Charging The Future

at Algonquin College:

The Electric and Hybrid Vehicle Charger

November 24, 2016

Jennifer Bayley
Executive Summary

The purpose of this document is to recommend to the members of the board of the Sustainable Algonquin Steering Committee (SASC) that they purchase and install an Electric Vehicle Charger at the college to further their sustainability goals.

The current situation is that Electric Vehicle sales have begun to rise in many Canadian provinces, but mainly in Ontario. This sales trend means that Electric Vehicles will become more prevalent in the city of Ottawa due to the provincial push toward green energy and climate control; and that Algonquin college will have more students and staff in the future that own an electric vehicle.

The solution I propose to this problem is the purchase an installation of Level 2 EV charger, the Siemens Versicharge Universal at Algonquin College for the use of staff and students. The cost of this solution is outlined in this Table:

| Siemens Versicharge Universal | $ 899.99 |
| ESA Electrical Permit | $ 100.00 |
| Installation Cost Range (variation due to charger placement) | $ 1000.00 to $ 5000.00 |
| **Estimated Total Cost** | **$ 1999.99 to $ 5999.99** |
| Ontario EV Rebate up to 50% off cost of EV charger purchase | Save $ 450.00 |
| Ontario EV Rebate up to 50% off installation cost | Save $ 500.00 |
| **Estimated Final Cost** | **$ 1049.99 to $ 5049.99** |

The Benefits of this solution to Algonquin College will be:

- Create a better rapport with Siemens due to the use of their products on campus
- Show a community spirit in line with Ontario’s energy saving goals
- Raise the profile of Algonquin College Online

In conclusion, the Algonquin Sustainability Steering Committee has made a choice to strive toward green energy, sustainability measures, and the future of tomorrow. The purchase and installation of an EV Charger on campus will show support to its students and for the College’s sustainability goals.
Table of Contents

1.0 Green Algonquin………………………………………………………4
2.0 Trends in Travel……………………………………………………5
3.0 Charging the Future…………………………………………………6
   3.1 Implementation…………………………………………………7
   3.2 Costs………………………………………………………………7
4.0 Alternatives…………………………………………………………8
5.0 Benefits………………………………………………………………9
6.0 Conclusion……………………………………………………………10
Glossary………………………………………………………………11
List of References………………………………………………………12
1.0 Green Algonquin

The purpose of this document is to recommend to the members of the board of the Sustainable Algonquin Steering Committee (SASC) that they purchase and install an electric vehicle charger at the college to further their sustainability goals.

Algonquin College, through the formation of the SASC, has made a commitment to sustainability and green energy goals by adopting the Sustainability Strategy Framework (SEE) as a guideline for the college to follow [1].

Some of the Social, Environmental, and Economic goals that this framework promotes are:
• to Lead in Community and Corporate Social Responsibility
• to Reduce Our Ecological Footprint
• and to Advance as an Incubator for a Green Economy

Following these guidelines, Algonquin college has created important initiatives for sustainability such as: The LEED gold initiative restructures and builds green infrastructure at the college such as the ACCE building. The Vocational Learning Outcomes promote digital learning through E Texts which reduces the amount of paper used on campus. It also partnered with Siemens Energy services in 2014 by signing the Energy Savings Contract; for the next 20 years this contract reduces the colleges energy usage bill, promotes green energy, and provides the college with 51 million dollars to meet the SEE goals [2].

In this document, I will first discuss the current situation which requires the need for an electric vehicle recharger, and follow with my solution for this situation. I will cover the implementation and costs involved, then show the benefits and alternatives to this solution. Finally I will summarize my proposal in a conclusion and give my recommendations.
2.0 Trends in Travel

Electric vehicle sales have begun to rise in many Canadian provinces, but mainly in Ontario, British Columbia, and Quebec because of the government incentives offered to their consumers.

One 2014 chart of sales figures show that 1 out of every 300 vehicles sold in Canada is either an electric battery or hybrid plug-in, and a 2015 survey shows that there are over 3,835 electric vehicles in the province of Ontario alone [3]. Refer to Chart One. A major incentive for residents of Ontario to buy an electric vehicle of some type is the Ontario Transportation EV Incentive Program which offers a rebate to buyers. Up to $14,000.00 can be remitted to provincial residents from the cost of an electric vehicle, many of which are sold at $30,000.00 to $40,000.00 [4].

Chart 1: EV Provincial Sales [5]

This sales trend means that Electric vehicles will become more prevalent in the city of Ottawa due to the provincial push toward green energy and climate control; Algonquin college will have more students and staff in the future that own an electric vehicle.

An ideal solution to this situation will:

- be cost effective for the college
- fit into the Sustainable Strategy Framework
- benefit Algonquin College and it’s student body
3.0 Charging the Future

The solution I propose to this problem is the purchase an installation of Level 2 EV charger at Algonquin College for the use of staff and students.

There are three types EV chargers available [6]:
1. Level 1 which is a simple electrical cord that comes standard with every vehicle and is plugged into an electric socket, it is very slow and time consuming to use.
2. Level 2 is the standard commercial charging apparatus which is meant for storefronts and parking lots, the plug type is standard to fit all vehicles in North America. It charges a Plug-in hybrid to full in 1 to 4 hours and a Battery EV in 4 to 8 hours.
3. Level 3 is a direct current charger that is made for highway driving as it charges all vehicles to full in about 30 minutes. It is very expensive and the charger type is not standard to all EV vehicles.

I have chosen the Level 2 charger:

**Siemens Versicharge Universal**

**Technical Specifications [7]**

- Hard-wired directly into electrical grid to avoid portability and theft
- Simple 20 foot charging cord can easily reach vehicles in the designated parking spot
- Able to work outside in the temperature range of: -30 degrees to +50 degrees Celsius
- Charger is made of 60% recyclable materials for a better impact on the environment
- Customizable switch allows power supply adjustment and time delay, the College can set charger to be used only during the day or designated hours
- Uses 200 to 240 volts of power at 30 Amps, the same power draw as an electric dryer
3.1 Implementation

Five Steps to implement solution [8]:

1. Purchase the EV charger

2. Pick site for charger installation on college grounds

3. Gain the electrical permit from Electrical Safety Authority

4. Have a Licensed Electrical contractor install the charger

5. Have the installation Inspected by the ESA

3.2 Costs

Here is the estimated cost breakdown of implementing this solution:

Table 2: Estimated Cost of Solution

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESA Electrical Permit [9]</td>
<td>$ 100.00</td>
</tr>
<tr>
<td>Installation Cost Range [10] (variation due to charger placement)</td>
<td>$ 1000.00 to $ 5000.00</td>
</tr>
<tr>
<td><strong>Estimated Total Cost</strong></td>
<td><strong>$ 1999.99 to $ 5999.99</strong></td>
</tr>
<tr>
<td>Ontario EV Rebate [4] up to 50% off cost of EV charger purchase</td>
<td>Save $ 450.00</td>
</tr>
<tr>
<td>Ontario EV Rebate up to 50% off installation cost</td>
<td>Save $ 500.00</td>
</tr>
<tr>
<td><strong>Estimated Final Cost</strong></td>
<td><strong>$ 1049.99 to $ 5049.99</strong></td>
</tr>
</tbody>
</table>
4.0 The Alternatives

What could the College do differently?

1. Do nothing - Algonquin College could simply decide not to enact this solution at this time.
2. Wait/Poll the student body - The college could wait for a demand for this solution by others, or it could conduct a poll to determine interest among the student body.
3. They could pick a different EV charger - The College could like the solution, but decide to purchase and install a different EV charger.

I will compare my solution in Table Two, to two other EV chargers on the market that are frequently purchased by consumers:

**Table 3: Comparison of EV Chargers [7]**

<table>
<thead>
<tr>
<th>EV Charger</th>
<th>Aero Vironmet</th>
<th>Siemens Versicharge Universal</th>
<th>Elmac EVDuty (Model 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cord length</strong></td>
<td>25 ft</td>
<td>20 ft</td>
<td>25 ft</td>
</tr>
<tr>
<td><strong>Temperature range in Degrees Celsius</strong></td>
<td>-30 to + 50</td>
<td>-30 to + 50</td>
<td>-40 to + 40</td>
</tr>
<tr>
<td><strong>Comments</strong></td>
<td>Preferred by car manufacturers</td>
<td>Flexible, Versatile, 60% recycled materials</td>
<td>Best cold weather temperature range</td>
</tr>
<tr>
<td><strong>Price</strong></td>
<td>$1,150.00</td>
<td>$899.99</td>
<td>$729.00</td>
</tr>
</tbody>
</table>
5.0 Benefits

Why pick Siemens EV Charger?

Algonquin College has partnered with Siemens Energy Services to promote Sustainability. Choosing to purchase their EV charger may benefit the college in the short and long term by producing these effects:

- Price reduction in the purchase of the Versicharger Universal
- Reduction of ongoing electrical charging costs due to the Energy Savings Contract
- Creating a better rapport with Siemens due to the use of their products on campus

What is in it for Algonquin?

Algonquin College will be able to show a concrete example to the students and staff of its commitment to sustainability and green energy. This solution will meet the stated goals of the Sustainability Framework SEE by:

- showing a community spirit in line with Ontario’s energy saving goals
- helping to reduce carbon emissions
- and to show an investment in the future of technology

This solution will also raise the profile of Algonquin College in Ontario and the Country. Installing an EV charger on campus will create a wider criteria for Search Engines to target the college Online. Many more Mapping Applications will be able to show Algonquin College which will not show other educational institutions; bringing more attention to the college.

Such Apps are:
- GoogleMaps
- EVCharge Hub
- PlugShare
- AMA EVCharge

Algonquin College’s Relationship with its students will improve and strengthen; The college will show them that:

- Algonquin cares about their lives
- Algonquin cares about the needs of future students
- and that Algonquin wishes to provide them with a needed service
6.0 Conclusion

Algonquin College, through the creation of the Sustainability Steering Committee, has made a choice to strive toward green energy, sustainability measures, and the future of tomorrow. The residents of Ontario have begun to show an interest in saving the environment by buying and driving Electric Vehicles. This trend is growing and many of these buyers can be and will be future students of Algonquin College. To show support to these students and for the College’s sustainability goals; I propose that an EV charger be installed on campus. It is cost effective, will raise the profile of the college Online, and will bring closer ties to our Energy Partner, Siemens Energy services.

To enact this proposal I recommend that Algonquin College:

1. Discuss this proposal among members of the Algonquin Sustainability Steering Committee
2. Begin a dialogue with Siemens Energy services
3. Meet with Algonquin College’s Facilities Management Department
Glossary of Terms

**EV** is an acronym of the term Electric Vehicle that covers all types of vehicles that mainly run on electricity rather than gasoline.

An **Electric Battery Vehicle** is a motorized vehicle that runs only on electricity which is received and generated from a large battery located inside the motor.

A **Hybrid Plug-in Vehicle** is a motorized vehicle that runs on battery generated electricity, but also carries a small combustion engine which can supplement the battery.

The **EV Charger** is a mechanical apparatus that charges the battery of an electric vehicle by conducting an electric current from the electricity grid to the vehicle.

**Sustainability** is a term given to the concept of supporting long-term ecological balance by not being harmful to the environment or by depleting the earth’s natural resources.
List of References


