



Thermal Gradient Header (TGH) technology from Thermenex.



MCW's current work for the University of Calgary's Energy Efficiency and Heat Recovery Initiative.

Lessons From COVID-19

The pandemic shines a light on the benefits of today's mechanical and HVAC systems

by NATALIE BRUCKNER

While the mechanical and HVAC sector was impacted at the beginning of the year as a result of COVID-19 measures, activity started to rise again in July and is expected to continue into the foreseeable future, according to the experts.

"Obviously, the pandemic is a big change for everyone, but a somewhat unexpected change for our sector," says Sheldon Samborsky, team lead, mechanical at Williams Engineering. "Clients and the public are now much more aware and interested in the role HVAC plays in building air quality and our safety. Whether it is to plan a return to work in a building or just to improve the conditions in their own homes where we suddenly have to spend much more time, the sudden growth in awareness surrounding HVAC systems has been frankly astounding."

Samborsky adds that the challenge now is figuring out how to capitalize on this interest to influence how people think about their interactions with HVAC systems and what they desire from those HVAC systems.

Clients are also showing interest in energy efficient design choices, and Samborsky explains that an increasing number are pushing consultants to demonstrate life cycle efficiencies of equipment and systems as a way to evaluate options during design. "This has been done for some time with major institutional clients but is spreading to smaller non-institutional clients as well. To me this is an exciting change that may mean more effort for consultants,

and ultimately better design outcomes and better energy efficiency in HVAC systems."

One project that showcases the capabilities of Williams Engineering is the new sports centre in Edmonton, the Coronation Community Recreation Sports Centre. It will house a wood cycling track that must be kept at proper humidity and temperature levels to be used safely. "The challenge is creating a stable indoor atmosphere despite what may be happening outdoors. Using a high-efficiency outdoor air energy recovery core, a chilled water dehumidification, and waste heat recovery coils the ventilation systems will cool and dehumidify air during the summer months and ensure the track and the sport centre remain comfortable. The recovered energy systems used for dehumidification will reduce consumption dramatically in what is typically a energy intensive process."

James Furlong, partner at MCW Hemisphere Ltd., agrees that the pandemic has had an interesting impact on the mechanical and HVAC sector as clients look for answers as to the benefits of body temperature scanning equipment, and air and UV filtration technology. "We are getting inquiries for airports, offices, and schools, but it is very early on in our understanding and more research is needed."

"The jury is still out on whether HVAC will have a meaningful impact on things when it comes to COVID-19, but it hasn't been ruled out. There is a lot of tire kicking at this point as a lot of property managers are trying to figure out what's real and reasonable, especially if there is a second wave of the pandemic. It comes down to a discussion of risk management and cost."

Furlong says that despite the pandemic being top of everyone's mind, the focus on reducing greenhouse gas and carbon emissions seems to have increased and MCW is being brought to the table early on in discussions, especially when it comes to education projects and federal stimulus spending.

One project MCW is currently working on is the \$10-million retrofit work on the University of Calgary. MCW Custom Energy Solutions (MCW CES) was chosen as the energy engineering partner

for the second phase of the University of Calgary's Energy Efficiency and Heat Recovery Initiative.

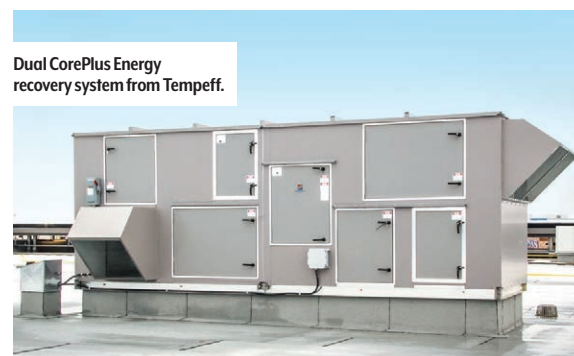
The Initiative seeks to reduce campus GHG emissions across the University's Main and Foothills campuses through a combination of mechanical and electrical system retrofits, HVAC system retro-commissioning, and Building Automation System Controls upgrades in research, laboratory, and teaching spaces.

"One of the energy aspects we are trying to figure out now with regards to the impact of COVID-19 is how to establish a credible baseline for measuring energy savings in nearly empty buildings with increased fresh air being delivered. It's a weird anomaly," he says.

Another area of interest that MCW is seeing in Calgary is an uptick of interest in underfloor air distribution and displacement ventilation, particularly in offices. However it is still too soon to understand if this will be beneficial when it relates to preventing the virus from spreading.

Looking ahead, Furlong is positive that the industry will continue to grow, especially with the help from Government incentives and if interest rates stay low, bringing more demand from the multi-family dwelling sector.

When it comes to systems and technology, the sector continues to impress with its innovations. Over at Tempeff in Manitoba, the increasing regulatory demand for high-performing ERVs, in some cases upwards of 80 percent energy efficiency, has seen a growing demand for its equipment that provides up to 90 percent energy efficiency.



Dual CorePlus Energy recovery system from Tempeff.

“Overall there has been a major shift in making high-efficiency ERV’s part of the mechanical design,” says Tom Todoruk, national sales manager at Tempeff. “When choosing an ERV it is important to consider the defrost requirement. Does the equipment require an energy robbing defrost strategy? If so, how does this requirement impact the performance of the overall system? Does it lower the supply air temperature during defrost? Does it require any form of pre-heat? These are all areas of concern that will impact overall design.”

Todoruk adds that if the ERV does not require a defrost, the additional heating requirement can be downsized taking advantage of the high efficiency and consistently high supply air temperature coming off the ERV. “This not only increases systems saving but minimizes long-term energy costs. This are just some of the advantages when using Tempeff Dual Core.”

This year Tempeff was pleased to announce its new Dual CorePlus Energy recovery, which provides summer latent recovery of up to 57 percent and could significantly reduce summer cooling loads, depending on design conditions. “What’s important to note is that the desiccant cores are on the warm side of the equipment and as such will not be prone to freezing. The combination of superior winter and summer performance [without the requirement of a winter defrost strategy] allows the mechanical engineer to reduce the size of any additional heating/cooling equipment and overall systems requirement. This makes the system less complex and as a result, increases the reliability with the ongoing benefit of lowering long-term operational costs.”

Another technology that continues to see demand is Thermenex’s Thermal Gradient Header (TGH) technology that went through a major redevelopment based on lessons learned from monitoring 20 projects for over 10 years.

“We recently developed an enhancement we call Single Primary, Dual Secondary piping. It greatly simplified controllability, increased real world performance, and reduced capital cost. The TGH concept is now standard for all buildings. No more one-off complex control sequences that were difficult for operators to manage,” says Jeff Weston, principal at Thermenex.

The company opted to soft launch the TGH technology on local healthcare facilities, largely supported by their Energy Environmental and Sustainability Team, with funding from the Province’s Carbon Neutral Capital Program. The first TGH went in St. Paul’s Hospital under the direction of Alex Hutton.

Another project where the TGH was studied extensively was at BC Children’s and Women’s Hospital’s Campus, by the engineers at HH Angus. With ambitious goals to reduce carbon, the TGH technology was determined to be the most cost-effective way to reduce carbon. Three TGH’s are now under construction, with a fourth in design.

“Our success has led to discussions about TGH in new hospitals. It is clear they don’t need fossil fuels until it is well below freezing outside. TGH allows engineers to design systems that achieve this while automatically minimizing the electrical consumption too,” says Weston. He adds that working

with different consultants as they incorporate the TGH technology into their designs and the transfer of knowledge between teams helps them get comfortable with the change that is slowly progressing through the HVAC industry.

“Thermal Energy is an undervalued renewable resource that is everywhere in everything, we are in it, so we don’t see it, like a fish that has no idea what water is. Not everyone is comfortable with changes coming to an industry stuck in its ways. We were called crazy when we first connected heating and cooling together into one pipe. Now, when we suggest cooling a boiler with a heat reclaim chiller, or using ice for heating, at least those that have worked with us are willing to listen to the logic before jumping straight to ‘crazy.’”

Looking ahead, Thermenex is excited to see how the next generation of engineers, passionate about sustainability and change, apply the TGH technology in many different types of buildings and as District Energy solutions as well.

It appears that despite the challenges that everyone experienced at the beginning of the year, the mechanical and HVAC sector is as strong, if not stronger than ever, with companies like Broadway (a full-service mechanical contractor who designs, installs, repairs and services heating, ventilation, air conditioning, refrigeration, and plumbing systems for the commercial, multi-residential and institutional markets), NDY Canada Management Inc., and Aqua-Tech winning bids on numerous high-end projects to add to their already impressive portfolio. The industry, thus far, remains very healthy for many. **A**

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