Strategies, policies and initiatives to enhance electric vehicle adoption

Electric vehicle adoption in BC has been slower than hoped. There are many things that the BC provincial government could do to enhance electric vehicle (EV) adoption, and we understand that any action taken must align with and complement current transportation strategies, including LNG/CNG and other lower emission vehicles. Some actions are critical to enhancing adoption levels, others have varying degrees of impact. Different approaches may have different costs. Vancouver Electric Vehicle Association (VEVA) has studied a number of EV-related initiatives over time and observed their impact both in other jurisdictions and here in BC. BC is a unique environment with unique opportunities; we hope to better understand how these initiatives might fit with broader strategies now being considered by the BC Government. As a stakeholder that has extensive experience with EVs, we expect our government will consult with us when forming policies to improve our collective approach.

It is clear that EVs are good for the environment, good for our health, quality of life, and cost less over time. Whether they are electric bikes, trains, buses, cars, trucks or boats, we must transition to lower and zero emission vehicles operating on sustainable energy sources. A number of ministries are involved in the necessary changes. In many cases, while the motivation for change comes from one ministry, the action needed must be undertaken by a second ministry and the benefits flow to a third, with funding ultimately coming from Finance.

VEVA has considered EV availability, driver motivation, and infrastructure initiatives. Availability of EVs is a problem. Drivers need to see the benefits. Public infrastructure, a 'green highway', home and strata retrofits, and EV readiness in new homes are all needed. While the BC Government has partially addressed some of these needs, more work on the overall infrastructure is critical. Without completing the necessary infrastructure there can be no large scale EV adoption. This work must be government enabled, as the private sector business case is weak in the current regulatory climate. Regulatory obstacles need to be overcome. The table below summarizes and prioritizes specific initiatives, their impact on adoption levels, cost, and ministries involved.

Initiative	**Impact**	**Cost**	**Ministry**
Green Highway - DC Fast Charging Stations	High	Medium - Low	Environment, Finance, Energy
CAFE Regulations - ZEV minimum requirement	High	Low	Environment,
building code - requirement for all new homes	High	Low	Housing
right to charge in strata buildings & apartments	High	Low	Housing
HOV lane access	Medium	Low	Transportation
education	Medium	Low	Environment
home retrofit rebates including MURBS	Medium	Medium	Envir, Finance, Housing
public Infrastructure in cities and towns	High	High	Environment, Finance, Energy
marketing strategy	Medium	Medium	Environment
rebates on EVs	Medium	High	Environment, Finance
Distance based or transferable Insurance	Low	Low	Transportation

VEVA is a non-profit society registered in BC since 1988 with a mission to promote electric vehicles as an superior alternative to internal combustion engine powered vehicles. With a membership of 100-200 members and over time 120 EVs owned, we have been effective in helping to establish B.C. as a leading jurisdiction in EV adoption. Our collective experience with and knowledge of EVs is extensive. We have participated in several hundred public events with EVs since our inceptions.

The following pages detail the initiatives in the table above.

Green Highway: DC Fast Charging Stations

High Impact / Medium – Low Cost

JURISDICTIONAL QUAGMIRE
The Ministry of Environment may be the visionary of the Green Highway but it also involves the Ministry of Transportation where infrastructure is installed road side. The Ministry of Energy is involved with the sale of electricity. The Ministry of Health is a beneficiary as less pollution means fewer health costs. The Ministry of Finance would be involved in funding unless the private sector is enabled.

SITUATION
Because current battery technology limits the range of EVs to about 150 km, travel between cities requires fast charging opportunities away from home. To date, only a few EVs have driven across our province or country and they all relied on RV Parks for charging. The green highway (formerly the hydrogen highway) is started, but does not include most of BC highways. Forming BC's key part of the West Coast Green Highway initiative, the existing initiative plans an initial 13 fast charge stations this year and a total of just 30 that were announced in November 2011. Only 6 are now operational. For comparison, there are about fifty Auto Propane stations in BC serving vehicles with greater range capability. Only a public utility, with exceptions for municipalities and employers (to staff), are enabled to sell electricity as governed by the Utilities Commission Act. The city of Surrey requires new gas stations to include EV charging, but they are unable to charge for the power distributed.

PROBLEM
It is challenging to locate convenient charge stations. Until gas station convenience equivalent infrastructure is installed, the public will hesitate to purchase EVs. Due to regulatory obstacles created by the Utilities Commission Act, private businesses and individuals cannot sell electricity, so there is no business case to install EV infrastructure in BC. The BC Government in recent announcements has gotten out of the way of the LNG/CNG industry, allowing it to flourish, but remains an obstacle to the Electrical Transportation industry which offers a much cleaner solution.

ANALYSIS
To gain widespread EV acceptance, drivers need to have access to fast charging along all inter-city highways in BC.
Drivers hesitate to purchase EVs unless the experience offered is equivalent to that provided by existing internal combustion engine vehicles. Even one EV fast charge station in each city and town will make BC accessible to EVs. VEVA estimates that fifty fast charging locations, one at least every 100 Km in each municipality, would provide the minimal coverage needed to travel on all main highways in the province. Municipalities in BC tend to be about 100 km apart. Additional charging stations should be encouraged at shopping centers, motels and travel destinations along BC highways to double that base and reduce the maximum distance between charge stations to 50 Km.

RECOMMENDATIONS
VEVA sees BC's active pursuit and coordination of an electric green highway network as the most vital investment in opening widespread EV adoption. **VEVA recommends that the BC Government continue existing funding until the objective is met and increase allocated funding to extend the original plan for 30 stations to the minimum of 50 to 100 that are needed to drive EVs between all BC communities.** The goal should be to have as many DC Fast Charge stations as gas, propane or LNG/CNG stations. **VEVA also recommends that the province require that new LNG/CNG fuelling stations or other gas station upgrades at major inter-city highway intersections include EV DC Fast Charging.**

Both publicly funded and privately funded charging stations should be encouraged. In addition to increasing government funding, **VEVA recommends that either the Utilities Act be modified to remove the regulatory obstacle or that the Clean Energy Regulation for GHGs be modified in a manner similar to that provided that enables LNG/CNG fuelling stations**.

VEVA recommends that the following wording (or words to this effect) be added to the Utilities Commission Act - Definitions – "Public Utility" ...but does not include …

(h) a person not otherwise a public utility who provides the service or commodity only for the purpose of electric vehicle charging.

Alternatively and more expediently a change to the Clean Energy Act Regulations for GHGs could be made with the following wording or words to that effect.
“A person shall be permitted to operate as a public utility for a prescribed undertaking that is for the purpose of selling or re-selling electricity for the purpose of electric vehicle charging only.”

JUSTIFICATION
These regulatory changes are intended to enable persons to provide electrical infrastructure to the public on private or public lands and recover reasonable costs. EV charge stations will become a key economic driver for businesses such as retail outlets or travel destinations such as parks.

On-Road Vehicle and Engine Emission Regulations / Zero Emission Vehicle minimum requirement - High Impact / Low Cost

JURISDICTIONAL QUAGMIRE

The Ministry of Environment is the only Ministry directly involved although the increased trade may be of interest to the Ministry of Trade.

SITUATION

Auto makers would not manufacture electric cars without the Corporate Average Fuel Efficiency (CAFE) regulations. These regulations created the EV (and previously the minivan and SUV),- in the 1990s in California, until the CAFE regulations were killed in the courts. Immediately after Obama was elected, the EPA revisited the CAFE regulation decision and we now have North America-wide harmonized On-Road Vehicle and Engine Emission Regulations.

There are two exceptions: Canada's regulations are a bit stronger due to a small change suggested by VEVA through EMC to Transport Canada and were accepted due to our cleaner grid. The other exception is California which still has the Zero Emission Vehicle (ZEV) % clause. As a result of the ZEV % regulation, most EV shipments are to California where auto makers can trade the ZEV credits on the open market. Auto makers that do not sell the minimum percentage of EVs are fined $5000 for each vehicle short of the target. Tesla makes only EVs and so has a lot of extra credits to sell. They made a lot of money last year selling ZEV credits. This situation means that automakers that make EVs have a strong business case to sell as many as possible in California.

PROBLEM

As a result of the California opportunity, there is little supply of EVs coming to Canada or B.C. if automakers can meet the fuel efficiency requirement with gas cars. It won't be until 2016 or later that the automakers will be challenged to meet the regulations without selling some EVs as part of the mix. Currently there is a 5 to 6 month wait to purchase an EV in B.C.

ANALYSIS

Having ZEV minimums is essential to building the EV market and familiarizing buyers with EVs. No matter how much interest is created, or demand is built, the supply will go to California first. Without EV availability, promoting EVs only creates frustration and the infrastructure we build will go unused.

RECOMMENDATION

VEVA recommends that a ZEV minimum requirement be introduced in BC.

JUSTIFICATION

Other provinces may support this, as do a half dozen states that support California. Harmonization would be beneficial to the auto makers, so alignment with the California regulations would help. The Liberal government had previously considered adopting California-style regulations but dropped them when the federal regulations were released. Experience has shown that the California style ZEV minimum regulations work to enhance EV adoption and that the national standards are insufficient.

Building Code Requirement- High Impact / Low Cost

JURISDICTIONAL QUAGMIRE

The Ministry of Housing manages the Building Code. The code has a Green Building objective, but it applies only to the building envelope, not to appliances that plug into the garage and leave the building daily. Although the Ministry of Environment has attempted to promote code changes to support residential charging, the Ministry of Housing was not supportive as it is not seen as their concern or scope. The electrical code is also owned by the Ministry of Housing, but this has been updated at the national level and looks to the building code for EV infrastructure direction. Mandating EV infrastructure is outside the scope of the electrical code. To create the required EV infrasatructure, there is no other regulatory vehicle available or more appropriate than the building code.

SITUATION

You cannot charge an EV without an EV charging outlet. Auto makers and eBike retailers know they can't sell EVs in a places that can't charge them, just as they could not sell gasoline, diesel, hydrogen or LNG powered vehicles in areas without secure access to gasoline, diesel, hydrogen or LNG and an appropriate delivery infrastructure. The infrastructure must come first.

PROBLEM

Very few homes have an electrical outlet suitable for charging EVs in the garage. Builders will not include an outlet in the garage for EVs unless it is in the code, as they build to meet the standards of the Building Code and little more.
Buildings last 50-100 years or more and must be built to accommodate the technologies of tomorrow as It is expensive to retrofit infrastructure as technology changes.
Municipalities do not have the legislative ability to require EV infrastructure in new construction, only the BC Building Code can provide the legal tool necessary to ensure that new buildings will accommodate the new technologies of the future and in particular, the need for EV charging infrastructure for cars, eScooters, and eBikes. The lack of province wide regulation is an obstacle to municipalities.
Vancouver has led with a building code amendment. West Vancouver and others have followed with a patch work of zoning and other regulations. This inconsistency is confusing for developers.

ANALYSIS

Most charging should occur at home, overnight and off peak. This is the best approach to developing the needed infrastructure.
Unless EV charging outlets are available for every home we cannot enable every person to own an EV. BC needs to consistently enable all municipalities to achieve their carbon targets.

RECOMMENDATION

VEVA Recommends that the BC Building Code be amended to require that each residence have an electric outlet installed and wired in accordance with the BC Electrical Code for the purpose of electric vehicle charging in all new building construction.
Building EV readiness in new homes removes the home infrastructure obstacle over time.

JUSTIFICATION
Building infrastructure creates green jobs in the skilled trades. It also moves the government out of the way of the electric transportation industry and allows it to flourish.

Right to Charge in Strata & Landlord & Tenant Acts - High Impact / Low Cost

JURISDICTIONAL QUAGMIRE

The Ministry of Housing oversees the Strata Act but the Ministry of Environment is the most interested in EV adoption. The Ministry of Energy is concerned about EV infrastructure installed in visitor parking areas. Although EV car share programs would be allowed in a MURB, vehicles could not be charged by non-residents without violating the Utilities Commission Act. The liveability of cities and Ministry of Health are beneficiaries.

SITUATION

Most early adopters of EVs that live in condos are being denied permission by strata councils to install infrastructure for charging EVs in strata-title residential property. Without super majority approval by 75% of owners in a strata, no infrastructure can be built. The BC Government is studying this now and a first report on the issues is due from CHOA soon. More than 95% of current EV owners live in houses, not condos. A recent mapping of registered EVs in BC showed that virtually no EVs are owned by downtown Vancouver residents living in strata titled buildings. It also showed that plug-in hybrid adoption was normal in the down town core.

PROBLEM

This situation is a major obstacle for the 62% of Vancouver residents who live in MURBs, many of whom would otherwise be early adopters. The situation exists in all strata titled land in B.C., including small communities.

ANALYSIS

Changes to address this issue have been led by governments in Hawaii. Permitting strata owners the 'right to drive emissions free' would increase the market for EVs in geopgraphic areas that should contain a significant portion of the early adopters but do not. Removing this regulatory barrier would help in eliminating carbon pollution. Some early adopters have even had to move homes to a more amenable housing situation in order to drive electric. Others have fought with their strata councils for a number of years before being allowed to charge their EVs. Other individuals in the complex would also be prevented due to the limited electrical supply and upgrade costs. If allowed to install EV infrastructure, owners would be able to proceed in resolving other issues such as metering and billing. Unfortunately, the Utilities Commission Act also prevents EV infrastructure in visitor parking in MURBs.

RECOMMENDATION
VEVA recommends that the Strata Act be amended to prevent strata organizations from blocking the development of charging infrastructure and embed "Right to Charge" legislation in the Strata Act and the Landlord and Tenant Act with supporting sample by-laws. Prior to Strata Act amendments the province is requested to make available sample by-laws to this effect as guidance for strata organizations that might adopt them.

Example wording of a by-law is: "*No person shall be prevented from installing an electric vehicle charging system in or near the parking stall that the person owns*." and
"A powered outlet shall be permitted in at least one of the parking stalls in an attached, built-in or detached garage or carport that serves each residential dwelling for use with an electric vehicle charging system for which specific installation requirements are located in the electrical code."

Support for eBike and eScooter charging is needed in strata-titled properties also. The Vancouver Parking By-Law provides an example.

JUSTIFICATION

Many B.C. Residents are prevented from adopting EVs by government regulations. If the government were to require strata organizations to get out of the way of early adopters and allow them to live green, it would help to achieve our carbon reduction targets.

HOV Lane Access - Medium Impact / Low Cost

JURISDICTIONAL QUAGMIRE

The Ministry of Transportation manages the Highway Traffic Act and is concerned with congestion. The Ministry of Environment is interested in EV adoption and GHG reduction. The Ministry of Health is concerned about the costs associated with air pollution.

SITUATION

The goal of both HOV lanes and EVs is to reduce the production of greenhouse gases (GHG). EVs do not produce GHGs.

PROBLEM

The public will hesitate to adopt EVs unless they can provide most everything a gas car can plus a little more. Given the limited range, more benefits are needed to encourage early adopters.

ANALYSIS

The benefits of the HOV lane to individuals are obvious. HOV access creates a benefit to EVs that cannot be had with single occupancy Internal Combustion Engine (ICE) vehicles. Having an edge over ICE vehicles may create a tipping point in the adoption of EVs. HOV lane access will attract EV adopters and reduce GHG emissions.

Several other jurisdictions already have special allowances for EVs in HOV lanes: Ontario, California, Maryland, New York and other states. Their experience has been successful. Allowing access with supporting signs on the highways is probably the lowest cost promotional strategy the BC Government can take. The signs may be the best marketing campaign for EVs possible. It would create almost instant widespread awareness, curiosity about EVs, benefit and demand.

With the coming of other ultra low emission, though not zero emission technologies, such as hydrogen fuel cell hybrid electric powered cars and LNG hybrid electric powered vehicles, they might also be allowed in the HOV Lanes. Eventually, as uptake advances, only zero emission EVs should be allowed with 2 or more people. Hybrid vehicles using any gas, diesel, propane, or LNG ICE technologies are not sufficiently low carbon to achieve our carbon reduction targets and should be discouraged over time.

RECOMMENDATION

VEVA recommends that all Plug In EVs be allowed in HOV lanes. Further VEVA recommends that HOV lanes be renamed as Green Lanes and become part of the Green Highway expansion.

JUSTIFICATION

EVs have the biggest impact on the GHG reduction goal of HOV lanes. Other jurisdictions have used a green license plate or sticker to identify a vehicle as Green Lane permitted. These can be renewed annually as green lane targets are raised based on emissions per km. and per passenger. By creating an awareness of how much pollution is created to move a number of people around we identify and promote technologies and optimal vehicle sizes.

Education - Medium Impact / Low Cost

JURISDICTIONAL QUAGMIRE

The Ministry of Environment is primarily involved in education of the public about EVs. The Ministry of Health is concerned about education of first responders related to EVs involved in accidents. The Ministry of Housing is interested in education of electricians that install EV infrastructure.

SITUATION

There is a lot of information available about EVs.

PROBLEM

Much of the information is buried on the web and not well presented.

ANALYSIS

Motivated people will find information about EVs, but may find it difficult, confusing or time consuming.

Developing new materials is unnecessary, given the volume of information available. However, improving the access and presentation may help. The VEVA website and other EV focused websites have links to most information needed to make purchasing decisions. Investment in these established non-profit organizations and their website enhancement would help early adopters and provide end user support to ensure a smooth transition.

Engaging existing EV owners as EV ambassadors would take advantage of their enthusiasm, be most effective and reduce other educational costs.

RECOMMENDATION

VEVA recommends the BC Government undertake education for the general public about government programs that support EV adoption, through existing EV owners and early adopter organizations such as VEVA.

JUSTIFICATION

VEVA is a well established and recognized non-profit society that has the depth of experience necessary to support an educational initiative.

Home Retrofit Rebates including MURBs – Medium Impact / Medium Cost

JURISDICTIONAL QUAGMIRE

Ministry of Housing manges the Livesmart Program and the Ministry of Environment needs infrastructure to enable EV adoption to reach GHG targets. The Ministry of Energy is concerned with energy efficiency.

SITUATION

Home charging overnight is where 87% of charging now occurs with existing EV owners and this will increase with home infrastructure development. Existing programs offer rebates for EVSE purchases with new EV purchase. This program will sunset in March 2014.

PROBLEM

The biggest cost and challenge to EV adoption is the price of the electrical work in the home by BC electricians. Due to the potentially high costs of renovation and rework it can be a major obstacle to adoption of EVs. The existing EVSE rebate program is not sensitive to the variable costs of electrical work. Not having an installed electrical infrastructure base requires that this be addressed by individuals at the time of their EV purchase, which increases the cost and time of sales cycles. The Livesmart rebate program is based on improvements to the energy efficiency of the building envelope, not automobiles.

ANALYSIS

At this time there are many players in the EV infrastructure space vying for a foothold in this emerging market. Local systems integrators and electrical contractors can add this to their offered services, and formal training programs for electricians are now available from leading industry associations, such as the Electrical Joint Training Committee.
In order to accommodate EVs in existing buildings, we need to renovate buildings to provide for EV charging. As markets and technology matures, the cost of offshore-made EV supply equipment is dropping and is more predictable. The cost of electrical renovations are highly variable and less predictable.

Multi-Unit Residential Buildings (MURB)which house a majority of citizens in urban areas and a growing share in suburban BC communities are in need of EV charging infrastructure to enable those residents to drive EVs. Multi-unit residential developments require more planning, coordination and technical expertise than single family homes. The existing MURB Charging Infrastructure Fund was established to learn about these challenges and will guide further retrofitting.

Expensive electrical work needs support in advance of EVSE purchases. Costs of renovation can vary from a few hundred to upwards of $7000 per outlet. The average is about $2500 in houses and $3000 in MURBs but varies widely. Charging at home is the primary and preferred charging location. It enables off peak charging which helps to level the load on the grid creating stability. It is also more convenient. Preparing existing homes for EVs in advance of purchase enables home owners to start shopping for EVs sooner and shortens the often impulsive sales cycle.

Support for this, if included in the Live Smart program, can be done more efficiently at the same time as other electrical work, such as heat pumps and electric hot water, that may share the electrical load and help level grid peaks from the smart home.

Building EV infrastructure will train and employ local BC trades and suppliers who are not at risk of being outsourced offshore.
Infrastructure to support eBikes, eScooters and eMotorcycles is also needed in MURBs.

Funding EVSE purchase effectively supports offshore manufacturing of a maturing product. Funding infrastructure supports BC jobs.

RECOMMENDATION

VEVA recommends that governments provide support for retrofitting existing residential buildings by adding them to existing Livesmart home renovation energy efficiency rebates in a way that supports the variable costs of renovation and the switch to sustainable electrical energy for transportation.

JUSTIFICATION

The process of installing infrastructure creates more awareness and the outlet is a constant reminder of the convenience of EV charging at home, encouraging EV adoption. Combining the electrical work with other green building initiatives saves on electrical permit costs, planning and rework. Building the infrastructure creates BC jobs.

Public Charging Infrastructure in Cities and Towns - High Impact / High Cost

JURISDICTIONAL QUAGMIRE

The Ministry of Environment has managed the CCIF program. The Ministry of Energy is interested in the sale of electricity. Land ownership is involved in placing infrastructure and the Ministry of Housing manages the electrical code which sets out safe practices of distributing power across properties. The Ministry of Energy is concerned with the sale of power.

SITUATION

Many urban dwellers, the largest potential group of early adopters, do not have sufficient garage or private parking space to charge at home overnight. They need a place to charge, on the street or at work. The Community Charging Infrastructure Fund originally funded 570 Level 2 public charging stations (to be distributed throughout the province) by providing funding for businesses and municipalities. Numerous administrative, educational and supply hurdles have faced applicants for this new infrastructure. Although this program provides a basic infrastructure in southeast BC, there are still a few holes in the network that leave some areas without any public charging and therefore no access for those without private parking.

PROBLEM

Private enterprise is catching on to grow EV infrastructure further at work places, grocery stores and other retail locations, but they are restricted by the same regulatory obstacles that limit the DC Fast charge stations. There is also a lack of charging opportunities while on the go for eBikes, eScooters, and eMotorcycles which use a standard 120V outlet not an EVSE.

ANALYSIS

As the range of EVs is restrictive, more infrastructure is needed. A public infrastructure for EV charging creates a safety net to overcome range fear concerns and to extend range on days when more extensive driving is needed. For comparison, there are about eighty gas stations in Vancouver but less than a third as many public charge locations. Vancouver would need at least fifty charge stations in city lots and parks to address range fear and many more to support those without private parking.
Other areas of Canada, particularly on the prairies have addressed the need to plug cars in for block heaters. Similar problems face EV charging such as extension cords crossing side walks, access to power, rain and snow and parking restrictions. Although the power demands are higher, the problems are similar. For example, the Manitoba electrical code has a provision for an automotive block heater outlet in driveways. Other jurisdictions require extension cords to be hung high over the side walks to avoid tripping.

RECOMMENDATION
VEVA recommends supporting those without private residential parking garages with faster Level 2 public infrastructure in city and government owned destination parking lots (e.g. EasyPark), provincial parks etc., with a target density of <1 Km spacing in urban areas. This aligns with the maximum distances that bus stops are apart from all residences and destinations.
VEVA recommends the province extend funding of this program to complete the network throughout BC and support charging of 2-wheel EVs. We also recommend that the province study the problem of those without private parking who park on the street and determine how they might be provided with EV charging ability.

VEVA recommends modifications to the Clean Energy Act Regulations for GHG to enable private enterprise and individuals to install charge stations in parking lots and street side in front of homes.

JUSTIFICATION

This enables those residents without private parking and completes the public infrastructure.

Marketing Strategy – Medium Impact / Low Cost

JURISDICTIONAL QUAGMIRE

The Ministry of Environment is primarily interested in promoting EVs.

SITUATION

Seven years ago VEVA created a strategic plan with the goal to convince 20% of the public to commit to "My Next Car Will Be Electric". We achieved that goal in 2 years using newsworthy grass roots methods. Now we find that almost 50% of people we talk to are aware of EVs and expect it is the way of the future. The adoption / buying cycle for EVs begins with awareness, then analysis. Most drivers in BC are aware and are learning about EVs. The BC Government is sponsoring through the Fraser Basin Council, a Marketing Strategy program to address the marketing of EVs.
VEVA has been promoting EVs for 24 years. The VEVA membership of 100-200 enthusiasts is the largest local body of knowledge there is in BC about EVs. VEVA has extensive technical expertise and promotional experience with EVs. VEVA hosts an EV show every year. VEVA has the EVs, drivers and enthusiasm. VEVA has attended and shown our EVs at over 25 community events annually in recent years.

PROBLEM

The public is aware of EVs but have not moved through the analysis phase into purchasing EVs. Awareness of BC Government programs by the public is low and awareness of infrastructure challenges is low, as is awareness of the real needs of driving range and charge times . Finding locations for events that are appropriate to offer rides in EVs to the public is always challenging.

ANALYSIS

EVs are bought on emotion, not facts. If the desire is there, the early adopters will sort out the facts and overcome the hurdles. The first question asked about EVs is "*How far can they go?*". EVs are practical - Range exceeds by 3X daily needs of 50 Km. And the second question is "*How long does it take to charge?*" EVs are convenient – drive all day, charge at night at home, it takes just 5 seconds to plug in, can echarge at >500 public stations.

Emotional messages that answer "Why Drive Electric?" include: *EVs are Fun* - high performance and quick acceleration makes driving fun; *Silent and Smooth* - Electric motor is whisper quiet with no vibration; *Reliability* - Simple drive train has few moving parts to repair or replace; *Better Energy Economy* - Go 100 Km on $2 of electricity, or just 2 cents per Km; *Local Sustainable Resources* - Use local hydro electricity instead of carbon producing gas; *Feel Good* - about saving the planet from GHGs and our health from air pollution.

BC stakeholders need to start conversations around these messages and then get people into an EV. The most effective way to convince people to get interested in EVs is to get "Bums in Seats": we all remember our first ride in an EV. VEVA can help drivers in the analysis phase of adoption through sharing our knowledge about EVs and function as EV Ambassadors.
The Province of BC can help with organization, promotion, venues, information booths and funding.

RECOMMENDATION

VEVA recommends the BC Government work with VEVA and other EV owners to promote EVs. Public / Non-Profit partnerships can work.

JUSTIFICATION

VEVA is a volunteer organization so is very inexpensive. It is the go-to organization for EVs in B.C.

Rebates on EVs - Medium Impact / High Cost

JURISDICTIONAL QUAGMIRE

The Ministry of Environment benefits from achieving GHG reduction targets but depends on the Ministry of Finance for funding.

SITUATION

Administered by the New Car Dealers Association of BC, the CEV4BC program has been somewhat successful in providing financial incentives to early adopters to purchase EVs. B.C.'s rebates are scheduled to sunset in March 2014. While the first EVs from auto makers arrived in late 2011, the availability of EVs generally has been slow in Canada, with priority markets such as Japan and California receiving a majority of early production. This has resulted in only 600 Nissan Leafs being allocated to Canada and only 125 sold in BC. Car dealers are motivated to sell cars that are in stock, and not cars that need to be ordered in advance. Auto makers may be withholding shipping EVs to BC due to the more favourable sales climate in California and other states and countries.

PROBLEM

EVs are still at emerging technology prices that are at least 10% higher for equivalent vehicles. Although the pay back period is only a few years, buyers are reluctant to pay more up front. New technologies are always expensive and early adopters bear the brunt of the costs which is an obstacle. Current Availability of EVs is limited in BC. The number and selection of EV models during the rebate program to date has been severely limited. Most dealers do not have EVs in stock. Many EV purchasers are on 5 month waiting lists for their EV delivery. For purchases as significant as automobiles, many consumers look to later generations of production for the improvements and price reductions that come with them.

ANALYSIS

Many jurisdictions have offered rebates. Most retail sales increase when products are offered at a discount. Jurisdictions that have higher incentives have proportionally higher adoption. Incentives to purchase an EV are effective. To facilitate faster adoption, incentives for early purchases are helpful.
The Toyota Prius is now the best selling car in the world but It took five generations of models. Although these contain all the electric technology and prepare the public to consider EVs, there are still barriers to adoption. EVs have seen improvements and cost reductions in the technology in just the first few years of production. It is expected that later in 2014 new models that are less expensive and offer greater driving range will start arriving from many of the current EV automakers, and first new models will be available from Ford, Chevrolet, Daimler-Smart, BMW and others. This was clearly demonstrated in the up-take of gasoline-electric hybrid vehicles, which now forms a core segment of auto mobile production today. New products generally take time to develop through their first commercial production models, where improvements and standards can change quickly.

RECOMMENDATION

VEVA recommends the BC government extend the CEV4BC rebate program for 3 years or until a minimum number of EVs have been sold.

JUSTIFICATION

By kick-starting EV sales, BC can reach its GHG targets on schedule.

Distance Based or Transferable Insurance - Low Impact / Low Cost

JURISDICTIONAL QUAGMIRE

The Ministry of Transportation and ICBC determine insurance strategies. Benefits of changes to insurance accrue to the Ministry of Environment. The political appetite for ICBC changes is low.

SITUATION

A full analysis of distance based insurance is described in another publication. Current technology EVs have limited range.

PROBLEM

Most people feel that they need more than the 3 times daily average driving distance available now in EVs which translates to range anxiety and hesitation to adopt EVs.

ANALYSIS

Existing gasoline powered vehicles could be kept as a second car when purchasing a new EV. However, this incurs the extra cost of insuring two vehicles, even though only one would likely be used most of the time and mileage would not increase.
Many families have two cars and could benefit from the flexibility to own at least one EV. This scenario helps to overcome the range fear associated with EVs. Distance-based insurance would reduce costs for EV adopters to keep two cars: an EV for the city and a PHEV/ gas for the highway. This way they could use the right car for the trip. Introducing transferable insurance would also address this range anxiety obstacle to EV adoption.

RECOMENDATION

VEVA recommends the province of BC consider changes to ICBC to support EV ownership.

JUSTIFICATION

A temporary pilot project could be undertaken where at least one vehicle would have to be an EV.
Transferable insurance or distance-based insurance is helpful to users who choose to adopt electric cars for urban travel, but may wish to keep their existing longer range conventional vehicle without increasing insurance costs. It is a fairer system. Such a change for ICBC has many benefits beyond EVs. Drivers become more aware of driving distances and costs and often drive less with distance-based insurance.