MARCH 2024

# THE VOICE OF ONTARIO'S ENGINEERS

Battery Recycling Infrastructure

Reducing Greenhouse Gas Emissions from Ontario Diesel Highway Trucks

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# Canada Desperately Needs an EV Battery Recycling Plan

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## UPFRONT



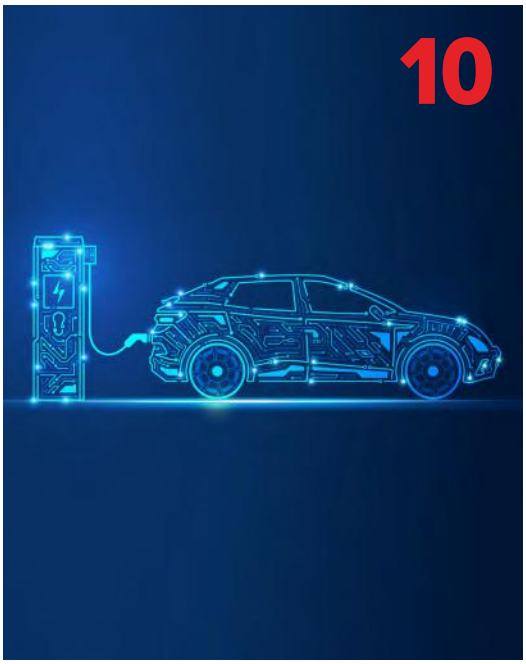
## ADVOCACY IN ACTION



## FEATURED CONTENT



**Battery Recycling Infrastructure: Canada Desperately Needs an EV Battery Recycling Plan**




## OSPE EVENTS



## NATIONAL ENGINEERING MONTH



## GOVERNANCE



## PROFESSIONAL DEVELOPMENT



ENGINEERING ACADEMY

## MEMBER PROFILE

THE VOICE
OF ONTARIO'S ENGINEERS

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Dear OSPE Members,

When you read this, we will be right in the middle of **National Engineering Month**, an opportunity for the engineering community to come together, support each other, and learn from one another.

OSPE is thrilled with how this event has grown over the years, spanning multiple cities and campuses, and engaging thousands within and beyond the engineering community.

This year we hosted our Kickoff Event at the CN Tower - ***"Understanding the True Value of Engineering Services and How to Boost Them"*** - special thanks to moderator Dave Carnegie, P.Eng. and panelists Stephanie Smith, P.Eng., Nick Mocan, P.Eng., and Jim Sarvinis, P.Eng. for sharing their thoughts and experiences of where we are at as an industry today and where we need to go.

When OSPE organizes an event like this we are looking for more than just a summary of where we are at in the industry, we are looking for energy and inspiration about what to do next, and there was certainly a lot of both last week.

Just to level set, we do have challenges in Ontario. Multiple panelists indicated that they are hungry for talent and they just can't find it. OSPE has been aware of this for some time, so we are helping internationally trained engineers through the licensing process and leaning on Professional Engineers Ontario (PEO) to get them, and other qualified individuals, through the process as quickly as possible.

Another challenge is the fact that many engineering graduates are being lured into sectors of the economy that do not require licensure. Employers are seeking them out for their problem-solving skills (obviously!!) but that does create concern over who is going to lead and build if we are losing our best and brightest to other sectors of the economy.

One of the suggestions from the panel, and I agree, is that we need to do a better job showing people how fun "this" is. Engineers are going to be critical to the next 100 years, but probably not the ones who are designing apps or financial instruments. It will be the ones who lead the green energy transition, or those who commit to figuring out how we can house and feed 8.5 billion people smarter than we ever have before. The challenges of our modern world are legacy-building opportunities for engineers and we have to remind them of that at every opportunity.

That has been the focus of our ongoing ***We Are Engineering*** campaign, highlighting the many faces and voices of our industry. It has been very successful in terms of bringing people into the association and celebrating the many different ways that engineers are thriving. We are actually looking to identify some new voices for the 2024 campaign right now. Maybe we are looking for you!

In closing, the only way we can make positive change in the engineering industry is to coordinate and collaborate. That means more events like the one mentioned above where we honestly explore the concerns we all have about the future of the profession. That means more advocacy targeting external stakeholders like government (see a summary of our annual Lobby Day on page 9). And that means being more inclusive than ever, in our associations, our workplaces, and in our communities, so that those who can make a contribution, will do so.

Engineers are natural problem solvers, and the simple truth is we need them more than ever. If we work together and support each other, we can get to where **society** needs **engineers** to be.

**Sandro Perruzza**
Chief Executive Officer
Ontario Society of Professional Engineers

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# NEWS FROM THE FRONT

OSPE's advocacy team has had a busy first quarter, with our annual MPP Lobby Day and Reception taking place in early March as well as meetings and submissions regarding our Women and Gender Equity Project, guidance for schools on indoor air quality, advocating for a Clean Indoor Air Act in Ontario, and advocating for required involvement of Professional Engineers in the technical aspects of reporting required by the International Sustainability Standards Board (ISSB).

## Women and Gender Equity (WAGE) Meetings with the City of London, the City of Oakville, and the City of Kingston

OSPE continues to advocate for all equity-seeking groups with public officials. In these meetings, OSPE staff discussed our **Women and Gender Equity project** and how **Sustainable Procurement** can support female engineers in the workforce.

## Meeting with Health Canada

In this meeting, OSPE met with representatives from **Health Canada's Water and Air Quality Bureau**. OSPE discussed our recommendations regarding the provisions that should be included for filtration, ventilation, and air cleaning devices in their upcoming **Guidance for Schools on Indoor Air Quality**.

## Meeting with the Ontario Ministry of Municipal Affairs and Housing

OSPE staff, and volunteers Beatrice Sze, P.Eng. and Jim Hotchkies, P.Eng., members of the Research and Innovation Task Force, met with representatives of the **Office of the Minister of Municipal Affairs and Housing** to advocate funding for **Decentralized Wastewater Treatment (DWWT)** as it is a more affordable, efficient, and sustainable wastewater solution.


## Meeting with Associate Chief Medical Officer of Health – Dr. Wajid Ahmed

In this meeting, OSPE Staff and volunteer Joey Fox, P.Eng., met with the **Associate Chief Medical Officer of Health, Dr. Wajid Ahmed**, to discuss OSPE's advocacy for a **Clean Indoor Air Act** in Ontario. Indoor air quality is currently not monitored or enforced in public spaces in Ontario. Implementing an act such as this would establish a mechanism for enforcing air quality standards.

## SUBMISSIONS

### Letter to the Ontario Securities Commission (OSC)

OSPE is advocating to ensure Qualified Persons (QPs), such as Professional Engineers, are responsible for the technical aspects of reporting required by the ISSB sustainability disclosure standards. In this letter, **we urge the OSC to consider the necessity of the involvement of Professional Engineers in the technical aspects of reporting required by the ISSB Standards**.

### Ontario Pre-Budget Submission

OSPE's submission to the **Ontario Pre-Budget Consultations** encompassed a broad range of topics we view as vital for investment to benefit Ontario's engineering community and economy more widely.

Read the summary of our recommendations here:

**Empowering Ontario's Future: OSPE's Vision for a Prosperous and Innovative Province**

# Lobby Day and MPP Reception 2024

OSPE held our annual Lobby Day and MPP Reception on March 6 at the Queen's Park Legislative Assembly. This event served as a platform for meaningful dialogue, collaboration, and advocacy, demonstrating engineers' vital role in driving positive change for Ontario's future.

Thank you to all the representatives for engaging and thank you to all our amazing volunteers who participated.

**MPP Ted Hsu** speaking at OSPE's Lobby Day reception

**MPP Mike Schreiner** speaking at OSPE's Lobby Day reception


(Left to right) **OSPE CEO Sandro Perruzza**, **MPP Marit Stiles**, and **OSPE Public Affairs Manager Paola Cetares**

**OSPE CEO Sandro Perruzza** (left) and **MPP Amarjot Sandhu** (right)

OSPE's MPP Reception

# Canada Desperately Needs an EV Battery Recycling Plan

Chloé Richard, M.A.Sc

It is no question that electric vehicles (EVs) are here to stay. The operation of EVs, powered by renewable energy, is much less harmful to the environment when compared to fossil-fuel-powered vehicles [1].

In December 2023, new regulations were released by the Government of Canada, phasing out all sales of new fossil-fuel-powered vehicles by 2035 [2–4]. While these regulations are a step in the right direction, the environmental impacts of the production and disposal of lithium batteries themselves are often ignored [1].

Given Canada's mineral resources, pre-existing automotive manufacturing, and excellent research programs, it has the potential to become a crucial part of the lithium battery resource extraction and manufacturing industry [5], [6].

Several investments have already been made by the government in this industry, including a $27 million investment in E3 Lithium to support the development of a lithium production plant and the development of an electric vehicle battery plant in St. Thomas, Ontario [7], [8]. The manufacturing plant in St. Thomas, in collaboration with Volkswagen, has the potential to be the largest EV battery plant in the world.

This presents significant implications for battery end of life (EOL) management in the decades to come, given the large number of EV batteries that will be in circulation in North America [9]. This article will further investigate existing legislation for single use and small rechargeable batteries in Canada and provide reflections on how to implement, enforce, and execute sound vehicle battery EOL policy.

Historically, battery recycling legislation in Canadian provinces has been minimal. Since the beginning of the 21st century, some extended producer responsibility (EPR) legislation has been implemented for the manufacturers of small batteries. [10]. This legislation was designed to set targets for producer collection of spent batteries and set benchmarks for the percentage of total used batteries recycled in Canada. British Columbia (BC), Ontario, Manitoba, and Quebec governments developed various targets for the collection, recycling quality and efficiency of small single use and rechargeable batteries.

However, all four provinces have struggled to achieve collection goals or implement adequate enforcement policies [10]. Moreover, BC does not have any limitations on what is considered recycling; the battery material can be used for agricultural purposes or recovered as slag. This makes it more difficult to assess the positive environmental impact of recycling the batteries, especially when the emissions resulting from the collection and transportation of batteries are considered [9], [10].

In 2020, Ontario made some updates to its batteries regulation. According to the **Resource Productivity & Recovery Authority (RPRA)**, battery producers in Ontario are responsible for establishing collection sites at retail or non-retail locations that are easily accessible for consumers to return spent batteries. They must also process, refurbish, or reuse 40% of the batteries supplied [11]. The recovered battery materials must be recycled to be used in new products or repurposed for agricultural use.

Placing the responsibility of recycling on battery manufacturers instead of burdening municipalities or provincial taxpayers is sound. In the European Union (EU), this practice has been commonplace for decades for EOL electronics, at no charge to the consumer [12].

In Ontario, there is a small cost that could be incurred by the consumer. An environmental tax can be applied to products by the battery producer to help cover the cost of recycling [11]. These Ontario regulations are relatively new but could provide a framework for EV battery recycling.

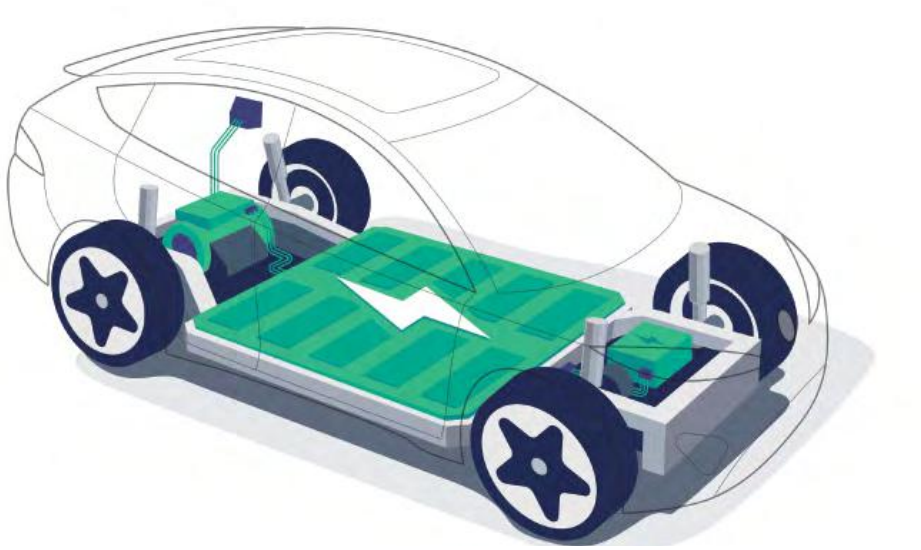
However, the consequences for falling short of Ontario's battery recovery and recycling targets are not clear and appear to be nonexistent. Without negative consequences for battery producers, it may be difficult to incentivize company compliance and public participation in these programs.

An additional consideration for EVs is the transportation of spent batteries to potential recycling plants. Transportation of large batteries to recycling plants will contribute to emissions and costs. Therefore, the size and location of battery recycling plants in Canada should be of interest [9].

Currently, there are several lithium battery recycling plants in development: for example, a Montreal based company, Lithion, secured 125 million dollars in funding in 2022 to build a recycling plant in Quebec [13]. A study done by the **National Research Council (NRC)** evaluated the most advantageous location for battery recycling and disposal plants nationwide to minimize costs and the environmental burden of EOL management [9]. Three hubs were established: one serving the province of Ontario; one serving the Maritimes and Quebec; and one serving BC and the Prairies. Within these hubs, several cities were identified as ideal locations to establish disassembly and recycling plants as well as collection sites. Should the development of these sites follow the recommendations of the evaluation, the cost per kg of recycled battery pack would be about $1.29 CAD, while producing 0.7 kg$CO_{2e}$ per kg [9].

To promote the growth of the battery recycling industry in Canada, the government should introduce legislation incentivizing or regulating the critical mineral supply chain, which could include rebates for the consumer for returning their EV battery to a collection centre at EOL, or financial support for the promotion and development of commercially available lithium-ion battery recycling.

While the government has already made plans to change the **National Building Code** to facilitate the spread of charging stations, there has been no mention of regulating battery EOL management. If all new cars sold in Canada will be electric by 2035, commercialized lithium-ion battery recycling and appropriate EOL management regulations are desperately needed [4]. Moreover, the recycling process itself can further exacerbate the environmental burden of EV batteries. Recycling efficiency and quality must be a priority to ensure recovered materials are used appropriately and the environmental impact from the industrial processes is minimized [10]. Given that the recycling plant infrastructure is still in development and EVs are only increasing in popularity, researchers and experts in the field must help identify opportunities to commercialize the technology, minimize the costs, and facilitate partnerships with battery manufacturers. This will help solidify a more circular economy in the lithium battery industry by creating synergies between battery manufacturers and battery recycling plants, thereby reducing waste and mining activities. Moreover, this will facilitate further job creation, strengthening both the provincial and national economy.



# CYBER RISK MITIGATION STRATEGIES

## 1 Regularly back-up critical data to a separate location that would be unaffected by an issue with your live environment, and test to ensure those backups are recoverable.

All organizations should perform regular back-ups of their critical/important data and should ensure these back-ups are recent and restorable. By doing so, you can guarantee your organization will still function following the impact of a cyber attack, accidental deletion, physical damage, or theft of data. Furthermore, if you have back-ups of your data that you can quickly recover, ransomware attackers are much less likely to successfully blackmail you.

The more often you update your files and data that are critical to your business, the more often you need to back-up. You should consider daily back-ups if you make changes every day, or monthly back-ups if your updates are less frequent, for example.

Many platforms have built-in back-up functionality, so you may already have available options. Alternatively, you can explore either a third-party back-up solution (like cloud backup platforms) or perform your own back-ups to external drives that you keep secure and disconnected from your live environment.

## 2 Use multi-factor authentication (MFA) for cloud-based services and for all remote access to your network.

Passwords no longer provide sufficient security, especially for services available via the cloud (Microsoft 365, Google Workspace, etc). Users might create passwords that can be easily guessed, and humans are vulnerable to accidentally sharing their password via social engineering.

MFA is important as it makes stealing your organization's information much harder for the average criminal. MFA doesn't eliminate the necessity for usernames or passwords, but it adds a layer of protection to the sign-in process. When accessing accounts or apps, users provide additional identity verification, such as scanning a fingerprint or entering a code received by phone or mobile app. MFA is built-in to most cloud/internet-based services, so please ensure you enable it. Alternatively, there are third-party suppliers that offer MFA utility using SMS codes, unique codes, and even hardware tokens. Please note, MFA is not required if you/your business uses Jane, Clinicmaster, owl practice, or Practiceperfect.



## 3 Do not allow remote access into your environment without a virtual private network (VPN).

Attackers are regularly "port scanning" the entire internet for visible remote-access services, such as Microsoft's Remote Desktop Protocol (RDP). Any open RDP services will be constantly probed for weaknesses, so hiding your remote-access services behind a VPN will provide a good level of protection against these attacks.

Like MFA, there are many third-party providers that offer VPN services and your own networking infrastructure (e.g. routers) may also have this functionality built in that needs to be enabled. This requirement is only for remote access to on-premises services.

## 4 Regularly (at least annually) provide cyber security training, including anti-phishing, to all individuals who have access to your organization's network or confidential/personal data.

Your staff are at the front line of your organization. They are constantly exposed to electronic communications with third parties that may leave them open to attack. Even though technical security measures may afford some level of protection – think of email gateways, endpoint detection, and response (EDR) software – it is still essential for staff to be aware of the risks. Training will help employees identify cyber risks, and in turn, will hopefully prevent them from impacting your organization in the first place. The National Cyber Security Centre (NCSC) offers free cyber security training for staff, which has an anti-phishing module within it. You can visit getcybersafe.gc.ca for information and free resources.

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# Reducing Greenhouse Gas Emissions from Ontario Diesel Highway Trucks

Tom Markowitz, P.Eng.

Many Ontario sectors emit greenhouse gases. But, can you name the sector with the highest rate of increase in greenhouse gas emissions? Cars? SUVs? Buildings?

The Ontario sector with the highest rate of increase in greenhouse gas ("GHG") emissions is diesel highway trucks.

Ontario freight truck GHG emissions increased from 6,390 kilotonnes of carbon dioxide equivalent ("kt CO2e") in 1990 to 12,700 kt in 2019, a 99% increase. During the same period, Ontario's population increased by 41%. In 2022, total emissions continued to increase, despite the effects of COVID-19.

The **Government of Canada's Emissions Reduction Plan** has set a target of a 40% reduction in Canada's GHG emissions, below 2005 levels, by 2030 and net-zero emissions by 2050.

If we are to achieve significant reductions within six years, we must produce significant reductions in emissions from diesel highway trucks, our fastest-growing emissions sector.

The 2022 OSPE Research Report, **Reducing Greenhouse Gas Emissions from Ontario Diesel Highway Trucks**, describes practical actions and technologies that can achieve major emission reductions within the next few years, without enormous changes in our energy infrastructure.

## Some Basic Facts:

Combustion of 1 litre of diesel fuel emits 2.73 kg of CO2 into the atmosphere.

Ontario's 135,000 highway diesel trucks burned 5.57 billion litres of diesel fuel in 2019.

## The Biggest Opportunities to Reduce Emissions:

### Intermodal Transportation

Intermodal, or truck-to-rail, refers to shipping freight in containers over long distances by rail and then transferring the containers to trucks for final delivery.

Since shipping by rail is much lower in GHG emissions (13.3 grams CO2 per tonne-km) than shipping by truck (65.5 grams CO2 per tonne-km), shifting more freight from trucks alone to truck-to-rail offers a significant opportunity to reduce GHG emissions.

A major shift from trucks to rail would also relieve the overcrowding on Ontario's major highways and relieve the current and future shortage of truck drivers.

Canada's largest railway, CN, a master of intermodal shipping, owns one of Canada's largest truck fleets. In 2018, CN shipped over 2.6 million containers through its intermodal system.

Canada's two freight railways, CN and CP, operate the highly efficient intermodal shipping of freight containers from the Port of Montreal (PQ), the Port of Saint John (NB), and other sources to large and efficient intermodal freight container yards in Vaughan, Mississauga, and Brampton (ON). There the containers are transferred from rail cars to trucks for final delivery. The (short) final delivery routes are ideal for rechargeable, short-range electric vehicles. These intermodal freight yards are also used to load containers of Ontario products from trucks onto trains for delivery throughout North America.


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Across North America, large e-commerce retailers (e.g. Amazon, Walmart) are already creating their own intermodal shipping networks.

A champion of intermodal rail-to-truck is the Canadian Tire Corporation, which ships containers of retail merchandise across Canada by rail, transfers the containers to trucks at Ontario intermodal yards, and then delivers the containers by truck to retail stores.

The new infrastructure (double tracks, separating passenger rail from freight, intermodal yards, overpasses replacing level crossings) to shift more cargo from trucks to trains would cost billions of dollars, and would require close cooperation among federal, provincial, and municipal governments. However, the economic benefits of an intermodal freight system would be large, and the cost of environmental benefits, in dollars per reduced tonne of GHG, would be small.

The United States Government is currently modernizing its freight railway system as part of the $1.2 trillion infrastructure package, signed on November 15th, 2021. Canada must match the USA's efficiency improvements, or we will find that Canadian companies will ship their goods through the USA instead of Canada.

### Streamlining of Trucks

When a traditional, rectangular box-shaped tractor-trailer is cruising on the highway at 100 km/h, approximately 52% of the engine power is used to overcome aerodynamic drag. External attachments (fairing and covering) have a notable impact on aerodynamic drag, which can be reduced by up to around 26%.

**Courtesy: Professor Mir Atigallah, Mechanical Engineering, Kennesaw State University, Marietta, GA, USA**

We can expect to see highway transport trucks becoming more and more streamlined, just as the rectangular box shape of automobiles 50 years ago evolved into the streamlined shapes of automobiles today with low drag coefficients.

Streamlining trucks will require reliable data, standards, and regulations, involving the governments of Canada, the USA, the provinces and states, trucking organizations, and trucking unions.

The environmental cost of streamlining, in dollars per tonne of reduced GHG emissions, would be low.

### Natural Gas Fuel


Already used as a fuel in many urban transit buses, natural gas emits 30% less GHG per unit of fuel energy than diesel fuel. Ontario's natural gas utilities are promoting compressed natural gas as a fuel alternative to diesel fuel for freight trucks. Enbridge Gas claims that natural gas is up to 40% lower in cost per unit of fuel energy than diesel fuel and is more stable in price. Federal funding is provided through **Natural Resources Canada's Electric Vehicle and Alternative Fuel Infrastructure Deployment (EVAFIDI)**, which is investing in establishing natural gas refueling stations along key transportation routes.

Southern Ontario already has thirteen public service stations where trucks can refill with compressed natural gas. Some truck manufacturers (Volvo, Kenworth, Freightliner) already offer heavy trucks with compressed natural gas engines.

To the trucking industry, compressed natural gas is the most acceptable “clean fuel” alternative to diesel fuel. Natural gas already has an existing refueling infrastructure in Ontario. “Fossil” natural gas can be replaced easily by “renewable” natural gas.

## Other low-cost, effective opportunities to reduce GHG emissions:

- Low rolling resistance tires
- Longer containers: from 53 feet to 60 feet
- Long Combination Vehicles
- Driver training
- Organized planning of freight shipments
- Off-peak delivery of freight

## In the Long Term, New Technologies

In coordination with other jurisdictions, governments should continue to encourage the research, development and demonstration of new technologies that will reduce GHG emissions from Ontario freight trucks in the future.

These technologies include:

- Renewable natural gas fuel
- BioDiesel fuel – production and use
- Renewable ethanol and methanol in diesel fuel
- Autonomous trucks
- Truck platooning
- Electric battery infrastructure, charging and propulsion
- Hydrogen infrastructure and propulsion

These new technologies are described in detail in the **OSPE Trucking Report**.

In adopting each of these new technologies, we must consider:

- Cost per unit of energy
- Compatibility with engines and vehicles
- Availability of feedstock
- Safety of production, distribution, and use
- Environmental emissions during production, use, and disposal

## The "Elephant in the Room" --- Electrification of the Entire Truck Fleet

If Ontario's 135,000 large, diesel engine vehicles were replaced by battery-powered or hydrogen-powered vehicles, how much electrical energy would we need to charge or fuel the new vehicles? How could we generate this new electrical energy?

To convert all of Ontario's 135,000 highway trucks from diesel to electric battery or hydrogen power, Ontario would need to generate 23 terawatt-hours of additional electrical energy per year.

(The full calculation is in the **OSPE Trucking Report**.)

Ontario's existing non-fossil fuel generation system would be able to provide a small fraction of this additional 23 terawatt-hours on windy nights.

Ontario's natural gas-fired generators have enough unused capacity to generate the additional 23 terawatt-hours that would be required to charge the trucks, provided that the trucks were not charging during times of peak electricity demand.

In the absence of major changes in the electricity generation fleet, this natural gas-fired capacity would become the major source of electrical energy to charge electric vehicles in Ontario. The promoters of electric vehicles should realize that most of the electrical energy to charge these vehicles in Ontario would come from natural gas-fired generators.

The use of Ontario's existing gas-fired generators to charge electric vehicle batteries would be attacked by non-government organizations and by some municipal governments that have pledged to end fossil-fuel energy.

If we chose to generate all 23 terawatt-hours from new wind turbines, we would need to install 8,138 new, 1-megawatt wind turbines, each over 100 metres tall. These new wind turbines would cover 5,300 square kilometres of land area in windy areas of Ontario.

If we chose to generate all 23 terawatt-hours from new Candu nuclear reactors, we would need three new, Bruce-size Candu nuclear units.

These calculations do not account for inefficiencies of electrolysis, energy storage, battery charging, hydrogen compression, or electricity transmission. These calculations do not consider the heavy weight of battery-powered vehicles compared to fossil-fuel vehicles.

An even greater challenge would be the installation of thousands of vehicle battery chargers. One of the most recent battery-powered heavy freight trucks, the Volvo FH Electric, can be fully charged over 9.5 hours at 43 kW AC or over 2.5 hours at 250 kW DC. Can Ontario install thousands of chargers, to provide these kilowatts at thousands of locations to rapidly charge thousands of electric freight trucks? (Ontario has 135,000 large diesel highway trucks.) Each charger would require a massive distribution line, transformer, and rectifier to deliver the power from the high-voltage AC transmission line to the low-voltage DC charger.

A complete conversion of Ontario's freight vehicle fleet from diesel to electric would require an enormous increase in Ontario's electrical generation, transmission, and distribution capacity. Conversion of private motor vehicles from gasoline to electric would require even more new capacity.

In its 2020 **Annual Planning Outlook**, Ontario's Independent **Electricity Systems Operator ("IESO")** reminds us that the federal government has set a long-term sales target of 100 percent zero-emission vehicles by 2040, with interim sales goals of 10% by 2025 and 30% by 2030.

"Overall, electric vehicle electricity demand is forecast to grow in Scenario 1, from 0.4 TWh in 2022 to 4.1 TWh in 2040, an average annual growth rate of 15.2%, and in Scenario 2, from 0.3 TWh in 2022 to 3.1 TWh in 2040, an average annual growth rate of 14.5%," according to IESO.

IESO's forecast of total electrical energy consumption by all Ontario electric vehicles, cars, and trucks is much smaller than the total energy that would be required by the freight truck fleet if all diesel freight trucks were replaced by electric.

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## Where do We Go from Here?

The urgent task of massively reducing GHG emissions from Ontario diesel highway trucks can be accomplished within a few years by promoting the low-cost, practical, achievable technologies and actions described in the **OSPE Trucking Report**.

The major first step to achieve these reductions is cooperation among governments (federal, provincial, and state), industry associations and labour unions in Canada and the USA.

The OSPE Research Report, entitled **Reducing Greenhouse Gas Emissions from Ontario Diesel Highway Trucks**, is available on the OSPE web site.

Written by:

Tom Markowitz, P.Eng.
Member, OSPE Climate Crisis Task Force

EngWork By OSPE | EngConnect By OSPE

# Engineering Employment Events

Cut through the noise of online applications. Stand out and make valuable one-on-one connections with employers in your area looking to fill engineering positions now.

Engineering Employment Events are designed to bring together top notch engineering employers and qualified job seekers.

**April 16, 2024**

Sheraton Parkway Toronto North, Richmond Hill

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**May 1, 2024**

EY Center, Ottawa

Learn More:
**go.ospe.on.ca/e3**

# Transforming Transit in the GTA

Mukul Asthana, P.Eng. and Jeannette Chau, P.Eng.

Emissions from personal vehicles using fossil fuels contribute significantly to greenhouse gases. Canada's commitment to net-zero requires an environmentally friendly and effective urban transit system that can reduce the number of personal cars on our roads. A multimodal transport system that relies increasingly on mass transit will effectively meet climate goals.

For greater uptake of public transit by a population, it needs to satisfy the following main three aspects:

1. **Convenience**
2. **Cost-effectiveness/Affordability**
3. **Customer experience**

## Convenience

Transit must be easy to use and travel times must be comparable or better than using personal cars for people to consider switching to public transit. People are becoming increasingly attracted to a 15-minute walkable and livable city coupled with convenient transit.
A robust transit system provides safe and equitable transportation while reducing road congestion and getting people to their destinations quickly.
While municipalities in the GTA have made significant strides in improving their transit systems, significant effort is required to bolster the GTA's ranking in global livable city rankings.

As one example, large investments are needed to electrify the GO Train system as electric motors allow for much faster acceleration and deceleration of the engines as compared to the existing diesel engines, a practice used in many parts of the world. Electrification would allow for shorter distances between GO stations, meaning more commuters could choose a GO Station closer to home, reducing total travel time.

A well-integrated transit system is more likely to meet the diverse needs of the population. However, a major concern seems to be 'silo' thinking and managing coordination between various agencies, which hinders integration.

A potential solution could be a system like **Transport for London (TfL)**, where approximately 75 agencies work together to provide a seamless, integrated system. A potential 'TfGTA' could be ideal for providing integration between municipal boundaries, seamless connections between different transit modes such as GO trains, Light Rail Transit (LRT), Bus Rapid Transit (BRT) lines, buses, on-demand shared/individual fleets, or Uber taxis and last mile solutions (e.g. 'on-demand' electric vehicles or e- scooters). In the future, transit systems could also integrate autonomous taxis subsidized by municipalities.


## Cost-effective/Affordability

Transit must be cost-effective and affordable to increase uptake amongst the population.

The 'black swan' event of COVID-19 and the consequent disruption of supply chains contributed to rising inflation and higher interest rates. As a result, many individuals and families are facing financial hardship, and many find that transportation affordability is a contributing factor. For a growing section of society e.g. low income, (approximately 13% live below the poverty line in the GTA), seniors, people with mental health or physical challenges - the equitable solution is integrated transit.

### Accessibility

The right to mobility can be achieved, in part, through accessible and affordable public transit. Enhancing the subsidization program for various demographics, exploring partnerships with employers, building accessible infrastructure for people with mobility challenges, and upgrading buses, trains, etc. are all actions that can be explored to improve accessibility.

### Case Study – Kansas City

Kansas City, home to the **Kansas City Area Transportation Authority (KCATA)**, introduced the groundbreaking ZeroFare KC initiative in 2020, offering free bus rides. Widely acknowledged as the most expansive program of its kind in the country, the initiative proved successful, prompting the city to pursue additional funding to extend it beyond 2023. Since RideKC implemented fare-free buses, commuters have reported improved access to essential services such as grocery stores (92%), healthcare (88%), and employment (82%). The initiative also contributed to a reduction in safety incidents, with former KCATA CEO Robbie Makinen attributing over 75% of incidents to fare-box disputes. Notably, Kansas City's ridership rebounded to 80% of 2019 levels by October 2020, outpacing many other metropolitan areas during the challenging times of the COVID-19 pandemic.

## Customer Experience

Customer experience is another essential element of public transit to increase user uptake.

The GTA will require much more extensive network coverage to reduce total travel times and wait times at interchanges. Greater amenities can also enhance the customer experience. Transport agencies must work with retail, food, beverage, and hospitality industries to allow patrons to conveniently purchase items which make their trips more comfortable and enjoyable.

Apart from service facilities implemented by transit agencies in the GTA such as Wi-Fi at stations and trains, further improvements could enhance customer experience such as:

- Rush hour trains following the schedule within 5 minutes.
- An effort to achieve a year-over-year increase in customer satisfaction in transit communications.
- More seating to ensure seats are available during rush hour for every passenger on 80% of trains.
- Improved time to address customer concerns and answering 80% of phone calls within 20 seconds.

For digitally savvy customers to plan the shortest duration and distance for 'home to destination' trips, access to Wi-Fi both at stations and onboard is essential. For the not-so-savvy population, we will still need to have all the same real-time information available via digital boards at bus stops, train stations, and last-mile connectors.

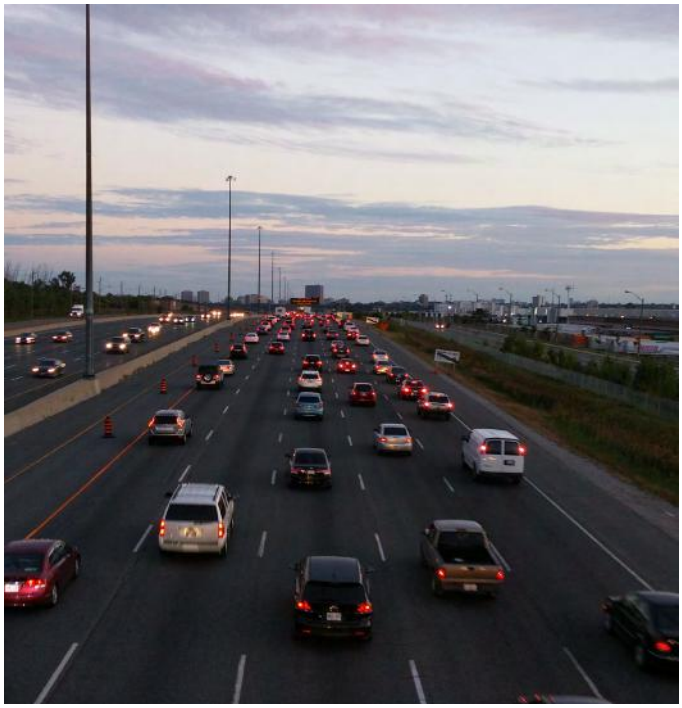
The GTA must also take advantage of various emerging technologies (Artificial Intelligence, Machine Learning, Internet of Things, 5G, Edge technology, Quantum computing etc.) to make data-informed decisions by policymakers, developers, and city planners, not only for capital expenditure but also for operational effectiveness (e.g. real-time route rationalization, frequency of service, providing more rolling stock as required.)

Due to the large number of digital touchpoints, an immense amount of raw data is generated. By anonymizing this rich 'Big Data' and analyzing it, the resulting solutions could be effective in enhancing customer satisfaction and better experience by predicting user behaviour (e.g. when, where, and what the person engages in). For example, the need to pick up some groceries when the person disembarks from transit.

The above, in addition to an integrated fare and payment system via mobile phones, based on distance or zones travelled, makes transit more convenient and less burdensome. Just some examples are the Oyster travel card on the London tube; Unified Payment Interface (UPI payment system) in India and 'We Chat' App payment in China. Today, smartphones are ubiquitous and are being used extensively in several countries for payments for various transactions in transport.
GTA transit agencies are also beginning to employ other aids such as cameras and AI technology to understand customer behaviour and problems faced in using the system to find ways to provide solutions.

A transit system can only be successful with continuous improvement in customer satisfaction. Obtaining feedback from users by various means and focusing on cost-effective digital solutions will result in greater customer buy-in and satisfaction.

It is also recommended that the decision-makers actively engage the community in transit planning. Employers, Business Improvement Associations, large institutions, schools, and universities must all be part of the solution.



## Call to Action

We cannot view the transit system in isolation.

It has been observed in China and India that an investment of $1 in transit results in over $3 in societal benefits and contributes to the upward mobility of less fortunate sections of society. This is in addition to reduced traffic congestion, improved health, increased productivity at work, and improved well-being.

EngTalks
By OSPE

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- CleanTech
- Climate change
- Construction
- Emerging Technologies
- Energy
- Leadership & Management
- Mining
- Sustainability
- The Engineering Profession
- Research & Innovation
- Project Management
- Public Safety

*Note: All presenters earn continuing professional development credits for their efforts.*

When we build new or modify existing transit infrastructure, consideration must be given to climate-resilient and sustainable green infrastructure which can absorb and mitigate the negative effects of climate change as much as possible.

By focusing on the above initiatives, we can create a transit system which would significantly contribute to unlocking the gridlock, improving affordability, increasing accessibility, and helping address climate change goals.

Written by:

Mukul Asthana, P.Eng.
Member, OSPE Research and Innovation Task Force

Jeannette Chau, P.Eng.
OSPE Member

**SCENARIO**

Mary wakes up in the morning and gets ready to go to work. She checks her phone to see if the bus is running on time and walks/uses on-demand transport to the nearest stop which is never more than 1 km away for any resident. Her nearest bus stop has a shelter against the light rain that is now falling and the display board confirms the bus is almost there. She boards the bus swiping her smartphone against the fare reader which debits her phone for the cost of her fare for the entire planned travel route. Her bus travels to a transit hub where she disembarks and boards a train. The train crosses from one region to another, but it makes no difference to Mary because the fares are integrated.

# The Dos and Don’ts of Home Insurance

Home insurance may help to protect your house and belongings against most instances of accidental damage or theft and is often required by mortgage companies, bank lenders and landlords. But how do you choose the right coverage for your unique needs?

Here are some basic dos and don’ts to keep in mind when you’re shopping around for home insurance.

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## Do

**Understand what's included in your insurance policy**

It's important to know what your insurance policy covers so that you can have peace of mind if you ever need to file a claim. While most policies cover claims related to fire, theft and storm damage, you may need to purchase additional coverage for:

- Damage caused by some natural disasters, like earthquakes
- Damage caused by an escape of fuel oil (if you have an oil tank on the premises)
- Damage or theft of particularly valuable possessions like jewellery, furs, collections or works of art
- Water damage such as sewer backup or flood coverage

**Keep an inventory of your possessions**

Make a list of all your belongings, keep your receipts, and record any appraisals of their value wherever possible. This may help expedite your claim if you ever need to replace them. It's also a good way to help determine how much insurance coverage you actually need.

**Review your home inventory and insurance coverage annually**

It's important to carve out time to review your policy each year because, if you renovate or make any major purchases for your home, you may need to adjust your coverage to ensure you're properly protected. Try to choose the same time each year to complete your review so it's easy to remember – your policy renewal date is a good option, but the first of the year or another key milestone could work too.

**Keep your home secure**

You may be able to reduce your insurance premium by installing additional security features in your home, like a security system or an alarm that connects to a monitoring system.

**Ensure your home is properly maintained**

If you can do it safely, inspect your roof, water pipes, furnace, and major appliances regularly or hire a professional to do it for you. This could prevent unnecessary damage, which may help you avoid a claim and save more on your insurance premium.

## Don't

**Automatically opt for the policy that costs the least**

Being underinsured can cost you much more in the long run. Make sure you choose the coverage that best suits your lifestyle, the value of your possessions, and any unique risks associated with your home's location, like an increased likelihood of flooding.

**Underestimate how much you own**

When making your home inventory, be sure to include all the small things that would add up quickly if you had to replace them. Your total coverage amount should exceed this combined value so you're not on the hook for any out-of-pocket costs if something happens to your home and its contents.

**Omit information when talking to your insurer**

Failing to provide your insurance company with accurate information may jeopardize your coverage if you need to file a claim, so do your best to answer all the questions on your quote to the best of your knowledge.

If important things change after your policy is in place – like you get a new roof, for example, or you replace your furnace – you'll need to let your insurance company know so they can update your policy and ensure your coverage is still appropriate.

Home insurance is an essential requirement to protect your house and your belongings, so take the time to choose your coverage carefully. Plus, don't forget that if you ever need to make a claim, you can get in touch with us any time – day or night.

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To find out more, call 1-888-476-8737.

Or visit thepersonal.com/ospe

This article is being provided by the Ontario Society of Professional Engineers on behalf of The Personal which has a group sponsorship agreement with regards to home and auto insurance for our members. The Personal refers to The Personal General Insurance Inc. in Quebec and The Personal Insurance Company in all other provinces and territories of Canada.

# P.ENG. DAY 2024

## What Does a P.Eng. Stand For?

March 1, 2024 marked the seventh annual **P.Eng. Day** in Ontario and OSPE was excited to celebrate with you.

Ontario's engineers are vital to the innovation and growth happening in Ontario right now. This past year Ontario engineers have strengthened our infrastructure, advocated for more diversity in engineering, and fought for higher indoor air quality standards, and that's just the start.

Describing Ontario's hard-working engineers in just a few words is a challenge, here's what we came up with:

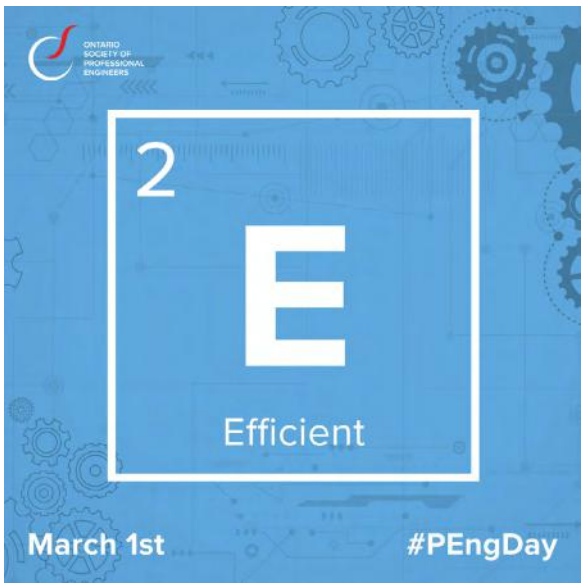

## P – Professional

Engineering is one of the oldest professions. Engineers have been important contributors to the development of modern society, and in a complex world with more than eight billion people, it is even more critical that engineers are held to the highest standards. Employing the most qualified, licensed individuals to "do the work" is paramount. We are proud to support our members throughout their journey, from engineering student to a meaningful engineering career.

***OSPE is committed to protecting the practice rights of engineers and the use of engineering services as a force for creating a more equitable and diverse society.***

*Learn more:*

- Sustainable Procurement
- Equity, Diversity, Inclusion & Accessibility Task Force



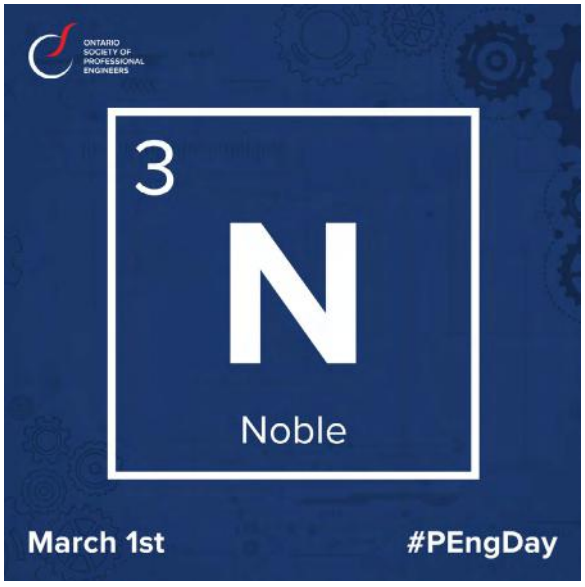

## E – Efficient

Engineering training programs require focus and discipline and feature how to solve real-world problems facing our community. Engineers are programmed to be systems-level thinkers who can balance the needs of today and tomorrow, maximizing tools and processes. To us, that is all about efficiency, which is why we are happy to celebrate this quality and lean into our depth of knowledge and experience to make sure that the most efficient solutions are considered, and to shine a light on when they are not.

***OSPE admires our members' commitment to making sure that evidence-based, efficient solutions are available to Ontario's decision-makers.***

*Learn more:*

- Retail Electricity Price Reform
- Proposed Amendments to the Greenbelt Plan



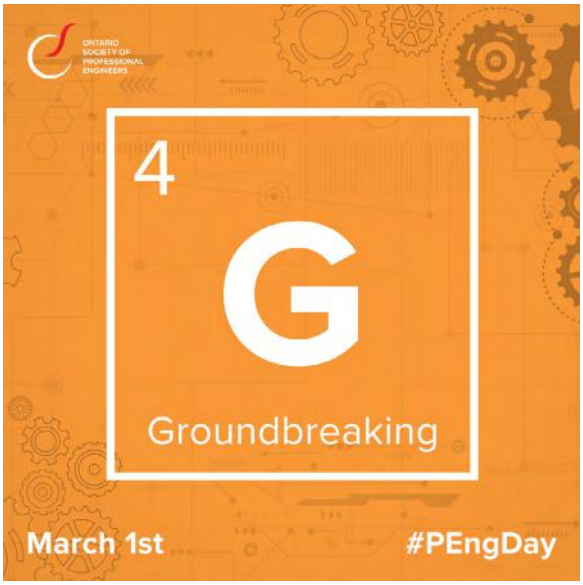

## N – Noble

The word noble can be defined as "having or showing fine personal qualities or high moral principles and ideals". Engineers have always been held to a standard of "doing no harm" and that encompasses protecting the health and safety of the community, as well as operating with honesty and integrity within their areas of competence.

***OSPE is fortunate to have so many talented individuals who are committed to making Ontario safer and more productive, and we encourage all Ontarians to support these efforts.***

*Learn More:*

- Introduce a Clean Indoor Air Act in Ontario
- New Bill Tabled to Ensure Safe Water for First Nations Communities




## G – Groundbreaking Ideas

The world as we know it is built on groundbreaking advancements made by engineers. The way we travel, communicate, and perform daily tasks with ease, are often the result of the work of engineers who saw opportunities to solve a problem. Professional engineers are consistently at the forefront of innovation and this orientation towards finding creative solutions has helped engineers create global change.

***At OSPE, we are committed to supporting research and innovation from our engineering community.***

*Learn More:*

- Research and Innovation Task Force
- Quantum Technology

## FEATURED SOCIAL MEDIA SHARES



# NEW!

# Member Engagement Events across Ontario

OSPE is happy to announce a series of member events that take our reach beyond the office.

We know we serve members across the province, and we want to get to know you better and meet you where you are!

Whether you've been a member for years, or weeks, or are just considering it, join us for an evening of casual networking in a comfortable setting where you can meet engineers in your community.

**Sudbury** | April 18
5pm – 6pm (Members)
6pm – 9pm (Non-Members)
Learn more

**Ottawa** | April 29
5pm – 6pm (Members)
6pm – 9pm (Non-Members)
Learn more

**Kitchener** | June 4
5pm – 6pm (Members)
6pm – 9pm (Non-Members)
Learn more

**Kingston** | October 1
5pm – 6pm (Members)
6pm – 9pm (Non-Members)
Learn more

**Windsor** | October 28
5pm – 6pm (Members)
6pm – 9pm (Non-Members)
Learn more

**Member Price: $25**
**Non-Member Price: $40**

**Keep an eye on our events page to see when we add a Member Engagement Event near you!**

EngConnect By OSPE

# OSPE's Upcoming Events

ospe.on.ca/events

GTA Engineering Employment Event (E3) | APRIL 16

Ottawa Engineering Employment Event (E3) | MAY 01

Annual General Meeting | MAY 07

OSPE Classic Golf Tournament | MAY 23

The Engineering Conference | OCTOBER 29


OPEA Awards | NOVEMBER 15

# Expect More.

We are up for any challenge. Complex projects are opportunities to demonstrate our unmatched skill, outside-the-box innovations, and unyielding strength. Whether you are looking for early contractor constructability expertise or need a consultation on the best methods approach that can add value to your designs, we will exceed your expectations for quality, safety and sustainability.

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# National Engineering Month

## UPCOMING EVENTS

### Professional Engineering Networking Mixer

**March 16 | 12pm – 3pm**

BMO Centre, 295 Rectory St. London, ON

Join Black Engineers Canada in London, Ontario for an engaging event that brings together engineers and engineering students to share their real-world experiences and explore strategies for advancing in the professional engineering landscape. The program includes insightful discussions and features a keynote speaker from the industry, making it an ideal opportunity for engineering students, recent graduates, and immigrant engineers to gain valuable insights and connect with like-minded individuals.

**LEARN MORE**

### Up4 The Challenge – Inclusive Design Experience

**March 20 | 7:30pm – 8:30pm**

Online

Up4 The Challenge will facilitate an interactive, Human-Centered Design workshop, uniting engineering principles with collaborative problem-solving for social issues. The interactive session will foster creative problem-solving and diverse perspectives by instilling empathy and providing actionable design tools. With a commitment to inclusivity, the workshop represents a holistic perspective on engineering that goes beyond technical aspects, focusing on creating positive change for communities.

**LEARN MORE**

### Nothing But NEM

**March 25 | 5pm – 10pm**

Pre-Game Reception at The Loose Moose, 146 Front Street West, Toronto ON *(5pm start)*

Raptors Game at Scotiabank Arena, 40 Bay St, Toronto ON *(7:30pm start)*

It's Back! Come join us as we host our 'Nothing but NEM' Event.

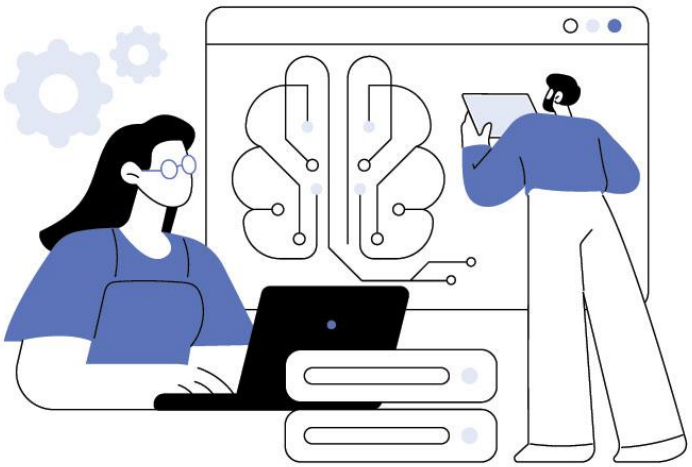
Celebrate National Engineering Month in full spirit with an evening of basketball, food, and fun. Enjoy dinner and comradery with fellow engineering colleagues at the pre-game tip-off party at The Antler Room from 5PM – 7PM. Then watch the Raptors take on the Brooklyn Nets starting at 7:30PM.

Don't miss out on good company, food and entertainment, and buy your tickets today. Limited Quantities Available.

Tickets will be sent electronically to the provided email address closer to the event date. Please ensure you have a Ticketmaster account to accept them.

GOOD COMPANY,
GOOD FOOD,
GOOD FUN.

**LEARN MORE**



## The Intersections of Research in Autonomous Vehicles and Government Policies

**March 26 | 12pm – 2pm**

Online

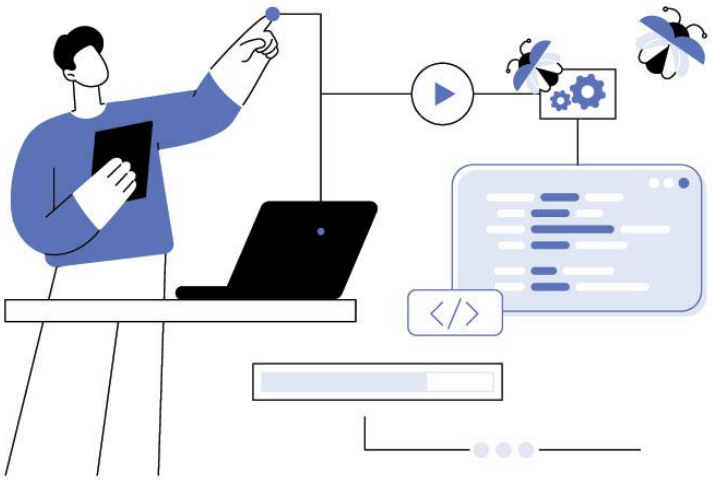
A team of Ph.D. Students, conducting research at the Smart Connected Vehicles Innovation Center at the University of Ottawa in Kanata North Campus, are organizing this event. This event aims to foster discussions on the current state of autonomous vehicles (AV) research and the key policy challenges with a focus on Canada. The planned activities will help the audience explore how government policies can support or hinder the development and deployment of autonomous vehicles, and how research can inform policy decision-making.

**LEARN MORE**

## Other Events Not to Miss:

- Breakfast Bytes: Internship Edition – Learn How to Standout and Excel (March 15)
- Water for the World (Grades 7 – 12) (March 18)
- Women in STEM: What's your story? (March 19)
- Significant Impacts of Equity, Diversity, Inclusion and Belonging (EDIB) (March 19)
- Women in Tech – Inspiring Inclusion, featuring TELUS and DELL (March 20)
- A Collaborative Approach to Developing a National Indigenous Climate Compass (March 21)
- Graduate Student Poster Research Competition (March 21)
- Visit Greenway Wastewater Treatment Centre, London, Ontario (March 21)
- EQ Communication in Engineering (March 23)
- Engineering the Future (March 23)
- Intersectional Perspectives on Engineering & Technology's Ability to Contribute to Social Justice (March 27)
- Graduate Student Poster Research Competition Finals (March 28)
- Ravine Discovery Walk: Exploring Engineering Wonders at G Ross Lord Park (March 30)

**For full details visit Events - nemontario.ca/events/**



national ENGINEERING MONTH

# National Engineering Month Kickoff Event

On March 5th, OSPE hosted a panel discussion ***"Understanding the True Value of Engineering Services and How to Boost Them"***.

Special thanks to moderator Dave Carnegie P.Eng. and panelists Stephanie Smith, P.Eng., Nick Mocan, P.Eng., and Jim Sarvinis, P.Eng. for sharing their thoughts and experience of where we are at as an industry today and where we need to go.

We look forward to further engagement with members, industry, and other stakeholders as we reinforce our sector for the future.


Panelist **Stephanie Smith, P.Eng**., Senior VP of Engineering and Chief Nuclear Engineer, AtkinsRéalis

Panelist **Nick Mocan, P.Eng.**, President, Crozier Consulting Services


(Left to right) **Marilyn Powers, P.Eng.**, **Dave Carnegie, P.Eng.**, **Steve Pepper, P.Eng.**, and **Jerome James, P.Eng.**

**Dr. Janusz Kozinski, P.Eng.**, Founding Dean at the Lassonde School of Engineering (York University)

People applauding the panel discussion at OSPE's NEM Kick-Off Event

NATIONAL BANK

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WITH Jessica Moorhouse

**A 4-step challenge to strengthen your financial independence**

**nbc.ca/women**

ONTARIO SOCIETY OF PROFESSIONAL ENGINEERS

# Join us at OSPE's Annual General Meeting

## Hosted Virtually

**Tuesday, May 7, 2024**

- Hear about OSPE's 2023 activities and achievements
- Meet your 2024/25 Board of Directors
- Receive important updates and learn about plans for the future
- Engage fellow OSPE members

**We hope to see you there!**
**To register please click here.**

*In advance of the Annual General Meeting, you will receive an email from Big Pulse about voting instructions.*


# 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 at **https://ospe.on.ca/about_us/governance/board-election/**.

The slate of candidates presented has been approved by the OSPE Nominations 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.

For more information on OSPE, please visit www.ospe.on.ca or call 416-223-9961 or 1-866-763-1654.

Online voting polls will open on **Monday, March 25, 2024**, and will close at 11:59 p.m. on **Monday, April 15, 2024**.

# Arjan Arenja, P.Eng., MBA, ICD.D

**EMPLOYER**
- Spectrum Business Development Inc, President

**EDUCATION**
- BASc. University of Waterloo, 1992
- MBA, Western University, 2007
- Director Education Program, University of Toronto, 2023

**EMPLOYMENT HISTORY**
- Spectrum Business Development Inc, 2015-present
- Bruce Power, 2007-2015
- Royal Group Technologies, 1996-2006
- EXP Inc. 1992-1996

**ACTIVITIES IN ADVOCACY ORGANIZATIONS**

Boards
- Engineers Canada, 2021- present
- Electrical Safety Authority, 2019 - Present
- Palette Skills, 2023 - Present

Committees

Engineers Canada
- Chair of the Human Resources Committee, Present
- Chair of the CEO Search Committee, Present
- Past Chair of Finance Risk and Audit Committee
- Member of the Governance Committee

PEO
- Ontario Society of Professional Engineers-PEO Joint Relations Committee (past)
- PEO, Government Liaison Committee (Vice-Chair - past)

**YEARS OF REGISTRATION WITH PROFESSION**
- P.Eng., 1994

**OTHER PROFESSIONAL AFFILIATIONS**
- Member of the Ontario Society of Professional Engineers, 2019-present
- Member of the Canadian Institute of Corporate Directors, 2019-present

**COMMUNITY SERVICE**
- Telecare, Community Distress Call Centre, Co-Chair of the Board (2006)
- PEO, Georgian Bay Chapter, Past Chair, Treasurer, GLP Chair (2016-2019)
- Kincardine Badminton Club, Past President, Treasure (2007- present)

**CONFERENCE OR TECHNICAL PAPERS**
- Co-Chair of the Joint OSPE-PEO Government Relations Conference, 2018
- Co-Chair (with Hon. Lisa M. Thompson, MPP, Huron—Bruce), Policy Advisory Committee on the Environment, 2017
- Member of the Organizing Committee Building Science Conference, 1995
- Co-authored various technical papers

**CANDIDATE STATEMENT**

I am deeply passionate about the success of the engineering profession in Ontario and have a robust suite of governance, financial, and collaborative skills that make me a particularly effective board member.

As a Councillor on the **PEO** Council over the past five years, as the Chair of their Governance and Nomination Committee, and working with their executive management team, I have steadfastly advocated for the prioritization of PEO's regulatory functions. Currently serving as the Chair of the Audit and Investment Committee at the **Electrical Safety Authority**, I provide leadership and oversee the organization's financial performance, enterprise risk management, and management of pension and investment funds exceeding $600 million. I have also chaired the Finance, Audit, and Risk Committee at **Engineers Canada** and currently lead the CEO Selection Committee. At **Palette Skills Canada**, I contribute to the Audit and Finance Committee during a critical growth period.

As a skilled collaborator, I always work closely with board members and the executive management team to achieve strategic goals.

I am now seeking to bring my experience, knowledge, and energy to OSPE to support and expand its advocacy efforts for the benefit of all Ontario Engineers. I look forward to bringing innovative thinking to growing the OSPE membership and making it a robust, resilient engineering advocacy organization.

# Nicholas Burgwin, P.Eng.

**EMPLOYER AND POSITION**
Toronto Metropolitan University, Manager, Innovation & Commercialization

**EDUCATION**
MASc., Electrical Engineering – Ryerson University – 2016
BASc., Electrical Engineering – University of Toronto – June 2010

**EMPLOYMENT HISTORY**

| | |
|---|---|
| 2024 – Present | Sustainable Aviation Fuel Database and Advisory, Founder |
| 2015 – Present | University of Toronto, Administrator for ECE 4th Year Design Course |
| 2016 – 2022 | Fibos Inc., Co-Founder and CEO |

**ACTIVITIES IN ADVOCACY ORGANIZATIONS**
- OSPE Board of Directors (2020 – 2023)
  - Audit and Finance Committee (2020-2023)
  - Treasurer (2021-2023)
  - Engineering Academy Steering Committee (2020-2023)
  - Membership Advisory Committee (2020-2023)
- European Virtual Institute for Gas Turbine Instrumentation, Board of Directors (2021 – Present)

**YEARS OF REGISTRATION WITH PROFESSION**
- P.Eng., Ontario - 2015

**COMMUNITY SERVICE**
- Ontario Professional Engineers Foundation for Education
  - Director & Treasurer (2022 – Present)
- Industry Advisor 2nd Year Design Course, UofT (2020 – Present)
- Sustainable Aero Lab – Mentor (2022 – Present)
- PEO East Toronto Chapter – Board Member and Treasurer
- Formula North and Formula Bharat – Design Judge

**CANDIDATE STATEMENT**
A strong regulator, PEO, should have a strong advocacy body, OSPE, to represent the needs and perspectives of Ontario engineers. I have had the pleasure to serve on the OSPE Board and am now seeking your support to run for a second term. I believe that a board should be collaborative and diverse, and my background and industry experience allows me to bring forth unique insights on the needs and motivations for OSPE members and non-members. I have a growth mindset and I am passionate about data. Problem-solving and decisions should be data-driven and made with supporting evidence, and solutions should be continuously evaluated to measure progress. I will bring this experience to OSPE if given the opportunity.

During my time on the OSPE Board, I focused on sustaining the organization's financial stability during COVID and driving membership growth. I was a member of the Audit and Finance committee and Treasurer for my last 2 years on the board. We explored the correlation membership had to the organization's financial position, and better understood the makeup of our members to ensure that our value proposition for our members was well aligned. During this time, OSPE experienced the largest growth in membership and the organization was well-situated to maintain that growth.

A strong advocacy body requires members to increase the strength of its voice, and as a board member, I want to continue focusing on growing membership. The engineering profession is at a pivotal moment with the changes being made by the regulator. This is an opportunity for OSPE to support Ontario engineers to become licensed and to maintain their license.

Thank you for your consideration of my candidacy. I look forward to making a positive impact as a member of the OSPE Board of Directors.

# Nick Colucci, P. Eng., BASc, MBA, FEC

**EMPLOYER**
Greenrock Engineering Ltd., President

**EDUCATION**
- BASc (Civil Engineering), University of Waterloo
- MBA, University of Windsor, England

**EMPLOYMENT HISTORY**
- Town of Erin, Director of Infrastructure Services & Engineer
- Township of Brock, Director of Public Works
- Township of Tay, Director of Public Works
- Greenrock Engineering Ltd., Consulting Engineer

**BOARDS**
- PEO, President-Elect, President and Chair, Past-President, 2021-2024
- PEO, Eastern & East Central Region Councillor
- ON1Call Board, Member
- MEA Board, Member
- OPWA Board, Member
- Durham Region Public Works Association, President
- National Spa and Pool Institute, President

**COMMITTEES**
- OSPE-PEO Joint Relations Committee
- Energy from Waste-Waste Management Advisory Committee
- Orillia Active Transportation and Trails Advisory Committee
- Canadian National Exhibition, Board of Governors

**PROFESSION REGISTRATION**
- Professional Engineer, PEO since 1989
- Certificate of Authorization, PEO since 1992

**CANDIDATE STATEMENT**
I am honoured to be nominated to serve on the OSPE Board of Directors and thankful to the nominating committee and staff for their hard work, dedication and professionalism throughout the process.

As an OSPE member since its creation in 2000, I have always been passionate about Ontario professional engineers having their own voice to advocate for engineers in Ontario.

As President and Chair of PEO Council, I fully understand the regulatory requirements of PEO as well as the advocacy needs of the 90,000 P. Engs. in Ontario.

Engineers in Ontario face a number of challenges that OSPE needs to address both at the provincial government level and in society as a whole.

OSPE needs to demonstrate to Government:
- the need for a Chief Engineer that could be consulted on engineering matters;
- the need for every municipality to have a P. Eng. on staff or appointed as Director of Public Works;
- that engineers should be consulted on all important policy changes like climate change, asset management, infrastructure funding and immigration;

OSPE needs to demonstrate to the public:
- the important work that engineers do and when an engineer should be retained;
- fair wages for engineers and engineering consultants in line with that of other professions.

OSPE needs to demonstrate to all Ontario engineers:
- That joining OSPE will increase the advocacy and collaboration voice with government, industry and the public;
- The financial benefit of joining OSPE including member rates for insurance, professional development, legal consultations, employment assistance, health and dental and other;
- a better value proposition to increase the current membership levels to guarantee the sustainability of the organization

I thank you for reading my candidate statement and ask you to vote for me so that I may continue to advocate for the profession and serve as a dedicated board member committed to continuing the great work of OSPE and strengthening the Voice of Ontario engineers.

Contact me at votecolucci@gmail.com

# Peter Marcucci, P.Eng.

**EDUCATION**
- UofT: B.A.Sc.,1980; M.Eng., 1986
- Harvard - Strategic Management of Regulatory and Enforcement Agencies, 2003
- York University - Masters Certificate in Operational Risk Management, 2006
- McMaster: Charter Director, 2013

**EMPLOYMENT**
- Retired, 2012
- 1999 – 2011: Electrical Safety Authority: Vice President,
- 1980 – 1999: Ontario Power Generation & Ontario Hydro: diverse engineering and managerial experience.

**CURRENT AND PREVIOUS BOARD ACTIVITIES**
- Technical Standards and Safety Authority – Board member - current
- Ontario Society of Professional Engineers Board member 2015-2017, 2021- current
- Electrical Safety Foundation International Canada – Board Chair 2011-2012
- Fire Marshal's Public Fire Safety Council – Board Member 2001-2010

**ACTIVITIES IN ADVOCACY ORGANIZATIONS**
- National Public Safety Advisory Committee – Member, Vice Chair
- Canadian Advisory Council for Electrical Safety – Member, Vice Chair
- Underwriters Laboratories of Canada Advisory Council - member

**PROFESSIONAL AFFILIATIONS**
- PEO
- OSPE
- Institute of Corporate Directors
- Queen Elizabeth II Diamond Jubilee Medal

**COMMUNITY SERVICE**
- Consumer Representative – Canadian Standards Association
- Consumer Representative - Home Inspectors Licensing Expert Panel
- Chair – Parents School Council 1990's

**CANDIDATE STATEMENT**

As engineers we know that working together is a building block of success.
OSPE is an effective advocate for our profession and represents our efforts as Ontario's engineers to have a collective, thoughtful and influential voice with the public, government, business and regulators.

The profession is changing in Ontario and across Canada. Engineering regulators are being compelled to focus on their regulatory mandate and divest of non-regulatory activities. Continuing education is a new requirement. OSPE is well positioned to represent the interests of engineers and provide the services we need.

The Board's role is to ensure CEO effectiveness; oversee and monitor the affairs of the organization; and establish (with the CEO) an effective strategy. Board members must understand their governance role. I know first-hand that a high performing board sets the "tone at the top" that enables the CEO and organization to succeed.

Conversely, we've seen many examples of how organizations (private, public, not-for-profit) have tarnished their reputations and lost their way because of poor governance from ineffective and dysfunctional boards.

In 2012, I obtained the Charter Director's designation from McMaster University and serve on Technical Standards and Safety Authority board. As an OSPE Board member I understand OSPE's challenges and opportunities. Effective Board members possess a matrix of skills. My skill set includes: corporate governance, strategy development, risk management, government relations, regulatory management, stakeholder engagement, and human resources management. I have spent the largest part of my career in roles that required developing collaboration and consensus among diverse interest groups. I have served on OSPE's Human Resources Committee and the Board Development and Strategic Planning committee.

These skills help me fulfill my responsibilities as a Board member in service to OSPE and its membership.

# Marilyn Powers, PhD, P.Eng.

**EMPLOYER AND POSITION**
Mohawk College
Director, Academic Technology Innovation

**EDUCATION**
- Director's Education Program, Rotman School of Management 2024
- Digital Transformation, Watspeed, 2022
- PhD Mechanical Engineering (University of Calgary, Alberta & École Polytechnique de Montréal, 2005
- MSc Mechanical Engineering, University of Calgary, Alberta, 1999
- BASc Mechanical Engineering, University of Waterloo, Ontario, 1996

**EMPLOYMENT HISTORY**
- Mohawk College, Director, Academic Technology Innovation, 2020 – present
- Mohawk College, Professor & Coordinator, Immersive Technologies, 2019 - 2020
- PowersTech Creatives Ltd, Product Management Consulting, 2017 – 2020
- D2L Inc., Senior Product Manager, 2014 – 2018
- AXDEV Group, Director of Operations, 2013 - 2014
- CAE Healthcare, Inc, Manager, Project Management Office, 2011 – 2012
- CAE Healthcare, Inc, Manager, Education, Training & Research, 2008 – 2011
- MPB Communications, Inc, NSERC Industrial Post-doc in Haptic Interfaces & Mechanical Engineer, 2006 – 2008
- University of Calgary, Researcher, Biomechanics, 1996 – 2005
- Mount Royal College, Instructor, Engineering, 1999 – 2002

**YEARS OF REGISTRATION WITH PROFESSION**
- Ontario – 17 years (1996 – 2003 & 2014 - 2024)
- Quebec – 9 years (2004 – 2013)

**OTHER PROFESSIONAL AFFILIATIONS**
- Association of International Product Marketing & Management, Certified Product Manager

**COMMUNITY SERVICE**
- OSPE Board, 2021-2024, Chair 2022-23
- Surge @Mohawk (an entrepreneurship service), Mentor, 2 years
- Communitech, Product Management P2P Co-Champion, 3 years
- Communitech, Women in Tech Mentor, 1 year

**CANDIDATE STATEMENT**
It has been an honour to serve as an OSPE Board Director for the past three years and I hope to continue to serve you for another three-year term.

We have accomplished a lot during the last three years with the implementation of a strategic plan anchored on four pillars: engineers lead, engineers grow, engineers care and engineers prosper. Over the next three years, if elected to the board, I would advocate to continue building on these strengths to amplify and unite the profession toward greater prosperity and inclusion.

I bring to the board my experience of serving as Chair for 2022-23. During this time I met students, engineering graduates and professional engineers from across Ontario and heard the concerns facing you. These connections help me focus on OSPE's purpose to serve our members and remain a strong organization. I served as Chair of the Board Development and Strategic Planning committee in developing our strategy and helped evolve the strategic mandate of the board. I also served as Chair of the Human Resources committee ensuring an accountability framework aligned with the strategic plan. I look forward to bringing my expertise in facilitating complex discussions, raising the voices of everyone and leading with the courage to ask the tough questions. As my commitment to continuous professional development, I am currently completing my Corporate Director certification and looking forward to bringing the practices of disciplined boards back to my fellow board directors.

# Beatrice Sze, P.Eng.

**EMPLOYER AND POSITION**
Canadian Intellectual Property Office, Patent Examiner

**EDUCATION**
University of Toronto – Mechanical Engineering – BaSc
Osgoode Hall Law School – Juris Doctorate

**EMPLOYMENT HISTORY**
2007-2010: GE | Hitachi Nuclear Services
2010-2011: BWXT Nuclear Services
2011-2014: Osgoode Hall Law School (JD candidate)
2014-2015: Baker McKenzie LLP
2015-2020: Sze Law
2020-present: Government of Canada, Innovation Science and Economic Development, Canadian Intellectual Property Office

**ACTIVITIES IN ADVOCACY ORGANIZATIONS**
2019-present: OSPE, Research & Innovation Task Force, Data Working Group
2011-2014: Ontario Bar Association – Intellectual Property and Information Technology Law Working Group

**YEARS OF REGISTRATION WITH ENGINEERING PROFESSION**
13 years

**OTHER PROFESSIONAL AFFILIATIONS**
Professional Engineers of Ontario – licensee
Law Society of Ontario – licensee
Ontario Bar Society – member

**COMMUNITY SERVICE**
2023-present: OSPE, Research & Innovation Task Force, Chair.
2019-2022: OSPE, Data Working Group, Chair.
2014-2018: Pro Bono Ontario – legal aid hotline volunteer.
2011-2014: Engineers Without Borders – Professional Member.

**CONFERENCE OR TECHNICAL PAPERS GIVEN OR PUBLISHED**
Sze, Beatrice, Osgoode Hall Law School, 2011-2014, https://www.yorku.ca/osgoode/iposgoode/tag/beatrice-sze/.
Sze, B. Software Simulation: A Tool for Enhancing Control System Design, Presented at the International CANDU Maintenance Conference, Toronto, November, 2008.
Goldenberg, A., and Sze, B. Development of Kinematic Equations and Projection Software for an MRI- Guided Surgical Robotic System. Presented at American Society of Mechanical Engineers Conference. Ann Arbor, MI. April 1, 2007. Viewable at: http://www.mie.utoronto.ca/undergrad/thesis-catalog/files/335.pdf

**CANDIDATE STATEMENT**
As we move forward from the pandemic lock-downs, the challenges facing our province and profession remain substantive. Disruptive technologies like AI and ML, rising housing costs, political interest in greening Ontario's infrastructure, and sensitive discussions on equity, diversity, inclusion and accessibility are just some of the issues facing Ontarians today. It is clear to me that engineers are uniquely qualified to contribute long-lasting nonpartisan solutions to such complex problems. Moreover, our statutory commitment to serving the public interest sets us apart from other professions when we engage with law-makers and business leaders.

As a licensed engineer and lawyer, I have spent the last 15 years advocating for and defending the interests of engineering teams working on complex technical and public policy matters. I believe my professional background and time-spent practicing both engineering (CANDU nuclear sector) and law (regulatory compliance, civil lit, intellectual property) in Ontario enable me to effectively serve Ontario's engineering community on OSPE's board of directors. My time-spent volunteering within OSPE's task forces has yielded a track-record of collaborative leadership within OSPE's community. It has been my privilege to promote engineering thought-leadership and represent the interests of the profession. I seek the opportunity to build on this work as a Board Member.

Regardless of who you vote for, thank you for reviewing all our candidate-statements. It is because of members like you that our profession is able to thrive.

Rotman School of Management
UNIVERSITY OF TORONTO

**Mostapha Haidar**, MBA '21
Strategy and Analytics Associate,
Johnson & Johnson

**Previous role:**
Project Engineer, Consolidated Contractors International Company, Kuwait

**Previous education:**
Bachelor of Engineering (B.Eng.), Civil and Environmental, Lebanese American University

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The CAEM Certification is valid for three years, can be renewed once, and requires verification of continuing education for renewal. If you do not yet have a Professional Engineer status in Canada, this is the certification for you.

## OSPE/Watspeed Certificate Programs

**Dates:**
Available until
December 31, 2024

**Price:**
Varies by program, 20% discount for OSPE members

Engineers stand at the forefront of innovation and as technology disrupts traditional practices, continuous learning is pivotal to remain relevant and ahead of the curve. WatSPEED, leading the way in technology-focused education, and OSPE, with an acute insight into industry learning demands, have joined forces to achieve just that. Together, we've formed a partnership that symbolizes our collective dedication to empowering engineering professionals to adapt, thrive, and lead. This partnership ensures that engineers not only have access to top-tier educational resources but also benefit from a financial perspective, making quality education more accessible and rewarding.

## Certified Professional in Engineering Management (CPEM)

**Dates:**
Available until
December 31, 2024

**Price:**
$340 - $420

The Certified Professional in Engineering Management (CPEM) is jointly offered in Canada by the Ontario Society of Professional Engineers (OSPE) and the American Society for Engineering Management (ASEM).

This certification is designed to recognize experienced professionals who are seeking to validate with a professional certification their skills, knowledge, and experience in the management of technical operations. If you are a Professional Engineer in Canada, this is the certification for you.

**Learn more: go.ospe.on.ca/learn**

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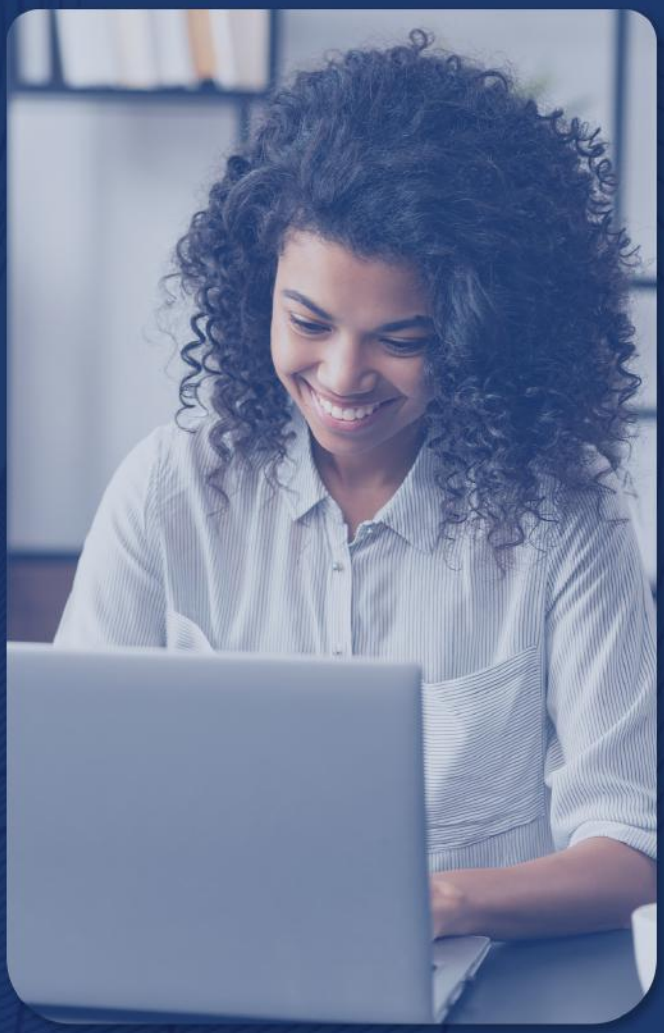

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# MEMBER PROFILE

## Rowena Delina

### An Engineering Career in Four Countries

Rowena Delina is a professional engineer from Cebu in the Philippines, where she completed her civil engineering degree in 1993. She's done projects in Asia and North America, and now works as a Building Information Modeling (BIM) Manager for EBC Inc., where she proposes and implements 3D visualizations for large scale construction projects.

Looking back it all started with an interest in roads, bridges, and other linear projects.

"When I was a young engineer, I felt that there were many competitors in commercial and residential buildings. Very few people concentrated on bridges or linear projects, or subways because they thought that civil work was very easy," said Rowena.

She was challenged by the opinions of her peers and decided to concentrate on the linear field, especially bridges and roads because the people around her took the work for granted and she knew it was vital to the functioning of society.

After finishing school, Rowena took the next steps to get licensed in the Philippines, which meant taking an exam.

While studying for the exam, Rowena worked with her uncle who was an electrical engineer. He ran a small engineering firm, building homes and some commercial buildings where Rowena calculated and recommended sizes for beams, columns, slabs, and the like.

Once Rowena got her engineering license, she moved to metro Manila, the urban centre of the Philippines where there was more opportunity for her to grow her career. There she was hired by a cement management company, where she helped with silo calculations for building cement plants across the country. One in Luzon, the largest island in the Philippines and two in her hometown of Cebu.

She transitioned to doing calculations for conveyor foundations and structural framing before making a big move to the United States of America (USA) to work for the Parsons Corporation. There she took on projects in airports, bridges, and subways. She calculated the thickness of the slab for airport runways, ran calculations for bridge support and became an early trainee in Bentley Systems' software programs, MicroStation, InRoads, and InRail (now Rail Track).

Rowena enjoyed her work at Parsons and was promoted to Assistant Bridge Engineer. A short while after, one of her colleagues landed a job with the Land Transportation Authority in Singapore where they were starting Metro Rail Transit (MRT) and Light Rail Transit (LRT) projects. Knowing that Rowena had spent her career working on horizontal projects, and had learned InRoads, InRail and MicroStation, her colleague passed along Rowena's resume and Rowena found herself with an unexpected interview for a new job in Singapore. The software was newly being used in Asia, and Rowena, thought, 'why not?'

She moved to Singapore the following year and worked on drawings for the upcoming MRT and LRT projects. In 2013, Rowena was working on projects in Marina Bay, in central Singapore, drafting presentation drawings for

subway tunnels, but she wanted to get back to her roots in calculations.

Around that time Building Information Modelling (BIM) was introduced and Rowena was eager to learn and integrate the new system into her work. At the time Changi Airport in Singapore was looking to extend their runway. So, Rowena applied for the position and began working on the new project the following year in a managerial role.

Rowena met with stakeholders, subcontractors, and BIM coordinators a couple times a week and she mainly worked on scheduling and 3D modelling, working closely with the design manager.

A couple years later, Rowena moved to Canada for her husband's education and landed a job at EllisDon as a BIM Specialist where she stayed for two years and trained engineers to use Revit software and create 3D models.

Rowena is currently planning to receive her Professional Engineer designation in Canada in 2025.
Until then she is an engaged OSPE member always seeking to continue her professional development and take on new challenges.

## MEMBER PROFILE Q&A

**How do you think that being an engineer in four different countries has shaped your view of the profession?**

*Having worked in the Philippines, Singapore, the US, and Canada, I've realized that engineering is about how you adapt yourself, and how you engage yourself in learning more.*

*We engineers come from different backgrounds, different cultures, and our processes may be different, but our job is the same and the final assets are the same, whether it be a bridge or a subway.*

*Brainstorming, sharing different ideas, integrating new ideas and being inclusive of different perspectives and processes makes us all better engineers.*

**What would you say to the next generation of engineers?**

*There should be a younger generation concentrating on building roads and bridges and airports and subways.*

*My generation is going to retire in 10 to 15 years, and we have to pass on our knowledge to the next generation.*

*Ontario allotted a lot of money to linear projects, and so I think for younger people, they should consider pursuing linear projects because the potential is a lot and the competition is very few.*

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