

Deloitte.



Electrified fleets pave the way to emissions reduction

**Canada's drive to net-zero is the opportunity
to decarbonize commercial vehicles**



Contents

Introduction	02
The benefits of moving fast	06
Plan your route carefully	08
1. Strategic considerations	09
2. Vehicular considerations	10
3. Infrastructure considerations	12
4. Incentive considerations	14
5. Financial considerations	16
6. Operational considerations	19
Start your EV engines	23

The business case for fleet electrification has never been stronger. Governments are targeting the transport sector to reduce its emissions significantly and consumers are demanding that businesses act on climate change. Many companies are already developing strategies to reduce their emissions across the value chain, including those generated by commercial transport providers. The fleet operators that act quickly to electrify their fleets stand to gain a powerful first-mover advantage, capturing market share and strengthening their brand in the process.

5



Introduction



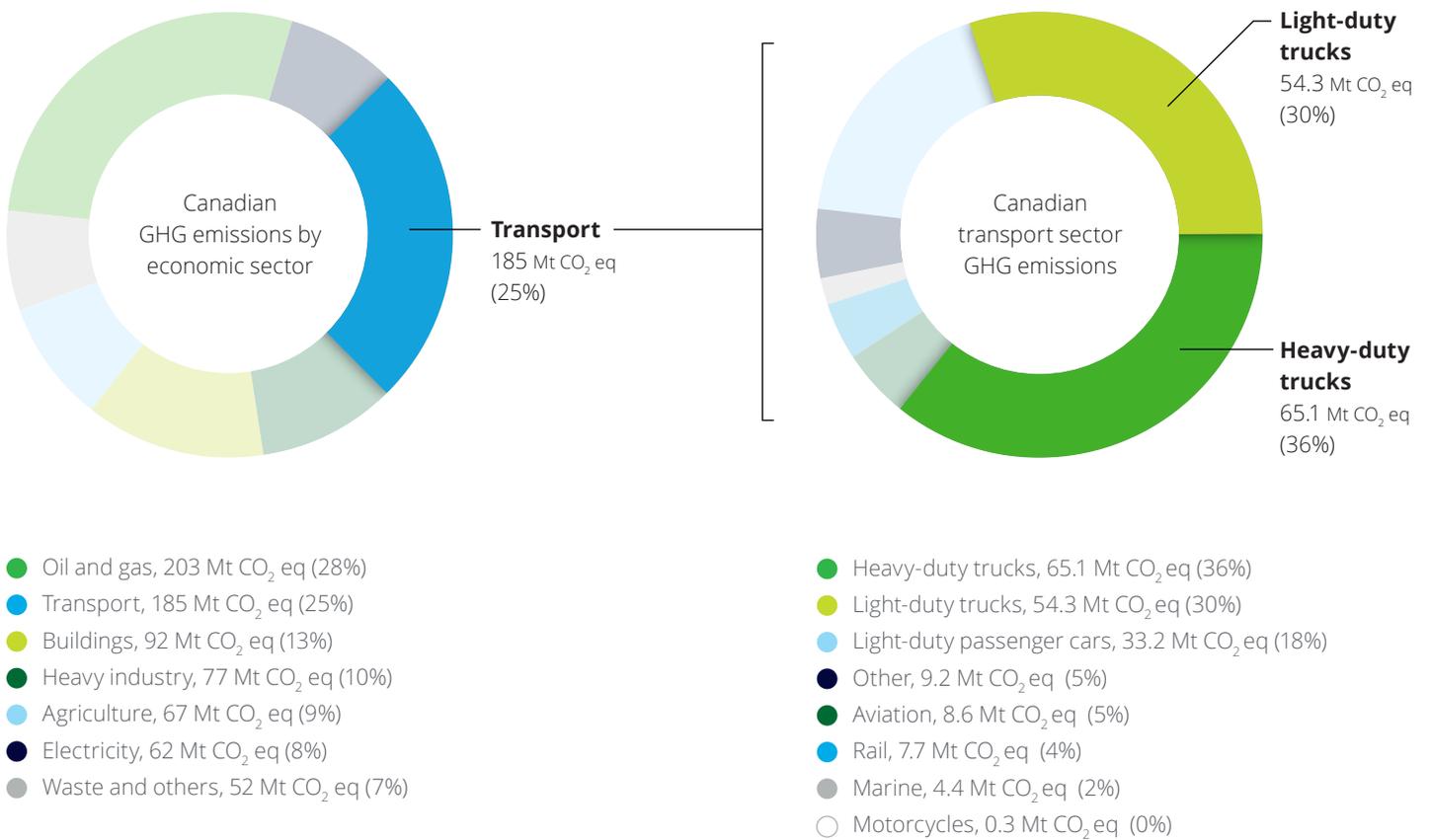
The transport sector is an important part of the Government of Canada's plan to achieve net-zero emissions by 2050.¹

In Canada, the sector is responsible for 25% of all greenhouse gas (GHG) emissions.² Commercial vehicles account for 20% of all vehicles in Canada, but generate more than 60% of the country's road transport emissions (see *Figure 1*).

The federal 2030 Emissions Reductions Plan calls for new policies, subsidies, and infrastructure investments to incentivize emissions-reducing technology and fuel-switching, specifically targeting commercial vehicles.¹ This focus reflects the fact that decarbonizing a commercial vehicle has a greater impact on emissions reductions than doing so on a passenger vehicle: a commercial vehicle can emit up to 21 times more CO₂ than a light-duty passenger vehicle (see *Figure 2*).

Electric vehicles (EVs) are expected to play a significant role in enabling companies to decarbonize their commercial fleets and reduce emissions at a competitive cost. According to the International Energy Agency's projections, EVs will comprise nearly 100% of commercial vehicle sales by 2050 in a net-zero scenario—compared to just 0.1% in 2020.³

Figure 1: Transportation sector contributions to Canadian GHG emissions, 2019



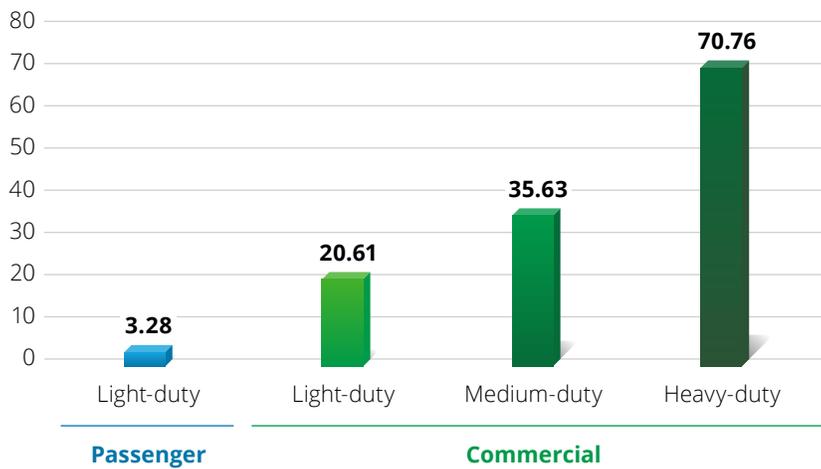
Note: Mt CO₂ eq = Megatonnes of carbon dioxide equivalence

Source: Natural Resources Canada

Many Canadian organizations that operate or otherwise use commercial vehicle fleets have set electrification goals as part of their emissions-reduction strategy, including couriers, retailers, telecoms, and transit authorities. Governments at various levels have set similar goals for the fleets of service and emergency vehicles, school buses, and snowplows they operate. And even those that haven't yet moved recognize they need to accelerate their efforts—converting their fleets to electricity-powered vehicles is a complex process that demands forethought, creativity, and careful planning and investment to succeed.

In this paper, we'll explore the benefits, complexities, and opportunities of fleet electrification. We'll also outline an approach your organization can use to start reaching its own emission reduction goals.

Figure 2: Annual CO₂e emissions per vehicle type, kg CO₂e/vehicle



Source: Natural Resources Canada

Battery EVs are not the only zero-emission option

While fleet operators tend to look at battery based EVs as the main option for reducing emissions, there have been other important developments in zero emission technologies. Hydrogen fuel cell powered electric vehicles (FCEVs), for example, will be an attractive option in some situations where, due to application requirements and/or geographic locations, battery technology will not meet business needs. Scaling up FCEV adoption depends on the availability of hydrogen production and refuelling facilities in the future.



Scope 1, 2, and 3 emissions

What you need to know

Carbon emissions are often described as being Scope 1, 2, or 3. What does that mean? It's a way of categorizing the different kinds of carbon emissions a company creates in its own operations and in its wider value chain.

1

Scope 1 emissions cover the greenhouse gas (GHG) emissions that an organization makes directly—for example, while running its boilers and vehicles.

2

Scope 2 emissions are the emissions an organization makes indirectly, such as those created in the production of the electricity or energy it buys for its heating and cooling needs.

3

Scope 3 emissions are a bit trickier. This category includes all emissions an organization is indirectly responsible for across its value chain, such as the emissions related to buying products or services from suppliers and logistics service providers or to customers using its products. Transport vendors should be prepared to accurately report Scope 3 emissions to their customers; those with greener transport networks may have a competitive advantage over those whose networks are less carbon-efficient. It's important to note that successfully reducing Scope 3 emissions ultimately depends on suppliers' own Scope 1 and 2 emissions-reduction programs and reporting discipline.

The benefits of moving fast

Reducing emissions may be the most important benefit of electrifying an organization's fleet, but it's not the only one. There are numerous operational, financial, competitive, and reputational advantages for organizations that move quickly.



First-mover advantage:

Fleet operators that are already working to electrify their fleets are better positioned to capture an important competitive advantage—and more market share—as their business customers increasingly shift to more carbon-efficient commercial transport providers to reduce their Scope 3 emissions.



Reduced operating costs:

Switching to EVs can shelter companies from fluctuating gas and diesel prices. In addition, EV maintenance costs are lower than those of internal combustion engine (ICE) vehicles, helped by the fact that an EV drivetrain contains around 20 moving parts—compared to more than 2,000 moving parts in a typical ICE drivetrain.⁴ As a result, EV trucks cost 30% to 40% less to maintain than ICE vehicles. The total cost of ownership (TCO) for some EVs is already lower than ICE vehicles, and this trend will continue as EV production continues to scale and technologies improve.



Demonstrated market leadership in sustainability:

A recent Deloitte survey found that reducing carbon emissions was a near-universal priority for consumers worldwide.⁵ Consumers expect brands to take climate action in exchange for their loyalty, and the companies that move decisively to electrify their fleets may earn reputational and competitive rewards as a result. For transport companies, early adoption could be key to capturing a greater share of the market as retailers and other organizations seek to reduce their Scope 3 emissions by engaging transport vendors that offer greener networks than their competitors.



Preparing for the future:

Canada's carbon tax will continue to increase this decade, from \$50 per tonne of CO₂e in 2022 to \$170 per tonne by 2030.⁶ The federal government is banning the sale of new gas- and diesel-powered cars and light trucks by 2035 and targeting 100% zero-emission medium- and heavy-duty vehicle sales by 2040. Organizations that are working to transform their fleet's power source today will minimize the disruptive impacts of these regulatory changes on their businesses in the years to come.

This kind of transformation involves investing significant capital into vehicles and charging infrastructure. Operators can offset those costs by taking advantage of the \$3 billion in EV grants and incentives currently offered by Canada's federal and provincial governments (*see Figure 4*), but the window of opportunity is closing: these grants and incentives are both time-bound, expiring by 2027, and capped. Those who wait may find that the funds have been exhausted, requiring them to bear the full cost of their electrification efforts.

Taking early action also helps ensure that partnerships with EV manufacturers can be established to secure the vehicles and infrastructure required at a time when EV demand is outpacing supply. In addition, first movers can ally early with local utility companies to attain additional power supply that may be needed for on-site charging infrastructure.



Plan your route carefully

While the environmental gains to be made make the case for fleet electrification, we can't lose sight of how large an undertaking it is. It requires organizations that operate or rely heavily upon transportation to fundamentally transform how they operate. For those tasked with this massive responsibility, we suggest careful consideration of several key areas to help with the decision-making.



1

Strategic considerations

Developing a successful strategy and road map starts with collecting and analyzing data about fleet operations, infrastructure, and organization. The resulting information and insights will enable the fleet operator to determine the EV range the fleet will require, the types of EVs best suited to its operations, the charging infrastructure needed, and where the infrastructure should be built. The data can also be used to inform a rollout plan that prioritizes and meets the organization's carbon reduction targets and timelines.

Implementing telematics across the fleet can provide fleet operators with essential data that can be used to develop an enhanced, fact-based, and highly detailed electrification strategy. Telematics devices should be able to capture data in real time, and this data should be stored centrally, integrated into existing transportation management systems, and made available to the team involved in building the fleet electrification plan.

Figure 3: Data points to examine when developing strategies

Fleet data

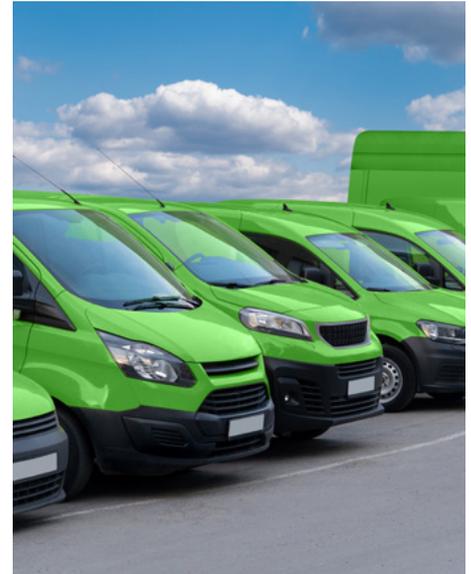
- Fleet ownership structure
- Vehicle classes, makes, and models
- Vehicle age and retirement schedules
- Maintenance and energy costs
- Routes operated—short, medium, and long haul
- Operational territory planning and mapping
- Geographic climate and weather conditions

Infrastructure data

- Facility locations and territories served
- Facility ownership structure
- Facility energy consumption and available electrical capacity or bottlenecks
- Facility operational flow
- Facility and yard layout
- Utility-provider infrastructure considerations and capacity constraints

Organizational data

- Financial health
- Projected growth
- GHG-reduction goals
- Alignment with other electrification initiatives (material-handling equipment, heat pumps, public-/personal-use EVs, etc.)



Get electrified

Deloitte's business accelerator, **Electrified**, can be employed to understand your fleet and its potential for electrification. It ingests your fleet telematics data and integrates it with your operational data and proprietary benchmarking datasets to establish your current utilization, GHG emissions rate, and related costs. The output includes a fleet profile overview, optimal vehicle candidates for EV replacement, an electrification simulation of a multi-year fleet electrification plan that reflects budget realities and different priorities (GHG reductions, cost savings, etc.), and recommendations for charging infrastructure systems and sites. Electrified also overlays any available grants and incentives to assist in prioritizing rollout plans.

2

Vehicular considerations

Operating battery-powered EVs isn't the same as operating traditional ICE vehicles, of course. The unique characteristics of EV batteries can require companies to rethink and redesign their fleet operations, routing, and networks.⁷ Aspects to think about include:

- **Extreme temperatures:**

The performance and durability of EV batteries are more affected by temperature than traditional diesel vehicles. At just -15°C, for example, EV range drops by nearly half.⁸ To counter this, manufacturers are implementing thermal management systems that keep batteries in their optimal temperature zone.

- **Charging time:** Using the fastest available charging technology as required by the business, a commercial EV will take more than two hours to fully recharge. That's significantly longer than it takes to refuel a fossil fuel-powered truck but not a concern for vehicles that have daily routes within range and can charge overnight.

- **Haul loads:** Some commercial EVs with heavy loads may drain batteries faster than predicted. This may result in shorter ranges or higher energy consumption.

- **Battery size:** With current technology, additional or larger batteries are the only way to extend the range of commercial EVs. This comes at the cost of longer charging times or lower payloads relative to ICE vehicles.



Fleet electrification is achieved by replacing an existing fleet with new or used commercial EVs or, in some situations, by retrofitting existing ICE vehicles in the fleet. These options have different benefits and costs.

Replacing an existing fleet

Exchanging ICE vehicles for EVs is the most common approach to fleet electrification. Organizations often prioritize EV replacement for older vehicles, those with high mileage, and those with above-average repair and maintenance costs for their class.

Once replacement targets are identified, operators must select the model(s) of EV that will best meet their operational needs—and that are approved by Transport Canada. At the time of writing, there are at least 19 commercial EVs available on the global market, offering a variety of classes, ranges, and battery capacities. Established original equipment manufacturers (OEMs) have invested billions in EV offerings. This includes GM's \$2-billion investment to create Canada's first all-EV assembly plant, which will focus on building BrightDrop commercial electric vans for the North American market.⁹ There are also several start-ups and scale-ups building commercial EVs, some of which have landed lucrative partnerships, investments, and contracts with companies such as Amazon, UPS, and FedEx. As global decarbonization efforts gather momentum, more EV models are expected to become available as technology improves, capital costs decrease, and OEMs achieve economies of scale in production.

Retrofitting an existing fleet

Turning an ICE vehicle into an EV vehicle means replacing the existing powertrain, exhaust system, and fuel tank with an electric powertrain and battery pack.¹¹ This option can be more economical than replacement and enables fleet operators to upcycle their existing vehicles rather than prematurely disposing of them.¹² Retrofitting can also help organizations achieve their GHG emission reduction targets despite commercial EV supply constraints. However, it does come with some risks: as a new practice, retrofitting lacks a clear process of regulation, inspection, and checks to ensure the work is completed safely. This means retrofitted EVs will likely require additional safety reviews and maintenance checks compared to purpose-built EVs. The lack of a reputable accreditation scheme for retrofitted EVs may also make it more challenging for organizations to insure those vehicles.¹³



OEM partnerships improve access to EVs amid tight supply

With demand for commercial EVs greatly exceeding supply in North America, some organizations have partnered with OEMs to secure access to EV vehicles. UPS has invested in EV manufacturer Arrival to procure 10,000 electric step vans, and Walmart teamed with Canoo to procure 4,500 electric vans, with an option to extend that to 10,000.¹⁰ While these types of partnerships and investments allow these large organizations to secure their own supply, they can also tie up the production capacity of the OEMs for many years.

Fleet operators should move swiftly to build OEM relationships to avoid long EV wait times, alleviate costs, create a buffer in resource allocation, and gain better insight into EV-related technological advances.

3

Infrastructure considerations

Charging infrastructure can be one of the most complex aspects of fleet electrification, requiring significant planning, time, and capital investment. These are the key stages to focus on when developing a charging infrastructure strategy:

- **Assessment and design:** It's essential to start with a needs assessment to determine the number of charging stations required and the readiness of facilities to accommodate them. This will necessitate a detailed analysis of the electrical power supply and all structural and operational requirements to support the charging infrastructure at each site. Close collaboration with utility companies is important to understand the feasibility and potential costs involved in installing chargers at a given site. Engaging an engineering firm to conduct site assessments will ensure the structural, systems, and electrical integrity of charging station facilities.
- **Procurement:** There are several factors to consider in selecting a supplier for EV-charging hardware and software for facilities. In choosing a partner for hardware, charging speeds, communication capabilities, costs, after-sale services, and support to minimize operational risks should be examined. When selecting charging software, organizations should consider capabilities such as monitoring the status of the chargers, visualizing charging data, managing energy levels, and generating automatic reports. The importance of interoperability for all the different charging hardware and software cannot be overstated—it can make the difference between potentially costly, time-consuming issues and drivers being able to charge their vehicles without any complications.
- **Construction and installation:** There should be a well-thought-out plan in place for the electrical service and facility upgrades needed to accommodate the construction and installation of charging infrastructure. Engaging a third party enables access to specialized expertise and best practices, typically through one of three models: charging as a service, project management support, and outsourced turnkey installation. Each model has different advantages, disadvantages, cost structures, and risk profiles, which should be carefully evaluated.
- **Commissioning and operation:** The logistics of EV charging need to be understood and integrated into the charging infrastructure plan. One of the key decisions involves overnight versus sequential charging. Overnight charging is best suited for organizations with fleets that are idle at night so the EVs can be charged at a terminal, with one charger per vehicle. With sequential or opportunity charging, EVs are charged in sequence regardless of the clock, making it more suitable in situations where a facility's electricity supply is constrained.
- **Other:** Organizations may also want to look at ways to mitigate the risks related to power outages or battery drainage in the field. Possible solutions include onsite solar or wind power-generation facilities, and backup or mobile chargers.



IKEA pieces together its path

It's not surprising that the retail giant is striving to electrify its fleet—sustainability has been part of its culture for years.

IKEA is diligently pursuing science-based emissions reduction targets aligned with global climate agreements and targets, including reducing its Scope 3 emissions worldwide. The world's largest furniture retailer says it's committed to leading by example and doing the right thing, even if it's not always easy. And it's certainly not been an easy path to electrification in Canada and the United States.

The first challenge is that IKEA doesn't actually own a fleet. Instead, the company relies on networks of independent transport service providers (TSPs) in these markets. (In Canada, it contracts with eight TSPs, with some owner/operators among them.) That means the retailer has had to persuade its TSPs to make the switch to EVs. Encouragingly, it has found them to be quite open to the idea, but with some concerns—especially about charging the vehicles.

IKEA Canada's solution has been to make a significant capital investment to install charging infrastructure at its locations across the country, aided by grants from government programs. This move allows its TSPs to use IKEA locations as a home base for their EVs, charging their trucks overnight to be ready for the next day's deliveries. IKEA US has done something similar in several locations, but the fact that the company leases many of its facilities makes it tough to justify significant capital

investments. The solution? Working with third-party suppliers to install mobile charging units inside shipping containers for TSPs to use.

IKEA Canada's fleet electrification program continues to gain momentum. In 2022, the company issued its first transport-related request for proposals that requires EVs—and makes it clear that fleets without zero-emission solutions will not be considered. Looking ahead, the company expects its efforts will necessitate other changes. EV range limits will likely drive continued re-examination and redesign of the company's fulfillment networks as it works to achieve its ambitious sustainability targets.

4

Incentive considerations



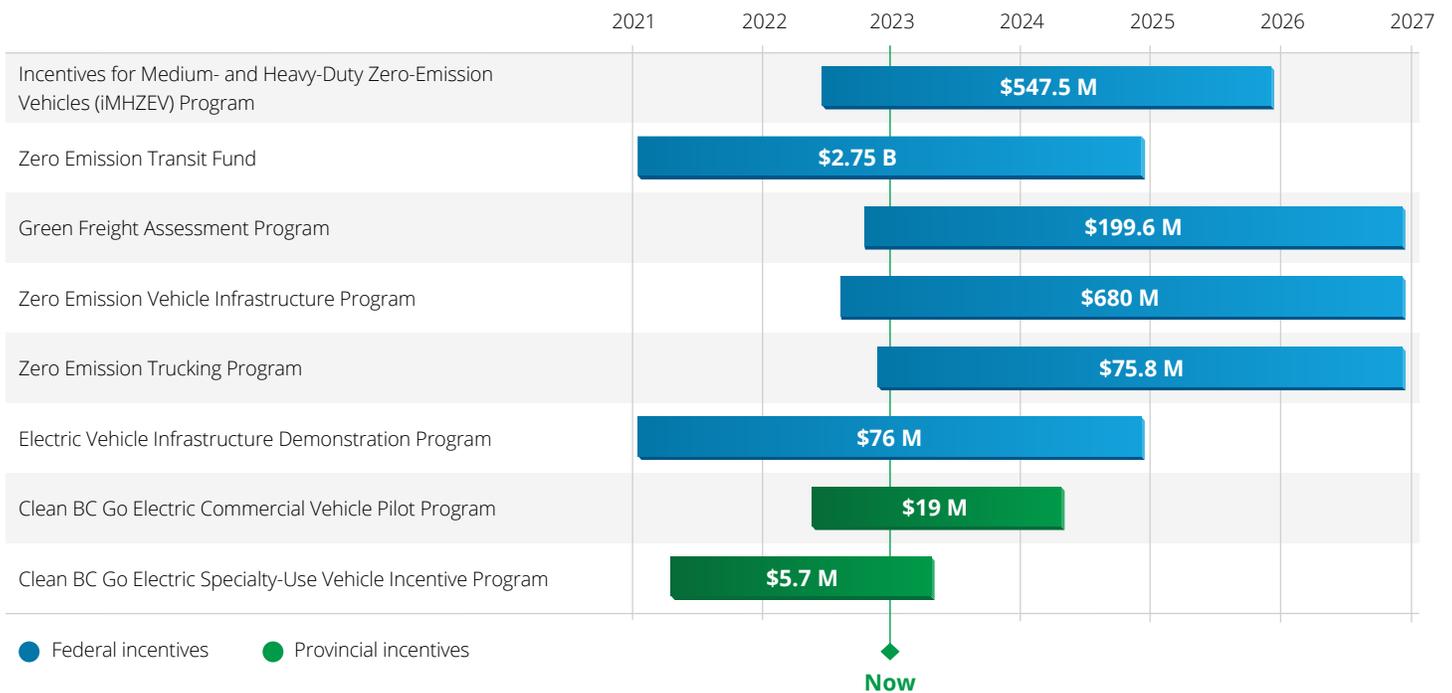
While the initial capital costs involved in fleet electrification are high, organizations can offset them and reduce the TCO for EV vehicles by taking advantage of federal and provincial incentives. But it's important to move fast, as these incentive programs are only available until funding runs out or time expires.

We estimate that approximately \$3 billion is available for fleet electrification in Canada between now and 2027 under the federal government's 2030 Emissions Reduction Plan. Additional funding is available at the provincial level and through organizations such as the Canadian Infrastructure Bank, which recently launched a \$500-million infrastructure initiative with the goal of increasing the number of EV charging and hydrogen refuelling stations across the country.¹³ These funding programs can be used to reduce the initial capital costs of EV purchases, charging infrastructure, and related work.

It's also important to be aware of the federal and provincial plans and regulations related to emissions reductions.

- The Emissions Reduction Plan calls for 35% of medium- and heavy-duty vehicle sales to be zero-emission by 2030 and sets a goal of 100% of sales by 2040.
- The federal carbon price is expected to dramatically increase by 2030, making it more costly to operate traditional ICE vehicles.
- Some provinces are implementing their own regulations: British Columbia, for example, will require more than half of the trucks sold in the province to be zero-emission by 2035.

Figure 4: Fleet electrification incentives available in Canada



Other programs:

- Zero Emissions Vehicle Awareness Program
- Écocamionnage Program—Technology Acquisition (Stream 1)
- Transportez Vert Program—DC Fast Charging Station (Stream 4)
- SouthGrow Regional Initiative—EV Charging Program

Chart shows total available funding of the program when announced. This is not an exhaustive list.

5

Financial considerations

Fleet operators should recognize and consider the TCO in their plans.

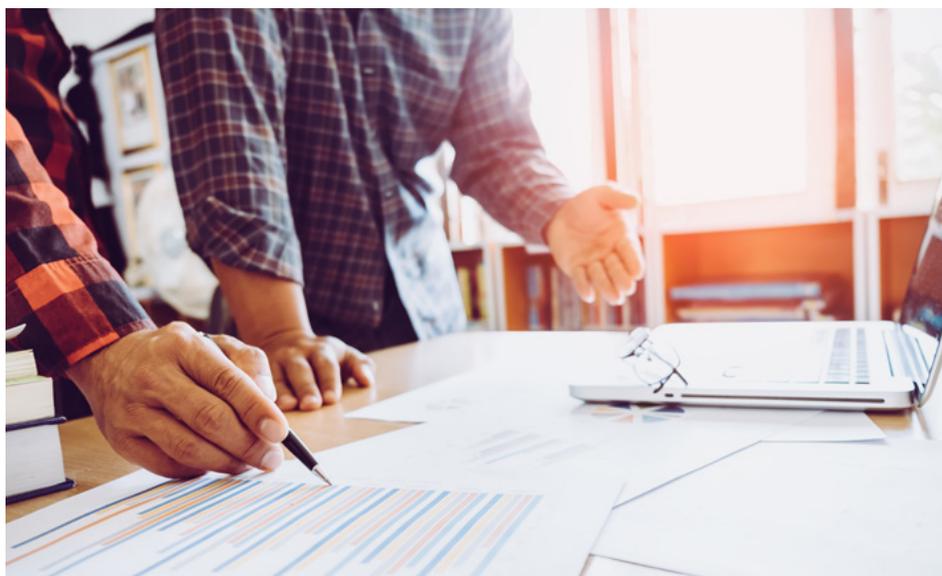
Batteries are the biggest cost for electric vehicles. EVs that require larger batteries to move large payloads or travel longer distances on a single charge cost significantly more than ICE vehicles; currently, a battery-electric class 8 truck can be up to four times more expensive than its diesel equivalent. However, EVs that carry lower payloads or travel shorter distances (e.g., cargo vans) require smaller batteries, and can cost just 15% more than an ICE equivalent. Though class 2 commercial EVs come with a capital cost* premium, they can already achieve price parity on a TCO basis because of lower energy, maintenance, and other costs*. As battery-electric technology costs are expected to decline, most class 8 commercial EVs are likely to reach TCO price parity by 2030 (see Figure 5).

At the same time, maintenance costs for EVs are considerably lower than for their ICE counterparts, because their drivetrains have far fewer moving parts and are less dependent on friction braking. As a result, EV trucks cost 30% to 40% less to maintain than ICE vehicles.

Fleet electrification can also significantly reduce operators' energy costs* and protect them from fluctuating fuel prices. Electricity is cheaper than diesel per gigajoule of energy across most of Canada, except in Ontario, New Brunswick, Nova Scotia, and Prince Edward Island (see Figure 6). The higher energy efficiency of EVs means they should be much cheaper to operate, even in jurisdictions with high electricity prices (Ontario, for example) or low fuel prices (such as Alberta), as illustrated in Figure 7. And with Canada's carbon price set to gradually increase from \$50/t CO₂e

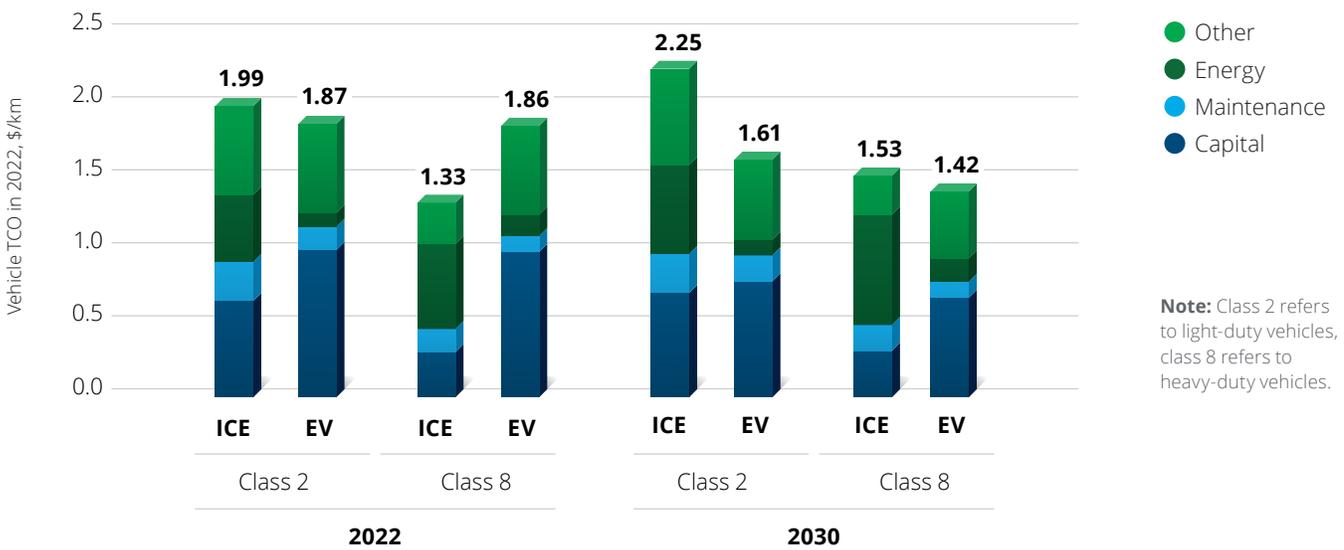
in 2022 to \$170/t CO₂e by 2030 (from 13 to 46 cents per litre), fuel prices are expected to rise more quickly than electricity prices over the same period.

Finally, technological improvements should contribute to lower capital costs and the TCO over time. Battery prices have steadily declined as manufacturing processes have improved and new battery chemistries identified. According to BloombergNEF, average battery pack prices could drop to \$100/kWh by 2024, which would put the TCO of many EV models on par with their ICE equivalents. In addition, improving battery energy density means that new EVs will require less battery power to travel the same distance as older EVs—which translates to fewer battery cells and lower vehicle prices (see Figure 8).



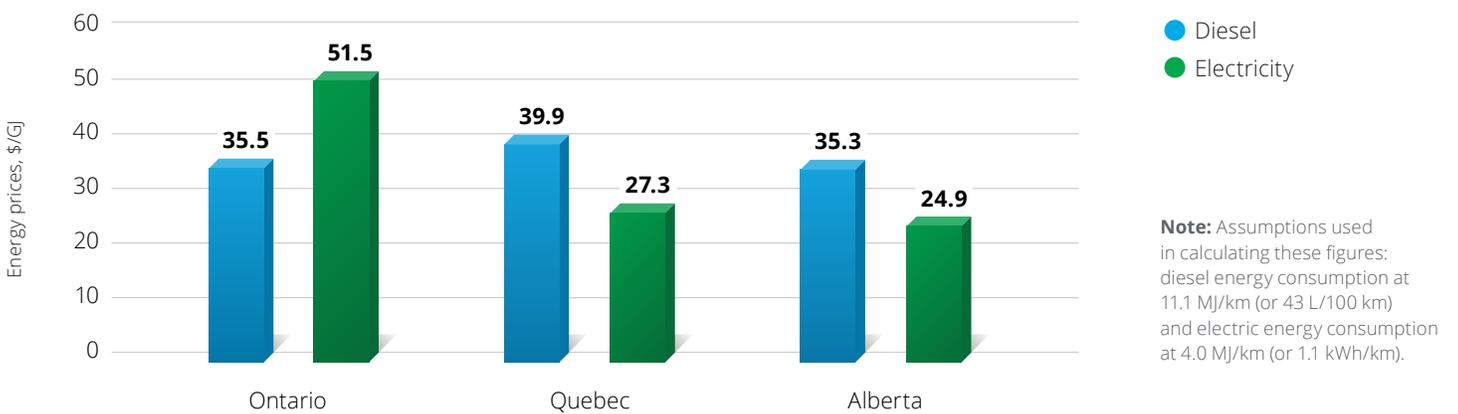
* Capital costs include vehicle and infrastructure costs. Energy costs include the carbon price. Other costs include depreciation, insurance, and miscellaneous costs.

Figure 5: Total cost of ownership comparison between 2022 and 2030



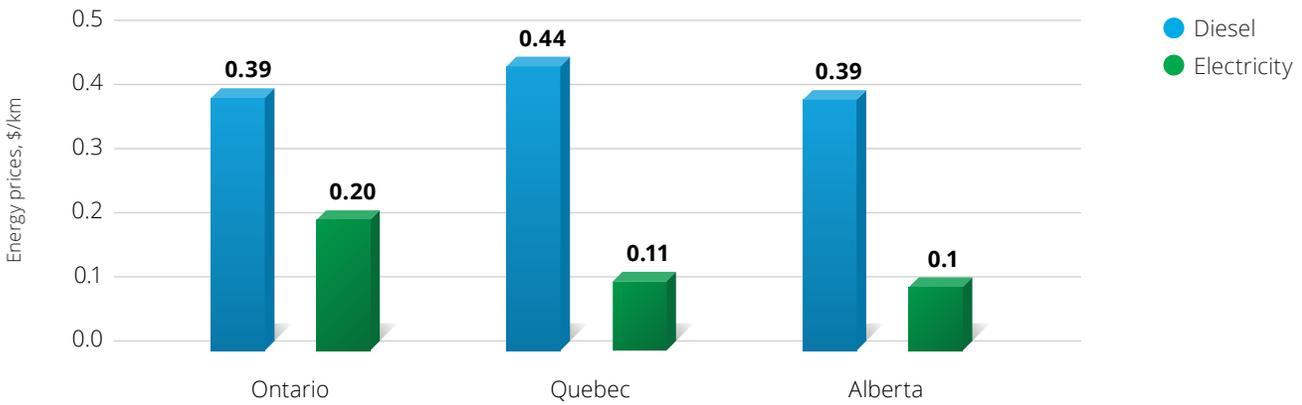
Source: Canada Energy Regulator

Figure 6: Energy prices in selected Canadian provinces



Source: Canada Energy Regulator

Figure 7: Comparison of diesel and electric prices per km in selected Canadian provinces



Source: Canada Energy Regulator

Figure 8: Volume-weighted average pack and cell price split, real 2021 \$/kWh



Source: BloombergNEF

6

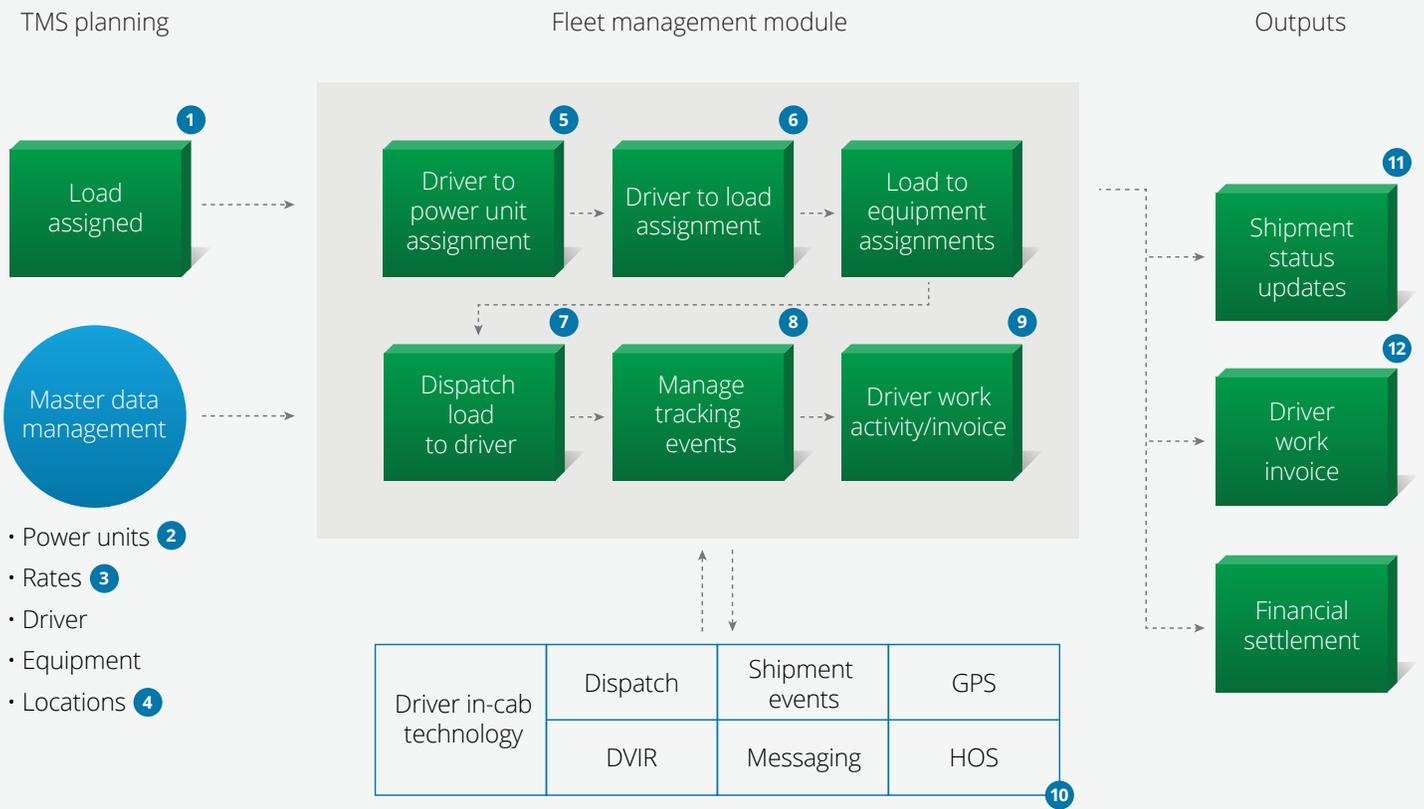
Operational considerations

The impact of fleet electrification extends well beyond vehicles and chargers. Businesses will need to manage change across multiple functions—and their workforce—as they put their electrification plan into action.

- Transportation management system (TMS) upgrades:** Companies may need to enhance their TMS to equip load planners with the tools they need to integrate commercial EVs into daily operations. It's especially important for internal IT teams and outside service providers to integrate data from Internet of Things devices (e.g., battery range monitors) into the TMS, and to update the TMS routing engine and dispatch board or load planner's workbench accordingly, so that load planners can maximize the benefits of an EV fleet while creating feasible loads for drivers. Other TMS modules will be affected by the switch to EVs, from master data management to freight invoicing and driver pay (see *Figure 9*).
- Driver compensation and incentives:** How drivers are paid may require re-evaluation and redesign. If drivers are paid by mileage, for example, time spent charging an EV may result in lower overall income and potentially affect other incentives.
- Organizational alignment:** Fleet electrification fundamentally changes how organizations think about their business and manage their network of drivers, trucks, and shipments. Leadership teams must align on a shared vision and purpose to effectively drive change and new behaviours across the organization to successfully transition to EVs.
- Workforce training:** Drivers, load planners, and maintenance personnel will be the ones most affected by fleet electrification. Drivers will need to be trained on EV operations to ensure safe, efficient performance, particularly as medium- and heavy-duty EVs are often heavier than their ICE counterparts. EV range limitations and the lack of public charging infrastructure will also change how drivers and load planners manage their days; route optimization training will be useful in this regard. Load planners will also require training to balance driver hours, EV range and load constraints, and shipment distances. Maintenance staff will also be impacted: there will be less need for diesel mechanics and greater demand for workers with highly specialized electrical skills. Reskilling and retraining will be needed to ensure a just transition for affected workers.



Figure 9: Fleet electrification impact on transportation management systems



Fleet management solutions need to **re-invent** their product to be able to support the **new requirements** of fleet operators.

EV requirements and considerations

1. TMS considers which loads to tender to the fleet considering weight, distance, region, specific locations, etc.
2. Power unit constraints for maximum distance, maximum weight setup in MDM
3. Potential rate differentiation for specific long-haul EV routes
4. Location MDM additions of EV charging stations
5. Driver associated with power unit to incorporate driver preferences and/or resource requirements
6. Planning loads specific drivers based on their assigned power unit constraints including roundtrip planning to reduce empty miles while ensuring driver can return to home location with sufficient battery/range buffer
7. Updating the dispatch based on real-time battery status (adjustments to plan)
8. Receive additional tracking events for EV fleet (range remaining)
9. Driver pay to consider stopping for charge top-offs
10. Enhancements to telematics tech to capture and send EV-specific data points (remote battery monitoring)
11. Broadcast shipment status to downstream parties, including EV-specific metrics
12. Third-party owner-operator-driver work invoice considerations



Start your EV engines

The shift to electric vehicles will transform any organization that operates or relies on commercial fleets, from logistics service providers and retailers to municipalities, utilities, and beyond.

But it involves much more than replacing traditional ICE vehicles with EVs; its impact extends across the business, with implications for operations, IT, finance, load planning, routing—and, of course, the drivers themselves.

A successful transformation requires a well-crafted strategy and a tactical road map that reflects the realities of an organization, including its fleet, infrastructure, and core competencies. It also requires clear, committed leadership and an effective change management plan to ensure the workforce has the knowledge, skills, and training needed to meet business and customer demands with an EV fleet.

The best time to move forward is today. Customers are demanding companies take action on carbon emissions. Companies like IKEA are beginning to favour transport suppliers with greener networks to reduce their Scope 3 emissions. Establishing relationships with EV OEMs early on can secure access to commercial EVs when the supply tightens. Fleet operators in Canada that make electrification a priority can take advantage of the billions of dollars in federal and provincial government incentives that are available today. And as new government regulations come into force and carbon prices continue to rise, those that don't act now may discover that delaying costs much more in the long run.



Endnotes

1. Government of Canada, [Canada's 2030 Emissions Reduction Plan](#), June 22, 2022.
2. United Nations Framework Convention on Climate Change (UNFCCC), [Canada 2021 National Inventory Report \(NIR\)](#), April 12, 2021.
3. International Energy Agency (IEA), [Global Energy Review 2021](#), April 2021.
4. Tom Raftery, "[Seven Reasons Why The Internal Combustion Engine Is A Dead Man Walking](#)," *Forbes*, September 6, 2018.
5. Deloitte, The Wall Street Journal, "[Consumers Expect Brands to Address Climate Change](#)," April 20, 2021.
6. Government of Canada, [Canada's Climate Plan](#), November 22, 2022.
7. Geotab, [Medium and heavy-duty electrification trends](#), December 16, 2020.
8. Charlotte Argue, "[How Extreme Cold and Heat Affect EV Range](#)," *Fleet Forward*, June 3, 2020.
9. Jamie L. LaReau, "[GM expands Canada's manufacturing role in EV future, pickup production](#)," *Detroit Free Press*, April 4, 2022.
10. Akash Sriram, "[Walmart to electrify its delivery fleet with Canoo EVs](#)," *Reuters*, July 12, 2022.
11. Organisation for Economic Co-operation and Development, [Retrofitting: A Frugal, Circular and Inclusive Solution to Decarbonize our Vehicle Fleet](#), February 28, 2022.
12. Robbie Watts, Aritra Ghosh, and Justin Hinshelwood, "[Exploring the Potential for Electric Retrofit Regulations and an Accreditation Scheme for the UK](#)," *Electronics*, MDPI, November 11, 2021.
13. Canada Infrastructure Bank, [CIB Launches \\$500 Million Charging and Hydrogen Refuelling Infrastructure Initiative](#), press release, September 28, 2022.



Contact



Darren Plested

Partner
Future of Mobility &
Transportation
dplested@deloitte.ca



Elizabeth Baker

Partner
Supply Chain &
Network Operations
elizabethbaker@deloitte.ca

Authors

Anders McKenzie

Partner
Financial Advisory
Technology, Media &
Telecommunications

Joe Solly

Partner
National Consumer
Sustainability Leader

Samira Dadgar

Partner
Tax & Legal

Contributors

Barbar Moawad
Michael Misko
Nicole Rudyk
Ali Sohrabi
Satwik Chugh



This publication contains general information only and Deloitte is not, by means of this publication, rendering accounting, business, financial, investment, legal, tax, or other professional advice or services. This publication is not a substitute for such professional advice or services, nor should it be used as a basis for any decision or action that may affect your business. Before making any decision or taking any action that may affect your business, you should consult a qualified professional advisor. Deloitte shall not be responsible for any loss sustained by any person who relies on this publication.

About Deloitte

Deloitte provides audit and assurance, consulting, financial advisory, risk advisory, tax, and related services to public and private clients spanning multiple industries. Deloitte serves four out of five Fortune Global 500[®] companies through a globally connected network of member firms in more than 150 countries and territories bringing world-class capabilities, insights, and service to address clients' most complex business challenges. Deloitte LLP, an Ontario limited liability partnership, is the Canadian member firm of Deloitte Touche Tohmatsu Limited. Deloitte refers to one or more of Deloitte Touche Tohmatsu Limited, a UK private company limited by guarantee, and its network of member firms, each of which is a legally separate and independent entity. Please see www.deloitte.com/about for a detailed description of the legal structure of Deloitte Touche Tohmatsu Limited and its member firms.

Our global Purpose is making an impact that matters. At Deloitte Canada, that translates into building a better future by accelerating and expanding access to knowledge. We believe we can achieve this Purpose by living our Shared Values to lead the way, serve with integrity, take care of each other, foster inclusion, and collaborate for measurable impact.

To learn more about Deloitte's approximately 330,000 professionals, over 11,000 of whom are part of the Canadian firm, please connect with us on [LinkedIn](#), [Twitter](#), [Instagram](#), or [Facebook](#).

© Deloitte LLP and affiliated entities.

Designed and produced by the Agency | Deloitte Canada. 23-6683181