Building a greener future

New benchmarks for energy efficiency are set to disrupt the B.C. building industry, posing fresh challenges for the development, design and construction sectors | B2

Built to Passive House standards, the Heights mixed-use development at Skeena and East Hastings streets is the type of high-performance, low-energy project the now-one-year-old Zero Emissions Building Exchange (ZEBx) is encouraging the construction industry to build. The Heights was designed by Cornerstone Architects for 8th Avenue Developments and built by Peak Construction | SUBMITTED
ENVIRONMENT: CLIMATE CHANGE, ENERGY-EFFICIENCY STANDARDS SET TO DISRUPT CONSTRUCTION INDUSTRY

By 2032, most of the walls, windows and mechanical systems used today will be obsolete.

By Peter Caulfield

In 12 years, nearly everything you build today will be obsolete. Are you ready?

That was the attention-getting title of a presentation given by Monte Paulsen, a Passive House consultant and specialist in multi-unit residential buildings, at the Vancouver Regional Construction Association’s recent Construction Leadership Forum in Whistler.

“The B.C. Energy Step Code is going to disrupt the construction industry,” said Paulsen, an associate at RDH Building Science Inc. in Burnaby. “By 2032, most of the walls, windows and mechanical systems that architects and builders are familiar with today will be obsolete.”

The B.C. Energy Step Code is a recent (2017) provincial standard that provides an incremental approach to meeting the requirements of the base B.C. Building Code.

“The Step Code does this by establishing a series of measurable, performance-based energy-efficiency requirements for construction that builders can choose to build to and communities may choose to adopt in bylaws and policies,” said Paulsen.

The Passive House approach to meeting the Step Code is a rigorous standard for energy efficiency in a building to reduce its ecological footprint. It results in ultra-low-energy buildings that require little energy for space heating or cooling.

Applicable to almost any building type or design, the Passive House building standard is the only internationally recognized, proven, science-based energy standard in construction. Passive House certification ensures that designers and consultants are qualified to design buildings to meet the standard.

There are several benefits to building to Passive House standards. For example, it gives building occupants control over indoor air quality and temperature with simple-to-use and durable systems, making them quiet and comfortable in each of the four seasons. Reduced operating costs make up for any additional construction costs, and the reduced carbon emissions give peace of mind.

Paulsen said that, although the construction industry is booming now, the ground beneath it is starting to shift because of climate change, as well as the steps governments are taking to adapt to climate change and mitigate its effects, such as the City of Vancouver’s Climate Emergency Response and the B.C. Energy Step Code.

“Radical changes in construction will be needed to reduce greenhouse gas emissions connected directly and indirectly with construction,” said Paulsen.

New buildings in southern B.C. will need to be sufficiently insulated and the way we build buildings will need to make big changes to their design processes, Paulsen said.

And builders will need to construct thicker walls, use triple-pane windows and insulated slab edges and install different mechanical systems.

“This is scary,” Paulsen said. “More than in most industries, for many years the construction industry has resisted change. The industry has not faced disruption like this since the introduction of the elevator in the 19th century.”

But don’t despair, said Paulsen.

“Those segments of the construction and design industries that are already building Passive House structures have been achieving excellent results on dozens of buildings in B.C.,” he said. “The industry has not faced disruption like this since the introduction of the elevator in the 19th century.”

Monte Paulsen
Consultant, Passive House

said. “RDH Building Science Inc.” alone is consulting on more than four million square feet of Passive House, including three high-rises and a dozen mid-rise projects.

“There is still plenty of time to get ready, but the industry needs to start now. We need to change the way we build buildings.”

To be ready for 2032, general and trade contractors should start taking training, and plenty of it, Paulsen said.

“Take Step Code training, Passive House training, and there are other programs, too. One of the best ways to learn is to choose a simple Passive House project and get to work now. That way, 2032 won’t be scary when it comes around.”

Paulsen said the international Passive House community, which is large and influential, especially in northern Europe, recognizes that Vancouver is a Passive House leader in the world, which makes this city unique.

“There are hundreds of Passive House consultants in B.C., dozens of Passive House buildings being built, and hundreds more are in process.”

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The industry has not faced disruption like this since the introduction of the elevator in the 19th century.

Monte Paulsen
Consultant, Passive House

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INNOVATION: GROWING MARKET FORECAST FOR GREEN TECH

Market for high-performance building products worth $3.3 billion

BY PETER CAUL菲尔德

Major changes to regional building standards, in the form of the City of Vancouver’s Greenest City 2020 Action Plan and the B.C. Energy Step Code, will affect how Metro Vancouver builds in 2032.

Greenest City 2020 is intended to prepare Vancouver for the potential impacts of climate change and at the same time build a vibrant community, a thriving green economy and a greener, healthier city.

The B.C. Energy Step Code is a provincial standard that provides an incremental and consistent approach to achieving construction that uses energy more efficiently. It requires builders to demonstrate that buildings are compliant with the energy-efficiency requirements of the building code by modelling a structure’s energy requirements.

The Vancouver Economic Commission (VEC) has been researching the size and depth of the market for green products and technologies that will enable this region, as well as other jurisdictions in Canada and the U.S., to make the transition to energy-efficient buildings.

According to a recent VEC report — Green Buildings Market Forecast: Demand for Building Products, Metro Vancouver, 2019-2032 — changes such as Greenest City 2020 and the Step Code are creating a $5.3 billion market for high-performance building products and technologies.

The report focused on six product categories: fenestration products, insulation products, HVAC equipment, domestic hot water and drain-water heat recovery.

B.C. currently imports many of the technologies, especially mechanical equipment such as heat pumps and heat recovery ventilators, that are required for high-performance buildings.

According to the report, manufacturing such products in Metro Vancouver would support an average of 925 jobs every year between 2019 and 2032.

In addition, the installation of new “green” products and technologies would support an average of 770 installer positions in Metro Vancouver.

The report says demand for low-performance products, especially windows, will “evaporate” after 2022, while the call for high-performance systems will increase.

B.C. and Vancouver businesses should act now to target markets with similar climates and advanced green building codes, such as the U.S. Pacific Northwest, as well as markets throughout North America, the report says.

Cascadia Windows Ltd. is taking advantage of these new market opportunities. The Langley company produces high-performance fenestration products, such as windows, skylights and doors, structural glazing and curtain walls.

“Our products enable B.C. contractors to meet modern building codes and buildings to operate more efficiently,” said Mike Battistel, president of Cascadia Windows.

“Our extensive and integrated line of window and door products allows for greatly improved building performance without having to sacrifice any part of your design,” Cascadia has a number of different product lines, including its Universal Series, an all-fibreglass system that features the latest in energy-efficient window and door technology; the adjustable Cascadia Clip fibreglass thermal spacer made of low-conductivity fibreglass, which reduces thermal bridging and improves the effective thermal resistance of exterior walls; and its fibreglass curtain wall vent adapter, which allows the thermally weakest part of curtain wall systems, the operable vents, to achieve excellent thermal performance by using a fibreglass sash and frame in place of aluminum.

“Most of our customers today use our windows, which produces a healthy market for high-performance building products,” Battistel said now is the time to think outside the box and develop new products.

The VEC works with local organizations, such as Passive House Canada, the Canada Green Building Council and the British Columbia Institute of Technology, to increase the number of local green builders and technology suppliers and to help them become world leaders.

“We need to all work together to make it work,” said George Benson, a green building market acceleration consultant, Vancouver Economic Commission: “we need to all work together” to increase the number of local green builders and technology suppliers.

According to the report, manufacturers such as Cascadia Windows Ltd. is taking advantage of these new market opportunities. The Langley company produces high-performance fenestration products, such as windows, skylights and doors, structural glazing and curtain walls.

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“Most of our customers today are contractors in Oregon and Washington,” said Battistel. “In the future, we expect the B.C. market to grow, especially in Vancouver. Our fibreglass windows and doors are more durable than plastic and just as strong as aluminum, so they can be used on large commercial projects.”

Battistel said now is the time for local producers to enter the market.

“The Step Code is changing gradually, which gives entrepreneurs enough time to think outside the box and develop new products.”

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Mike Battistel

President, Cascadia Windows

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This content is from WorksafeBC's July 2019 edition of Restoration Worksites. 

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Ensure you have a system in place to coordinate all work activities to keep your workers healthy and safe.

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WORK SAFE BC
In 12 years, what we build today will be obsolete. Are you ready?
The construction industry needs to change, and VRCA is working to ensure it is prepared for what lies ahead.

BY FIONA FAMULAK

There are times when a single statement – maybe even a single sentence – changes our perspective.

I experienced this in May when our association hosted its annual Construction Leadership Forum in Whistler. Monte Paulsen, Passive House specialist with RDH Building Science Inc., made the statement that “by 2032, every B.C. builder will face a simple choice: build like Passive House, or build somewhere else.” His statement caught my attention.

We know that the construction industry in British Columbia, and the Lower Mainland in particular, has some key milestones ahead, whether it be navigating the skilled labour shortage through 2021 and beyond, when demand for construction services is at an unprecedented level, or building to support Metro Vancouver’s projected population growth of one million newcomers by 2041.

Paulsen’s statement wasn’t directed at the supply of labour or population forecast. He was referencing the process of construction and, specifically, the need for all new residential and commercial buildings in Vancouver to be built to zero-emissions standards by 2030, and for all new buildings in B.C. to be net-zero-energy ready by 2052.

Such milestones require the construction industry to build faster, greener and more productively than ever before. Building “greener” includes the need to adapt to new, high-performance building standards. What I hadn’t fully acknowledged until that moment in Whistler is the risk of not adapting to those standards – the risk that a company might find itself out of business if it doesn’t change.

While the pace and scale of B.C.’s construction market transformation is daunting, it has several positive qualities.

First, the provincial government’s BC Energy Step Code and the City of Vancouver’s Greenest City 2020 Action Plan provide a clear road map of code changes and their timing. There’s no need to guess what’s required and when. What’s more, the policies will help to catalyze construction innovation in an industry that is ripe for change.

Second, the City of Vancouver, recognizing that the industry needs help to meet the city’s 2030 milestone (and 2025 stretch milestone), seed-funded our Zero Emissions Building Exchange (ZEBx), the first and only in Canada, for the purposes of educating understanding of and capacity to build to zero-emissions standards. ZEBx recently celebrated its first year of operation and has already cemented its place in the industry as the go-to resource for zero-emissions building advice.

Third, the market transformation that will disrupt B.C.’s construction industry in a way not seen in generations brings with it significant business opportunities. A recent research study – Green Buildings Market Forecast: Demand for Building Products, Metro Vancouver, 2019-2032 – published by the Vancouver Economic Commission reports that local and provincial zero-emissions and net-zero-energy-ready building policies are creating a $7.3 billion market for high-performance building products and technologies in Metro Vancouver alone.

Understanding the urgency to change and the business opportunities associated with that change informed the editorial theme of this edition of Construction in Vancouver, where we examine why the industry needs to adapt and the steps it can take.

And the market transformation is not restricted to the development, design and contracting communities. Our post-secondary institutes have a key role to help build the workforce of tomorrow, preparing students to fill roles – some of which do not yet exist – that will be required in response to the industry’s growing need for clean tech, digitization, data management and analysis, advanced manufacturing and robotics.

In that context, Simon Fraser University is launching its new Sustainable Energy Engineering program this fall, while the British Columbia Institute of Technology is continually updating the curriculum offered by its School of Construction and the Environment.

The Vancouver Regional Construction Association’s (VRCA) board of directors anticipated significant and fast-paced industry change when it set the strategic direction for our association in 2017. It identified that excellence, underpinned by a culture of learning and innovation, is a critical factor for the survival and prosperity of VRCA’s members and B.C.’s construction industry as a whole.

Our vision is clear. Our foundation is strong. And our commitment to serving members is unwavering.

In 12 years’ time, what we build today will be obsolete. Our industry therefore needs to change. In collaboration with its many industry partners, VRCA is actively working to help ensure the development, design and construction communities are ready for what lies ahead.

Fiona Famulak is president of the Vancouver Regional Construction Association.
MILESTONES: ZERO EMISSIONS BUILDING EXCHANGE TURNS ONE

ZEBx is strengthening the public, private and civic capacity to deliver zero-emissions buildings

BY PETER CAULFIELD

The Vancouver Zero Emissions Building Exchange (ZEBx), a collaborative platform for strengthening the public, private and civic capacities to deliver zero-emissions buildings, opened its doors one year ago, in July 2018.

ZEBx was established to help industry deliver the City of Vancouver’s Zero Emissions Building Plan, which aims to reduce thermal energy demand and greenhouse gas emissions intensity in new buildings. It is hosted by the Vancouver Regional Construction Association (VRCA).

The first 12 months of ZEBx have been busy, said executive director Christian Cianfrone. In the last year it organized 50 industry events with the help of Passive House Canada, one of its delivery partners.

ZEBx organized a tour of Brussels, Belgium, the global leader in high-performance buildings. It built four window-wall mock-ups, housed in the British Columbia Institute of Technology High Performance Building Lab, to show how highrise residential buildings can meet the next generation of net-zero or net-zero-ready standards. And it helped launch the Women4Climate mentorship program in Vancouver.

Later this year, ZEBx will be convening a new provincial heat-pump coalition to co-ordinate and advance activities in that space. “Collaboration is essential if we are to rapidly advance solutions towards our goal,” said Cianfrone. “Experience has proven that those who are most forthcoming in sharing their knowledge have benefited from their position of leadership,” said Pander. “By investing in an organization (ZEBx) that can identify private-sector leaders and then create platforms for them to share their successes and challenges, the city builds industry capacity and enthusiasm for highly efficient buildings that use only renewable energy. It’s a key action for implementing our Zero Emissions Building Plan.”

ZEBx is a partnership of four parent organizations: the City of Vancouver, VRCA, Passive House Canada and the Open Green Building Society.

Although ZEBx is new, it is already delivering benefit to VRCA members, said association president Fiona Famulak. “VRCA’s strategic plan is built around the association’s commitment to educate, advocate and facilitate connections across industry,” said Famulak. “As host of ZEBx, we understand why our industry needs to build to zero-emissions building standards. Given our reach, we are able to connect directly with our general and trade contractors, manufacturers and suppliers from across industry, communicate where change is necessary and help them prepare for the future.”

Sean Pander, manager of the City of Vancouver’s green building program, said ZEBx is an important asset to the city. “New requirements for emission reductions from buildings cannot be introduced if industry lacks the confidence or the capacity to meet them,” said Pander. “By investing in an organization (ZEBx) that can identify private-sector leaders and then create platforms for them to share their successes and challenges, the city builds industry capacity and enthusiasm for highly efficient buildings that use only renewable energy. It’s a key action for implementing our Zero Emissions Building Plan.”

Pander said Vancouver has benefited from ZEBx in a number of ways.

“There is rapidly growing private-sector interest and confidence in zero-emission buildings. There are 54 building projects that are voluntarily pursuing Passive House or other zero-emission construction standards that have recently completed or are moving through city permitting processes.”

The projects include more than 2,000 houses, apartments or condominiums representing over two million square feet of residential development. And many of these voluntary early leader projects are for new rental buildings.

“The projects include more than 2,000 houses, apartments or condominiums representing over two million square feet of residential development. And many of these voluntary early leader projects are for new rental buildings.”

“We have observed the effectiveness of centres of excellence, such as ZEBx, in achieving the required transformation in other markets, such as Brussels and New York, and have long supported them.”

Passive House Canada has benefited in a number of ways from ZEBx in the past year.

“The additional staff resources, events and communications that ZEBx offers have significantly increased the capacity of local industry leaders to advance building performance across the region,” said Bernhardt. “Participation in courses and events has increased substantially. Most importantly, the rising number of high-performance Passive House buildings being designed and built places Vancouver at the forefront of construction industry transformation.”


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**DESIGN: NEW SFU BUILDING A LIVING SUSTAINABILITY LAB**

Expansion to Surrey campus is a LEED Gold candidate and showcase for energy efficiency

**BY BRIGITTE PETERSEN**

Simon Fraser University’s (SFU) latest expansion to its Surrey Centre campus will be home to a new Sustainable Energy Engineering (SEE) program launching this September. The $126 million building, located on University Drive beside the existing campus, was designed as a living showcase for sustainable building standards. A LEED (Leadership in Energy and Environmental Design) Gold candidate, the five-storey, 20,458-square-metre facility features energy-efficient systems for air handling, including a system to monitor and ensure laboratory air quality while reducing ventilation and HVAC energy loads by about 50%, the first of its kind in B.C. It also has efficient water heating, cooling and energy-recovery systems.

“The SEE building will immerse students in a learning environment that includes many of the concepts, materials, techniques and systems that they will be studying,” said Kevin Oldknow, director of SFU’s Sustainable Energy Engineering program. Oldknow said the SEE program plans to address a demand that B.C. is on a trajectory to be a hub of innovation, activity and research positions. SEE graduates include professions in heating, ventilation and air conditioning as well as in energy systems for commercial and residential buildings. They could also work as consultants or entrepreneurs or pursue higher education and research positions. SEE sectors include wind, solar, geothermal, hydroelectric power, fuel cell, gas turbine, biomass, transportation, manufacturing, and oil and natural gas.

Oldknow said the SEE program was developed in response to a growing demand for engineers ready to take up new challenges in the clean-tech sector.

“As a LEED Gold candidate and showcase for energy efficiency, SEE will be an important asset and learning environment that includes many of the concepts, materials, techniques and systems that students in a learning environment that includes many of the concepts, materials, techniques and systems that they will be studying,” Oldknow said.

**The SEE building will immerse students in a learning environment that includes many of the concepts, materials, techniques and systems that they will be studying.**

Kevin Oldknow, director of SFU’s Sustainable Energy Engineering program

Invest BC website, the future of the clean-tech industry looks bright. There are currently about 270 clean-tech companies in B.C., more than 25% of Canada’s total. Seven of these companies are listed on the 2019 Global Cleantech 100 ranking of the world’s most innovative and promising firms. Based on KPMG’s 2017 BC Cleantech Report Card, about 8,500 people, or more than 7% of B.C.’s tech-educated workforce, are employed in the sector, which has one of the highest growth rates in Canada.

“The creation of the new Zero Emissions Buildings Exchange as a centre of excellence right here in Vancouver is one more clear indicator that B.C. is on a trajectory to be a hub of innovation, activity and growth,” said Oldknow.
By Peter Caufield

The British Columbia Institute of Technology (BCIT) School of Construction and the Environment is looking forward to hosting environmentally sustainable and advanced building codes.

For example, the school’s Learning Centre for Zero Energy Buildings at BCIT’s School of Construction and the Environment was created for their skills and meet the new Code for buildings that go beyond the revised the B.C. Energy Step Code to Factor Four area at BCIT contains six buildings that are intense energy and material users and represent the entire range of building types – industrial, commercial and residential.

Wayne Hand, dean of the School of Construction and the Environment, says the school has 7,000 full-time and 6,000 part-time students in trades and technology degree and career advancement programs.

The school offers more than 270 part-time courses and 60 different full-time programs in applied and natural sciences, engineering and technical areas, and in trades and apprenticeship.

“Most programs are delivered on the main Burnaby campus, but there are some satellite programs delivered at high schools around the province,” said Hand.

“In addition, we offer service programs that are delivered to industry clients on-site.”

The centre is home to the High Performance Building Lab. Developed in partnership with BC Housing and BC Hydro, the lab provides hands-on training in zero-eminence buildings.

New requirements for energy-efficient housing and buildings require changes to existing building envelope design and construction techniques. Hand says construction technology graduates and non-trades designers and builders need to become familiar with building envelope application technologies and energy-efficient envelope systems.

The Centre for Architectural Ecology, a School of Construction and the Environment research centre, is host to collaborations in living architecture, acoustics and building science. While the centre’s initial research established how green roofs perform in the damp climate of coastal British Columbia, much additional research has taken place since then. For example, the centre is currently investigating the extent to which green roofs improve a city’s ecological, health and well-being.

The Learning Centre for Zero Energy Buildings was created to help the local, regional and global experts to change and innovate through scaling ecological restoration and optimization. Attendees will also learn about re-sourcing the school is also using the Build it, re-use it materials for new uses and innovative ways to reduce carbon footprint with responsible materials.

For attendees in the development sector, the green buildings stream of urban design will be a must-see, as experts discuss ideas to help guide building development that represents an important part of environmental and social stewardship – essential to building cities in balance with nature.

The summit is made possible with the support of many sponsors, academic partners and strategic partners, including Stantec, Urban Solar, DIRTT/Innovior, EllisDon, Dialogue, BC Hydro, EllisDon, and the Vancouver Region Foundation of BC, Perkins+Will Canada, B+H, Concert Properties, UN-Habitat, United Nations, University of British Columbia, BC Green Building Council, GBC/Canada, Vancouver Regional Construction Association and Recycling Council of BC.

To register for the summit or view the event program, visit ecocity2019.com.
### CAREERS: VRCA OUTREACH PROGRAM EDUCATES YOUTH

**Volunteer-led initiative has engaged more than 5,500 students from 21 schools**

**BY DAVID WEIR**

It is ironic that, for an industry that relies on innovation, there are myths and best practice procedures, construction struggles to attract young talent. Currently in the throes of a skilled labour shortage that, according to BuildForce Canada, is forecast to be as many as 25,000 unfilled construction jobs across B.C. by 2028 (and 12,100 unfilled jobs in the Lower Mainland by 2021), the industry attracts only one in 45 high school graduates into its construction trades programs.

The increasingly globalized and competitive business environment, tight labour market and advances in knowledge and technology are creating new pressures for construction companies to innovate, differentiate, improve their reputations and attract the next generation of talent. Added pressure comes in the form of some deep-rooted myths that must be countered with facts if the industry is to improve the one-in-45 ratio and attract young talent in the future. Those myths include:

**Myth No. 1: A career in construction is a “second-best” choice compared with one that requires a university education.**

The industry does a poor job at promoting itself. While working in bad weather on site is inevitable for some, our industry is far more sophisticated and reliant on technology to drive innovation and productivity than is perhaps understood. In fact, trades professionals today require excellence in math, physics and technology. In the vast majority of the art mechanical and electrical systems, operate equipment and keep multimillion-dollar projects on track.

**Myth No. 2: The construction industry offers a limited career path.**

Our industry is multi-faceted and allows apprentices to pursue their chosen field or to be entrepreneurial and own their own business as early as their mid-30s. A skilled trades professional can climb the corporate ladder toward a senior executive position and/or pursue rewarding career opportunities across the country or the world.

**Myth No. 3: A career in construction doesn’t pay well.**

The industry is full of good-paying jobs. The average annual salary of a B.C. construction worker is $61,202. Compare that with the average student debt in B.C. after a four-year degree of $35,000, the highest in Canada, and it’s easy to see the math works.

Today’s youth have an essential role to play in the future of the construction industry, not only to fill the 2038 projected shortfall but also to help the industry be technologically smart, innovative, productive and competitive at home and overseas.

It’s why, in late 2015, the Vancouver Regional Construction Association (VRCA) engaged counselors and students from schools across the Lower Mainland to identify ways in which we can work together to promote construction as an attractive and viable career path.

Those conversations gave rise to our school outreach program, a volunteer-led initiative designed to help educate youth about the opportunities associated with a career in construction. Four years later, and with the help of counselors, teachers and 90 volunteers – many of whom are tradeswomen and female project managers and estimators – we have engaged 5,266 students from 21 schools. We’ve also collected some interesting data: 33% of students polled before a presentation said they would consider a career in construction. When the question was asked again post-presentation, approximately one-third of those students said “No” or “Maybe” now said they wanted to learn more.

While our school outreach program will not resolve the skilled labour shortage immediately, we are heartened by its early results and believe it has the potential to reduce the forecasted shortage in the years to come. It’s why VRCA is now in the preliminary stages of evolving the program to have greater impact and debunk the myths about careers in construction once and for all, so that young people can get the facts, as they’re recognized as an employer of choice, keen to attract a diverse, skilled and tech-savvy workforce.

David Weir is manager, industry and government relations, at the Vancouver Regional Construction Association.