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MECHANICAL & ELECTRICAL CONTRACTING

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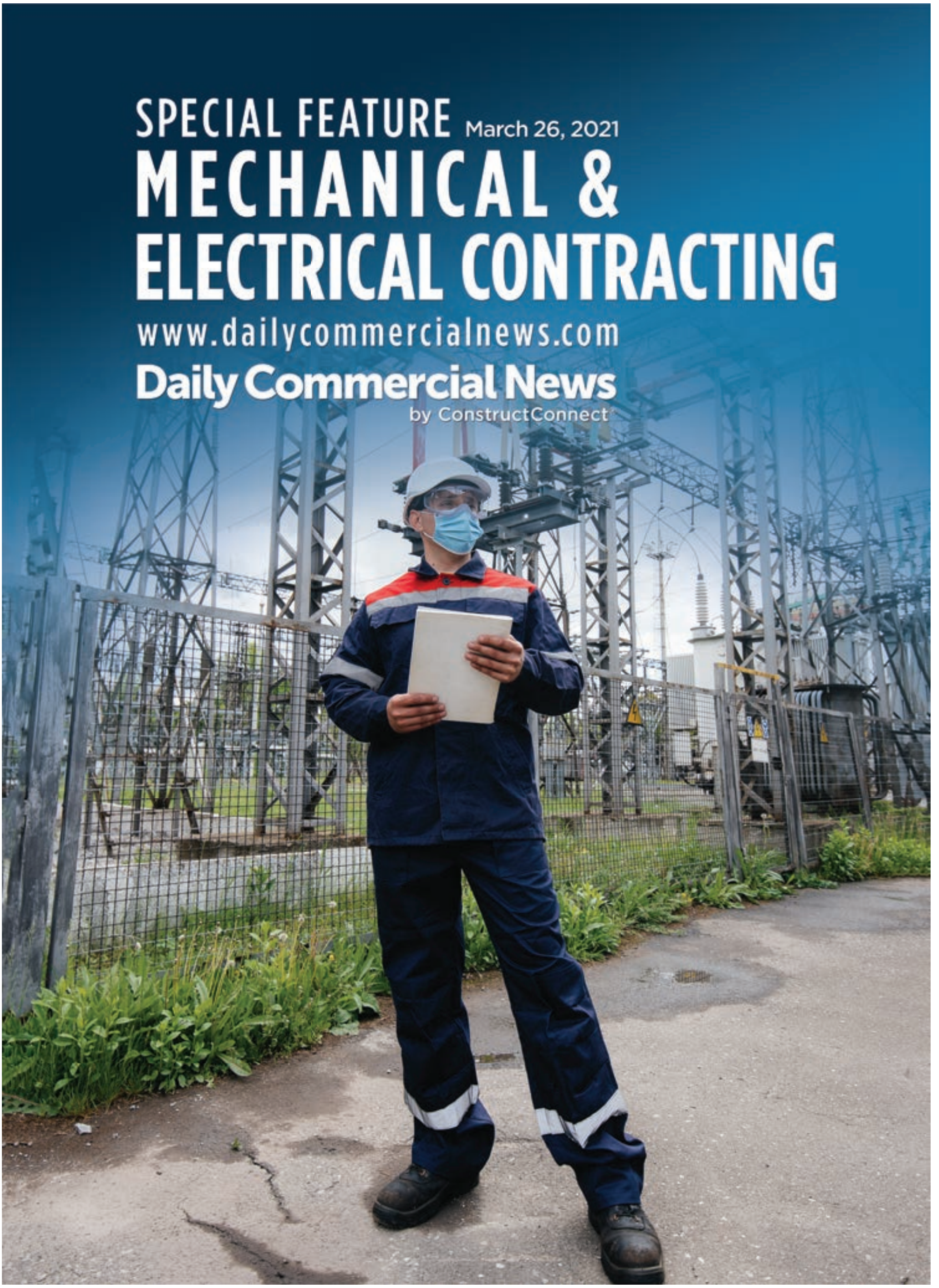


HRAI advocates for energy reduction, stimulus driving retrofit program

SHUTTERSTOCK

GRANT CAMERON
CORRESPONDENT

The Heating, Refrigeration and Air Conditioning Institute (HRAI) of Canada is calling on the federal and provincial governments to invest in a home and building retrofit program as a way of reducing energy costs for individual homeowners and stimulating economic investment and employment growth post-COVID-19.

The national trade organization, which represents more than 1,150 members, maintains that concern about indoor air quality is of paramount importance because Ontarians want safe indoor environments.

"We have been pretty aggressive with government at all levels — municipal, provincial, federal — in trying to get their attention in that this is a part of the marketplace and that if you are serious about looking to solve these issues, this is a place you've got to start," says HRAI president and CEO Sandy MacLeod. "We've been pushing government pretty hard and part of our effort at this point is just trying to get their attention."

HRAI maintains the timing is right for such a program because there is a need to address the cost of energy, to reduce carbon emissions and to get people across the province back to work with good-paying jobs.

The built environment presently contributes 17 per cent of total greenhouse gas (GHG) emissions annually. Across Canada, that amounts to 111 million tonnes of GHGs per year.

The organization's members want the province to act decisively and, where necessary, in concert with the federal government and take the recovery opportunity to support legacy improvements in homes and workplaces that reduce energy costs, increase energy efficiency and reduce GHG emissions.

"In a world affected by COVID-19, there is new interest from Ontarians and from people across the globe in healthy and safe indoor environments as well as in simultaneously deploying new technologies to combat GHGs throughout the built environment," the HRAI said in a pre-budget submission to the province.

The industry has the technology and know-how to create and maintain healthy, sustainable conditions through proper treatment of air to ensure businesses can remain functional, the HRAI states, and it has the expertise to drive down energy costs and reduce emissions, with targeted support from government.

MacLeod says the HRAI hasn't put a specific dollar figure on the ask, but he notes that investing in a home and building retrofit program would help governments achieve lower carbon emissions and boost the recovery.

"We don't go out and say you should do $1 billion or $2 billion. But we say, 'This is a sector that can help you.' Twenty per cent of carbon emissions in this country are related to heating and cooling and our sector has the technology and the know-how to create and maintain these types of systems."

MacLeod says the HRAI has found it's better to work with government on developing a program and the dollar figure will evolve with it.

The HRAI states that a home and building retrofit program will benefit businesses, improve air quality for employees, and drive investment in small and medium-sized businesses as well as create local jobs. It will also provide opportunities for youth and women who might have lost jobs in other sectors of the economy.

MacLeod says the federal government indicated in its earlier Throne Speech that it intends to put money into the marketplace to tackle the issue but the initiatives have lacked details and, while it is great to make funds available, it's often left up to individual provinces to put the actual programs together.

"What we're trying to do just now is get this on the radar at all levels," he explains. "We're also trying to let the government know that we can help them build out these programs so that when they are launched they're done so in a thoughtful way, and that the incentives actually make sense."

There have been instances, for example, where an incentive was placed on an expensive product and it wasn't enough to make up the price difference over a cheaper alternative.

"That's a pretty tough sell for the contractor, whether it's commercial or residential, to say to the person that's going to pay the bill, 'Hey, look there's a government incentive in place and you should take advantage of it,' and then find out the math is a 40-year payback," he says. "That doesn't make any sense."

HRAI is asking the province to support making investments that will help overcome the up-front barriers.

On the legislative front, HRAI is also pushing for Ontario align its building code with the federal one to improve productivity and reduce costs, and also eliminate heating contractor licensing at the municipal level as it is redundant to the existing system of provincial licensing under the Technical Standards and Safety Authority.

MacLeod says it's important to have harmonized standards across the provinces and also with the U.S. because American consumers drive the market and it makes no sense for a province in Canada to be out of synch.

If a province wants a furnace that's 98 per cent efficient and the rest of the world wants one that's 96-per-cent efficient, the supply won't be available because manufacturers won't make them just for one province, he says.

"Now you've got a standard that says 98 per cent and you can't supply the product."

Economic Snapshot

Update on Nova Scotia – almost, but not quite recovered

John Clinkard

'Almost but not quite' is the best way to describe how close the Nova Scotia economy is to a full recovery from the coronavirus health crisis and from the impacts of the COVID-induced recession. According to the provincial government's *COVID-19 Dashboard*, after hitting a high of 142 last November, the number of COVID cases in the province has trended steadily lower and now (March 19) stands at just 17, the second-lowest level in the country.

From an economic perspective, the indicators which best capture the extent to which the province has recovered are the province's latest (February) jobs numbers. Over the past 12 months, Nova Scotia has clawed back more of the jobs it lost as a result of lockdowns to limit the spread of COVID than any other province.

Hiring has increased in eight of the province's 17 major industrial sectors largely due to gains in professional, scientific, and technical services; education services; finance insurance and real estate; and transportation and warehousing. Although the number of public sector jobs is up by +7.3% over the past year, total employment in the private sector has yet to fully recover and is still down -3.5% from a year ago. However, the outlook for private sector employment did brighten recently after the provincial premiers of the four Atlantic provinces agreed to *open the Atlantic 'bubble' effective April 19*.

Nova Scotia's exports have also exhibited a significant recovery over the past eight months. After being down by -42.4% y/y in May 2020, they have gradually trended higher driven primarily by stronger foreign sales of lumber, paper, and seafood, the bulk of which has been shipped to the United States, the market for 63% of the province's total foreign sales.

The main reason the province's exports have not exhibited a stronger recovery is a sharp (-39% y/y) drop in exports to China. Looking forward, stronger U.S. growth, fueled by the recently approved $1.9 trillion fiscal stimulus package, will undoubtedly have a positive impact on the province's exports through the remainder of this year and into 2022.

The phrase 'almost but not quite recovered' understates the current health of Nova Scotia's housing market. Fueled by near-record-low mortgage rates, the above-noted strong growth of employment, and despite a very sharp drop in net international migration that has been partially offset by a record net inflow of migrants from other provinces, sales of existing homes over the past six months are up by +40% compared to the same period a year earlier.

Reflecting this surge in demand, average sale prices were up by +28.9% y/y in February, a thirty-year high. At the same time, the months' supply of homes for sale has fallen to a record low of 1.8, which reflects a severe shortage of existing homes for sale.

Not surprisingly, the unprecedented increase in demand for existing homes and a shrinkage in the volume of newly completed and unoccupied dwellings has contributed to a solid gain in new residential construction. Over the past six months, housing starts in the province are up by +22% versus the same period a year earlier.

Going forward, the persisting impact of low-interest rates, a pickup in net international migration, sustained strong net interprovincial migration and solid jobs growth should cause starts for the year to increase from 4,900 units in 2020 to 6,000-to-6,500 this year and 4,200-to-4,600 in 2022. That said, the very strong growth in sales of existing single-family dwellings relative to a much more modest rise in single-family starts suggests house prices in the province will remain under pressure well into the second half of 2021.

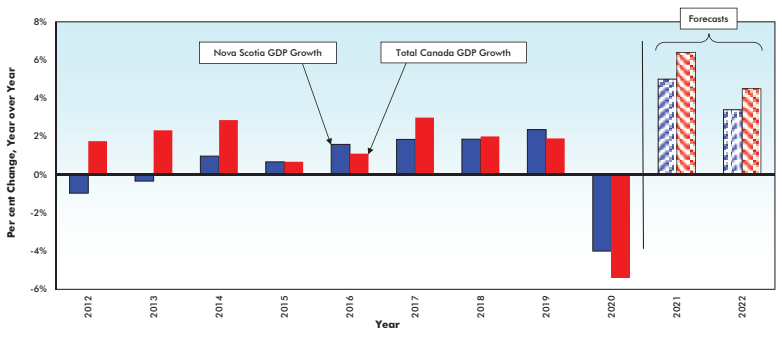
Despite the headwind of COVID lockdowns and the downbeat projections of most analysts, nonresidential construction in Nova Scotia posted a gain of +2.0% last year, second only to British Columbia. Nova Scotia's 2020 increase followed back-to-back declines in 2018 and 2019. The 2020 climb was driven by spending on public sector projects including health care facilities; schools; and roads and bridges. Major projects included the QEII New Generation Health Care Project and the Cape Breton Regional Health Care Redevelopment Project.

Going forward, nonresidential construction will continue to be supported by the Halifax Shipyard Contract to build combat and coast guard vessels and by the Halifax Airport Capital project. It might also receive significant boosts from the Goldboro LNG Liquefied Natural Gas Export Facility and, potentially, from the Bear Paw Liquefied Natural Gas Project.

The solid pattern of job growth, the imminent re-opening of the Atlantic 'bubble', persisting low-interest rates and a sharp rebound in business confidence, as indicated by the *CFIB Business Barometer*, collectively reinforce the prospect that after contracting by an estimated -4.0% in 2020, the Nova Scotia economy will expand by +4.5% to +5.5% this year and by +3.0% to +4.0% in 2022.

John Clinkard has over 35 years' experience as an economist in international, national and regional research and analysis with leading financial institutions and media outlets in Canada.

Real* Gross Domestic Product (GDP) Growth — Nova Scotia vs Canada



* "Real" is after adjustment for inflation.

Data Sources: Actuals — Statistics Canada; Forecasts — CanaData.
Chart: ConstructConnect — CanaData.

Roadmap to better high energy efficient materials released

DAN O'REILLY
CORRESPONDENT

Considering the territory's harsh climate and vulnerability to climate change, it was perhaps appropriate the 2018 Energy and Mines Ministers Conference was held in Iqaluit, Nunavut.

At that conference, the federal, provincial and territorial ministers responsible for energy and mining portfolios formally released a far-reaching document which — if its recommendations are implemented — could have profound implications for the construction, heating, refrigeration and air conditioning and allied industries, and Canadians in general.

Officially titled "Paving the Road and Beyond: market transformation road map for energy efficient equipment in the building sector", the paper was created by Natural Resources Canada's Office of Energy Efficiency in consultation with the provinces and industry stakeholders and non-profit associations such as the Heating Refrigeration and Air Conditioning Institute of Canada.

Just shy of 100 pages, its sets out a series of aspiratory goals on how the design, manufacture, and installation of highly energy efficient building materials and products will support the transition to a low carbon economy — and the measures needed to achieve that objective.

It focuses on residential windows, space heating, and water heating systems as they are the highest sources of energy consumption. Residential windows account for 35 per cent of a home's heat loss, space heating constitutes between 56 to 64 per cent of energy use in homes and buildings, while water heating constitutes between eight to 19 per cent.

At the same time, those components offer significant opportunities to reduce energy use by overall figure of more than 35 per cent when "next generation technologies become available."

As an example, the document cites "emerging technologies under development" which could increase window performance from between 50- to 60-per cent compared to what's on the market now. Some examples include vacuum and/or aerogel filling to the insulating glass unit, smart blind mechanisms, and improved light weight, non-metal insulating materials such as carbon fibres.

In the space heating sector, some of the new and still-evolving technologies include ground source heat pumps, cold climate air-source heat pumps, and gas heat pumps. If these technologies were utilized on a wide scale, heating consumption could be slashed by 30 per cent and greenhouse gas emissions lowered by 18 megatonnes, it says.

But the road map also cautions that, "These technologies still require significant research and development efforts before they become mainstream."

> 'Approximately 70 stakeholders have come together to participate in a Roadmap Advisory Council and Technology Experts Teams,'
>
> Jamie Hulan
> Natural Resources Canada

The underlining message of the road map is the need for government, the private sector, and non-profit associations to work together to overcome the myriad — and not insignificant — technical and market barriers to incorporating those elements into homes and buildings. Just some of those barriers include high upfront costs, product availability, retrofit challenges — such as installing high efficiency windows, consumer unawareness of new technologies, and a lack of contractor training, knowledge, and experience in designing and installing new products.

To overcome those obstacles, the road map calls for a series of initiatives including product development, large scale product demonstrations, consumer education and awareness, and training incentives.

It underscores the thread which links technical and market research and that of convincing consumers to purchase more energy efficient — but more expensive — systems. Manufacturers are urged to conduct market research to support their own efforts to educate customers on the benefits of new technologies, such as the thermal comfort, safety, and durability provided by high efficiency windows.

In response to a list of emailed questions on what has transpired since the official release of the road map, Natural Resources Canada indicated there has been progress on a number of fronts.

From industry, provincial and territorial governments, academia and non-government associations have come together to participate in a Roadmap Advisory Council and Technology Experts Teams, says Jamie Hulan, director with NRCan's office of energy efficiency.

These groups have been tasked with assessing the market status of high-efficiency space and water heating technologies and next-generation windows, plus identifying the necessary next steps to continue moving towards. A progress report will be is scheduled to be published later this year, says Hulan.

A digital tool called Lay of the Land is also being developed with the purpose of cataloguing program and projects related to the initiatives outlined in the road map. As of this past February, 180 different programs initiated by various levels of government and industry have been downloaded.

Among the road map's many recommendations is one which calls for the creation of software tools to help contractors keep up-to-date with space heating equipment design changes — "and developed with Canadian regions in mind."

Citing the creation of an Air-Source Heat Pump Sizing and Selection Guide, which includes the guide, an addendum of worked examples, and an excel-based operating tool, Hulan says those design advances are taking place. The guide is applicable to new system and replacement system applications and covers all types of air source heat pump and backup systems.

Another topic pinpointed in the road map was the need for incentives and financing programs to encourage homeowners and businesses to pay for costly high-efficiency technologies and products. Asked about that particular issue, Hulan said non-profit associations can play a significant role in increasing consumer awareness of the advantages new technologies offer. Certain high efficiency products will be also eligible for a maximum $5,000 grant through a soon-to-be announced retrofit program, he says.

Purolator gears up for future package tsunami

IAN HARVEY
CORRESPONDENT

Purolator plans to move 72,000 packages an hour through their new $330 million national super-hub in Etobicoke on more than 4.5 kilometres of conveyor belts.

Senior Director of Strategic Operations, Roger Alouche says the new plant should open in the fall and is in the final stage of installation now.

From the outside the super-hub looks like any other low-profile industrial building. What's different is its size — at total 440,000 square feet set on 62 acres of landscaped grounds — and the number of loading doors and the state-of-the-art equipment.

The plant itself is about 330,000 square feet and there are two other buildings, one to monitor transport truck traffic coming and going and the other for offices and a retail operation. There's also room for future growth.

Packages come in different sizes, including mail and some are designated dangerous goods and each is moved through at a different pace. Conveyables process at 48,000 an hour, mail at 15,000 an hour, non-conveyables at 4,000 an hour and dangerous goods at 2,000 an hour.

It's a major electrical-mechanical installation which takes packages in through 62 loading doors and starts the process of sorting them by destination to output them through 140 more loading doors on the other end.

In between there's a mass of high-tech gear from cameras which read the package labeling and direct them down the right channels to reach their destination. This will triple Purolator's capacity and is part of a $1 billion investment across Canada.

Alouche says the land was acquired in 2008 and planning for the facility began in 2017 and kicked up in January 2018.

PUROLATOR

Purolator's super-hub location is 440,000 square feet set on 62 acres in the northwest end of Toronto near Pearson airport and four major highways.

PUROLATOR

Purolator's national super-hub in Toronto is a major mechanical-electrical installation when it comes to sorting of parcels thanks to 4.5 km of conveyor belts.

"We're a 60-year-old company and we know we need to plan for the future," he says noting it seems visionary because the Covid pandemic has boosted on line sales and driven parcels to new heights across the globe but it's coincidental because the planning has long been in place.

Pomerleau is the general contractor and Janick Electric is doing the electrical installation and Turner Townsend are the project managers.

The equipment itself is digitally controlled via an AI algorithm and is provided by Siemens.

Essentially, incoming packages from the Greater Toronto Area and points beyond come into the plant and some are loaded by hand on to the conveyors with some decision making on size and destination.

One of the incoming doors houses a Siemens RUBUS system which automatically unloads up to 12,000 packages an hour pulling them onto the conveyor system as a mass intake.

From there the software takes over with packages physically separated by a Visicon, the label scanned, and automatic measuring & weighing equipment uses a light grid to detect their exact position and size.

They are then pre-sorted by multiple VarioRoute systems and loaded onto a VarioSort EXB cross belt sorter.

Parcels are logically sorted to the respective outbound destinations and dropped down the appropriate chute.

At the output end there are two installation types of VarioReach, which are telescopic conveyors which reach out as arms to load trucks.

However, the ultimate loading, is done by hand and often into a customer's custom container.

"We have a turnkey parcel logistics system," says Alouche.

The installation of the system with all it's automated controls, cameras, light grids, diversion gates is a complex job requiring not only power but also cabling to connect all the addressable devices to the back-end computer system.

He says the facility meets all the requirements for Toronto's green building codes including a white roof and planting of 1,500 trees and shrubs and the installation of a berm along the perimeter road to provide visual screening.

Addressing skills and knowledge shortage a key HRAI focus

DAN O'REILLY
CORRESPONDENT

Already suffering from a lack of skills tradespersons, the heating, refrigeration and air conditioning industry needs to pivot in response to an evolving marketplace, says that sector's association vice-president.

"Canada is transitioning to a low-carbon economy and technologies such as heat pumps, variable refrigerant flow systems, and new building practices are the wave of the future," says Martin Luymes, vice-president of government and stakeholder relations for the Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI).

The Atlantic Provinces, which are heavily dependent on oil, as well as British Columbia, are actively promoting the installation of residential ground source heat pumps, he points out.

Demands for alternate sources of energy will increase as the country moves closer to its net zero targets. In many jurisdictions, such as Toronto, it will be mandatory for new homes to be built to net zero standards by 2030 and, under the federal government's Climate Change Plan, the goal is to achieve a net-zero economy by 2050.

However, a major stumbling block to attaining those net zero objectives is the lack of skilled technicians to design, install, and maintain low-carbon systems, coupled with the industry's own comfort level, he says.

"Our industry is resistant to change."

The overwhelming majority of HRAI members are small contractor companies who are more comfortable promoting and installing relatively inexpensive natural gas heating and cooling systems to their customers than advocating for more expensive technologies such as heat pumps, he says.

Addressing that skills and knowledge shortage is the objective of a major funding proposal that HRAI submitted in early March to Employment & Social Development Canada, the federal department responsible for employment and skills training.

If the application is successful, the funding will be used by HRAI to offer a range of different training and retraining programs. There are a number of other objectives including measures to help contractors adapt to marketplace changes.

"We don't usually ask the government for money. We're a small non-profit organization supported by its members. But, in this case we're asking for help, so we can help them (the government) achieve its goals."

A decision on the application should be announced by mid-summer, which would allow HRAI to launch the training programs by September, says Luymes.

One solution to help bridge the gap between the demand for new technologies and required skills training is Ontario's Residential Air Conditioning Systems Mechanic (313D) apprenticeship program which HRAI advocated for about 15 years ago, despite some initial opposition from commercial contractors.

Consisting of 4,020 hours of on-the-job training/work experience and 480 hours of in-school training, it prepares apprentices to install, maintenance and service air conditioning and heat pumps. If at least four other provinces implemented similar programs, graduates could become Red Seal certified.

Citing the drive for heat pumps in the Atlantic Provinces, he says Red Seal Certification would enable licensed technicians to take advantage of work opportunities in different parts of the country.

As the country moves closer to the respective 2030 and 2050 net zero carbon goals, the federal government will most likely offer a series of rebates. Combined with carbon tax hikes, those incentives will make it more palatable for homeowners to switch to more expensive low carbon technologies, he says.

For the heating, refrigeration, and air conditioning industry, the challenge is to have a skilled workforce which can meet that demand, says Luymes, adding the HRAI's official position has always been that incentive programs should be conditional on system installation by qualified contractors.

HVAC sector looks to upgrade best practices post-COVID-19

IAN HARVEY
CORRESPONDENT

SHUTTERSTOCK

The lessons learned from the Covid-19 pandemic impacts could open doors for a renewed interest in HVAC upgrades and installations when things return to normal.

Martin Luymes, vice-president, government and stakeholder relations at the Heating, Refrigeration and Air Conditioning Institute (HRAI) of Canada says the industry is looking at new opportunities post-Covid and believes there's going to be refocused attention on indoor air quality.

On the ICI side, Luymes says, the HRAI has tabled research and recommendations with the government around improving air quality in schools but says money is an issue.

While there's some $50 million announced for air quality upgrades in schools it works out to about $1,000 for each of Ontario's 3,948 elementary and 880 secondary schools.

The research detail 11 areas of indoor air quality concern and some of the challenges faced in schools in upgrading systems.

Taking that research one step forward the same group is now looking air quality in long term care facilities where the virus proved the deadliest.

Still, Jeffrey Siegel, a professor of civil engineering at the University of Toronto who also contributed to HRAI research on school air quality says he's hopeful there may be a new appetite to improved air quality but remains cynical at heart.

"I suspect more pessimistically that after some initial change we're going to go back to the way things were before," he says. "And that's a shame because we're missing an opportunity here."

The issue is one of time perspective, he says. We know a virus can be fatal in the short term but we ignore that pollutants are toxic and can be fatal in the long term when they trigger diseases like cancer.

There are three main areas of air quality control engineers and regulators need to look at he says and that's source control, ventilation and air cleaning.

"We do things like hand washing and wear masks to control COVID transmission at the source but if there's a smell of manure in the room we tend to treat the air not get rid of the source of the problem, which is removing the manure itself," he says noting it was analogy used by 19th Century German chemist who pioneered air quality research.

"The big thing in indoor air quality is not to do something to make it worse, like cooking without venting properly."

Ventilation again, isn't as simple as opening a window because air quality outside can be worse such as in Los Angeles smog during the 1970s. "Though Toronto's outdoor air quality is generally quite good for a city of this size."

Even then, he says, until there's a breeze or temperature differentials which moves the air there's often no benefit to opening a window.

Cleaning the air with some kind of mechanical or other filtration system is also problematic because until properly applied it won't work well.

"That's not because its not a good filter it's just not being used well," he says. "Most air cleaners on the market don't work that well."

Luymes says cost is always the big hurdles when talking about air quality and control because it tackles something people don't see.

"But it should not be held back by cost issues," he says. "We are pointing out to people the kind of solutions we are capable of delivering today that vastly exceed what the building code requires."

He says while everyone agrees indoor air quality is an important factor in health care settings, it's just as important in other commercial buildings. Studies have long shown better air quality in offices produces happier, more productive employees.

Famed automaker Ferrari is so obsessive about the air inside their Maranello, Italy factory that in addition to state-of-the-art ventilation and filtering they've also planted islands of small trees and shrubs to help absorb CO2 in order to maintain optimum quality for their employees assembling the luxury cars.

Luymes says signs point to a market where costs may not be the deciding factor in selecting and installing an air system because going the extra step will also help in the next pandemic.

"You can't eliminate the virus so there's no silver bullet, "he says. "But there are lots of promising technology which uses UV light to sanitize the air."

Some of its simple things like ensuring if filtering is applied in a system that the system is also checked for leaks because that filters won't work if air is spilling out unchecked.

"People don't see the payback on $10,000 to $15,000 upgrade and they're more interested in granite countertops and hardwood floors," he says. "We think a lot more needs to be done with the Building Code in this area."