ELECTRIC CHARGING SOLUTIONS AND PARTNERSHIPS NEEDED

ISSUE

Widespread electric vehicle adoption hinges on utility investment in charging infrastructure — a process fraught with payback challenges and difficult strategic choices.

The global auto manufacturing industry is undergoing a rapid transition from reliance on internal combustion engines (ICEs) to battery electric vehicles (EVs). This shift is essential for cutting greenhouse gas emissions in order to avoid the most catastrophic impacts of climate change and presents a major economic opportunity for the auto manufacturing industry. If done right, federal policy can help mitigate the climate crisis, deliver a win for workers, and ensure national competitiveness in key areas of economic growth, decarbonization, and technological innovation. BC and Canada need to build competitive domestic supply chains in industries that are at the frontier of technological change.

The growing trend in electrical vehicle (EV) deployment has transformed independent power network and transportation network studies into highly congested interdependent network performance evaluations assessing their impact on power and transportation systems. Electrified transportation is highly capable of intensifying the interdependent correlations across charging service, transportation, and power networks. However, the evaluation of the complex coupled relationship across charging services, transportation, and power networks poses several challenges, including an impact on charging scheduling, traffic congestion, charging loads on the power grid, and high costs.[1]

BACKGROUND

Much of the charging infrastructure deployment to date in Canada has focused on establishing geographic connectivity along key highway corridors with 'fast-charging' stations that allow a typical EV to charge to 80% in 30 minutes.[2]

Canada is actually doing pretty well on this front. Thanks to investments by the federal government, provincial governments, electric utilities and a handful of private companies, Canadian EV drivers now have access to a number of charging networks that can get them from Victoria to Halifax.

However, ongoing investment in charging infrastructure is essential to make sure there is a base-layer of charging infrastructure that can meet the demands of a growing EV population. By that measure, much of this country's existing fast-charging infrastructure suffers from two key limitations:

---

1 https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwjT1a3J7KHvAhXY854KHf4VDC0QFjAAegQIARAD&url=https%3A%2F%2Fwww.mdpi.com%2F1996-1073%2F13%2F13%2F3371%2Fpdf&usg=AOvVaw1ai67q-WHpTF7qr1epZE2r

2 https://electricautonomy.ca/2020/05/21/ev-charging-economics-for-utilities/

Inadequate charging power: The 50kW charging speed of many fast chargers leaves something to be desired. While they can recharge a 2011 Nissan Leaf with 117 kilometres of range to 80% in about 30 minutes, the batteries in EVs with 400 kilometres or more of range take longer to charge. Research suggests that charging at 150 kW, with the potential to replenish 300 to 400 kilometres of range in 30 minutes, is an essential development for EVs to appeal to a broader slice of the population. An increasing number of vehicles are coming to market that can charge this fast, and we should be building infrastructure in anticipation of them.

Too few chargers: The majority of fast-charging sites across Canada can only charge one EV at a time. First-hand accounts from Canadian EV drivers suggest this is already leading to some headaches on peak travel days, and modeling has shown that many jurisdictions need to be thinking of charging stations with four, eight or even more chargers each to avoid line-ups in the near future.

What's needed are opportunities to build a broader business case for public fast-charger deployment that looks beyond simply selling electrons. These three are the most compelling:

Companion retail: Some retailers may enjoy having a captive audience with 20-30 minutes to kill in their store. I have clothes that I purchased at an outlet mall that I would never have shopped at it if it hadn't been next to the fast charger half-way between Vancouver and Seattle! Convenience stores, coffee shops, grocery stores and other outlets may see EV charging as a way to lure customers, although they'll need to take a close look at the math based on the expected EV traffic in the area.

Carmaker incentive: Some automakers have seen fast-charging deployment as a necessary investment to enable sales of their EVs. Tesla, which has been deploying high-powered, multi-port charge stations since 2012, is the most obvious. But Volkswagen and Ford are among other EV makers now entering the charging game.

EV-driven load growth: A growing number of electric utilities are investing in public charging infrastructure on the basis that it will accelerate EV adoption, which in turn increases utility revenue through overall growth in electricity demand. While public fast chargers may only provide roughly 5% of an EV driver's energy needs, the electric utility is in the unique position of being able to recognize revenue from the remaining 95 per cent of that driver's charging, whether it happens at home, at work, or on the go.

Electric utilities can play a big role in addressing many of these issues.

Battery Prices: Cell costs have plummeted to $145 per kWh or lower and are expected to continue falling with technological improvements and returns to large-scale production. While cells are only one component of the cost of an installed battery, the cost of installed batteries has declined from around $1,000 per kWh in 2010 to an estimated $250-350 per kWh in 2018. Total battery costs are falling more

slowly, as consumers demand EVs with longer ranges and thus larger batteries. Meanwhile, governments are finding it increasingly difficult to fiscally justify large subsidies to attract buyers.[3]

The lifetime costs of battery-only cars (BEVs), plug-in hybrids (PHEV) and gasoline-fueled internal combustion-engine vehicles (ICE), needs to be evaluated and prepared for. The PHEV is more expensive than the ICE in almost all scenarios, while the BEV is robustly cost-competitive, once installed battery prices reach $200-$250 per kWh. Further reductions in battery costs will still be needed for BEVs to be a viable alternative to ICEs.

Commercial success for EVs will require installing charging infrastructure that is accessible, easy to use, and relatively inexpensive—whether at home or in public locations. The form this infrastructure will take is still uncertain, with a range of charging technologies currently available and more expected to emerge over the next five years. The total cost of power from fast charging stations is higher than slower residential chargers unless the former can achieve sufficiently high utilization rates.

THE CHAMBER RECOMMENDS

That the Provincial Government:

Leverage utilities to build a positive business case for investing in charging infrastructure, helping to accelerate the transition towards electric mobility while delivering cost savings to their ratepayers.

Submitted by the Surrey Board of Trade

[3] https://projects.iq.harvard.edu/files/energyconsortium/files/rwp18-026_lee_1.pdf