Micro-Mobility Fact Sheet #7

# Designing Cities to Support Clean Transportation

## Introduction

What does transportation look like when you ponder the cities of the future? Are you picturing space age flying aerocars with transparent bubble tops typical of a Jetson's television episode?[1] Or more like villain Francisco Scaramanga's 1974 AMC Matador X Coupé used to escape from James Bond in The Man with The Golden Gun?[2]

For many, the future is here right now and it looks just like your neighbour's new car, the school bus your children ride each day, and the delivery truck that brings your online purchases. And with that, a burgeoning infrastructure to support the growing roster of zero-emission (ZEV) and alternative fuel vehicles and devices which also includes those under the battery-powered micro-mobility (BPMM) banner.

E-bikes are one of the most popular types of BPMM which are defined as small, low-speed lightweight devices powered by battery with human propulsions capabilities and travel at speeds below 32 kms/h. BPMM also includes electric tricycles, cargo e-bikes, electric scooters, electric wheel chairs and other wheeled electricity-powered conveyances and will, according to many, continue to make up a significant portion of transportation assets as individuals, companies, and organisations opt for cheaper, more efficient and environmentally-friendly transportation options.

According to Electric Autonomy Canada, an independent news platform reporting on Canada's transition to electric vehicles, autonomous transportation and new mobility services, future transportation is safer, cleaner and more affordable, noting. "We must have collaborations across diverse industry sectors and all levels of government to ensure positive outcomes and minimal downside to those disrupted." [3]

Modern Canadian communities will be the result in part of made-in-Canada technological solutions that bring economic benefits to Canadians while helping to ease reluctance and issues associated with the acceleration of transportation electrification. Communities are already working towards providing the infrastructure required to support the wide variety of electric and zero-emission vehicles both on the roads today and anticipated in the years ahead.

Most have heard of electric cars and trucks, viewed them in their car dealer's showroom or seen them advertised in the media. Sometimes referred to as ZEVs or alternative fuel vehicles, they typically do not produce any toxic carbon emissions. There are currently three types of ZEVs: battery-electric (BEV), plug-in hybrid electric (PHEV), and hydrogen fuel cell vehicles (FCV).[4] Each type comes with its own sets of unique benefits and applications. BEVs are the most fuel-efficient and are ideal for those who want to reduce emissions, fuel costs and vehicle maintenance fees; PHEVs are tailored more for those who drive long distances; and FCVs (also fuel cell electric vehicles or FCEVs) have no vehicle emissions other than water vapor and run off of a renewable source of energy!

The presence of these new technologies has made an explosive presence in the past few years and what was once a fringe idea is rapidly making traction in the mainstream. Canadian grocer Loblaw has committed to a fully zero-emission transportation fleet by 2030 and many other companies such as Tim Hortons and Walmart Canada are adding zero-emission vehicles to their fleets as they transition away from fossil fuel-powered vehicles.[5]

A growing number of manufacturers including Lion Electric, Volvo, Freightliner and Kenworth are also now offering an array of light-, medium- and heavy-duty all-electric trucks. Canadian school systems are accelerating their transition to electric buses and an increasing number of ambulance and paramedic fleets are getting behind the new alternative fuel technologies.

Joining the ever-growing list of zero-emission and battery electric offerings are electric refuse and fire trucks, police vehicles, heavy-duty mining equipment, and bucket and dump trucks. With such a proliferation of vehicle types on the roads, a robust and readily accessible network of chargers is essential and will require a multi-stakeholder approach to ensure success.

This means chargers in single-family and multi-unit residential buildings, work locations, parking facilities, institutions such as health care facilities and educational organisations, retail stores and shopping centres, restaurants, hotels, community centres, street-side parking spaces, etc.

Many traditional gasoline retailers and convenience chains such as Parkland (Pioneer, Ultramar) Couche-Tard, Petro-Canada, Shell and 7-Eleven are also entering the landscape and offering ultra-fast electric vehicle charging networks across Canada. With this migration away from fossil fuels comes the need to ensure electric/alternative charging capabilities are readily available in both rural and urban settings and will, for the foreseeable future, require extensive capital investments by both public and private entities including homeowners.

Ensuring the power grids themselves are able to withstand higher future electricity demand is a challenge being taken on by those tasked with guaranteeing Canada's energy future and delivering electricity to point of use. This includes major utility companies across the country such as Ontario Power Generation, Hydro-Québec, Bruce Power and BC Hydro. All are doing their part employing a number of


*Figure 1. It is easy to incorporate a range of services around a multi-user charging facility turning underutilized land into a profit centre that highlights a corporate commitment to reducing greenhouse gas emissions while supporting ZEV and BPMM users. SOURCE: Elocityhttps://elocitytech.com*

electricity-generating methodologies including hydro, natural gas, solar, nuclear, wind and biomass.

A growing number of private Canadian companies are also embracing power generation on a smaller scale on public and private sites as evidenced by the proliferation of solar collector panels on residential and commercial/institutional rooftops, in fields, and more recently as canopies in large outdoor parking lots. (See Figure 2 below.) Concomitant with these new scalable infrastructure installations for localized power generation is the need for software programs which are being provided by companies such as Elocity which empowers utilities, EV charging service providers, and multi-unit building owners with charging management software and hardware for better grid load balance and reliability.

ZEVs, and particularly BPMM devices, hold the potential to completely transform contemporary urban transportation into a much more sustainable, efficient, accessible and eco-friendly model.

## Making the Case for ZEVs and BPMM

### Environmental Considerations

The widespread usage of ZEVs and BPMM devices in our electrified cities will result in a significant reduction of GHG emissions, improved air quality, and decreased reliance on private [internal combustion] vehicles.[6]

In 2021, the transport sector was the second largest source of GHG emissions in Canada, accounting for 22% of the total with passenger vehicle transportation (cars, light trucks, public transportation, etc.) accounted for 57% of total transportation-related emissions.[7]

Canada is committed to decarbonizing the transportation sector and leading the transformation with zero emission vehicles. This shift to a more sustainable culture of transportation also allows for further benefits such as improved accessibility, equity, population health, and access to transportation.[8]

### Efficiency

The use of BPMM improves travel efficiency by reducing the number of automobiles on roadways, reducing commute times, freeing up automobile parking spaces, and decreasing the need for investment into road maintenance.[8] Increased reliance on BPMM would also result in decreased investment in infrastructure of travel nodes, such as train and bus stations and present an opportunity for


*Figure 2: Sloping solar canopies elegantly combine vehicle shelter and power generation, providing rain and snow management that goes beyond just power generation. Note covered outdoor e-bike/BPMM charging feature. SOURCE: VCT Group* ***https://vctgroup.com***

more community space and parks to be built on lands previously occupied by transportation infrastructure. Time can be spent more efficiently by actually 'commuting' rather than sitting in traffic fuming.

### Equity, Affordability, and Access

BPMM promotes equitable transportation solutions by enabling many underprivileged and underserviced groups to affordably reach their destinations. While the upfront cost of a BPMM device may be high for some, it is much less than the upfront cost and ongoing maintenance expenses associated with a typical internal combustion vehicle. Many cities are also providing affordable and practical solutions, such as bike/e-bike and e-scooter sharing programs with increased awareness and promotion of benefits, creating equitable distribution and accessibility of these devices.[8]

Many cities, provinces and the Government of Canada provide incentives for the purchase of ZEVs and BPMM devices, and the purchase and installation of ZEV chargers. You are encouraged to check with local authorities to learn more about funding that may be available. Check also our Guide to BPMM Funding and Incentives at:
https://greenhealthcare.ca/micro-mobility/

### Population Health and Safety

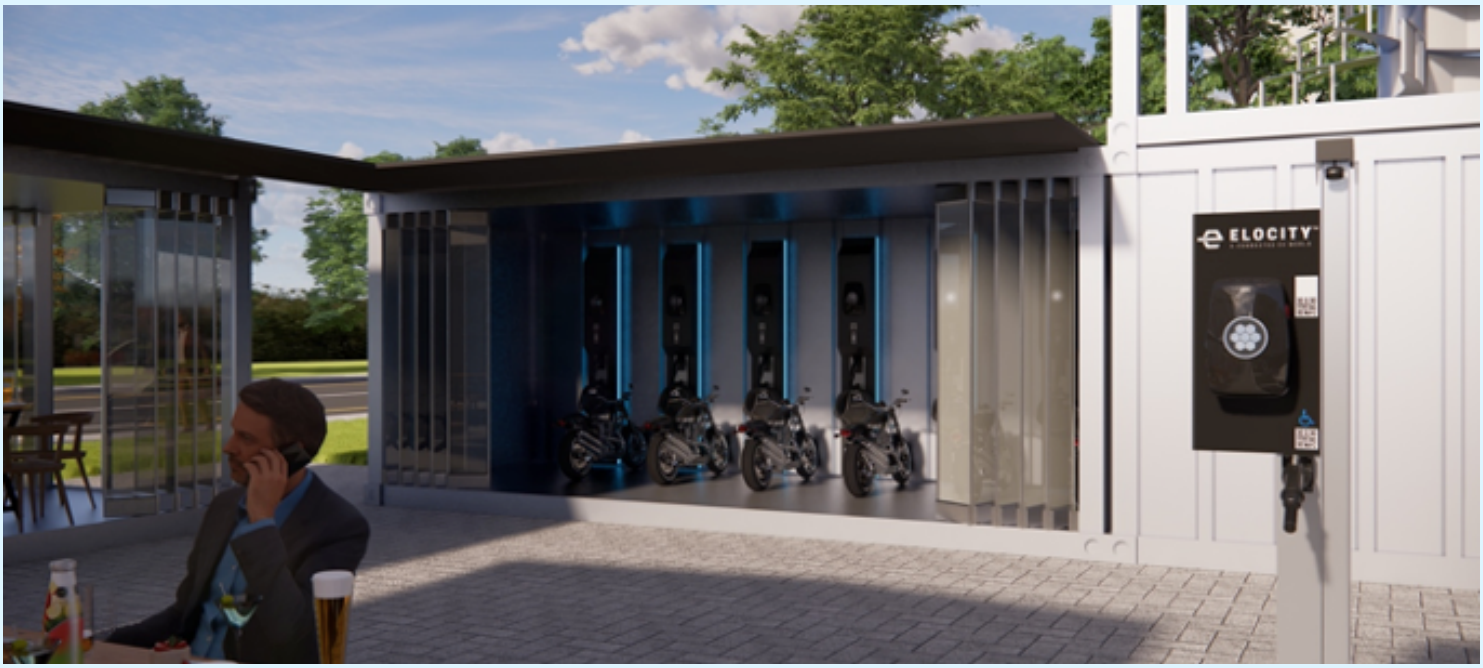
Cities with a larger proportion of cyclists and pedestrians tend to have lower rates of road fatalities. [8] And while there are safety concerns associated with certain modes of BPMM, a city that implements infrastructure that supports BPMM, such as dedicated bike lanes, can significantly reduce accidents and conflicts with vehicular drivers.

Increasing reliance on active forms of transportation (e.g., walking, bicycling) will also lead to less sedentary lifestyles and bring physical health benefits. Even the use of e-bikes provides moderate physical activity!

In addition, noise pollution, which is associated with a range of health issues, can be dramatically reduced by supporting active forms of transportation and expanding the use of BPMM.

### Economic Benefits

The adoption of ZEVs and BPMM travel solutions have opened doors to a whole new industry that supports countless new jobs in the manufacturing, sales, promotion, and maintenance fields. For BPMM, this will also provide economic opportunities for the construction industry (to build infrastructure that supports widespread usage of BPMM) and for the service industry.




*Sheltered charging for e-bikes and other battery-powered mobility devices can easily form part of a cleverly landscaped park setting for client/customer use. SOURCE: Elocity https://elocitytech.com*

For example, the Canadian Electric Bicycle Association (CEBA) whose mission is to lead and advance the electric bicycle industry, does so by providing world-class electric bicycle technician training and comprehensive support for e-bike dealers to ensure owners and riders can access the best possible repair services.

The electrified city also affords individuals more options when it comes to exploring local (and distant) neighbourhoods and small businesses such as shops and restaurants that may be less accessible due to chronic traffic congestion, limited car parking opportunities or less than ideal urban planning. This will allow for community businesses to excel. Individuals who previously couldn't access jobs because they didn't have a car or access to public transit can now reach their destination quickly and conveniently utilizing personal BPMM devices or rental/sharing services.

For more information on the benefits of BPMM, read our "Benefits of Battery-Powered Micro-Mobility" fact sheet available at www.greenhealthcare.ca/micro-mobility

## How Cities Can Support Transportation Diversification

There are many feasible and dare we say essential steps cities can take in order to prioritize and optimize ZEVs and BPMM as a viable form of urban transport. In order to accomplish the development of a vibrant and robust electric device infrastructure, a joint effort between governments, public transit commissions/ authorities, the private sector, users (and non-users) and public institutions will need to be undertaken.

Municipal, regional, provincial, territorial and federal governments can institute financial incentive programs for both individuals to overcome high purchase cost as well as businesses to promote the sale of BPMM and ZEVs.

Additionally, investments in charging infrastructure will be a requirement to ensure widespread access to reliable and affordable public charging stations. Various government agencies, such as Natural Resources Canada (NRCan), can also play a large role in furthering the promotion and knowledge sharing/awareness surrounding the benefits of BPMM use.

### *Canadian Electric Bicycle Association (CEBA)*

*The mission of CEBA is to lead and advance the electric bicycle industry by providing world-class electric bicycle technician training, comprehensive support to E-Bike dealers, and fostering strong relationships with distributors. As a key stakeholder, CEBA is dedicated to championing the interests of the E-Bike industry through effective advocacy and collaboration with like-minded organizations. Our commitment extends to promoting and adhering to regulations that ensure the sustainability, safety, and growth of the electric bicycle sector in Canada and beyond. By uniting industry stakeholders, CEBA strives to elevate the standards of the E-bike industry. https://cebassociation.com*

There is an ongoing need to incentivize research and development in order to improve efficiency, increase battery capacity, extend vehicle life, and reduce high upfront costs. There is also room for innovation of city-wide digital platforms to access BPMM, similar to those of public transit. It's paramount that in urban planning, an emphasis is placed on creating welcoming public spaces that are open, accessible and appealing. Dedicated bike, BPMM and ZEV lanes should be prioritized and green spaces should be ubiquitous.

A city without a drastic need for traffic-jammed roads will have more open areas that can be put to better use. Even roads and parking spaces can be redesigned with the well-being of the population in mind.

For example, cities can alternatively build parks, schools, hospitals, playgrounds, among many more options. To further support increased use of ZEVs and BPMM, these infrastructure projects can easily design in solar collector infrastructure to capture the sun's energy for use in the electricity grid.

Parking lots can also become home to cleverly designed collector panels in the form of carports that cantilever over parked cars providing protection from damaging ultraviolet rays during summer, and snow and ice during winter, bringing with it reduced winter maintenance costs and happier parking lot customers. Covered space can also be configured to accommodate EV charging devices for ZEVs and BPMM devices parked under the canopy.

The same principle applies to the shielding of sidewalks, walkways and patios through the use of similar solar canopies designed to be attractive and practical while generating power and/or a revenue stream for the owners.

## The Final Word

We believe active transportation, whether bicycles or e-bicycles, scooters or e-scooters, skateboards, hoverboards or the many other devices available today, will continue to expand and play a much more significant role in moving citizens around, through and within our cities. Alternative fuel vehicles (electric, hybrid, hydrogen) will also be integral to the future of transportation and will have an enhanced presence in moving people and the goods that sustain us.

*Multi-use space can accommodate ZEV charging facilities, BPMM charging outlets and a multiplicity of user amenities to support a growing electrified user base. SOURCE: Elocity https://elocitytech.com*

With this move to more sustainable modes of transportation, a drastic increase in infrastructure dedicated to the travelling public will be needed. Cars, trucks, buses, heavy equipment, and BPMM will all need space to stop to power-up. Alongside those spaces, ancillary services such as food, retail and service outlets will develop to supply the travelling public.

Parks and other community-focused spaces will increase as a result of lessened reliance on parking lots and traditional transportation services. Dedicated bike/e-bike and alternative fuel lanes will increase to handle the growing demand.

### *Can my car really power my home?*

In a word, yes! Thanks to the marvels of modern science, a clever technique known as bidirectional charging permits your electric vehicle to share energy from its battery with your home, return power to the grid, to another EV or to suitably enabled appliances. This is known as vehicle to grid or V2G or vehicle to home (V2H)[9].

Currently, a limited number of vehicles are equipped to accommodate bidirectional charging including the Ford F-150 Lightning pick-up, Cadillac Escalade IQ, Nissan Leaf, and certain models from Hyundai, Genesis and Toyota among others. General Motors is expected to make the technology standard on all its Ultium-based electric vehicles by 2026.

When Ford Motor Co. launched its electric F-150 Lightning pick-up in 2022, the automaker touted the truck's 131-kilowatt-hour battery pack, which can power a dwelling for days with the installation of a bidirectional charger and a home power-management system [10].

If you are planning to purchase an electric vehicle in the near future, in addition to asking questions about price, features, charging speed and range, you may also wish to find out if your vehicle can power your home via onboard bidirectional charging technology.

*The attractive solar canopy brings shade and protection during inclement weather while gathering solar energy to power the electrified city of today.*
*SOURCE: VCT Group https://vctgroup.com*

Delivery of everything from pizzas and flowers to hamburgers, wine and human medical samples will see a noticeable uptick thanks to cities that make bike/e-bike/cargo-bike a priority by improving safety and streamlining regulations which includes developing supportive notions towards bike and scooter rentals. Solar energy will power much more of our infrastructure and will have an increased presence in our homes. Should a power outage occur, simply plug in your electric vehicle and tune in a rerun of the Jetsons. We have the technology.

We encourage you to learn more about electrification, electric/alternative fuel vehicles and battery-powered micro-mobility solutions in your community and to determine how you can play a greater role in a healthier planet.

And above all, don't be afraid to dream! We aren't.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**Cover image:** Sturdy solar canopies bring shade and protection from inclement weather to a community park setting while gathering solar energy to power the electrified city of today. SOURCE: VCT Group https://vctgroup.com

**About us:** *The Canadian Coalition for Green Health Care is Canada's premier green health care resource network and is leading the evolution of green in Canada's health sector as a national voice and catalyst for environmental change. Collaboratively, we strive to reduce health care's ecological impact from compassionate care delivery while providing a platform upon which to discuss and promote best practices, innovation, environmental responsibility and climate change resiliency. www.greenhealthcare.ca*


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