



**The Buddhist Temple of Southern Alberta**

**An EcoSangha  
Net-Neutral-Electricity  
Resolution**

**February 12, 2020**

## ***Resolution***

Consistent with the path to becoming an ecoSanha and conditional upon approval by the general membership, be it resolved that the Buddhist Temple of Southern Alberta engage EnergySmart Canada Ltd to install a 56MW photo-voltaic solar array on the south-facing roof of the temple building.

Further, be it resolved, that, conditional upon approval by the general membership, that the outdoor lighting be modernized by replacing the four light standards with solar-powered lamps that illuminate the parking lot at 33% of full capacity until motion is detected at which time they are fully illuminated; and that all of the soffit lamp bulbs be replaced with LED bulbs.

## ***Rationale***

- Utilities represent the highest building operation expense at about \$15,000
- a photovoltaic solar array will save about \$9,000 per year
- solar panels are a generating asset: a capital expense that generates income
- The BTSA currently has liquid assets sufficient to cover the cost of the PV array
- Panel pay-back will be about 12 years under the current price structure
- Exercising the option to be charged 19¢/kWh between the spring and autumnal equinoxes would reduce pay-back time to about seven years
- BTSA membership is ageing so the ability to sustain utility payments will become more difficult
- EnergySmart is the preferred contractor due to the Made-in-Canada content of the components they will use
- There are some concerns about cybersecurity associated with Huawei components to be used by Solar Optix
- EnergySmart is considered to be more stable than Solar Optix
- Outdoor parking lot lighting is currently a significant component of the total electric consumption and proposed new lighting would eliminate most of that
- A 56MW PV array will eliminate about 35 tonnes/CO<sub>2</sub> per year

## ***Summary***

Minutes of the 13Mar2019 board meeting show that the Building Maintenance Committee was to explore acquiring solar panels for the temple. A report was presented to the board at the 15May2019 and a resolution was passed that the board would take the proposal to fund installation of a 56kW solar panel system to the general membership. As summer approached it was agreed to work on the ecoSangha concept over the summer and present the idea to the membership at a town hall meeting in the fall. This happened on 14Dec2019 and consisted of presentations to interested members on how the temple could become more environmentally friendly, including becoming net neutral for electricity by installing solar panels. Rudy Reger from EnergySmart Ltd gave the assembled group a tour of his home which has one several prizes, included best net-zero home in Alberta for 2019. Those present at the town hall meeting appeared to be in agreement that solar panels would provide good value as a generating asset.

The BTSA has a declining membership and currently holds assets sufficient to purchase a solar panel array so a solar array would result in a significant reduction in ongoing building maintenance for the next two or three decades. The board has requested proposals from at least two companies for installation of the solar panels for the February 2020 board meeting. EnergySmart and Solar Optix provided updated proposals which are attached to this document.

Both proposals suggest a 56KW system. The EnergySmart proposal is \$120,540 including GST using Canadian Solar and Solar Edge components. These components include an optimizer to increase the efficiency of the system. The Solar Optix proposal is for \$110,775 for Chinese Huawei components. The two proposals have been jointly reviewed and it is recommended that the EnergySmart proposal be accepted as the preferred proposal.

Rationale for this choice is that firstly, the EergySmart proposal contains components that are believed to be of higher quality. SolarEdge and Enphase represent 90% of the solar inverter market. Solaredge uses the "optimizer" strategy to get per

panel monitoring and Enphase uses micro-inverters on each panel. Solar Edge and Canadian Solar components are considered to be Canadian or American in origin although there is some Chinese contribution. The Solar Optix proposal uses Huawei components imported from China and the array uses "string inverters" which are cheaper, but don't give use per panel monitoring.

Secondly, the current status of these two companies suggests that EnergySmart will be more stable as the future unfolds. Solar Optix was about to close its doors recently but was rescued at the last minute by Neulite Electric. If it doesn't demonstrate profitability to its new owners its continued existence will be in doubt. EnergySmart is diversified and appears well positioned to continue offering solar options.

Check out the following:

Canadian Solar:- [https://en.wikipedia.org/wiki/Canadian\\_Solar](https://en.wikipedia.org/wiki/Canadian_Solar)

Solar Edge:- <https://en.wikipedia.org/wiki/SolarEdge>

Huawei:- <https://en.wikipedia.org/wiki/Huawei>

A concern raised in The Financial Times (<https://www.ft.com/content/58fcedea-1905-11e9-9e64-d150b3105d21>) warns that "Huawei's sales of solar equipment in the US threaten the entire American electricity grid, members of Congress have warned, in the latest rift between US politicians and the Chinese company. Both Democrats and Republicans have said that Huawei solar equipment could be hacked to allow a third party to slow or even interrupt US electricity supplies."

**Currently.....submitted with the original presentation on 15May2019**

The monthly electrical consumption by the BTSA for 2018 obtained from utility bills was used to analyze a "typical" year. The temple consumed 75,660 kWh during the year resulting in an expense of \$15,487. Three companies, Energy Smart, Solar Optix and Solar Wind, were invited to provide estimates on the number of panels, with purchase and installation to equal the annual consumption. The estimates to accomplish this ranged from \$100,000 to \$115,000.

There are four components to micro-generation: (i) total generation (TotalGen) is the total wattage produced by the panels (TotalGen is described by a harmonic curve that is maximum at the summer solstice and minimum at the winter solstice); (ii) the total consumption (TotalUse) is what the building consumes and it can be constant over the year or peak in the winter or the summer depending on use patterns; (iii) the GCM is excess solar panel output that is sent to the grid because TotalGen and TotalUse do not match; and (iv) DCM is power pulled from the grid when the solar panels do not meet the building needs

The average cost per kWh of electricity in 2018 was 20.47¢ per kWh obtained by dividing the total consumption by the total cost. The BTSA pays 20.47¢ for DCM but only receives the going rate for electricity for GCM 7.8¢.

Solar panels are guaranteed for 25 years but are usually considered to have output of up to 80% even after 50 years. The cost of purchasing a solar panel system rated at 56KW that produces 72,000 kWh per year for \$115,000 is about 15.65¢.

The patterns of the four variables for the author's residence was used to get estimates of the amount of DCM and GCM that the BTSA would experience. GCM was 65% of TotalUse and DCM was 63% of TotalUse. Thus, we could expect that the consumption would decrease from 75 MWh to 46 MWh for a saving of \$6,967 per year. The GCM would generate an additional \$2,896 for a total reduction of \$9,205. Depending on the electricity supplier, for example Alberta Co-operative Energy, it might also be possible to sell the GCM for an additional 2¢ per kWh.

Predicting the outcome of investing \$115K in the stock market is difficult. In this case an attempt was made by downloading the TSE monthly close quotations for 25 years. The average annual gain was 6% but one year the TSE lost 35% and there was another year that saw a gain of 30%. Trying to determine the outcome with any accuracy is almost impossible. Nevertheless, if we consider the future value of \$115,000 invested in a product that gives compounded interest the final value at 6% was \$325,296. Subtract the cost of electricity at \$461,157 means an outlay of \$135,861.

Compare this to investing the \$115,000 in solar panels results in a total cost of \$173,939 for electricity. However, it also results in a decrease \$9,208 in the annual budget. If this was invested at 3.5% in a GIC it would result in a future value of \$ 235,335. This saving makes the installation of solar panels give a profit of \$53,604. [Cost of DCM + \$115,000 +fv(\$9208/yr)].

## ***Request for Proposal***

This request is for a quotation to explore the opportunity to install solar panels on the roof of the Buddhist Temple of Southern Alberta (BTSA).

### ***Needs***

- recommendations as to number of panels
- method of installation
- assurance that the integrity of the roofing surface will be preserved
- installation of solar panels
- obtaining all necessary permits
- estimate of the costs and long-term benefits
- details of panel and installation warranties
- on-line access to real-time performance of the panels
- information on opportunities to obtain financial assistance

### ***Scope***

The BTSA is open to suggestions to:

1. improve power use efficiency in the building
2. to proposals for additional steps to reduce CO<sub>2</sub> footprint

### ***Time***

Deadline for submission is end of business May 8, 2019

### ***Organization information***

The Buddhist Temple of Southern Alberta is located at

470 40th Street S.

Lethbridge, AB, T1J 3Z5

Contact: David Major

261 Eagle Place N

Lethbridge, AB, T1H 4X1

rojam@telus.net

403-328-4957



Agreement/Contract for Solar  
PV System

**Customer Details**

The Buddhist Temple of Southern Alberta  
470-40th Street S  
Lethbridge, AB T1J 3Z5  
Contact: David Major 403-328-4957  
261 Eagle Place N  
Lethbridge, AB T1H 4X1  
[rojam@telus.net](mailto:rojam@telus.net)

**Prepared by**

Rudy Reger  
2825b 2nd Ave S  
Lethbridge AB  
T1J 0G8  
[rudy@energysmartcanada.com](mailto:rudy@energysmartcanada.com)  
(403)327-4129

**Date** 03/02/2020

**Solar PV Estimate**

**System Size**

**56KWp**

**KWp**

QTY	Item	Price
1	Grid Tied Solar PV System	\$114,800.00
	Solar Edge Optimizer Roof Flush- Kinetic Portrait Includes breaker and panel upgrade to accommodate 56KW system	0.00
	<b>Sub-Total</b>	<b>\$114,800.00</b>
	<b>GST @ 5%</b>	<b>\$5,740.00</b>
	<b>Total</b>	<b>\$120,540.00</b>

PV System Install		Groundwork/Trenching	
Yes	AC electrical tie in	Trenching	N/A
Yes	DC electrical tie in	Backfill to rough grade	N/A
Yes	AC Electrical materials	Utility Crossing	N/A
Yes	Delivery to site	Micro Piles	N/A
Yes	Flush Mount		N/A
Yes	M/C Hire		N/A
Yes	Monitoring Connected (Router/Internet Rqd)		N/A
Warranty			
20 yrs	Solar PV Modules (Power at 90%)	Solar Modules (Workmanship)	10 yrs
25 yrs	Solar PV Modules (Power at 80%)	Labor (Workmanship)	1 yr
10 yrs	Mounting Frame (Workmanship & Parts)	Inverter	12 yrs

**Project Costs**

Sub-Total	\$114,800.00
GST	\$5,740.00
<b>TOTAL</b>	<b>\$120,540.00</b>

**Payment Schedule**

Down Payment \$60,270.00

Balance due on completion of installation \$60,270.00

**Signatures**

Date \_\_\_\_\_

Customer \_\_\_\_\_

Energysmart  
Canada \_\_\_\_\_

A 2% per month charge will be added to over due accounts.

---



A Division of Neu-Lite Electric Inc.

1320 - 36th Street North  
Lethbridge, Alberta T1H 5H8  
Phone (403) 327-7711 info@neu-lite.com  
www.neu-lite.com

# Quotation

**Date:** 01/28/20  
**Attn:** David Major  
**Re:** BTSA 57kwDC Solar Proposal

Thank you for the opportunity to provide you with a quoted price for the project stated above. As per our site visit

<u>Qty</u>	<u>Description</u>
148	Hanwha 385W module
1	Sun2000 45KTL Huawei inverter
1	Sun2000 data logger
1	Fast Rack mounting system
1	AC distribution tie in
1	On Line monitoring set-up
1	Watt Node consumption monitoring
1	Structural engineers report
1	Electrical engineered design & drawings
1	City of Lethbridge Interconnection
1	Electrical permit
1	Building permit

**Our Total Price** \$ **105,500.00**  
+gst

*Quotation valid for 45 days*

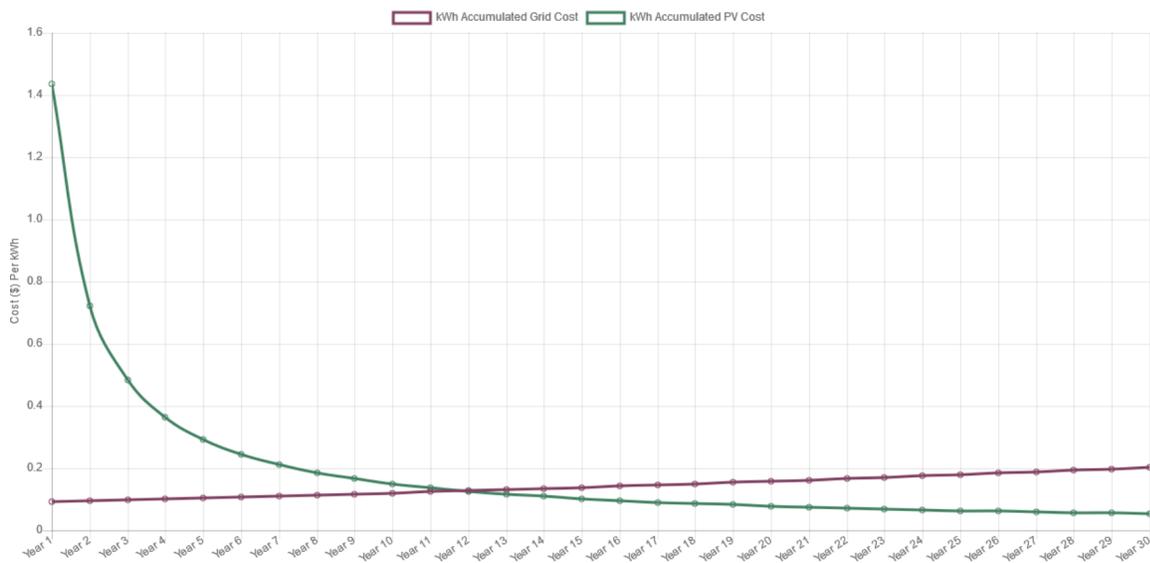
## SOLAR OPTIX ENERGY SERVICES

Per: Bryce Allred

### Calculated Economic Indicators - Outputs

Life Sum of Net Present Value Grid Cost (\$)	396841.046
Life Sum of Net Present Value PV Cost (\$)	105500
Levelized Cost of Energy (LCOE) (\$/kWh)	0.039
Levelized Avoided Cost of Energy (LACE) (\$/kWh)	0.148
LACE-LCOE (\$/kWh)	0.109
Discounted Return on Investment (ROI) (% after project life)	276.153
Discounted Return on Investment (ROI) (%) (Annual)	4.515
Payback (yrs) - Defined as accumulated Cost for PV less than for Grid 12	

### Solar PV Accumulated Cost (\$/kWh) Compared to Grid Purchased Cost



### Solar PV Total Accumulated Cost (\$) Compared to Grid Purchased Cost

