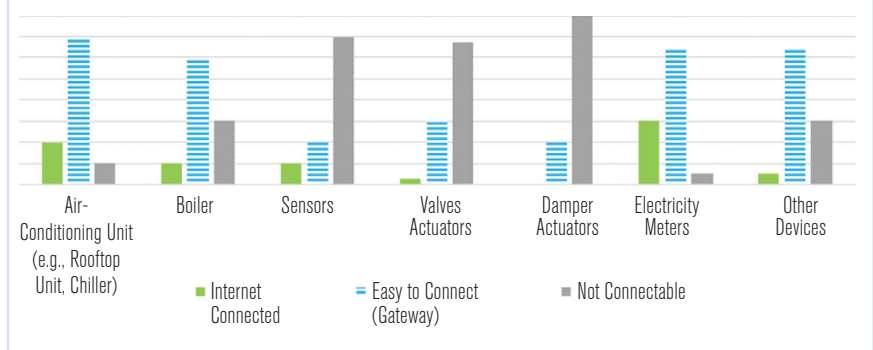
In terms of end uses, sensors collect a wider range of physical characteristics—notably IAQ, occupancy, lighting or safety-related concerns converging into the same building automation and controls (BAC) systems. This convergence is naturally facilitated with connected systems—wired or wireless, overlaid or integrated.

CO₂ detectors saw peak growth rates this year, and this

HVAC Sensor Market by Application, % Share by Value, 2019 (U.S.)



Field Devices Connectivity, Volume, % Share, 2020 (U.S.)



could continue. This is particularly true in some verticals such as schools due to the U.S.'s targeted federal and state funding for improved ventilation. Other digital sensors are geared more toward equipment performance, energy efficiency, reliability and resilience. Remote monitoring is becoming increasingly popular to ensure most efficient use of systems and also preventive maintenance.

Field devices get more sophisticated, driving more data. Movement in the market is expected as the market rebounds from the pandemic. For controllers, the IP uptake is lower, closer to the field level, e.g., about 40% for field level controllers compared to 100% for building controllers. But BSRIA expects the uptake of IP to continue.

For BAC systems, the progression of digitalization

ties into developments in data storage, data analytics and in the convergence of building management functions—all possible in the cloud. The needs for operational efficiency include predictive maintenance and parts management on the maintenance side and cold chain efficiencies, comprehensive building data management and dashboards, user feedback and awareness on the facility management end. Beyond the product offering, digitalization reshapes and streamlines business transactions with improvements on supply chains, the sales cycle and customer experience, e.g., e-commerce.

Publicly traded HVAC&R companies report their digital progress to their investors. Original equipment manufacturers most likely stand to benefit, as they would expand their offering along with the IT industry, such as Big Tech and systems integrators. Utilities will also be interested in using that big data as part of their overall grid planning and increasingly

their Distributed Energy Resources management. The nature of contracting for installers could also profoundly change.

Digitalization is not a new concept. The HVAC&R industry is a follower and not a leader, unlike some other industries where new revenue streams and business or models—pay-per-hour and as a service—are more prevalent. Perhaps one of the earliest developments in advanced artificial intelligence features will be in training, with the lack of skilled labor a serious limitation, not only short-term.

The adoption of IoT devices in the HVAC&R industry is still largely nascent but is set to grow, being pushed by a number of factors, including COVID-19 mitigation, the transition to net zero, and the opportunities IoT devices offer to building owners and operators to run their buildings more cost-effectively while being able to meet occupant needs. ■

Industry Roundup

Importance of Ventilation, Air Filtration Stressed in National COVID-19 Plan

WASHINGTON, D.C.—The U.S. government has released the National COVID-19 Preparedness Plan, which lays out the road map to help fight COVID-19 in the future. It includes a focus on improving ventilation and air filtration. The U.S. government will provide a Clean Air in Buildings Checklist that all buildings can use to improve indoor ventilation and air filtration and will encourage uptake of ventilation improve Administration will provide technical assistance that encourages schools, public buildings as well as state, local and Tribal governments to make ventilation improvements and upgrades using American Rescue Plan funds. Download the plan: <https://tinyurl.com/2p8e9m3s> Source: *The White House*

Solution Addresses Furnace Emissions

OAK RIDGE, TENN.—Oak Ridge National Laboratory researchers have developed a novel solution to reduce the environmental impact of natural gas-condensing furnaces commonly used in U.S. homes. The team built a prototype furnace that incorporates mono-

lithic acidic gas reduction (AGR) as the catalyst to minimize acidic gases and condensate acidity, and oxidize carbon monoxide, hydrocarbons and methane. “AGR functions like a catalytic converter in a car, passing the exhaust over metals to reduce acidic gases and other pollutant emissions that contribute to global climate change,” said ORNL’s Zhiming Gao, Member ASHRAE. “This technology could be applied to commercial rooftop units, thermally driven heat pumps, gas-fired water heaters and boilers.” Source: *ORNL*

Study Identifies Low-Carbon Heating Tech Innovation Opportunities

EDINBURGH, SCOTLAND—Recent research indicates a great potential exists for innovation to bring down the high costs associated with low-carbon heating technologies. As part of their Heat in Buildings Strategy, the Scottish government commissioned research that found low-carbon heating technologies with the potential for technical innovation were air-source heat pumps, district heat networks, thermal energy storage and the use of waste heat from industry. Download the report: <https://tinyurl.com/yejrtvuj> Source: *Specification Online* ■