Foresight

Smart Policy Series

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INCENTIVIZING LOW CARBON PATHWAYS FOR TRANSPORTATION

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Global greenhouse gas (GHG) emissions from the transport sector have more than doubled since 1970.[1] Today, in Canada, transportation accounts for 25% of carbon emissions.[2] Breaking that down even further, in British Columbia, transportation is responsible for 38% of all carbon pollution.[3] So what's the big deal? Well, the vast majority of transport needs are met by oil, with only a small proportion met by non-emitting clean fuels such as hydrogen, biofuels and electricity. But things are changing. 16 countries—including China, France, Japan, and the U.K.—have announced plans to phase out fossil-fuel-powered cars and/or increase the availability of zero emission vehicles.[4] Oil giant, BP bought the largest electric charging network, Chargemaster, for £130m.[5] Enel, one of the largest utilities in the world, through its US subsidiary EnerNOC, acquired California-based advanced energy and e-mobility solutions company eMotorWerks.[6] Against this backdrop, it's evident that low carbon vehicle options are on the cusp of wider adoption but the sector needs support if we are to significantly reduce carbon and GHG emissions from transportation.

To solve the challenge of mass adoption, governments, cities and companies are setting ambitious goals providing a mandate for more time and investment spent in deploying best-in-class zero emission transport options, developing policy incentives and creating financing models for sustaining infrastructure. However, no one solutions fits all. Crafting a market is not an easy feat, especially if the market requires adoption of new expensive vehicles, financing of new infrastructure and integration of technologies with existing electricity systems, policy change and of course, behavior change. So how are countries and cities adapting their strategies to reflect these market barriers?

In this short article, we will shine a light on recent policy initiatives and incentives, technology and financing developments from British Columbia, across Canada, USA, China and the United Kingdom to understand what options exist today. We will discuss passenger car vehicles that fall within the zero emissions categories as outlined in the table below.

100% pure electric vehicles (EVs) are powered by a battery which drives the electric motor. They have no exhaust emissions. Battery electric vehicles typically have a range of around 80 miles, but some can achieve up to 300 miles.	**Plug-in hybrid and range-extended electric vehicles also have a conventional diesel or petrol engine, meaning they have a longer range than with a battery alone.**	**Hydrogen fuel cell electric vehicles have a fuel cell which uses hydrogen to produce electricity which powers the wheels of the vehicle. They typically have a range of around 300 miles.**

EMERGING POLICY INCENTIVES

Policy incentives for adoption of zero emission vehicles can be vastly different according to regional vs national needs or are in alignment such as with the 'Zero Emission Vehicle' (ZEV) mandate which has been interpreted and adopted for different markets since its inception in California, USA in 1990.

The program was designed to help the Californian state to achieve its emissions goals by requiring that a certain percentage of vehicle fleets use the cleanest available technologies (battery electric, fuel cell, and plug-in hybrid). While it has been amended several times, its long-term goal is to encourage adoption of 1.5 million ZEVs in California by 2025. It requires major manufacturers of passenger cars and light trucks (up to 8,500 pounds) to attain a certain number of ZEV credits depending on the number of vehicles produced and delivered for sale in the state. Other US states can adopt California's standards under Section 177 of the Clean Air Act.[7] As of December 2018, nine states have adopted California's ZEV program: Connecticut, Maine, Maryland, Massachusetts, New Jersey, New York, Oregon, Rhode Island, and Vermont.[8]

China is following suit with the introduction of a New Energy Vehicle (NEV) mandate policy. Their NEV mandate is a modified version of the US's ZEV mandate with goals of promoting new energy vehicles and providing additional compliance flexibility to the existing fuel consumption regulation. This policy applies only to passenger cars and took effect from April 2018.[9] Similar to the program in California, the system effectively acts as an EV quota, requiring automakers to generate credits through the sale of EVs. Automakers who do not sell enough EVs are forced to buy credits from competitors. According to Bloomberg New Energy Finance – "this is the single most important piece of EV policy globally and is shaping automakers' electrification plans". It's expected that China will increase the quota in order to hit its 2025 target of EVs representing 20% of vehicle sales in the country.[10] Interestingly, hydrogen also plays a large role in China's zero emission plans. The government's most recent five-year plan indicated that heavy transportation modes such as buses should be using hydrogen fuel cells instead of gasoline.

In Canada, automotive emissions standards are influencing gasoline consumption. New standards under the Environmental Protection Act encourage automotive fleets to reduce gasoline use and subsequent emissions from light duty vehicles, aligning with US standards. This regulation sets limits on grams of carbon dioxide or CO2 equivalent emissions per mile for each manufacturer's vehicle fleet.[11] This is encouraging. Further to this, Canada's Transport Minister announced in January 2019 that Canada now has a target to sell 100% zero-emission vehicles by 2040". This is in line with ZEV targets already established by the Provinces of Quebec and British Columbia (BC).[12] In 2016, Quebec was the first Province in Canada to adopt a ZEV mandate, much like the US version. The legislation outlines that 15.5% of new vehicles sales will be zero emission by 2025, with provisions for automakers to generate and sell credits.

Following this, in late 2018, the BC government introduced legislation for Spring 2019 to phase in targets for the sale of ZEVs.[13] This legislation will set targets of 10% ZEV sales by 2025, 30% by 2030, and 100% by 2040, while government will take additional steps to make ZEVs more affordable. BC's new legislation is being touted as one of the most ambitious ZEV policies in North America. Already, the Province has one of the largest charging-infrastructure networks in Canada, with over 1,500 public charging stations, and the highest per capita adoption rate of electric vehicles in the country with about 12,000 CEVs registered.[14]

This is in part thanks to a programme called the Clean Energy Vehicle programme that provides financial incentives to make ZEVs affordable, supports research and development and investment in hydrogen fuel stations or charging infrastructure.[15] This activity to lower emissions from transportation aligns with the recent launch of BC's Clean Plan which introduced a 2030 goal of reducing carbon from all industries including transportation and freight from 62.3 million tonnes (Mt CO2e) to 44.8Mt.

This mandate gives BC companies such as Hydra Energy[16] a boost. This Vancouver-based startup and Foresight alumni assists firms in lowering the cost and environmental impact of their commercial vehicle fleets. In exchange for a fixed-term fuel supply contract, Hydra Energy covers the cost of vehicle conversion to dual-fuel systems that can run on both hydrogen fuel (internal combustion, not fuel cells) and gasoline and sets up on-site refueling stations. Hydra Energy's hydrogen-as-a-service solution is not only less expensive than gasoline and diesel fuel, but by reducing, if not eliminating, the use of hydrocarbon fuels, it allows its partners to conduct their operations in a more environmentally friendly manner.

CITIES AS INNOVATORS

We've highlighted National and Provincial policies, but just as important is City policy. At the City level, the driving forces behind the need for zero emission transportation is not only about lowering GHG emissions, but also reducing air pollution, congestion and noise in urban centers.

In the City of London, UK, the introduction of the Ultra-Low Emission Zone (ULEZ) from April 2019 requires cars and vans to meet new, tighter exhaust emission standards or pay a daily charge to travel within the area of the ULEZ.[17] Combined with incentives from UK government in the form of grants to purchase zero emission vehicles with no charge of Vehicle Tax or Congestion charge, even the most polluting heavy diesel vehicles driving in London are encouraged to transition to ZEVs.[18] Across cities in China it's already possible to see the impact of their restrictions on gasoline dependent vehicles in cities. According to Bloomberg New Energy Finance - *'in 2017, 21% of all global EV sales were in just 6 Chinese cities, all of which have significant restrictions on buying and using new internal combustion engine vehicles.'*[19]

In 2016, the City of Vancouver adopted the Electric Vehicle Ecosystem Strategy looking to better integrate deployment of EV charging infrastructure in residential, public and workplace contexts.[20] This was led by the goal to achieve 100% renewably powered transportation before 2050. Work had already started on integrating EVs with core City processes such as building codes. In 2011, the City of Vancouver adapted its Building Bylaw and it is now a requirement that 20% of parking stalls in apartments and condos, and all stalls in houses are to be electric vehicle ready. In 2013, it was updated to allow for 10% of stalls in mixed-use and commercial buildings are also ready for electric vehicles. There are also Provincial incentives for drivers to purchase a hydrogen fuel vehicle through the Clean Energy Vehicle (CEVforBC) Point of Sale Incentive Program.

Vancouver City's policies are providing a launchpad for new and emerging businesses. Local company ReCharged [21] has created a unique and new social enterprise business model that provides cities with electric vehicle charging stations, at no cost, as a way to build out much needed infrastructure ahead of demand. By utilizing ReCharged's platform, cities can generate more awareness around clean personal transportation, promote local businesses and events, while also receiving a share of advertising revenue. ReCharged has taken the traditional transit shelter advertising model and applied it to charging stations as a way to grow rapidly while giving back to the community, through ReCharged Eco-Venture fund, which will help kickstart more green initiatives.

WHAT'S NEXT?

We see that national, provincial and city incentives and strategies can be successful in increasing uptake of zero emission vehicles, as is the case of cities in China. With further uptake globally, thanks to financial incentives and new business models, it is anticipated these vehicles will be the preferred option as they will have become cheaper to make than those with an internal combustion engine. Even more so, core components of zero emission vehicles like lithium ion batteries (in the case of EVs) have been decreasing over time.

Buses, trucks and marine transportation are the next wave of disruption. A recent new pilot project with TransLink, Natural Resources Canada, Metro Vancouver and BC Hydro is to bring four fast-charging electric-battery buses in a trial to the region starting in 2019.[22] Norway and Sweden are already leading the way for electric ferries [23] and BC Ferries is investing in building hybrid electric vessels.[24]

It's not all positive. Challenges remain to be solved, specifically for financing and developing the supporting infrastructure such as charging stations, hydrogen fuel pumps and managing power and load through grid integration from EVs. Foresight will be on the lookout for innovators and technologist who are solving these upcoming problems. Join us!

Endnotes

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