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ENGINEERS AND GEOSCIENTISTS BRITISH COLUMBIA NOVEMBER/DECEMBER 2018

INNOVATION

MEET THE PRESIDENT

RESULTS OF MEMBER SURVEY ON CLIMATE CHANGE

THREE CLIMATE CHANGE INITIATIVES

ANNUAL CONFERENCE AND AGM RETROSPECT

PM40065271

Dr. Katherina Tarnai-Lokhorst, P.Eng., FEC

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INNOVATION

NOVEMBER/DECEMBER 2018 | VOLUME 22 NUMBER 6

COVER STORY

MEET THE PRESIDENT

Meet Dr. Katherina Tarnai-Lokhorst, P.Eng., FEC, Engineers and Geoscientists BC's 2018/2019 president.

HUDSON'S HOPE GOES SOLAR

A small district municipality in northeastern BC proves that you don't have to be big to go green.

NON-PROFIT HOUSING RETROFITS

A crucial sector of BC's housing landscape gets some much-needed engineering support.

NORTH SHORE WASTEWATER TREATMENT PLANT DELIVERS

Making the most of a small footprint.

NEWS / DEPARTMENTS

COMMENT

OTHER

ALSO IN THIS EDITION

ON THE COVER

Dr. Katherina Tarnai-Lokhorst, P.Eng., FEC, was inducted as Engineers and Geoscientists BC president on October 20, 2018. PHOTO: ROOP JAWL DESIGN & PHOTOGRAPHY

ENGINEERS & GEOSCIENTISTS BRITISH COLUMBIA

DR. KATHERINA TARNAI-LOKHORST, P.ENG., FEC,
President
president@egbc.ca

RESPONDING TO CHALLENGING TIMES WITH COLLABORATION

In my candidacy statement for president, I expressed appreciation for many of the tools and programs our association uses to support our primary mandate: protecting the public. I mentioned the Mentoring Program, the Fairness Panel, and Organizational Quality Management Program—just three of the many ways we're advancing our work as a regulator in making sure the public can trust our professions. In my involvement with the association over the years, I've been very fortunate to witness the development and enhancement of these tools and programs.

And we've seen the results of our efforts: we maintain high professional practice standards, our members are well regarded, and we've demonstrated the effectiveness of self-regulation. We've worked hard to become continuously better at what we do, and that hard work has paid off.

But I also said that we're in a critical period. In October, the BC Government introduced the *Professional Governance Act*—proposed legislation stemming from a review of the professional reliance model in the natural resource sector. While this kind of change can lead to concerns and uncertainty, I've been grateful for the collaborative and collegial foundation that we've laid with government over the years that has helped us respond to these developments today.

That work has paid off, too. Our collaborative approach has meant that we were successful in making some changes, and the new legislative framework is a considerable improvement over what was originally proposed. We've maintained our members' ability to elect their own Council, something members told us was critical to a self-regulating body. And we'll gain a number of regulatory tools that will bring us in line with our counterparts across the country. These are important changes that may not have happened without our association's commitment to stakeholder collaboration.

This is still a crucial moment, and the new legislation leaves us with a number of uncertainties and many unanswered questions. The overall process may take years to complete; but in the same way we're committed to continuous regulatory improvement, we're also committed to strengthening our cooperative relationship with government, to help us face the challenges we both share.

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Own a condo?

What You NEED TO KNOW About Strata Deductibles for Condos and Townhouses in British Columbia

Many condo owners are unaware of the very high earthquake and water damage deductibles that are becoming very common in Condo/Strata Master Insurance policies. In the event of a claim, this deductible could be shared between all unit owners in the building. Protect yourself:

1) Review your Condo/Strata Master Insurance Policy annually. (This should be provided at your strata corporation's AGM. If you do not have a copy, contact your property manager.)
2) Contact the experienced insurance advisors at Park Insurance who manage the ***Engineers and Geoscientists BC Member Insurance Program*** to ensure that you have adequate coverage.

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PROVINCE INTRODUCES PROFESSIONAL GOVERNANCE LEGISLATION

The BC Government has tabled new legislation that will impact how the professions of engineering and geoscience are regulated. If approved, the *Professional Governance Act* would restructure government oversight of the five professional regulators for engineering and geoscience, forestry, agrology, applied biology, and applied science technology under a new Office of the Superintendent of Professional Governance.

WHAT IS THE *PROFESSIONAL GOVERNANCE ACT*?

This new legislation is the first step in implementing recommendations from the Professional Reliance Review. The legislation addresses items specific to governance and oversight of professional regulators, and provides a framework for consistent governance standards, including:

- increasing public representation and instituting a merit-based nomination process for council;
- setting common ethical principles;
- requiring competency and conflict of interest declarations from qualified professionals;
- strengthening professionals' duty to report unethical conduct of other professionals;
- providing whistle blower protections to those who report; and
- enabling professional regulators to regulate firms.

These changes would be introduced over time in order to modernize regulatory standards in BC.

WHAT ARE THE IMPLICATIONS OF THE *ACT*? WILL IT BE EFFECTIVE?

Over the preceding three months since the Professional Reliance report was released, we have been engaging with government and other stakeholders to articulate our concerns that any changes to regulatory oversight should enhance, rather than weaken protection of the public interest. While there are a number of unanswered questions about the implementation of the legislation, the framework introduced in October is considerably better than the one originally proposed by government in June, reflecting some key recommendations made by Engineers and Geoscientists BC during consultations.

While we appreciate these concessions, and see benefits in proper resourcing of government oversight and the addition of new regulatory tools to protect the public interest, it is too early to determine the efficacy of this new legislation and office.

The Office will have broad and sweeping powers and a number of the changes to regulatory oversight are significant. The key to successfully improving the framework and protecting the public interest will be careful, well considered implementation of the office and these changes. We are calling on government to be cautious and to work with the impacted regulators to ensure that the risks associated with sweeping change are identified and mitigated.

In addition, Engineers and Geoscientists BC has significant concerns with the portion of legislation that would provide independent practice rights for agrologists, biologists, and applied science technologists and technicians. While the legislation enables the provisions of these rights, no decision has been made on scope, or if they will ultimately be granted. Government has published an intentions paper on this subject, and is collecting input as a part of a consultation process. Engineers and Geoscientists BC will be actively engaged in that process to ensure that the public interest is appropriately protected.

If the new office is properly implemented, the *Professional Governance Act* has the potential to improve the regulatory framework in BC, but at this point there are too many unanswered questions to know how or if this will be achieved. The introduction of this legislation reflects the start of a long process of working with government and this new office to ensure that the model of effective self-regulation that has served British Columbians for 100 years is maintained and that these changes do indeed improve the protection of the public interest.

As regulations are developed, we will continue to work with government to the best of our ability to ensure changes to the regulatory model are carefully considered and effectively implemented.

WHAT'S NEXT?

If the legislation is enacted, regulations will need to be developed to support implementation. We have been advised that this would be a long-term process, with regulations on various provisions of the *Act* coming into force as they are developed. Each regulation is expected to involve its own consultation process, which Engineers and Geoscientists BC expects to be actively involved in. It is anticipated that it will take the next three to five years to fully implement the *Act*.

MORE INFORMATION

More information about the *Professional Governance Act* is available on our Professional Reliance webpage, *egbc.ca/Professional-Reliance*.

If you have questions, please contact *professionalreliance@egbc.ca*.

2018 COUNCIL ELECTION AND BYLAW VOTE RESULTS

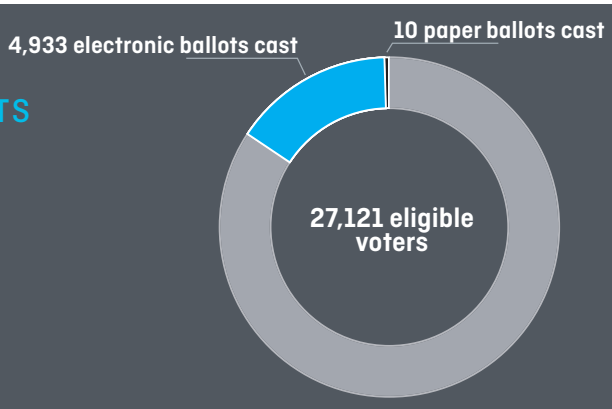
Voting for Engineers and Geoscientists British Columbia's 2018/2019 Council election and bylaw vote opened September 5 and closed at noon on October 5, 2018. Online and paper ballots were available to members.

Three registered members of the association—Dr. John Clague, P.Geo., FGC, FEC (Hon.), John Watson P.Eng. (Non-Practising), FEC, FGC (Hon.), and Ken Williams, P.Eng. (Non-Practising), FEC—scrutinized the electronic and paper voting processes. The online ballot was conducted securely and anonymously using systems contracted from Everyone Counts Inc.

2018 COUNCIL ELECTION RESULTS

This year, 18.23% of registered members and limited licensees returned ballots.

The election results are as follows:



PRESIDENT

Dr. Kathy Tarnai-Lokhorst, P.Eng., FEC

VICE PRESIDENT

Harlan Kelly, P.Eng.

COUNCILLORS (ELECTED)

Antigone Dixon-Warren, P.Geo.
Susan MacDougall, P.Eng.
Brock Nanson, P.Eng.
Kevin Turner, P.Eng., FEC, FGC (Hon.)
Larry Spence, P.Eng.

COUNCILLORS (CONTINUING)

Doug Barry, P.Eng.
Dr. Catherine Hickson, P.Geo., FGC
Lianna Mah, P.Eng., FEC
Jeremy Vincent, P.Geo.
Tim Watson, P.Eng.

GOVERNMENT APPOINTEES

Suky Cheema, CPA, CA
Ken Laloge, CPA, CA, TEP
John Turner, P.Ag. (ret)
David Wells, JD

COUNCIL APPOINTEE

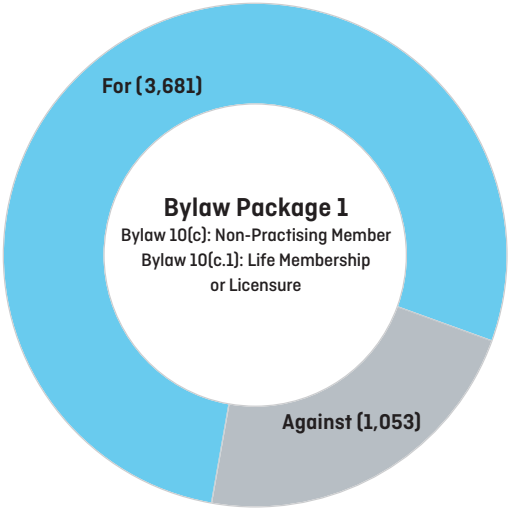
Dr. Nimal Rajapakse, P.Eng.*

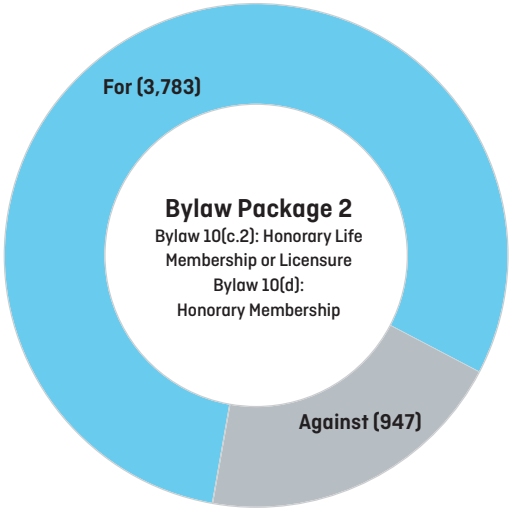
**Appointed by Council in accordance with Section 9(7) of the Act.*

BYLAW VOTING RESULTS

Members also had the opportunity to vote on proposed amendments to four association bylaws. The amendments were grouped into two bylaw packages. Bylaw Package 1 included amendments to bylaws 10(c) (relating to Non-Practising Members) and 10(c.1) (relating to Life Membership or Licensure). Bylaw Package 2 included amendments to bylaw 10(c.2) (relating to Honorary Life Membership or Licensure) and bylaw 10(d) (relating to Honorary Membership).

Both bylaw packages passed and the four amendments to the bylaws were ratified. Bylaw amendments must achieve a two-thirds majority to pass.





IT'S TIME FOR MEMBERSHIP RENEWAL - HERE'S WHAT'S NEW FOR 2019

It is time to renew your membership or licence for 2019. The *Engineers and Geoscientists Act* requires renewals by January 1. After this date, late fees are applied to overdue payments. As of March 1, 2019, members and licensees not yet renewed are struck off the register. The January 1 deadline also applies to members who submit their 2019 annual membership renewal invoice to their employers for payment.

HOW DO I RENEW?

You can renew your membership:

- by signing into your account on the association's website at *egbc.ca/account*, or by mailing a copy of your invoice and your method of payment to:
  Engineers and Geoscientists BC
  200 – 4010 Regent Street.
  Burnaby, BC V5C 6N2.

Please allow sufficient time for delivery.

WHAT IF I WANT TO RESIGN?

If you wish to discontinue your membership with Engineers and Geoscientists BC, be sure to resign prior to January 1 to avoid being liable for membership renewal fees. Resignation can be tendered through our website or by contacting the association directly. Resigned professional members can re-apply for membership in accordance with the association's Return to Practice Policy. Members-in-Training who re-apply must comply with Engineers and Geoscientists BC's Reinstatement Policy. Any outstanding annual membership fee, late fees, and associated administrative fees must also be paid.

NON-PRACTISING MEMBERS

Earlier this fall, members voted to ratify amendments to four bylaws. Based on the change to *Bylaw 10 (c) Non-Practising Member*, the following changes are effective for 2019:

- The annual fee for non-practising membership/licensure has been reduced to 50% of the full professional member/licensee fee.
- Non-practising members/licensees must make an annual declaration committing not to practise professional engineering or geoscience in British Columbia, including unpaid or volunteer work.
- Non-practising members/licensees must use the qualifier "Non-Practising" or "Retired" after their designation.

WHO CAN BECOME A NON-PRACTISING MEMBER?

Non-practising membership status is available to professional engineers (P.Eng.), professional geoscientists (P.Geo.), engineering licensees (Eng.L.) and geoscience licensees (Geo.L.). Members-in-Training (EITs and GITs) and Non-resident Members are not eligible for non-practising status. You can apply for non-practising status through the membership renewal process, or at any time during the year.

WHAT TITLES DO NON-PRACTISING MEMBERS USE?

They must also use one of two qualified titles: "Non-Practising" or "Retired". For example, a non-practising professional engineer must use the title **P.Eng. (Non-Practising)** or **P.Geo. (Retired)**.

WILL I STILL BE A MEMBER?

Members with non-practising status are still members of Engineers and Geoscientists BC. They will continue to have the right to vote, and can still participate on certain non-technical association boards and committees.

CAN I RETURN TO PRACTISING STATUS?

Non-practising members can re-apply for practising status anytime by submitting an application and application fee under the Return to Practice Procedure. For more information about non-practising status, and to learn more through our Guideline & FAQ For Non-Practising Status document, please visit *egbc.ca/Become-a-Member/Non-Practising-Membership*.

WHERE CAN I GET ALL THE DETAILS ABOUT NON-PRACTISING MEMBERSHIP?

Our new Non-Practising Membership page provides all the information about non-practising status. We've also provided a detailed guidance document, Guideline & FAQ For Non-Practising Status, that explains:

- what non-practising members (versus practising members) can and cannot do;
- how non-practising members must refer to themselves professionally;
- the continuing professional development obligations of non-practising members;
- guidelines for voting rights and volunteering on committees for non-practising members; and
- how non-practising member can return to practice.

Visit *egbc.ca/Become-a-Member/Non-Practising-Membership* to learn more about Non-Practising Membership and read the Guideline & FAQ For Non-Practising Status.

FORTIS BC™

B.C.'s natural gas supply is limited

Due to the rupture of the Enbridge-owned natural gas transmission pipeline north of Prince George on October 9, 2018, B.C.'s natural gas supply is limited this winter. We're asking all our customers to reduce their natural gas use over the coming months. Here's how you can reduce your use of natural gas:

Turn down the heat: we recognize that in some parts of B.C. it may be impractical to turn off thermostats completely due to cold weather. Where possible, set your thermostat no higher than 20 °C when heat is needed, and to 17 °C in unoccupied areas or during off-hours.

Ensure equipment is working efficiently: maintain hot water and HVAC units and clean or replace air filters and dampers regularly.

Inspect and insulate: ensure heating ducts and pipes in unheated areas are insulated and sealed.

Visit **fortisbc.com/reduceyouruse** for more energy-saving tips, or contact your FortisBC key account manager.

2018 ANNUAL GENERAL MEETING OVERVIEW

Engineers and Geoscientists BC held its 99th annual general meeting on October 20, 2018, in Vancouver, BC. The meeting was attended by 129 members, 8 members-in-training, 14 students and 22 guests, and was located at the Vancouver Convention Centre East. It was chaired by the association's 2017/2018 president, Caroline Andrewes, P.Eng.

President Andrewes opened the meeting, acknowledging the unceded shared traditional territories of the Coast Salish peoples, and in particular, the Squamish, Musqueam, and Tsleil-Waututh First Nations. She read greetings from Premier John Horgan on behalf of the BC government.

A motion to approve the agenda was carried and meeting rules were approved as circulated. The previous year's annual general meeting minutes were approved.

ELECTION AND BYLAW VOTE RESULTS

John Watson, P.Eng., (Non-Practising), FEC, Chief Scrutineer for the 2018 council election and bylaw amendment vote, confirmed that he and his fellow scrutineers were satisfied that the election was held in a confidential, fair, and impartial manner. He announced the results (SEE PAGE 7), and a motion to destroy the ballots at the end of three months was carried by the assembly.

ANNUAL REPORT AND FINANCIAL STATEMENTS

Reports on the activities during the 2017/2018 year were provided by President Andrewes and CEO and Registrar Ann English, P.Eng. Councillor Suky Cheema, CPA, CA, presented the report from the Government Appointees to Council. She also provided a report on the association's audited Financial Statements.

For more information, see the 2017/2018 Annual Report, online at *egbc.ca/Resources/News-and-Publications/Annual-Report*.

GREETINGS FROM ENGINEERS CANADA AND GEOSCIENTISTS CANADA

Engineers Canada president Annette Bergeron, P.Eng., FEC, and Geoscientists Canada representative Garth Kirkham, P.Geo., FGC, brought greetings to the assembly from their respective organizations.

IN MEMORIAM

The assembly observed a moment of respectful silence in acknowledgment and remembrance of members of the association who passed away during the previous year.

PRESENTATION ON PROFESSIONAL RELIANCE

Vice-President Dr. Kathy Tarnai-Lokhorst, P.Eng., FEC, presented an update on the BC government's Professional Reliance Review and the association's response to date. She reported on the drivers for the review, actions taken to date, and anticipated next steps. Following the presentation, President Andrewes and CEO English responded to questions from members on this topic.

MOTIONS BROUGHT FORWARD BY MEMBERS

Members presented motions for the consideration of Council. Motion 1 was submitted ahead of the submission deadline for advance motions, allowing for publication and distribution online, along with supplementary background information. This motion was considered first. A further two motions were submitted at the AGM.

> **Motion 1:** *That Council consider undertaking and putting the necessary resources into the development of a comprehensive Climate Change Action Plan that will provide direction on the roles and duties of EGBC's member in addressing this issue.*

The motion was carried.

> **Motion 2:** *That Council consider assessing whether it is ethical for members to work on projects that could significantly increase greenhouse gas emissions (e.g., expansion of oil sands, mines, fossil fuel pipelines, and LNG projects), given that climate change is causing widespread harm to people and the environment, both locally and globally, and that the Code Ethics requires that "members and licensees shall hold paramount the safety, health and welfare of the public and the protection of the environment." In addition, for Council to prepare a report for members about this assessment.*

The motion was defeated.

> **Motion 3:** *That council consider holding a referendum before enacting corporate registration.*

The motion was defeated.

INTRODUCTION OF THE 2018/2019 COUNCIL

Outgoing President Andrewes welcomed the association's president for 2018/2019, Dr. Kathy Tarnai-Lokhorst, P.Eng., FEC. President Lokhorst recited the oath of office and introduced the members of the 2018/2019 Council. Past President Andrewes announced the date of the 2019 conference and AGM in Kelowna, BC, October 17-19, and adjourned the meeting.

ORGANIZATIONAL QUALITY MANAGEMENT PROGRAM

The following organizations have recently received OQM certification. To find out more, visit *egbc.ca/oqm*.

Hub Engineering Inc.
March & Associates Engineering Ltd
Trinitas Engineers Inc.
Site Power Engineering Consultants Ltd.
Chalten Engineering Ltd.
NDY Management Canada Inc.
SR Engineering Ltd.

TASK FORCE EXPLORES VOTING RIGHTS FOR MEMBERS-IN-TRAINING

Currently, the right to vote in Council elections, bylaw ratifications, and at the association's Annual General Meetings is restricted to professional members and limited licensees. As part of a recent review of Engineers and Geoscientists BC's nomination and election processes, Council is recommending the expansion of voting rights to members-in-training (EITs and GITs).

Voting rights are determined by the governing legislation for Engineers and Geoscientists BC—the *Engineers and Geoscientists Act*. At the 2017 AGM, members passed a motion that Council consider advocating to have the *Act* changed to allow members-in-training the right to vote. Council referred this motion to the Nomination and Election Review Task Force for consideration.

In a scan of practices across the country, the task force determined that the rules for voting rights vary. In Alberta, Ontario, and PEI, members-in-training may not vote, while in Manitoba, they may only vote for one reserved position on Council for a member-in-training. In Saskatchewan, New Brunswick, Newfoundland, and Nova Scotia, members-in-training may vote, and in some cases, stand for election to Council.

Members-in-training have expressed a desire to be able to participate in voting processes, and the task force agreed that this would be a positive change that would enable members entering the profession to have more of a stake in their future, as well as the future of the professions. Voting is also seen by members to be a critical aspect of self-governance.

In September 2018, the task force recommended that Council expand voting rights to members-in-training. Council supported this recommendation, and also asked that member input be sought on this issue.

A change to the *Engineers and Geoscientists Act* would be required in order to enact the expansion of voting rights. Only government has the power to amend the *Act*, and any proposed changes must be made through a request to the Ministry of Advanced Education and approved by the BC Legislature. In light of the recent introduction of the *Professional Governance Act* (SEE PAGE 6), support for this request is unknown, but Council wishes to advance it should the opportunity to do so arise.

Currently, there are just over 6,000 members-in-training registered with Engineers and Geoscientists BC.

Council is seeking member input on this proposed expansion of voting rights. To provide your thoughts on this issue, email *communications@egbc.ca* by January 4, 2019.

MOUNT POLLEY: DISCIPLINARY HEARINGS ANNOUNCED

Engineers and Geoscientists British Columbia has announced disciplinary hearings for three individuals related to the 2014 breach of the tailings storage facility at the Mount Polley Mine.

On August 4, 2014, the Mount Polley Mine's tailings storage facility breached, releasing nearly all of its contained water and mine tailings into Polley Lake, Hazeltine Creek, and nearby Quesnel Lake.

This marks the conclusion of a lengthy, independent investigation. Engineers and Geoscientists BC's Investigation Committee alleges that three individuals involved in the design, construction, and monitoring of the tailings storage facility demonstrated negligence and/or unprofessional conduct in the course of their professional activities.

At this stage, the allegations have not been heard by a disciplinary panel and are unproven.

The investigation was led by a three-person subcommittee of senior professionals from Engineers and Geoscientists BC's Investigation Committee. During the course of its investigation, the subcommittee received more than 13,000 documents for review, including contracts, reports, correspondence, and daily site reports. In addition, it considered the reports resulting from other public investigations conducted by the Independent Expert Engineering Investigation and Review Panel and the Chief Inspector of Mines.

Following the breach, Engineers and Geoscientists BC took actions to improve dam safety in BC, which included producing professional practice guidelines for site characterization for dam foundations in BC, updating existing guidelines to confirm the duties of the "Engineer of Record," and holding professional development seminars.

A Notice of Inquiry, which outlines the specific allegations, has been issued to each of the three individuals. The disciplinary hearings are scheduled for 2019.

If allegations are proven at the conclusion of a disciplinary hearing, Engineers and Geoscientists BC can impose sanctions under the *Engineers and Geoscientists Act*, which can include a reprimand, practice restrictions, suspension, cancellation of membership,or a fine of up to $25,000—the maximum allowable under the *Act*—and can require those subject to the disciplinary process to pay legal costs to Engineers and Geoscientists BC.

Hearing dates, and the complete Notices of Inquiry, are available on our website, *egbc.ca/Complaints-Discipline/Discipline-Notices*.

These two member advisories were first published in eNews in September 2018. If you have questions about this advisory or other related practice matters, please contact Amy Fernandes, P.Eng., Practice Advisor, at afernandes@egbc.ca.

CLARIFICATION ON FIELD REVIEWS AND CONSTRUCTION DEFICIENCIES, SAFETY

A number of Engineers and Geoscientists BC professional practice guidelines address the roles and responsibilities of registered professionals and other parties involved in various aspects of building projects. In response to concerns from members about misinterpretation by project participants regarding how the engineer of record's field review relates to addressing construction deficiencies, and the role of the engineer in relation to construction safety, the association has issued a member advisory to provide guidance.

"Member Advisory: 2018-04 - Field Reviews, Construction Deficiencies and Safety" provides clarification on field reviews as they are defined in the *BC Building Code*, differing from inspections performed by authorities having jurisdiction to confirm compliance with code or bylaw requirements.

The advisory discusses the treatment of deficiencies identified by field reviews and provides context for what constitutes construction safety aspects as they relate to the registered professional's role and responsibilities.

This member advisory, as well as other practice resources, is available on the association's Practice Guidelines webpage, *egbc.ca/guidelines*.

NEW REGULATIONS FOR STEEL STORAGE RACKS

Steel storage racks, particularly pallet racks, are commonly used in modern warehouses, manufacturing facilities, 'big box' retail centers, and other storage and distribution facilities. Changes to the *Occupational Health and Safety (OHS) Regulation* regarding storage racks came into effect January 1, 2018. Recently, Engineers and Geoscientists BC published an advisory notice to members on this topic.

Engineers and Geoscientists BC's "Member Advisory 2018-05 - New Regulations for Steel Storage Racks" discusses the changes in OHS Regulation 4.43.1 – Storage Racks, under Part 4: General Conditions, and presents related considerations for geotechnical aspects related to seismic design, permitting and design requirements, and damaged racking.

The new regulations in Section 4.43.1 – Storage Racks, apply to steel storage racks made of steel frames, beams, and associated accessories that are assembled into a structure to support materials and products. Common types of steel storage racks are pallet racks and cantilever racks, however the new regulations apply to other types of steel storage racks such as drive-in or drive-through racks, push-back racks, and other similar types of industrial racks.

The new regulations outline the worker safety requirements for racks in workplaces to ensure employers understand the hazards, their responsibilities, and the procedures that must be in place with respect to these structures.

This member advisory, as well as other practice resources, is available on the association's Practice Guidelines webpage, *egbc.ca/guidelines*.

DR. KATHERINA TARNAI-LOKHORST, P.ENG., FEC

Engineering Positive Relationships Through Collaboration

PHOTO: ROOP JAWL DESIGN & PHOTOGRAPHY

KYLIE WILLIAMS

After declaring to her father at a young age that she wanted to be a singer, Dr. Katherina Tarnai-Lokhorst, P.Eng., FEC, the new president for Engineers and Geoscientists BC, followed his advice and identified a profession to support her singing hobby: engineering. And, her connection with a fellow engineer who also happened to be a musician would play a key role in launching her aerodynamics career.

After graduating in 1988 during a recession, when engineering companies across the country were not hiring, Tarnai-Lokhorst moved to Toronto to 'pound the pavement'. She landed an interview with the lead aerodynamics engineer at Boeing Canada, de Havilland Division. Although the company was in a hiring freeze, the two connected over the instruments they played and a shared love of music.

Eventually, Tarnai-Lokhorst was hired as one of seven new engineers at the company when the freeze was lifted. The process taught her an important lesson: "It's not just the math and physics and your marks that get you a job; it's how we connect and build relationships, and sometimes that is through the extra-curricular things we do."

After several happy years at de Havilland, Tarnai-Lokhorst was 'desked' and assigned research projects while expecting her first child, because the working conditions on the shop floor were not considered safe at the time for a pregnant woman. "It was difficult because I loved being on the shop floor and I loved interacting with the assemblers, the supervisors, the inspectors," she says.

Soon after, Tarnai-Lokhorst and her husband moved to Victoria, and, after a brief period as a stay-at-home-mom, she set out again to find work as an engineer. Despite her qualifications and experience, at the time companies were not hiring engineers on a part-time basis.

"I couldn't accept that this couldn't be done part time."

Inspired by a colleague who was teaching part-time, Tarnai-Lokhorst changed direction and approached the Chair of Mechanical and Civil Engineering at Camosun College in Victoria BC. She began teaching statics to mechanical engineering students in January 1994 and discovered her passion: "I found through that course that I absolutely loved teaching and the opportunity to share my knowledge and give back."

Tarnai-Lokhorst has been teaching in the Mechanical Engineering Technology department at Camosun since 1994. That experience led to opportunities to work with engineers from other disciplines—opportunities that ultimately prepared her for a future with Engineers and Geoscientists BC.

WHAT FIRST INSPIRED YOU TO VOLUNTEER WITH ENGINEERS AND GEOSCIENTISTS BC?

By the early 2000s, I was department chair at Camosun and had joined a number of cross-disciplinary committees. They were collegial, friendly, and high achieving. They were some of the best teams that I've been on. Around the same time, Charlotte Huffman, [P.Eng.], a practising engineer in Victoria, invited me to join Engineers and Geoscientists BC's Victoria Branch executive group, and that was the beginning of a wonderful experience. I loved working with other engineers and belonging to group of people who were all looking to improve engineering for the future. It was amazing to be so well-supported; it was a very rewarding and inclusive experience.

WHAT CHALLENGES DO YOU SEE FOR THE REGULATION OF PROFESSIONAL ENGINEERS AND GEOSCIENTISTS?

Engineering and geoscience are expanding professions, with new disciplines being identified at a rapid pace, such as software engineering in computer science, or other fields that are developing, such as integrated engineering and mechatronics. These are essential fields to our changing economy, so it is important that we guide them in ensuring public safety and individual privacy. They're doing amazing work—we just need to make sure that they're included so that all practitioners can realize the same recognition and high level of professionalism, ethics, and integrity.

Of course, the major development right now is the new proposed provincial legislation on professional governance. The new legislation gives a framework, but there are still a lot of details to be worked out through regulations. We've made lots of progress so far by collaborating with government to hopefully implement this new legislation carefully and effectively. The whole process will probably take several years, so most of my time in the next few months will be spent navigating the details of that legislation and ensuring that we can continue working productively with government all the way through implementation.

IN YOUR CANDIDACY STATEMENT, YOU TALKED ABOUT THE IMPORTANCE OF DIVERSITY TO ENGINEERING AND GEOSCIENCE PROFESSIONS. WHAT CONCRETE STEPS CAN WE TAKE TO ADDRESS THIS?

Let me answer this with a story. I was teaching the module on diversity, equity, and inclusion in my Project Management and Social Responsibility class at Camosun recently. It was an opportunity for me to have candid and courageous conversations with my students, who are predominantly white males. One of the men turned to me and said, "Hold on, do you think that we," and he meant 'we,' the white males, "are the problem?" I thanked him for asking that because it dawned on me why there is so much tension around this issue.

I looked at him and said: "If you make the effort through your career to be inclusive of people who are in minorities, if you advocate for that woman in the room who is having trouble finding her voice, if you change the language at your organization to be more inclusive and invite more diverse applicants to your jobs—then you're not part of the problem, you're part of the solution." I said, "I believe everyone in this classroom can be part of the solution." ◆

PERSONALLY SPEAKING

WHAT IS YOUR PERSONAL LEADERSHIP STYLE?

My job is to empower other people to have their voice heard, and to bring together those voices into a consolidated viewpoint. I want to be that empowering person who inspires, motivates, and builds hope for a positive future, and helps us all move towards it.

WHAT DO YOU DO FOR FUN?

I sing to improve my mood, and I sing for joy. My daughters both sing as well, so whenever my middle daughter comes home from Toronto, the two girls and I always spend time at the piano. The three of us sing in harmony and it feels so wonderful.

WHAT WAS YOUR LAST NETFLIX BINGE?

Fullmetal Alchemist.

WHAT WAS THE LAST BOOK YOU READ?

Codex Alera by Jim Butcher.

WHAT ARE YOU LOOKING FORWARD TO THIS WINTER?

I am looking forward to getting to know members and other regulators over the holiday season. I'm also looking forward to spending some quiet time at home with the family. I have a little grandson, and it will be nice to watch the season unfold through his eyes.

MEMBERS AND CLIMATE CHANGE IN THEIR WORK

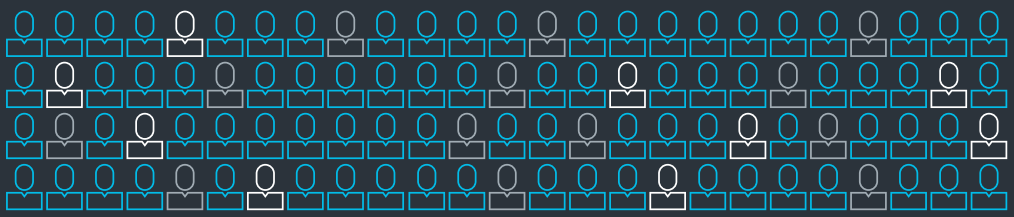
Engineers and Geoscientists BC's Climate Change Advisory Group developed a survey to assess the membership's attitudes towards climate change. These are the key findings.

SURVEY OBJECTIVES

1. How important and urgent is action on climate change to members?
2. Within its remit, how can the association support members to consider the impact of their work on the climate, and the impact of climate on their work?

INTEREST

A CLEAR MAJORITY OF MEMBERS ARE INTERESTED IN CONSIDERING CLIMATE CHANGE IN THEIR WORK.



79% "very interested", "interested", "slightly interested" 9% "not currently interested, but might be someday 13% "not interested and I don't want to try"

Percentages may not sum to 100% due to rounding.

IMPORTANCE

FOUR OUT OF FIVE MEMBERS FEEL IT IS IMPORTANT TO CONSIDER CLIMATE CHANGE IN THEIR WORK.

81% "very important", "important", "somewhat important"

ACTION

THREE OUT OF FOUR MEMBERS FEEL TAKING ACTION SHOULD BE URGENT.

74% "very urgent", "urgent", "somewhat urgent"

MANY MEMBERS ARE ALREADY TAKING ACTION.

64% "always", "regularly", "occasionally" active at currently considering climate change in their work

TYPES OF ACTIONS

GATHERING INFORMATION

CONSIDERING RELEVANCE TO THEIR WORK

DISCUSSING WITH CLIENTS AND COLLEAGUES

MITIGATION AND ADAPTATION ARE EQUALLY IMPORTANT.

67% adaptation, 65% mitigation "very important, "important"

OBSTACLES

FOR EVERY MEMBER WHO FINDS IT EASY TO CONSIDER CLIMATE CHANGE IN THEIR WORK, TWO MEMBERS FIND IT DIFFICULT.

DIFFICULTIES

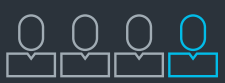
LACK OF MANDATE

LACK OF CLIENT DEMAND

LACK OF SUPPORT, TIME, OR RESOURCES

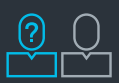
43% "very difficult", "difficult" 21% "very easy", "easy" 36% "neither", "do not know"

ONLY ONE IN FOUR RESPONDENTS FEELS THE ASSOCIATION IS DOING ENOUGH TO SUPPORT THEIR EFFORTS.



26% "very well", "well" "meets expectations" in fulfilling its support roles

OVER HALF ARE UNAWARE THE ASSOCIATION HAS RESOURCES TO HELP MEMBERS, OR ARE NOT USING THEM.



52% "I wasn't aware or haven't used this resource."

SUPPORT

MEMBERS FEEL SUPPORT FROM THE ASSOCIATION SHOULD BE PRACTICAL AND SPECIFIC TO THEIR WORK.

DESIRED SUPPORT

FRAMEWORKS AND TECHNICAL OPTIONS FOR CONSIDERING CLIMATE CHANGE

DATA GATHERING, ANALYSIS, AND SCENARIO ASSESSMENT METHODS

ENGINEERS AND GEOSCIENTISTS BC THANKS MEMBERS WHO GAVE FEEDBACK ON HOW BEST TO SUPPORT THEM. THE ASSOCIATION IS USING THESE RESULTS TO EVALUATE THE PROVISION OF FUTURE TRAINING OPPORTUNITIES AND RESOURCES.

FOR THE ASSOCIATION'S POSITION PAPERS AND TECHNICAL PRACTICE RESOURCES, GO TO EGBC.CA/CLIMATECHANGE

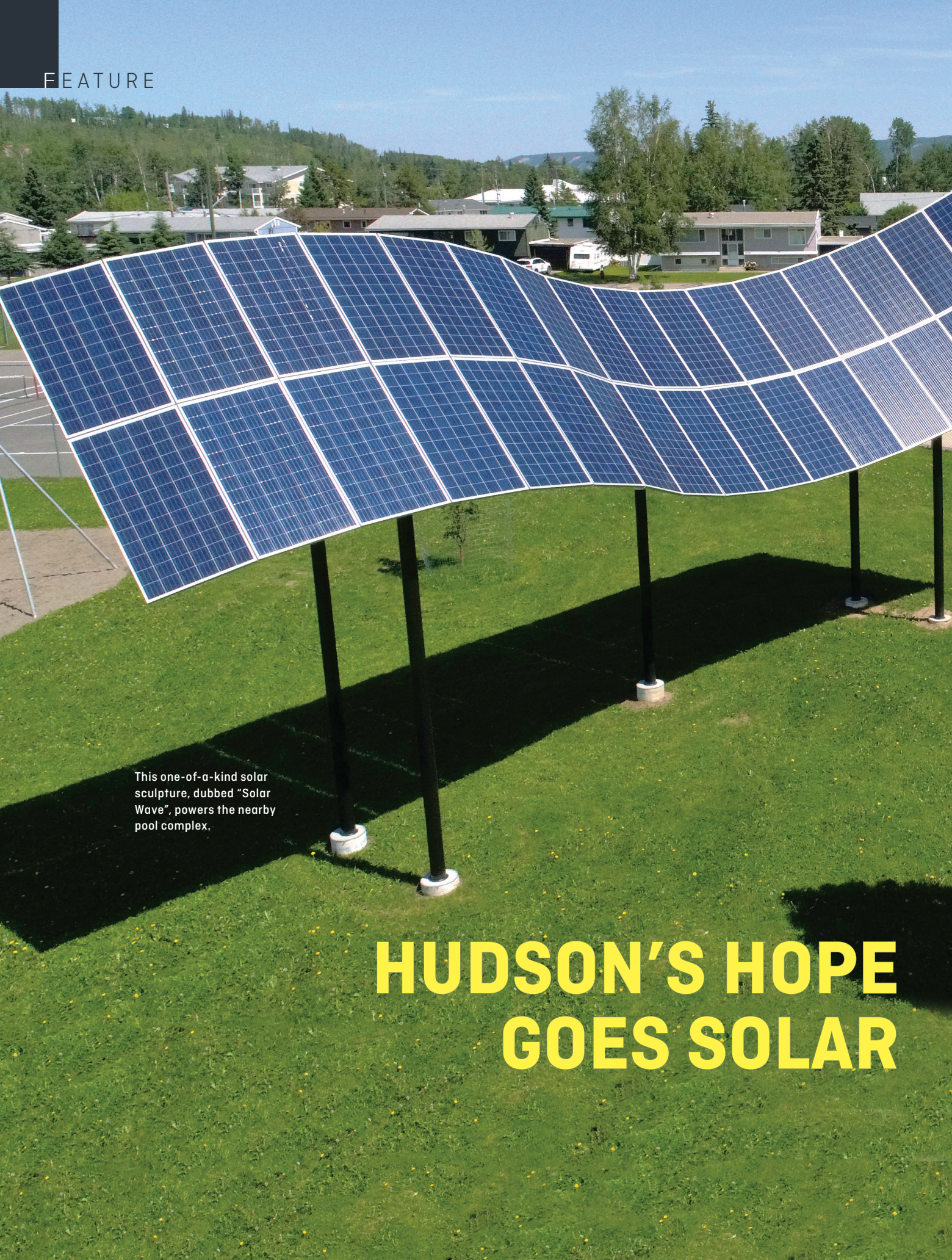
ENGINEERS & GEOSCIENTISTS BRITISH COLUMBIA

In 2017, the Engineers and Geoscientists BC Climate Change Advisory Group (CCAG) conducted an online survey open to all members in good standing, to gauge members' attitudes about climate change. The CCAG wanted to know how Engineers and Geoscientists BC help its members consider the impact of their work on the climate and the impact of climate on their professional activities, and to what extent members see action on climate change as important and urgent.

The results showed that a clear majority of members feel it is important and urgent to incorporate climate change considerations into their professional practice. We heard that members are interested in incorporating climate change into their work, and are already somewhat active in doing so, but finding it difficult. The survey also highlighted that emissions mitigation and adaptation to climate change are equally important, and that members are already taking action through information gathering, considering the relevance of climate change to their work and discussing the issue with clients and colleagues. The responses also showed a general preference for the association to help its members account for climate change in their professional practice, yet only one in four respondents felt that the association is doing enough to support their efforts, while more than half were unaware of, or not using, the association's existing resources.

Responses were received from members from all disciplines and all 15 branches of the association, with work experience ranging from less than five years to over 20. The survey's 1027 responses provide a 95 percent confidence level with a margin of error of 3 percent, and are summarized in the infographic to the left.

The CCAG is considering the survey results in more detail, paying particular attention to the members' expressed interest in support from the association that is practical and specific to their work. We are currently evaluating the provision of future training opportunities and resources, and how to better increase awareness of the association's current position papers on human-induced climate change and the evolving responsibilities of engineers and geoscientists in response to climate change. We are also seeking to raise awareness of the association's online resources at *egbc.ca/climatechange,* where members can access the climate change information portal, the association's climate change position papers and a detailed Summary of Climate Change Survey Findings. The professional practice guidelines on adaptation (Developing Climate Change-Resilient Designs for Highway Infrastructure in BC) and mitigation (Whole Building Energy Modelling Services) are available at the professional practice guidelines page at *egbc.ca/guidelines.* ◆



This one-of-a-kind solar sculpture, dubbed "Solar Wave", powers the nearby pool complex.

HUDSON'S HOPE GOES SOLAR

The northeastern BC District of Hudson's Hope, with a population of about 1,100, might not seem like an obvious candidate for a municipal solar installation that slashes electricity consumption and is expected to save millions over the coming decades. But municipal leaders weren't intimidated, and now Hudson's Hope is home to the largest municipal solar array in the province—proving you don't have to be big to be green.

ED KNAGGS, P.ENG.

The District of Hudson's Hope in northeast BC is leading the way in municipal-scale solar power. More than 1.500 solar modules were installed on nine municipal facilities over the summer of 2017, producing more than 500 kilowatts of power, making it BC's largest municipal solar project. Hudson's Hope implemented its community solar initiative with the primary goal of offsetting ever-rising electricity costs and taking a lead role in sustainable energy solutions.

HOW THEY DID IT

The project was initially spearheaded by Mayor Gwen Johansson, with help from Peace Energy Renewable Energy Cooperative, a Dawson Creek-based solar cooperative, the first of its kind in Western Canada. A community solar plan was roughed out and, in 2017, after the municipality received a federal grant, the district worked with the cooperative and Urban Systems of Fort St. John to develop a more detailed plan for the project. The project scope

PHOTO: DON PETTIT, PEACE ENERGY COOPERATIVE

The roof of the district office in Hudson's Hope, and the curling rink (background), were two of seven municipal buildings outfitted with solar panels. The district built two additional solar installations. Photo: Don Pettit, Peace Energy Cooperative

included the installation of nine separate systems; roof-mounted solar arrays on seven municipal buildings, a ground-mounted array at the sewage treatment lagoon, and another ground-mounted array at the district swimming pool. Each of the nine systems operate independently to offset the utility power for the facility they are connected into. The total capacity of all the combined arrays is just over 510 kilowatts.

The Union of BC Municipalities provided $1.35 million through its Strategic Priorities Fund and federal Gas Tax Fund. A joint venture between Peace Energy Co-op and Moch Electric, along with solar energy engineering specialists HES PV Ltd., were selected through a competitive bid process to provide mechanical and electrical engineering and to supply, install and commission the nine arrays. The project began in the summer of 2017, and the final systems were installed and commissioned in Spring 2018.

The project takes advantage of BC Hydro's net metering program, which allows individual, corporate, and government consumers like Hudson's Hope to generate and use their own power, and feed any excess power back into the public grid. These net metering participants remain 'grid-tied', but extra solar energy accumulates as a credit on the building's BC Hydro account. This credit can then be used when the building requires more power than its solar array can generate, such as at night or in the winter.

By carefully analyzing how much power each building historically used, the team was able to engineer the arrays to produce just enough power over a one-year season cycle to 'zero-out' energy usage. When this is achieved, the building is considered to be electrically 'net-zero'. The result is essentially zero cost for electricity.

This works particularly well at Hudson Hope's location at latitude 56 degrees north. In Spring, Summer, and Fall, the region has many hours of daylight, leading to more energy production than needed. The extra energy is 'banked' through BC Hydro as credit. In Winter, solar arrays are sometimes covered with snow; daylight time is reduced and the sun's angle is very low, so energy production is also low. In Spring, Summer, and Fall, 90 percent of the annual solar energy is drawn from the sun, and either used immediately or banked. In Winter, the amount drops to 10 percent—but the remaining energy required for the building is drawn from the credit that was accumulated in Summer.

"Presently this is the largest municipal solar project in BC. We are proud to be a leader in electricity self-generation, and appreciate the BC Hydro net metering initiative that helps us achieve our goal," says Mayor Johansson.

The Hudson's Hope Bullhead Curling Club is now net-zero with its 72-kilowatt solar array, and the district's municipal

office now gets approximately 80 percent of its energy from its 53-kilowatt rooftop array. The district's municipal office is very close to net-zero with a 92-kilowatt array, and the newly upgraded sewage treatment lagoon will get half its power from the sun via a 200-metre-long ground-mount array.

Not all of the Hudson's Hope buildings achieved net-zero, because BC Hydro has set a net meter limit of 100 kilowatts per account. This limited the size of the array that could be installed at each location.

The solar systems installed in Hudson's Hope Will be harvesting 'free' energy from the sun for many years to come.

"We anticipate the reduction in the district electricity costs to be about $74,000 in the first year, increasing each year after that as rates for regular grid power increase. Allowing for expected rate increases that amounts to a savings of more than $3 million over the next 30 years," says Mayor Johansson.

TECHNOLOGY

Solar modules are solid-state devices with thin cells of crystalline silicon that turn sunlight directly into electricity. This 'photoelectric effect'—where electricity flows from crystals when exposed to sunlight—was first mathematically explained by Albert Einstein, for which he received his one and only Nobel Prize in 1921.

In modern solar modules, crystalline silicon is sealed from the elements behind a layer of tough tempered glass. Experience has shown that these modules will run with no maintenance for at least 30 years—probably much more.

Hanwha high-efficiency polycrystalline solar modules, each with a peak output of 340 watts, were selected for the Hudson's Hope project because of their proven reliability.

The modules were coupled with SolarEdge voltage optimizers and inverters. Optimizers are essentially DC-DC converters that adjust individual solar module voltage independent of the rest of the array string, ensuring maximum output even in partial shading or varying climatic conditions (temperature and light intensity). Inverters convert the DC power generated by the solar modules to grid-ready AC current at efficiencies greater than 98 percent. The inverter automatically synchronizes with the grid's power and safely disconnects if any issues arise. The current CSA inverter standard (CSA 22.2 No. 107.1) ensures that the inverters are designed and tested to properly interact with the grid. Inverters are capable of more than just producing

Continues on page 36...

NON-PROFIT HOUSING RETROFITS

BC's non-profit housing sector, comprising about 3,100 housing complexes, is facing a critical backlog of retrofit projects and the pressing need to reduce energy consumption and related costs. Non-profit housing societies—many of which are run by volunteer boards—often lack the financial resources, technical expertise, and procurement experience to oversee these projects. But a new collaboration between utility providers and government is ensuring engineering support is available to help guide these retrofits towards quality, efficiency, and sustainability.

MIKE GAMBLE, P.ENG.

For years, the non-profit housing sector has been facing an urgent need for asset upgrades and building retrofits. Volunteer boards that run the societies often lack the financial resources and technical expertise to evaluate project plans, cost projections, and equipment for complex building upgrades and retrofits. When these housing societies undertake projects without professional support, the result falls much short of their hopes and expectations.

But now, a new partnership between utility providers and government has made funding available for societies to retain professional engineering support, in the hope of completing projects that are more efficient, more sustainable, and ultimately a marked improvement for the most vulnerable in our society.

THE LANDSCAPE OF NON-PROFIT HOUSING

Non-profit housing can be defined as rental housing that is owned and operated by community-based non-profit societies.

A seniors' facility in Surrey, BC, replaced its aging boilers before they failed (Right). The new installation (Left) was installed by a contractor, with engineering assistance.

THE HOUSING CONTINUUM

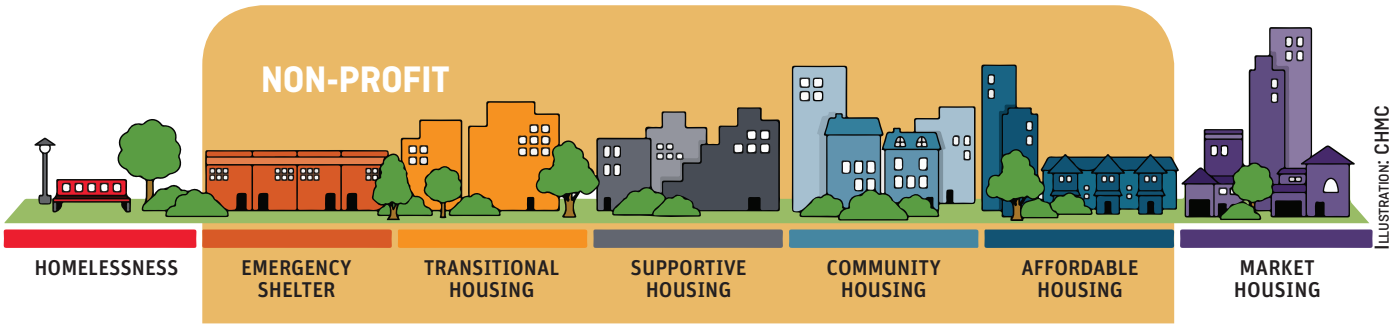


Illustration: CHMC

In general, the mandate of these societies is to provide safe, secure, affordable accommodation to vulnerable groups of the population, or households with low to moderate incomes. In BC, there are approximately 3,100 housing complexes that fall into this category; these are managed by about 800 different societies. The types of buildings in the sector cover a wide range of the housing continuum from emergency shelters up to affordable rentals.

RETROFIT AND UPGRADE ISSUES ARE BECOMING MORE PROMINENT

Buildings of all types need routine repairs. As they age, building assets require major upgrades or renewals to operate effectively. Unfortunately, there has been little investment in the affordable housing sector in the past few decades, and the sector has accrued over $700 million worth of deferred maintenance. Many buildings urgently need major

A seniors' residential complex in Surrey, BC, that upgraded its boilers with the help of an engineer.

retrofits, such as boiler plants, ventilation systems, hot water systems, and envelope and windows.

CHALLENGES FOR SOCIETIES

Approximately 10 percent of non-profit housing units are managed directly by BC Housing. The remaining independent societies may employ staff, although they are often focused on tenant-related issues instead of long-term asset planning. Other societies are operated by volunteer boards who often lack the technical background or sufficient expertise to evaluate contractor proposals, plan upgrades, or manage the construction process of significant retrofits.

Funding limitations create additional pressure to complete projects without the help of a professional engineer—which can result in a range of issues.

Poor installation and design result in missed energy performance opportunities. One non-profit society needed to replace their existing atmospheric boilers, and wanted to use modern, high-efficiency condensing boilers. The project was completed by a non-engineer, but a professional engineer was needed to review the installation for rebate eligibility. The review found several deficiencies with the installation. The engineering consultant said that "it was apparent that the contractor did not understand how a condensing boiler plant was meant to operate." The consultant estimated that, under best design practices, the project would lead to energy-use reductions of 23 percent—compared to the slight energy-use increase the building experienced post-retrofit.

Societies often lack the expertise to provide technical specifications for retrofit projects, and therefore can only evaluate contractor proposals based on price or sales. In 2008, a non-profit society asked three contractors to provide quotes for a boiler system replacement. The society had limited technical experience and did not provide a specification, so they selected the contractor with the lower price. More recently, high maintenance costs led the society to consider another retrofit. An engineer familiar with the project explained that the original retrofit included low-quality equipment—a much more costly choice over the long-term. The society had no one to provide them with this insight during the first retrofit.

PROFESSIONAL ENGINEERS CAN HELP

When professional engineers are involved in retrofits, the number of minor issues are substantially reduced, and major issues are eliminated. For this reason, The BC Non-Profit Housing Association (BCNPHA) always recommends that a society hire a professional engineer for complex retrofits.

Engineers have the needed technical expertise for the project. But they're also bound by practice guidelines and a Code of Ethics that require them to recommend whatever is in the best interest of the society. A society can trust that solutions from an engineer are technically sound, but also are in the best interest of the society, without the worries of upselling or low-cost products that are likely to fail.

Engineers are ensuring that retrofit projects are energy efficient, too. BC Housing's Energy Efficiency Retrofit Program (EERP) provides funding to societies for small, energy saving retrofits such as light fixtures and boilers—and requires the use of a professional engineer. In a study, BC Housing confirmed that projects they reviewed under the EERP were achieving the expected energy savings. With the introduction of Engineers and Geoscientists BC's Whole Building Energy Modelling Services Guidelines, engineers can now prepare energy projections with increased consistency and accuracy. This will further increase the confidence that societies have in selecting a professional engineer.

Once a non-profit housing society starts working with a professional engineer, they almost always continue for

future projects. For example, Senior Citizens Housing of Surrey, BC, decided to proactively replace their boilers to prevent an unexpected loss of service in the winter. They asked professional engineers to help—and Don Beaton, their maintenance manager, now says other societies should think about doing the same. "The engineers took care of everything so that we could focus on running the building, he says. "Whether it was obtaining permits, coordinating with the contractor, or accessing rebates, they managed the process so that we can focus on what we do best."

FUNDING IS PART OF THE SOLUTION

For years, BCNPHA has been lobbying for funding programs that not only incentivize high-efficiency retrofits, but also provide funding for professional advice to ensure projects are professionally evaluated and implemented. There has been broad agreement that lack of funding for professional support was a major barrier to energy-saving potential.

A collaboration led by FortisBC, between BCNPHA, BC Housing, and BC Hydro, resulted in a new program called the Social Housing Retrofit Support Program (SHRSP). Through a single SHRSP application, non-profit housing societies can access:

- up to $5,000 of funding towards an energy study to help identify measures and provide an accurate business case for the board to consider;
- up to $7,000 of funding towards retaining an engineer to prepare design documentation and manage the construction process; and
- financial incentives to reduce the cost of high-efficiency equipment, such as boilers, envelope retrofit, and heat pumps.

In addition, the Ministry of Energy, Mines, & Petroleum Resources has collaborated with utilities to integrate EfficiencyBC's Social Housing Incentive Program with SHRSP, ensuring a streamlined experience. The EfficiencyBC program offers societies additional funding to reduce their greenhouse gas emissions, through natural gas efficiency and fuel switching measures that complement the traditional demand-side management measures offered by the utilities.

What makes these programs innovative is that multiple utilities and stakeholders have come together to make professional advice available, and to promote energy conservation and efficiency across the sector throughout BC.

ENGINEERS HAVE A ROLE TO PLAY

The timing of these new programs is ideal, because the affordable housing sector is about to experience significant investment from all levels of government in coming years. With increased capital funding available and support programs in place for societies to obtain professional advice, there is a significant opportunity for more professional engineers to become involved in the non-profit housing sector. Over 75 societies have already submitted applications for SHRSP, for projects ranging from simple lighting retrofits to deep, full-building retrofits. The opportunity now exists for professional engineers to apply their knowledge and expertise to ensure that BC's affordable housing sector remains sustainable for generations to come. ◆

Mike Gamble, P.Eng., is a mechanical engineer within the Asset Management department at BC Non-Profit Housing Association, which is the provincial umbrella organization for the non-profit housing sector. The Asset Management department supports its members to maximize long-term operation of building assets though education, energy retrofit coaching, and capital planning services.

Networking, Education, and Keynotes Highlight 2018 Conference

Over three days in October, more than 1,000 engineering and geoscience professionals, students, and industry stakeholders gathered at the Vancouver Convention Centre at Engineers and Geoscientists BC Annual Conference. Delegates networked with colleagues, learned about the latest engineering and geoscience products and technologies through 41 exhibitors, and expanded their knowledge through 11 professional development streams. The event concluded with the association's Annual General Meeting on October 20.

Conference keynote speakers included medical education research scientist Dr. Glenn Regehr, futurist Nikolas Badminton, Harvard-trained author, researcher, and media expert Dr. Shimi Kang, and Canadian football Hall-of-Fame inductee Michael "Pinball" Clemons.

Many thanks to all of our exceptional stream coordinators, speakers, sponsors, exhibitors, and conference delegates for your contributions and support in making the conference and annual meeting a success.

The association's 2019 annual conference and AGM will be hosted in Kelowna, BC, October 17–19, 2019. Mark your calendars! ◆

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Previous page from top clockwise: Delegates vote at AGM; a delegate visits the association's booth; Michael "Pinball" Clemons; the association's new President and Immediate Past President. This page top left: Nathan Ozog, P.Eng., receives his President's Award. Photos: Mike Crane Photography. This page above: Nikolas Badminton.

The main objective of the under-construction North Shore Waste Water Treatment Plant is to provide both primary and secondary wastewater treatment as required under new federal regulations. But it doesn't stop there. When commissioned late in 2020, the plant will use biogas to heat and power the facility itself, and also recover heat from the effluent for delivery to regional customers. That double benefit is remarkable enough—but it will all be accomplished from a scant 3.5 hectare site.

SHANA JOHNSTONE

Construction is now underway on the North Shore Wastewater Treatment Plant (NSWWTP) in North Vancouver. The new Metro Vancouver facility will replace the existing Lions Gate Wastewater Treatment Plant, the regional district's oldest wastewater facility and one of only two remaining primary treatment plants serving the region. Budgeted at $700 million and scheduled for commissioning at the end of 2020, the new LEED Gold and ENVISION Gold facility will serve the over 250,000 residents of the District of West Vancouver, District of North Vancouver, City of North Vancouver, and Squamish and Tsleil-Waututh nations.

While the new plant is expected to fulfill all the duties of a modern wastewater treatment plant, designers are particularly proud of the facility's novel energy recovery capabilities and low

NORTH SHORE WASTEWATER TREATMENT PLANT DELIVERS OUTSIZED BENEFITS ON DIMINUTIVE SITE

Artist rendering: Acciona/Metro Vancouver

emissions, expecting to reduce greenhouse gases by 75 percent over the existing plant. And this achievement is made even more remarkable considering the footprint constraints of its tiny urban site.

ENERGY RECOVERY AND EFFICIENCY

Recovered energy from captured biogas from the wastewater treatment process will provide heat and power for in-plant use. The treatment process will remove organic matter, collecting the sludge from primary and secondary processes into anaerobic digesters that convert it to biogas and a reduced amount of biomass. A co-generation engine will then condition and combust the biogas to produce electricity and heat for use within the facility. Energy will also be recovered from effluent to heat office space in the plant. Lillian Zaremba, P.Eng. and Senior Project Engineer, Utility Research and Innovation with Metro Vancouver,

explains that the facility will need to purchase 'very little' natural gas to operate.

Not only will it produce much of the energy needed to run its systems, the facility will itself be a source of energy feeding others in the neighbourhood: heat recovered from the treated wastewater will be sent to the nearby district energy system owned by Lonsdale Energy Corporation (LEC). Zaremba describes how the NSWWTP will extract heat from the effluent and transfer it to the water loop that LEC uses to supply heat to its customers. "A heat pump works like a refrigerator or air conditioner," she says. "It uses an evaporation-compression cycle to move thermal energy from one fluid to another." The plant will have an industrial heat pump, which she describes as "about the size of a train engine."

Top and Middle: The plant is being constructed on West 1st Street, only blocks from residential, commercial, and industrial areas. Bottom: An artist's rendering of the south-facing arrival hall. Photos: Acciona/Metro Vancouver

"Lonsdale Energy Corporation uses hot water as its heat delivery medium," she says. "We'll be providing heat into their hot water loop at about 70 to 82 degrees. The heat will then be transferred to various buildings that they serve," she says.

Zaremba says the heat recovery benefits are made possible because of the plant's proximity to LEC's hot water infrastructure, and because LEC's system is ready-made for the heat that the plant can deliver. "The connection point to LEC's existing distribution piping is only about a kilometre away from the plant. That really helped the business case," she says. "The heat will displace the use of natural gas by LEC, reducing greenhouse gas emissions. Metro Vancouver placed a value on carbon, which made heat recovery a viable alternative to natural gas. Acquiring greenhouse gas reductions from this project will help Metro Vancouver deliver on its commitment to carbon neutrality."

Only a portion of the effluent flow will be directed towards the heat pump, Zaremba says—just the right amount to meet the demand of LEC's customers. Plenty of heat will remain in the effluent, but the compressed plant footprint means that expansion of heat recovery in this area isn't possible. Yet there is plenty of opportunity for other users to capture the leftover heat from the effluent downstream of the plant before it is discharged.

Complementing the co-generation and heat recovery systems are various techniques and equipment that will conserve energy throughout the treatment process and in facility operation. These include gravity-fed wastewater flow, high-efficiency blowers in the aeration basin—part of the facility's world-class odour abatement system—and heat exchangers and heat pumps in the facility's HVAC system. Emissions control, too, will be found throughout the facility, with control systems on the co-generation engine and the standby generator as well as treatment of all air in the facility.

With these systems, the NSWWTP is expected to generate far fewer greenhouse gas emissions than the existing Lions Gate primary treatment plant. Emissions in 2021 are targeted at 1,170 tonnes carbon dioxide equivalent (tCO_2e)—80 percent lower CO_2e per year compared to similar Canadian facilities.

In addition, the facility's heat recovery for district energy use is expected to reduce overall greenhouse gas emissions by 5,650 tCO_2e in 2021. Together, the facility's systems remove more emissions than they generate: expected net emissions in 2021 are -4,480 tCO_2e.

THINKING BIG ON A SMALL SITE

The NSWWTP is being built on a very compact site—though "compact" is understatement. At just 3.5 hectares, the site is one-third of the size of Metro Vancouver's Lulu Island site in Richmond, yet will achieve the same capacity. The new facility's design departs from typical sprawling campus models, instead using a vertical approach to fit all treatment processes on-site. Metro Vancouver's Paul Dufault, P.Eng., Project Manager, North Shore Wastewater Treatment Plant, says that some of the treatment technologies were selected for their small footprints (lamella clarifiers, high-rate clarifiers, ultraviolet-light disinfection, vortex grit removal), their maximization of volume through height on a small footprint (tall digesters, deep activated sludge tanks), or their stacking ability (secondary clarifiers).

To save even more space, Dufault explains that common wall construction will be used for large tanks, and multiple stories will maximize square footage—requiring the thoughtful location of uses since those typically found at-grade will in some cases be located on higher floors. Maintenance shops, for example, will be located on the third floor of the operations and maintenance building. "We like to compare this [to] a ship with … many constraints, tight spaces and different areas, and numerous systems," says Dufault.

As well as being compact, the site is urban, located in North Vancouver at the intersection of West 1st Street and Pemberton Avenue, bounded by the CN Rail line to the south and a new vehicle and pedestrian overpass to the west. Sensitivity to community needs required a careful and creative site layout: the larger, intensive treatment processes will be at the western end of the site, and the smaller, more refined processes will be at the eastern end, recognizing the pedestrian scale of Pemberton Avenue and allowing as much public space as possible.

But the site layout and architectural design hasn't simply met the challenge of context. It's exceeded community expectations by designing for people and infrastructure systems in equal measure. Far from the unfriendly design of the existing facility and large infrastructure projects in general, the NSWWTP's modern design, welcoming landscape features, and public art will integrate the facility into the local neighbourhood as an appealing destination. Here, community involvement will be encouraged with all-purpose spaces, a plaza, an accessible rooftop, and exhibits that provide teaching opportunities.

With educational and other non-critical uses located on the ground floor, the facility, which sits in proximity to Burrard Inlet, is able to meet a flood control level of 6 metres for critical operations—significantly above the normal design flood control elevation of 4.5 metres—which increases the facility's resilience to sea level rise, extreme weather events, and tsunami. "This facility and site have their own constraints," says Dufault, "and we've responded to them as opportunities. We've worked with the unique nature of this place." ◆

NSWWTP QUICK FACTS

- Owner and operator: Metro Vancouver
- Owner's team: AECOM, Golder Associates, and Louis Berger
- Facility design: Tetra Tech, Wood Group, and DIALOG
- Facility delivery: ACCIONA
- Conveyance design: WSP
- Conveyance delivery: North Shore Conveyance Partners
- Cost: $700 million
- Funding: $405 million from governments of BC and Canada

SIX WAYS YOU CAN REDUCE YOUR CARBON FOOTPRINT

1. **Carpool to work and to offsite events or meetings.** Talk to your colleagues to coordinate. Commuter Challenge BC has resources to help organize carpools on their website, *www.commuterchallengebc.ca*.
2. **Develop a culture of conservation**. Create an office Green Team to champion workplace sustainability. There are many online carpooling resources, and you can even challenge your coworkers by participating in local initiatives like GoByBike Week (*www.biketowork.ca*).
3. **Put your computer to sleep.** Next to light and heat, computers draw more power than anything else in your office. In Sleep Mode, computers store your work into memory and then shut down, using only enough power to maintain the data in memory. Setting your computer to sleep at night or while you're away, can reduce its power consumption dramatically. BC Hydro and Fortis BC have developed toolkits to help encourage office workers to reduce their electricity use by turning off monitors, lights and heaters. Learn more at *www.bchydro.com/powersmart/business/programs/workplace-conservation/campaign-kits.html*
4. **Compost.** Reduce garbage by providing compost bins in meeting rooms and lunchrooms. Reduce single-use items by making reusable cups, plates, and cutlery available to staff in lunchrooms and cafeterias.
5. **Print less.** Use screens in meeting rooms to display digital meeting packages rather than printing and distributing documents.
6. **Opt in to digital *Innovation*.** Receive the electronic version instead of the print version of *Innovation* by visiting *egbc.ca/account*, logging into your account, and changing your communications preferences.

DELEGATES RAISE $10,000 FOR SCHOLARSHIPS AND BURSARIES AT ASSOCIATION GALA

For the fourth year in a row, members generously donated to the Engineers and Geoscientists BC Foundation at the President's Awards Gala, helping to raise more than $10,000 towards scholarships and bursaries that support post-secondary students studying engineering and earth science.

Funds raised at the gala help dedicated students achieve their personal and professional goals by offsetting costs associated with attaining engineering or geoscience degrees at BC universities. "I will continually strive to work my hardest to further my knowledge in my post-secondary studies and on my path to becoming a professional engineer," says Alvin Tran, a first-year engineering student and recipient of the 2018 Post-Secondary Entrance Scholarship. "I am excited about the new opportunities and experiences that I will gain through my education at UBC."

The Engineers and Geoscientists BC Foundation is a registered charity that operates at arms' length from the association. To learn more about the Foundation or to donate, please visit egbc.ca/Foundation. *During this year's membership renewal period, members will be able to donate their chosen amount, or round their fee up to the nearest $10.*

DISCIPLINARY NOTICE: NARAYAN ABHYANKAR, P.ENG./P.GEO., LANGLEY, BC

Member acknowledges he failed to document field reviews and ensure regular, documented checks of his work on a retaining wall at a residential property. The member agreed to pay a fine and legal costs, and complete a course.

Engineers and Geoscientists BC issued a Notice of Inquiry to Narayan Shankar Abhyankar, P.Eng./P.Geo., in February 2018, regarding engineering services he provided for a retaining wall at a residential property in Surrey, BC. Instead of proceeding to a disciplinary inquiry, Mr. Abhyankar agreed to a Consent Order dated September 20, 2018. In the Consent Order, Mr. Abhyankar admitted that he:

1. failed to ensure filed reviews were documented by him, or under his direct supervision, during implementation or construction of the retaining wall at the Surrey Site in contravention of section 14(b)(3) of the association's bylaws; and
2. contravened section 14(b)(2) of the association's bylaws in October and November of 2014 when he failed to ensure regular, documented checks of the engineering work using a written quality control process appropriate to the risk associated with the work.

As part of the Consent Order, Mr. Abhyankar agreed to:

1. successfully complete the course entitled "Field Review Responsibilities of Design Consultants" on November 1, 2018 at his own expense and notify the association, on or before November 21, 2018, that he has successfully completed the course;
2. pay a fine of $5,000, within 30 days of the date of the Consent Order; and
3. pay $7,500 toward the association's legal costs within 30 days of the date of the Consent Order.

Mr. Abhyankar also agreed that if he fails to comply with the terms of the Consent Order, his membership with the association will be suspended until every default has been remedied.

The full text of the Consent Order agreed to by Mr. Abhyankar can be found in the Disciplinary Notices section of our website, egbc.ca/Complaints-Discipline.

Engineers and Geoscientists BC's website contains information on the complaint, investigation, and discipline processes. You can contact us at 604.558.6647 or toll-free at 1.888.430.8035 ext. 6647, or by email at complaints@egbc.ca.

DISCIPLINARY NOTICE: JAMES W.E. HALAREWICZ, P.ENG., VANCOUVER, BC

The association issued two Notices of Inquiry to Mr. Halarewicz, alleging that a number of his communications breached the association's Code of Ethics and that he failed to participate in a required practice review. A panel of the Discipline Committee subsequently found that actions surrounding the practice review breached the Engineers and Geoscientists Act, *and that his communications to various parties were disrespectful, discourteous, and misogynistic. The Discipline Committee also found that Mr. Halarewicz demonstrated a contempt for the regulatory processes that the association administers in the public interest.*

Engineers and Geoscientists BC issued separate Notices of Inquiry to James W.E. Halarewicz, P.Eng., in June and July 2018, regarding his unprofessional correspondence to staff at the Architectural Institute of British Columbia (AIBC) and Engineers and Geoscientists BC and, separately, his failure to comply with a practice review for which he was randomly selected.

A disciplinary inquiry was held on August 28 and 29, 2018. Although he was notified of the disciplinary inquiry, Mr. Halarewicz did not attend. A panel of the Discipline Committee (the Panel) heard evidence from witnesses in relation to the allegations set out in the Notices of Inquiry.

On October 11, 2018, the Panel issued their Determination, which stated that the allegations set out in the Notices of Inquiry had been proven. The Panel determined that Mr. Halarewicz contravened sections 30(4) and 44 of the *Engineers and Geoscientists Act* by failing to provide information to the Investigation Committee and by refusing to participate in a practice review.

The Panel also found that Mr. Halarewicz's conduct was a marked departure from the standard expected of members and a contravention of Principle 7 of the Code of Ethics. In their Determination, the Panel wrote:

> The Panel finds that Mr. Halarewicz engaged in unprofessional conduct by sending crude, sexist, lewd, demeaning and profoundly disrespectful emails to female staff members at AIBC. These emails reflected a marked departure from the standard of conduct required of members of the Association. Communications of this nature are unacceptable in professional discourse. The emails also contravene Principle 7 of the *Code of Ethics* as their demeaning and offensive content reflected a complete lack of courtesy and respect towards AIBC senior staff.
>
> The Panel condemns Mr. Halarewicz's communications with AIBC staff and the Association and its counsel in the strongest terms. These communications were shocking, disrespectful, discourteous, misogynistic and disgraceful.
>
> Mr. Halarewicz demonstrated an utter contempt for the regulatoryprocesses that the Association administers in the public interest. Mr. Halarewicz's refusal to participate in the mandatory practice review and failure to provide a meaningful or substantive response to legitimate inquiries from the subcommittee undermined the Association's statutory mandate of protecting the public from unprofessional conduct and brought the profession of engineering into disrepute.

The Panel requested written submissions from the association and Mr. Halarewicz be provided on appropriate sanctions and whether the association's legal costs should be payable by Mr. Halarewicz. The deadline for the submissions is December 21, 2018.

The full text of the Determination can be found in the Disciplinary Noticessection of our website, egbc.ca/Complaints-Discipline.

Engineers and Geoscientists BC's website contains information on the complaint, investigation, and discipline processes. You can contact us at 604.558.6647 or toll-free at 1.888.430.8035 ext. 6647, or by email at complaints@egbc.ca.

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power when the sun is shining; they can adjust the level and characteristics of the power they produce in reaction to the parameters of the grid power they are synchronized to. These adjustments can help support the grid voltage and frequency, which is already a big benefit to utilities and grid operators in California and Hawaii.

The system also provides remote internet monitoring of each solar panel in real-time, plus a record of historical energy output by the day, month or year. This allows the district to monitor produced power, save money, and identify any problems as they arise. This real-time information is also displayed on a large-screen public kiosk in the District Municipal Office as part of their community engagement program.

COMMUNITY

"It's been very positive for the community overall," says long-term resident Guy Armitage. "The economic benefits are obvious, but there is also a certain pride in knowing we are leaders on the environmental front."

Seven local high school students were hired to work on the solar installation teams, giving them valuable work experience and training. Several public information sessions provided by the district and presented by Peace Energy Cooperative were very well attended. The district also held a community Solar Celebration official launch event in Spring 2018, just as the last array was commissioned. District personnel were trained to safely operate and monitor the solar arrays.

PHOTO: DON PETTIT, PEACE ENERGY COOPERATIVE

The District's solar project also included one unique and eye-catching element: the Solar Wave, an elevated solar array designed in the shape of a giant wave, installed outside the District's outdoor public pool facility. The array is part sculpture and part tourist attraction, but also supplies solar power to the facility. "At Peace Energy Co-op we think solar can be much more than just electricity," explains Dueck.

"Solar is relatively new in BC, so community education and engagement is particularly important," says Greg Dueck, solar project manager for Peace Energy Cooperative. "That's largely why we came up with the Solar Wave concept for the Hudson's Hope outdoor swimming pool."

Solar-generated power has been available for a long time. So why only now are we seeing systems like these become more commonplace? The main reason is that the cost of solar modules has dropped by over 85 percent since 2009. This price plummet, coupled with BC Hydro's user-friendly net metering program, and the fact that solar is a carbon free power source, makes solar power the perfect choice for municipalities to reduce their footprint and mitigate the increasing cost of electricity.

"We're saving money by reducing our need for grid-produced electricity and helping the environment—that's something our community is very proud of," explains Mayor Johansson. ◆

Ed Knaggs, P.Eng., is a Victoria-based electrical engineer with HESPV, a Canadian company that provides residential, commerical, and industrial customers with solar power solutions. Knaggs and his colleagues at HESPV provided the electrical design and engineering support for the solar project in Hudson's Hope.

CLASSIFIEDS

ENGINEERS & GEOSCIENTISTS
BRITISH COLUMBIA

MEMBERSHIP

IN MEMORIAM

The association announces with regret the passing of the following members:

G.E. Barker, P.Geo.
E.M. Berlie, P.Eng.
G.S. Bhar, P.Eng.
B.D. Bornhold, P.Geo.
M.R. Buckley, P.Eng.
S. Butte, P.Eng.
M.M. Carvey, P.Eng.
R.S. Crosby, P.Eng.
C.M. Deines, P.Eng.
D.A. Delcourt, Eng.L.
G.W. Downie, P.Eng.
J.M. Hutchinson, P.Eng.
C.H. Iverson, P.Eng.
T.W. Kirkham, P.Eng.
C.G. Lavers, P.Eng.
N.C. Lenard, P.Eng.
R.D. Louie, P.Eng.
J.E. Lusney, P.Eng.
R.L. MacDonald, P.Eng.
J.B. Mantle, P.Eng.
T.T. Nonay, P.Eng.
V.A., Pakalnis, P.Eng.
J.M., Philip, P.Eng.
F.G., Powell, P.Eng.
J.A. Reid, P.Eng.
H. Schmidt, P.Eng.
W.T. Seto, P.Eng.
D.K. Soutar, P.Eng.
N.J. Strate, EIT

INNOVATION

AD INDEX NOVEMBER/DECEMBER 2018

CONTINUING PROFESSIONAL DEVELOPMENT

PERSONAL INVESTMENT. PROFESSIONAL COMMITMENT.

FUNDAMENTALS OF PROJECT MANAGEMENT
January 9 and 10, 2019 – Vancouver, BC

The purpose of this course is to introduce technical and non-technical individuals to the principles and techniques of effective project management, which can be usefully applied to technical and non-technical projects.

PROJECT CLAIMS AND DISPUTES AND TEAM BUILDING ON ENGINEERING AND CONSTRUCTION PROJECTS
January 11, 2019 – Vancouver, BC

The morning session will focus on contract claims and disputes. This session discusses the causes and types of claims, the procedures by owners and contractors to avoid claims, and methods to quantify and resolve claims. The afternoon session will focus on team building and partnering. This session attempts to create an environment where trust and teamwork prevent disputes, foster a cooperative bond to everyone's benefit, and facilitate the completion of a successful project.

OQM CERTIFICATION TRAINING SESSION
January 16, 2019 - Burnaby, BC

Engineers and Geoscientists BC's Organizational Quality Management (OQM) Program has been developed to improve the quality management of professional engineering and geoscience practices at the individual and organizational level. This voluntary program offers certification to participating organizations.

CLIMATE CHANGE AND WATER MANAGEMENT
January 28, 2019 – Vancouver, BC

The seminar will begin with the review of water resources management challenges posed by the climate change. Then it will explore an example on how to address future climate change in current water resources engineering practice. Then we will at discuss consequences of changing conditions.

PROFESSIONAL PRACTICE TRENDS AT ENGINEERS AND GEOSCIENTISTS BC
January 30, 2019 – Webinar

Everything you wanted to know about the common misconceptions and uncertainties in professional practice. This session will delve into the most common questions the Engineers and Geoscientists BC Professional Practice department receives and the top trends seen in OQM audits and practice reviews.

EVALUATION AND REHABILITATION OF PAVEMENTS
January 28 and 29, 2019 - Burnaby, BC

This course will provide an overview of the most popular design methods for roadway pavements as well as methods and procedures to evaluate pavement condition to determine how we can cost-effectively extend their service life. Case studies will be presented to show examples of pavement condition, why it is in the condition, and how best to cost-effectively treat defects to maximize the life of the asset. Pavement preservation and life-cycle cost procedures will be discussed to assist asset managers in conveying the importance of timely maintenance and rehabilitation actions.

WOMEN IN LEADERSHIP
February 4, 2019 – Webinar

An introduction to Taking the Stage® and Succeeding on Stage™. The Humphrey Group has developed Taking the Stage® and Succeeding on Stage™ as two high impact programs that enable women leaders to project a powerful leadership presence that commands recognition and respect. You will learn to unlock the power of your voice, excel in the spotlight and advance in the corporate world. This introductory webinar will focus on some fundamental concepts that will be expanded on during these courses, specifically: adopting a leader's mindset and communicating your thinking persuasively.

FUNDAMENTAL OF POWER SYSTEM PLANNING AND OPERATION
February 6 and 7, 2019 – Vancouver, BC

Power system planning and operation covers wide and diverse topics in electrical engineering. This course will cover fundamental concepts, aspects and issues in system planning and operation. The most basic objectives are voltage and frequency control and management. The seminar introduces means of controls such as synchronous generator, shunt and facts devices.

CONTRACT ADMINISTRATION AND CONTRACTUAL ISSUES FOR ENGINEERING AND CONSTRUCTION PROJECTS
February 20 and 21, 2019 – Vancouver, BC

This module will cover legal and contractual issues related to the effective management and administration of construction projects. It focuses on the roles and responsibilities of the project managers to contractors and suppliers. It provides project managers with a good understanding and the practical implications of the legal precedents and improves the ability to make better decisions. Legal cases and disputes situations will be reviewed and discussed with participants.

LEADING MAJOR CAPITAL PROJECTS
February 22, 2019 – Vancouver, BC

The level of uncertainty and volatility associated with major capital projects make a predictable outcome almost impossible to achieve, as these large projects are more complex and last longer. These projects present great challenge to busy leaders, managers, and executives. The long history of staggering cost overruns and completion delays offers little assurance that cost and schedules estimates can be relied upon. This half day session provides an opportunity to discuss the relationship between the business and project sides of the organization.

STORMWATER DETENTION POND DESIGN
February 25, 2019 – Vancouver, BC

Urban stormwater ponds have a long-term cost and the potential to become amenities in communities. The planning and design processes are becoming increasingly complex and must include multiple use systems that are operated and maintained while providing recreational and educational opportunities to the community. This seminar will explore advanced topics of concern in the planning and design of modern stormwater management ponds in urban areas.

TAKING THE STAGE®
February 28, 2019 – Vancouver, BC

Taking the Stage® is a high-impact program that enables women leaders to project a powerful leadership presence that commands recognition and respect. Unlock the power of your voice, and excel in the spotlight. This intensive seminar will show you how to be recognized for your views. You will learn how to develop a clear message, create a persuasive structure, and communicate it in a way that allows you to be heard the first time you speak.

For a complete listing of events or for more information, visit *egbc.ca/Events/Seminars* or contact us at 604.430.8035 or 1.888.430.8035.

CALL FOR PRESENTERS

Are you an expert in your field who would like to contribute to engineering and geoscience practice?

Engineers and Geoscientists BC is actively seeking members to present on a variety of topics. For more information, please visit *egbc.ca/Events/Seminars*.

ENGINEERS & GEOSCIENTISTS
BRITISH COLUMBIA

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ENGINEERS & GEOSCIENTISTS BRITISH COLUMBIA