

1920s



1970s



Today

Electric Motorcycles and Controlled Access Highways in Ontario

The Electric Vehicle Council of Ottawa

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Executive Summary

Electric motorcycles, regardless of capability, are banned from Ontario’s controlled-access highways. This was reasonable when the typical electric motorcycle had abilities similar to what is now classified as a limited-speed motorcycle (LSM). However, more capable machines are now being produced.

In a world where we are looking for innovative solutions to air quality, greenhouse gas emissions, and multiple other forms of pollution associated with the internal combustion engine and fossil fuels (water, groundwater, noise, thermal), we need to remove barriers to existing technologies, such as highway-capable electric motorcycles.

The Electric Vehicle Council of Ottawa (EVCO) requests that the Ontario Ministry of Transportation repeal the current ban on the use of electric motorcycles on controlled-access highways, where those motorcycles are capable of appropriate speeds and safe operation in the existing vehicle mix.

This action will allow Ontarians to choose another transportation technology option which has a lower environmental impact than the conventional automobile or motorcycle, reduce wear and tear on our roads, while accomplishing the common one or two-passenger commute mission, even on high-speed roadways.

Background

EVCO is an incorporated, non-profit, volunteer organization that promotes the use of zero-emissions electric transportation where it is appropriate.

EVCO has worked with the Ministry over the past several years regarding the legalization of electric power assisted bicycles (PABs) in Ontario. The EVCO membership is pleased that a pilot project was announced on October 4th, 2006, which permits these energy-efficient, zero-emissions, compact vehicles to be used on Ontario roads for the next three years. We look forward to the evaluation that will result from this study, and legislation that will make them a permanent feature in Ontario, as they are now in most Canadian provinces and U.S. states.

Electric motorcycles have traditionally been smaller, lower-speed versions of the gasoline-powered motorcycles, such as the Aurantetic Charger of the 1970s. However, as electric propulsion technology has evolved, more capable electric motorcycles are being made. Recent breakthroughs in electric storage technology (lithium, NiMH, nickel-zinc, zinc-oxide) are making such highway-capable electric motorcycles more practical and affordable. Electric motorcycles which can exceed 100 km/h, such as the GPR electric and the Vectrix Maxi-Scooter, are available for sale in North America today.

In light of the creation of the limited speed motorcycle (LSM) designation in Ontario in November of 2005, EVCO feels that this pre-existing restriction on all electric motorcycles is overly restrictive, and discriminates against clean, efficient, electric motive power.

Current Regulation

Regulation 630 of the Ontario *Highway Traffic Act* includes the following text.

1. (1) Subject to subsection (2), no person shall operate,
...
 - (c) a motorcycle driven by electricity stored in the vehicle;
 - (c.1) a limited-speed motorcycle, as defined in Ontario Regulation 340/94 (Drivers' Licences) made under the Act;

...
on those controlled-access highways and parts of controlled-access highways described in the Schedule. R.R.O. 1990, Reg. 630, s. 1 (1); O. Reg. 598/05, s. 1.

Regulation 340 of the *Ontario Highway Traffic Act* includes the following text.

“limited-speed motorcycle” means,

- (a) a motorcycle that,
 - (i) has sufficient power to attain a rate of speed of more than 32 kilometres per hour on level ground within a distance of 1.6 kilometres from a standing start,
 - (ii) has a maximum attainable speed of 70 kilometres per hour or less, measured in accordance with International Organization for Standardization standard ISO 7117:1995 entitled “Motorcycles — Measurement of Maximum Speed”,
 - (iii) has steering handlebars that are completely restrained from rotating in relation to the axle of only one wheel in contact with the ground,
 - (iv) has a minimum seat height, when unladen, of 650 millimetres,
 - (v) has a minimum wheel rim diameter of 250 millimetres and a minimum wheelbase of 1,016 millimetres, and
 - (vi) has an engine displacement of 50 cubic centimetres or less

EVCO feels that the definition of limited-speed motorcycle and the provision for prohibiting their operation on controlled-access highways per Regulation 630 subsection 1.(1)(c.1) is sufficient for motorcycles of that capability, and subsection 1.(1)(c) serves only to discriminate against electric motive power, where an electric motorcycle is capable of highway speeds.

Opportunity

Opening the door to the highway-capable electric motorcycle means that Ontario businesses can find a home-market for innovative products in this vehicle niche, which can later be exported to other markets. This could include research into ways to make motorcycles safer in collisions and operation, and provide better protection against the cold and weather for their operators.

As the climate continues to warm, more and more of Ontario will experience less and less traditional winter weather, notably appreciable amounts of snow. This will extend the range that will be open to year-round or near year-round operation for motorcycles. However, a switch from vehicles powered by fossil fuels to those which produce no greenhouse gas emissions will help Ontario to reduce its greenhouse gas emissions, and mitigate the impacts of climate change in the future by reducing the planet's greenhouse gas inventory.

The use of smaller, lighter vehicles (relative to conventional cars and light trucks typically used for commuting in Ontario today), will also reduce the impact on our roads, reducing the cost of maintenance to some degree. Use of vehicles with a smaller physical footprint can reduce congestion on our highways, and space devoted to parking.

As Environment Minister Broten was quoted as saying on October 4th, "Emissions from cars, trucks and buses contribute greatly to the quality of air we breathe. With e-bikes, more Ontarians can connect to the outdoors in an environmentally-friendly way." Electric motorcycles provide another zero-emissions transportation option, only capable of higher speed operation.

Most conventional motorcycles do not have emissions control equipment on them, and are not tested in the Drive Clean program. Therefore, these machines typically pollute more for the fuel they consume than cars with emissions controls. As a result, zero-emissions motorcycles substituted for conventional motorcycles can provide a bigger air quality benefit than might otherwise be expected.

State of the Technology

The state of the art in electric propulsion has been refined over the past three decades, primarily with the development of transistor-based motor controllers, advances in rechargeable battery technology, and the development of more affordable electric motors in appropriate power ratings and physical packages for powering vehicles. As a result, electric motorcycles have advanced significantly from the Corbin-Gentry and Aurantetic models inspired by the OPEC actions of the 1970s to more capable machines today. Higher speeds, better acceleration and where advanced batteries are being used, longer range are the hallmarks of these advances. A sampling of what is being accomplished follows.



The Killcycle, pictured above, is an electric drag racing motorcycle. It covers the quarter-mile in 9.450 seconds, and hits the trap at 152.07 mph—243 km/h.

While this machine is not intended for road use or long-range missions, it gives a sense of what is possible with current technology.



The GPR electric is a street-legal electric motorcycle. The production model boasts a top speed of 65 mph, or 104 km/h. This vehicle has been available for sale in the U.S. since 2005.



The Vectrix Maxi-Scooter has a top speed of 100 km/h, and a range of over 110 km per charge using nickel-metal-hydrate (NiMH) batteries. It is available for sale in the U.S., Europe and Australia.

There are other manufacturers producing highway-capable electric motorcycles today, and even more have announced their intention to enter the market. In particular, it

appears the Chinese are gearing up to start production of higher-speed electric motorcycles.

Not everyone has been prepared to wait for a mass-manufactured unit to appear in order to have a highway-capable, small footprint, zero-emissions EV. Many people have elected to make their own highway-capable electric motorcycles. Some of these are noted below.



The El Ninja is a conversion of an existing gasoline bike, and plans for it are available on the Internet. One version of the bike is able to achieve a speed of 70 mph, or 112 km/h.

There are also many one-off conversions on the roads in Canada and U.S. already. The following Web sites provide a sampling. There are many more.

<http://www.austinev.org/evalbum/875>
<http://www.austinev.org/evalbum/757>
<http://www.austinev.org/evalbum/716>
<http://www.austinev.org/evalbum/748>
<http://www.austinev.org/evalbum/703>
<http://www.austinev.org/evalbum/674>
<http://www.austinev.org/evalbum/623>
<http://www.austinev.org/evalbum/621>
<http://www.austinev.org/evalbum/612>
<http://www.austinev.org/evalbum/538>
<http://www.austinev.org/evalbum/497>
<http://www.austinev.org/evalbum/457>
<http://www.austinev.org/evalbum/453>
<http://www.austinev.org/evalbum/415>
<http://www.austinev.org/evalbum/392>
<http://www.austinev.org/evalbum/141>

Most of these are capable of speeds in excess of 70 km/h, which would mean they do not fall in the limited-speed motorcycle classification in Ontario. They would fall into the conventional motorcycle class, based on their capabilities.

Conclusion

The definition of limited-speed motorcycle and the provision for prohibiting their operation on controlled-access highways per Regulation 630 subsection 1.(1)(c.1) is sufficient for motorcycles of that capability.

Subsection 1.(1)(c) serves only to discriminate against electric motive power as a class, and not based on capability. This is undesirable given that electric motive power provides an energy efficient mode of propulsion and multiple environmental benefits.

Therefore, EVCO urges the Minister of Transportation to repeal Regulation 630 subsection 1.(1)(c), keeping Regulation 630 subsection 1.(1)(c.1).

This change would permit capable, zero-emissions motorcycles to operate on controlled-access highways in Ontario, while keeping less capable vehicles such as LSMs, PABs, and motor-assisted bicycles off high-speed roadways.

Notes

This document was prepared for EVCO by Darryl McMahon.

Darryl McMahon is President of Econogics, Inc., and author of *The Emperor's New Hydrogen Economy*. He is a long-time proponent of zero-emissions electric drive technology and Ontario resident. He was a founding member of the Electric Vehicle Association of Canada, and a current member of the Electric Vehicle Council of Ottawa, the Electric Auto Association, and Electric Mobility Canada.

Mr. McMahon converted a motorcycle to electric drive in 1981. It was specifically designed to travel only at speeds up to 80 km/h because it was not permitted on high speed roadways in Ontario. He also owns an Aurantetic Charger electric limited-speed motorcycle.