



# MEMORANDUM

DATE: May 4, 2015

TO: Note to file

FROM: Carmen Proctor, EcoSave Coordinator

SUBJECT: **Solar Garden Conversation Café, Oso Negro, April 8, 2015**  
**Café Notes and Opinion Poll Results**

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## CAFÉ NOTES

**Moderator:**

David Reid, West Kootenay EcoSociety

**Panel Presenters:**

Carmen Proctor, EcoSave Program (Nelson Hydro),  
Elroy Switlishoff, Jetson Consulting (Electrical Engineer)  
Alex Love, Nelson Hydro General Manager  
David Lovekin, Pembina Institute

**Audience members:**

Approximately 90 in attendance

**PANEL PRESENTATIONS:**

**Carmen Proctor:**

- Overview of aspects of community solar garden
- Locations
  - Recycle Centre, RDCK Transfer Station
  - Bonnington Plant
  - Need to gauge importance of visibility to the community
- Rate models – per kWh, per solar panel, shares
- Solar power would be at a premium

**Elroy Switlishoff:**

- Used various modeling tools to measure solar potential
- Nelson has favourable location
  - lack of barriers on west and east horizon
  - captures “shoulder” solar at the beginning and end of day
- Nelson has long running weather station at airport that provides good weather data and allows adjustments for snow, rain, and other meteorological effects
- Comparable to Germany with regards to solar potential, but not as good as Kimberly
- Elevation has a large impact on solar production – the higher elevation, the higher production
- Not all roofs are optimally aligned for solar
  - Once you move away from optimal alignment, you lose the midday sun production
  - Nelson isn’t considering axis trackers due to cost

**Alex Love:**

I’m going to speak about why Nelson Hydro would want to champion a Solar Garden Project.

Why would an electric utility want to be involved in a solar garden? – After all;

- We could buy power at lower rates,
- Our customers could install solar themselves,
- It might turn into a maintenance headache,
- It takes time and effort to construct and implement any project.

Well there are three good reasons why Nelson Hydro should help make a Solar Garden happen;

1. Nelson has committed to being a low carbon (GHG) city,
2. This is a way of providing a means for our customers to participate in solar. It is not for everyone but it is a great option for those who are interested.
3. Most importantly, Distributed Generation, like wind, micro-hydro and solar, is becoming and will continue to become more prevalent within electric power grids,
  - The technology of electric utilities is changing,
  - The business model of electric utilities will need to change – we could change from being suppliers of energy to suppliers of backup power,
  - So now is a good time to build our experience with distributed generation, experience with the technology (solar), experience with the business model, and experience with customer satisfaction.

The Solar Garden is an excellent way for us to develop that experience.

**Dave Lovekin:**

- Background in analysis of renewable energy for companies, governments, municipalities
  - Work with different org's to shift policy towards renewable/clean energy
- International Energy Agency (IEA)
  - Sun will be world's largest energy source by 2050
  - Speaks to the capacity of solar technology
- Global investments in 2013 – \$270 billion in fossil fuels, \$207 billion in solar – more investors putting money in renewables
- 1990 - \$5/watt, 2013 - \$0.69/watt
- Germany
  - Government policies in place enabling industries and companies to install solar
- Why solar in Nelson?
  - Amount of electricity at Bonnington serves half of Nelson's electrical needs
  - Other 50% comes from Alberta which is coal based or natural gas – Fortis Power

**Carmen:**

- Want to use information in survey to assess project and take that information to council

**DISCUSSION:**

- When will it be implemented?
  - Within the next 6-12 months, depending on interest in community
- Will it be available to all Nelson Hydro customers?
  - Yes
- Does Nelson Hydro have a net metering system?
  - Yes – energy is bought back at the current Nelson Hydro rate
- Is there a location in BC that can provide a solar power rate on par with hydro?
  - Kimberly is best location in BC
  - Will it compare with Site C hydro power? Yes – solar is getting close
- Why wouldn't solar be placed in more advantageous site for production?
  - Turns it into more of a business investment and takes away the community aspect
- Why aren't mirrors being considered?
  - Collection efficiency isn't good
  - Mirrors are more expensive and labour intensive
- Would it make sense to locate array at a higher elevation locally?
  - Accessibility is an issue for maintenance and practical considerations
- How will monetary investment be reflected on utility bill?
  - Energy production from purchased panels will be deducted from hydro bill

- Morgan Solar has panels for half the price of market panels – worth exploring
- Source of grid power – can you tell specifically where power comes from? No – difficult to “identify” power.
- Peak power occurs in winter months, when solar isn’t producing, so does solar actually offset “dirty” energy from Fortis?
  - Energy saved or produced in Nelson is less energy coming from the international grid
- Cost of producing panels is a dirty environmental process that uses many chemicals and is high in GHG emissions
- Can city make loans available to put solar on residential roofs and also develop solar garden?
  - No fundamental reason why City can’t provide loans for rooftop solar, but is not being considered at this time
- Community solar garden will only power 3 Nelson homes
  - Solar is an additional option being offered to customers and only those interested need sign up – it will be available at a premium above that of hydro power
- Testimonial from audience member regarding their home solar system – think it’s the best investment ever made
  - Invested between \$20,000 to \$30,000 and get credit for any additional power that’s not used
- Location – has visible neighborhood location been considered? May encourage residents to sign up
  - No location has been selected, but audience is free to provide ideas for location
  - Value in knowing and being able to see the panels – there’s a sense of pride and community
- If “community” aspect fades, would Nelson Hydro still continue with project?
  - Nelson Hydro won’t pursue project without financial support from public
- Could Selkirk College be involved in the project?
- Can solar array be sited on water?
- Vancouver Coop – SolShares
  - Any BC resident can invest in SolShares
  - Carmen will look into this
- If the model is an upfront investment leading to a credit on hydro bill, how long will credit last?
  - Typical contracts extend from 20 to 25 years
  - Credit is the avoided cost of power purchase, but power purchase costs can’t be definitively known
  - As electricity rate increases, so does credit recouped
- Any thought to creating a vertical system?
  - Not a known system – just brainstorming
  - Willing to look at available designs
- If everyone invests in a solar, what impact will it have on peak energy demand
  - Peak demand occurs in summer and winter
  - Solar will affect summer peak, but not winter peak

- Wouldn't it be better to invest in small hydro systems (i.e. Cottonwood Creek) than solar
  - Cottonwood creek does not have good potential for micro hydro
- What's the economy of scale for building a solar garden rather than individual rooftop installations
  - \$4000 for capital costs for 4 panels on rooftop, still need to supply labour
  - Similar cost for solar garden, but garden is installed cost and will be more optimally located
- Important to determine which effort is more productive – individual roofs or solar garden?
  - 30% more costefficient to have panels located in solar garden
  - Solar garden benefits those customers who do not have a roof option
- Who will maintain solar garden, how much will it cost, who will pay those costs?
  - Nelson Hydro will take care of maintenance costs – in the process of determining maintenance cost forecasts
- Do all rate payers cover maintenance costs or just solar customers:
  - Still in the process of determining how this will work
- Is District Energy (DE) comparable in dollar value to solar garden on a per watt basis?
  - Business case for DE will be brought forward in June
- Are there federal or provincial grants available for this?
  - No grants available at this time, there could be other funding opportunities that would bring down the cost of the project for the customer

**RECAP OF SMALL GROUP DISCUSSION:**

- If the same investment were put into energy efficiency, would the payback be better?
  - EcoSave retrofits program covers efficiency measures
- New panels that make up roadways – hexagonal interlocking panels
  - Department of highways in US in looking at this
- In Nelson, there is strong spirit for making community things happen
  - Could be investors in the community, so that people who can't afford solar would still be able to have a piece of this – similar to Nelson Commons
- Trying to find out more about green bonds or if this is a carbon offset system
  - Could have system so that people can buy in and gift a certain amount to someone who can't afford solar
- Project is an opportunity to get used to doing things differently
  - Opportunity to expand energy options
  - Will be a way to get used to a new reality
  - Nelson project can be replicated on larger scale in other communities
- Has SD8 property been considered on North Shore
- Early adopters will benefit in long term
- Cost of putting carbon into atmosphere is often left out of the business case and economics
- Is there an estimate for return on array? i.e. dollar values produced by the array

- Energy production simulation on 50 kW array – approx. 61,000 kWh per year, equal to approx. \$5500 per year
- Pioneering spirit in the room
  - In BC, rural BC is struggling, only hope to survive rural lifestyle is projects like this
  - Need to be less dependent on major corporations like power – need distributed power
- Coffee Creek
  - Nelson used to have license to get power from coffee creek
  - Potential in water system

## **OPINION POLL RESULTS**

The following information has been compiled from the emails and opinion polls that were collected from the Solar Garden Conversation Café on April 8, 2015.

### **Location Ideas**

- Johnson Rd. up-slope or along lakeshore (reflection from water advantage)
- Upper corner Prince Phillip Park
- On roadways (part of the road)
- CP Yard (2)
- Selkirk College roof (2)
- Transfer site (7)
- Airport (5) –one comment: visibility for promotion and education purposes
- Remote flying location in Blewett (by canals)
- Lakeside park (shade shelters)
- On the orange bridge
- Parking lots
- Roof tops (6)
- City Parkade (build a layer on top, put panels that)
- 2 array locations, one for demo use with a picture of the real site in a visible location, 2<sup>nd</sup> site where max. energy can be produced
- Top of Svoboda Road
- Shore Acres
- Not in potential human use spaces (e.g. waterfront)
- North Shore – south aspect
- Above winter cloud level
- Above Davies St. Park
- Elephant Mtn. (4)
- Whatever makes the most sense (5)
- 10<sup>th</sup> Street empty residential lot (sunny all day) (Owner of lot may sell/lease, contact information provided)
- Not a green field site, no loss of habitat to the extent of practical

- Top of new Co-op building (2)
- Out of town (2)
- Walmart roof
- Lot next to Walmart
- Krestova
- My roof (no other information provided)
- School roofs
- Roof of 310 Ward St. (City Hall) or west face of building
- Floating on lake (3)
- Roof of Post Office
- Bonnington – Power Generation site
- Not the transfer site (2)
- Parking lots...look at everything before settling on a location. This may also mean home rooftops that are in productive zones. Don't decide until you've adequately explored new relationships between the sun limits.

### **Comments**

- Full support – Awesome, Thanks for showing leadership, Bravo!
- Learn from other communities
- I really think we need to move forward on this as we will need it even more in the future and this sounds like a great partnership as a start, I applaud the city for being willing to give it a try
- Super informative, and great to see so many people turn out. I am excited to see a local and renewable source of energy become a reality one day in Nelson. In my opinion, a few comments last night were getting too hung up on “how many houses will this power”. I always say...the ocean is nothing but many tiny drops of water
- Full support
- Ask council to move forward, it is about future energy, our kids are watching
- Go for it
- Thanks for a great community event
- I support solar energy even though there is no legitimate business case to do so. Nevertheless, I still feel good about these types of projects
- Tom Rand-Morgan Solar – Google it, Thanks for this!
- Much to think about, thanks
- I want panels made in Canada
- I don't think this makes sense, too much cloud cover
- How about offer homeowners a comparison in an ideal neighborhood
- Great conversation to start how the town can be more efficient
- Look into rack tracking
- It's about time
- This is so great, may we come together as a community and make this happen

- Climate change makes renewable energy crucial! I am willing to do whatever it takes help Nelson make this vital transition. I'd like to see us do this in a way that would be replicable, so we could set a precedent other cities and towns could follow
- Since hydro power itself is renewable, I'm leaning toward the idea that a solar garden need to make economic sense in the absence of other compelling reasons
- 15 years seems too long, I would like to see parity in under 10 years
- Land is expensive and high profile sites are valuable for other uses, thus wouldn't it make most sense out at Bonnington where we own the land
- If I were to invest in this, the panels would preferable be Canadian made, and made of non-toxic materials
- I look forward to hearing more details as this program develops
- Provide options to accommodate those with lots of money plus for those who would need a payment plan
- Ideas: Collaborate with Selkirk College, VREC – Vancouver Renewable Energy Co-op, Sol-Share Project, Building on Water: BCSEA webinar
- I support the solar gardens as a demonstration project and a catalyst for other renewable projects both on a community and private level. Thanks for instigating.
- I am willing to invest in a community solar power system for the future and also feel that solar power should become part of the building code for new homes and buildings.
- The hard economics of solar in our area are not here yet but there are positive/negative intangibles that could be learned from other communities' experiences with community solar gardens. Getting these experiences circulated to interested Nelson residents should be beneficial.
- Make it safe for people to visit the plant and they can see for themselves the success of the program. Add to that public reporting measure like the False Creek "lights" or a column in the paper that graphically shows the power produced and the number of participants etc. chooses the criteria that will help create a tipping point toward sun power and show them to the community.

### **Concerns**

- Security – vandalism of the panels
- Would be good to see the approximate rate of returns that people might see (e.g. 3% annual return for 20 years, 6%?)

### **Questions asked by the community, from the comment section of the opinion poll:**

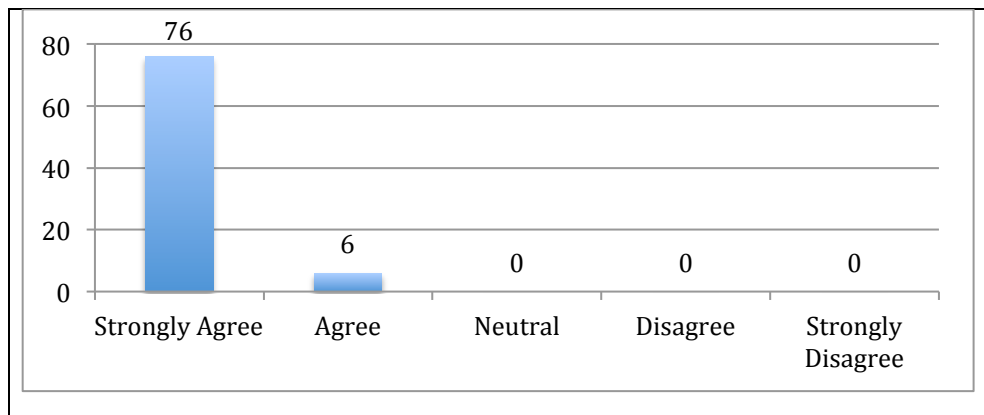
(Answers provided below each question)



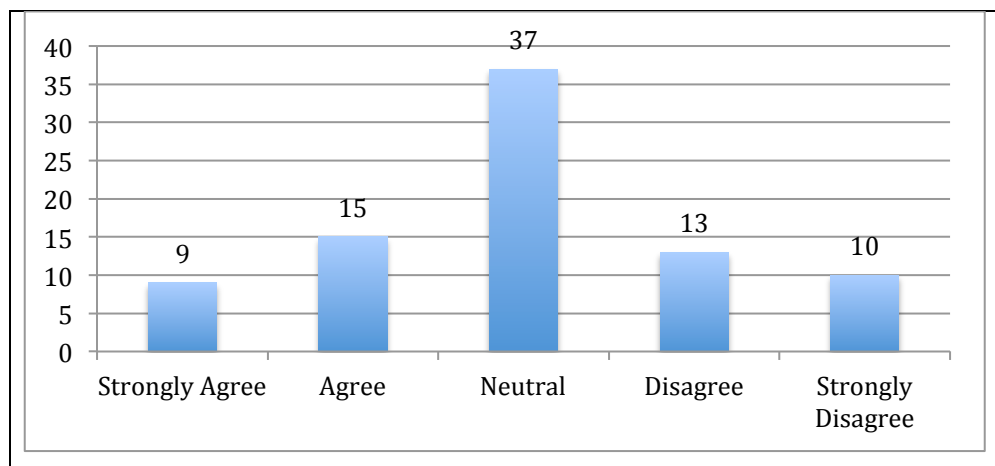
- Why here? Why not in Alberta near coal plants, here in Nelson we already have green power.
  - It is important that we tie into the Nelson Hydro grid for this project as that avoids transmission costs, having the solar array here in the community supports the objectives for this local renewable energy project. We could invest in solar in another location like Arizona but then it is a purely a business project not a community project.
- Why didn't the pressure reducing stations get converted to hydro plants if this investment makes sense?
  - We have looked at several Pressure Reducing stations and one of them has some potential for economic power generation. When that station is upgraded the plan is to include enough space for a future electric generator.
- What if we move?
  - The plan is the solar credit can be transferred from account to account within the Nelson Hydro service territory; the options for moves out of the area are still being determined.
- If "we" go ahead, we buy less from BCH/FortisBC, to that extent they have extra energy to market on other markets, can we (Nelson Hydro) negotiate profit sharing to reduce costs?
  - No we have power purchase contracts in place that provide low cost energy.
- Is the site selection controlled by the city?
  - Nelson Hydro is a part of the city so yes the site selection is controlled by the city by pragmatically as a Nelson Hydro decision on feasible spots, and from a zoning land use perspective the solar garden must be compatible with land use plans.
- Why is there a termination of the contract 20-25 years, what happens then? Are we simply leasing a portion for a finite period?
  - Yes, subscribers would be purchasing the solar energy produced for the term of the contract, which would likely be 25 years.
  - At the end of the contract Nelson Hydro would take over the Solar array including any power generation benefits as well as maintenance, upgrade, and replacement costs, during the contract period Nelson Hydro will budget for annual maintenance of the solar install.
- What about vertical solar?
  - Solar design will be determined once a location has been selected; a variety of designs will be looked at.
- If the model is to invest upfront, how long do you get credit for?
  - Both upfront payments and payments plans will offer the same contract for receiving the solar credit, this would likely be 25 years.
- I don't live in Nelson, but am looking to invest in green. Any possibility for green bonds or offsets?
  - This program will only be offered to Nelson Hydro customers at this time.

**RESULTS FROM THE QUESTIONS ON THE OPINION POLLS:**

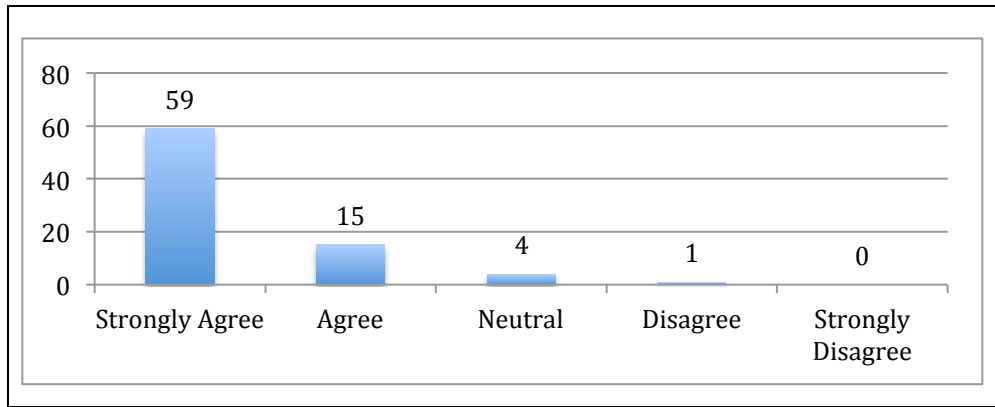
1. Developing local renewable energy is important to me.



2. It is important to me, as a potential customer, that the solar community garden is located in a visible location in Nelson.

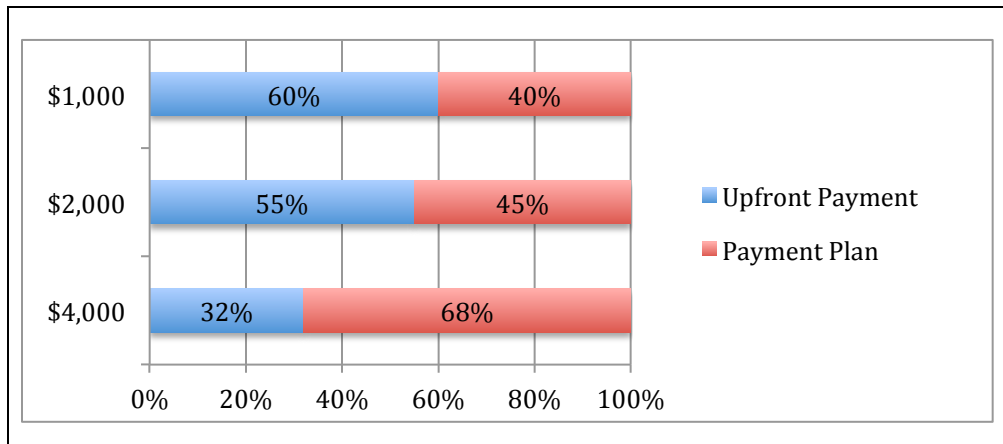


3. Maximum solar energy production is more important to me than a visible location.



4. Depending on how the buy in model is structured, the amount would vary. Please choose which best suits how you would invest given each of the three following examples: (these are only examples, buy in costs may be different)

- \$1,000 investment:     *Single, upfront payment*    or     *Monthly payment plan*  
 \$2,000 investment:     *Single, upfront payment*    or     *Monthly payment plan*  
 \$4,000 investment:     *Single, upfront payment*    or     *Monthly payment plan*



\*Note: This graph indicates that if the investment amount were a \$1,000 that 60% of those asked would choose to pay upfront, however if the investment were a \$4,000 option 68% would choose to use a payment plan.

5. The cost for solar energy will be above that of existing hydro power rates and may be at parity in 15 years, I would still be interested in investing:  
(e.g. If, 1 panel cost: \$50/year, approx. solar production may be 300 kWh/year (at current electricity rate, your credit would be approx. \$30/year)

