

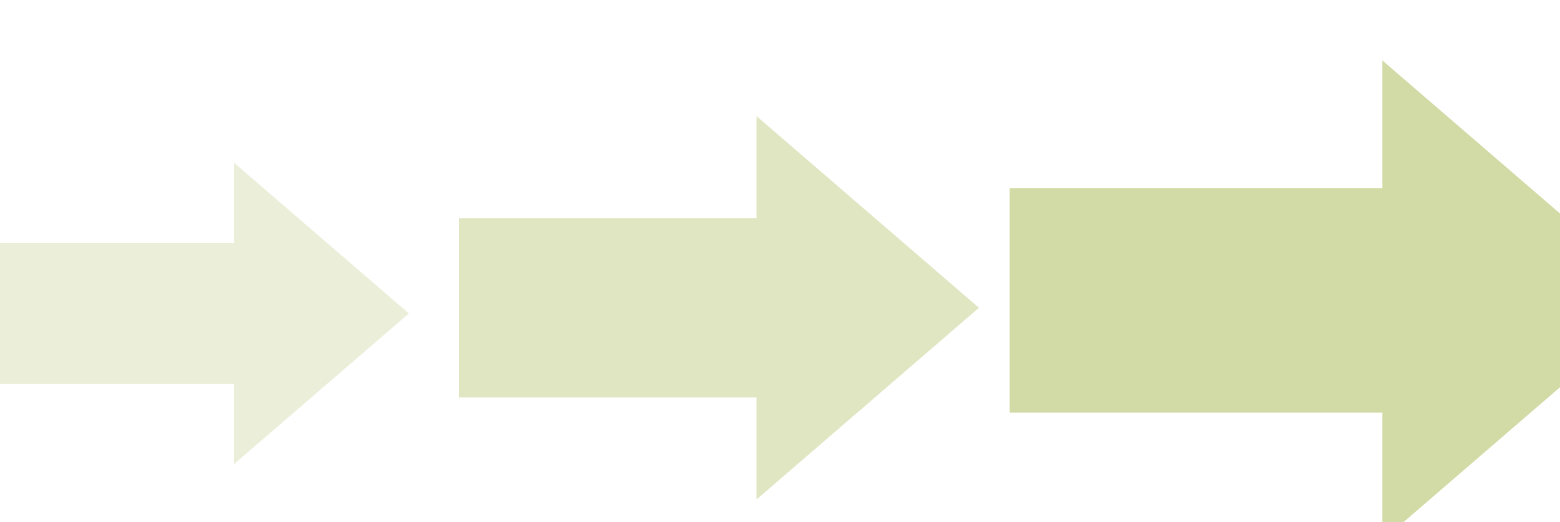


# Charging Up

Electric vehicles offer environmental benefits and cost savings to fleets

by Anne Phillips





CONSUMER INTEREST IN ENVIRONMENTALLY-FRIENDLY automotive options, as well as continuing economic pressure, has stimulated experiments with alternative fuels over the years. Recently the automotive industry has seen a focus on electric vehicles (EVs), powered by special battery packs – not gasoline or natural gas.

The companies investing in the research and manufacturing the vehicles claim that the new EVs are eco-friendly – not using carbon fuels and not producing by-products that create greenhouse gases (GHGs) and contribute to declining air quality – which for consumers and legislators is seen as an advantage. A recent Discovery Channel program showed viewers that fewer operating parts are required for an electric-powered vehicle, meaning repair and replacement costs should be less – another advantage for owner-operators. And then there is the price of gasoline, which continues to rise and appears likely to do so in the foreseeable future. Over time this will make EVs more cost effective to run. According to Mike Elwood at Azure Dynamics, the operating cost of an EV is one to two cents per mile versus ten cents per mile for a gasoline powered vehicle.

However, despite the environmental and cost advantages, EVs are seen to have some drawbacks compared to traditional gas-powered vehicles such as decreased speed available and less driving range, meaning more frequent stopping for recharging plus the time it takes to recharge. Elwood says there are “three levels of charging available. Level 1 is your normal standard outlet (110V) that all the EVs can use to charge, but this is very slow, taking longer than overnight. Level 2 is the same as the voltage used by a stove and this is effective in about 6 hours. Level 3 is high voltage and delivers a quick charge but currently batteries are not ready for this type of charging.” Places with Level 2 recharging capabilities may not be as convenient or easy to find as is your average gas station. When asked how the vehicle performs in cold climates like ours in Canada, Elwood said, “pretty much like an internal combustion engine (gas-powered). You use more energy, whether gas or battery power, when it is colder out, but the lithium ion batteries are much more dependable, robust batteries than traditional batteries.”

Considerable R&D support and atten-

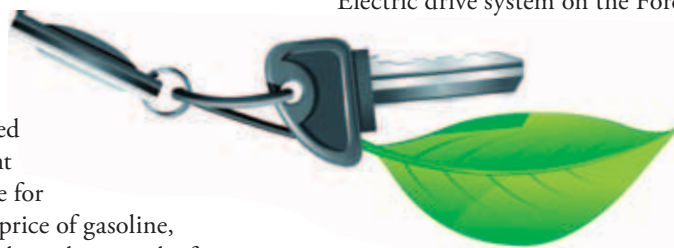
tion from manufacturers have the new generation of vehicles addressing the speed, range and infrastructure issues. This year has seen several new electric vehicles enter the market, many designed with fleet applications in mind. According to John Addison, publisher of the Clean Fleet Report ([www.cleanfleetreport.com](http://www.cleanfleetreport.com)), “most [electric vehicles (EVs)] are used in fleet applications, from maintenance to checking parking meters.”

Generally, commercial users travel predictable, short-range routes with lots of stop-and-go in urban and suburban environments. Azure Dynamics developed a Balance™ Hybrid Electric drive system on the Ford E450 chassis that has seen service in the last two years as a shuttle bus and service vehicle. The City of Toronto and the University of Alberta have had this vehicle in their fleets for a couple of years.

Ford and Azure Dynamics worked together to deliver the Ford Transit Connect EV – an all-electric vehicle with the attributes of Ford’s successful commercial Transit Connect van and Azure Dynamics’ Force Drive™ battery electric drive-train. The Transit Connect was chosen as the platform for an all-electric power version due to its combination of driving dynamics, cargo capacity, accessibility and low costs of operation. The all-electric Transit Connect has a range of up to 128 kms and reduced operation and maintenance costs. Canada Post has ordered 10 and Ministry of Transport Ontario, along with other EV300 group members such as the cities of Toronto and Hamilton, Richmond Hill, Ontario’s Ministry of Transportation and the University of Toronto are also placing orders.

The Toronto Atmospheric Fund’s Fleetwise EV300 initiative wants to see 300 electric vehicles on the road in the Greater Toronto Area by 2012. They would be purchased by public and private fleets through a buyers’ club offering electric vehicle repair services, dedicated charging infrastructure and performance monitoring. Benefits for the members include economies of scale, knowledge sharing and risk mitigation.

In December 2010, Mitsubishi Motors Corporation (MMC) displayed its new-generation electric vehicle – the i-MiEV – at Japan’s Narita International Airport, which has been utilizing the car as an internal work vehicle in its effort to reduce pollution. According to Mitsubishi “the i-MiEV maximizes the long wheelbase stemming from its base model



to install a large capacity lithium-ion drive battery under the floor and the power unit under the luggage compartment, providing a cruising range ample for everyday use.” The i-MiEV boasts a single-charge range of 160 km which would vary depending on weather conditions, road congestion and driver operation. The drive battery can be charged at standard outlets or use a quick charge method. Specifications can be found at [www.mitsubishi-motors.com](http://www.mitsubishi-motors.com). MMC is selling the i-MiEV in Japan, Hong Kong, Australia, and Europe.

Nissan has released its LEAF – a pure battery electric vehicle that can achieve highway speeds and a range of 160 kms, but according to Addison, not at highway speeds or on mountain roads. It is powered by 24kWh of laminated lithium-ion batteries and has LED head lights, which reduce the demand on the batteries. The car comes with safety items most buyers now consider standard such as stability and traction control and air bags plus onboard technology appears to match other Nissan vehicles including: an advanced GPS, Internet/smart phone connectivity, Bluetooth, intelligent-key push-button start, Sirius/XM satellite radio capabilities and wireless roadside assistance. Another model includes a solar panel spoiler that supplies a trickle charge and a rearview monitor. Hertz will add the Leaf to its car rental fleet and Nissan has committed that 500 LEAFs will be available to the EV300 group with initial deliveries slated for late 2011.

GM recently released its new Chevrolet Volt, positioned as an extended range electric vehicle (EREV). The Volt already has a large fleet customer; in November 2010, GE announced that it plans to purchase 25,000 electric cars by 2015 – 12,000 of them being the Chevy Volt. In parts of the US, Enterprise Rent-A-Car is offering customers the new Volt.

Addison test drove the Volt in July 2010 and found that “in normal mode, the Volt always stayed in the quiet electric mode that gives this 4-door sedan a 40 mile electric range before engaging its 1-litre gasoline engine to provide 300 extra miles of range, depending on driving conditions. In sport mode the Volt accelerated faster than needed to enter any freeway, or pass another car ... acceleration and braking is smooth... has plenty of leg room and comfort”.

But innovation is not stopping anytime soon; apparently by 2012 the Volt will be available with a flex-fuel engine that can support E85 ethanol blends. Ford is planning to introduce an all-electric Ford Focus this year and next-generation hybrid vehicles, including a plug-in version, by 2012. This fall BMW plans to test its new electric drive system technology and SB

LiMotive lithium batteries in a Series 1 BMW converted to be an electric car – the Active E. In 2013 BMW plans to begin selling a pure battery electric hatchback called the Megacity Vehicle (MCV), as well as its plug-in hybrid sports coupe. The MCV will be lighter to extend battery life and increase driving range. It will use an aluminum chassis and a carbon fiber-reinforced plastic outer skin saving up to 600 pounds. Tesla ([www.teslamotors.com](http://www.teslamotors.com)), founded in 2003 by a group of Silicon Valley engineers, released its innovative Tesla Roadster in 2008. It was powered by a unique light-weight motor coupled directly to a single speed gearbox above the rear axle,

which reduced weight and eliminated the need for complicated shifting and clutch work. In reverse, the motor simply spins in the opposite direction. In 2012 Tesla plans to release its Model S, offering a choice of three battery pack options: 160, 230, or 300 miles per charge. Tesla says the Model S is engineered to plug into nearly any outlet, anywhere in the world and can be recharged in 45 minutes.

Despite the activity, how the market for electric vehicles will develop is the subject of varying opinions. According to Tony D’Altoria in a July 2010 article for [www.dailymarkets.com](http://www.dailymarkets.com), most manufacturers of alternative powered vehicles acknowledge that sales will “start out modest ... at best. Higher costs and lack of widely available recharging infrastructure will keep customers at bay.” However, in the same article, Carlos Ghosn (chief executive of Renault) foresaw “zero-emission – primarily electric – cars capturing a tenth of the world market by 2020” and that there will be a “shortage of manufacturing capacity for plug-in cars and the batteries needed to power them within two years.” According to a May 2008 *Economist* article, Ghosn plans to have a Renault-Nissan alliance offer-

ing a wide range of electric vehicles in many major markets by 2012. Nissan has also partnered with NEC Corp to develop batteries and Renault is partnered with Better Place, a California-based company started by Shai Agassi.

At a Better Place you can “switch your spent battery for a fresh one in less time than it takes to fill a tank of gasoline.” According to the website ([www.betterplace.com](http://www.betterplace.com)) car companies in the US are now “making deals with local officials ... to set up public charging stations and make it easier for customers to power up at home. In some areas, utilities are also backing the efforts, offering customers special rate packages for recharging their cars. But the electrification efforts aren’t limited to the usual suspects – traditionally green cities like San Francisco and Seattle. Efforts are also under way in places

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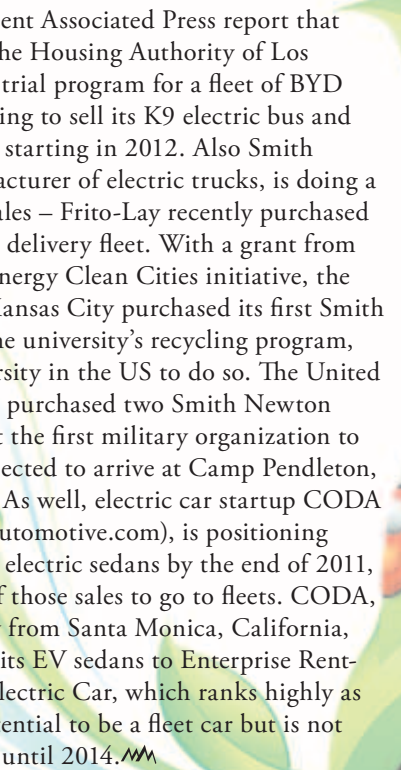


like Orlando, Indianapolis and Memphis.” According to Martin Rovers of a Better Place, the Government of Ontario is interested in making electric vehicles work in the province (it offers a tax credit to purchasers). Southern Ontario is an area of interest given its population and the relative closeness of various communities.

Better Place is also building on its successful pilot of an EV taxi program in Tokyo, which was supported by the Japanese government in cooperation with Nihon Kotsu Co., Tokyo’s largest taxi operator. Taxis are seen to be major contributors to GHG emissions and other tailpipe emissions, so electrification of this fleet was seen to be essential to making a real impact on air quality and oil consumption. Taxis require instant charge of their battery to maintain continuous and quality service to the public – waiting even as little as three to four hours for a standard charge is not an option. Battery switching allows the driver to recharge in less time than it takes to refuel. Taxi drivers enter the switching station and within minutes the used battery is replaced automatically without human intervention. Renault is developing a vehicle where the battery is placed on the bottom so that automatic switching can take place. Martin Rovers says that as long as batteries meet certain geometrical requirements different types of batteries can easily be swapped. In late October 2010, Better Place, with support from the US government and in partnership with the cities of San Francisco and San Jose, committed to bring a switchable battery, electric taxi program to the Bay Area by early 2012.

Despite the pros and cons attributed to electric vehicles, many of which will change as the manufacturers address the market demands, several will soon become part of fleets, or at

minimum be purchased to test their suitability for operating within a fleet.

An example is the recent Associated Press report that China’s BYD Auto and the Housing Authority of Los Angeles have launched a trial program for a fleet of BYD electric cars. BYD is hoping to sell its K9 electric bus and E6 electric car in the US starting in 2012. Also Smith Electric Vehicles, manufacturer of electric trucks, is doing a steady business in fleet sales – Frito-Lay recently purchased 171 electric trucks for its delivery fleet. With a grant from the US Department of Energy Clean Cities initiative, the University of Missouri-Kansas City purchased its first Smith electric truck to use in the university’s recycling program, making it the first university in the US to do so. The United States Marine Corps just purchased two Smith Newton electric trucks, making it the first military organization to do so. The trucks are expected to arrive at Camp Pendleton, California early in 2011. As well, electric car startup CODA Automotive ([www.codaautomotive.com](http://www.codaautomotive.com)), is positioning itself to sell 14,000 of its electric sedans by the end of 2011, expecting the majority of those sales to go to fleets. CODA, a privately held company from Santa Monica, California, will be providing 100 of its EV sedans to Enterprise Rent-A-Car. The Volvo C30 Electric Car, which ranks highly as a ‘green’ car, also has potential to be a fleet car but is not expected for general sale until 2014. 

**Anne Phillips** has been the editor of *Summit: Canada’s magazine on public sector purchasing* for more than 10 years. Prior to that, she was a project manager for a boutique contract publishing company, Prospectus, which specialized in trade and market sector research and publications for various government departments and public organizations.