

## 4 EMERGING HVAC TRENDS YOU NEED TO KNOW

By Nick Agopian

The HVAC industry doesn't change, right? It's a slow-moving dinosaur that simply reacts and doesn't innovate – is that an apt description? Well, in this age of technological innovation and increased focus on our environment and sustainability, if companies don't adapt, they risk being left behind. As a result, we're seeing substantial industry momentum in the direction of four emerging trends.

Before we jump in, let's first take a quick look at the state of the global HVAC market since this impacts everything we're discussing. Then we'll dive into the four emerging HVAC trends you need to know to stay ahead of the competition.

### The Global HVAC Market is Strong

According to key indicators, the U.S. economic outlook for the rest of 2018 is strong. Experts are calling it a Goldilocks economy since GDP growth is expected to remain between the two to three percent ideal range, unemployment is forecast to continue at the natural rate and there isn't too much inflation or deflation.<sup>1</sup>

Regarding the global HVAC market specifically, it's projected to cross \$207 billion by 2022, according to a report by TechSci Research.<sup>2</sup> The report found that rising focus on the adoption of energy-efficient HVAC systems, coupled with a continuing increase in construction and infrastructure activities, will fuel demand for HVAC systems worldwide.<sup>3</sup>

The Energy Recovery Ventilator (ERV) market is also doing well, and is forecast to reach \$3.37 billion by 2022 from \$1.97 billion in 2017, at a CAGR of 11.4 percent.<sup>4</sup> This growth is primarily driven by three factors: an increasing need to reduce energy consumption in residential and commercial buildings, a greater number of green buildings across the globe and growing awareness of the importance of indoor air quality (IAQ).<sup>5</sup>

With that, here are the four emerging HVAC trends you need to know:

### Trend #1: Healthy Buildings Matter

Growing knowledge of how indoor environments can seriously affect how people think, act and feel is increasing demand for healthy buildings. In fact, in a recent survey of 140 facility executives by Structure Tone, 92 percent described building wellness features as "essential, mainstream or an emerging need."<sup>6</sup>



One of the aspects of healthy buildings gaining considerable traction is IAQ. This is especially true as buildings become more airtight, thus causing internally generated contaminants to build up and impair the quality of indoor air. Deficient IAQ is a serious problem that can harm the health, cognitive function, productivity and wellbeing of indoor occupants. The Environmental Protection Agency (EPA) even ranks indoor air pollution as a top-five environmental health risk.<sup>7</sup>

To underline why IAQ is so important, studies by NASA, the Harvard School of Public Health and the Lawrence Berkeley National Laboratory have all found that CO2 levels commonly found inside most buildings negatively impact thinking and decision-making.<sup>8</sup> The Harvard School of Public Health also found that doubling the rate of a conventional ventilation system only costs about \$32 per person, per year and leads to an astounding productivity increase of \$6,500 per person, per year.<sup>9</sup>

Further, a study by the Lawrence Berkeley National Laboratory found that enhanced IAQ could save up to \$200 billion in worker performance and \$58 billion in lost sick time annually.<sup>10</sup> Another study found that workers are five to six percent more productive when air pollution levels are rated as "good" by the EPA.<sup>11</sup>

<sup>1</sup> Kimberly Amadeo, The Balance, August 02, 2018, "U.S. Economic Outlook for 2018 and Beyond," <https://www.thebalance.com/us-economic-outlook-3305669>.

<sup>2</sup> "Global HVAC Market - Competition Forecast & Opportunities, 2012–2022," TecSci Research, December 2017, <https://www.reportlinker.com/p05241408/Global-HVAC-Market-Competition-Forecast-Opportunities-.html>.

<sup>3</sup> Ibid.

<sup>4</sup> "Energy Recovery Ventilator Market by Technology Type, Application and Region - Global Forecast to 2022," MarketsandMarkets, December 18, 2017, <https://www.marketsandmarkets.com/Market-Reports/energy-recovery-ventilator-market-242565927.html>.

<sup>5</sup> Ibid.

<sup>6</sup> Ken Edelstein, "Five green building trends for 2018," The Kendeda Fund, January 9, 2018, <https://livingbuilding.kendedafund.org/2018/01/09/five-green-building-trends-2018/>.

<sup>7</sup> "Why Indoor Air Quality is Important to Schools," United States Environmental Protection Agency (EPA), <https://www.epa.gov/iaq-schools/why-indoor-air-quality-important-schools>.

<sup>8</sup> Joe Romm, "Exclusive: Elevated CO2 Levels Directly Affect Human Cognition, New Harvard Study Shows," Climate Progress, October 26, 2015, <http://thinkprogress.org/climate/2015/10/26/3714853/carbon-dioxide-impair-brain/>.

<sup>9</sup> Piers MacNaughton, James Pegues, Usha Satish, Suresh Santanam, John Spengler and Joseph Allen, "Economic, Environmental and Health Implications of Enhanced Ventilation in Office Buildings," International Journal of Environmental Research and Public Health, November 18, 2005, <http://www.mdpi.com/1660-4601/12/11/14709/html>.

<sup>10</sup> "The heat is on office building owners and managers to improve indoor air quality," The Comfort Zone, CCIM Institute, <https://www.ccim.com/cire-magazine/articles/comfort-zone/?gmSsoPc=1>.

<sup>11</sup> Tom Y. Chang, Joshua Graff Zivin, Tal Gross, Matthew Neidell, "Air Pollution Is Making Office Workers Less Productive," Harvard Business Review, September 29, 2016, <https://hbr.org/2016/09/air-pollution-is-making-office-workers-less-productive>.

So if healthy buildings are so beneficial to tenants and their productivity, does this mean that building owners can charge more in rents and increase the value of their buildings? Absolutely, since the U.S. Green Building Council (USGBC) found that healthy and green buildings, which are supported by sustainable ventilation, can grow lease potential by 20 percent, ROI by 19 percent and building asset value by 10 percent.<sup>12</sup>

Consequently, as the well-proven connection between healthy buildings and financial rewards is gaining visibility, building owners, architects and employers are taking notice. Building owners want healthier buildings so they can boost property values and charge more in rents, architects can now show the economic value of healthier buildings and employers want healthier buildings for a better company bottom line.

Green building certification programs are noticing this trend too as many more are incorporating healthy building standards into their rigorous criteria. For example, joining the Living Building Challenge – which already incorporated healthy building standards into its checklist – are V4 of LEED, which focuses more on healthy buildings, and the WELL Building Standard, which measures a building's health and is steadily growing in popularity.<sup>13</sup>

### How RenewAire Supports Healthy Buildings

As we've seen, one of the main components of a healthy building is high-quality indoor air. For 35 years, RenewAire has been a pioneer in improving people's health, cognitive function, productivity and wellbeing by enhancing IAQ in homes and buildings of every type. This is accomplished via increased and balanced energy recovery ventilation that replaces equal parts of stale indoor air with fresh and filtered outdoor air.

RenewAire technologies help realize green and healthy buildings by enhancing IAQ energy-efficiently, cost-effectively and sustainably via fifth-generation, static-plate, enthalpy-core Energy Recovery Ventilators (ERVs) and Dedicated Outdoor Air Systems (DOAS). Our products reuse otherwise-wasted energy and humidity from the exhaust airstream to condition incoming outdoor air, which creates cleaner and healthier indoor air, decreases energy use and saves money.

In addition, in order to further occupant health by enhancing IAQ in all indoor spaces – including the smallest ones – RenewAire is introducing our slimmest residential ERV yet, the Slimline. It has a low profile, fits into tight areas, has variable flow ECM features and offers the highest airflow in its category and size. It's perfect for multifamily housing, single-family homes and condos with minimal installation space.

### Trend #2: Energy Efficiency is Critical

Buildings are power hungry. They consume roughly 40 percent of the total energy used in the U.S. and more than 70 percent of the country's electricity, according to the U.S. Department of Energy.<sup>14</sup> On top of that, they're incredibly inefficient as they waste about 30 percent of their total energy intake.<sup>15</sup> There has to be a better way to run a building.

In fact, there is, as HVAC technologies are becoming much more efficient, thus cutting building energy use and operating costs. Today, architects, building owners, engineers and contractors alike are increasingly using energy-efficient and cost-effective HVAC products and technologies because it's in their own economic interest. Green buildings now lead to more green for the bottom line due to improved energy efficiency.

As a sure sign that interest in energy efficiency isn't going away, the number of green building certifications that rate buildings on their effective use of energy is constantly mounting. So many options now exist, including LEED; Passive House; Passive House Institute US (PHIUS); Net Zero; Green Globes; ENERGY STAR; Air-Conditioning, Heating and Refrigeration Institute (AHRI); WELL Building Standard; and the Living Building Challenge, to name a few.

### How RenewAire Supports Energy Efficiency

RenewAire's ERVs and DOAS units optimize energy efficiency by conditioning the fresh and filtered outdoor air coming in with the otherwise-wasted total (sensible and latent) energy and humidity of the exhaust air going out. This exchange of energy moderates temperatures and moisture, decreases HVAC loads and equipment needs, drives operational efficiencies, conserves energy and generates significant financial savings.

One of the challenges of ventilation is bringing in enough outdoor air to enhance IAQ sufficiently because the conditioning process can be costly. RenewAire solves this issue with our DOAS unit with fixed-plate energy recovery, which enables HVAC units to operate independently, depending on building load. This process effectively conditions outdoor air efficiently and sustainably.

Installing a RenewAire ERV or DOAS unit – and thus boosting a building's energy efficiency – lowers capital and operating costs by downsizing HVAC equipment. The economic impact is tremendous as ERVs can cut ventilation heating and cooling loads by 70 percent, leading to potential reductions in ventilation energy costs by up to 65 percent.<sup>16</sup> Not only do ERVs enhance IAQ, they also generate substantial financial savings.

RenewAire's energy recovery ventilation technologies also play a key role in meeting the stringent energy-efficiency requirements of green building certifications. For example, one of the most rigorous programs is Net Zero, which seeks to create buildings with zero net energy consumption. RenewAire products help to achieve Net Zero by significantly reducing the HVAC energy consumed by a structure, while also enhancing IAQ – a win-win for everyone involved.

### Trend #3: Sustainability is a Core Building Principle

No longer a fringe interest, sustainability is a core principle driving building design and construction. Why? Because with the energy-efficient HVAC technologies mentioned above, sustainable buildings not only reduce energy consumption and protect the environment, they also cut operating costs and save money for building owners and tenants.

Furthermore, the driving force behind the labor market today – Millennials, who will make up 75 percent of the workforce by 2025<sup>17</sup> – overwhelmingly prefer working for a company that's viewed as socially responsible.<sup>18</sup> This means that an employer housed in a sustainable building demonstrates its commitment to the environment, sustainability and corporate social responsibility (CSR), which makes it a more desirable place to work.

Sustainable buildings also support many large-scale initiatives to cut carbon emissions since less energy used means a smaller carbon footprint. Making buildings more efficient and sustainable can have a major positive impact on the environment since commercial and industrial buildings alone generate 45 percent of total U.S. greenhouse gas emissions.<sup>19</sup>

<sup>12</sup> "The Business Case for Green Building," U.S. Green Building Council (USGBC), February 10, 2015, <https://www.usgbc.org/articles/business-case-green-building>.

<sup>13</sup> Ken Edelstein, "Five green building trends for 2018," The Kendeda Fund, January 9, 2018, <https://livingbuilding.kendedafund.org/2018/01/09/five-green-building-trends-2018/>.

<sup>14</sup> U.S. Department of Energy; About The Building Technologies Office; <http://energy.gov/eere/buildings/about-building-technologies-office>

<sup>15</sup> Ibid.

<sup>16</sup> All data pertains to a RenewAire HE2XINH ERV when compared to conventional exhaust equipment at 1,500 CFM of OA in Minnesota using DX cooling and gas heat. Future energy costs calculated based on current energy costs. For more information view: [https://www.renewaire.com/wp-content/uploads/2017/09/MAR\\_LIT\\_RGB\\_0317\\_PX800\\_080\\_00.pdf](https://www.renewaire.com/wp-content/uploads/2017/09/MAR_LIT_RGB_0317_PX800_080_00.pdf).

<sup>17</sup> Fred Dews, "Brookings Data Now: 75 Percent of 2025 Workforce Will Be Millennials," The Brookings Institution, July 17, 2014, <https://www.brookings.edu/blog/brookings-now/2014/07/17/brookings-data-now-75-percent-of-2025-workforce-will-be-millennials/>.

<sup>18</sup> Marissa Peretz, "Want To Engage Millennials? Try Corporate Social Responsibility," Forbes, September 27, 2017, <https://www.forbes.com/sites/marissaperetz/2017/09/27/want-to-engage-millennials-try-corporate-social-responsibility/#7a4649266e4e>.

<sup>19</sup> "Buildings & Plants - Facts and Stats," ENERGY STAR, year-end 2015, <https://www.energystar.gov/buildings/about-us/facts-and-stats>.

Sustainable buildings are integral for cutting carbon emissions and energy consumption, which is a principal objective of several recent initiatives, including:

- Architecture 2030 recently launched The 2030 Challenge with the goal of all new buildings, developments and major renovations to be carbon-neutral by 2030.<sup>20</sup>
- The Carbon Neutral Cities Alliance (CNCA)'s 80x50 initiative, which seeks to decrease greenhouse gas emissions by 80% or more by 2050.<sup>21</sup>
- One of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)'s primary sustainability goals is to realize Nearly Zero Energy Buildings (NZEBs) by 2030.<sup>22</sup>

### How RenewAire Supports Building Sustainability

RenewAire's energy recovery ventilation technologies support building sustainability in three specific ways:

- **Optimized energy efficiency:** By recovering and reusing energy and humidity (that would typically be discarded by conventional systems to condition incoming outdoor air, RenewAire solutions are incredibly energy efficient.
- **Reduced HVAC loads:** Because less energy is used in the ventilation process, the loads that HVAC systems use to power heating and cooling can be drastically reduced, resulting in even further reductions in HVAC energy use and costs, as well as capital equipment downsizing.
- **Minimized carbon footprint:** The combination of less energy used and HVAC loads being reduced minimizes a carbon footprint, thus supporting the environment and strengthening sustainability efforts.

As a company committed to sustainability, RenewAire believes it's critical to be a responsible corporate citizen and to practice what we preach. As a result, our brand-new Madison, WI facility is completely wind-powered, has three Green Globes and is on track to receive LEED Gold and ENERGY STAR certifications.

### Trend #4: Smart HVAC Technologies are on the Rise

In order to create healthy buildings, reduce energy consumption, save money and strengthen sustainability, a growing number of building professionals are turning to smart HVAC technologies. These include controls, advanced monitoring systems, building automation systems, smart thermostats and Internet of Things (IoT) lighting controls, to name just a few.<sup>23</sup>

Smart HVAC technologies expand connectivity with global networks to provide greater control, transparency and data collection. This allows operators to monitor overall performance of HVAC systems more closely by collecting real-time analytics.<sup>24</sup> As a result, problems are fixed faster, areas of inefficiency are addressed, maintenance is easier, systems last longer, less energy and other resources are consumed and operating costs are decreased.

In addition, smart HVAC technologies are now affordable and widely available. No longer are they costly and difficult to purchase, install and operate. Today, these innovative technologies are streamlined and simple to use, often times via a smartphone app.<sup>25</sup> Therefore, we're seeing more and more smart HVAC technologies being integrated and adopted.

### How RenewAire Supports Smart HVAC Technologies

As the first innovator with static-plate, enthalpy-core technology in North America, RenewAire is constantly incorporating the latest energy recovery ventilation technologies into our products to improve usability, efficiency and effectiveness. For example, many of our solutions now utilize integrated programmable controls, which improve the performance and user experience of our products.

Why are integrated programmable controls so essential? They strengthen functionality, streamline operations and boost operational efficiencies. This is accomplished via sophisticated factory-installed microprocessor controls and sensors that provide stand-alone ERVs with Direct Digital Control (DDC) and/or Building Management System (BMS) control interface.

What's more, we're providing smart capabilities to our ERVs and DOAS units that enable them to deliver energy-efficient ventilation depending on the need. For example, via innovative technologies, some of our ERVs can provide 100 percent outdoor air without recirculation to maximize IAQ. Additionally, some of our products offer a boost mode option to handle heavy ventilation situations on a case-by-case basis, such as in kitchens during cooking.

### In Sum

The HVAC industry, while traditionally slow to react, is now moving forward to address these key trends: building and occupant health, energy efficiency, sustainability and smart technologies. At RenewAire, we're constantly innovating and working to stay ahead of the curve to provide the best ERVs and DOAS units possible and to ensure we're fulfilling exceptional customer service, experiences and outcomes.

For more information on our energy recovery ventilation technologies that enhance IAQ energy-efficiently, cost-effectively and sustainably, contact us today.

***Nick Agopian** is Vice President, Sales and Marketing at RenewAire. For 35 years, RenewAire has been a pioneer in improving people's health, cognitive function, productivity and wellbeing by enhancing IAQ via energy recovery ventilation technologies. This is done energy-efficiently, cost-effectively and sustainably via fifth-generation, static-plate, enthalpy-core Energy Recovery Ventilators (ERVs) and Dedicated Outdoor Air Systems (DOAS). For more information, visit: [www.renewaire.com](http://www.renewaire.com).*

<sup>20</sup> "THE 2030 CHALLENGE," Architecture 2030, [http://architecture2030.org/2030\\_challenges/2030-challenge/](http://architecture2030.org/2030_challenges/2030-challenge/).

<sup>21</sup> "Carbon Neutral Cities Alliance," Wikipedia, [https://en.wikipedia.org/wiki/Carbon\\_Neutral\\_Cities\\_Alliance](https://en.wikipedia.org/wiki/Carbon_Neutral_Cities_Alliance).

<sup>22</sup> Dan Brightmore, "Sustainability is in the air in the HVAC industry," Construction Global, April 14, 2018, <https://www.constructionglobal.com/sustainability/sustainability-air-hvac-industry>.

<sup>23</sup> Sourced from: 1) "Global HVAC Market - Competition Forecast & Opportunities, 2012-2022," TecSci Research, December 2017, <https://www.reportlinker.com/p05241408/Global-HVAC-Market-Competition-Forecast-Opportunities-.html> and 2) James McPhail, "2018 Trend: Energy Management Is Heating Up Across Commercial Businesses," Forbes, March 6, 2018, <https://www.forbes.com/sites/forbestechcouncil/2018/03/06/2018-trend-energy-management-is-heating-up-across-commercial-businesses/#690336841700>.

<sup>24</sup> "4 HVAC trends to start 2017," WorldBuild 365, January 26, 2017, <https://www.worldbuild365.com/news/pg2huc29f/hvac/4-hvac-trends-to-start-2017>.

<sup>25</sup> James McPhail, "2018 Trend: Energy Management Is Heating Up Across Commercial Businesses," Forbes, March 6, 2018, <https://www.forbes.com/sites/forbestechcouncil/2018/03/06/2018-trend-energy-management-is-heating-up-across-commercial-businesses/#690336841700>.