



REPORT TO COUNCIL

To: **Mayor and Councillors**

Subject: Feasibility of Solar Powered Traffic Control Equipment

File #: [Required]

Doc #:

From: Cameron Perkin, EIT
Engineering Technologist

Date: November 2, 2020

RECOMMENDATION:

THAT Council receive staff's report on the "Feasibility of Solar Powered Traffic Control Equipment" for information.

PURPOSE:

The purpose of this report is to discuss the use of solar powered equipment for traffic operations within the City of Langley.

POLICY:

N.A.

COMMENTS/ANALYSIS:

During the June 15, 2020 City Council meeting, staff were asked to investigate the feasibility of using solar energy for future traffic operations in the City.

This report briefly outlines the advantages/disadvantages of using solar powered equipment within the City and the types of solar powered equipment that are currently available in the market.

Background:

Self-sufficiency and portability of the solar powered systems make them ideal for infrastructure such as Speed Reader Boards (SRBs), which often are relocated

strategically from time to time. The City currently uses four (4) solar powered SRBs. Additionally, this year the City is installing two more solar powered SRBs and one Rapid Rectangular Flashing Beacon (RRFB) as part of the crosswalk upgrades at Grade Crescent & 201A Street.

Pros and Cons of Installing Solar Powered Equipment

Pros:

- Self-sufficient as it does not require external power sources.
- Portable as it does not need to be tied into the existing power grid.
- May have a lower installation cost than conventional systems, as the conduit installation cost for conventional systems depends on their proximity to an available hydroelectric source; the farther their locations, the longer conduit and higher installation cost is required.

Cons:

- Greater theft risks due to its exposed solar panel component, when compared to conventional equipment with its power source (i.e. wirings) protected underground.
- Using solar powered equipment may not always be feasible as the panels need to receive a certain level of sunlight to operate properly. Therefore, any locations that could potentially obstruct direct sunshine (e.g., tree branches, tall buildings, etc.) on these panels may affect their optimal operations.
- The life cycle costs of solar powered equipment are often higher than conventionally powered equipment.
 - Typically, the initial material costs of a solar powered RRFB system is approximately \$800 dollars higher than the cost of a conventional system.
 - Batteries in the equipment would need to be replaced 3 or 4 times over their average life expectancy of fifteen years, adding approximately up to \$1,600 additional life cycle cost. In comparison, a conventional system uses approximately \$150 of electricity over fifteen year period.
- There is no perceived environmental advantage over the use of a conventional power supply system. BC Hydro power generation is 91% from renewable resources and use of LED lights significantly reduces the demand.

Solar Powered Traffic Asset Types

The following Table presents common and/or desirable solar powered traffic control infrastructures with remarks on whether the City is currently using them.

Table 1: List of Available Solar Powered Infrastructure in the City of Langley

Infrastructure Type	Solar Powered Alternative (Yes / No)	Comments
Speed Reader Board (SRB)	Yes	All speed reader boards in the City of Langley are already solar powered.
Rapid Rectangular Flashing Beacon (RRFB)	Yes	<ul style="list-style-type: none"> Depending on the life cycle cost of the asset installation and operation, solar powered RRFBs may be used in the City. If conduit installation is not required for other electrical components such as streetlighting, solar powered RRFB systems may be cheaper to construct. The RRFB soon to be installed at Grade Crescent & 201A Street will use solar energy for this reason.
Traffic Signals	No	<ul style="list-style-type: none"> Solar powered traffic signals for permanent installation do not appear to be readily available in Canada. Furthermore, the Ministry of Transportation and Infrastructure (MoTI) does not allow regulatory intelligent transportation solutions (i.e. traffic signals) to be powered by a single alternative (wind, solar, etc.) power source.
LED Enhanced Signs	Yes	<ul style="list-style-type: none"> The City currently does not use any LED enhanced signs. The City has not used them to date as no suitable sites have been identified yet. LED enhanced signs are typically used to increase driver compliance with regulatory signs as LED enhancements improve conspicuity. They often are installed in areas with poor sightlines, at stop signs, and at locations where drivers fail to recognize an intersection.
Streetlighting	Yes	<ul style="list-style-type: none"> Solar powered alternatives do exist and are currently used in limited scenarios throughout

Infrastructure Type	Solar Powered Alternative (Yes / No)	Comments
		BC. <ul style="list-style-type: none"> • Before installing any solar power streetlighting in the City, a detailed study should take place to determine if it would be suitable and cost effective for the City.
In-Road Warning Lights	Yes	<ul style="list-style-type: none"> • In-road warning lights are typically used to increase driver compliance at crosswalks. • These systems are typically pedestrian activated and illuminate crosswalk markings in a flashing manner when a pedestrian is using it. • The City has not used them to date as no suitable sites have been identified yet.

In summary, the above table shows that solar powered alternatives exist for smaller systems, but do not exist for larger systems such as traffic signals which require a larger and more stable source of energy.

Plans Moving Forward

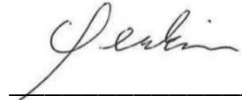
Moving forward and unless otherwise directed by Council, the City will keep its current practice of comparing the option of installing solar powered traffic assets vs. conventional systems on a case-by-case basis and will use solar powered equipment in the following situations:

- When equipment needs to be relocated on a semi-frequent basis;
- It is cheaper to install and maintain the solar-powered equipment; and
- When BC Hydro electricity is not available within a feasible distance from the project.

BUDGET IMPLICATIONS:

There are no financial implications associated with this report.

Respectfully Submitted,



Cameron Perkin, EIT.
Engineering Technologist

Concurrence:



Hirod Gill, P.Eng.
Manager of Engineering Services

Reviewed by,



Rick Bomhof, P.Eng.
Director of Engineering, Parks & Environment

CHIEF ADMINISTRATIVE OFFICER'S COMMENTS:

I support the recommendation.



Francis Cheung, P. Eng.
Chief Administrative Officer