

Tricky Economics and Inconsistent Pricing Impede Transition to Electric Vehicles in Nova Scotia

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The January 11, 1914 edition of The New York Times carried a story where Henry Ford described his next plans to redefine the nascent automobile. He proposed to enlist the help of a notable friend.

“*Within a year, I hope, we shall begin the manufacture of an electric automobile. I don't like to talk about things which are a year ahead, but I am willing to tell you something of my plans. The fact is that Mr. Edison and I have been working for some years on an electric automobile which would be cheap and practicable. Cars have been built for experimental purposes, and we are satisfied now that the way is clear to success. The problem so far has been to build a storage battery of light weight which would operate for long distances without recharging. Mr. Edison has been experimenting with such a battery for some time.*”

The story of electric vehicles (EVs) is of a painful missed opportunity – in the early twentieth century, it was not at all clear that the internal combustion engine would eclipse the electric motor as the choice to power cars. Now, 108 years later, is the way to EVs finally “clear to success?”

The short answer might be: it depends where you live. Here in Nova Scotia, the answer is probably not.

“Education, rebates, infrastructure and supply are recognized as the four pillars of EV adoption,” says Thomas Arnason McNeil, Ecology Action Centre’s climate policy coordinator for sustainable transportation.

The latter three of these pillars are essentially economic. Let’s take a look at these, widening our discussion of the second pillar to include full cost rather than only rebates. Where is Nova Scotia lacking?

Of course, cost includes the upfront price of buying a vehicle, and the continuing costs of energy and maintenance. Henry Ford’s gasoline-powered Model T came in at about \$440 USD in 1914, affordable for the small but growing American middle class. Converted to 2022 dollars, this is about \$16,000 CAD. What’s remarkable is how little this baseline figure for a cheap, gas-powered car has changed. The cheapest EV’s bought new, by contrast – say, a Nissan Leaf or Chevy Bolt – come in at just under \$40,000 CAD.

However, a substantial offset – for those who can afford the upfront cost – is the approximately **47 per cent reduction** in maintenance costs of EVs compared to gas-powered vehicles.

This past August, I bought a 2017 Bolt from the only used EV dealership in Nova Scotia. My Bolt has a brand new battery due to a recall. With the new battery, it has an estimated maximum range of 420 kilometres– just about the distance by road from Halifax to Sydney. I got lucky. A modest windfall from the sale of the start-up company I work for allowed me to afford it.

But relying on people getting lucky and choosing to use their extra money on an EV is not a winning strategy. The decision to buy a car, and what to buy – or not to buy one at all – is an area where public policy enables consumer choice.

What are the federal and provincial governments doing to speed the transition from gasoline to electric? As usual, it's a tale of carrots and sticks.

Wherever you live in Canada, there is something of a carrot. The federal government offers up to \$5,000 for a new EV, though nothing for a used one. **Nova Scotia** offers a \$3,000 rebate for new EVs and a \$2,000 rebate for used, **less generous** than the other Atlantic provinces, Quebec, and B.C., but more generous than Ontario. The prairie provinces offer no incentives.

Some American states offer a larger carrot to help middle-income earners. **Vermont's incentive model** is tied partially to income. A buy-back program rewards taking gasoline powered vehicles off the road as well as putting EVs on the road. And we have a history of using Vermont's models, as Efficiency Nova Scotia took partial inspiration from Efficiency Vermont.

But this now brings us to the next pillar of EV adoption: infrastructure. And infrastructure means charging stations.

Here things get tricky.

There are 3 levels of chargers: Level 1 is simply your average outlet and generally only adds 6-8 kilometres of range to your EV per hour. Level 2's are most commonly installed at home, and also the vast majority of public charging stations: they add, as an average, about 30 kilometres of vehicle range per hour. Level 3 DC fast chargers add up to 200 kilometres per hour of range (more for Tesla fast-chargers).

Since Ford's 1914 musings which led to nothing, gas stations have proliferated to nearly every village, city neighbourhood, and stretch of rural highway. While EV drivers who own a home with a driveway can install a Level 2 charger and plug-in to get a full charge or close to it overnight, everyone else – condominium, apartment, or co-op dwellers – have to find a public charging station. Currently, 80 per cent of charging in Canada takes **place at home**, indicating that ownership of a home with a driveway is still a hurdle to EV adoption. The Nova Scotia government has **incentivized the installation of chargers at multi-unit residential buildings** through Efficiency Nova Scotia, but the program is far too small in scope. And the public charging infrastructure in Nova Scotia is inconsistent and unregulated.

PHOTOS: Courtesy of All EV Canada - Electric Vehicle Store



TAKE ACTION

Electrifying our school bus fleet is an important step in lowering emissions from transportation in our province. That's why we're calling on the government of Nova Scotia to put in place a mandate and clear targets to achieve a 100 per cent electric school bus fleet over the next 10 years. Go to ecologyaction.ca/take-action-electric-school-buses-nova-scotia to join the call, or email thomas.arnasonmcneil@ecologyaction.ca!

The vast majority of public charging stations are Level 2 chargers. These cost about \$50,000 to install, while the Level 3 DC fast chargers cost around \$500,000 to install. But for a stop on a long haul or a charge for those without a home charger, Level 3's are far more appealing.

Who is installing these chargers? And what of the costs and logistics to plug in and charge up at these public chargers? The answer to the first question is a mishmash of community groups and private businesses, incentivized by government grants. Most require an app to access – most commonly Flo, Chargepoint, or JuiceBox (a notable exception is the Petro Canada Level 3 “Electric Highway” chargers in Halifax off Herring Cove Road and in Stewiacke. Tesla chargers are incompatible with other EVs, though Teslas can plug into other charges with an adapter. Public chargers charge by the hour, but the rates don't always show up on the app, and there is a lack of transparency as to how much energy you're actually getting. This situation is complicated by the fact that older EVs or those with partially charged batteries will add charge more slowly. But the charging stations billing you for time don't care.

Different chargers, different rates of cost, different rates of charge: all of these make for a complex picture. Fortunately, possible solutions are on the horizon: Measurement Canada is **considering** standards for per-kilowatt-hour billing. Additionally, some charging stations have flat fee per-use charges. While these novel pricing structures will do more to ensure accountability and transparency, it remains to be seen which of them will become the new standard.

Finally, let's look at supply. The unfortunate truth is that EV manufacturers send more cars faster to bigger markets – Quebec and B.C. in Canada, California in the U.S. And so wait times for new EVs – already long before the supply chain issues which

have exacerbated in 2022 – are stretching into the years. But the slow pace of EV delivery to smaller markets such as Nova Scotia slows the demand for charging infrastructure. Poorer infrastructure makes Nova Scotia a less appealing destination for EV drivers from elsewhere, and hinders the growth of larger EVs for the transport of goods. It also slows the rate at which people become familiar with EV cost, charging, and maintenance.

Why are certain EV markets considered desirable while others are ignored? The ‘larger markets’ mentioned above have chosen to employ a stick and carrot approach: In addition to higher rebates, British Columbia and Quebec have followed in the footsteps of fourteen states, most notably California, to implement a Zero Emissions Vehicle (ZEV) mandate: 100 per cent of new light-duty vehicles must be so-called zero emission vehicles by 2035. (We'll save the discussion of the term “zero emission vehicle” for another time: a useful but somewhat misleading term, ZEVs encompass both electric vehicles and plug-in hybrids; the “zero” refers to tailpipe emissions rather than lifetime emissions).

Could Nova Scotia implement an EV mandate soon? Arnason McNeil thinks so;

“While we were successful in pressing NS to put a ZEV mandate on the books last year, they still have yet to implement that regulation. When the federal government announced they were designing a nation-wide ZEV mandate this year, we joined the province in pressuring them to adopt regional sales targets for smaller, have-not provinces. But if federal policy making ignores Atlantic Canada and forces us to compete with larger markets, the cycle of long wait times for EVs and slowed infrastructure deployment will continue unabated.”

So, the solution appears to be a mixed bag. Higher incentives, more public charging stations (and especially more Level 3 fast chargers) would be a start. Mandates for EVs either by flat numbers or as a percentage of vehicles sold, and specifically targeting the less populous provinces in federal legislation would be another logical step.

Recent data shows transportation is responsible for consistently **around 25 per cent** of Canadian greenhouse gas emissions. MIT's **carbon counter app** estimates that an electric vehicle generates 30-40 per cent of the lifetime emissions of a comparable gas vehicle. This includes emissions associated with manufacturing and mining of metals for batteries. Where precisely your vehicle falls within this 30-40 per cent also of course depends on the sources of energy which power your battery charges.

Some quick math will tell us that, if the total number of vehicles remained the same and all were converted to electric, Canada would cut 15-17 per cent of its emissions by this measure alone. But until smaller provinces like Nova Scotia catch up, the way to widespread EV adoption is certainly not yet “clear to success.”

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