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Minnesota Housing Project Gets Energy & Comfort Upgrade



Rachel Ruhi

Common Ground Uncommon
Communications, LLC

Sadly, it's rare to hear "comfort" and "affordable housing" together in the same sentence. Too often there's a compromise. At the losing end it's usually comfort that gives way to price and ease of installation.

Yet managers of Prairie Meadows, a Section 8 housing community in a suburb of Minneapolis, stood firm in providing better comfort. Built in the 1970s, the housing complex has undergone a sweeping retrofit helped by government funding.

According to Richard Reynolds, 15-year boiler maintenance manager at Prairie Meadows, it is not at all common for residents of Section 8 housing to experience the comfort of hydronic heat. Facility managers understood that Prairie Meadows' 500 residents in 10 buildings and 180 units call this place home and see it as a place to seek comfort. So why shouldn't they experience a level of comfort often reserved for people of greater means?



Pictured (l-r) Mike Jackson, Associated Mechanical pipefitter foreman, and Nick Kruse, Michel Sales field support and technical trainer, perform final boiler commissioning in one of the mechanical rooms.

At Prairie Meadows, many of the occupants are families with children, though there are also seniors and the physically disabled. Apartments range from 850- to 1,000 sq ft with one, two and three bedrooms.

The multi-phased \$10 million renovation to Prairie Meadows concluded in late 2017. While some attention was given to cracked sidewalks, kitchen upgrades and plumbing fixtures, the main focus was an energy retrofit.

Work included door and window replacements, some new appliances, insulation and some roofing. Though the big, old cast iron boilers still worked, they were gluttons

for maintenance and natural gas and operated at efficiencies of 65% to 75% Annual Fuel Utilization Efficiency (AFUE). A potential bump of 20% to 30% fuel efficiency caught the attention of renovation managers.

Rigors of Winter

The old boilers tended to—more frequently through the years—require expensive or time-consuming maintenance or service work, most often during the winter months when downtime meant real potential discomfort and/or danger for residents.

In Minnesota, roaring winter winds frequently sweep through the state and deliver an average of 170 inches of snow. Temperatures can reach -50°F, too cold even for ice fishing. The need for reliable heat is dire.

Importance of efficiency

"Our state government has regulations and energy standards when it comes to building efficiency; they're slowly trying to switch everything to high efficiency systems," explained Reid Mathiason, project manager at Shakopee, MN-based Associated Mechanical, the plumbing and mechanical contracting firm chosen to install new heating systems at the apartment complex.

"The mechanical systems at Prairie Meadows—with gradually falling energy efficiency measurements—no longer made the cut," he added. "Even though many were still operating, they had to go."

The state of Minnesota provides a high level of public and private support for energy-efficient technologies. They offer utility incentives and energy efficiency programs that are accessible to a wide variety of commercial and industrial companies, including financial incentives for upgrades and system-wide improvements.

Comfort conversion

With efficiency being the No. 1 concern, Laars Mascot FT firetube boilers were selected for the retrofit project at Prairie Meadows. With an efficiency of 95% AFUE, input of 199 MBH (1 MBH = 1,000 British thermal units [BTUs]), 10:1 turndown and the capability of cascading up to 20 boilers for larger structures, as well as redundancy—the new boilers gave managers and residents peace of mind to prepare for and face the inevitable winter.

Associated Mechanical began its work in July and continued through September. In preparation, demolition contractors gutted the mechanical room in each building and evicted the old cast iron boilers.

Associated had a three-man crew to install the boilers. While two technicians finished up one mechanical room, the third technician began preparations in the next room.

One facet of the demolition caught the eye of the technicians: gradual deterioration of pipes, exhaust flues and heat exchangers due to acidic condensate. It posed a challenge for on/off boilers when combined with record-setting winter temperatures.

Thanks to careful maintenance throughout the years, this challenge was kept in check, however the old systems would have eventually succumbed to condensate effects.

Luckily the new, modulating-condensing systems welcome the presence of condensate. The boilers and the polyvinyl chloride (PVC) flues are built to take the presence of acidic condensate in stride. In fact, the boilers gain in operational efficiency by stripping BTUs from the fluid before the exhaust process is completed.

Nick Kruse, inside salesperson at St. Paul-based Michel Sales Agency, explained that the new boilers are wall-hung, which also saves space in the tight basement mechanical rooms. Piping was also designed in a primary secondary fashion.

"Each apartment building now has two to three of the Mascot boilers," added Larry Sundberg, technical train-



Laars Mascot FT firetube boilers are wall-hung in one of the mechanical rooms at Prairie Meadows.

ing and field support at Michel Sales. "The system was designed with a lead-lag configuration with equal runtime for greater efficiency and reliability."

Dialed-in Comfort

Boiler operation is now controlled with an outdoor reset, built into each boiler's circuitry. "This alone brought a whole new level of comfort for residents of the apartment complex," added Sundberg. "Before, residents had one- or two-zone systems that simply operated by an 'on' or 'off' function."

"Essentially, it was either hot or cold," continued Sundberg. "Now, with gradual, seamless boiler modulation, and with operation tied to outdoor conditions, residents are finding out firsthand what hydronic comfort truly means—with warmth that's easily controlled."

"Laars Mascot boilers were chosen for this job because they had standard features that weren't even options with other brands, such as integral circulating pumps," said Mike Jackson, Associated Mechanical's jobsite superintendent.

"With circulating pumps built into the boilers, we didn't have to supply one for each system at an additional cost to us, or incur added work. Those advantages helped as system selections were made, as well," said Jackson. **ICM**

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