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ONTARIO HOMEBUILDER

PLUGGED IN

Designing for our EV parking future has to shift into overdrive

Hold the door! P.55

PLUGG

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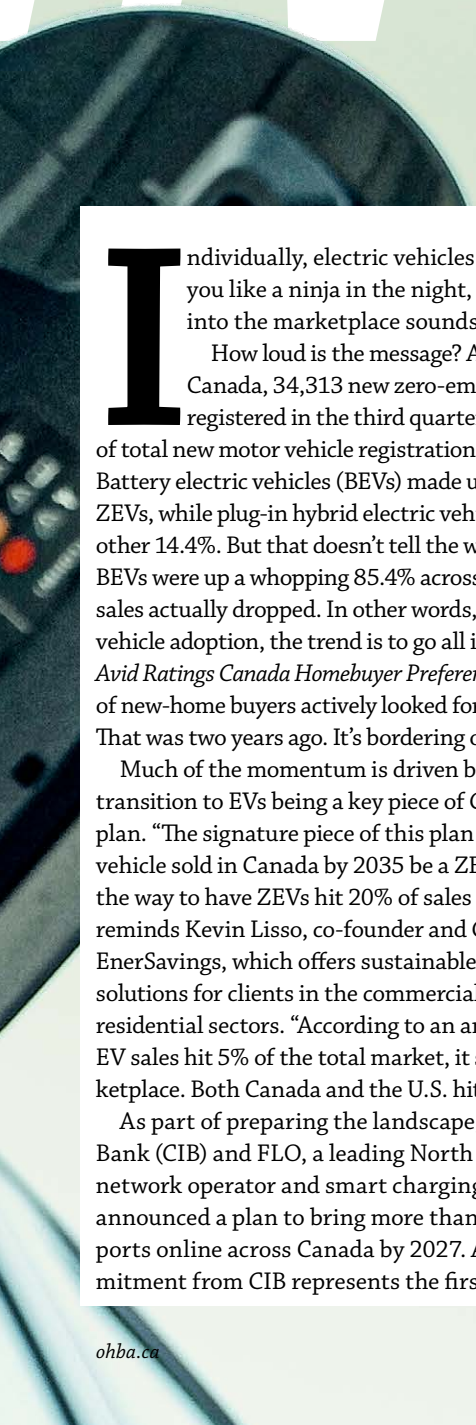
The future of multi-residential EV parking

BY TED McINTYRE



Individually, electric vehicles can sneak up from behind you like a ninja in the night, but their collective advance into the marketplace sounds more like a marching band.

How loud is the message? According to Statistics Canada, 34,313 new zero-emission vehicles (ZEVs) were registered in the third quarter of 2022, comprising 8.7% of total new motor vehicle registrations—up 43.2% year over year. Battery electric vehicles (BEVs) made up the bulk (85.6%) of new ZEVs, while plug-in hybrid electric vehicles (PHEVs) comprised the other 14.4%. But that doesn't tell the whole story. Year over year, BEVs were up a whopping 85.4% across the country, while PHEV sales actually dropped. In other words, when it comes to electric vehicle adoption, the trend is to go all in. Further, the 2021 *CHBA/Avid Ratings Canada Homebuyer Preferences* study indicated that 36% of new-home buyers actively looked for a pre-installed EV charger. That was two years ago. It's bordering on an expected feature today.

Much of the momentum is driven by government, with the transition to EVs being a key piece of Canada's emission reduction plan. "The signature piece of this plan is a mandate to have every vehicle sold in Canada by 2035 be a ZEV, with benchmarks along the way to have ZEVs hit 20% of sales in 2026 and 60% by 2030," reminds Kevin Lisso, co-founder and CEO of Toronto-based EnerSavings, which offers sustainable and tailored energy-saving solutions for clients in the commercial, institutional and multi-residential sectors. "According to an analysis by Bloomberg, once EV sales hit 5% of the total market, it starts a tsunami in the marketplace. Both Canada and the U.S. hit that 5% threshold in 2022."

As part of preparing the landscape, the Canada Infrastructure Bank (CIB) and FLO, a leading North American EV charging network operator and smart charging solutions provider, have announced a plan to bring more than 2,000 public fast-charging ports online across Canada by 2027. A $220 million loan commitment from CIB represents the first investment under its Charging and Hydrogen Refuelling Infrastructure initiative, which is focused on expanding the private sector's rollout of large-scale charging infrastructure.

The installations will nearly double the number of total universal public fast-charging ports currently available in the country.

Quebec-based FLO has been in the market for 14 years. "As with any new trending industry, there are a lot of new entrants, sometimes with questionable quality and reliability. It's great to have a charger, but it needs to be reliably operational," stresses Julien Deschamps, FLO's regional sales director for Eastern Canada. "We're recognized as having the chargers with the highest uptime. The reliability component and robustness of the units is critical. Ours are designed and assembled in Canada for our changing weather, so the elements are not a concern."

Northwinds Corp. services Ontario clients for FLO, including Application Engineers who will work with architects and engineering firms to optimize EV plans.

There are no regulations currently in the National Building Code that require multi-unit residential buildings (MURBs) to offer EV charging, but independent news platform Electric Autonomy Canada identifies some regions as being more driven than others. "B.C. is, by far, Canada's most advanced province in terms of having mandates for EV charging access in condos, apartment buildings, strata or townhomes, with 20 cities with modified building codes to stipulate EV-readiness requirements and one city in the process of implementing them," with some of those local bylaws dating back five years.

Ontario waded into the pool in 2017, when the Kathleen Wynne Liberal government amended the Ontario Building Code to require 20% of parking spaces in a new single-unit, semi-detached and townhouse buildings to feature EV charging, making Ontario the lone province at the time to mandate EV charging. But the policy was repealed in 2018 after the Conservative party took power.

Tridel's innovative program shares electric vehicles as well as e-bikes with residents at its Bianca condos, but can also feed energy back to the building.

Since then, the issue has been punted to local governments. Toronto is among the few to take charge. According to the Zoning Bylaw 569-2013, which was amended in December 2021, and Toronto Green Standard Version 4's EV infrastructure standards, which came into effect in May 2022, "all residential parking spaces provided for dwelling units located in an apartment building, mixed-use building, multiple dwelling unit building, excluding visitor parking spaces, must include an energized outlet capable of providing Level 2 charging or higher."

In Mississauga, an amendment to zone bylaw 0225-2007 passed last June requires EV-ready parking spaces "for the construction of new buildings or portions thereof, effective June 8, 2023." A minimum of 20% of multi-residential residents' parking spaces must be EV-ready; 10% for visitors lots, the amendment cites. Other cities, Hamilton and Sarnia among them, currently have staff looking into EV requirements.

Some builders are already plugged in. Amexon's Central Park community beside Leslie subway station in North York will be the first large-scale project of its kind in Canada to include electric vehicle charging stations in each one of its 1,500+ parking spots, the developer notes.

One of the most innovative approaches to EV parking belongs to EVE Park in London, Ontario. Equipped with smart charging systems, each of the project's four buildings will feature a pair of EV-ready parking towers—one that can hold up to 14 sedan vehicles and the other up to 12 SUVs. The low-footprint tower designs allow for multiple electric vehicles to park in the same land space as two surface lot parking spots, increasing land efficiency by up to 700%, according to developer s2e Technologies. EVE-Car, meanwhile, is the development's EV car share program, with four plans to choose from that offer Tesla Model 3s or the latest Model Ys for lease, be it by the hour or for a family trip.

Tridel has also entered the car-sharing market. Its Bianca condo in Toronto's Annex neighbourhood was the first MURB in Toronto to feature sustainable ride sharing, thanks to partnerships last year with Canadian cleantech companies Kite Mobility and Swtch Energy. Bianca residents can book one of two Tesla Model 3's, a Nissan Leaf or eight e-bikes through a mobile app. Depending upon demand, additional vehicles (and corresponding parking spots with charging stations) will be added. The pay-as-you-go (or monthly subscription) arrangement helps users avoid vehicle upkeep costs, while contributing to clean transportation.

Kite, whose other recent developer partners have included Collecdev, Broccolini, Madison Group, Vandyk Properties and Distrikt, estimates it can reduce 10 automobiles per building for every car share program. "In Vancouver, where electric mobility uptake is higher, developer Canderel is currently removing a whole parking level of 450 spots in a new building through a Kite partnership," notes REMI Network.

SHARING THE LOAD

There is an added power management component to the Bianca Condos innovation, though—a pilot project with Kite and Switch Energy that's part of the Government of Canada's i.d.e.a innovation fund. "We were the first—maybe even globally—to combine vehicle-to-grid charging with electric vehicles and an electric vehicle car-share service," says Graeme Armster, Director of Innovation

BY THE NUMBERS

35%+

Annual growth rate for electric vehicles (past five years).

* Statistics Canada

and Sustainability at Tridel. "The idea is to give people affordable and green mobility solutions right at home, but then when those cars aren't being used, to have the ability to unload that energy during down periods for other uses, like bringing down peak demand in the building. So now you're getting multiple bang for your buck in terms of it being both a mobility solution and also a load-management solution.

"Ultimately, I think the solution is for every building to have access to multiple charging tools—Level 1, Level 2, Level 3 and V-to-G (vehicle-to-grid). And then the question should be, 'How do we use those different charging tools, and in what quantity?"

The Ontario Energy Board is addressing the demand on electricity that growing EV numbers will entail with a new ultra-low overnight rate. At 2.4 cents per kilowatt hour from 11 p.m. to 7 a.m., it is 67% lower than the standard off-peak rate. (If customers choose that plan, though, it will be in exchange for a higher on-peak rate.)

"That special rate presents some interesting opportunities for leveraging technology on the energy management side, particularly if we can expect a steady increase in residents returning home from work in the evening and plugging in their vehicles at a similar time," explains Armster. "You could say, 'OK charging station, I'm plugged in, but don't turn on and charge my car until after 11 p.m.'

"Of course, if you've got 400 cars in a garage and they all need power at the same time, maybe you run into a new peak in the building, and the utility may start adjusting the rate structure," Armster notes. "From that perspective, you want to make sure from an infrastructure standpoint that you're set up and malleable enough to address that in the future. As the industry transitions to a lower carbon economy centred around electrification, we want to ensure that the properties we're developing will never be at risk of not having access to enough power, and will be resilient to that, where all the peaks and valleys are technologically managed on the building side—batteries or even renewables, and even feeding back to the grid. That's where I think things will go. But the key question is, 'Do you have the infrastructure in place so that you can manage what you have right now in terms of at least just shifting charging times so that you're paying the lowest rates?'"

One company immersed in the power management field is Toronto-based EVdirect. Designed, developed and built in North America, with a key manufacturing facility in Mississauga, the company's Evolute product is a smart multi-user electric vehicle charging system that addresses the unique challenges associated with deploying EV supply equipment in both new and existing MURBs, office towers and fleets.

"Currently, the main challenges facing this sector are limited capacity, remote control, billing and consumer freedom. The Evolute is the only system that addresses all four," says EVdirect founder and Chief Visionary Officer David Ackermann. "Its advantage over the others is its agnostic charging station compatibility and multiple billing options, providing consumers with full freedom of choice. The software includes a cloud-based dashboard for administrators and management, with tools for remote control, monitoring, billing and account management."

EVdirect's partnership with multinational power management giant Eaton Corporation has also helped attract developers, included Trulife Developments (8188 Yonge St. in Thornhill) and Broccolini (River & Fifth Condos in Toronto). "Eaton is the panel builder, while we designed the software," says Ackermann, a master electrician himself.

Ackermann believes builders should "stay out of the appliance game" when it comes to installing chargers. "The charging station is a small appliance in your condo—it's your toaster, your microwave," he says. "It's something that every end-user should be able to choose and upgrade when they like, and match to what their auto manufacturer suggests, if they want. When you're building in 2023 and occupancy is going to be 2026, why would you spec a charging station today for occupancy in three years? Just like cell phones, they're going to change multiple times by the

Choose your charging stations carefully, advises FLO EV Charging.

BY THE NUMBERS

100%

New vehicle sales in Canada mandated to be zero-emission by 2035.

* Transport Canada

80%

Amount of electric vehicle charging done at the home.

* *Forbes Magazine*

time you get to occupancy. Even the *way* we charge is going to change, such as wireless charging, etc. The proper way to do it is to give everybody power in their spots and manage that power in an efficient way to make sure that everybody wakes up in the morning and is charged."

And there's money to be made, if builders recognize it, Ackermann says. "Our system without a charging station—just the actual infrastructure, with a Level 2 receptacle—is about $1,000 a drop. That doesn't include the pipe and wire from the system to the particular parking spot or the charging station, which could be another $2,000. But it's $1,000 for that basic infrastructure, where they're going to now flip it for anywhere from $5,000-$10,000 more than a traditional spot, which I've heard going from $40,000 to beyond $70,000.

"But I see too many builders not looking at the future to what drivers are going to want and expect. They're trying to do the least expensive solution and not seeing the upcharge value of it. There are all these buildings that have maybe a dedicated panel for EVs, but there's no metering, no power sharing and no way to expand the system past the initial uptake of whatever they designed it for. And that really has to change, because a retrofit condo across the street that might be 10 or 15 years old is doing proper upgrades. You're either going to lose potential owners, or there's going to be blowback afterward from unit owners."

LEARNING CURVES

With the implementation of any new technology, there are bound to be learning curves, and there were two right off the bat for Tridel.

"First, just because you put an EV station in doesn't mean someone is going to use it right away," Armster cautions. "The numbers we're seeing right now from our sales and marketing team is the demand for about 30% of the parking spots to have charging stations in each new development. After a project is completed, though, I'll usually go back and walk through the parking garage to inspect things. Over the past couple of years, I've seen tons of parking spots with charging stations but with an internal combustion engine parked in it. That tells me that someone's future-proofing their spot and planning on making the jump to an EV eventually. But the issue there is that the utility has assumed a fixed timeline on payback for the investment they made in expanding the local electricity infrastructure to serve the new development. Payback is achieved through forecasted revenue that is generated from the electricity ratepayers for that development. When assumptions are off, which is often, the developer has to make up the revenue shortfalls that the utility receives. This will continue to be difficult for developers and utility providers to manage as more and more people look to future-proof their parking spots."

Focusing on energy management instead of the charging stations themselves is key, says Toronto's EVdirect.

"I see too many builders not looking at the future to what drivers are going to want and expect. They're trying to do the least expensive solution and not seeing the upcharge value of it."

 # BY THE NUMBERS

71%

Canadians considering an EV as their next vehicle.

* KPMG

Getting the numbers right is also important, given the expense associated with being EV-ready. EnerSavings, which has 'future-proofed' 250 buildings across the country, estimates that the added builder cost to installing an EV-ready versus standard parking space is approximately $2,000 per stall. This cost includes rough-in and running conduit and wiring during construction so that other equipment such as transformers, electrical panels, metering and charging stations may be added easily in the future. If you wanted to move beyond EV-ready and select a fully wired EV charger at your parking spot, Armster notes that the cost, including the associated infrastructure, would be about $10,000 to $15,000 extra per parking spot.

"The second learning curve was making sure that in the condo documents there is a clear process for expansion," Armster says. "We've seen examples where people have

Each of the four buildings at London's EVE Park will feature a pair of EV-ready parking towers that can hold up to 26 vehicles apiece.

told their condo corporation, 'Hey, I want to add a charging station to my parking spot,' and the condo corp. says, 'OK, let's price this out.' They get an engineer, a design and price, and after adding a transformer, panel and all the associated wiring to introduce EV charging to the condo, it could be $150,000 for the resident. If economies of scale come into play, you could get one at maybe $10,000 to $15,000, but they'd have to find 9-14 other residents or so to make it all work.

"It's also not as simple as saying a person should be able to just plug their vehicle into the outlet that's there; there should be a process in terms of the breaker being off for that plug, and the person requesting that they want power turned on now," Armster advises. "Developers should have a process in their condo docs that lays out the obligations of the condo corp. to support this service and for growth and expansion. But they must also identify the responsibilities of the parking spot owner, and consider that those who don't have spots should not have to contribute maintenance fees for the upkeep of those spots."

Armster also worries whether the amount of mining required to meet the demand for both lithium batteries and copper wiring might offset any potential gains from the move to EVs. But there are other reasons why this might environmentally motivated upgrade isn't so straightforward. "Will all the EV spots we're installing get used in the future?" Armster wonders. "Will fewer people even need to own a car because autonomous vehicles have taken off and the infrastructure around transportation has changed in Toronto? Will they figure out hydrogen cars in the next five years? Everyone has the same goal right now. We want to address climate change and reduce carbon emissions, and we have to act quickly. But I think sometimes we have to just take a second longer to think about what we're doing to make sure that we're not over-vectoring, and in trying to solve one problem creating another."

BY THE NUMBERS

36%

Amount of new home buyers actively looking for a pre-installed EV charger in a new home.

* CHBA/Avid Ratings *Canada 2021 Homebuyer Preferences Study*

BURNING TOPICS

Insurance companies will also be watching closely, since EV batteries produce an entirely different type of fire, burning longer and hotter and requiring a different fire extinguishing approach. Automotive news site MotorBiscuit reported on a Germany parking garage that banned EV and hybrid vehicles altogether, since the underground car park ceilings were not high enough to allow for heavy equipment to pull out burning cars. "Since lithium-ion fires are a chemical reaction, they can only be cooled not extinguished," it noted. "They end up burning for several days in some cases. In that case, damage to the parking structure would be extensive."

"Ontario has prescriptively prohibited the installation of lead-acid or lithium-ion batteries for energy storage solutions below grade or above 23 metres in a building. Interestingly, this hasn't been fully addressed with regard to electric vehicles, as that would technically be a battery that would be parked below grade," Armster says. "But our industry may see changes in the near future as building codes catch up. It could be driven by insurance companies. It could be driven by safety authorities. But the City is not quite there just yet."

We also might not be quite there with respect to federal and provincial funding for EV's evolution. "Many incentives are currently going to people who were going to buy EVs anyway," says Steve Boccadoro, president of Eaton Canada. "In terms of funding, investment and incentives, we have to make sure we're directing it to the overall hurdle of EV charging infrastructure. The government needs to incentivize the private sector to draw them in."

Ackermann agrees. "The rebate system and the NRCan grants just don't talk about infrastructure. If builders could get some infrastructure rebates or some other incentives instead of these programs focusing on charging stations, that would be a huge boost." **OHB**