



# What is behind the evolution of smart HVAC machines?

## Looking at the current HVAC market, what challenges do machine builders (OEMs) face?

Christophe Borlein: First of all, I see several environmental trends related to the impact of HVAC machines on global warming. For example to reduce their environmental footprint many HVAC machines now use new refrigerants like HFO<sup>1</sup> or natural fluids. This refrigerant revolution is driving new ideas and machine improvements, but the shift also means OEMs must redesign all of their machines, which is a huge task.

Secondly, there's a move to the Internet of Things (IoT), which provides users with better communication, remote control and monitoring, and predictive maintenance tools. This is a new, large, and complex topic. The IoT technology is arriving very quickly and is challenging the ways we think about cybersecurity, connectivity, apps, analytics, and services.

## What are the benefits for OEMs and end users of moving to the IoT?

Eric Vatonne: There are many tangible benefits for both end users and facility managers of residential and commercial buildings. For example, the IoT allows facility managers to react quickly to a drift in energy consumption, reducing the bill for the end user. Other benefits

are around comfort, such as the ability of the end user to easily set room temperature remotely, to prepare their home or office for their arrival.

In fact, I believe that today we have only a fraction of what we will have in 10 years' time in terms of technology and smart capabilities. Digitization is something quite recent and something that will continue to inspire new services. Today, globally, we are only taking the first step. Over time, smart HVAC machines will continue to get smarter.

OEMs have to manage this change by implementing connectivity between the machines and the cloud, and by improving their web services with real-time applications and providing more online content. The ultimate benefit for them is that they are able to provide better services and smarter machines.

## What does "smart" exactly mean in the context of HVAC machines?

Eric Vatonne: Smart machines, simply, are more flexible, connected, efficient, and safer than traditional HVAC machines. Smart features can be useful for HVAC users in residential homes as well as big commercial buildings. Users can connect to their machine wherever they are, not just when they are standing in front

"With smart HVAC capabilities, I believe that today we have only a fraction of what we will have in 10 years' time" – Eric Vatonne

<sup>1</sup>Hydrofluoroolefin – a refrigerant with low environmental footprint

of the device. Mobile devices and wireless systems are leveraging remote access.

### What influence does smart HVAC have on cost and efficiency?

Christophe Borlein: Smart machines maximize efficiency through intuitive collaboration with people. The machine is always reachable by the user – so if no one is in a room, the air conditioning can still be controlled remotely through the IoT.

We also need to bear in mind that machine builders are required to comply with local and international energy efficiency regulations. Smart technology makes this easier. For example, monitoring and analytics help users understand a machine's energy consumption, and react faster in case of drift.

As for the total cost of ownership, predictive maintenance tools embedded in smart machines help reduce operating expenses. Traditionally, service teams had to be dispatched to check the machines – and sometimes they would find nothing wrong, wasting time and money. With this solution they come only when needed.

### You mentioned energy efficiency legislation. How are these regulations affecting the HVAC market?

Eric Vatonne: Many countries, such as the U.S., China, and European Union member states, have validated energy labels that take into account the Seasonal Energy Efficiency Ratio (SEER) and Coefficient of Performance (COP) of machines. So new HVAC machines must be classified by energy efficiency levels – in Europe this is A+++ to G, and one to five in China. There are different legal requirements in individual countries. For example in China, green buildings have to account for 30% of new construction by 2020. That's why the market for efficient HVAC machines is growing quicker than the overall HVAC market.

### How can HVAC machines be more energy efficient to meet these requirements?

Eric Vatonne: Globally, HVAC and refrigeration applications are responsible for about 15% of electricity consumption, which is huge, so improving HVAC energy efficiency will have a relevant effect on global warming. What's more, HVAC equipment accounts for roughly 40% of total building energy consumption, which is why efficient machines are in such high demand.

The energy consumption of a machine doesn't only depend on the machine itself, but also on its installation, maintenance, and usage. Technologies such as COP monitors, allow end users to keep track of the efficiency of their machines, and react when efficiency is decreasing. Also, algorithms such as floating high-pressure control improve efficiency and can reduce energy consumption by up to 35%. Using variable speed drives for fans, compressors, or pumps, can save up to 50% in motor energy usage compared to conventional controls. Schneider Electric provides many solutions to reduce energy consumption.

**Smart HVAC machines** are more flexible, connected, efficient, and safer than traditional HVAC machines

### What makes Schneider Electric solutions different?

Christophe Borlein: Schneider Electric has served the HVAC industry for about 30 years and has a strong presence and support offering across the world in several different markets. The company boasts a complete range of solutions and dedicated HVAC products such as [Modicon M171/M172](#) logic controllers, the [Altivar 212](#) variable speed drive, and our SoMachine HVAC programming software platform.

With a worldwide network of application design engineers (ADEs), Schneider Electric also has the expertise and experience to design and provide an optimized and adaptable solution for each individual OEM, supporting the machine builder throughout the whole process.

Eric Vatonne – HVAC Application Leader, Industry business

Christophe Borlein – Product Manager – Modicon M171/M172, Industry business

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