

Contractors Buck the Trend

While it's easy to complain about government, two Texas contractors have adopted a different attitude.

Pat Rucker, president of Entech Sales & Service, Dallas, said he's looking forward to the future, despite his concerns.

"At my age there is no point in worrying about it," Rucker said. "I just want to stick around and see what's going to happen next."

And the ultimate symbol of a positive attitude about government regulations is exhibited by Steve Saunders, CEO of Tempo Mechanical, Dallas.

"We waste no time at Tempo by being frustrated with or trying to determine which regulations are good and which are bad. We don't frustrate ourselves with the government because they don't make some things easy or because they are making other things too expensive. This is simply wasted effort and wasted brainpower," he said. "Our time is spent trying to figure out how best to be above the baseline for performance and ahead of the curve of regulatory change. If we are in front of what the government is doing, then their changes do not impact our business, nor our customers' problems."

going to stay in business, and yet the consumer receives no benefits for these expenses."

He added, "When prices go up, they want to know why. The current answer is: government."

Similarly, Jim Miller, president and CEO of Murphy & Miller Inc., Chicago, said, "We are concerned about the cost reduction push-through from the negative impact of the ACA."

Yates referred to it as the "Unaffordable Care Act," and he and many other contractors are worried about how it will impact their companies further down the road.

Douglas Lindstrom, co-owner of Lindstrom Air Conditioning & Plumbing, Pompano Beach, Fla., said, "My concerns are interest rates going up when the Fed stops buying bonds, and the effect of Obamacare in 2015, when I believe the rates will spike significantly in the high 20-30 percent range."

While Hank Bloom, president of ECS, Mentor, Ohio, believes everything is stable for now, he added, "My concerns are rising overhead costs like health care taxes and tax incentives being taken away that are difficult to budget."

Overbearing Agencies Increase Burden

In addition to the hot-button issues like DOE standards, EPA phase-outs, and health care, there are other areas where contractors feel that government intrudes too much into their business.

For example, Karl Roth Jr., CEO of A.N. Roth Co., Louisville, Ky., said the Occupational Safety and Health Administration (OSHA) is his biggest pet peeve, since he has always considered safety to be job No. 1.

"Many of the training requirements are overdone," he said. "You have to be a certified forklift driver and certified to operate a scissor lift," he said. "Yearly hazard communication and many of the other requirements are extremely difficult for small business to deal with."

For Brian McDonald, general manager of Outer Banks Heating & Cooling, Kill Devil Hills, N.C., it's his state's Department of Environment and Natural Resources that causes him headaches.

"They have such restrictive regulations on closed-loop ground bores; it's crazy," he said. "They treat them like water wells for some reason. For example, the vertical bores are supposed to be 15 feet from any structure attached to a house. When we met with them before the rules went into effect, I asked them why and they said the hammer drill action causes basement walls to crack. My first question to them was: When did you start regulating the actual house structure? That's an issue between the driller and the property owner. The second thing I told them was we don't have basements here. Our houses are almost all on pilings a minimum of 8-feet above ground, and we live on a sandbar so we mud rotary drill, which has no hammer action at all."

"They then decided they needed to add a form so HVAC and loop contractors can request a variance. If they already knew they needed variances, why not just fix the rules?" McDonald asked.

Licensing Laws Lack Teeth

For those striving to stay compliant with the complex and ever-changing regulations that impact their businesses, one of the most frustrating aspects of such diligence is when repercussions aren't inflicted on those who don't follow the rules.

"Labor laws, OSHA, mandatory certifications, and qualifications are a burden and added expense to the contractor doing it right. Here, the guys that just ignore the rules seldom, if ever, get punished," Hoover said. "If we could just get our local guys to actually deal with unlicensed contractors, it would be a huge help."

Kobie agreed, stating, "The penalty for unlicensed activity lacks any real teeth, and the lack of enforcement for unpermitted work is a disgrace." **N**

energy management

RTUs Cool More Space Using Less Energy



Southport Heating, Plumbing, and Geothermal technicians Josh Pothast (left) and Nicholas Draeger (right) install a 30-ton Modine Atherion rooftop packaged unit at Rite Engineering, in Franksville, Wis. The unit provides heating, cooling, and IAQ with the added benefit of an energy recovery ventilator (ERV).

By Dan Vastyan
For *The NEWS*

Some industry experts in the HVAC industry consider gas-fired condensing combustion heating systems to be the final frontier in rooftop heating technology.

As seen during the formative years, throughout the development of high-efficiency residential furnaces, several manufacturers boast condensing rooftop equipment on the market. Most product lines available today are in the 90-92 percent efficiency range, but a few approach 95 percent.

Since 2010, the Gas Technology Institute (GTI) has monitored a number of buildings that employ condensing and noncondensing rooftop units (RTUs), keeping close tabs on energy consumption and just about every other factor that influences how the equipment will find its way onto rooftops across the continent.

GTI was formed through the merger of the Gas Research Institute and the Institute for Gas Technology in 2000. Today, GTI is a not-for-profit research, development, deployment, and training organization. "We're viewed as the research and development arm of the gas industry," said Douglas Kosar, GTI's senior institute engineer and energy technologies manager. "In one form or another, we've worked with each of the manufacturers who have a horse in this race. At the moment, there are four."

According to Kosar, Modine Mfg. Co., Engineered Air, and Reznor are most heavily invested in condens-

ing rooftop technology. Munters' speciality is field testing technology.

Building on Current Designs

"Condensing rooftop technology is actually very similar to that found in residential condensing furnaces," explained Kosar. "It's a matter of adapting secondary heat exchanger technology to larger pieces of equipment."

The primary tubular heat exchanger is typically followed by a tight, finned coil — the site of condensation. But it takes more than just increasing the scale of a residential furnace to make the technology work in the commercial range. Manufacturers have worked to ensure uniformity of flow, consistent temperature distribution, and pressure drop to make the heat exchangers work as they should.

For example, Modine offers two cabinet sizes and eight models in their Atherion® condensing RTU line. Through extensive product development, the company improved the heating efficiency of its newest offering, the smaller B cabinet, which comes in variations between 7-15 tons cooling capacity.

"We were able to squeeze more efficiency out through improved airflow distribution in the cabinet," said Mike Shires, product manager at Modine. "Also, we use a different control scheme that varies power exhaust speed and controls gas pressure based on a number of operating characteristics being monitored."

These changes bring the B cabinet to 94 percent thermal efficiency, up 4 percent over the C cabinet

sizes (packaged ventilation systems between 15-30 tons).

Both the B and C cabinets are available with an energy recovery ventilator (ERV) module. Their Con-servicore® secondary heat exchanger employs a slight variation of the existing model that's proven to be very effective in the residential and commercial unitary heating market.

Applying the secondary coil to a rooftop unit came with one distinct challenge, however, because air passes through the secondary coil first on all unit heaters. There was concern that outdoor air coming in contact with these fins first could potentially cause the condensate to freeze. To address the issue, the orientation of the primary and secondary heat exchangers was reversed to temper winter air before it reaches the secondary coil.

Reznor's 10-15-ton YSDA packaged rooftop line also includes a stand-alone control system, and is available in six models ranging from 10-25 tons.

Market Application

Although installations of condensing rooftop equipment are regularly popping up in the northern states, the majority of activity has taken place in Canada, where larger loads and longer winters make for quicker return on investment (ROI).

"Over the course of an entire heating season, GTI collected data from office buildings, restaurants, department stores, and big-box retailers," said Kosar. "We confirmed that long run times, big mid-winter differences between indoor and ambient temperatures, large air volumes, and



HVAC technician Josh Pothast stabilizes the Atherion's ERV module as it's moved into position.



If an existing roof isn't engineered to support the weight of a packaged unit, installing equipment on a frame at ground level is sometimes an option.

extensive hours of operation are key factors in seeing quick payback. Now we can quantify it."

Given current low gas prices and the inherent cost premium of new technology, GTI found that the new condensing equipment proves most cost-effective in dedicated outdoor air system (DOAS) applications. According to Kosar, 100 percent outdoor air is ideal, but the technology performs economically in most applications where units supply 50 percent or more outside air. Falling below 50 percent outdoor air makes it tough to justify the additional cost of condensing technology.

"Big-box stores are the perfect application for this type of equip-

ment," continued Kosar. "High-volume buildings in operation 24/7 year-round make for the best ROI."

As part of a joint utility consortium and local-utility emerging-technology program initiative, a field evaluation was conducted over the 2012-2013 heating season at a big-box retail location in the Chicago area. Two noncondensing rooftop DOASs were retrofitted with condensing heating modules. Testing demonstrated that each condensing DOAS provided gas savings of 11 percent — in that particular case, 2,400 therms were saved each heating season.

Based on an installed cost premium of \$6,085 for the condensing

DOAS and its condensate system, chiefly, GTI found a simple estimated payback of 4.4 years, if energy costs were constant.

The reason to switch to high-efficiency equipment is obvious, it offers reduced energy expenses. Yet, there are roadblocks to widespread implementation. "Sufficient operating cost savings must be demonstrated," said Kosar. "Some installers consider having a condensate drain line on the roof to be an issue, especially in a cold environment. But it's not a big deal. The trick is to get the line into conditioned space through the base of the RTU."

On both the Atherion and Engineered Air's 90 percent efficient

DJX Series condensing units, all drain stubs are inside the insulated cabinet. Condensate lines penetrate the roof curb without ever being exposed to outside air.

According to Kosar, he's also heard concerns of dealing with acidic condensate. In his opinion, it's no different than in a condensing boiler installation. New building or retrofit plumbing is almost surely resistant to condensate acidity.

"Condensate neutralizers developed for the boiler industry easily handle the problem of condensate in older pipe," added Kosar. "As a conservative rule of thumb, depending on the condensing efficiency level, you're looking at 1

gallon or less per 100,000 Btuh."

"When you're in the 90-plus percent efficiency range, you're talking about a lot of condensate," said Laine Wright, general manager for Engineered Air's DeSoto, Kan., plant. "If it wasn't dealt with properly, you'd end up with a skating rink on the roof of the building. Our units include an overflow sensor in case the condensate became clogged."

And, They're Off


"I see this as a three-way race," said Kosar. "Condensing gas technology, ERV, and demand control ventilation (DCV) are all competing to be the best option for high-efficiency commercial space-heating applications. Evolving standards, such as ASHRAE 90.1, are playing an important role in the growing utilization of ERV and DCV, but still only require a minimum of 80 percent noncondensing heating efficiencies for RTUs.

"DCV technology has significant potential," said Kosar. This system monitors carbon dioxide levels in a conditioned space and circulates conditioned outdoor air when levels reach a set point — typically around 700 parts per million (ppm) above ambient.

In comparison, versatile ERVs have received far more industry attention recently. They come in a variety of configurations and materials, and use rotating wheels or thin membranes to separate and exchange energy between outdoor supply and indoor exhaust air to temper incoming air. Both residential and commercial implementation has been broad, due chiefly to the technology's application for both heating and cooling seasons.

Currently, Modine's ERV module for the Atherion combines condensing combustion technology with environmentally friendly ventilation. The optional ERV module uses an aluminum wheel-type exchanger that's 70 percent effective. It can provide up to 8,700 cfm of outdoor air to be economically preheated or cooled before entering the unit's respective elements.

Engineered Air's DJX units are made-to-order, so ERV components can be added to the DJX unit cabinets.

The near future looks bright for equipment that uses one or more of the three technologies in the space-conditioning race. One thing is certain: Less energy is being used to condition more space. 

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