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## Electric Vehicle Demonstration Project and Partnership

### Recommendation

That the Standing Policy Committee on Environment, Utilities and Corporate Services recommend to City Council:

That the Administration be directed to send a letter of support to the project partners for this initiative and allocate solar powered electricity purchased from existing customers on Saskatoon Light & Power's grid to meet the needs of the four electric vehicle charging stations until December 31, 2020.

### Topic and Purpose

Saskatoon Light & Power (SL&P), along with project partners including the Saskatchewan Environmental Society (SES), SES Solar Co-operative, Saskatoon Car Share Co-operative, the University of Saskatchewan, the Saskatchewan Research Council (SRC), and Sun Country Highway, would like to develop the necessary infrastructure to support local electric vehicle (EV) car-share programs by installing EV charging stations and supplying them with 100% local solar-powered electricity. The project would involve four sites and would serve to demonstrate and evaluate the feasibility of EV charging stations in public spaces.

### Report Highlights

1. Each project partner provides valuable expertise in their respective areas to support this initiative, and are already established with operations in Saskatoon.
2. All project partners share a common vision to accelerate the deployment of plug-in EVs in Saskatoon.

### Strategic Goal

This report supports the Strategic Goal of Environmental Leadership to replace conventional energy sources with green energy technologies, and to implement energy efficiency practices and reduce greenhouse gas emissions.

### Background

A decade ago, there were only a few thousand EVs on the road worldwide. By 2015, the number of EVs on the road exceeded 1 million. Transportation currently represents more than half of the oil used in the world. According to the International Energy Agency, reducing emissions to levels consistent with limiting climate change to less than two degrees would see 715 million EVs cruising the streets by 2040, which would also shrink global oil demand by 20% relative to today.

In 2015, just under 7,000 Canadians bought an EV, up by 32% from the year before, but still just representing 0.4% of all new vehicles sold across the country. EVs produce no tailpipe pollution, and in most provinces EV drivers plug into relatively clean power grids. Limited access to clean power is currently a possible barrier for EV deployment

in Saskatoon. This initiative would ensure EV charging stations included in this pilot are supplied with 100% local solar powered electricity. SaskPower also recently announced plans to increase renewable power production to make up 50% of the generating capacity going onto the provincial grid by 2030.

The cost of EVs is expected to be comparable in price to their gasoline competitors within the next six years. The cost of an electric car battery (the most expensive component) dropped 35% last year alone. Meanwhile, battery density has increased, extending the distance a battery powered vehicle can travel on each charge. Drivers will soon have more options to choose from, as the world's auto manufacturers plan to roll out dozens of new electric models over the next decade. A majority of Canadians think EVs will outnumber gas powered cars within 10 to 20 years, according to a 2016 poll by Abacus Data.

### **Report**

SL&P would work with a number of partners to accelerate the deployment of electric vehicles in Saskatoon. All partners are already established with existing operations in Saskatoon, and share this common vision. A profile of each partner's organization follows:

#### Saskatchewan Environmental Society (SES)

The SES is a non-profit, registered charity whose mandate is to work towards a world in which all needs can be met in sustainable ways. The SES has been active in Saskatchewan since 1970 and is committed to supporting sustainable living and resource use in the province. The SES works with, and on behalf of, organizations, businesses, and policymakers to encourage informed decision making that moves us towards sustainability. They undertake research and use educational programs, community outreach, and demonstration projects to provide the people of Saskatchewan with support, information, and the tools they need to make informed decisions.

The SES Solar Co-operative was started in 2015 and currently operates at two locations within Saskatoon, one at the Two-Twenty Building (220, 20<sup>th</sup> Street West), and one at the City's Landfill Gas Power Generation Facility. They currently have 130 community members as shareholders, and are looking at the potential to add additional solar generation capacity within Saskatoon to supply EV charging stations. For this project, the SES has applied for program funding from Western Diversification.

#### Saskatoon Car Share Co-operative

The Saskatoon Car Share Co-operative has been operating for over four years and currently uses two gasoline powered 2011 Nissan Versa four door hatchback vehicles. Cars are parked in designated spots in the Nutana neighbourhood near Broadway Avenue. They currently have over 50 members. Trip lengths are typically 5, 10, or 20 kilometres. Several membership options are available with different payment terms, hourly, and per-kilometre rates.

The Saskatoon Car Share Co-operative is currently running a Crowd Funding Campaign to expand their fleet, with all donated funds matched by Sun Country Highway. The goal is to add EVs to their fleet, fueled by 100% local solar-powered electricity. The Saskatoon Car Share Co-operative is also hoping to expand to include other areas of the city, such as City Park and Riversdale.

The Saskatoon Car Share Co-operative would provide vehicles that would participate in the project and share data on use and other information.

### University of Saskatchewan – Car Share Program

A car share program has been operating for three years at the University of Saskatchewan. Although a change in service providers is currently underway, the University of Saskatchewan intends to continue hosting a car share program for staff and students. The program is intended to reduce the total number of personal vehicles on campus by offering flexible alternative transportation options. To date, two gasoline powered vehicles have been available through the program, one parked in Lot 1 (Place Riel), and one parked at the Graduate Housing Complex along Aird Street in College Quarter.

The University of Saskatchewan is looking at the potential to switch to EVs instead of gasoline powered vehicles, fueled by 100% solar powered electricity. They would provide vehicles and sites for the charging stations located on campus for this project.

### Saskatchewan Research Council (SRC)

The SRC is one of Canada's leading providers of applied research, development and demonstration and technology commercialization. Over the past year, the SRC undertook more than \$22 million in projects aimed at creating positive environmental and social impacts. Their work for clients contributed to the reduction of more than 21 kilo-tonnes of greenhouse gas emissions and saved over 40 million kWh per year of energy.

The SRC is interested in exploring demand-side management opportunities for EV charger networks, such as using an external signal from the utility, through a smart grid, to enable charging during off-peak periods when electrical generation costs are at their lowest. They are also interested in improving performance for EVs in cold weather conditions through winterization.

The SRC would provide much of the monitoring expertise for the project.

### Sun Country Highway

Sun Country Highway, with their head office in Saskatoon, has developed the largest Level 2 EV charging network in the world, encompassing North America from coast-to-coast-to-coast. Most electric car charging is done at home, by simply plugging into a standard 120 volt AC outlet using the charging cord supplied with the vehicle. Level 2 chargers use a 240 volt AC power source, and will charge the EV much faster (3 to

4 hours for most EVs). Level 2 chargers are typically found in public spaces such as shopping malls or other places of business.

Sun Country Highway would provide and install the required charging stations.

For the demonstration project, Level 2 EV Charging Stations are proposed to be installed at the following four locations within SL&P's Service Area:

1. In Nutana, near Broadway Avenue (to supply Saskatoon Car Share);
2. In Riversdale, near 20<sup>th</sup> Street West (to supply Saskatoon Car Share);
3. Near Cumberland Avenue and Aird Street (to supply University Car Share); and
4. At the University of Saskatchewan, near Lot 1 (to supply University Car Share).

### Saskatoon Light & Power

SL&P has established a Net Metering Program that allows customers to be interconnected to the grid with their own solar panels. When customers produce more solar-powered electricity than they can use at their home or business, SL&P purchases the electricity from its customers at the retail rate. In 2017, approximately 250 megawatt-hours of solar powered electricity is expected to be purchased from over 75 interconnected customers, and would be enough to fuel 100 EVs per year with 100% local solar powered electricity. Throughout this demonstration project, SL&P is committing to supplying the EV charging stations with 100% local solar power from the grid at the retail rate, to the close of the project in 2020.

SL&P has installed an Advanced Metering Infrastructure (AMI) using smart meters throughout its Service Area (defined by the 1958 City Boundary, and including the St. Thomas More Building adjacent to Lot 1 at the University of Saskatchewan). By the end of 2017, all customers will have a new smart meter. The AMI provides the communication network for the smart meters, and is the first step toward implementing a smart grid. With the new smart meters, it could be possible to "virtually" net meter solar-powered electricity produced at one location, against the electricity consumed by the EV charging stations at different locations across SL&P's grid; thereby, fueling EVs with 100% local solar powered electricity. The AMI could also be used to facilitate smart grid applications such as demand-side management with the EV charging stations.

If in the future the City wants to commit to continuing to supply EVs with 100% solar power, and depending on the number of EVs on the roads in Saskatoon, additional solar power sources could be added to the grid, either from new interconnected customers and community co-operatives such as the SES Solar Co-operative, or through utility-scale solar projects led by SL&P or other development partners.

### **Options to the Recommendation**

In addition to supplying EV charging stations with 100% solar powered electricity, SL&P could also supply civic facilities in the future with 100% solar power virtually net-metered over the grid. SL&P could also implement a Green Power program such as SaskPower

has offered its customers in the past, whereby customers pay a premium charge for electricity from renewable sources.

### **Communication Plan**

If the project proceeds, appropriate communication materials will be jointly prepared by the project partners to share the project details with residents. This may include website content, social media posts, and news releases.

### **Financial Implications**

There are no financial implications. All solar powered electricity produced onto SL&P's grid would be purchased at the EV charging stations at the retail rate. If the Province of Saskatchewan implements a carbon tax starting in 2018, as has been legislated in other parts of Canada, the renewable energy credits allocated to the EV charging stations through this program would amount to a total of approximately \$360 through the close of the project in 2020. The costs of installing and monitoring the charging stations is addressed by the other partners in the projects.

### **Environmental Implications**

Since all electricity used by the EV charging stations is generated from local solar panels on SL&P's grid, there would be no net emissions from the EVs. For each EV participating in the program, it would be equivalent to removing a gasoline powered vehicle from roadways.

### **Other Considerations/Implications**

There are no public and/or stakeholder involvement, policy, privacy, or CPTED implications or considerations.

### **Due Date for Follow-up and/or Project Completion**

The EV charging infrastructure could be in place by the end of 2017. Administration will report back at that time regarding the success of the demonstration project.

In the future, SL&P could offer a subscription program, whereby EV drivers would register with SL&P to purchase solar power from the grid to supply their EV charging with 100% renewable energy resources. In the coming decades, there could be up to 50,000 EVs charging daily within SL&P's Service Area, and would use an equivalent amount of energy as could be provided by 100 megawatts (MW) of solar panels.

### **Public Notice**

Public Notice pursuant to Section 3 of Policy No. C01-021, Public Notice Policy, is not required.

### **Report Approval**

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Approved by: Jeff Jorgenson, General Manager, Transportation & Utilities  
Department

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