



The road to electric cars is paved with good intentions

A clean transportation corridor between Ontario and Québec would bring enormous economic opportunities to the region. But lack of political will is a major roadblock.

by TYLER HAMILTON

The Mitsubishi all-electric i-MiEV car goes on sale in Canada next year, so to give Canadians a peek at the future the Japanese automaker sent the battery-powered hatchback on a 25-day summer trek across the country.

It was eye candy for evening newscasters, but what the public didn't see during the 7,500-kilometre journey is telling: a large

truck loaded with a diesel generator that kept the little i-MiEV charged up for most of its tour.

The juxtaposition of an emission-free electric car chaperoned by an emission-spewing truck and generator was a somewhat comical reminder that electric transportation of any type is of little value without the infrastructure to support it.

Building out that infrastructure

presents some major challenges, but more importantly, it represents an enormous opportunity for regions that choose to lead. Most transportation experts will tell you no part of Canada is better positioned to grasp that opportunity than the densely populated stretch between Windsor, Ontario, and Québec City.

Indeed, development of such a clean transportation corridor, powered by

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low-emission electrons from Québec hydroelectric stations and a coal-free Ontario, could prove an economic bonanza for a region that's struggling to reinvent itself and find its place in the global green economy.

"The technologies are there. It's just money and the will to do it," says Peter Frise, chief executive of Auto21, a federally-backed automotive research centre based in Windsor.

Nicholas Parker, executive chairman of the research consultancy Cleantech Group and a member of Ontario Premier Dalton McGuinty's climate-change advisory panel, has become a champion for the cause. He says electrification of the 1,145-kilometre Windsor-Québec corridor could be the cornerstone of a much broader smart mobility strategy that would revive automotive and industrial manufacturing, create tens of thousands of high-skill jobs, and attract billions of dollars in foreign investment. It would also address gridlock, air pollution, and greenhouse gas emissions.

"It embraces more than the auto sector and transit—it's a whole vision of what the mobility strategy is for the 21st century," says Parker, adding that in both provinces there's a clear recognition of the potential at the highest levels of government. "But what we need both politically and economically are some signature projects that say we're dead serious about this."

Today, the outside world doesn't take the region so seriously. Parker points to venture investments in smart mobility between 2004 and 2009. They amounted to roughly \$4 billion spread across 350 deals related to everything from transportation logistics to

electric cars to advanced batteries. "How much do you think came into Ontario? Virtually nothing," he says.

If Ontario and Québec were to embrace a broader vision linking clean energy and smart transportation with green jobs and sustainable economic development, how might such a bold initiative evolve?

MAKING A FIRM COMMITMENT to high-speed electric rail would be a crucial first step, though the idea is hardly new. It has been bandied about since the 1960s and no government has yet had the courage to act. The government conducted its last major study in 1995.

In the 90s, Bombardier boasted a project linking Toronto to Québec City that would take seven years to build and create 175,000 manufacturing and construction jobs. Once in operation, the service would keep 6,000 people employed and add \$352 million to gross domestic product. Nothing ever came of it.

At the time, the government's priority was eliminating deficits, says Paul Larouche, director of product planning for Bombardier's transportation division. Had the government acted then, Canada would no longer be the only country in the exclusive G8 economic club without high-speed rail.

There are signs of progress. After many months of delay, a new \$3-million federally funded study is expected this fall. The so-called EcoTrain study will assess construction and operating costs, expected demand for the service, technology and route options, as well as environmental benefits and the impacts on car and airline travel.

"It's a different world today," says Larouche. "We need that update. But after that we need to act."

The benefits are clear: based on 1995 data, the Pembina Institute estimates that high-speed rail in the corridor has the potential to reduce carbon emissions, reduce air travel by 18 per cent, and auto travel by 40 per cent. These estimates are expected to increase with new data.

Even if a firm commitment to high-speed rail were made today it would likely take over a decade to launch the service, because of lengthy agreement discussions, regulatory issues, and construction.

But the commitment alone would be tremendously symbolic. It would put the region on the map and create momentum for further electrification projects that, together, would establish the corridor and its communities as an emerging cluster of smart mobility innovation.

IF ELECTRIC RAIL DEVELOPMENT begins gathering speed, governments could support a parallel effort to reduce the environmental impacts of the cars, trucks, and buses that will still need to travel along Highway 401 and Autoroute 20 over the next few decades, observers such as Parker contend.

Charest's government is expected to announce an electric-vehicle plan for the province this fall, and Ontario has already set a target—one out of every 20 vehicles will be electric by 2020.

Michael Martin, a senior managing consultant with the energy and utilities group at IBM Global Business Services, says every home and small business in Ontario will



STATISTICS REPRESENTING THE POTENTIAL REDUCTIONS IN CONVENTIONAL TRANSPORTATION AFTER THE INTRODUCTION OF HIGH-SPEED RAIL ALONG THE WINDSOR-QUÉBEC CORRIDOR.

have a smart meter by 2011. This puts the province in a good position to lay the early groundwork for an intelligent charging infrastructure that could support electric travel, both along the main highways and within the communities that line them.

“In a way, Ontario has become a micro-lab for the rest of the world,” says Martin, adding that the smart meter program is proof that ambitious infrastructure projects are doable. “Dozens of utilities around the world are now watching what’s going on here.”

What they’ll see is limited—a handful of pilot projects will put a few dozen electric cars into corporate and government fleets supported by one or two charge stations. Such projects are important, but much

more can be done.

Take the case of Foothill Transit. In eastern Los Angeles County, it has purchased three EcoRide BE-35 all-electric buses and two fast-charging stations from a Colorado company called Proterra. The buses can operate for two to three hours before needing a charge—10 minutes at fast-charging stations—located strategically along routes. The City of Montreal wants its 1,300-plus bus fleet to go all-electric by 2025, but hasn’t made a similar investment.

Inter-city buses could also be piloted. China’s Zonda Bus, for example, claims a 500-kilometre range and a battery lifespan of 500,000 kilometres. Such innovation, followed up by deployment, could be happening today in the communities lining the

Windsor-Québec corridor.

Along the highway itself, gas and diesel-powered vehicles will still dominate for at least the next two decades. To reduce their impact, Martin says there’s a need to bring intelligence to the roads—an advanced communications infrastructure designed to manage vehicle congestion and improve highway safety. It could eventually interact with a smart charging infrastructure as electric vehicles grab a greater percentage of the market.

Rob Farrell, who works as marketing manager for Eaton Canada’s electrical sector operations, says charging infrastructure will take three forms: slow AC charging through a standard 120-volt household outlet; twice-as-fast AC charging through

upgraded 240-volt stations that will be popular with fleets; and superfast DC charging that can get an electric vehicle's battery topped up to 80 per cent in 30 minutes.

Farrell envisions quick-charge stations located every 60 or 70 kilometres along Highway 401 and Autoroute 20, similar to one being developed along Interstate-5 Highway in Washington. The charging network would sell electricity as a premium service, making longer drives in all-electric vehicles possible for early adopters. Initial locations might be government-owned service stations, but as more electric cars get on the road more private stations would gradually sprout.

Today, the Mitsubishi i-MiEV might need to stop and charge five or six times to make it from Toronto to Montreal, adding two to three hours to a five-hour road trip. But as battery range improves, the trip could eventually be narrowed down to one or two quick charges. Tesla Motor's Model S sedan, for example, is expected to have a maximum range of 260 to 480 kilometres on a single charge when it hits the market in 2012.

IF THE GOVERNMENTS OF Ontario and Québec are working together on a bold and comprehensive smart mobility roadmap, or even giving the idea some thought, then they're not letting on. Requests to interview McGuinty and Québec Premier Jean

Charest, as well as their respective transportation ministers, were denied.

In principle, both McGuinty and Charest are keen on developing high-speed rail between the two provinces. Less clear is their willingness to move forward, and whether they see such a project as part of a broader vision of electrified transportation. Jane Almeida, press secretary for McGuinty, insists that no such discussions have taken place.

Hydro-Québec won't talk about it, and Ontario's Hydro One offered this comment: "No one has anything on the table or [is] in discussions about this type of project."

Perhaps the barriers are too high. Such projects run more than a decade and the risks of delay are real. The cost is jaw-dropping, and that's before the likelihood of overruns. "People look at the price tag and they go, 'Holy Cow!' and back away. At some stage it has to be done, but it's about having government with an appetite to do it," says Frise of Auto21.

Nicholas Parker says Charest and McGuinty, while "hot to trot" on high-speed rail, also have their hands tied by Ottawa. Sources say the federal government, whose funding and support would be critical, is keen on protecting the interests of Air Canada and Porter Airlines against the threats posed by a competing high-speed rail service.

There are also other transportation

projects that, while complementary, are competing for attention. The Ontario agency Metrolinx, for example, is currently studying the cost of electrifying its entire GO Transit rail system, which services the Greater Toronto Area and a good portion of the province's "Golden Horseshoe" region.

And there's no certainty that voters, still licking their recessionary wounds, are behind such megaprojects when, once again, deficit-fighting is in vogue.

But we have to take a more holistic view, says Parker. How much would such a project expand tax revenues? How much could be saved by deferring highway upgrades? What's the cost of not acting?

"Sure, it's a big-ticket item, but there are a bunch of returns here," he says.

"We have a lot of assets in place to move forward. The innovation base is there, it's just not commercialized. The industrial infrastructure is there but underutilized. A lot of the smart grid stuff is in place to enable us to move forward on deployment."

The bottom line: the region has all the assets it needs to electrify Canada's busiest transportation corridor. "At some point we have to take the first step," says Frise. "Now is as good a time as any." 🐼

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Westport Innovations Inc.	BC	Green Engines and Cars	TSX:WPT	4*
Carmanah Technologies Corp.	BC	Solar Lighting	TSX:CMH	4
RuggedCom	ON	Communications	TSX:RCM	4
Waterfurnace Renewable Energy	USA	Heating/Cooling	TSX:WFI	4
5N Plus Inc.	QC	Metals	TSX:VNP	3
NEO Material Technologies Inc.	ON	Metals	TSX:NEM	2
ATS Automation Tooling Systems Inc.	ON	Manufacturing	TSX:ATA	1
GLV Inc.	QC	Water & Recycling Solutions	TSX:GLV.B	1
Primary Energy Recycling Corp.	USA	Waste Energy	TSX:PRI	1
Pure Technologies Ltd.	AB	Infrastructure Management	TSX:PUR	1

CLEANTECH NEXT 10 COMPANIES	HQ	INDUSTRY
Arxx Corp.	ON	Construction
Cavet Technologies	ON	Smart/Wireless Technology
ecobee inc.	ON	Smart/Wireless Technology
Ensyn Technologies Inc.	ON	Biofuel
Lotek Wireless Inc.	ON/ NL	Smart/Wireless Technology
Morgan Solar Inc.	ON	Solar Power
Nexterra Systems Corp.	BC	Biofuel
Pond Biofuels Inc.	ON	Biofuel
Saltworks	BC	Desalination
Terragon Environmental Technologies Inc.	QC	Waste Management and Recovery

Since the Cleantech 10's inception in October 2007, the companies on our list have outperformed the S&P/TSX Composite by 11 per cent (based on unweighted average returns until September 21, 2010).

CLEANTECH 10 METHODOLOGY

The Cleantech 10 list was created by Rafael Coven, Managing Director and Index Manager of The Cleantech Index (CTIUS; cleantechindex.com). It underlies several Index-based funds such as the PowerShares Cleantech ETF (NYSE:PZD), and is the only index to cover a broad array of industries. CTIUS has outperformed nearly all alternative energy or "green" stock indexes.

NEXT 10 METHODOLOGY

The Next 10 are selected by an advisory panel of Canada's foremost authorities on cleantech: **TYLER HAMILTON**, Energy Columnist, Toronto Star and adjunct professor of environmental studies, York University; **ANDREW HEINTZMAN**, Co-Founder, Investeco; **DENIS LECLERC**, President & CEO, Écotech Québec; **NICHOLAS PARKER**, Executive Chairman, Cleantech Group LLC; **TOM RAND**, Practice Lead, Cleantech & Physical Sciences at the MaRS Discovery District; **VICKY J. SHARPE**, President and CEO, Sustainable Development Technology Canada

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