

RUN ON LESS – ELECTRIC CANADA

Identifying & sharing best practices
for fleet electrification across Canada.

Electric Mobility Canada | Mobilité Électrique Canada

FINAL REPORT - March 2025





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The Run On Less project was:

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Canada*

| **Canada** 





1. Introduction

This is the final report on EMC's project titled *Run on Less – Electric Canada: Identifying and sharing best practices* for the fleet electrification experience across Canada, realized in collaboration with the North American Council for Freight Efficiency (NACFE) and partially funded by Natural Resources Canada.

In this document we will describe the activities of the project, share key learnings and evaluate the project performance in relation to the identified indicators.

1.1 PROJECT OBJECTIVE AND SUMMARY

The objective of this project was to secure the participation of Canadian fleet operators in [NACFE's 2023 Run on Less - Electric DEPOT](#) and extend the campaign beyond the current U.S. context to include Canadian representation, and subsequently inform the analytics, metrics, and learnings presented to Canadian stakeholders.

The project timeline was from June 5th, 2023 to March 31st, 2025, and included multiple levels of deliverables of which three workshop events across Canada were central. These activities aimed to address awareness and knowledge gaps among Canadians of zero-emission and low-emission options in the medium- and heavy-duty vehicles (MHDV) sector, as well as to increase capacity and reduce knowledge gaps among MHDV stakeholders on zero-emission and low-emission options in the MHDV sector.

1.2 KEY LEARNINGS

The main staples of the MHD Fleet Electrification workshops organized through this project were the roundtable discussions centered on eight different topics and a keynote presentation by NACFE on its *Run on Less - Electric DEPOT* program.

1.2.1 Workshop roundtable discussion insights

These are the recurring challenges and discussion points from the three MHD Fleet Electrification workshops (held in Toronto, Halifax, and Vancouver), listed under the following roundtable discussion topics:

Class 8 tractors

- Vehicle availability limited – long lead times
- Truck reliability and maintenance requirements not well documented
- Upfront cash investment remains high – lack of data makes TCO difficult to assess
- Shared resources (such as Run on Less pilot programs) are helpful

Medium-duty trucks & vans

- Range anxiety requires education
- Choosing the right vehicle for the right routes and conditions requires knowledge and data
- Access to data for planning, selection and operation

EV performance

- Understanding impact of cold weather is essential
- Mitigating strategies can significantly improve performance
- Access to data is essential for planning and for real-time operations
- Understanding seasonal performance to choose best vehicle (battery size) & operational strategy





Utilities and the grid

- Early engagement with utilities is essential
- Lead time to connection needs improvement
- Visibility on power availability is requested
- Two-way conversation required between fleets and utilities

Financial incentives & environmental regulations

- Funding opportunities not well known
- Need for support in identifying sources and navigating applications
- Predictability and administrative clarity are essential (funding programs)
- CFR opportunities not well understood (at all)

Charging systems

- Right sizing but also planning for future needs – design with expansion in mind
- Phased approach is essential for the learning curve
- Include demand mitigation strategies (smart charging, micro-grid, and back-up power)
- Base charging / home charging / public (en route) charging: finding the best mix

Regenerative braking & operational changes

- Strategic importance of regenerative braking recognized by experienced fleets
- Charging management requires planning & operational adjustments (and again, data)
- Driver confidence requires training, information, and data feedback

Technician training

- LOTS of work to do here
- Technician training required to develop confidence before the trucks roll in
- Competent training staff is rare and difficult to find
- OEM collaboration essential – could accelerate training development
- Some upskilling programs ready or in progress, but basic training for new technicians not quite there
- Collaboration required between education, standards and industry – including OEMs and fleets

1.2.2 Run on Less insights:

NACFE participated in the three MHD Fleet Electrification workshops for this project, bringing the Run on less insights to each activity via a keynote speaker, and sharing key insights such as “over and under estimation challenges”:

OVER estimation challenges

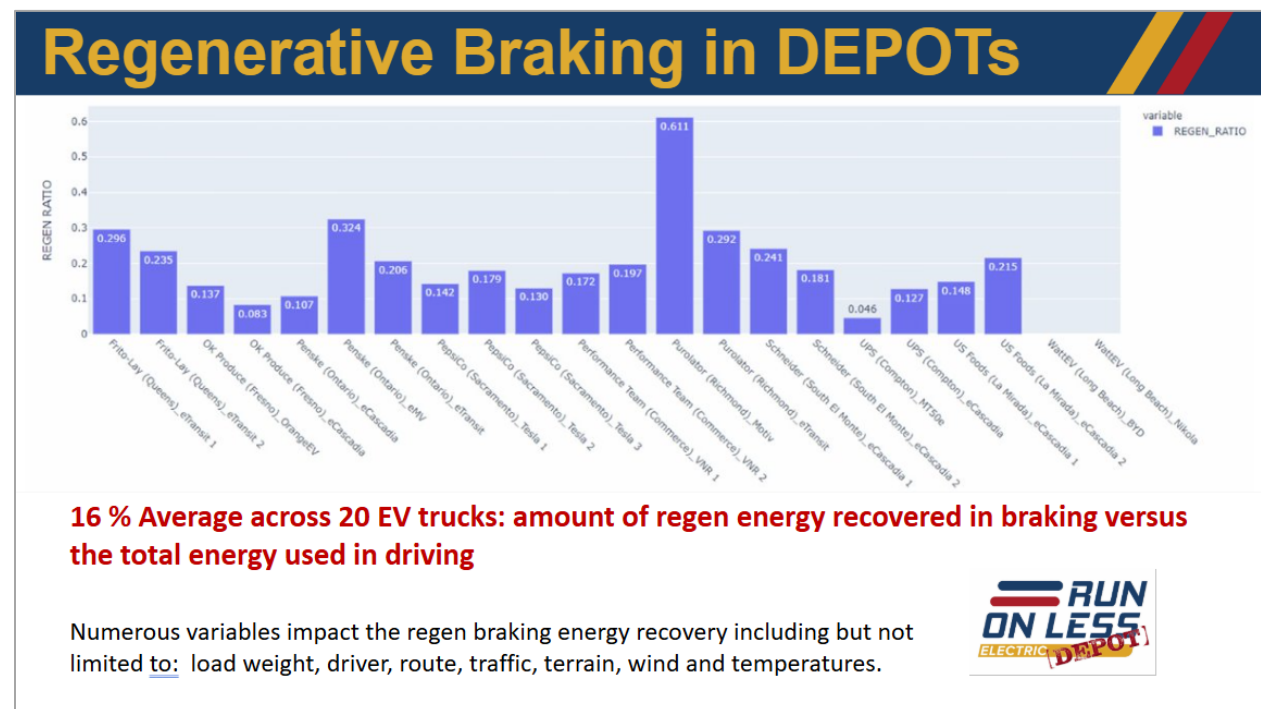
1. Overestimating kWh/mi consumption for vehicles based on out-of-date data
2. Ignoring energy recovery from regenerative braking
3. Ignoring reduced out-of-route miles and driver time made possible from depot charging
4. Requiring one charger for every vehicle
5. Assuming the highest charger rating for every charging event
6. Ignoring the benefits derived from managed charging
7. Assuming vehicles require 100% charging at each charging event
8. Assuming vehicles require daily charging
9. Assuming loads are reaching maximum gross vehicle weight (GVW) on every vehicle for every trip
10. Assuming vehicles are driven the maximum miles every trip
11. Assuming only one charge per day is possible
12. Assuming enroute charging is not feasible at delivery points





UNDER Estimation Challenges

1. Not considering cold and hot weather effects in battery sizing and charging
2. Not considering the impact of road grades
3. Not considering battery degradation possible over years of ownership
4. Overestimating maintenance cost savings from early generation BEVs
5. Ignoring charger losses (efficiency) in estimating power needs
6. Ignoring increased tire wear from heavier, more agile BEVs
7. Assuming the driver has no impact on performance
8. Assuming tractor and trailer aerodynamics don't matter





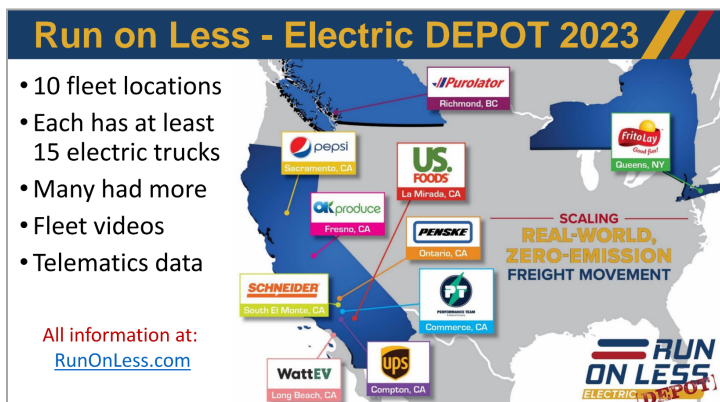
2. Run on Less - Electric DEPOT

The [North American Council for Freight Efficiency \(NACFE\)](#) works to drive the development and adoption of efficiency enhancing, environmentally beneficial, and cost-effective technologies, services, and operational practices in the movement of goods across North America.

NACFE provides independent, unbiased research, including [Confidence Reports](#) on available technologies and [Guidance Reports](#) on emerging ones, which highlight the benefits and consequences of each, and deliver decision-making tools for fleets, manufacturers, and others. NACFE partners with Rocky Mountain Institute (RMI).

on a variety of projects including the [Run on Less](#) demonstration series, electric trucks, emissions reductions, and low-carbon supply chains. In 2023, EMC partnered with NACFE to help bring Run on Less learnings to Canadian fleets and other industry stakeholders.

NACFE successfully secured a [Canadian fleet](#) participant (as well as nine other North American fleets) in its 2023 *Run on Less – Electric DEPOT*. The 10 fleet locations each had at least 15 electric trucks: vans & step vans, MD trucks, terminal tractors and trailer-tractors. The Canadian participant, Purolator in Richmond BC, tested a class 6 step van (Motiv EPIC) and a class 2 van (Ford E-Transit). In total, 291 BEVs were part of the 2023 Run on Less project: 446,831 miles traveled, and 1,044 MWh of power used.



Run on Less – Electric DEPOT 2023 included the publication of 10 bootcamp videos:

1. Best practices for utility-fleet relationships
2. Grants and incentives for the trucks and infrastructure
3. Electric truck developments
4. Faster charging — Opportunities and challenges at 350KW and higher
5. Opportunities to extend BEV range (via charging technologies)
6. Electricity resiliency and availability (microgrids, renewable energy...)
7. Current and future regulations for zero-emission trucks
8. Managed charging to improve availability, cost and range
9. Scaling charging infrastructure equipment
10. Electric depot site planning and construction

Bootcamp videos and Electric Depot reports and data are available online:

<https://runonless.com/electric-depot/>

<https://runonless.com/electric-depot/electric-depot-bootcamp/>

<https://runonless.com/run-on-less-electric-depot-reports/>





3. MHD Fleet Electrification workshops

3.1 FLEET ELECTRIFICATION WORKSHOP AT TRUCK WORLD, HELD APRIL 2024 IN TORONTO, ONTARIO



EMC integrated an MHD Fleet Electrification workshop in Truck World 2024's programming. The partnership with this industry event aimed at ensuring outreach to the project's target audience of fleet owners and operators. The 50+ attendees were offered a deep-dive into the promise and challenges of electric trucks.

WORKSHOP PROGRAM (Truck World, April 2024, Mississauga, ON)	
PART 1 – Presentation and panels	PART 2 – Round table discussions
Run on Less electric demonstrations <ul style="list-style-type: none"> - Dave Schaller, NACFE <p>Panel Discussion 1:</p> The fleet electrification experience <ul style="list-style-type: none"> - Chris Henry, Purolator - Patrick Smart, Cogeco - Andrew Ewing, Geotab - Dave Schaller, NACFE (moderator) <p>Panel Discussion 2:</p> Enabling fleet electrification <ul style="list-style-type: none"> - Greg Woodhouse, BGIS - Emmanuelle Toussaint, Cleo - David Bellito, Siemens - Maureen Shuell, EMC (moderator) 	Roundtable discussion sessions* <ul style="list-style-type: none"> - Class 8 tractors - Medium-duty trucks & vans - EV performance - Utilities and the grid - Financial incentives & environmental regulations - Charging systems - Regenerative braking & operational changes - Technician training <p>* Three sessions, approx. 30 minutes each; participants invited to move to a different topic table between sessions.</p>

3.1.1 Speaker highlights – Truck World

Run on Less learnings (NACFE)

- 10 depots, operating 850 trucks in total:

8 **Electric Mobility Canada | Mobilité Électrique Canada**





- 291 EVs and 139 chargers
- 1,044 MWh of power used for 446,831 miles traveled
- Energizing sites take too long
- For the 10 depots in the Run, it took 9 to 36 months to energize the infrastructure
 - Trucks are arriving before charging is in place, sometimes months earlier – temporary/portable chargers can help
 - Roadblocks to energizing: Site planning, utility approvals, site permitting etc., all contributing to too much time to energize depots
 - Utilities must shorten energizing timelines
- Due diligence is needed to ensure reliability of power to avoid brownouts
- Large power demands: small depots require less power, but power is a significant issue for medium or large energy depots
- Tactics to mitigate include:
 - Using a consultant with experience
 - Adding an early phase to get started but getting a 100% complete electrification quickly and possibly in a single effort
- Small depots are ready for electrification now and large depots are gaining momentum
- There have been big improvements in trucks and chargers since Run on Less 2021
- The industry needs cost and weight reductions to improve TCO
- Range can be extended with multiple charges per shift at the depot and enroute
- Regardless of their initial feelings, drivers love EVs once they have driven one

Telematics & charger data: Full picture (GEOTAB)

- Data provides increased confidence that EVs will be ready when needed, and more information when troubleshooting:

Vehicle data

- Make, model, VIN, & more
- Location, geofencing
- Real-time SoC, logged every 1% change
- Energy added after losses
- Battery capacity (kWh), battery state of health (SoH)
- Estimated range
- Driving status, Last driver
- More

Charger data

- Charger state (charging), status (availability)
- Charging sessions & energy consumption
- Depot status, energy

Preliminary lessons learned (PUROLATOR)

- Align electrification strategy with corporate goals and values
- Build strong governance to support collaboration between departments
- Set up infrastructure first; prepare for long lead times for service upgrades and installation
- Consider supply chain risks and long lead times for equipment
- Prioritize strong change management, communication and training
- Test different use cases (e.g., climate), vehicles, chargers and charge management solutions
- Engage early with landlords, utilities and municipalities
- Plan and understand early impacts to processes and vehicle maintenance





Energy management - A NEW REALITY (CLEO)

- While fuel prices are set at the pumps, the electricity bill is greatly influenced by the moment when power demand was highest.
- That moment will have a direct effect on your next electricity bills.
- Orchestrating all your charging activities will lead to greater savings.

3.1.2 Roundtable discussion insights – Truck World

Charging time

- Logistic planning for charging to ensure productivity
- Technician days are measured in productivity – charging time takes away from that
- Can charging time be factored into spec? Yes, but doesn't address cost of business issues
- Making operational changes to adapt, (e.g., geo-fencing) trying to reduce market size (smaller distance to accommodate battery range)
- Vehicles can be charged during lunch breaks (is this their time or company time?)
- Real fleet solution: using charging time for training – workplace safety, EV training, etc.
- Managing charge: charging habits are a big part of adaptation
- Real fleet experience: only 5% of charging off-base
 - that will likely change in coming years
 - 70% of their fleet is home-based
 - Plan is to support home charging for drivers (switching to depot charging would affect productivity too much)

Power outages

- Backup plans – beyond generation
- Also, where to put generators to ensure efficiency & servicing capacity
- Real fleet solution: Network designed w/ backup
- Better over perfect: ok for now to still depend on diesel and generators during emergency events

Power requirements

- Almost maxing out on building power – installing new chargers not as easy as it should be
- For expansion of EV fleet – need to rely beyond grid power
- Grid capacity – real fleet running generators in summer to alleviate pressure on grid for municipality

Cold weather

- Energy needs of trucks – real experience: pre-conditioning = 30-40% energy use difference
- Pre-conditioning – increase employee confidence in the vehicle (biggest gamechanger)
- Geofencing – cycle starts before the storms hit
- Weather is main/only relevant factor on EV performance
- Other efficiency measure – adding partition to trucks so only front seat needs to be air conditioned, heated
- Heated seats & steering wheels instead of air – falls into driver behaviour
- Main issue w/ cold weather is charging (longer time)
- Reinforcing problem: More charging needed during storms





Change management

- High level – can make strategic plans etc. – but a lot depends on getting drivers / technicians to buy in, be convinced, change their driving behaviour
- Driver confidence – equipping them with tools to find all charging stations so range is less of a concern
- Have dealer training program to inform consumers / end users – provide training materials to dealers
- Easier for big companies to set up training programs – not always feasible for smaller companies (SMEs)
- Misinformation – causes strong need to make sure right info gets to end users
- Ford training revolves largely around range maximization – but heavily depends on driver willingness to adapt behaviour
- People also need to reset their expectations about battery performance & technology
 - Simple fact – vehicles will not be as efficient in the cold or v. hot weather
 - True of all batteries – phone, laptop, etc.

Financial incentives & environmental regulations

- Toronto Metropolitan University, Simon Fraser Uni: mixed use charging lab for rideshare, fleets, adjacent dwellers
- Dealers perceive risk: will funding be available? Are program funds depleted?
- 10-vehicle cap on incentive programs: what if purchaser has already availed themselves of an incentive with other dealer
- Risk of lag in reimbursement versus point-of-sale
- How can you monetize emission-reduction opportunity from charging activity? Are fleets aware of options?
- CONCLUSIONS: Low awareness of incentives and low capacity to engage.

Technician training

- Develop a coalition of support:
 - Internal
 - External
 - OEM, partners, service providers
- Consideration of the TCO in the procurement cycle





3.2 FLEET ELECTRIFICATION WORKSHOP AT EMC'S NATIONAL CONFERENCE (EVVE 2024), HELD SEPTEMBER 2024 IN HALIFAX, NOVA SCOTIA



As a pre-event activity to its annual conference, EVVE 2024 in Halifax, EMC organized a second MHD Fleet Electrification workshop, and once again gathered fleet industry stakeholders to discuss the promises and challenges of electric on-road freight transportation.

The program expanded contents to include a keynote speaker on public transit electrification to gain insights from Halifax Transit's real-world experience. With over 115 attendees, the event was a resounding success.

WORKSHOP PROGRAM (EVVE, September 2024, Halifax, NS)	
PART 1 – Presentations and panel	PART 2 – Round table discussions
<p>Run on Less electric learnings</p> <ul style="list-style-type: none">- Dave Schaller, NACFE <p>Electrifying Halifax's public transit</p> <ul style="list-style-type: none">- Amr Sami, Halifax Transit <p>Panel discussion:</p> <p>Planning, TCO and operations</p> <ul style="list-style-type: none">- Jean-François Veilleux, CIMA+- Rachel Doran, Clean Energy Canada- Amy Schwartz, Green Municipal Fund- Vincent Bordeleau, Innovative Vehicle Institute- Theresa Cooke, Siemens (moderator)	<p>Roundtable discussion sessions*</p> <ul style="list-style-type: none">- Class 8 tractors- Medium-duty trucks & vans- EV performance- Utilities and the grid- Financial incentives & environmental regulations- Charging systems- Regenerative braking & operational changes- Technician training <p>* Two sessions, approx. 30 minutes each; participants invited to move to a different topic table between sessions.</p>





3.2.1 Speaker highlights - Halifax

Run on Less learnings (NACFE)

See 3.1.1 Highlight – adapted for an East Coast audience.

Challenges and opportunities (HALIFAX TRANSIT)

CHALLENGES

- Validate our baselines
- Operation challenges
- Scheduling challenges
- Challenges faced by transit agencies optimizing their energy needs
- Rapid technological advancements
- Codes and standards are not keeping pace
- Steep learning curve

OPPORTUNITIES

- Energy as a service, EaaS is a rapidly growing trend
- Smart charging software
- Microgrid integration
- Cost-saving potential through shared infrastructure
- The extent of adoption required to lower ownership costs

Key Challenges (CIMA+)

PLANNING challenges

- Choosing the right type of vehicle: Range, capacity and usage (road type, temperature, ...)
- Vehicle availability
- Infrastructure upgrades: power increase
- Operational changes: Involve operation leads

DESIGN challenges

- Charge efficiency: Charge management system
- Planning for the future: Additional chargers and future technologies
- Fleet standardization: Standardized implementation and operation, modular approach, spare parts

DEPLOYMENT challenges

- Equipment lead time: Up to 1+ year for major equipment
- Utility approvals: Start the discussions early
- Deployment strategy: Use a phased approach





Case study lessons (CLEAN ENERGY CANADA)

Case study: URBAN LAST MILE DELIVERY FLEET

- Working with EV consulting company helpful to liaise with manufacturers, navigate government incentive programs, and choose the right charging infrastructure

Case study: FILM PRODUCTION TRANSPORT COMPANY

- Even without depot charging, acquisition is doable, access to incentives is critical and programming should be adaptable to innovative solutions like mobile charging

Case study: URBAN PUBLIC TRANSIT CORPORATION

- Engaging a third party helped overcome challenges, building trust from all parties critical, phased approach key, engage utility early and often

Case study: MULTINATIONAL FOOD AND BEVERAGE COMPANY

- Has begun next phase of utility engagement sooner and found technology improving quickly

Case study: RURAL SCHOOL BUS FLEET

- Find mutually beneficial changes by understanding use case and drivers, build a transition plan in phases, find ways to use cheaper overnight charging, third-party service critical

INTERCONNECTION STUDY

- Process is multi-layered and utilities and fleets have roles at each stage to reduce friction points
- Good communication, and the engagement of experts reduces friction points
- Plan for at least six months for the full process: 1-Online request, 2-Preliminary Design, 3- Design, Connection agreement, permitting, 4-Construction and site inspection, 5-Energization

OVERALL LESSONS LEARNED

- Engage an expert to ease the transition and track technology change
- Plan for a transition, not a switch, starting with low-hanging fruit
- Engage early and often with the utility to reduce unpredictability and speed timelines
- Work closely with drivers and unique use cases and duty cycles to build plans for charging and use that will work in real world conditions

Plug-in Fleet pilots' trends and takeaways (INNOVATIVE VEHICLE INSTITUTE)

EASY ELECTRIFICATION IN 2024 – CHECKLIST

- Less than 200km/day
- Return to base at night
- Dry box (no PTU, TRU, dumper, etc.)
- Low to medium payload
- Limited highway driving

SEASONAL RANGE TRENDS

- Spring-Fall: Nominal = 0% change
- Best Winter conditions (> 0C): -15% range
- Winter average: -30% range
- Very cold conditions (< -10C): -45% range





KEY TAKEAWAYS

- EV Trucks are viable, mature, and operators love them
- Finding or making winning conditions is key
- Real-world experiences lead to clear-minded decisions. Deploy a few units as soon as possible.

Funding offers for municipal fleet electrification (Green Municipal Fund)

FEASIBILITY STUDIES

- Supporting the transition of municipal and transit fleets to ZEVs
- Eligible feasibility studies must:
 - Consider the entire municipal and/or transit fleet
 - Include a ZEV transition plan
 - Model an optimized scenario that reflects options for downsizing and right sizing the fleet
 - Include an equity assessment
- Grant for up to 50% of eligible costs, up to a maximum of \$200,000

FLEET CAPITAL PROJECTS

- Finance the partial or complete transition of municipal and/or transit fleets to ZEVs
- Eligible costs:
 - Replacement of ICE vehicles with ZEVs
 - Required EV supply equipment (charging infrastructure)
 - Any required facility upgrades to existing buildings
- Combined grant and loan for up to 80% of eligible costs
 - Grant of 15% of GMF loan
 - Loan up to a maximum of \$10 million

NET ZERO TRANSPORTATION – PROJECT IDEAS

- Microgrids and battery storage that help meet peak electricity demand and add resilience to local grids.
- Integrated modal shift and transportation demand management strategies that address potential rebound effects
- MHDV pilot projects of vehicles that are new to Canadian municipalities (e.g. Water trucks, municipal paramedic trucks, heavy-duty snowplows, and others)

3.2.2 Roundtable discussion insights – Halifax

Class 8 tractors

- 3-phase power (lack of). Sometimes easier to move charging infrastructure to substation.
- Vehicle availability – long lead times
- Determining if routes are compatible with class 8 electric trucks
- Truck reliability and maintenance
- Vehicle/charging compatibility: Vehicle and charger manufacturers don't collaborate
- Challenge: huge upfront cash investment
- BEST PRACTICES:
 - Strong relationship with OEMs
 - Test, test, test
 - Data, planning





MD trucks & vans

- Charging – questions about Level 2 or 3 (fast charging)
- Cold performance not understood
- Importance of regeneration (vs braking)
- Range anxiety, requires education

EV performance

- Small fleet owners in multi routes (average range)
- Factors: Topography, speeds, stops, route, weather, payload, off-peak charging, reliability as users
- Access to data to inform smart dispatching capability based on weather prediction
- Real-time data metrics from fleet for automated dispatching system (3rd party products)
- Climate-controlled environment for charging + pre-conditioning (indoor)
- Set lower SoC limit (e.g. 20%)
- Operator training on using regenerative braking (encouraging energy efficiency)
- Data sharing & OEM standardization

Utilities & grid

- What info is publicly available? Can utilities do better on public engagement
- Try to engage the customer relation team
- Heat maps (available power), if possible, would be a helpful starting point

Financial incentives

- Current incentives not well known – federal & provincial
- Point of sales incentives preferred
- Currently, off-road vehicles excluded
- ZEVIP program: L/M on-road / offroad also piloted
- Can stack multiple funding + ZEVIP + Prov subsidy
- ZEVIP could need more marketing (ends in '27)

Charging systems

- Connectors & cable management: Standardization & ability to not bet / proprietary / flexibility & direction?
- Reliability of charging stations: Port availability when enroute
- Supply chain issues (long lead times)
- Availability of 600V / 480V service conditions.
- Connectors & cable management: standards to protocols across all classes of fleets
- Bus / grid two-way transformer: Stability to define uses - lots of greenfield areas, use case definitions are maturing but still require clarity
- How is the technology of EV charging developing? And for how many years it is expected to be good.
- Charging standards for fleets? (communication protocols)
- Deployment strategy for mobile charging systems?
- Most current L2 chargers do not support V2X
- Current 150 kW options will be obsolete soon
- Will NACS be used for fleets?
- Chargers with telematics for fleets?
- What about emergencies/priorities?
- Flexibility to change connectors?

Re-generative braking and operational changes

- Regenerative braking: Charging batteries while braking - Part of fleet study plan - Important to consider when planning operations
 - Training drivers how to use it to make kWh/Km better
 - What are potential savings when used properly?





- Brake pads seizing if too good at regenerative braking (maintenance issue)
 - Tesla's brakes will deploy on a regular basis to clean + maintain
- Safety around regenerative traction control plus wheel slip

Technician training

- Post-secondary institutions across Canada have some programs to upskill technicians and are working on extending to higher level of training
- Subject matter experts are challenging to find, specifically for medium and heavy-duty vehicles
- Training programs need to be agile to stay up to date with technology
- Finding the right people (maybe not the same profile as traditional mechanics)
- Different: testing & isolating. Identify the hazards. How to safely isolate the vehicle before working on it. TPPE needed
- MTB works on tier training and competencies
- Awareness training will help build confidence before technicians can do work (culture change)
- Certification (CSA) work with multiple colleges to ensure the standard of training. Program + certification
- Institutions to work with others who have been training in the field plus industry SMEs and OEMs
- Collaboration with colleges to ensure curriculum is up to date + industry is aware of the training
- Public believes that current upscaling courses are the technical training, but these are offered for those who are already technicians.





3.3 FLEET ELECTRIFICATION WORKSHOP AT RECONNECT, HELD MARCH 2025 IN VANCOUVER, BRITISH COLUMBIA



Organized as a shoulder-event to Plug In BC's 2025 Zero-Emission Fleets Reconnect event, this workshop brought us to Western Canada to discuss once more with local and national stakeholders about the promises and challenges of electric on-road freight transportation. The 60 motivated attendees contributed to making this final activity another successful operation. The diversity of the attending stakeholders, including multiple municipalities and fleet operators was an eloquent demonstration of BC's momentum in fleet electrification.

WORKSHOP PROGRAM (March 2025, Vancouver, BC)	
PART 1 – Presentation and panel	PART 2 – Round table discussions
Run on Less electric learnings <ul style="list-style-type: none"> - Ken North, NACFE <p>Panel discussion:</p> MHDV fleet electrification <ul style="list-style-type: none"> - <i>Panel introduction and EMC's MHDV Working Group</i>, Charlotte Argue, Geotab (Moderator) - <i>BEYOND AWARENESS: A Regional Approach to Support the Transition to Medium and Heavy Duty Zero Emission Vehicles (MHDVs) in BC</i>, Danielle Wiess, Community Energy Association - <i>Fleet Electrification: Key Steps to Get Started</i> Anaïssia Franca, CIMA+ - <i>Deploying to achieve zero emissions</i> Chris Henry, Purolator 	Roundtable discussion sessions* <ul style="list-style-type: none"> - Class 8 tractors - Medium-duty trucks & vans - EV performance - Utilities and the grid - Financial incentives & environmental regulations - Charging systems - Regenerative braking & operational changes - Technician training <p>* Two sessions, approx. 30 minutes each; participants invited to move to a different topic table between sessions.</p>





3.3.1 Speaker highlights – Vancouver

Run on Less learnings (NACFE)

See 3.1.1 Highlights– adapted for West Coast audience.

WHY DECARBONIZE TRANSPORTATION?

- U.S.A. & China = 47% of global fossil fuel consumption
- Canada = 9%
- 7.9B people on Earth – Wealthiest 10% responsible for 49% of CO2 emissions
- Transport emissions have grown faster than any other sector over the past 50 years.
- Since 1990, emissions from medium and heavy-duty trucks have increased by about 75%.
- Trucking in the USA - 93 billion miles/year (1000+ trips to the sun) – 413 million tons CO2

MESSY MIDDLE: A TIME FOR ACTION

- Present:
 - Technology still maturing
 - Still many unknowns & challenges
- Messy middle:
 - Many optimization options
 - Growing infrastructure
 - Multi-fuel choices
 - Innovation and maturation
 - Facts replacing estimates
 - Learning curves
- Future
 - Fast charging
 - Long-life, low-cost batteries
 - Acceptable weights & costs

GROWING ABUNDANCE OF ZEV CHOICES

- 40+ OEMs
- 160+ ZEV models

REGENERATIVE BRAKING IN DEPOTS

- 16% average across 20 EV trucks: Amount of regen energy recovered in braking versus the total energy used in driving
- Numerous variables impact the regen braking energy recovery including but not limited to load weight, driver, route, traffic, terrain, wind and temperatures

Beyond awareness: What we learned (COMMUNITY ENERGY ASSOCIATION)

PLANNING AND IMPLEMENTATION

- Start with fleet assessment study
 - Don't review your fleet without considering and reviewing your routes
 - Plan to incorporate public fueling/charging infrastructure into your operations plan, cannot rely on private infrastructure alone in some instances/use cases
 - Early engagement with fueling providers (utilities) & don't forget about relevant permitting requirements
- Map stakeholders





- Limited funding for planning, more funding for implementation but neither are entirely sufficient as compared to investment required
- Engage OEMs at onset of fleet planning
 - Work with OEMs who provide full access to telematics data to enable detailed analysis
 - Work with OEMs that can address all components of fleet operation (help with equipment procurement, fueling needs, maintenance support, etc.)
- Review access to maintenance and troubleshooting support
 - physical and software components
 - Plan for downtime, it will happen

COMMON ERRORS TO AVOID

- Review your insurance coverage as you switch your fleet to ZEV
- Limited stakeholder engagement
- Insufficient driver training
- Not assessing your physical facility and its suitability/ability to accommodate MHD ZEV and associated infrastructure
- For electrification projects, evaluate charging equipment and software just as robustly as MHD vehicles

OPPORTUNITIES

- Collaboration:
 - Group buying/purchasing for MHD technology
 - Fleet/sector partnerships for fueling and charging infrastructure
- Update procurement policies to replace existing assets with ZEV technology:
 - Flip the evaluation on its head as we know it today – require significant justification to purchase non-ZEV technology

Key steps to get started (CIMA+)

START NOW TO BENEFIT FROM EARLY ADOPTION

- Leverage lessons learned from early innovators
- Strengthen your brand image – what is innovative today will be standard in 5-10 yrs.
- Take advantage of financial incentives before they disappear

TO GET STARTED

- Step 1: Current state assessment and gap analysis
 - Building assessment
 - Understanding no-go zones for equipment and assessing operations requirements
 - Conduct a gap analysis to inform electrical, mechanical, structural, civil, and architectural design
 - Implement a phased approach to minimize service disruptions
- Step 2: Operations review and modelling
 - Collect several months of telematics data to analyze operational variability
 - Model battery capacities over time, considering degradation and technological advancements
 - Formulate a phased electrification strategy, including depot charging, on-route charging, charger types, and inductive charging.
 - Evaluate peak energy demand
 - Assess resilience thresholds and model operations within a garage
- Step 3: Feasibility & fleet decarbonization strategy
 - Review various deployment scenarios
 - Develop a phased implementation plan (vehicles + infrastructure) that accounts for current gaps and delays (e.g., utility connections, market availability of parts, etc.)
 - Define key resilience features
 - Determine when a charge management system will be needed





- Set clear targets
- Step 4: Roadmap & action plan
 - Identify how to implement the strategy effectively
 - Ensure you have the right level of support (which may include full-time staff)
 - Apply for federal and provincial funding
 - Define a new RACI framework
 - Establish strong relationships with all partners

CONCLUSIONS

- Data-driven decisions will lead to better planning and optimized asset deployment
- You may be more capable of electrifying your fleet than you think
- Anticipate now: Work processes and operations will evolve, and people will need support
- Electrification presents an opportunity to rethink and enhance our operations

Key considerations for facility and route prioritization (PUROLATOR)

- Leased versus owned terminals (lease term)
- Grid emissions intensity
- Loading layout (indoor versus outdoor)
- Service upgrade requirement
- Available incentive programs (e.g., B.C., QC)
- Provincial utility costs
- Balance pace of electrification to reduce risk
- Vehicle performance (climate, geography)
- Right vehicle, right route:
- Vehicle range capability
- Payload, cubic capacity

See also section 3.1.1 for preliminary lessons learned (Purolator).

3.3.2 Roundtable discussion insights – Vancouver

Class 8 tractors

- Vehicle cost issues – emphasize the economics
- Economic uncertainty affects CAPEX/OPEX
- Industry wants program navigators
- Industry awareness and education are key
- Simplification of government regulations
- Share resources

Medium- and heavy-duty trucks & vans

- Most news about EV trucks is about the vehicle – want to hear more about the charging, the software, etc. Get into more details, e.g. the collaboration with utilities
- Data education piece – Run on Less and other data is available, but we need navigators, how can we translate into relevance to me
- More service providers in the room than customers – how can we get them here
- Design with expansion in mind – start with what you can and make sure there's space to grow





EV performance (incl. cold weather)

- What info do we need on the planning stage is one's specific conditions and driving operations, how far are they going, what climate conditions, and how it impacts the efficiency and the decisions for the battery of the EV
- The fleet's needs depend on the stakeholder – efficiency and savings feedback for the drivers by trip/quarter/year, sustainability, maintenance costs

Utilities & the grid

- Importance of transparency – should be two-way transparency, inconsistencies across the country with respect to how they share that info, where customers can connect, who they're connecting with
- Most utilities have access to key account managers for larger fleet operators, but may be a gap for smaller operators – consider an EV team or department to support them so they don't get left behind
- Awareness – utilities can do a better job of sharing: utilities have programs to help but not known by all fleets, how they work, how rate structures are formed to signal certain behaviors,

Financial incentives & environmental regulations

- Incentives: Keep them because they're working, uncertainty creates a turbulence in adoption, transparency with volume of incentives and what's left in a fund
- Financial: Requirements ensure consistency across adoption
- Environmental side: CFR, LCSF, need synchronicity among programs and how to access them

Charging systems

- Private warehouse depot: May not be allowed to have general public come in but could have commercial arrangements with other commercial fleets
- Public charging: Service station owner may want to contract out for fleets to charge
- Common theme: Need for getting load factors up to get as much charging as possible for as long possible

Regenerative Braking & Operational Changes

- Driver training and change management – how to maximize regen braking potential, a 5% increase regen can have a significant impact when driving across the province
- Information sharing: Better impact

Technician training

- Bridging skills gaps: Safety training for technicians
- EVs still in early stages of entering marketplace: whether for independent shops or OEMs – training gives technician confidence when vehicle rolls in the shop
- How to identify what technicians should be trained on: Strong electrical knowledge, diagnostic and troubleshooting skills, knowledge of vehicle architecture
- Leveraging information from OEMs who are usually tight lipped, to expedite knowledge transfer to technicians





4. Other MHD awareness activities

4.1 EMC'S NATIONAL CONFERENCE, EVVE 2023, HELD NOVEMBER 2023 IN EDMONTON, ALBERTA



Industry stakeholders gathered in Edmonton for EMC's annual national conference. The 2023 program included a breakout session titled **"Running on Less in Canada: Scaling Up Electric Trucking"** featuring David Schaller (NACFE) as a presenter and moderator, and four panelists: Chris Henry (Purolator), Charlotte Argue (Geotab), Brent Wilson (BGIS), and Adam Thorn (Pembina Institute).

In addition to an overview of NACFE's Run on Less - Electric DEPOT program results presented by David Schaller (NACFE), Charlotte Argue (Geotab) presented insights into how data can help fleets plan, operate, and scale electric:

- ✓ Vehicle selection
- ✓ TCO calculations
- ✓ Infrastructure strategy: Siting and sizing
- ✓ Range and routing
- ✓ Driver alerts
- ✓ Battery health monitoring
- ✓ Charge and load management
- ✓ and more.

The EVVE 2023 program included an additional session on MHD fleet electrification:

- **Looking forward: Electrifying Commercial Truck Fleets**
 - The Road to ZE MHDVs in Canada, by Adam Thorn, Pembina Institute
 - The Road to Net Zero, by Meena Bibra, Clean Energy Canada
 - Cracking the Code of Getting MHDV EVs on the road, with Theresa Cooke, Siemens, Shayna Rector-Bleeker, 7Gen, Patrick Gervais, Lion electric and Arjan Sharma, City of Edmonton

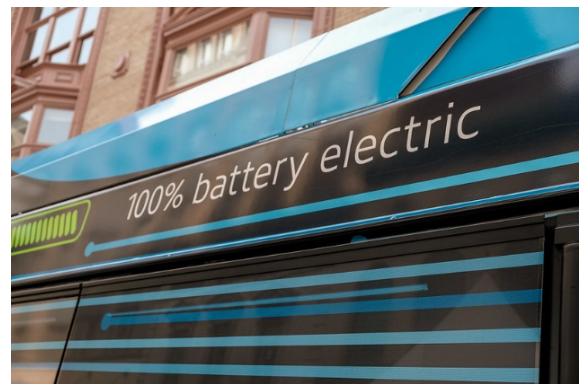




4.2 MHDV SHOWCASE HELD SEPTEMBER 2023 IN OTTAWA, ONTARIO

The Accelerate Alliance organized a “*Canadian ZEV supply chain exhibition*” in Ottawa on September 27, 2023. Spanning two blocks on Sparks Street, the showcase exhibited products and technologies from the ZEV supply chain. Thirty five companies showcased items ranging from raw minerals, battery technologies, electric vehicles, and marine crafts. EMC mobilized its membership to ensure the exhibit featured medium- and heavy-duty vehicles.

Following the showcase, 120 guests congregated for a reception at the Metropolitan Brasserie where a panel discussion occurred, encompassing representatives of Electric Mobility Canada, the Global Automakers of Canada, the Mining Association of Canada, the Battery Metals Association of Canada and the Canadian Critical Minerals and Materials Alliance, discussing the roadmap to ZEV industry success.



Photos : Accelerate Alliance





4.3 WINTER TRUCK TOUR DEMONSTRATION AND EXPOCAM, HELD FEBRUARY 2025 IN QUEBEC CITY, SAGUENAY AND MONTREAL, QUEBEC

Over three days, from February 4th to 7th, 2025, EMC's Winter Electric Truck Tour traveled across the Saguenay-Lac-Saint-Jean region to showcase the capabilities and performance of MHDV in winter conditions, and the potential of sustainable transportation.

The tour began in Quebec City with an official send-off in front of the National Assembly, proceeded around Lac St-Jean, and concluded at ExpoCam 2025 in Montreal where attendees had the opportunity to see the trucks up close and connect with industry specialists to discuss the future of electrified freight.

Participating trucks were put to the test against a true Canadian winter, facing high winds and temperatures dropping close to -40°C. These challenging conditions provided valuable insights into the resilience and efficiency of electric trucks, reinforcing their potential to perform even in the harshest climates.

This activity was supported by *Roulez Électrique*, *Fize Électrique*, *Circuit Électrique*, Electrify Canada, *Association des Véhicules Électriques du Québec* (AVEQ), Theron, Rivian Canada, Bectrol, Bourgeois Chevrolet Buick GMC, Lussier Chevrolet Buick GMC, Nissan Canada, Hyundai Canada, Tesla Canada, Peterbilt, Baril Ford St-Hyacinthe, and Kruger.

5. About Electric Mobility Canada

Electric Mobility Canada is the unifying and authoritative voice for the transition to electric transportation across Canada. Founded in 2006, EMC is the national industry association that enables and accelerates the transition to sustainable electric mobility through advocacy, collaboration, education, and thought leadership, with the goal of creating a cleaner, healthier, and more prosperous future for all Canadians.

EMC has approximately 200 member organizations, including electricity suppliers; manufacturers of light, medium, heavy, and off-road vehicles; infrastructure providers; technology companies; mining companies; research centres; government departments and agencies; cities; universities; fleet managers; unions; environmental NGOs; and EV owner groups.

EMC supports the activities of its members by:

- **Informing members** on topics of interest concerning legislation, policies, and technical and operational issues affecting electric mobility - this includes identifying measures needed to meet members' needs and proactively communicating them to policymakers and other stakeholders.
- **Establishing partnerships** to accelerate the adoption of electric mobility through research, pilot projects, policies, programs, and strategies to increase market penetration.
- **Acting as a resource** center by publishing relevant and up-to-date information on electric mobility in Canada and elsewhere.





Appendix

NACFE LINKS ON ELECTRIFICATION

2023 Run on Less – Electric DEPOT (15+ EV trucks at one depot location) - all of this is free thanks to the [sponsors](#)

- [10 Session Bootcamp](#)
- [Fleet Profiles](#)
- [Metrics/Data](#)
- [Reports](#) *includes* data set from 22 EV trucks
- [Stories \(videos\) from the Road](#)



2021 Run on Less – ELECTRIC (initial pilots) - all of this is free thanks to the [sponsors](#)

- [10 Session Bootcamp](#)
- [Fleet Profiles](#)
- [Metrics/Data](#)
- [Reports \(Overview + 4 vehicle use cases\)](#)
- [Stories \(videos\) from the Road](#)



Guidance Reports on Electric Trucks (10 reports plus a video for each report)

- [Decarbonizing Truck & Trailer Refrigeration: Zero-Emission Temperature Control in Trucking](#)
- [Intermodal & Drayage: An Opportunity to Reduce Freight Emissions](#)
- [Charging Forward with Electric Trucks](#)
- [Hydrogen Trucks: Long-Haul's Future?](#)
- [Charting the Course for Early Truck Electrification](#)
- [High Potential Regions for Electric Truck Deployments](#)
- [Electric Trucks: A Regional Haul Report](#)
- [Electric Trucks: Where They Make Sense](#)
- [Medium-Duty Electric Trucks: Cost of Ownership](#)
- [Viable Class 7/8 Electric, Hybrid, and Alternative Fuel Tractors](#)
- [Electric Truck Primers](#) (Fleet primer for Utilities & Utilities primer for Fleets)





[Fleet Fuel Study](#) (no electrification information, but a LOT of info on adoption of truck tech)

[Messy Middle](#), Alternative fuels including EV & HFC

[A Need to Redefine Class 8 Long-Haul Trucking](#). What can be included in “long haul”?



From our friends and teammates at RMI:

- [Preventing Electric Truck Gridlock](#)
- [With Smart Policy, Truck Electrification is Within Reach](#)
- [The Case for Placing Drayage Truck Chargers Away from Ports](#)
- [How Electric Truck Fleets Can Save Money with Smarter Charging, Solar Power, and Batteries](#)

