

Providing Vision and Leadership for the Future of the HVAC and ture Sheet Metal Industry

INTERNET OF THINGS (IoT): IMPLICATIONS AND STRATEGIES FOR SHEET METAL AND HVAC CONTRACTORS

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Prepared By: Continuum Advisory Group

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Technology will transform the commercial HVAC market. Here's what contractors need to do to stay competitive.

INTRODUCTION

Building systems already have the ability to capture and send massive amounts of data to building owners and operators that they have not previously had. Analysis will help them make better decisions about how they run their buildings, how they conduct repairs and maintenance, and how they make capital improvements. Ultimately, these data applications will also flow back into new building designs, engineering and system selection. They will change the built environment.

We have just begun down the path of turning our buildings into "big data engines." Contractors will be affected by it, and it won't just be service contractors or design/build contractors. Many contractors may remain passive and do not understand what is happening, but they should be aware of how big data will change the ways that buildings and building systems are designed. HVAC contractors, who have the connections and insight to be on the front end of transformaties, can become more valuable to the owner in a consulting capacity by suggesting what kind of data systems are required. They can also help adjust systems to be more efficient and effective, resulting in buildings that are cheaper and faster to construct, as well as function better.

Some service contractors already get it, but our initial research indicates that the awareness of how this phenomenon is already transforming the built environment is low among HVAC contractors, particularly those who are exclusively focused on new construction. The new construction sector will be impacted and the participants should pay attention. Businesses won't suddenly die, but over time they will have less control and influence and face margin-erosion.

The underlying technology that enables what is described above is the *Internet of Things*, commonly abbreviated as IoT. Merriam Webster defines the

Internet of Things as: "the networking capability that allows information to be sent to and received from objects and devices (such as fixtures and kitchen appliances) using the Internet. The Internet of Things really comes together with the connection of sensors and machines."

These sensors and machines, when connected to the components of building systems, are what ultimately turn buildings into big data engines. One new company, Enertiv, boasts of already having more than five billion hours of asset performance data captured. Another recent startup, Senseware, was able to help a client develop a real-time response to Indoor Air Quality (IAQ) problems caused by wildfires in California. This solution was used to assure that air quality was maintained by pinpointing the specific locations and times of the worst problems so the HVAC settings could be adjusted to alleviate problems.

These two examples show both the incredible analytic power of the big data, as well as how these building systems can be deployed to quickly solve specific and acute problems in the built environment.

Firms that have the will, interest and motivation to enter the IoT market have a great opportunity to gain a competitive advantage. They are on the front edge of a trend. IoT technology will disrupt the commercial HVAC industry over the next 10 years, and the main driver of that disruption will be changing customer expectations.

HOW DO THE END USERS VIEW IOT FOR BUILDING SYSTEMS AND HVAC?

Owners and end users are in the early stages of figuring out what IoT means for their buildings, factories and other capital assets. As one would imagine, there is a wide range of definitions being expressed. The majority of the owners we interviewed believe several different forms of connectivity are synonymous with IoT, including connectivity between buildings, hardware and software.

Some of the areas they perceive as being IoT include:

- Improved use of Building Information Modeling (BIM)
- Adding more single purpose sensors (e.g., sensors that indicate trash cans are full)
- Connecting more sensors to building or energy management systems that enhance monitoring capabilities
- Deploying more sophisticated sensors with more memory
- Moving 'monitored' data over proprietary networks

While all of these perceptions are reality in different contexts, the IoT technology applications that most directly impact the HVAC space are connecting more sensors to building or energy management systems and deploying more sophisticated sensors with more memory.

These applications are the baseline technology that enable buildings and their systems to be turned into "big data engines" in order to be utilized by owners, service providers and others to significantly improve building operations. The companies that are offering this technology and functionality range from startups like Enertiv and Senseware noted above. to large building automation companies like Siemens, Honeywell and Johnson Controls; and to HVAC system OEMs like Daikin, Trane and Carrier.

In the short-term, this means that the relationship status between owners and IoT technology remains "complicated." Most of the owners surveyed believed that these technologies may not gain momentum for three to five years. This may seem like a long time, but in business terms with a trend like this, it's really just around the corner. In fact, if you visit the websites of IoT startups who are focused on the built environment such as those listed in the table, their current customer base appears to be pretty extensive.

| Cushman and Wakefield | Durst Group |
|-----------------------|-------------------------|
| Related | Avalon Bay |
| Fischer Brothers | CBRE |
| Colliers | CenturyLink |
| New Jersey Transit | Kansas State University |
| WeWork | Equity Residential |
| Albanese Organization | Rudin |
| Prologis | Laramar |

So given the list above, which is only a small sampling of the companies working to understand how to take advantage of IoT systems, technologies and applications, it is not a stretch to say that the time is now for service providers and contractors to begin seeing where they fit in the IoT picture. The sooner you get started, the sooner you will start to understand the best ways to position your company for success in the future of IoT.

Before going too far down this road, it is critical to understand why building owners are interested in these technologies, because if the new capabilities were not solving tangible business challenges, nobody would be thinking about investing.

The most common stated reasons for interest in IoT for buildings are managing energy usage, reducing cost and improving system reliability. These factors appear to motivate owners across most sectors (manufacturing, healthcare, technology, retail and government).

Cost savings is always a significant driver of behavior and investment in the built environment, but it is a broad category to get your arms around. To be more specific, here are some areas that owners cited as opportunities for cost savings related to IoT:

Reduced manpower needed for facilities and systems monitoring is an area where automated monitoring systems can create an impact, as the equipment and systems self-report their condition and operating efficiency and effectiveness. This reduces the need for building operations staff to perform routine observations and visually inspect equipment and systems.

- Conducting equipment maintenance on an asneeded or predicted cadence instead of on a routine schedule is another area that can reduce cost (e.g., instead of changing filters every three months whether needed or not). It is important to note that this reduces money spent on repairs also because maintenance is performed as-needed based on the data gathered from the equipment. This helps to improve equipment uptime and reduces costly breakdowns and prevents major repairs.
- Energy levels can be better matched to occupancy and human traffic, which reduces the money spent on electricity (e.g., temperature, lighting, etc.).
- Given the more detailed and richer operating data that is created from these systems, owners also find that they can save money by "rightsizing" equipment and components, and the more granular analysis of efficiency and other operating ratios can provide better information on return on investment to justify replacing older and less efficient equipment with new equipment that will improve operating cost.

Companies focused on the user experience as a driver of customer acquisition or retention, such as class A office space, museums, theaters, private schools and high-end apartments, are deploying additional sensors and some voice activated IoT in order to improve the user experience. As more companies become more aware of customers' feedback through various means (social media, customer surveys and automated onsite ratings systems), they will seek to respond by providing the environment and experience their users and customers desire. This creates more demand for IoT and automation that improves the experience.

By getting started now, before IoT becomes completely mainstream, HVAC contractors have an opportunity to become more knowledgeable. Contractors can assist owners in understanding and implementing IoT, making sure they understand how the systems will affect some of the owners' major business drivers. The initial phases of getting all the systems to sync and "talk" to one another has been described by many as a major hurdle. Most businesses are very focused on reducing energy costs and increasing efficiencies. HVAC contractors have often been involved in retrofit projects that delivered cost savings and efficiencies, and could showcase current clients' successes as a way of establishing knowledge of cutting-edge practices.

CONVERSATIONS WITH CONTROLS COMPANIES

Controls companies like Siemens and Honeywell have indicated that a fundamental culture shift is occurring as owners move from routine maintenance goals to more predictive and proactive operations. This tracks with our research on startups in the space and the discussions we had with end users, owners and contractors. Currently, most systems are wired for some degree of control and some predictive maintenance. The next step is to increase the data collected and integrate it for improved data analytics and predictive maintenance, which is an area that the large controls companies are moving towards, but are not yet as nimble or flexible as the startups. Therefore, they appear to be lagging the market.

The following activities were cited as supporting these efforts today and in the future:

- Open protocols is an ongoing trend which allows all devices/sensors to "talk" to one another regardless of brand. It increases owners' OEM and control brand choices, as they are not forced to stay with one brand in their systems because they bought it 10 to 20 years ago.
- System and data integration are critical elements of the IoT trend. Open protocols have accelerated the focus on integration. Several owners, and the control respondents as well, have indicated that data integration is necessary for improved ongoing and predictive maintenance, data analytics, artificial intelligence and IoT. In addition, integration is a difficult task requiring multiple skill sets that go beyond knowing HVAC equipment, including some or all of the following: network technologies, programming capabilities, and knowledge of multiple building automation systems, energy management systems, OEMs and control systems. Most integration work is currently being done

by the controls companies, building automation startup companies or freelance integration consultants.

- Artificial Intelligence (AI) has been described by Siemens as being in the early phases of development in facilities management. Respondents define AI as an 'unintelligent' system that literally tests for patterns in an almost trial and error fashion. AI requires very large data sets, usually including data that may not be HVAC related. AI is a driver of adding more and more sensors and data integration. This is something that a number of the startups we researched are pushing forward, along with the large controls companies. As more data points are collected from building systems and building operations, the AI algorithms will improve to the point where they will recommend improving operating settings, repairing and replacing components, and redesigning systems for major retrofit projects. This data will also flow into the design of new facilities, design of OEM equipment, and the determination of operations staff roles, responsibilities and workflows.
- Several respondents at the controls companies indicate that owners are incorporating more HVAC expertise in the design and engineering phases of construction in order to maximize control and cost savings. This is another area where HVAC contractors have an opportunity to add value or may risk losing control of, and/or losing opportunities all together, if they fail to fill the need. As the data continues to increase and the insights from the analysis improve, the HVAC expertise can be filled by non-HVAC contracting firms, and ultimately by firms that are not even directly involved in HVAC. For example, if the owner controls the data, they can use it to design the HVAC systems without engaging contractors, OEMs, controls companies or consultants.

For HVAC contractors to position themselves to win in the emerging world of IoT and big data from buildings, they will need to be open to changing their business activities somewhat, if not completely changing their business models. It will be critical to understand how current clients are making this shift, as well as developing an understanding of best practices and lessons learned that can be shared with customers and prospects. Sales resources who understand the current situation can communicate how the technology is evolving and build strong business cases for clients, which will be extremely valuable. The large controls companies are good sources for these individuals.

The open protocols and data integration trends may end up requiring upgrades in technicians' skill sets, including networking, programming and knowledge of all equipment, and BAS/EMS packages. AI is coming, and contractors should stay abreast of how it is impacting HVAC. HVAC is being included in design phases more often. Hence contractors may want to establish more relationships among owners, general contractors, controls companies and startup building automation companies. As we'll explore below, our respondents indicated that HVAC contractors are not viewed as thought leaders in this area so partnerships and collaborations with the right firms and types of firms will be important.

HOW DO OWNERS VIEW DIFFERENT INDUSTRY ROLES?

Controls Companies

The majority of the non-government owners view controls companies as educators on the newest trends in monitoring, maintenance and data analytics. Alternatively, they are known for being biased towards their own systems. This legacy attitude and difficulty in transitioning to open protocols is one of the main factors that creates the opportunity for new technologies, companies and service providers to find niches to exploit.

Industry Specific Sources

Retailers use both vendor management and biller third parties. Vendor management companies, such as Service Channel, look for alignment between an HVAC contractor's capabilities and an owner's requirements and ensure that the data required for the owner is captured. In addition, respondents indicated that most retail companies utilize third party billing companies for data and reports that are then used in construction and facilities planning.

Universities have a "Big 10 Trends" conference where individual schools can share lessons learned and successes on a variety of subjects, including HVAC.

HVAC Original Equipment Manufacturers (OEMs)

Companies like Daikin, Trane, Carrier and Panasonic are viewed primarily as leaders in equipment design and manufacturing. They are all embedding more IoT technology and sensors into their equipment, and most provide building automation and controls as part of their systems. Given their large installed bases of equipment and ability to develop and deploy new products, these companies will remain in the picture but are not considered as innovative as the controls companies, university researchers or startup building automation companies.

IBM Watson/Tririga

One key government respondent considers IBM as the leader in facilities management and has worked on task forces with IBM. IBM's system provides a broad portfolio of capabilities for building owners and operators – from managing leases and capital projects to space optimization, operations and maintenance, and customer/occupant experience. For owners looking to integrate all of their facilities' needs, IBM's offering could be compelling.

Georgia Institute of Technology Digital Building Laboratory

A respondent noted that those running the laboratory are experts in this area and have a deep understanding of cutting-edge trends. This is an organization that can provide insights into trends on data standards and interoperability, smart buildings, infrastructure and environments, as well as design, fabrication and construction automation. It makes sense for contractors to keep abreast of what the Digital Building Laboratory is doing as it relates to building systems and facilities operations and management.

General Contractors/Architects/Engineers

Many owners rely on A/E firms for HVAC expertise in design. Fewer view GCs as experts in MEP systems design and operation.

Building Automation Startup Companies

These companies are just beginning to develop profiles in the market so it is difficult to determine their overall positioning. However, in reviewing their customer feedback and understanding what they are bringing to the market, it is safe to assume that the customers' perceptions are generally positive. As these companies begin to penetrate the market more and the bar of expectations is raised, it will be interesting to see how they fare in comparison to other players, particularly controls companies and contractors.

HVAC Contractors Are Not Currently Considered Thought Leaders

Respondents described negative experiences with HVAC contractors whom they consider to be the "weakest link" in the service community. Respondents indicated that instead of critically thinking about an issue, repairmen tend to go down a checklist, fixing what isn't "working" even if something else that needs to be replaced is causing both elements to malfunction, which can be costly and time consuming.

Despite the overall negative perception of HVAC contractors as it relates to IoT, building automation and operations analysis, there are still opportunities for HVAC contractors to position themselves positively. Given the market fragmentation and the lack of significant "national scale" options, most owners will work with local HVAC contractors to address their service, repair, retrofit and new construction needs. As the IoT trend continues to grow, it will be important for HVAC contractors to focus on developing the account management capabilities to sell and educate their customers, as well as the operating capabilities to conduct sophisticated analyses of building systems to ensure that they deliver root cause preventative and proactive maintenance and repairs.

DIFFERENT END USER MARKET PERCEPTIONS

Government

All government respondents stated that facilities management is decentralized both among and within the various agencies interviewed. Individual campuses, and in some cases buildings within a campus can be using different equipment and BMS/BAS/EMS software. Budgets are very constrained, which a few respondents imply may lead to a greater acceptance of smaller vendors who are paid as a percent of savings realized.

Universities

There was a wide range of responses in terms of understanding and sophistication of both hardware and software. In addition, it appears those schools in highly competitive environments may be more focused on the end user experience than other end users.

Large Box Retail

These respondents indicated they use third parties for energy vendor management, as well as data collection from those vendors. In addition, they rely on their billing companies to provide usage data related to HVAC, which is then used in new facility or retrofit decision-making.

Fast Food/Convenience Stores

Sheetz is the only company interviewed in this category and stands out as it is far ahead of most other respondents in terms of monitoring, predictive maintenance and HVAC.

Health

Banner Health was the only company interviewed in this category. However, Siemens also indicated that hospitals are working hard to improve predictive capabilities and AI. Banner Health is very focused on open protocol and automated maintenance. It is one of the more sophisticated respondents contacted. Many companies already have energy reduction programs and use equipment monitoring to drive energy reductions. Several respondents are also using at least rudimentary forms of data analytics. Today, HVAC contractors are not perceived as data managers and are not expected to take this role in the future. Most respondents perceive controls companies, third party billers, vendor managers and other third parties specializing in energy reduction as sources for assistance with or performing analytics.

Data science is not a term understood by owners. They also do not understand the potential role of AI in HVAC facilities management. Getting the best monitoring data collected and integrated into current BMS/BAS/EMS systems is the main concern today. Only one company indicated it is hiring a data scientist. Regardless of where data is managed, all facility managers want increased visibility of building functions on their dashboard.

HVAC players are not expected to become data management or analytics providers. However, knowledge of best practices and cutting-edge technologies will be key to success.

SMACNA CONTRACTORS' PERSPECTIVES ON IoT

In order to understand the current perspective of SMACNA contractors on the IoT trend, we conducted an online survey and did a few interviews. While the overall number of responses were below the level where we can infer statistical significance, the results and insights from the survey and interviews are interesting and worth exploring.

The respondents tended to be from large companies, with more than half citing annual revenue of \$70 million or more. Energy efficiency was viewed as important to the respondents' customers with 9 in 10 rating it either "high" or "very high" as a priority. In addition, 9 in 10 also indicated that reducing repairs and maintenance, and increased energy efficiency were the top benefits their customers sought from HVAC services. These services are highly correlated with the benefits of IoT solutions.

As noted in the first section of this white paper, the most common benefit of IoT that was cited by owners, controls companies and building automation startups is the ability to use the data generated by IoT systems to implement preventative maintenance and to increase the efficiency of MEP systems (see *Figure 1*). Given the parallel between customers' priorities when seeking HVAC services and the benefits of IoT systems, we expect that the various IoT systems for building management/building automation will continue to increase their penetration over the next three to five years.



All of those who responded to the survey perform both new construction and maintenance, and 64% provide equipment monitoring. The majority of the work for those who did respond fell into commercial, healthcare and institutional. This sample matches the owners' sectors who participated in the study as well.

Since energy management is such a high priority for building owners and operators, we asked the SMACNA contractors how their customers currently handle energy management. The most common responses were purchasing new equipment, running analytics on historical data and combining energy data with other facility data for more predictive control over cost and maintenance (see *Figure 2*). These activities also go with IoT systems because the analytical data provided by the advanced sensors often will help owners understand the return on investment for new equipment purchases. The data available is incredibly rich compared with typical historical information, and many of the IoT systems combine overall operating data (such as occupancy trends, air quality, temperature, humidity and particulate matter) with the operating efficiencies and effectiveness of various building equipment and systems. Similar to the data in



Figure 1, these preferences from owners indicate that the "big data" IoT systems are likely to continue being adopted by facility owners and operators.

HOW PREPARED ARE SMACNA CONTRACTORS?

Given the strong indicators that the IoT systems are likely to continue increasing in the market, it is important to begin to understand how prepared SMACNA contractors may be for this future. We asked respondents to rate their current organization's capabilities in the area and found that there is reason to be optimistic. However, it is also important for these contractors to focus on increasing their internal capabilities to deploy and manage IoT systems in order to build strong, competitive positions in the future. More than half of the respondents indicated having some experience with these technologies and that they are capable of installing them when specified (see *Figure 3*). This is a pretty good indicator that these respondents are well positioned with the IoT phenomenon this early in its deployment. On the other hand, more than 30% of the respondents indicated that they have limited knowledge and expertise for IoT systems, and less than 10% rated themselves as industry leaders. The challenges for contractors primarily fall into three categories:

1. The expertise and capability to sell customers on the benefits of the various IoT systems and to help them differentiate among the options to select what is going to be most effective for their facilities.



- 2. The ability to work with the customer, engineers and specifiers to ensure that the correct system, including components, accessories and materials are specified, installed and set up properly.
- 3. The knowledge and capability to analyze, manage and proactively provide service to ensure that the building systems are running most efficiently, that repairs and replacements are done proactively, and to identify and recommend capital improvements and retrofit opportunities as needed.

There are also a number of more specific skills and capabilities that fit into these categories, such as understanding how to estimate these jobs, learning the most efficient ways to install components and equipment, knowing the best ways to test and validate that the systems are functioning properly, being able to interpret the data and analysis performed by the system to ensure that they are addressing root causes of problems and not symptoms, as well as others. Given where the respondents rated their organizations in general, it is safe to assume that most contractors need to improve in all of these areas in order to participate, let alone lead the market in the IoT space.



When contractors were asked how they see their customers react to IoT more directly, the answers tracked with the idea that the trend is beginning to climb the adoption curve but the majority of the market still doesn't understand exactly what IoT is.

No respondent indicated that their customers see IoT as "hype," while about 15% believe their customers see it as "valuable." The remaining respondents indicated that "it is mixed" or "unclear" how their customers perceive IoT. This is interesting as the combination of 15% who perceive it positively, along with the mixed and uncertain majority coupled with the lack of those who see IoT as bogus, clearly indicate a technology that may be on the verge of crossing over the "Chasm" in the Technology Adoption Curve developed by Geoff Moore in his book <u>Crossing the Chasm</u>.



One of the most important criteria for a product to "cross the chasm" from early adopters, who are considered visionaries, to the early majority, who see the new technology as having value, is that the product is complete. In other words, the customer can buy the product and receive the benefits from it without having to add value, perform additional work or buy other products or services in order to make it work. The building automation startup companies are able to install sensors and software systems that provide datadriven insights back to the building owner without the owner having to do anything else to the system. The ability to make decisions and take better actions based on the analytics is an area where the average facility owner or operator still lacks capabilities and must rely on a third party for help.

To the extent that controls companies, building automation startups, OEMs, engineering companies or HVAC contractors are able to deliver this help at scale, this is likely the next factor that is needed for the IoT systems to cross the chasm into the greater market. These services and capabilities need to be easy to find so the service companies must do a good job of marketing themselves, have a clear value proposition that demonstrates a positive return on the investment in their services and be able to consistently execute high quality, accurate services that the customers value.

In our research we defintely got the feel from owners that they don't perceive the third party service supply as being well-organized enough or visible enough to consider because it exists at scale as described in the



prior paragraph. Also, the contractors who responded to our survey echo this perception, as they noted the biggest challenges their customers face in adopting IoT include "Knowledge/Expertise" (finding the right people or building the knowledge to do it), "Value Proposition or ROI is unclear" and "Total Cost to Adopt" (see *Figure 5*) These perspectives track with the idea that the service base to act on the better information and insights has not been developed yet. One of the implications of this is that there is still time and market space for HVAC contractors to claim their opportunity because the same respondents rated their biggest challenge in adopting IoT systems as "Knowledge/Expertise." At least one strategy for HVAC contractors is clear: Develop the knowledge and expertise to be able to help customers with this challenge.

WHAT IS HAPPENING NOW?

A small number of contractors who responded are already working in the IoT space, in most cases providing services to analyze or respond to analysis that is provided by the IoT system. These companies are finding that they can use the IoT systems to improve their efficiency and productivity onsite with service and repair calls by a significant factor. One contractor who was interviewed noted that they are able to serve an existing client that has a relatively complex facility in a matter of hours, diagnosing and fixing the problem, compared to a one and a half to two day process of manual analysis that was used prior to the customer implementing an IoT based system.

This contractor does a lot of work in partnership with Honeywell for control systems. He believes that Honeywell is one of the leaders in using technology and the internet to control and provide data from thermostats, which is really growing in the commercial sector. His technicians are using smart phones, tablets and laptops to establish programs with HVAC controls, systems, get alerts, etc. Their ability to be proactive and to enact preventative maintenance has increased significantly as a result. This contractor is seeing increasing opportunities as a result of this service line. So does the IoT primarily represent an opportunity or threat for HVAC contractors? Our research indicates a mixed bag, but the outcomes in that bag are largely within the contractor's influence. As one of our interviewees noted:

"Honestly, I don't see this as a threat. That's always a concern that I hear, that we are now eliminating jobs for service. I disagree. In the long run, what it does is establish us as a leader in the industry and we provide a valuable service. Over the long-term, we may be reducing some of the nuisance calls, but by proving and showing savings, our customers value our contribution. I'm involved in future remodels, expansions, replacements after twelve to fifteen years. I see it as a positive for more work opportunities. I think we are gaining more by having that service available, proving it out and being able to be the contractor of choice. We eliminate the competition. We are just asked to do the upgrades."

Another respondent stated the following:

"We are set up with our large commercial customers to get notices before the owner even knows about it. They say 'great, get out and address/resolve it.' We can resolve a lot of the issues online without even going onsite. We've been able to prove savings to our customers."

Yet another contractor who we interviewed has seen a significant uptick in control systems that provide "push" notifications to the service company. For example, the system will send an email to the service company and/or the owner that says, "your filters are 85% plugged, you should change them," instead of an emergency notification when the heating fails because of the filters. In his experience, this is being driven by the controls companies like Honeywell and OEM/controls companies like Carrier and Trane. The facilities management department for his customers are pushing for proactive technology to prevent downtime. In order to ensure that critical building functions are not interrupted by equipment downtime, many buildings have 100% redundancy on the equipment. However, with proactive notification, it's possible to reduce that to 50% redundancy. The savings for existing factilities are huge and the savings

from designing future facilities with less redundancy could be even bigger from capital and operating budget standpoints.

SOME STRATEGY OPTIONS FOR HVAC CONTRACTORS

As the IoT landscape continues to evolve, it is challenging for HVAC contractors to determine their best options for getting involved and building IoT business. Here are a few ideas that can help contractors get started. One common thread in all of these strategies is to develop your network of contacts and partnerships in the market. In an emerging category like IoT, networks are important as they provide access to critical information that can help contractors to anticipate and quickly adjust to shifts in the market. These networks also provide business opportunities. The following strategies are not mutually exclusive and contractors who pursue a combination of these strategies are likely to find more success with IoT.

Strategy 1

Align with controls companies (e.g. Honeywell, Siemens, JCI, etc.) and OEMs (e.g. Trane, Mitsubishi, Daikin, etc.) to learn about IoT systems and work together to build relationships with owners. These companies already have well-established brands and relationships with owners, and often are interested in partnering with contractors who are able to provide smart resources to implement IoT solutions and ongoing service, retrofits and repairs. They are also conducting research and development in IoT equipment, systems and solutions so working with these companies can position contractors to be at the leading edge of knowledge in IoT.

Strategy 2

Find out which building automation startup companies (e.g. Senseware, Enertiv, etc.) are active in your area and build relationships to bring a higher level of service and value to owners. These firms are among the most innovative and agile companies involved in the IoT, HVAC and building automation categories. Their systems are typically relatively inexpensive, easy to implement, and provide data and insights either in conjunction with or separate from the owners' existing building automation system. They are often defining the latest trends in IoT and are typically open to sharing information and partnering with companies who can help them by installing and servicing their IoT systems. Their systems also tend to provide new information to building owners that often leads to retrofit projects. Working in partnership with companies who can perform those projects and services with quality, reliability and speed is valuable to them.

Strategy 3

Work with owners to enhance and improve their HVAC systems in partnership with controls companies, OEMs and building automation startup companies. This strategy requires that the contractor already have or quickly build a high-value relationship with building owners. Contractors with existing service and controls businesses are typically best positioned to execute this strategy. The role of the contractor here is as the trusted advisor to the owner in helping them to make good decisions on how to determine their IoT strategy, and then supporting them in implementing the strategy. It is also helpful for the contractor to have good relationships and knowledge of the controls companies and OEMs.

Strategy 4

Get up to speed on what International Training Institute (ITI) is doing with OEMs and technology companies to help position the Union Sheet Metal industry for success. The ITI is currently involved with quite a few OEMs and technology companies to bring the latest knowledge to the industry. Work in your area to partner with the SMART Union to ensure this knowledge and technology is deployed in the field so contractors will have access to execution resources and the Union will have a new avenue for its members to develop their skills and opportunities.

WHAT IS COMING NEXT?

IoT systems are poised to accelerate in penetration in both existing facilities through retrofit projects and in new construction. The benefits that owners desire from their facilities, particularly energy efficiency, equipment reliability and proactive maintenance, align directly with the typical benefits from early IoT systems. The sector still has challenges. In particular, the issue of data and systems integration and interoperability still must be sorted out. Additionally, the landscape is crowded with multiple business profiles jockeying for position and establishing roles: HVAC equipment OEMs, controls companies, startup building automation companies, engineering companies and HVAC contractors are among the leaders.

While the technology continues to improve, the cadre of respondents who will take action to improve systems based on the analytics from IoT systems has yet to come together. This presents an opportunity for HVAC contractors to claim a niche in the ecosystem. Whether it's partnering with controls companies or OEMs, aligning with building automation startups, creating their own sales, marketing and operating capabilities, or some combination, the clear call to action is for HVAC contractors to start figuring out how they can add value in the new world of the Internet of Things.