MARCH 2026

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# TRANSIT SPEED IS A CHOICE

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## PROFESSIONAL DEVELOPMENT



THE VOICE
OF ONTARIO'S ENGINEERS

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Dear Members,

As you read this, we are almost a quarter through 2026; smack dab in the middle of **National Engineering Month**; and a couple of weeks away from our first **EngTalks Symposium** in Waterloo, ***AI & the Future of Engineering***. Where does the time go?

I have no doubt that you are also enjoying a very busy start to the year. There is still so much shifting below all of our feet as Ontario looks to get stronger, be nimbler, and attack the many challenges ahead of us.

OSPE's mandate is to represent the engineering community, and one of our important annual initiatives is to engage the government. Throughout the year, we do so in many constructive ways, and once a year we visit **Queen's Park**, speaking with ministers, the opposition and their staff, to ensure the expertise and the ideas of engineers are well known to key decision makers. This annual event is occurring later this month, after a one-year break due to the timing of the last election.

As we prepare to engage our elected officials and critical civil servants, our task forces have been busy working on a list of recommendations. We are also focused on a few notable areas:

- **Right to Practice** – Making sure that the areas of practice outlined in the **Professional Engineers Act** remain consistent with public safety
- **National License** – Easing the burdens of qualified talent seeking work in additional jurisdictions
- **Effective Procurement** – Improving the performance of infrastructure investment through focus on Qualifications-Based Selection

The sum total of these areas is to create an environment where the talented engineers of Ontario can thrive. The training and experience of the engineering community here is second to none, which is one of the many reasons there is so much opportunity, even as we navigate an unpredictable business environment.

That doesn't mean growth and progress are easy, especially considering the complexity of our economy and community.

OSPE is here to make sure that the value of engineering services is appreciated, not commoditized. That the contributions of engineers are valued, not taken for granted. That progress is managed smartly and safely, not with reckless urgency, and that engineers are viewed as critical problem solvers, building and reimagining as we evolve.

2026 is going to be another critical year for Ontario, and the engineering community is ready to do its part.

Thank you for being a part of it.

**Sandro Perruzza, ICD.D, CRSP**
Chief Executive Officer
Ontario Society of Professional Engineers

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ONTARIO SOCIETY OF PROFESSIONAL ENGINEERS

national ENGINEERING MONTH

Engineers Open Doors.

# News from the Front

Over the past several months, OSPE has continued to advance the engineering profession and champion engineering-driven solutions to government. Staff met with provincial ministers across multiple ministries to advocate for aligning engineering education with industry needs, modernizing the **Professional Engineering Act**, promoting **Qualifications-Based Selection (QBS)** over lowest-bid procurement, and protecting interprovincial trade for engineering firms. OSPE also advanced practical solutions to climate challenges with provincial and federal policy officials and celebrated policy wins in climate resilience and critical minerals. As the Ontario legislature resumes this spring, OSPE will continue championing engineers and engineering-led solutions.

**Appearance at the Standing Committee on Finance and Economic Affairs – December 4**

In his remarks before the **Standing Committee on Finance and Economic Affairs** regarding the **2026 Ontario Budget**, OSPE **CEO Sandro Perruzza** called on the province to treat engineering as a strategic asset by investing in the full talent pipeline, prioritizing quality and long-term value in procurement, fostering a large and diverse engineering workforce, and consulting engineers early in policy and project planning.

**Meeting with the Ontario Energy Board (OEB) Ultra Low Overnight (ULO) Price Plan Policy Team – December 12**

OSPE's advocacy staff and the **Energy Task Force** met with OEB staff to discuss rate changes and the impact on the ULO price plan.

**Meeting with MPP Kristyn Wong-Tam – January 22**

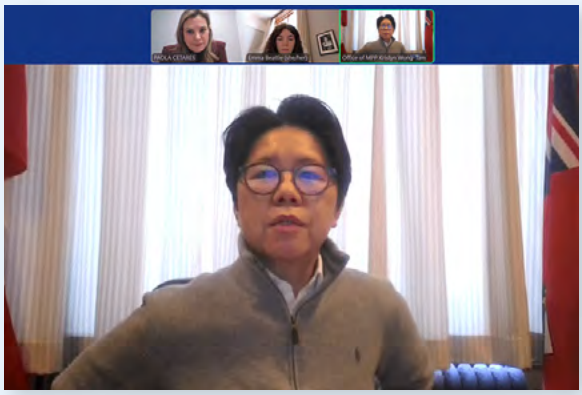
OSPE staff met with **MPP Kristyn Wong-Tam** and their staff to discuss modernizing the **Professional Engineers Act**. OSPE's suggestions to modernize the Act would improve access for qualified professionals, ensure fairness and transparency, enhance mobility and consistency across provinces, and support public access to the best engineering.

**Meeting with Minister Nolan Quinn – February 3**

OSPE staff met with **Minister Nolan Quinn** from the **Ministry of Colleges, Universities, Research Excellence and Security**. The conversation focused on how Ontario can better align engineering education with the needs of industry, particularly in manufacturing, applied innovation, and commercialization.

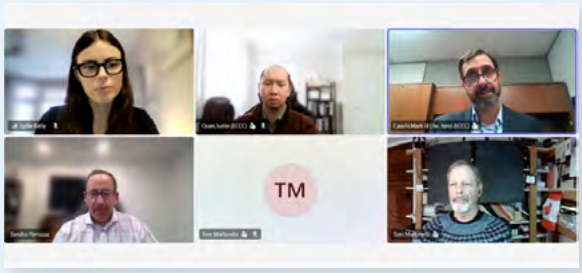
**Meeting with the Environment and Climate Change Canada (ECCC) Policy Team - February 11**

OSPE met with the **Environment and Climate Change Canada** policy team to discuss recommendations from OSPE's **Climate Crisis Task Force** to reduce greenhouse gas emissions.



MPP Kristyn Wong-Tam and staff discuss modernizing the Professional Engineers Act with OSPE's Director of Public Affairs Paola Cetares.

Minister Nolan Quinn meets with OSPE's CEO Sandro Perruzza and Public Relations Coordinator Lydia Batty.



OSPE's CEO Sandro Perruzza and Public Relations Coordinator Lydia Batty, and Climate Crisis Task Force meet with ECCC Policy Team to discuss Climate Change in Canada.

## Policy Wins

**Climate Adaptation Funding for Municipalities from Environment and Climate Change Canada (ECCC) – January 15**

**Environment and Climate Change Canada** announced increased funding for climate resilience in municipalities. Through a partnership between ECCC and the **Federation of Canadian Municipalities (FCM)**, $7.1 million will be invested in municipal projects that assess climate risks, strengthen infrastructure planning, and improve resilience to extreme weather events and long-term climate impacts.

OSPE's 2025-2026 federal budget recommendations called for sustained investment in climate-resilient infrastructure to protect public safety and create long-term value, making this announcement a major policy win for OSPE and the engineering profession.

## Letters and Submissions

**Submission on Proposed Amendments to Regulations under the Clean Water Act, 2006 and the Safe Drinking Water Act, 2002**

OSPE supports efforts to streamline processes and reduce unnecessary administrative burden, provided that any changes continue to uphold and strengthen the scientific and risk-based foundations of source water protection.

**Submission to ERO Notice Number 025-1257: Proposed Boundaries for the Regional Consolidation of Ontario's Conservation Authorities**

OSPE emphasized that administrative streamlining cannot come at the expense of the scientific, technical, and watershed-specific functions that underpin safe and sustainable development.

**Submission to Environment and Climate Change Canada (ECCC)'s Advancing Environmental Justice Engagement**

OSPE submitted four discussion documents to support ECCC's development of a national strategy to advance environmental justice and assess, prevent, and address environmental racism.

**Submission on Bill 72 – Buy Ontario Act**

OSPE's submission emphasized that the implementation of the Bill must explicitly protect technical competence, public safety, innovation, and value for money in engineering-intensive projects.

**OSPE Recommendations to Strengthen the Grid Innovation Fund**

OSPE submitted a letter to the **Ministry of Energy**, **IESO**, and the **Ontario Energy Board (OEB)** providing recommendations to maximize the **Grid Innovation Fund**'s ability to drive innovation, support business formation, and contribute to the long-term reliability and affordability of Ontario's electricity system as electrification advances and electricity demand rises.

**OSPE 2026 Provincial Pre-Budget Submission**

OSPE submitted its 2026 provincial pre-budget submission, which emphasized investing in the full talent pipeline, prioritizing quality and long-term value in procurement, fostering a large and diverse engineering workforce, protecting Ontario's water, diversifying energy planning to include thermal energy, building resilient and adaptable infrastructure for communities, and consulting engineers early in policy and project planning.

**Submission on ERO 025-1361 Exempting Low-Risk Activities from Requiring Environmental Permissions**

OSPE provided feedback on the **Ministry of the Environment, Conservation and Parks**' proposal to amend the **Ontario Water Resources Act**. OSPE supports efforts to reduce unnecessary regulatory burden where environmental risk is proven to be low.

**Submission on the Wesleyville Project**

OSPE provided feedback on the Wesleyville Project, a proposed new nuclear generation site located in Port Hope, Ontario. OSPE's comments emphasized that the project must have strong engineering governance, meaningful Indigenous involvement in decision-making, and that the project should be evaluated not only as a source of clean electricity, but also as a strategic thermal asset within Ontario's evolving energy system.

# Be Part of the Change in Canadian Engineering

Sexual harassment prevention and intervention are shared workplace responsibilities, and your perspective matters.

## Join the Change

As a CSPE or OSPE member, you play a critical role in creating safer engineering workplaces.

Engineering Change, a new national partnership between White Ribbon and Ontario Society of Professional Engineers, equips engineering employers and professionals with practical tools to prevent sexual harassment, intervene when it occurs, and create safer, more inclusive workplaces across Canada.

## Free Online Training - Launching Summer 2026

Take the **Engineering Change Course**: a national, bilingual, self-paced program developed by White Ribbon in association with CSPE/OSPE.

You'll gain the knowledge and confidence to:

- Understand your legal and ethical responsibilities as an engineering professional or employer.
- Recognize risk factors and early warning signs of harassment.
- Respond appropriately when harassment occurs or is witnessed.
- Support women, 2SLGBTQ+ people, and anyone impacted by harassment.
- Contribute to lasting cultural change within the engineering sector.

## Why it matters

Engineering has the opportunity to lead in creating inclusive, harassment-free workplaces.

- In 2021 the sector was roughly 85% men, 14% women, and 0.4% non-binary identifying individuals.
- Research shows that male-dominated fields are at higher risk for gender-based biases, harm, and harassment.
- Retaining women and gender-diverse professionals requires moving beyond recruitment to fostering inclusive cultures, equitable career paths, and supportive policies.

The engineering sector is roughly made up of:

| | |
|---|---|
| MEN | 85% |
| WOMEN | 14% |
| NON-BINARY | 0.4% |

Creating safe and equitable engineering workplaces the responsibility of:

**100% of us**

Be part of the change in Canadian engineering.

Engineering Change | white ribbon | Ontario Society of Professional Engineers | Canadian Society of Professional Engineers

*New!*

# National Licensing Working Group

Engineers and engineering firms in Canada must hold separate licences in each province and territory, creating barriers to working across jurisdictions. OSPE's **National Licensing Working Group** is exploring pathways to national licensing to reduce these barriers, support labour mobility, and improve access to engineering expertise nationwide.

Learn more by visiting **go.ospe.on.ca/NLWG**


# Be Part of the Conversation!

Joining an OSPE task force or working group allows you to connect with highly driven, accomplished, and experienced individuals, while providing a platform to discuss key issues with subject matter experts.

If you have valuable insights to share and are passionate about advocacy, we encourage you to get involved.

Contact **advocacy@ospe.on.ca**

EngLead
By OSPE


*New!*

# From Waste to Worth: Integrating Textile Byproducts into Composites

The growing volume of textile waste presents both environmental challenges and opportunities for sustainable material development. Repurposing textile fibres from cotton, wool, polyester, nylon, and other sources into composite materials offers an effective strategy to reduce reliance on landfills while conserving natural resources. Textile waste–based composites have been applied in construction, automotive components, furniture, sound-absorption materials, polymer concrete, and packaging. Expanding the use of textile waste in composite systems supports circular-economy principles and provides a practical pathway for sustainable waste management.

By valorizing textile waste in high-value applications, the environmental burdens associated with landfilling and incineration are reduced, as is energy consumption and the demand for virgin raw materials.

Download Report

# Help Shape the Future of Ontario's Building Code

Ontario's built environment is evolving rapidly. Population growth, housing demand, climate pressures, and new construction technologies are reshaping how buildings are designed and delivered across the province.

As the **Government of Ontario** undertakes a review of the **Ontario Building Code (OBC)**, the engineering profession plays an important role in ensuring that modernization efforts strengthen safety, resilience, and long-term building performance.

To support this effort, the **Ontario Society of Professional Engineers (OSPE)** is planning to establish a **Building Code Review Working Group**. The initiative is in its early stages and OSPE is inviting members of the engineering community to **join the group, shape its priorities, and contribute technical insight** to one of Ontario's most important regulatory discussions.

For engineers interested in contributing to public policy and the future of Ontario's built environment, this initiative is a meaningful opportunity to apply your professional expertise to benefit the public interest.

## Why the Ontario Building Code Matters

The Ontario Building Code governs how buildings across the province are designed and constructed. It sets requirements related to structural safety, fire protection, ventilation, accessibility, and energy performance.

These rules affect nearly every building Ontarians rely on, from homes and residential towers to hospitals, schools, and industrial facilities. However, the conditions that shape building design are changing quickly.

The planned OSPE Building Code Review Working Group will provide independent, evidence-based engineering insight into the ongoing conversation around code modernization, ensuring that engineering expertise informs how Ontario's building standards evolve.

One potential focus is identifying areas where the current Building Code may not fully address evolving risks or technical developments. This may include reviewing provisions that relate to climate resilience, extreme weather, and structural performance under changing environmental conditions.

Another important consideration is indoor air quality and ventilation. Growing evidence indicates that ventilation design directly affects occupant health and well-being, underscoring the importance of treating indoor air quality as a core building performance issue.

Advances in construction technologies, including mass timber, modular construction, and advanced materials, are transforming how buildings are constructed. Building codes must evolve alongside these innovations, ensuring new methods can be safely adopted while maintaining rigorous performance standards.

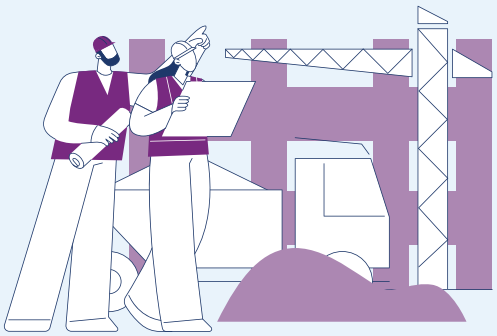
Engineers are particularly well-positioned to evaluate how emerging technologies can be responsibly integrated into the regulatory framework.

### A Call for Volunteers

OSPE members who would like to volunteer for the upcoming Building Code Review Working Group are encouraged to express their interest. Participation will involve contributing technical insight, reviewing materials, and helping develop recommendations that reflect the engineering profession's commitment to protecting the public interest.

If you are interested in contributing, please contact OSPE at **advocacy@ospe.on.ca** to learn more about how to get involved.

Engineering has always played a central role in shaping safe, resilient communities. By contributing to this initiative, engineers have the opportunity to help ensure that Ontario's Building Code continues to **support innovation, housing delivery, and long-term public safety**.

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# Sustainability in Action: OSPE Task Forces Share Their Insights

As part of OSPE Sustainability issue we asked all of our Task Force to consider how this mandate is influencing their work. These are their responses...

## How does sustainability inform your Task Force's work, including initiatives, recommendations, and your long-term vision for your topic area?

### Sustainable Cities Task Force

*"Sustainability is the foundation and guiding principle of the OSPE **Sustainable Cities Task Force**. In Ontario, engineers are entrusted with the responsibility to design infrastructure that meets today's needs without compromising the resources available to future generations. Where innovation and environmental responsibility advance together, sustainable cities chart a path toward a greener, stronger, and climate-resilient province.*

*Guided by the **United Nations Sustainable Development Framework**, this Task Force incorporates sustainability into every initiative. A qualifications-based procurement framework ensures technical excellence, accountability, and lifecycle performance in infrastructure delivery. The **Sustainable Materials Series**, including low-carbon concrete and steel, demonstrates practical strategies to reduce embodied carbon without sacrificing durability or performance. Climate-resilient infrastructure planning, integrated transportation and freight strategies, and a comprehensive water policy position reflect a systems-level approach to energy conservation, emissions reduction, and long-term productivity.*

*Equally critical is the focus on green retrofitting and smart city strategies. Modernizing existing infrastructure reduces emissions, extends service life, and preserves capital, while smart technologies optimize efficiency, improve service delivery, and support data-driven decision-making.*

*The long-term vision is clear: a future in which Ontario's cities are climate-resilient, built to minimize emissions and optimize resource efficiency, delivering lasting impact where professional oversight, innovation, and environmental stewardship thrive side by side.*

*The OSPE Sustainable Cities Task Force is advancing sustainability in standards, procurement, and strategic planning, shaping infrastructure projects that meet current needs while safeguarding the resources, energy, and systems that will support Ontario for generations to come."*

**- Deputy Chair Vana Tabrizi, EIT**

## Climate Crisis Task Force

*"The **Climate Crisis Task Force** is driven by the urgent need for economic and efficient reductions in greenhouse gas emissions by Ontario, Canada and the world, and the need to withstand the impact on our environment from climate change caused by these emissions. We can achieve a sustainable society if we reduce these emissions and protect ourselves against their harmful effects.*

*Current initiatives include information to OSPE members through EngTalks, Thought Leadership Thursdays, and articles in The Voice. We also plan to reach out to other organizations through the Net Zero Challenge led by **Environment and Climate Change Canada**, and through Toronto Climate Week.*

*Recently, we discussed climate change policy with senior officials at Environment and Climate Change Canada. We recommend effective policies and programs to solve climate change problems, based on sound engineering knowledge.*

*Our long-term vision is to influence the engineering profession, the general public and our business and political leaders to solve the problems of climate change, based on sound engineering knowledge."*

**- Chair Tom Markowitz, P.Eng. and Deputy Chair Lynn Wizniak, P.Eng.**

## Energy Task Force

*"Given the growing nature of energy demands of all types, it is important that resources are resilient and that the energy systems to use them are adaptable. Accordingly, sustainability is a core commitment to energy generating solutions. The long-term planning horizon of many energy forms should allow a sustainability perspective rather than action in reaction to short term changes. We see that taking a societal view on efficiency and renewable energy use shows great potential for progress as does the development and coupling of thermal and electricity energy systems. Effective sustainability planning requires an integrated perspective and as such, our Task Forces propose to work together to strengthen our pursuit of sustainability in all aspects."*

**- Deputy Chair Michael Wiggin, P.Eng.**

## Research and Innovation Task Force

*"Sustainability is a primary focus of the **Research & Innovation Task Force**. White papers from the Task Force on sustainable materials and on decentralized infrastructure illustrate some of the recent priorities of the Task Force members, while the core motivation behind the industrial policy initiative is to explore how best to shape the dialogue around the development of a sustainable manufacturing renaissance in Ontario and across Canada.*

*As Canada continues to build and expand its industrial base, leverage our natural resource potential and create opportunities across both domestic and international markets, we must approach this growth responsibly and sustainably. With our commitment to society and as stewards of the environment, engineers have a key role to play in shaping the future of Ontario and Canada."*

**- Chair James Hotchkies, P.Eng.**

## Equity, Diversity, Inclusion and Accessibility (EDIA) Task Force

*"Sustainability and EDIA are extremely interconnected. One area that we've been exploring in recent years is environmental justice, and how the impacts of environmental disasters and climate change disproportionately impact marginalized groups. In pushing for an engineering profession and a society that is equitable, diverse, inclusive and accessible, we need to make sure that the culture and structures we put in place are adaptable and serve everyone not only now but also in the future."*

**- Chair Shivani Nathoo, P.Eng.**

# Transit Speed Is a Choice

Jan Anthony Mendoza, P.Eng.

The former mayor of Bogota, Colombia is often quoted, *"A developed country is not a place where the poor have cars. It's where the rich use public transportation."*

This is not just a pithy, but fantastical expression. In Canada, decades of policy have subtly shown that public transit is often an afterthought. Fortunately, governments have found that in order to have a more livable environment, a mode shift to public transit is key, and **Light Rail Transit (LRT)** has become a leading contender in enticing people to mode shift and kick-starting land-use intensification.

LRTs and streetcars are not an inherently slow mode of travel. Transit speed is not an accident, but a product of design decisions, governance alignment, and operational discipline. When these factors do not align, underperformance becomes normalized.

Even with significant street running operation, transit systems in The Hague (Netherlands), Gothenburg (Sweden), and Oslo (Norway) display an average of 16-20 km/h, which is 50-100% more speed than Toronto's streetcars through dense urban cores.[1] The uncomfortable truth is that light rail and streetcars often fall short of their intended role, especially compared to peer jurisdictions.

However, it is often after construction that the public and political scrutiny for a project comes forward. This often leads to slow, unreliable systems with interventions made after construction. This leads to bunching, a phenomenon where multiple buses travel in a group rather than being evenly spaced. Performance is neither transparent nor accountable. These are conditions where people find mode shift to transit a difficult proposition.

| Typical Commercial Speed Ranges | |
|---|---|
| **Street-running tram** | 15-22 km/h |
| **Segregated LRT** | 22-30 km/h |
| **Grade-separated light metro** | > 30 km/h |

## From Construction to Performance

Underperformance in LRTs/streetcars is rarely a technical mystery. It is the result of governance decisions during design procurement and operations that dilute performance. In Canada, we have often taken a "good enough" approach to many things. This includes transit performance.

Higher commercial speed and reliability improves infrastructure return on investment, fleet productivity, and emissions reduction. A system that allows passengers to travel without schedule anxiety, encourages transit use, supports land-use intensification, and strengthens public trust.

Sustainable infrastructure, particularly transit, must be operationally competitive with driving, not merely constructed and left on the doorstep. Billions of dollars are spent on constructing a transport mode that is treated as a high-capacity bus replacement, and as a result, receive a system that does not even outperform the bus that it supersedes. Even those who have driver's licenses and have a car will take transit if it provides a more attractive alternative.

What are the levers that make LRT and streetcars competitive with driving?

## Signal Priority and Intersection Design

Much like how intersections determine how fast one travels within a city, intersections and intersection design determine how fast LRT and streetcars go within a city, regardless of the speed leading to and from the intersection.

Right now, there is little or no transit signal priority in existing LRT and streetcar systems. In many systems, even grade-separated segments (segments of the road that are separated from other traffic) are interrupted by intersections where their signal priority is conditional or inconsistently applied. When transit vehicles carrying dozens of passengers yield to movements featuring low-occupancy vehicles, the cumulative delay significantly affects commercial speed. The prioritization of private vehicles make LRTs and streetcars less efficient.

Alternatively, priority can be given to LRTs and streetcars by detecting when the train is at or near the intersection and providing a 'green' signal for the train, superseding left-turn movements and red lights.

[1] https://www.snamuts.com/uploads/2/1/8/1/21813274/snamuts_tram_speeds_aug_24.pdf


## Stop Spacing and Dwell Time

How many and how long LRTs and streetcars spend at stops greatly influence a system's performance. While in Canada, we have moved to all-door boarding for LRTs and streetcars, the fact remains that we still treat the mode as a high-capacity bus replacement.

This extends to the distance between stops. If we are meant to treat LRTs and streetcars as competitive with automobiles, review is needed for stop placement and which stops provide an undue penalty on performance. If we treat LRTs and streetcars as an express mode of transport, stop placement and concentration should reflect that intent. Closely spaced stops improve proximity but reduce commercial speed through repeated dwell and acceleration cycles.

*Performance and accessibility are not mutually exclusive. Level boarding and thoughtful stop placement can preserve accessibility while minimizing operational penalties.

## Right-Of-Way Governance

Right-of-way governance extends beyond grade-separation, it includes the entire transit right-of-way. This is not just grade-separation vs street-running. It also looks at determining if routes have physical separation vs painted dedicated lanes, whether adjacent on-street parking should/shouldn't be allowed and when (especially during winter when snow forces vehicles onto the streetcar's path).

Grade-separation may be an important policy and design lever for performance, but without supporting policy, LRTs and streetcars are relegated to substandard transport. Nominal priority rarely produces meaningful change.

## Switch Design and Geometry

Streetcars passing through single-point switches have significant speed restrictions to prevent derailing and limiting simultaneous movements through junctions. Single-point switches are not a cost-saver as they are

bespoke and sources are limited. Standardizing on higher-speed, multi-point switches improves commercial speed as the standard switch type ensures lower dwell at intersections while improving safety.

## From Design Intent to Operational Drift

How do some systems maintain well-performing and reliable operations, while others can't outperform the systems they were built to replace.

Simply, not only were trade-offs made to prioritize automobile traffic over that of higher capacity modes (including LRTs and streetcars), the design intent was for the LRTs and streetcars to replace the bus route. Streetcars and LRTs did not have the design intent of being the express transport mode that they have the potential to be.

In some cases, while performance metrics are tracked internally, there are no thresholds or mechanisms for action based on performance, and there is not one body or agency responsible for corrective action. When no single authority is accountable for commercial speed metrics, performance outcomes reflect the lowest common denominator of institutional control. Despite billions being spent to reshape our built environment, projects can meet procurement and construction specifications but simultaneously fall short of functional intent.

## Performance Culture vs. Compliance Culture

Engineers should consistently ask, “does the system deliver its intended function?” and “are the parameters sufficient for what is being accomplished?” and not merely “did we meet the design standard?”

Regardless of one’s discipline, sector, or industry, Ontario and Canadian engineers are highly capable of providing high-performing systems, but are dependent on policy and governance structures for design intent to become reality.

Engineering excellence requires institutional environments that protect performance objectives not just in delivery, but operations as well.

## Aligning Engineering, Governance, and Sustainability

The engineering tools required to deliver fast, reliable transit are well-known. However, in order for transit to reap the return on investment and sustainability goals, engineering design, governance authority, and operation


accountability must align. If all three are in agreement, performance becomes predictable rather than a political surprise. But when we demand the best out of our built systems, reframe our design objectives, and keep ourselves accountable, the engineering profession can build systems that fundamentally change communities for the better.

If our design intent is to provide world-class transit, then we get world-class transit. That way, more of us will leave our cars at home for our very own LRTs and streetcars.

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Jan Anthony Mendoza, P.Eng., OSPE's Sustainable Cities Task Force Member

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# Integrated Energy Planning

Paul Acchione P.Eng., FCAE and Jim McConnach, P.Eng., CEng, FIET

This article responds to the question **"Why do we need Integrated Energy Planning?"**

Traditionally energy planning and strategy has been done on a "silo" basis for each energy form, technology, and goal with the result that in general we have separate Planning and Strategy Analysis Reports for Electricity, Natural Gas, Coal, Nuclear, Hydrogen, Renewables (water, wind, sun), Thermal Energy, Energy Efficiency & Conservation, Energy Storage. Electrification, Decarbonization etc. Also, each energy form has preferred and competitive end uses.

An integrated energy planning (IEP) approach ensures that the combined risks, benefits, economics, reliability, resilience, environmental impacts, and limits due to the unique characteristics, interdependencies, linkages (nexus), end uses, supply chains and life cycles of the various energy forms are analyzed to produce an optimum overall energy supply plan and strategy.

Energy comes in many forms, and each has its own unique characteristics, sources, production/generation technologies, transportation and distribution methods, financing, economics, reliability & resiliency, plus natural & social environmental impacts. Each energy form has preferred competitive end uses. Included in this and oft forgotten is conservation and end use energy efficiency – a unit of energy saved is a unit that does not have to be produced, transported, and distributed.

Electricity is a highly flexible common currency of energy as it can be produced/generated from many of the other energy forms and used for many applications (heating, cooling, lighting, transportation, telecommunications, digital, motive force, industrial loads, health and medical services etc.) The electrification of these end uses is a way to reduce carbon emissions provided the electricity is generated by clean renewable or low carbon energy sources. Its other unique characteristic is that it must be produced and available at the moment it is used. The reliability of power supply to the minute-by-minute

changes in the demand of end uses and services is primarily dependent on the corresponding minute-by-minute availability and reliability of electricity supply capacity (MW).

For frequency and transient (synchronous) stability the power system also needs very rapid response generation and inertia. Satisfying these characteristics is critical to power grid frequency and transient stability, reliability and resilience and is often not appreciated by non-technical audiences. Additionally, for protective breakers to open and clear a fault such as a ground fault or phase-to-phase fault, the generation source needs to have sufficient overcurrent driving capability to trigger the protective relays that open the breakers that are feeding the fault. This capability is referred to as a “fault clearing capability”.

Most synchronous generators and their excitation systems have this fault clearing capability because the stored rotational energy can be used to produce the required overcurrent for a sufficiently long period of time to trigger the protective relays that open the breakers on the lines that are feeding the fault, thus assuring system integrity and safety.

The various electricity generation technologies have preferred roles in supplying the varying demand of end uses. The economics of nuclear generation is best used for supplying reliable capacity and energy to meet continuous base load demand. Natural gas and hydro dam generation are best for intermediate and peak load capacity supply as they provide an economic fast response role to maintain power grid frequency and stability. In all cases the large rotating inertia of generators and turbines are essential to the maintenance of frequency and transient (synchronous) stability and the operation of system protections for assured integrity and safety.

Nuclear Energy Generation in Canada has been based on the Canadian CANDU Technology. In Ontario over 50% of electrical energy is produced by Nuclear Generation resulting in low carbon emissions from the power grid at an affordable cost. Small modular reactors (SMRs) are the next-generation of nuclear technology and is set to be deployed by Ontario Power Generation (OPG) right here in Ontario – the first place to do so in North America.

Coal fired generation was totally phased out in Ontario in 2014 in favour of Natural Gas Generation which has lower carbon emissions and faster response/ramping rates. Both simple cycle and higher efficiency combined cycle generation are deployed.

Renewable energy sources, particularly wind and solar are variable and intermittent, have low inertia, and do not contribute to firm capacity, reliability, and transient & frequency stability of the power grid. They also do not have fault clearing capability unless they include energy storage devices and the required control equipment to provide fault clearing capability. Thus, excess generation capacity and/or energy storage capacity must be provided at significant additional cost for their successful integration to the power grid. Sometimes synchronous condensers also need to be added at an additional cost of integration. All this has a major impact on economics and retail electricity rates to the consumer.

The water energy nexus is well known and there are many reports on the topic - see: https://en.wikipedia.org/wiki/Water-energy_nexus

The energy in waterfalls, rapids, waves, and tidal, can be used to produce electricity. It can also be used as a medium & long-term energy storage option through dams and pumped hydro technology. There are many competing uses of water, for irrigation, washing/flushing, waste disposal, heating, cooling, firefighting, and of course drinking. All these end uses require electricity supply for processing and pumping.

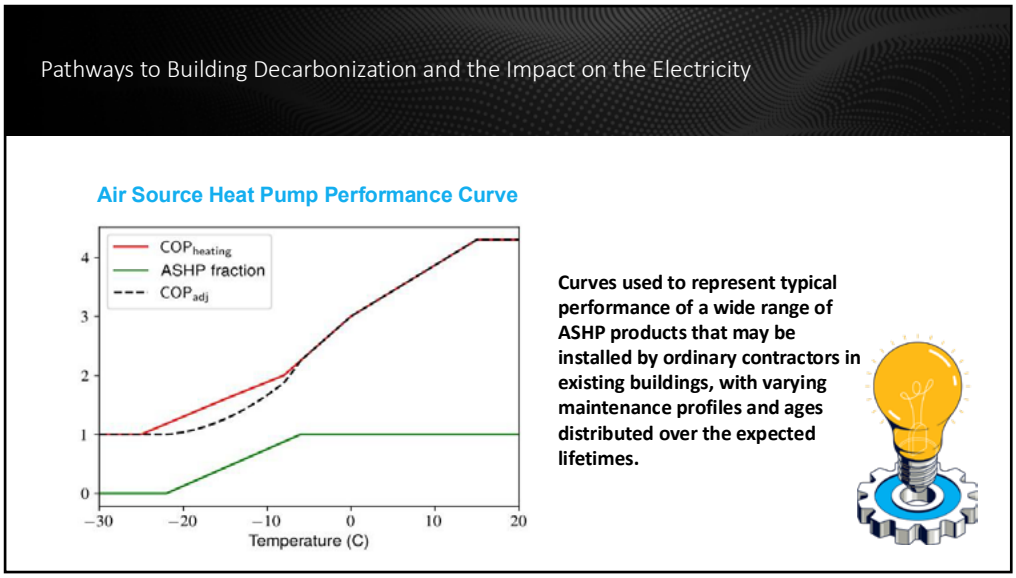
Thermal energy is a by-product of the poor conversion efficiency of generation technologies such as the simple cycle and combined cycle production of electricity from fossil and nuclear sources and photovoltaic solar generation. Ground (source GSHP) and air source heat pumps (ASHPs) are also thermal energy options. Many end uses have a by-product of thermal energy in the form of losses. In some cases, such as major data centers, there is the interdependent need for additional electricity demand for cooling purposes. These by-products can be used as a very low-cost source of supply to thermal energy networks (TENs). Combined heat and power (CHP) networks, or TENs, are widely in use in Europe and there is significant potential to expand their economic use in Ontario and Canada to reduce energy costs to the consumer.

GSHPs and ASHPs are an option to supply heating and cooling demands in regions with no gas supply. However, they do still require electricity and at very low air temperatures seen in many parts of Ontario in winter, the COP of ASHPs can approach unity. See Figure 1.

If ASHPs are widely used in future for space and water heating, the new peak electricity demand will occur in winter and coincide with the lowest air temperatures. Since winter heating demand is about 10 times greater than the summer cooling demand, the power system

peak demand will shift from summer peak to a much larger winter peak. This will have negative impacts on the required generation capacity and power system operating capacity factor. Increased consumer retail electricity rates will be needed to pay for the additional capacity that is only used in the winter. The annual operating capacity factor for the total system generation is the ratio of actual annual energy produced by the system generation over the energy produced if all the system generation is operated for all 8760 hours of the year expressed as a percentage.

**Figure 1.**




Natural gas is a competing source of supply for residential, commercial, and industrial heating demands. This includes water heating and cooking demands. It is also a competing low carbon (compared to coal fired generation) supply for electricity generation. In all cases, the overall reliability of energy supply to customers is dependent on a reliable electricity supply to gas compressor stations. Cases have occurred where failure of electricity supply to compressor stations has caused an interruption of gas supply with loss of generation capacity contributing to a possible power grid black out at peak demand. This can be mitigated by back up supplies to compressor stations and a reserve storage of LNG at the power station.

Clean hydrogen gas is best produced by electrolysis using low-cost electricity from renewable and low carbon generation resources. The economics of hydrogen gas networks is the subject of R&D projects because low priced clean electricity is not continuously available in current wholesale electricity markets. This results in a low operating capacity factor for the hydrogen electrolyzers which impacts the cost of the hydrogen. Another primary study is the acceptability to use Natural Gas piping networks for the transportation and distribution of hydrogen or a hydrogen/natural gas blend.

The use of hydrogen fuel cells for heavy electric vehicles is under study in industry pilots, but higher capital costs and poor round-trip efficiencies create economic challenges compared to petroleum gas.

Battery Energy Storage Systems (BESS) are the current preferred option for coping with the day-to-day variation and intermittency of wind and sun renewables. For longer duration storage, pumped and dammed hydro is an economic option where geography is favourable like Quebec and BC. Where geography is not favourable, seasonal thermal energy storage is about 100 times cheaper than seasonal battery storage. Therefore, if the seasonal energy demand is for heat, it is much cheaper to store heat rather than electricity.

Conversion, transmission, distribution and end use energy efficiency and conservation mainly impact demand and demand shape forecasts and are best covered in a separate article.

The value of applying an IEP approach is demonstrated by a recent study completed by the Boltzmann Institute comparing two pathways to achieve net zero carbon emissions from buildings in Ontario by 2050. Building heating in Ontario is primarily by natural gas and is one of the largest sources of carbon emissions. The full study report can be found at: https://zenodo.org/records/15547372

The Two Pathways to net-zero emissions from buildings are:

- Pathway 1 – Building Electrification using Air Source Heat Pumps (ASHPs)
  - » ASHPs in urban areas currently served by natural gas
  - » Ground source heat pumps and biomass heaters in rural areas

Figure 2

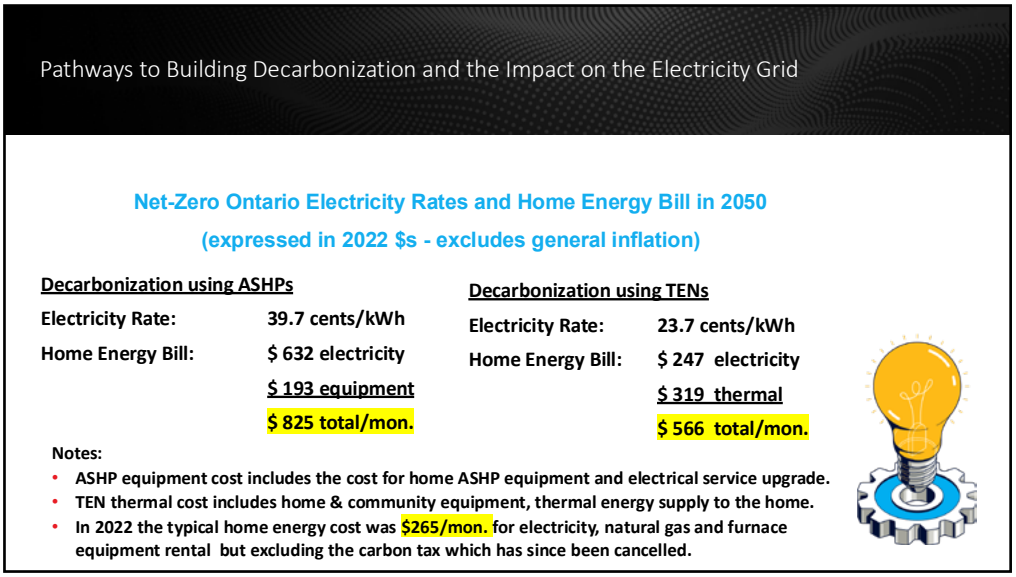
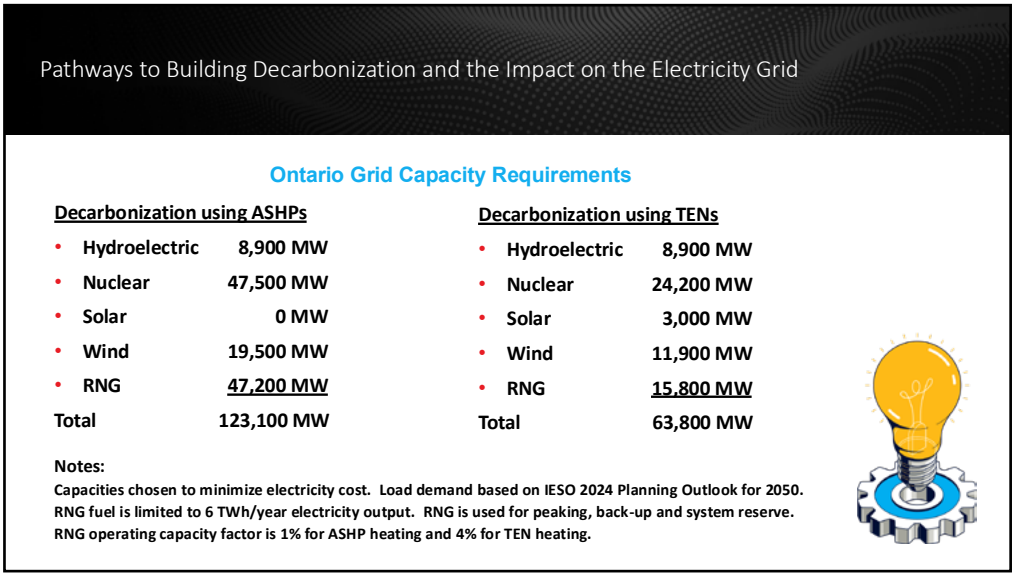



Figure 3




- Pathway 2 – Thermal Energy Networks (TENs): District Heating and Thermal Storage
  - » District Heating in urban areas currently served by natural gas
  - » Ground source heat pumps and biomass heaters in rural areas

The primary conclusions from the study are:

- The wholesale electrification of space heating, chiefly through deployment of ASHPs and GSHPs, is shown to be unaffordable, energy wasteful, and essentially unworkable.
- The alternative of substantial deployment of TENs to up to 70% of Ontario's buildings is found to be much more feasible and affordable.
- The annual operating capacity factor of system generation in 2050 for the TEN pathway is twice that for the electrification pathway, giving a much higher utilization of installed generation. The lower capacity factor of the electrification pathway will have a significant adverse impact on costs and future electricity rates - well above normal inflation rates.

Figure 2 gives a comparison of the typical monthly home energy costs for the two pathways The monthly bill for the electrification pathway is over 45% higher than the

TEN pathway. The annual saving is over $3,100 without allowing for general inflation.

Comparing new generation capacity to be built by 2050, 82,000 MW is needed for the electrification path, much of which would be less utilized, whereas the new build for the TEN path only needs 23,000 MW - see Figure 3. The cost and time to obtain approvals and build the 82,000 MW of new generation capacity needed by 2050 for electrification would be much more challenging and essentially unmanageable. Data for the existing system generation capacity and mix can be found at: https://www.ieso.ca/Learn/Ontario-Electricity-Grid/Supply-Mix-and-Generation

Note: The Figures in this article were extracted from the Presentation on Pathways to Building Decarbonization given at the November 3-4, 2025 OSPE Engineering Conference.

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# Power & Planet: Ontario's Clean Energy Transition and the Evolving Role of Engineers

Shrini Avula P.Eng., PMP, PQS, MEng, MBA

Ontario's energy sector is undergoing a profound transformation. As climate change accelerates and global attention turns toward sustainability, the province must respond with bold strategies to decarbonize its energy systems. Engineers play a pivotal role in shaping and implementing these strategies, ensuring a cleaner, more resilient, and equitable future. This article examines Ontario's clean energy transition, the growing demand for environmental stewardship, and the technical, ethical, and leadership roles that engineers must assume in this journey.

## Introduction

Ontario is entering a defining era in its energy history. Electricity demand is projected to nearly double by 2050, driven by industry, heating, and widespread electrification in transportation. With over 90% of current electricity already coming from non-emitting sources like nuclear and hydro, the province has a solid foundation to build upon. However, the clean energy transition is about more than just numbers and percentages—it is about securing our planet's health for future generations.

At the heart of this transition lies a growing imperative: environmental stewardship. This concept, long a cornerstone of engineering ethics, is now central to energy planning. Engineers must not only optimize systems for efficiency and reliability, but also for sustainability, equity, and minimal environmental impact.

## The Clean Energy Challenge in Ontario

Ontario's electricity system is already mostly non-emitting, but the hard work starts now. Demand is on track to rise sharply through 2050 as homes switch from gas to high-efficiency heat pumps, drivers plug in EVs, and industry electrifies heat and processes. Meeting this load growth while maintaining reliability means adding large amounts of new non-emitting supply, firm capacity, and flexible demand.

Today's energy supply mix is anchored by nuclear and hydro, complemented by wind and solar, with natural gas providing peaking and contingency support. As federal Clean Electricity Regulations push the grid toward net-zero by 2035, Ontario must progressively reduce unabated gas use and backfill that flexibility with a portfolio approach: more renewables, much more storage, strategic transmission, and demand-side resources.

Storage is pivotal. Short-duration batteries (2–8 hours) can capture midday solar or overnight wind and shift it to evening peaks. Over time, long-duration options (e.g., pumped hydro or other emerging technologies) will cover multi-day weather lulls. Transmission reinforcements are equally important to move clean power from where it's generated to where it's needed, unlock new resources in the North, and strengthen interties for regional balancing.

On the demand side, flexible loads—smart EV charging, industrial demand response, cold-storage pre-cooling, and building thermal storage—can flatten peaks and avoid overbuilding supply. Finally, planning must integrate affordability and community acceptance: siting and permitting need to be faster and more predictable, while ensuring meaningful Indigenous partnership and environmental safeguards from day one. Put simply, Ontario's challenge is not just to add megawatts, but to add the right mix of clean megawatts, flexible megawatt-hours, and orchestrated megawatts.

- **Ontario's Electricity Mix (2023):**
  - » Nuclear: ~52%
  - » Hydro: ~25%
  - » Natural Gas: ~10%
  - » Wind & Solar: ~12%
  - » Bioenergy & Others: <1%
- **Future Outlook:**
  - » Electricity demand expected to grow from ~145 TWh/year (2023) to ~280 TWh/year (2050)
  - » Net-zero electricity grid mandated by 2035 under proposed federal Clean Electricity Regulations (CER)
  - » Phase-out of unabated natural gas generation post-2035

Ontario must now scale renewable energy capacity, invest in long-duration storage, modernize its grid, and develop flexible solutions to match supply with variable demand.

## Environmental Stewardship Through Engineering

Stewardship turns climate targets into on-the-ground design choices. For engineers, that means treating carbon, water, land, and biodiversity as explicit design constraints alongside cost, schedule, and reliability. Lifecycle assessment (LCA) should inform technology selection, routing, and materials—from low-carbon concrete and recycled steel to modular designs that minimize waste and simplify decommissioning.

At the project scale, every asset needs an environmental performance specification: a carbon budget, a water balance, and a habitat plan. For wind projects, that could mean turbine micro-siting to avoid wetlands and raptor corridors, modern curtailment algorithms that reduce bat mortality with minimal energy loss, and construction windows that protect nesting seasons. For hydro, it includes fish passage, environmental flows, sediment management, and shoreline restoration. For nuclear, it means robust waste minimization, advanced fuel cycles where feasible, and end-of-life strategies that return sites to beneficial use.

Stewardship is also procedural. We need to embed Indigenous knowledge and rights-based engagement early, use cumulative-effects modeling rather than project-by-project views, and adopt adaptive management with transparent monitoring so projects learn and improve in operation. Critically, stewardship must extend to the demand side: decarbonizing buildings with heat pumps and district energy, expanding deep retrofits, and designing urban form that reduces energy use per capita. When engineers make these practices standard, non-exceptional environmental outcomes become measurable, auditable, and improvable over time.

Decarbonization is inherently an environmental mission. Engineers are increasingly tasked with quantifying carbon footprints, designing circular systems, reducing lifecycle emissions, and restoring ecological balance. Whether it is selecting low-impact materials, designing energy-efficient buildings, or creating carbon-negative technologies,

engineers are the stewards of both technical excellence and environmental integrity.

Clean energy projects must be designed with ecological considerations in mind. This includes habitat conservation during wind farm development, water stewardship in hydroelectric projects, and sustainable decommissioning plans for nuclear infrastructure. In this way, environmental stewardship becomes a measurable and actionable engineering outcome.

*How Engineers Can Be Stewards of the Environment:*

1. **Embed Environmental Metrics in All Projects:** Mandate carbon, water, and biodiversity impact assessments in all energy-related engineering designs.
2. **Expand Public Education:** Engineers must engage communities and counter misinformation about nuclear, wind, and other technologies.
3. **Advance Pilots and Prototypes**: Encourage living labs and demonstration projects in Indigenous, rural, and urban communities.
4. **Strengthen Interdisciplinary Collaboration:** Partner with climate scientists, economists, and sociologists for holistic project planning.
5. **Promote Equity in Energy Access:** Ensure engineering solutions address affordability and energy justice, especially in underserved populations.

### Case Study: Toronto's Deep Lake Water Cooling & Low-Carbon District Energy

Toronto's deep lake water cooling (DLWC) system, paired with expanding district energy, shows how demand-side engineering can deliver grid decarbonization and stewardship at scale. Instead of relying on thousands of electric chillers on peak-summer afternoons, DLWC draws naturally cold water from Lake Ontario through existing intake tunnels to cool a network of downtown buildings. This displaces large amounts of electricity otherwise used for mechanical cooling, cutting peak demand, reducing GHGs, and avoiding local noise and refrigerant leakage.

From a stewardship perspective, engineers designed DLWC with strict thermal and water-quality protections, continuous monitoring, and hydraulic controls that return water within regulated temperature bounds. The district system then integrates high-efficiency heat recovery and, increasingly, non-emitting heat sources, lowering total energy use per square meter across the served area. The lesson for Ontario's transition: thoughtfully engineered demand-side infrastructure can be a "virtual power plant," delivering reliability and emissions reductions while safeguarding ecosystems.

## The Expanding Role of Engineers

Today's engineers are no longer just builders or analysts. They are system architects, policy influencers, innovators, and trusted voices in public discourse.

Ontario's clean energy transition demands that engineer's step into the following critical roles:

1. **Grid Innovators:** Designing smart, decentralized, and resilient grids to manage renewable intermittency and bidirectional flows.
2. **Nuclear Pioneers:** Leading Canada's development of Small Modular Reactors (SMRs) like the Darlington project, enabling reliable baseload generation without emissions.
3. **Clean Tech Developers:** Advancing technologies in hydrogen, geothermal, advanced batteries, and carbon capture.
4. **Urban Planners & Builders:** Engineering net-zero buildings, low-carbon transit systems, and energy-efficient infrastructure.
5. **Policy Advisors:** Contributing to energy modeling, regulatory frameworks, and decarbonization roadmaps at both provincial and federal levels.

These roles increasingly intersect with public health, climate equity, and social responsibility—further reinforcing the ethical dimensions of engineering practice.

## Skills Engineers Need for the Energy Transition

As Ontario's energy systems evolve, so too must the skillset of its engineering workforce. Key areas of upskilling include:

- **Systems Thinking:** Understanding the interconnectivity of energy, environment, economics, and equity.
- **Data Literacy:** Leveraging AI, machine learning, and real-time data for predictive modeling and operational efficiency.
- **Sustainability Design:** Incorporating lifecycle assessment, embodied carbon, and circular economy principles.
- **Communication & Advocacy:** Translating complex technical ideas into public and policy discourse.

- **Indigenous & Community Engagement:** Ensuring energy solutions reflect the needs and rights of diverse populations, especially in rural and remote communities.

Organizations like OSPE have a significant role in facilitating continuing education, technical mentorship, and interdisciplinary collaboration to build this future-ready workforce.

## Conclusion

Ontario's clean energy future is not only a technological challenge but a moral and environmental imperative. Engineers are uniquely positioned to lead this transition, balancing innovation with integrity, efficiency with equity, and progress with preservation. By embracing their role as environmental stewards and change-makers, Ontario engineers can help power the planet forward—sustainably and inclusively.

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**Appendix: Visual Summary**

Figure 1: Ontario Electricity Mix - 2023

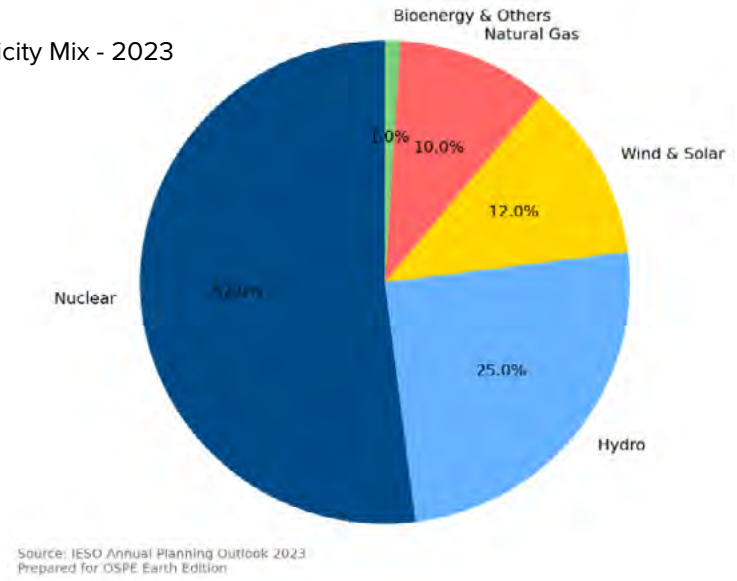
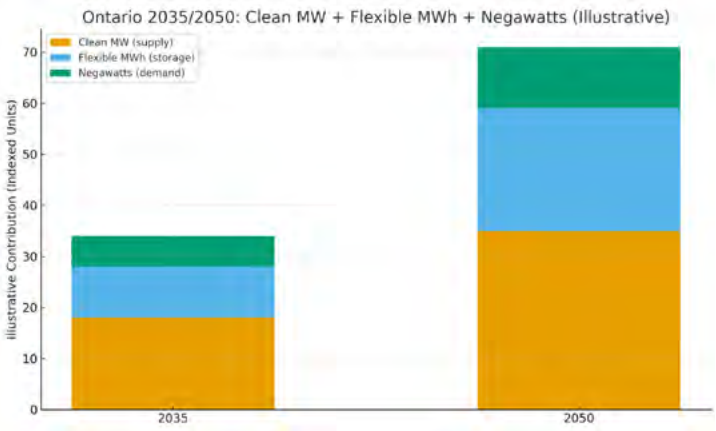



Figure 2: Portfolio for Reliability and Decarbonization




Note: Values are illustrative to show portfolio roles only; not an official forecast. 'Clean MW' = non-emitting supply; 'Flexible MWh' = storage & shifting; 'Negawatts' = efficiency & demand response.

# Concrete Change: Is Ontario Ready for a Geopolymer Future?

Ali Meratishirazi, MEng, EIT, and Vana Tabrizi, BEng, BSc, EIT

We are witnessing a reckoning in the global construction industry. It is our job to build the infrastructure of tomorrow while fighting a climate crisis caused, in part, by yesterday's materials. Despite being a marvel of engineering, *Ordinary Portland Cement (OPC)* comes at a steep cost: its production alone contributes to an estimated seven percent of global greenhouse gas emissions.[1]

For decades, we have tweaked the recipe by adding fly ash or slag. However, incremental changes are no longer sufficient. The time has come to look at a fundamental replacement: **Geopolymer Concrete (GPC)**.

Our team at the **OSPE Sustainable Cities Task Force** is researching the feasibility of this technology for an upcoming research report. Geopolymer concrete is no longer just a laboratory curiosity. It is a high-performance, low-carbon alternative that is ready for the spotlight, provided we can navigate the regulatory hurdles standing in its way.

## Not Just "Green," But Better

Geopolymer concrete is chemically distinct from the material we have used for a century. Unlike Portland cement, which relies on hydration to gain strength, geopolymers harden through a process called polymerization.[2] By activating aluminosilicate by-products, such as fly ash and blast furnace slag, with an alkaline solution, we create a dense, three-dimensional network that binds aggregates together.

The environmental benefits are immediate. According to a 2024 review by Odeh et al., eliminating the energy-intensive clinker production required for OPC allows geopolymer concrete to reduce embodied carbon by 60% to 90%.[3]

But for engineers, the real story is durability. The results of our review indicate that GPC is frequently more durable and effective in aggressive environments than traditional concrete. It retains over 70% of its strength at temperatures up to 800°C, whereas such heat would cause OPC to fail.[4] Additionally, it is highly resistant to acid and sulfate attacks, making it ideal for harsh industrial settings such as wastewater infrastructure or mining.[5]

## The Canadian Challenge: Cold Weather and Codes

If the material is so superior, why aren't we pouring it on every job site in Toronto? The answer lies in two uniquely Canadian barriers: our climate and our codes.

It is often difficult to pour in-situ during a Canadian winter because geopolymerization requires heat to begin.[6] However, this barrier is quickly vanishing. While early mixes needed high-heat curing, modern formulations using slag and nano-silica are achieving excellent strength at ambient temperatures.[7] Furthermore, the precast industry offers the most immediate opportunity for implementation. Pavers, culverts, and bridge decks can be cured without worrying about freezing temperatures or variable weather in a controlled factory environment.[8]

The more entrenched barrier, however, is regulatory. Current standards like CSA A23.1 are largely "prescriptive"—they effectively act as a recipe book, mandating specific ingredients (chiefly Portland cement) rather than focusing solely on the final performance of the material.[9]

As a result, geopolymer concrete which uses a completely different chemistry, automatically falls outside these standard specifications. This leaves engineers in a difficult position: to use GPC, they must currently designate it as an "Alternative Solution," a time-consuming process that often requires the engineer to assume additional personal liability.[9]

## A Call to Action

Our policy needs to be revised to transition from pilot projects to standard practice. Our goal should be to advocate for performance-based codes that specify strength and durability rather than chemistry.[10] We need procurement policies, such as the federal "Buy Clean" frameworks, that explicitly reward low-carbon innovations.[11] The technology is ready and the chemistry is sound. It is now up to us, the engineering community, to build the framework that lets it succeed.

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# How Net Zero Classrooms are Revolutionizing How Students Learn about Sustainability in STEM

Natalia Malafeeva, P.Eng. and Jerry Chwang, Siemens Canada Ltd.


As the morning bell rings at **Bishop James Mahoney High School** in Saskatoon, students enter an extraordinary learning space that's reshaping their educational experience. This is the **Net Zero Classroom**, an innovative educational environment that's doing more than just saving energy; it's transforming how students understand and interact with the technology that will shape their future.

In an era where climate change poses increasingly urgent challenges, the need to bridge the gap between abstract environmental concepts and practical solutions has become critical in education. The Net Zero Classroom directly addresses this need, offering students a living laboratory where they can experience, study, and understand sustainable technologies in real-time.

## Understanding Microgrids: The Foundation of Net Zero Spaces

At the heart of these innovative learning environments lies a powerful technology called a microgrid. These electrical distribution systems provide an alternative to traditional centralized power grids, offering the ability to generate, distribute, and control power independently. Whether serving a single classroom, a city block, or an entire community facility, microgrids function as local energy ecosystems, combining various renewable energy sources—such as solar panels and wind turbines—with energy storage systems and smart controls. This integration enables spaces to generate their own clean electricity, store excess power for later use, and operate independently from the main power grid when needed.

Students and faculty of Bishop James Mahoney High School in Saskatoon in front of the SmartFlower.

The practical implementation of these systems is evident in the classroom setting, where multiple sustainable technologies work in harmony. From solar installations like the **SmartFlower**[1] to advanced HVAC systems and smart lighting, these components create an intelligent ecosystem that can be managed by the **SICAM MGC**, a **Siemens Microgrid Controller**.

**Colonel Grey High School** in Prince Edward Island exemplifies this innovation. Their SmartFlower system, equipped with a controller that connects to their classroom, tracks the sun throughout the day as it moves across the sky to generate up to 40% more power than traditional stationary panels. This real-world application not only meets the classroom's energy needs but also provides valuable learning opportunities for students.

## Where Technology Meets Education

Building on this technological foundation, Net Zero Classrooms serve as immersive educational tools. Through collaboration with educators, Siemens has developed a comprehensive curriculum that brings these concepts to life for students across all grade levels. The program's tiered approach allows younger students to grasp basic energy system principles while challenging older students with complex concepts in grid modernization, data analytics and the power system's relationship with societal impacts.

Students at Colonel Grey High School, for instance, actively engage with real-time energy monitoring systems, observing their classroom's journey toward energy balance. This hands-on experience transforms abstract concepts into tangible understanding, as students analyze data from their own learning environment.

The success of these initial implementations has sparked a broader movement across North America. Educational institutions are taking leadership roles in sustainable technology implementation and education, with schools like Trinity High School in Washington, Pennsylvania, converting entire wings into Net Zero spaces. This expansion has shown how the sustainable technology in the Net Zero Classroom can be integrated for learning across various subjects, from environmental science to industrial technology.

## Extending Impact: Net Zero Spaces in Community Settings

Naturally, the concept of these educational initiatives lends itself to broader community applications, and far beyond North America's borders. The same principles and technologies that power Net Zero Classrooms

[1] Note: Siemens can incorporate its microgrid controller technology with various renewable energy sources, including SmartFlower (a product of Energy Management Inc.) to provide innovative energy solutions to power Net- Zero Classrooms.

are now being scaled to serve entire communities, transforming local arenas, community centers, and hospitals into "Net Zero Community Spaces."

Perhaps the most compelling example of this community-scale implementation is Denmark's SamsØ Island, which has evolved from being oil-dependent to becoming a model of renewable energy adoption thanks to the integration of net-zero spaces. The island's publicly owned SmartfFlower, strategically placed at the mayor's office, stands as a powerful symbol of community-wide commitment to sustainability.

## Industry Leadership in Action

The concept is also showcased at Siemens Canada's own headquarters in Oakville, Ontario. The building features a state-of-the-art Net Zero demonstration space where visitors can observe integrated sustainable technologies in action while viewing real-time energy consumption and generation data on dedicated monitoring screens. The facility includes everything from smart HVAC systems to renewable energy generation and EV charging stations, providing a complete demonstration of how these innovative technologies integrate into everyday operations. This accessible location offers an opportunity for educators, students, and interested professionals to experience firsthand the future of sustainable building technology.

Through this comprehensive approach the Net Zero program is creating more than just sustainable environments. It's generating inspiration, understanding, and the essential skills needed for a carbon-neutral future. These living laboratories are proving that the sustainable spaces of tomorrow can be built today, preparing students and communities for a future where sustainability is the foundation of how we learn, work, and live.

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Natalia Malafeeva, P.Eng. and Jerry Chwang, Siemens Canada Ltd.

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Siemens SmartFlower solar installation.

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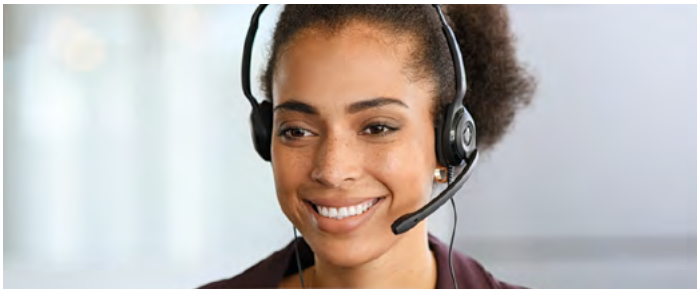

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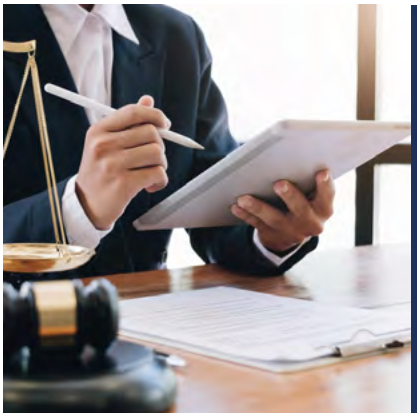

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# Engineering for Environmental Equity: Heat, Infrastructure, and Justice in a Warming Ontario

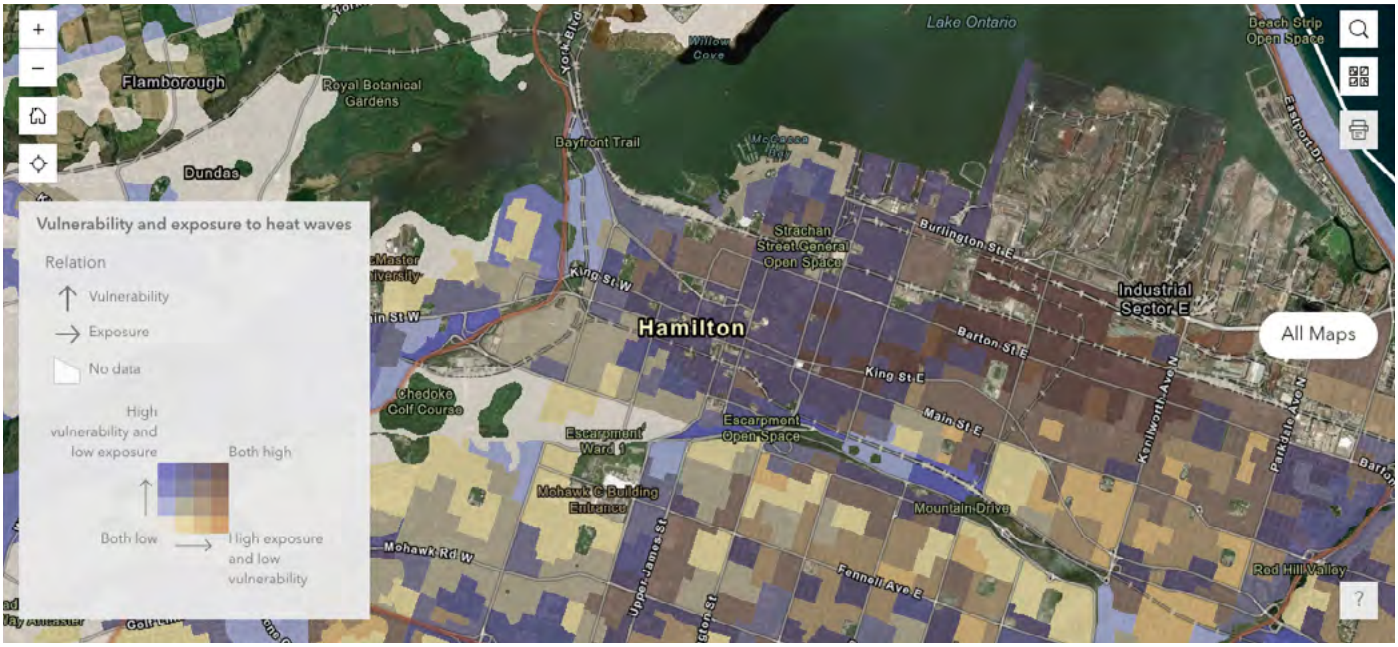
Naomi Williams

Extreme heat is no longer a distant climate scenario—it's a present-day engineering challenge that is growing in frequency, intensity, and inequity across Canadian cities. Canada is warming at roughly twice the global average, a trend reported in the Intact Centre on Climate Adaptation's Irreversible Extreme Heat report, and cities in Ontario are experiencing more summer days under a Heat Warning.[1,2] Extreme heat is the leading cause of weather-related deaths in Canada, and yet it is widely preventable[3] – this is a problem worth tackling, and engineers have a role to play.

This article continues the **OSPE Equity, Diversity, Inclusion, and Accessibility (EDIA) Task Force** work on exploring environmental equity from an engineering perspective. Below, an equity lens is applied to the problem of extreme heat, illustrating how the most vulnerable are disproportionately impacted by warming temperatures, and highlighting the role of engineers in addressing this challenge in the built environment. The sections that follow share a useful mapping tool, discuss the City of Hamilton's leadership in this area, and provide recommendations for engineers, consistent with the adaptive actions recommended by the Intact Centre.

## Extreme Heat in the Engineering Context

The reality of a warming province is not news to Ontarians – more than 60 heat records were broken across Canada last year, at least 10 of which were in Ontario.[4] While many understand the science that heat waves were made much more likely by human-caused climate change, some may not yet have considered




A sample of the Université Laval Mapping identifying Vulnerability and Exposure to Heat Waves[8]

the significant infrastructure causes and implications of extreme heat.

Extreme heat can be considered an engineering risk or unintended consequence, shaped by building design, infrastructure decisions, and regulatory choices. For example, heat vulnerability mapping in Toronto shows that low-income tower communities are significantly more vulnerable to heat than city averages, due to housing form, lack of air conditioning, and low tree canopy.[5]

The negative impacts of extreme heat are not limited to the health impacts that many first think of - there are also significant infrastructure impacts, such as to electrical distribution systems, telecommunications, transportation systems, and linear infrastructure, to name just a few. Peak electricity demands due to operating air conditioning units can occur alongside high temperatures reducing the efficiency of electricity transmission. Extreme temperatures add to the burden on data centres' cooling equipment.[1] Temperatures above 32°C can warp rail tracks.[6] Extreme temperatures cause increased demands for water services at times when water levels may be low.[1] Extreme heat is an infrastructure problem touching all engineering disciplines.

## Applying an Equity Lens: Who is Most Vulnerable?

Extreme heat does not impact everyone equally. The Intact Centre report notes three categories of risk factors increasing vulnerability to extreme heat:

1. **Increased exposure to extreme heat** (populations at risk include people living in housing poorly adapted to extreme heat, people with mobility issues, people who are socially isolated, and those living in urban-heat-island areas)
2. **Increased sensitivity to extreme heat** (includes older adults, pregnant women, infants and children, and people living with mental illness)
3. **Limited access to resources and/or information** (includes people with low income, those experiencing homelessness, and people who neither speak nor understand English or French).[1]

This brief overview of various populations at risk makes it clear: there is a strong equity component to extreme heat – and to address the challenge in a just way, equity-based planning and policy is important.

## Mapping Vulnerability and Exposure to Extreme Heat Waves

Previous articles in this *Engineering Environmental Equity* series highlighted the usefulness of the HealthyPlan.City tool – and in this case, too, that resource contains helpful data regarding average summer temperatures across census subdivisions in Canada.[7] In this article, another useful resource is also highlighted: the Université Laval has developed interactive online mapping of Vulnerability and Exposure to Extreme Heat Waves of Populations Living in Housing in Canadian Communities.[8] Based on socio-economic, demographic, and built environment

data, Laval researchers calculated four indices across 156 Canadian census areas: an exposure index, a sensitivity index, a coping capacity index, and a vulnerability index. The resulting mapping provides a useful tool when it comes to identifying vulnerability, in turn facilitating the development of more effective mitigation strategies. As shown in the image below, the mapping can be used to identify what geographic areas have high exposure to extreme heat waves, what areas have high vulnerability to heat waves, and which have both.[8]

## Municipal Leaders in Equity-Based Heat Response: City of Hamilton

One Ontario municipality has been leading the way in regard to applying an equity lens to their extreme heat adaptation efforts. The **City of Hamilton** used the Université Laval mapping tool to identify areas in the city that are home to high-risk populations, as well as which neighbourhoods had populations at greatest risk from extreme heat [9]. This contributed to the development of the *City of Hamilton Climate Action Strategy for Extreme Heat*,[10] supported by strong community advocacy led by Hamilton ACORN [11]. The City formed an *Extreme Heat Working Group*, including both internal City staff and local community partners providing services to individuals disproportionately impacted by extreme heat, who together discussed the actions and recommendations of the *Community Heat Response Strategy*.[10] The resulting strategy is targeted to protect individuals at highest risk of heat-related illness, and includes actions relating to engineering infrastructure, such as heat warning notification systems, provision of cooling spaces, energy efficiency retrofit supports, low impact development projects, and installation of shade structures and misting stations at priority locations identified using the Laval mapping.[10]

Another related initiative the City of Hamilton is working on is development of a maximum temperature by-law: at the request of City Council, City staff are developing an Adequate Temperature By-Law that may provide maximum temperatures for residential rental units within the city.[12] If this by-law comes into effect, it would go beyond other by-laws currently in place in Toronto and Mississauga - both of which have Adequate Temperature By-Laws requiring a maximum temperature in rental units - as these only apply for units which already are equipped with an air conditioning system.[13,14]

## What the Ontario Building Code Does (and Doesn't) Protect Us From

The **Ontario Building Code** provides only limited protection against the growing risks of extreme heat. When the province adopted the **National Building Code 2020** with amendments in late 2025, its HVAC provisions remained focused primarily on energy efficiency and system design rather than on extreme heat resilience or preventing indoor overheating.[15] As a result, there are no requirements for maximum indoor temperatures, no mandates ensuring cooling system redundancy for vulnerable forms of housing, and no provisions for passive survivability during heat events or power outages. Together, these gaps make a clear case: engineering standards have not kept pace with current climate realities, leaving building occupants increasingly exposed to preventable extreme heat health risks.

## Four Ways Engineers Can Respond

1. **Design for Passive and Active Cooling Resilience**
   - Incorporate the Grey Infrastructure adaptation strategies highlighted in the Irreversible Extreme Heat report into new projects.[1]
   - Integrate passive cooling strategies into facility design, such as exterior shading, cross-ventilation, and optimized building orientation.
   - Reduce urban heat through increased tree canopy, green roofs, and permeable/low-albedo surfaces.
   - Plan for redundancy in mechanical cooling systems, anticipating higher summer peaks and

the risk of power outages during heat events.

- Consider cooling as a human right and public health essential, designing beyond minimum code compliance.

2. **Adopt Data-Informed Equity-Focused Approaches**
   - Apply Université Laval's Vulnerability and Exposure to Extreme Heat Waves mapping tool to identify high-risk neighbourhoods.
   - Use geospatial data to prioritize retrofits and upgrades in areas with high exposure, sensitivity, and/or limited coping capacity.
   - Target locations for cooling centres, shade structures, tree-planting, misting stations, and low-impact development based on vulnerability mapping.
   - Integrate exposure and vulnerability indices into infrastructure planning and capital project prioritization.
3. **Address Gaps in the Ontario Building Code**
   - Recognize that current building code provisions do not address maximum indoor temperatures, cooling accessibility, or passive survivability.
   - Integrate resilience-focused design beyond code minimums for new builds and retrofits.
   - Advocate for future code updates that include overheating protections, cooling requirements, and energy-resilient building systems.
4. **Support and Shape Municipal Heat-Response Policy**
   - Provide technical expertise to help municipalities develop Adequate/Maximum Temperature By-Laws, including performance standards for cooling systems.
   - Contribute engineering analysis for heat-scenario modelling, building-stock assessments, and heat-risk evaluations.
   - Assist municipalities in designing cooling-network strategies, including publicly accessible cooling spaces and distributed resiliency hubs.
   - Align engineering recommendations with equity-based community advocacy, recognizing the disproportionate impacts on low-income and vulnerable groups.

## Conclusion

Ontario's extreme heat risks are growing, and engineers have a responsibility to help ensure that rising temperatures do not deepen existing inequities. Code-compliant is not the same as climate-resilient, and protecting public health now requires treating cooling as essential infrastructure - especially for those most at risk. With strong research, heat-vulnerability mapping, and emerging municipal leadership already available, engineers have the tools needed to design equitable, science-based solutions that keep all communities safe in a warming climate.

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Naomi Williams, Equity, Diversity, Inclusion, and Accessibility (EDIA) Task Force

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# Sustainability: It's All About Energy

Carlos Samuel Mefenya, EIT

Sustainability has evolved from a resource-management principle into a central organizing framework for modern energy systems. What began as a concern about avoiding resource depletion now governs how nations design power grids, allocate capital, structure markets, and innovate technologies.

Arguably, the backbone of industrial civilization, sustainability functions not as an abstract ethical ideal, but as a systems-level constraint and opportunity: it reshapes production pathways and consumption patterns, transforms technologies, and boosts long-term infrastructure planning. This article is about the historical foundations, technical evolution, classification, and quantitative trends of sustainability's role in shaping contemporary and future energy systems.[1,3,6,7]

## History and Definition

The concept of sustainability predates modern environmentalism. In the early 19th century, German forestry thinkers such as Hans Carl von Carlowitz and Georg Hartig articulated principles of harvesting timber at rates that did not exceed forest regeneration. The objective was continuity of supply across generations, a precursor to what is now termed intergenerational equity. The modern formulation emerged in 1987 with the Brundtland Commission's report Our Common Future, defining sustainable development as: "Meeting the needs of the present without compromising the ability of future generations to meet their own needs."[1,3,6,7]

This definition reframes sustainability as a development paradigm rather than mere conservation. It integrated environmental protection, economic viability, and social equity; the three pillars that continue to underpin policy and energy discourse. Energy focus sustainability translates into a systems requirement where energy needed must be produced, converted, distributed, and consumed in ways that:

1. Avoid irreversible environmental degradation

2. Do not deplete critical natural capital beyond regeneration rates
3. Maintain economic feasibility
4. Ensure equitable access across populations and generations

Energy sustainability, therefore, extends beyond fuel choice. It encompasses lifecycle emissions, land use, technological efficiency, grid resilience, economic cost structures, and social acceptance.[1,2,6,12,13]

## Sustainability Throughout the Energy Chain

Sustainability influences every stage of the energy chain: production, transformation, distribution, and consumption. Historically, global energy production has been dominated by fossil fuels such as coal, oil, and natural gas, whose combustion releases significant quantities of carbon dioxide and other pollutants. These fuels are finite, formed over geological timescales, and their continued large-scale use drives climate change. The concept of sustainability challenges this model on two fronts:

- Resource depletion: Fossil reserves are non-renewable
- Environmental pollution: greenhouse gas emissions and ecological disruption[6,12,13,15,18]

## Production

The solution to the sustainability challenges was the adoption of renewable energy sources such as solar, wind, hydro, geothermal, and certain forms of biomass, which then expanded rapidly. Recent data indicate that renewables account for approximately 32% of global electricity generation, a historic high compared to less than 20% two decades ago. In several countries, renewable shares exceed 60%, and in some cases approach 90%.[8,9,10,11,14]

### Transformation

Energy sustainability is equally concerned with how primary energy is converted into usable electricity or heat. Traditional thermal plants, coal- or gas-fired, operate through combustion-driven steam cycles. While incremental improvements such as supercritical boilers or integrated gasification combined cycle (IGCC) systems enhance efficiency, they remain carbon-intensive unless paired with carbon capture technologies. In contrast, renewable transformation pathways such as photovoltaic (PV) conversion or wind turbine generation produce electricity without combustion and with near-zero operational emissions. Innovation has significantly improved conversion efficiency:

- Solar PV module efficiencies have roughly doubled over several decades
- Wind turbines have increased in rotor diameter and hub height, improving capacity factors
- Advanced power electronics improve grid compatibility and reduce transmission losses[5,6,12,15,16,17]

## Distribution & Consumption

The most sustainable unit of energy is the unit not consumed. The “energy hierarchy” prioritizes:

- Conservation (reducing demand)
- Efficiency (using less energy per service unit)
- Sustainable supply expansion

Energy-efficient appliances, LED lighting, high-performance building envelopes, heat pumps, and electrified transport significantly reduce energy intensity per unit of GDP. For example, incandescent bulbs convert roughly 2% of electricity into visible light, whereas LEDs exceed 90% conversion efficiency. Such improvements illustrate how sustainability reshapes consumption technology. Simultaneously, smart grids and digital metering enable demand-side management, allowing dynamic load shifting to match renewable supply availability.[1,4,5,13,16,16]

## Sustainability as the Catalyst for Innovation

Sustainability has transitioned from constraint to innovation propellant. It has reshaped research priorities, capital flows, and system design. For example, solar PV and wind power dominate new capacity additions globally. Projections suggest renewable capacity could reach 4,600 GW by 2030, with solar representing the majority of growth.[1,2,3,7,8,9,10,14]

Renewable energy pushes onto the boundaries of clean technology, such as perovskite solar cells, which offer high theoretical efficiencies at low production costs; offshore wind turbines with increasing rotor diameters and floating platform systems; ocean and tidal energy systems harnessing predictable marine currents. These innovations reduce the cost of electricity while lowering lifecycle emissions, but since they heavily rely on natural phenomena, the energy output fluctuation has become an issue to address.[3,5,6,12,14,16,17]

Sustainability-driven innovation addresses the issue of renewable energy intermittency and grid disturbance

through new energy storages technology such as:

- Lithium-ion batteries for short-duration grid balancing
- Flow batteries and gravity-based systems for longer-duration storage
- Pumped hydro storage is the largest existing storage technology
- Green hydrogen, produced via electrolysis using surplus renewable power

With these solutions, energy storage systems transform variable generation into dispatchable capacity, enhancing reliability while preserving decarbonization objectives. The rapid growth of Artificial Intelligence and its demand for energy generates a sustainability problem that is partially solved by digitalizing and integrating AI into the grid.[6,12,14,15,16,17]

Smart grids integrate sensors, real-time analytics, and AI-driven optimization to forecast demand and renewable output, optimize dispatch, reduce losses, and prevent outages. Digitalization improves resilience and enables decentralized architectures, including microgrids and distributed generation systems that increase local energy autonomy. Even though innovations are implemented to address issues raised by sustainability principles, financial incentives from market and government policies play a major role.[1,2,4,5,12,16,17]

Sustainability principles, supported by public opinion and the orientation of governments' ambitions, facilitate reshaping economic incentives through Carbon Pricing, Renewable Portfolio Standards, Clean Energy Tax Credits, and Renewable Energy Certificates (RECs). These mechanisms internalize environmental externalities and redirect capital toward low-carbon infrastructure, preferably rooted in sustainability principles.[1,2,3,5,6,7,13,17]

## Conclusion

Sustainability has transformed the field of energy from a resource-extraction paradigm into a systems-optimization paradigm. It integrates environmental science, engineering, economics, digitalization, and public policy into a unified framework that prioritizes long-term viability. Its influence is visible in:

- The rapid displacement of fossil fuel growth by renewable capacity.
- Efficiency-driven demand management
- Electrification of transport and heating
- Storage and grid innovation
- Market reforms internalize environmental costs

Energy systems are undergoing a profound structural transition. While fossil fuels remain significant in absolute terms, investment patterns, technological innovation, and policy frameworks increasingly favour renewable and low-carbon systems.

Sustainability in the field of energy is therefore not a peripheral environmental concern; it is the defining strategic and engineering challenge of the 21st century. The trajectory of electricity generation, capacity additions, and innovation pipelines indicates that sustainable energy is evolving from alternative to dominant architecture. The decisive question is no longer whether sustainable energy systems are viable. The evidence demonstrates that they are. The central challenge now lies in accelerating deployment, ensuring equitable access, and maintaining system reliability during the transition to a resilient, renewable, zero-carbon global energy future with zero-decommissioning concern of stations and waste.

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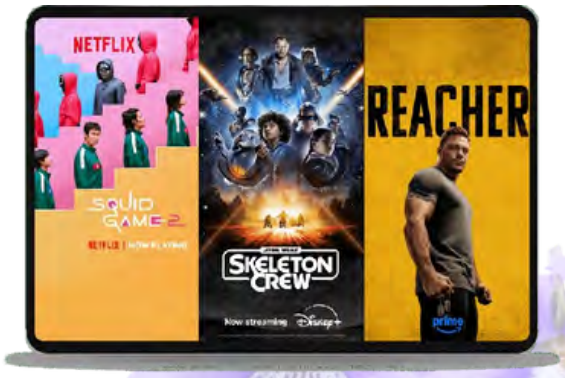


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# Standards and Society

James Atkinson, P.Eng.

Technical standards do not emerge in isolation. They reflect the priorities and challenges of the industries and time periods that produce them.

Therefore, as conditions evolve, through technological advancement and environmental changes, those technical standards must adapt accordingly. ASHRAE's Standard 62, which defines ventilation and air quality standards for the built environment, is a perfect microcosm of this relationship between engineers and society.

Today, a high emphasis has been placed on energy efficiency. Electricity demands have been forecasted to increase by some 75% by the year 2050[1], according to Ontario's IESO. This is due to an increase in power consumption from data centers, electric vehicles, and the electrification of existing building stock. At the same time, we must maintain a high-quality indoor environment to ensure occupant safety and comfort. With HVAC system energy usage consuming an estimated 40% of total building energy[2], how can the engineers today both satisfy the increasingly stringent air quality requirements while also making much-needed improvements on energy efficiency?

## ASHRAE Standard 62

First introduced in 1973, the **American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE)** specifies minimum airflow requirements for a variety of building types. It provides a simple and effective set of rules to design ventilation equipment that maintains acceptable indoor air quality for building occupants. There are separate standards for commercial and residential buildings, standards 62.1 and 62.2 respectively.

The minimum ventilation rates are given in terms of airflow per square foot and airflow per person, with the floor area component accounting for building-related pollutants and the per person component accounting

for exhalation and bioaerosols. These two coefficients are combined to calculate the minimum ventilation rate required for a given space, in the original design method known as the **Ventilation Rate Procedure (VRP)**.[3]

It's quick to implement in a design and can account for a wide range of buildings, since the design engineer has only to select the correct airflow coefficients and enter their building's size and occupancy details. Further, it is easy to update – ASHRAE continually publishes updated requirements for space ventilation as more data becomes available to track both the expected pollutant concentrations and their known effects on human health.

Since its release, standard 62 has been widely adopted most North American building codes to standardize ventilation requirements. Again, ease of implementation is a main strength here. Building inspectors can simply check the floor plan, reference the standard, and confirm the related air equipment meets the standard.

The main issue with a prescriptive standard such as ASHRAE 62 is exactly that: it's prescriptive. Comparatively little is done to ensure the final project as-built is able to deliver the performance promised by the design. Through updates, addenda, and appendices, many of these issues have since been addressed, but adoption of these new practices varies.

Simply delivering the required volume of outdoor air does not ensure that pollutant concentrations remain within acceptable limits. In real ductwork, pressure loss and temperature stratification means that not 100% of the air in a building is ventilated. A 2007 addendum to the standard adds a ventilation efficiency coefficient that increases airflow to account for these duct losses[4], but it still can't completely eradicate them in a prescriptive sense: if there is a building region with poor air circulation, no amount of over-ventilating will correct it, since the problem lies in the very design of the ductwork itself.

The standard also assumes that outdoor air is clean. During wildfire events, periods of heavy smog, or in polluted regions, this isn't the case. No amount of ventilation will deliver a healthy indoor space if the fresh air being used to ventilate it isn't clean to begin with. Once again, an addendum was created to address the issue. In 2004, air quality reports became standard practice in the design phase, and in the 2020's air cleaning equipment like filtration or adsorption devices officially joined the standard to clean up outdoor air.[4]

Finally, the VRP does not account for natural ventilation. Opening a window to bring in fresh air is the simplest, most basic form of ventilation we have access to, though it can be difficult in practice to quantify the effect of open windows from a design standpoint. An alternate compliance path, the Natural Ventilation Procedure, was introduced in 2019 to allow for such designs. While effective to dilute gas-phase pollutants like VOCs and CO2, natural ventilation can cause an increase in fine particulate pollution due to a lack of filtration.[5]

As the built environment develops, and we learn more about the health effects of poor air quality and a changing environmental landscape, the standard has been amended and revised to meet the challenges of the day. In response to the covid-19 pandemic, ASHRAE released "Standard 241, Controls of Infectious Aerosols"[6] to describe best practices and lessons learned from combatting a highly infectious and airborne contagion.

Recently, industry focus has shifted from infection control to energy efficiency as pandemic fears wind down and energy prices creep up. The VRP is an inherently conservative estimation tool, and can often lead to over-ventilated spaces, where more air (and, therefore, energy) is brought into a space than needed to adequately treat it. An under-utilized alternative compliance pathway from ASHRAE, the Indoor Air Quality Procedure, is now gaining industry support over the original VRP as building designers and managers look for new ways to save on energy.

## Practical Methods: the IAQP

To address the limitations of a purely prescriptive approach, the **Indoor Air Quality Procedure (IAQP)** was developed by ASHRAE. Rather than specifying a fixed airflow requirement, the IAQP uses a practical, performance-based approach to maintaining acceptable indoor pollutant concentrations.

The IAQP relies on a mass-balance approach, wherein pollutant concentrations are determined based on the rate at which they are generated in the space and the rate at which they are removed through ventilation, filtration, or air cleaning technologies. Key pollutants like CO2, VOCs, and particulate matter are maintained below standard thresholds.

Another benefit of the IAQP is flexibility; since designers can select the pollutants that are most relevant to the building type- a climbing gym will have different contaminants than a nail salon, for example.

With this method, air cleaning devices can be used to reduce the required proportion of outdoor air, allowing more recirculation and re-use of already treated air. Treating and recirculating return air requires much less energy than treating fresh air, generating massive energy

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Once the calculations are complete, rigorous testing must be undertaken to ensure that the design matches reality-air quality data is tracked and monitored extensively. If pollutant concentrations exceed thresholds, the fresh air proportion is increased until they are properly diluted.

Despite being released in 1981, there has been limited industry adoption of the IAQP, with professionals finding the language of the requirements ambiguous and the calculations confusing. Without clear guidance, designers fell back on the tried-and-tested VRP method, despite the energy performance benefits demonstrated by the IAQP. ASHRAE has since updated the procedure to clarify how pollutants must be tracked and how the calculations must be applied. ASHRAE has also released a calculation tool to assist design engineers in applying the IAQP method.

A large benefit of the IAQP is that it can be implemented in existing buildings. In many cases, ventilation systems already include the necessary recirculation and filtration systems to support IAQP operation, and the systems can be reprogrammed to take advantage of this. Proliferation of air quality sensing devices makes it easier to prove that the air is safe after IAQP implementation, and better controls systems allow for finer tuning of the indoor environment. Since no new air handling equipment is required, implementing the IAQP is a cost-effective way to reduce a building's energy consumption without compromising occupant safety.

## Conclusion

The evolution of ASHRAE Standard 62 illustrates an important truth about the engineering profession: technical standards are never truly finished. They represent an ongoing conversation between technical experts, researchers, clients, and society at large.

The first solution is rarely perfect, and one must instead focus on an iterative approach to arrive at a system that is derived through testing, feedback, and real-world experience. It is also important not to rely blindly on these design guidelines, as applying rules without context or careful consideration leads to over-designed and poorly optimized results. Design work requires critical thinking, professional judgement, and an understanding of the broader goals that the standards are intended to serve.

Each revision reflects lessons learned from past designs, new scientific understanding of the built environment and our own biology, and changing societal priorities. It is the combined effort of a dedicated team all working toward a brighter, healthier future. By rising to meet the challenges of today, engineers help to ensure that the buildings created today are not only safe and comfortable, but sustainable and resilient throughout their useful lifetimes.

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James Atkinson, P.Eng., Product Development Engineer for Blade Air

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# From Engineer to Fashion Founder: The Story Behind Couth Studios

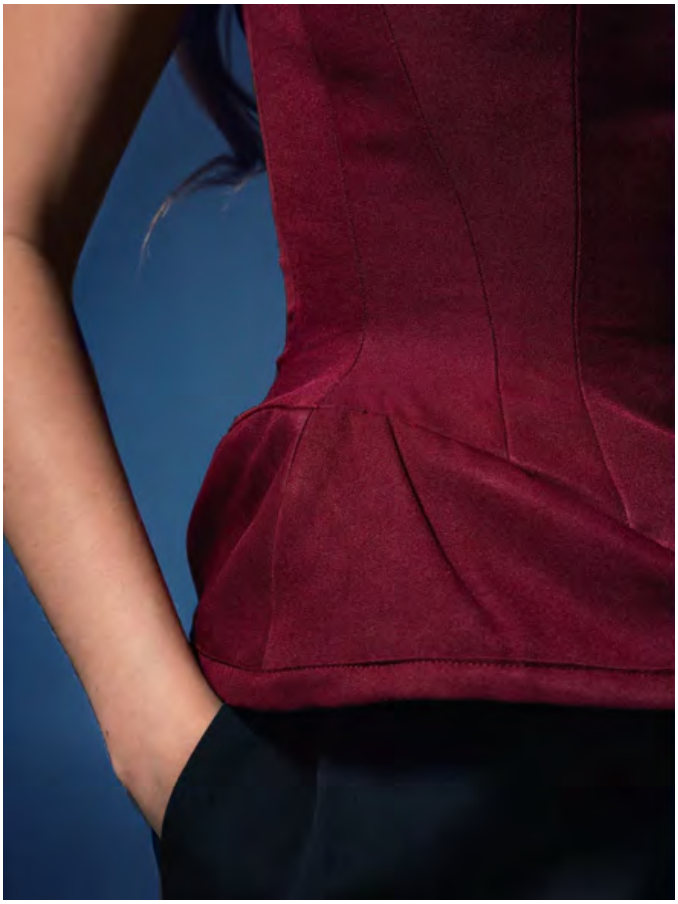
Sajna Massey. P.Eng., MBA


Growing up, fashion was always more than clothes to me - it was identity, expression, and memory. Yet, as I dove deeper into the world of technology and business, I became increasingly aware of a disconnect. The industry that brought joy and creativity to people's lives was, in many ways, disconnected from the people it served. It was slow to evolve, relied on outdated forecasting and mass production, and contributed enormously to environmental waste. That tension - between the emotional power of fashion and the inefficiencies of how it's made - sparked a question that would define my career pivot: *What if we could make fashion smarter, more intentional, and built around real human demand?*

I'm **Sajna Massey**, an engineer with an MBA whose career journey has spanned construction, finance, AI, and retail innovation - experiences that taught me to think in systems, to interrogate processes, and to pursue solutions that bridge worlds most assume are incompatible. For years I worked inside large organizations, helping teams scale initiatives and integrate emerging technologies. Yet, the more I watched industries transform through data and technology, the more apparent it became that fashion hadn't changed much at all. The cycle of guessing what might sell, overproducing, discounting inventory, and contributing to landfill overflow seemed like a system designed to perpetuate waste rather than to create value.

That realization ignited the idea for **Couth Studios**: a fashion brand where **AI meets community**, where every design is generated with purpose and produced with intention. At its core, Couth is an experiment in creative democracy - putting the power back in the hands of the people we design for.

Our process begins with technology that many industries take for granted but fashion has long overlooked. Instead



of guessing trends, we use advanced AI tools - including computer vision and generative models - to analyze real signals from runways. That analysis fuels a range of design concepts, each capturing elements that data suggests could resonate - silhouette, texture, colour, and mood. These aren't cookie-cutter "fast fashion" ideas.

But here's where Couth flips the script: **nothing gets made until our community decides it should**. We bring these AI-generated concepts to our audience, inviting them to vote not just on what they like, but on what they want to wear. The top-voted designs become real products. If the community doesn't choose a piece - we don't produce it. No assumptions. No overproduction. No unsold stock. Just a **feedback loop** between technology, design, and genuine demand.

This model doesn't just cut waste - *it redefines value*. Traditional fashion often dictates trends from a top-down position: brands decide, consumers follow. At Couth, we flip that hierarchy. We build with the people we design for - curating a wardrobe that reflects real desire rather than speculative forecasting. It's fashion rooted in humanity, not guesswork.
Of course, building something new has its challenges. Coming from engineering and tech rather than fashion meant I had to learn garment construction, sourcing, sizing, and supply chain dynamics from the ground up. There were moments when I questioned if this leap made sense. But engineering taught me something invaluable: systems - no matter how complex - can be understood, optimized, and rethought. That mindset has shaped how I lead Couth: not as a traditional designer, but as a systems thinker who views fashion as a process to be redesigned, not just an art to be created.

What I've learned along the way is as simple as it is profound: **impact begins with reimagining what's possible**. In a world where consumption often feels thoughtless and waste is normalized, Couth's mission - to democratize design and minimize waste - feels not just necessary, but urgent. By using AI as a creative collaborator and our community as active partners in design, we're proving that fashion can be both intentional and beautiful.

As Couth Studios grows, our goal remains constant: to redefine how fashion is created - not on assumptions, but through community, data, and intention. We're building a model that's smarter, more sustainable, and more responsive to the people who wear our clothes. And in doing so, we're not just designing garments - we're reimagining an industry.

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Sajna Massey. P.Eng., MBA, CEO and Founder of Couth Studios

Images: (https://shopcouthstudios.com)

# Engineering Beyond the Classroom: Our OEC Experience

Gia Nayee and Parvini Coonjoobeeharry


Competing at the **Ontario Engineering Competition (OEC)** was an experience we will never forget. After placing first at the McMaster Engineering Competition, we were excited, but also a little nervous, to represent our school at the provincial level. Winning our internal qualifier already felt like a huge achievement, and stepping onto the provincial stage felt even more surreal. We knew the competition would be challenging, but we were motivated by the chance to push ourselves and share a topic we were genuinely passionate about.

Our presentation focused on NASA's wildfire detection systems, specifically how satellite technologies like MODIS and VIIRS onboard the NOAA-20 satellite are used for early fire identification and disaster response. We chose this topic because it sits at the intersection of engineering, environmental sustainability, and real-world impact. We have both loved space since we were little girls, it's what got us into engineering. Watching launches, following missions, and even tuning in live to watch the Mars rover landing left us completely in awe. Space innovation has always inspired us, but what made this topic especially powerful was seeing how that innovation helps our own planet.

Going into OEC, we were nervous. The preparation window was short, and we were unsure how our presentation would be received. As we built it, we realized it was not just about technical accuracy; it was about clarity.

Preparing under pressure forced us to truly understand the systems we were presenting. We did not want to memorize lines. We wanted to know the material deeply enough to explain it naturally and confidently. By the end, we had learned about the satellites so thoroughly that we could name them off the top of our heads! We were no longer just competitors presenting slides. We had become deeply invested in the topic.

One of the biggest lessons we took away was the importance of communication. Explaining complex systems to a mixed audience requires precision and simplicity at the same time. During the question period, we were challenged to think about feasibility, global coordination, and long-term impact. Those conversations pushed us to reflect more broadly on engineering's role in society.

The most memorable moment came during the awards ceremony. After presenting, we were unsure how we had done. We replayed small details in our heads and wondered if we could have improved something. When our names were called, we were genuinely shocked. It took a second to process. That moment of disbelief and excitement is something we will always remember.

Beyond winning, OEC helped us grow. We strengthened our teamwork and built connections with students from other schools by learning about their projects and perspectives, which reminded us how diverse and creative engineering can be. We also had the opportunity to speak with industry professionals who share our passion for innovation. Most importantly, it reminded us why we chose engineering in the first place.

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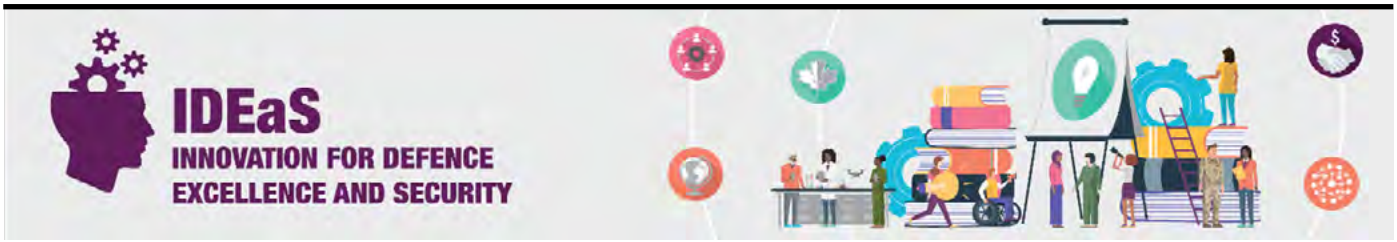


# Accelerating Defence Innovation Through the IDEaS Program

Innovation for Defence Excellence and Security (IDEaS) is a **Department of National Defence (DND)** program that invests in research, technology development, and innovative solutions to address the evolving needs of the **Canadian Armed Forces (CAF)**. Since its launch in 2018, IDEaS has been working with Canadian engineers, innovators, and businesses to turn innovative thinking into tangible solutions for the DND and the CAF.

## Opportunities for Engineers

Many IDEaS challenges require advanced engineering expertise across disciplines such as mechanical, electrical, software, aerospace, materials, and systems engineering. Participation in the program enables engineers to:

- Apply technical knowledge to real-world defence and security challenges
- Access funding to advance research, prototypes, and technology development
- Collaborate with defence experts and multidisciplinary teams
- Contribute to solutions that enhance Canada's operational readiness and national security

Engineers are encouraged to register for IDEaS notifications to stay informed about new challenges released throughout the year. When a challenge aligns with their area of expertise, they are invited to submit proposals that support the development of innovative solutions for DND/CAF. Engineers can and should also stay informed of new developments in federal procurement, which is another large marketplace for businesses to grow economically through federal contracts.

## Doing Business with the Government of Canada

On December 16, 2025, the **Minister of Government Transformation, Public Works and Procurement** announced the **Buy Canadian Policy Framework**. This policy is a key commitment of **Budget 2025: Canada Strong**, marking a major shift in federal procurement to strengthen long-term economic resilience.

The objectives of the Policy are to:

- **Make Canada its own best customer** by prioritizing Canadian suppliers and content
- **Build resilient domestic supply chains** to reduce foreign dependency
- **Strengthen Canadian industries and jobs** through the use of domestically manufactured or processed materials
- **Expand access to government procurement markets** and increase opportunities for Canadian businesses, including small and medium-sized enterprises

There are several ways you can get started: Register on Canadabuys, stay informed by monitoring the Canada.ca/CanadaBuys site for information on the Buy Canadian policy and access PAC services.

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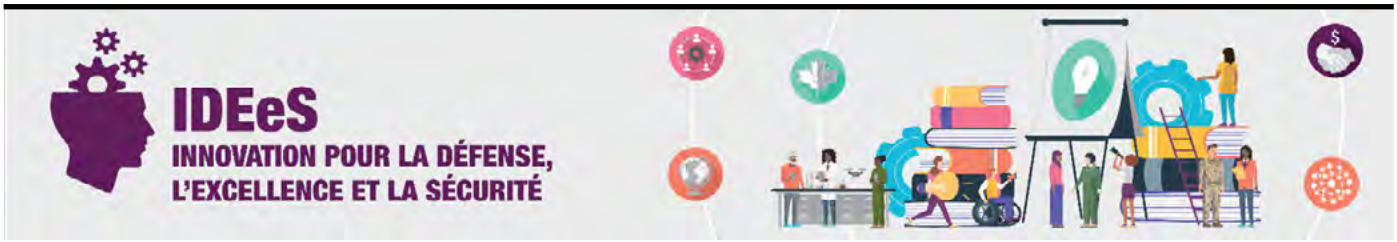


# Accélérer l'innovation en matière de défense grâce au programme IDEeS

Le programme **Innovation pour la défense, l'excellence et la sécurité (IDEeS)** du **ministère de la Défense nationale (MDN)** investit dans la recherche, le développement technologique et les solutions novatrices pour répondre aux besoins en constante évolution des **Forces armées canadiennes (FAC)**. Depuis son lancement en 2018, le programme IDEeS collabore avec des entreprises, des ingénieurs et des innovateurs canadiens afin de transformer la pensée innovatrice en solutions concrètes pour le MDN et les FAC.

## Possibilités pour les ingénieurs

De nombreux défis d'IDEeS requièrent une expertise avancée en ingénierie dans des disciplines comme le génie mécanique, électrique, logiciel, aérospatial et des matériaux et l'ingénierie des systèmes. La participation au programme permet aux ingénieurs :

- d'appliquer les connaissances techniques à des défis réels en matière de défense et de sécurité
- d'accéder à du financement pour faire avancer la recherche, les prototypes et le développement technologique
- de collaborer avec des experts de la défense et des équipes multidisciplinaires
- de contribuer à des solutions qui améliorent l'état de préparation opérationnelle et la sécurité nationale du Canada

Les ingénieurs sont encouragés à s'inscrire aux notifications du programme IDEeS pour se tenir au courant des nouveaux défis lancés tout au long de l'année. Lorsqu'un défi correspond à leur domaine d'expertise, ils sont invités à soumettre des propositions qui appuient l'élaboration de solutions novatrices pour le MDN/les FAC. Les ingénieurs peuvent et doivent également se tenir au courant des nouveautés dans l'approvisionnement fédéral, qui constitue un autre marché important pour les entreprises souhaitant connaître une croissance économique grâce aux contrats fédéraux.

## Faire affaire avec le gouvernement du Canada

Le 16 décembre 2025, le **ministre de la Transformation du gouvernement, des Travaux publics et de l'Approvisionnement** a annoncé le **cadre stratégique de la politique « Achetez canadien »**. Cette politique est un engagement clé du **Budget 2025: Un Canada fort**, qui marque un changement majeur dans l'approvisionnement fédéral pour renforcer la résilience économique à long terme.

Les objectifs de la Politique sont les suivants :

- **Faire du Canada le premier acheteur de ses produits** en donnant la priorité aux fournisseurs et au contenu canadiens
- **Mettre en place des chaînes d'approvisionnement nationales résilientes** pour réduire la dépendance à l'égard de l'étranger
- **Renforcer les industries canadiennes et les emplois au Canada** grâce à l'utilisation de matériaux fabriqués ou transformés au pays
- **Élargir l'accès aux marchés publics** et accroître les occasions pour les entreprises canadiennes, dont les petites et moyennes entreprises

Il y a plusieurs façons d'entreprendre le processus : Inscrivez vous sur AchatsCanada et tenez vous informé en surveillant le site Canada.ca/AchatsCanada pour obtenir de l'information sur la politique « Achetez canadien ».

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## Engineering the Transition – Building Ontario's Net-Zero Future

**May 2026 | Ottawa**

A Net-Zero future is an aspirational target, requiring commitments across many sectors. This one-day learning event brings together representatives from the engineering, engineering, infrastructure and construction sectors, focusing on what needs to be done today and tomorrow to move toward a Net-Zero future.

## Positioning Engineers as Leaders of Innovation & Design Thinking

**September 2026 | Toronto**

The role of the engineer is more multi-faceted than ever. Engineers have the responsibility to do more than just problem solve, they innovate, using new technologies and technique that drive our economy and ensure the smart growth of our communities.

## Land Drainage Conference 2026

**October 2026 | Guelph**

The Ontario Land Drainage Conference is an annual event bringing together Ontario's leading drainage engineers, municipal professionals and industry experts for two days of networking and collaboration.


Join us at #NEM
March 1 – 31
LEARN.
GROW.
THRIVE.
TOGETHER.
Learn more: nemontario.ca
ONTARIO SOCIETY OF PROFESSIONAL ENGINEERS
national ENGINEERING MONTH
Engineers Open Doors.

# NEM 2026

## Upcoming Events

national ENGINEERING MONTH
Engineers Open Doors.

### ANCWT – Engineering the Future | NEM 2026

March 14 | 2:30 pm – 6:30 pm
In-Person | Gloucester, ON

**Advancing New Canadian Women in Technology (ANCWT)** invites you to Engineering the Future 2026, held in recognition of National Engineering Month #NEM2026.

This event provides a platform for newcomer women in STEM to strengthen their professional network and showcase their technical expertise and presentation skills through a **3-Minute Technical (3MT) Pitch Competition**, a keynote address, and a structured Ask/Give networking session.

### Digital Engineering: The Next Frontier for Canadian Engineers

March 16 | 8:00 pm – 9:30 pm
Virtual

This panel explores how digital engineering is transforming the very core of how we imagine, design, and sustain the systems that shape Canada's future. As technology accelerates, engineers stand at the centre of a historic opportunity: to unite Cyber, AI, software, and emerging quantum capabilities into a new, integrated way of engineering.

Learn more

nemontario.ca

### City of Vaughan: National Engineering Month Open House 2026

March 25
Open House - 9 am – 3 pm
Bring a Bridge Competition - 11:30 am
In-Person | Vaughan, ON

The City of Vaughan's Planning and Infrastructure Development portfolio is excited to welcome you to their second annual Open House in celebration of National Engineering Month.

Join them to learn about the incredible engineering projects City staff undertake, women's contributions to the field and the critical role engineers play in building and shaping Vaughan.

Bring a Bridge is back - You build it... and they'll break it!

**March 18:** University of Toronto Master of Engineering (MEng) Information Session

**March 20:** The Biomedical Engineer's Ethical Dilemma Lab

**March 28:** Ontario Tech University Experience Day

**March 28:** STEM Workshop with Ontario Tech University

**March 28:** 1UP Conference 2026

**March 31:** Whirling Wonders

# OSPE's Upcoming Events

MAR 25

### All Candidates Virtual Town Hall Meeting

Meet your 2026 Board of Directors candidates and make an informed choice in this year's election. Access is limited to current OSPE members.

Virtual

MAY 06

### Annual General Meeting

Members and guests who attended the meeting got a chance to celebrate OSPE's advocacy wins of 2025, recognize incoming and outgoing Board Directors, and conduct official OSPE business.

Virtual

JUN 4

### OSPE Classic Golf Tournament

Relax, mix and mingle with Ontario's engineering community and industry stakeholders over golf and dinner. A portion of all proceeds go to the Ontario Professional Engineers Foundation for Education, which helps engineering students design the world of tomorrow!

Angus Glen Golf Club, Markham, ON

JUN 17

### Engineering Employment Event

Join us at one of OSPE's engineering job fairs. They bring together major employers and dozens of skilled engineering candidates across Ontario for an afternoon of face-to-face networking.

Ottawa, ON

# All Candidates Virtual Town Hall

Register Now

Meet your 2026 Board of Directors candidates and make an informed choice in this year's election.

March 25, 2026
6:30 pm

Hosted Virtually

ospe.on.ca

# Annual General Meeting 2026

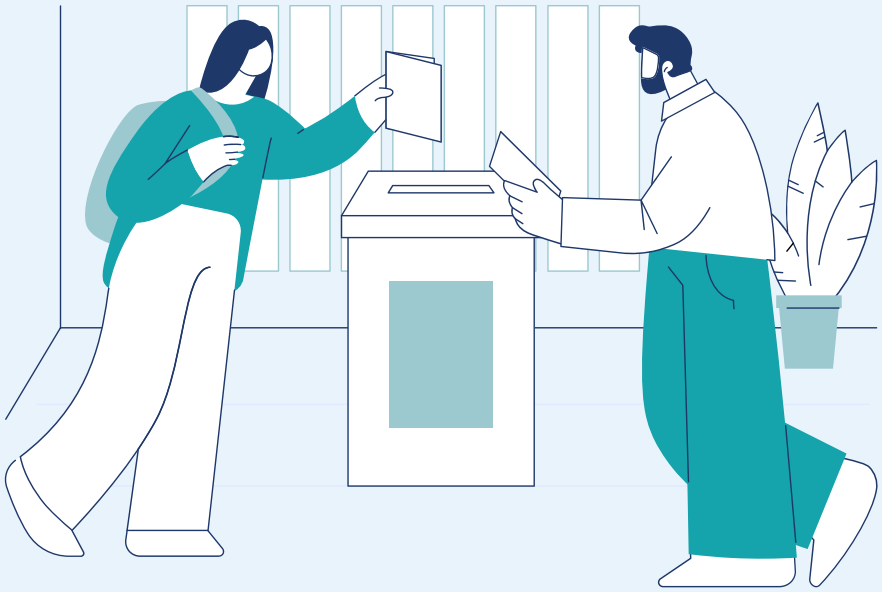
Register Now

- Hear about OSPE's 2025 activities and achievements
- Meet your 2026/2027 Board of Directors
- Receive important updates and learn about plans for the future
- Engage fellow OSPE members

May 6, 2026
6:00 pm

Hosted Virtually

* *These events are open to OSPE Members only.*



# 2026 OSPE Board Election

## Help Guide Your Member Association By Voting

The following pages contain profiles for all candidates running in this year's OSPE Board elections. There are 4 open positions, each for a 3-year term. The profiles are listed in alphabetical order. These profiles, along with complete details on OSPE election procedures, may also be viewed online **here**.

The slate of candidates presented has been approved by the OSPE Nominating Committee and the OSPE Board of Directors. All biographical information was prepared and submitted by the candidates. All candidate statements are the opinions of the candidates and do not necessarily reflect the opinions of OSPE.

Learn more

**ospe.on.ca/the-profession/governance/board-elections**

### Important Dates

**Monday, March 23, 2026**

Ballots and candidate information sent to members by email – Voting Opens

**Wednesday, March 25, 2026**

All Candidates Virtual Town Hall

**Monday, April 13, 2026**

Voting closes

**Wednesday, May 6, 2026**

OSPE Virtual Annual General Meeting

For more information please contact **Valeria Mueller** at vmueller@ospe.on.ca.

## Vir C Advani, P.Eng.

**EMPLOYER AND POSITION**
RBC Dominion Securities - Investment Advisor
- Lead a private wealth management practice for affluent individuals and families, business executives, not-for-profit and charitable organizations, and first-generation wealth builders.

**EDUCATION**
MBA, Queens University (2017)
- Class of 2017 Valedictorian
- Stephen J.R. Smith MBA Scholarship recipient
- GMAT Score of 710

B.Eng., Carleton University (2011)
- Dean's Honour List for the 2010/2011 academic year

**EMPLOYMENT HISTORY**
2025 - Present, Investment Advisor, RBC Dominion Securities
2019 - 2025, Vice President, RBC Capital Markets
2017 - 2019, Associate, RBC Enterprise Leadership Development Program
2015 - 2016, Vice President / Co-Owner, J & J Engineering and Management Inc.
2011 - 2015, Civil Engineer, J.L. Richards and Associates

**ACTIVITIES IN ADVOCACY ORGANIZATIONS**
Member, RBC Corporate Client Group Diversity & Inclusion Committee

**YEARS OF REGISTRATION WITH PROFESSION**
PEO, 10 years (2015 – present)

**COMMUNITY SERVICE**
President, OMS Montessori (2021 – 2025)
- Oversee a volunteer board of 12 directors whose responsibilities include hiring and evaluating the head of the school, developing and monitoring policies for the governance of the school, long-range strategic and budget planning, and fiscal decision making
- Investigate complaints and resolve grievances filed by parents/staff against the head of the school
- Advise on financial, legal, and remuneration-related matters

Founding Chair, OMS Foundation (2025)
- Lead the establishment of OMS Foundation – an independent capital arm of OMS Montessori with projected $6M assets under management

**CANDIDATE STATEMENT**

Over the past 10 years at RBC, I have developed a deep understanding of financial strategy, risk management, and organizational resilience. My roles have spanned corporate finance, investment management, risk management, and strategic advisory, equipping me with the ability to navigate complex financial landscapes and drive sustainable growth.

A highlight of my journey has been my 4-year tenure as Chair of the OMS Montessori board in Ottawa. In this role, I spearheaded initiatives to strengthen governance frameworks, improve financial transparency, and align strategic priorities with community needs. This experience underscored my ability to distinguish between operations and governance—a critical skill for any board.

As a P.Eng. with a decade-long career in the finance industry, and a proven track record in nonprofit governance, I am eager to bring to OSPE my financial acumen, business development and strategic leadership capabilities. My P.Eng. designation has carried me far in life, and I am now in a position to contribute meaningfully to OSPE's mission of advancing the engineering profession.

## Shelly Deitner, P.Eng.

**EMPLOYER AND POSITION**
Project Director, Senior Environmental Engineer, WSP

**EDUCATION**
Bachelor of Science, Civil Engineering, Queen's University, 2003

**EMPLOYMENT HISTORY**
- 2024-present: Project Director, Senior Environmental Engineer, WSP
- 2003-2020: Project Manager, Project Engineer, GHD (formerly Conestoga-Rovers & Associates)

**ACTIVITIES IN ADVOCACY ORGANIZATIONS**
- Board Director, YWCA Kitchener-Waterloo (2018-2020)
- Ontario Society of Professional Engineers:
  - Board Director (2016-2019):
    - Secretary, Executive Committee (2018-2019); Human Resources Committee (2018-2019); Nominations Committee (2017-2018 and 2020-2021); Board Development and Strategic Planning Committee (2017-2018)
    - Chair, Women in Engineering Advocacy Champions Task Force (2016-2019)
  - Mentor, Engineering Professional Success Pilot Mentorship Program for Women (2015-2019)
  - Equity, Diversity and Inclusion Task Force (2019-2022)
- 30 by 30 Champion, Engineers Canada (2016-2019)
- Board Director, Ontario Professional Engineers Foundation for Education (2017-2019)
- Society of Women Engineers:
  - International Senator (2016-2017); International Ambassador, International Member Team (2010-2017)

**YEARS OF REGISTRATION WITH PROFESSION**
PEO, since 2009

**COMMUNITY SERVICE**
- In-School Volunteer Coach – Letters, Sounds and Words Program, Strong Start to Reading (2022-2024)
- Mentor/Industry Sponsor, Civil Engineering 4th Year Capstone Design Course, Department of Civil Engineering, Queen's University (2011-2016)

**CONFERENCE OR TECHINCAL PAPERS GIVEN OR PUBLISHED**
- Keynote Speaker, Presenter, Panelist and Moderator

**CANDIDATE STATEMENT**

I am honored to have served on the OSPE Board of Directors and am pleased for this opportunity to advocate for my profession once again. I believe engineers have an obligation to use their problem-solving skills to not only lead but advance the engineering profession and to make it more equitable, diverse and inclusive.

As a professional engineer and long-time OSPE member and volunteer, I have seen how OSPE has advanced the professional interests of its members and is the strong voice of the engineering community.

As I seek your support to serve a second term, I bring governance, strategic planning and financial experience gained by serving on the boards of the Ontario Professional Engineers Foundation for Education, the YWCA of Kitchener-Waterloo and as an International Senator of the Society of Women Engineers. As an engineering consultant with over 20 years of experience working on remediation projects across North America, I bring relationship building, collaboration and project management skills obtained from working with diverse teams on complex projects.

Thank you for your consideration and involvement in our profession.

## Feyisayo Enuiyin

**EMPLOYER AND POSITION**
Founder and CEO Denobiq Technologies Inc

**EDUCATION**
McMaster University - Chemical Engineering

**EMPLOYMENT HISTORY**
- Geotab
- Bell Canada
- Royal Bank of Canada

**ACTIVITIES IN ADVOCACY ORGANIZATIONS**
- Committees
  - Member, Ontario Society of Professional Engineers Research and Innovation Task Force

**YEARS OF REGISTRATION WITH PROFESSION**
Registered Member of OSPE (2+ years)

**OTHER PROFESSIONAL AFFILIATIONS, INCLUDING POSITIONS HELD**
- Firehood Angels - Programming Support
- Toronto Tech Fest - Event Operations

**COMMUNITY SERVICE**
- RISE in STEM, Program Lead, 2021 - Present (4+ years)
- Girls Into VC, Co-Director of Events, 2024 - Present (1+ year)

**CANDIDATE STATEMENT**

I am interested in serving on the OSPE Board of Directors because I believe Ontario engineers are entering a defining decade. The profession is being reshaped by artificial intelligence, climate urgency, entrepreneurship, and evolving career pathways. OSPE has an opportunity not only to represent engineers, but to actively shape how engineering leadership evolves in this new environment.

With a background in chemical engineering and experience as a technology founder, my work sits at the intersection of engineering, product development, AI, and community building. I am motivated to help ensure OSPE remains forward-looking, relevant, and accessible to the next generation of engineers.

My experience reflects both strategic thinking and hands-on execution. As a founder, I have structured governance and accountability systems, aligned stakeholders, and made decisions with long-term impact. I have led cross-functional teams and organized professional initiatives that bring engineers and industry leaders together around shared goals. My work in emerging technology provides insight into how quickly the profession is evolving and the importance of balancing innovation with strong engineering principles. I bring an execution-oriented mindset, community engagement experience, and a genuine commitment to strengthening opportunity and relevance for Ontario engineers.

## Jonathan Hack, P.Eng., MBA, PMP

**EMPLOYER AND POSITION**
Centennial College Dean, Centennial Innovates - Applied Research, Innovation and Entrepreneurship

**EDUCATION**
- MBA, York University, Schulich School of Business, 1992
- B.Eng. & Mgt (Mechanical), McMaster University, 1985

**EMPLOYMENT PROFILE**
- 2019 – Present, Centennial College, Dean, Centennial Innovates - Applied Research, Innovation and Entrepreneurship
- 2010 – 2019, Bombardier Aerospace, Strategic Technology Engineering (R&D), University and Government Relations
- 1985 – 2009, General Motors, Various Positions - International and domestic product development & validation, Manufacturing Operations & Planning

**ACTIVITIES IN ADVOCACY ORGANIZATIONS**
- 2022–2025, Yves Landry Foundation, Board Member, Treasurer
- 2019–Present, Canadian Society of Professional Engineers, Board Member / Executive Committee
- 2013–2020, Ontario Society of Professional Engineers (OSPE), Chair, Vice-Chair, Treasurer, Board Director
- 2017–2019, SAE Aerospace, Technical Standards Oversight Committee
- 2019–2022, Ontario Professional Engineers Foundation for Education, Board of Directors, Treasurer and Audit Committee
- 2012–2015, Professional Engineers Ontario (PEO) / OSPE Government Liaison Committee (GLC)

**YEARS OF REGISTRATION WITH PROFESSION**
Registered as a P.Eng. in 1987

**COMMUNITY SERVICE**
NSERC Ontario Advisory Committee, Green Aviation Research and Development Network (GARDN), Ontario Aerospace Council – Research and Technology Committee, Aerospace Industries Association of Canada - Research and Technology Development Committee

**CANDIDATE STATEMENT**

I am thrilled to be nominated to the OSPE Board - it is an honour.

I am very proud to be a Professional Engineer. I believe that engineers accomplish so much in terms of making society a better place. Engineers are responsible for product improvements that impact all of our lives, and efficiency improvements in manufacturing that ensure that these products become increasingly affordable. Despite the tremendous impact that engineers make on society, I feel that our profession is poorly understood and does not receive the recognition it deserves.

Having served on the OSPE Board previously, I was proud to be Chair when we established the first Professional Engineers Day in Ontario, and being present in Queens Park when the announcement was read in the legislature is not something I will ever forget. In addition, our Board focused heavily on membership growth, and the growth of the Engineering Conference which is now the largest conference of its kind in Canada, including other public advocacy initiatives such as “An Engineer was Here”.

Despite all that has been accomplished, there is more to do. The engineering profession is evolving, with many opportunities for transformation in areas of sustainability, ethical AI, and the removal of barriers for next generation engineering talent. We must continue to embrace change through a solid foundation of engineering knowledge and experience. If elected, I look forward to working with the OSPE leadership team, and the Board to develop new strengthened initiatives designed to improve the practice and impact of engineering in Ontario.

## Meggen Janes, M.Sc., QPRA, QPESA, P.Eng.

**EMPLOYER AND POSITION**
Principal Engineer at Geosyntec Consultants
Executive Director, Canadian Brownfields Network

**EDUCATION**
- M.Sc., Environmental Engineering, University of Guelph, 1995
- B.A.Sc., Geological Engineering (Geotechnical option), University of Toronto, 1989

**EMPLOYMENT HISTORY**
- 2023 to current, Executive Director of the Canadian Brownfields Network
- 2021 to current, Principal at Geosyntec
- 2017 to 2021, Director, Soil and Groundwater Management, Waterfront Toronto
- 1997 to 2017, Various Management Roles: CH2M Hill (now Jacobs), Earth Tech Canada Inc. (now AECOM) and others

**ACTIVITIES IN ADVOCACY ORGANIZATIONS**
- Board Member, Ontario Society of Professional Engineers, 2023 to 2026
- Chair of OSPE Audit and Finance Committee, 2025/26
- Member of the OSPE Board Executive, 2023 to 2026
- Chair of the OSPE Board Nominating Committee, 2024/25
- Board Member of the Canadian Brownfield Network, 2017 to 2023

**YEARS OF REGISTRATION WITH PROFESSION**
29 years in Ontario

**COMMUNITY SERVICE**
- Recipient, Canadian Brownfield Network Pillar Award: 2018 Award Announcement
- STEM Lead, Palmerston Avenue Junior Public School: co-organized National Engineering Month events
- Science Fair Judge, Toronto School (2019, 2023)
- Science Fair Organizer/Participant, Waterfront Toronto (2019, 2020 and 2022)
- Healthy Lunch Program Volunteer, Palmerston Avenue Junior Public School: 2024 to 2026

**LECTURES AND CONFERENCE PRESENTATIONS**
- Past Graduate Course Instructor, Toronto Metropolitan University (TMU)
- Guest Lecturer, TMU and University of Toronto.
- Over 25 conference presentations including: Excess Soil Symposium, SETAC, CANECT, RemTech, Canadian Society for Civil Engineering, Greater Toronto Transportation Network, Toronto Construction Association and others.
- Produced a Micro Documentary Excess Soil

**CANDIDATE STATEMENT**

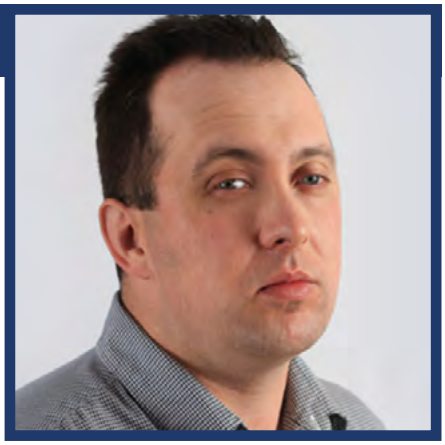
I am enthusiastic about continuing to serve on the Board of Directors of the Ontario Society of Professional Engineers (OSPE) because I deeply believe in the vital role engineers play in addressing complex societal challenges and shaping the future. OSPE's mission of unifying, elevating, and advocating for the profession aligns strongly with my values and professional experience.

As a Professional Engineer and Executive Director of the not-for-profit Canadian Brownfields Network, I work at the intersection of policy, engineering practice, innovation, and cross-disciplinary collaboration. I routinely lead multi-sector initiatives that require consensus-building, regulatory insight, financial oversight, and strategic execution.

Since my previous OSPE Board term began, I have further strengthened my governance and financial oversight experience as Treasurer and Chair of the Audit & Finance Committee. I worked on the Board through the renewal and development of a visionary Five Year Strategic Plan and contributed to financial stewardship as the organization achieved a balanced budget. These experiences have deepened my understanding of the Board's responsibility for governance, accountability, long-term vision, and strategic support.

I seek to continue contributing my governance experience to the Board, along with my financial knowledge, communication, and relationship-building skills to advance OSPE's strategic priorities and support the profession for current and future engineers.

## Josh Lilley, MBA, P.Eng., ICD.D



**EMPLOYER AND POSITION**
Hatch Ltd, Global Director of Commissioning

**EDUCATION**
- MBA, DeGroote School of Business (McMaster)
- B.Eng.Mgt, McMaster University

**EMPLOYMENT HISTORY**
- Global Director Commissioning, Hatch
- Senior Commissioning Manager, Hatch
- Operations Manager – Sudbury, Hatch
- Discipline Lead – Control, Automation & Electrical, Hatch

**ACTIVITIES IN ADVOCACY ORGANIZATIONS**
- Sudbury Chamber of Commerce Municipal Advocacy Committee (2023-2025)

**YEARS OF REGISTRATION WITH PROFESSION**
- 20 years with PEO
- 5 years with APEGS (non-practicing member)

**OTHER PROFESSIONAL AFFILIATIONS, INCLUDING POSITIONS HELD**
- 1 year member with Institute of Corporate Directors

**COMMUNITY SERVICE**
- City of Greater Sudbury Elections Compliance Audit Committee, Committee Member, 8 years
- Cambrian College, Program Advisory Committee - Mechanical Technologist, 2 years
- Greater Sudbury Hydro, Independent Director, Chair of the Audit, Finance and Risk Committee, 8 years

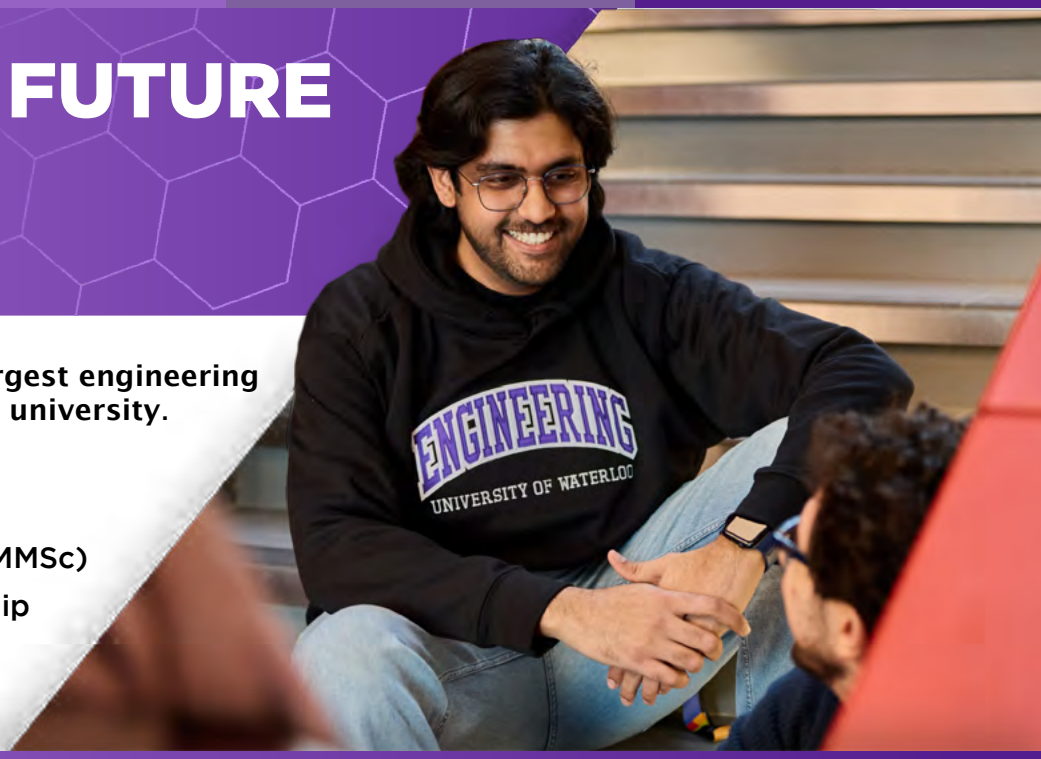
**CANDIDATE STATEMENT**

As an OSPE member based in Sudbury, I have an interest in providing insight to the board from Northern Ontario. With over 24 years of professional experience, predominantly based working in Sudbury's Engineering and Consulting Service Sector, I am eager to support the initiatives that OSPE is advocating for within the profession.

I have been actively involved as an Independent Director with Sudbury Hydro for over eight years. This has given me a solid understanding of being a board director on an organization which operates within a regulatory framework. Through my time with Sudbury Hydro, I have participated on the HR Governance Committee, supported the development and review of policies and procedures and currently involved with the Audit, Finance & Risk Committee.

To the Ontario Society of Professional Engineers, I offer my general management, board governance experience and organizational strategies.

# BUILD YOUR FUTURE
## WATERLOO ENGINEERING

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Master of Business Entrepreneurship and Technology (MBET)

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# Certificate Programs

EngLearn By OSPE | The Engineering Academy

## Project Management Essentials for Engineers

**Date:** April 14 - April 22, 2026

**Price:** Member $695 | Non-Member $860

**CPD HOURS: 16**

**ONLINE**

Managing projects effectively is a crucial skill for engineers, whether they are leading simple tasks or complex projects. The Project Management Essentials for Engineers workshop is a hands-on, virtual course designed specifically for engineering professionals. This course walks participants through key project management principles and techniques, helping them plan, execute, and oversee successful projects of all sizes.

## Lean Six Sigma White Belt Certificate Program

**Date:** April 13 - April 13, 2026

**Price:** Member $80 | Non-Member $119

**CPD HOURS: 8**

**ONLINE**

Designed for individuals seeking to understand the core concepts of process improvement and operational efficiency, this introductory program covers the essentials of Lean and Six Sigma, illustrating how these powerful methodologies work together to enhance processes and eliminate waste.

## AM360° Overview

**Date:** On-Demand

**Price:** Member $350 | Non-Member $500

**CPD HOURS: 11**

**ONLINE**

A collaboration effort between the University of Windsor Faculty of Engineering and CAMufacturing Solutions Inc., AM 360° Overview provides a foundational understanding of additive manufacturing (AM), also known as 3D printing. It covers the principles, processes, and materials used in AM, highlighting its applications across industries such as aerospace, healthcare, and automotive.

## Writing that Sells: Technical Proposals & Pitches Certificate Course

**Date:** On-Demand

**Price:** Member $225 | Non-Member $350

**CPD HOURS: 10**

**ONLINE**

This program provides you with tools to deliver impressive proposals and develop stronger relationships with clients and win over potential clients. Developed specifically for an engineering/technical audience, it's not your typical self-paced course. Its blended approach allows you learn independently and provides opportunities to interact with the course's subject matter expert and instructor through discussion boards and assignments.

# Journey to P.Eng.

## CBA Workshops: Crafting Your CBA Stories

**Date:** April 09, 2026 (8:30 am – 12:30 pm)

**Price:** Member $350 | Non-Member $475

**ONLINE**

Learn to identify your engineering experience and turn it into compelling stories aligned with PEO's 34 competencies. This session covers breaking down your experience into structured "Situation–Action–Outcome" stories, techniques for mapping them to all competencies, and practical writing strategies, templates, and exercises to build your confidence and skills.

## CBA Workshops: Polishing Your CBA Submission

**Date:** May 19, 2026 (8:30 am – 12:30 pm)

**Price:** Member $350 | Non-Member $475

**ONLINE**

Take your drafted stories and refine them to create a portfolio that meets PEO's experience requirements. Learn how to strengthen your stories, align your experience with remaining competencies, and organize a clear, professional CBA submission.

## Prep Course for the National Professional Practice Exam

**Date:** April 29, 2026 - May 27, 2026

**Price:** Member $350 | Non-Member $450

**ONLINE**

Our Prep Course for the National Professional Practice Exam provides the essential tools, knowledge, and guidance to help you excel in the National Professional Practice Exam. These sessions ensure you're fully prepared to meet the licensure requirements.

## Individual Competency-Based Assessment (CBA) Coaching

**Date:** On-Demand

**Price:** $475

**ONLINE**

Refine your Competency-Based Assessment (CBA) and boost your chances of approval by PEO or your provincial regulator. This two-hour program, delivered in two 1-hour virtual sessions, provides personalized feedback and in-session editing tailored to your CBA draft.

# Thought Leadership Thursdays

## IMAGINATION: The Brain's Simulation Engine for Developing Engineering Excellence

**Date: March 26, 2026**

**Price: Member $0 | Non-Member $59**

**CPD HOUR: 1**

**ONLINE**

When a bridge collapses, a system fails, or a safety incident occurs, engineering failures make headlines. Yet engineers are responsible for anticipating risks and imagining what could go wrong. This session challenges the idea that engineering thinking is purely technical and highlights scenario visualization and risk anticipation as critical but often overlooked engineering skills.

## Canada's Cities in a Changing World 1920-2120: An Engineer's Perspective

**Date: April 02, 2026**

**Price: Member $0 | Non-Member $59**

**CPD HOUR: 1**

**ONLINE**

Following the recent publication of Canada's Cities in a Changing World 1920–2120: The Halftime Report, Dan Hoornweg, P.Eng., will offer an engineer's perspective on where Canada's cities originated, their strengths and weaknesses, and where they are likely headed.

## Professional Practice Compliance in Modern Engineering Firms: From Obligations to Operational Reality

**Date: April 09, 2026**

**Price: Member $0 | Non-Member $59**

**CPD HOUR: 1**

**ONLINE**

Professional engineering practice is guided by regulations, documentation, and accountability, but firms often struggle to apply them consistently. This session covers risk assessment, scope, review, collaboration, document control, and use of the professional seal, showing how structured workflows support compliance while preserving professional judgment.

## Understanding Gen Z Engineers: Strengthening Collaboration in Technical Teams

**Date: April 16, 2026**

**Price: Member $0 | Non-Member $59**

**CPD HOUR: 1**

**ONLINE**

This session equips engineering managers, project leads, and technical supervisors with practical insights into how Gen Z approaches problem-solving, collaboration, and innovation. Using relatable engineering examples, we'll explore multigenerational dynamics, common communication gaps, and how Gen Z's comfort with digital tools influences workflows and productivity.

ONTARIO SOCIETY OF PROFESSIONAL ENGINEERS

go.ospe.on.ca/ELRP

# OSPE's Engineering Licensure Readiness Program

**Fully Virtual**

## CBA & NPPE Preparation for International Engineering Graduates (IEGs)

The Ontario Society of Professional Engineers (OSPE) is pleased to introduce our newest bridging program, the Engineering Licensure Readiness Program, designed to support IEGs with CBA preparation, NPPE preparation and employment supports.

### Component 1: CBA Preparation

Present your international experience confidently

- 3 live virtual workshops
- 2 one-on-one coaching sessions
- Supplemental tools to support writing success

### Component 2: NPPE Preparation

Ace the National Professional Practice Exam

- Access to public NPPE course
- 4 group support sessions
- On-demand videos to support learning and more

### Component 3: Employment Supports

Advance your engineering career

- 3 one-on-one job search and career coaching sessions
- Access to OSPE employment events
- 1.5 year OSPE membership

### Program Eligibility

- Canadian Language Benchmark 7+ | Non-Canadian B.Eng.
- Permanent Resident, Citizen, Nominee, Asylum Claimant, or approved work permit
- 4+ years of verifiable work experience
- Completed/near completion of technical exams and/or eligible for NPPE

### Program Dates

- Cohort 2 Schedule: October 2025 – January 2026
- Cohort 3 Schedule: December 2025 – March 2026
- Cohort 4 Schedule: February – June 2026

**For more information and program details, visit our program website go.ospe.on.ca/ELRP**

OSPE - 5000 Yonge St, Suite 701, Toronto, ON
1.866.763.1654 | info@ospe.on.ca

Ontario

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Ontario Tech University

# POWER YOUR FUTURE IN CANADA'S NUCLEAR INDUSTRY

## Train for in-demand nuclear careers - fast.

**Canada's nuclear sector is expanding rapidly, and skilled talent is in high demand. The Nuclear Career Accelerator from Ontario Tech University is an 11-week program designed to help you break into or upskill within the nuclear industry.**

- Gain practical, industry-aligned training led by experts.
- Turn learning into opportunity with optional add-on career and employment support including access to industry networking events.
- OSAP eligible for micro-credentials.
- Fully online / asynchronous.

**Learn More:**

**Explore all Nuclear Industry Training including Nuclear Project Management, Cybersecurity for Energy, and CANDU Decommissioning.**

ontariotechu.ca/nucleartraining

# Thought Leadership Thursdays

## Call for Speakers!

Are you a subject matter expert in an engineering field? Want to lead a one-hour webinar on a current engineering topic you care about?

**Email us at advocacy@ospe.on.ca**

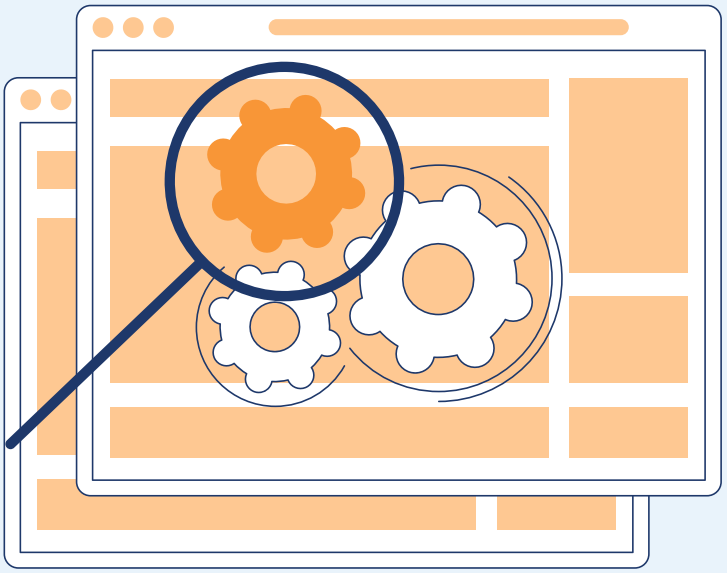
### Topics of Interest:

Artificial Intelligence • CleanTeach • Climate Change • Construction • Emerging Technologies • Energy • Leadership & Management • Mining • Sustainability • Engineering Profession • Research & Innovation • Project Management • Public Safety

Note: All presenters earn CPD credits for their efforts.

# Want to see your work published in an upcoming issue of the Voice?

We do too, which is why we are sharing some information on what we are looking for and how you can best share your research and perspective with the engineering community.



### Article Length: 800-1500 words

Anything longer is probably best published as a white paper (although an executive summary could be included in the magazine to promote it).

### Subjet Matter: Something Newsworthy

Submissions should emanate from research and/or technical work that is engaging and interesting to an engineering audience. Common aspects to consider include the economic, social, and/or regulatory impacts of particular areas of practice.

### Audience: Engineering +

Our magazine is distributed directly to all our members and to an additional 30,000+ members of the engineering community. That is a broad audience, and we encourage submissions to be written in a way that is accessible to all. Subject matter expertise is demonstrated as much by the ability to educate as it is by depth of knowledge.

We invite all members to submit their interest in having work published by sending a brief message to **marketing@ospe.on.ca**. Please be sure to include your name, a brief bio, and an overview of the work you wish to submit. There is no need to submit the finished work as part of your declaration of interest.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