

# Community Shared Solar Research & Program Design Options for the Town of Banff



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## **Executive Summary**

In 2015, the Town of Banff launched a new Solar Photovoltaic (PV) Production Incentive program to encourage property owners to install solar photovoltaic systems. This report explores and evaluates options for the design of a community shared solar project, which could expand the number of people able to participate in solar energy generation in Banff, and benefit from the Solar PV Production Incentive.

Community shared solar is a solar photovoltaic project that provides power and/or financial benefit to multiple community members. In some community shared solar models, participants buy or lease a portion of a large solar system, and are able to use their portion of the solar energy generated against demand on their own electricity bill, as if they had a solar system on their own rooftop. In other models, individuals and/or organizations pool their financial resources to establish a community-sized solar project, and receive financial benefits proportional to their investment in the project. Community shared solar projects greatly expand the potential for citizens, businesses and organizations to participate in the generation of solar energy in their community, as citizens can participate in such projects regardless of whether they own property or have a viable solar resource on their property.

There are a number of different organizational and financial models that have been successfully used to develop community shared solar projects in Canada and the United States, including models led by utilities, co-operatives, non-profit organizations and municipalities.

In a utility-led community shared solar model, a utility owns or operates a solar project that is open to voluntary ratepayer participation. Utility customers purchase shares in the solar installation and the electricity produced by the system. Customers then receive a credit on their bills for the electricity produced by their share in the solar array, which is called 'virtual net metering'. Nelson Hydro in Nelson, B.C., is currently developing such a utility-led community shared solar project.

Solar energy cooperatives are an organizational and financial model that has been used to establish and administer the majority of community-based solar PV generation projects in Canada. In this model, a group of people establishes a cooperative organization according to the laws and securities legislation in their jurisdiction for the purpose of creating a solar PV generation project. Members of the public in the jurisdiction can become members of the solar co-op, and can choose to purchase shares in a solar PV generation project. Solar co-op members receive regular dividends based on the amount of solar energy being generated by the solar project and the number of shares in the project they have purchased. Some solar energy co-operatives have been able to arrange to have shares in solar projects be registered retirement savings plan (RRSP) and tax-free savings account (TFSA) eligible

investments. Recently, a group of Albertans has created the Alberta Solar Co-op, whose mandate is to support the development of community-scale shared solar projects in communities around Alberta.

A non-profit organization may facilitate a community shared solar project by organizing and administering a project that shares benefits with participating members. In this model, the non-profit organization may be the host organization for the solar array, or the solar array may be located at another location. For non-profit organizations, ownership of a renewable energy project can generate additional income and/or energy savings, which can be used to pursue their mandates. Examples of non-profit organizations that are involved in community shared solar projects are faith-based organizations, housing associations and co-operatives, cultural associations, environmental organizations, professional associations and charities.

In a municipality-led community shared solar model, a municipality makes a municipal building or property available for a community-shared solar project, sometimes through a lease. In some cases, the municipality's involvement may be limited to providing or leasing space on a building or property, while all project coordination is undertaken by another entity such as a cooperative or company. In other cases, the municipality may take a more active role in coordinating the project construction, sale of shares and long-term administration of the project. One of the potential challenges for a municipal-led community shared solar project is that the project can be a strain on municipal project organizers, especially if the majority of project coordination falls to municipal staff.

Under current provincial and municipal policies and regulations, it appears that collaborating with the Alberta Solar Co-op to work to establish a Banff community shared solar project on a municipal building would be the most practical and feasible model for a large-scale community shared solar project. Such a project would be a co-operative led model, with elements of a municipal-led model. This initiative may be able to benefit from new provincial funding that has been made available for municipal solar projects.

The Alberta Solar Co-op has demonstrated interest in supporting Banff residents to explore options for developing a community shared solar project. The opportunity to create a Banff community shared solar project under the organizational and financial structure of the Alberta Solar Co-op would likely significantly reduce administrative and financial barriers to using a co-operative model. Under such a model, project leadership and coordination would be carried out by members of the Alberta Solar Co-op and a local team consisting of a local project board of directors and interested volunteers. The Alberta Solar Co-op may choose to hire a private company to help provide technical guidance, oversight and administration for tasks such as designing the solar array, arranging and obtaining regulatory approvals, overseeing the construction phase of the

project and planning and determining the funding which must be set aside each year to cover project close-out at the end of its lifecycle.

The Alberta Solar Co-op would enter into a longer-term agreement with the institution or business where the community-shared solar project is located. This agreement would specify how the benefits and costs of the project would be distributed. Banff residents who purchase shares in the community shared solar project would receive financial dividends at an established frequency, in relation to the number of project shares they purchase, and the amount of electricity produced by their share of the project. These dividends may be paid from the Alberta Solar Co-op to shareholders via a cheque on an annual, semi-annual or other established basis. If the Town of Banff offers the Solar PV Production Incentive to a Banff Community Shared Solar Project, this Production Incentive would only be available to Banff residents who participate in the project.

There are many potential locations for a community shared solar project in Banff. One potential location for a project is the roof of the Fenlands Recreation Centre, which is owned by the Town of Banff. The Fenlands Recreation Centre is a large, new building with a new roof that has a great solar resource and roof that could support a rack-mounted solar PV system where necessary. If the Town of Banff acts as a host location for a solar project, and is able to access funding from the new provincial municipal solar incentive, the economic feasibility of a project at this site would likely be favoured over other projects where such provincial incentive funding is not available. There are also numerous other potential locations for a community shared solar project in Banff, including the new Banff Elementary School and a number of commercial buildings.

Although it appears that the most viable option to create a community shared solar project that is open to investment from all Banff residents is through a solar energy co-operative led model with collaboration from the Town of Banff, there may be opportunities for smaller-scale community shared solar partnerships between commercial businesses and residents.

If the Town of Banff wishes to support the creation of community shared solar projects, it would be helpful for the Town to make community shared solar projects eligible to apply for the Solar PV Production Incentive. The Town may wish to prioritize community shared solar projects under the Solar PV Incentive Program, considering that such projects have the potential to involve and benefit a much greater number of Banff residents than individual applications to the incentive program.

An Alberta Solar Co-op led community shared solar project in Banff will take some time to develop, and will likely not be ready for investment from Banff residents until at least 2017. In the meantime, there are opportunities for the Town of Banff to encourage and incentivize Banff residents and businesses to partner to create smaller-scale community shared solar initiatives.

Following are some recommended next steps for the Town of Banff to undertake in 2016 and 2017 to further support and promote the development of community shared solar projects.

## 2016

- Start a local dialogue about community shared solar and provide information about the concept at the Banff Connect 2016 event. Generate project support by proactively addressing public questions and concerns, and encouraging public participation in the project.
- Modify the Solar PV Production Incentive program to prioritize community shared solar projects that include participation of and benefit a minimum number of Banff residents. This may encourage the creation of some small-scale community shared solar projects in the short-term.
- Form a project team to lead further exploration of options for a community shared solar project in collaboration with the Alberta Solar Co-op. Coordinators of similar initiatives elsewhere recommend that the project team include a combination of municipal officials, staff and community volunteers who are interested in the project. It may be wise to also include representatives from the Alberta Solar Co-op in this project team.
- Continue to pursue options to finance and install a solar array on the Fenlands Recreation Centre. Explore options to transfer the solar array to a locally-based community shared solar project of the Alberta Solar Co-op in the near future and/or to develop a future phase of the building's solar installation as a community shared solar project.
- Continue to identify potential community-shared solar project sites and evaluate the potential benefits to the municipality and the broader community of a community shared solar project at specific sites.

## 2017

- Follow-up on work conducted in 2016 to support the development of a large community shared solar project in collaboration with the Alberta Solar Co-op.
- Continue to support the activities of the project team formed to explore and lead development of a large community shared solar project in Banff.
- Evaluate the effectiveness of any prioritization of community shared solar projects in the Solar PV Production Incentive, and make any adjustments, if required.

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## 1. Introduction and Background

In 2015, the Town of Banff launched a new Solar Photovoltaic (PV) Production Incentive program to encourage property owners to install solar photovoltaic systems, by offering a financial production-based incentive to qualifying property owners over seven years. This program is being funded from the Town's environmental reserve, which is replenished by municipal franchise fees paid monthly by Fortis to the Town of Banff.

There was a great deal of community interest in this program during its first year, with 47 residential and commercial properties applying for the Solar PV Production Incentive. A lottery system was used to choose 16 successful applicants in 2015. The 16 solar PV systems have a combined projected solar PV generation capacity of 100 kW.

A number of applicants to the Solar PV Production Incentive did not have ideal solar resources available on their property, but still applied to participate in the program. Also, given that the program is designed to target residential and commercial property owners, there are numerous Banff residents who do not own property, or who live in condominiums, who are currently unable to participate in the program.

The installation of solar arrays by residents and businesses that were part of the first year of the Solar PV Production Incentive has generated further interest from other community members who are interested in participating in solar energy generation.



**Figure 1** Residential solar array installed on Kootenay Avenue with support from the Solar PV Production Incentive.

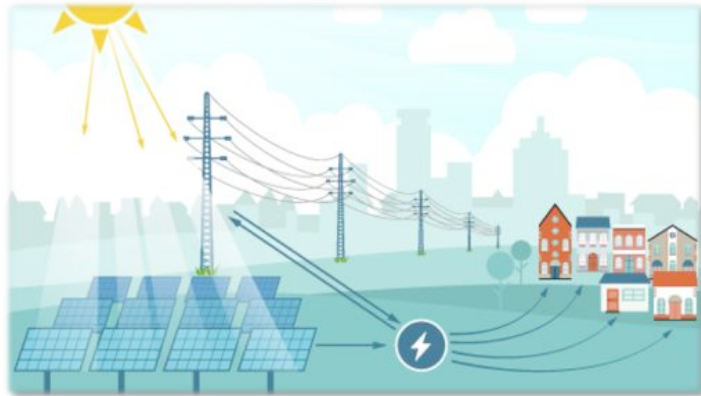
## 1.1. Objectives

The Town of Banff is interested in researching and exploring options for the design of a community shared solar project, which could expand the number of people able to participate in solar energy generation in the community, and benefit from the Solar PV Production Incentive. The main objectives of this project are the following:

- Research and document how a community shared solar project could be established in Banff, within the current regulatory framework in Alberta;
- Propose program design options for how a community shared solar project could work in the Town of Banff; and,
- Connect with and learn from people who have established and are establishing similar community shared solar projects in Canada and the U.S.

## 2. What is Community Shared Solar?

Community shared solar is a solar photovoltaic project that provides power and/or financial benefit to multiple community members. In some community shared solar models, participants buy or lease a portion of a large solar system, and are able to use their portion of the solar energy generated against demand on their own electricity bill, as if they had a solar system on their own rooftop. In other models, individuals and/or organizations pool their financial resources to establish a community-sized solar project, and receive financial benefits proportional to their investment in the project.

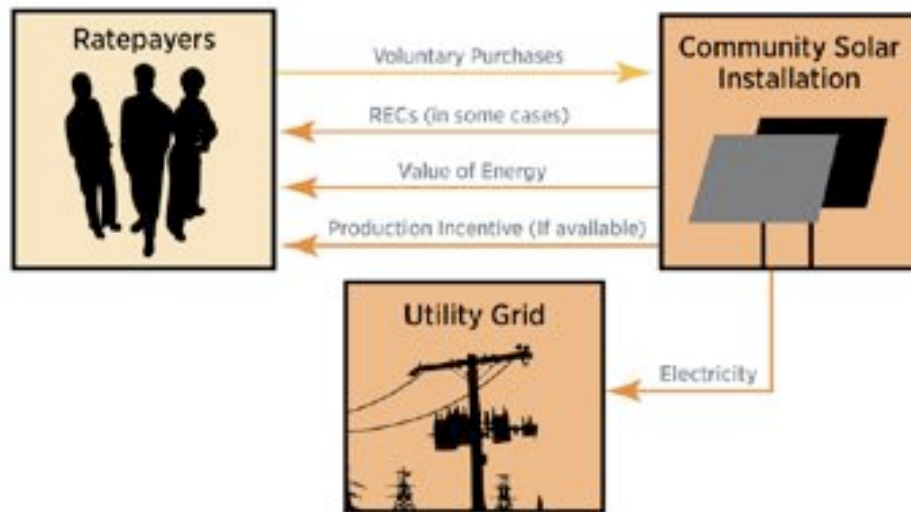


Source: U.S. Department of Energy 2016

Community shared solar projects greatly expand the potential for citizens to participate in the generation of solar energy in their community, as citizens can participate in such projects regardless of whether they own property or have a viable solar resource on their property. The U.S. National Renewable Energy Laboratory (NREL) estimates that in the United States, approximately 49% of households and 48% of businesses are

unable to host a solar PV system due to lack of access to roof space (rental situations) or insufficient roof space with good solar exposure.<sup>1</sup>

Participants in a shared solar project can include individuals, businesses and non-profit organizations. Figure 2 illustrates the structure of a community shared solar project. Table 1 summarizes the main people and/or entities involved in a community shared solar project, and the roles they play.



**Figure 2** Basic structure of a community shared solar project. REC is a renewable energy certificate. (Source: NREL 2012)

**Table 1** Who is involved in community shared solar and what roles do they play?

Person or Entity	Description of Role in Community Shared Solar
Site Owner	Owner of the property on which the community shared solar project is located. The owner may be a municipality, other public entity, or a private entity such as an individual or a business.
Participants	Community members, businesses and/or organizations that participate in a community shared solar project by purchasing an ownership share in the project, and then realize financial or energy benefits proportional to their investment in the project.
Solar System Owner	The solar PV system is most often owned by the group of participants that have invested in the project. The solar system may be owned by a utility or private business.

<sup>1</sup> NREL, *Shared Solar: Current Landscape, Market Potential, and the Impact of Federal Securities Regulation*, 1.

Project Coordinator	An organization or group of people who lead and administer the project. Some aspects of project coordination and development may be contracted to a separate company or organization.
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### 3. What are the Benefits of a Community Shared Solar Project?

There are many potential benefits to establishing a community shared solar project in Banff, including the following:

- Participants in a community shared solar project can include many people who may not otherwise be able to feasibly install solar panels on their own homes or businesses, including those who do not have sufficient solar resources on their own homes, people who rent housing, and condominium unit owners. In Banff, the creation of a community shared solar project would increase the proportion of taxpayers who are eligible to receive the Town Solar PV Production Incentive.
- Community shared solar projects tend to have a lower per kWh cost given their larger size and the resulting efficiencies and economies of scale that can be achieved.
- A community shared solar project would likely be larger than individual residential or commercial solar installations and would increase production of renewable energy within the community.
- Larger solar projects with a greater economy of scale can reduce the cost of incentive programs, such as the Solar PV Production Incentive. This would increase the number of projects and participants the Solar PV Production Incentive can support.
- The minimum cost to participate in a community shared solar project is most often less than the cost to install a solar array on an individual house or business, which lowers the economic barrier to participate in generating solar energy.
- Community shared solar results in more electricity being generated and managed locally, which supports more local job creation.
- The opportunity to directly participate in the generation of solar energy through a community shared solar project can play a powerful role in increasing public awareness, knowledge and support for solar energy generation, and energy awareness in general, including energy efficiency and energy use impacts. Participating in a community shared solar project enables more community members to place their 'head and heart' in renewable energy.
- Increased community engagement and participation in the production of renewable solar energy would support many environmental goals in the Banff Community Plan,

including reducing Banff's ecological footprint and being an environmental role model for communities around the world.

- A community shared solar project would support efforts by the Town of Banff to work towards a goal of 100% renewable energy use by 2050 and to encourage community members to work towards generating and using more renewable energy. A recent report researched by Urban Systems for the Town of Banff prioritized further investigation of solar PV opportunities to meet these goals<sup>2</sup>.



**Figure 3** Residential solar installation on Jasper Way, Banff. Community shared solar could increase the number of Banff residents who are able to directly participate in solar PV energy generation.

#### **4. Community Shared Solar Project Models**

There are a number of different organizational and financial models that have been successfully used to develop community shared solar projects in Canada and the United States. This section describes the main characteristics and gives examples of four main models led by utilities, co-operatives, non-profit organizations and municipalities.

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<sup>2</sup> Urban Systems, *Town of Banff: Working to the Goal of 100% Renewable Energy*, 3.

## **4.1. Utility-Led Community Shared Solar**

In a utility-led or utility-sponsored community shared solar model, a utility owns or operates a solar project that is open to voluntary ratepayer participation. An advantage of the utility-led community shared solar model is that utilities usually have the legal, financial and program management infrastructure to organize and implement a shared solar project<sup>3</sup>.

Utility customers purchase shares in the solar installation and the electricity produced by the system. Customers then receive a credit on their bills for the electricity produced by their share in the solar array, which is called 'virtual net billing' or 'virtual net metering'. Virtual net metering allows net metering credits generated by a single renewable energy system to offset electricity load at multiple retail electric accounts within a utility's service territory. In this model, usually the utility or a third party owns the solar system, and the participating customer does not have an ownership stake in the system.<sup>4</sup>

The development of utility-led community shared solar projects in the U.S. has been supported through the introduction of virtual net metering legislation at the state level, which often requires utilities to offer virtual net metering services to customers. Ten U.S. states and Washington D.C. have all adopted legislation which enables virtual net billing. In Canada, there are currently no jurisdictions with virtual net billing legislation.<sup>5</sup>

Utility-led community shared solar projects are quite common in the United States where approximately 25% of electrical utilities are locally-owned by cities, counties or local co-ops<sup>4</sup>. In Canada, utility-led community solar projects are much less common, with one utility-led project currently being developed in Nelson, B.C by Nelson Hydro. This project will employ virtual net billing.

### **4.1.1. Nelson Community Solar Garden Project**

An example of a utility-led community shared solar project in Canada is Nelson Hydro's Community Solar Garden Project. The Nelson Community Solar Garden Project is being led, developed, marketed and managed by Nelson Hydro, which is a municipal-owned utility. The solar installation will be located at Nelson Hydro's Bonnington Generation Station in Nelson. The solar array will be owned by Nelson Hydro and will feed into the Nelson Hydro grid to be distributed to customers. Nelson Hydro will be responsible for all repairs, maintenance and insurance required for the panels. The

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<sup>3</sup> NREL, *A Guide to Community Shared Solar: Utility, Private, and Nonprofit Project Development*, 8.

<sup>4</sup> NREL, *A Guide to Community Shared Solar: Utility, Private, and Nonprofit Project Development*, 8.

<sup>5</sup> People, Power, Planet, *Community Solar Gardens*.

community solar garden currently being developed will be between 50 and 112 kW in size (200 to 450 panels), dependent upon the number of panels purchased by Nelson Hydro customers.<sup>6</sup>

Nelson Hydro customers are able to voluntarily purchase shares in the community solar garden, and then receive credits on their electricity bills in proportion to their investment for the term of the 25-year contract. The credits customers receive are calculated based on the kWh produced by the panels the customer has purchased in the solar array, and are valued at the current Nelson Hydro electricity rate. The value of the kWh produced by the panels will increase over time as the electricity rate increases. Nelson Hydro estimates that the payback period for investment in the solar garden will be 12 to 15 years; however this is not guaranteed<sup>7</sup>. A contract agreement between the City of Nelson and Nelson Hydro customers specifies financing details, amortization periods, transfer options and rates for the community shared solar program. Sales of shares in the Nelson Community Solar Garden Project began in November 2015, and Nelson Hydro plans to construct the solar installation in the spring of 2016.<sup>8</sup>

Nelson Hydro has established two methods of financing for customers who wish to purchase shares in the community solar garden. Customers can choose to pay the entire cost for the panel(s) they wish to purchase up-front at the start of the project. Alternatively, customers can set up a payment plan using financing through their utility bill with Nelson Hydro or obtain a loan from the Nelson & District Credit Union. The costs for either of these financing options is a 3.5% fixed interest rate and loans can be set up for a 5- or 10-year term.<sup>9</sup>

Nelson Hydro has focused on strong community engagement in developing its community solar garden. Nelson Hydro held a community meeting early in the solar garden decision-making process to describe what a solar garden was, how one works, and to involve community members in an open discussion about interest in the project, where people felt the best location for the solar garden would be and people's preferences for financing options. A survey was also distributed to interested residents who attended the community meeting and via email. Project coordinators for the Nelson Community Solar Garden emphasize that strong and on-going community engagement has been key to a successful community-shared solar project.<sup>10</sup>

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<sup>6</sup> Nelson Hydro, *City of Nelson Community Solar Garden Project Plan*.

<sup>7</sup> Proctor, C. *Personal communication, March 2016*.

<sup>8</sup> Nelson Hydro, *Community Solar Garden*.

<sup>9</sup> Nelson Hydro, *Nelson Community Solar Garden - System One FAQs*.

<sup>10</sup> Love, Alex. *Personal communication, October 2015*.

#### **4.1.2. Sacramento SolarShares Program**

In California, the Sacramento Municipal Utility District (SMUD) has been operating its SolarShares Program since 2008. In this program, the SMUD buys output from local, community-scale photovoltaic systems under 20-year power purchase agreements, and then re-sells the solar power to customers that participate in the SolarShares Program. Participating customers purchase shares in the community PV systems, and have their electricity bills credited for the amount of energy their solar share produces through virtual net metering. Customers are paid full retail per kWh price for the power their solar share produces. This program is subsidized by the California Solar Initiative, which helps facilitate that the utility pays full retail electricity price to SolarShares participants. As of 2012, the program had maintained a stable enrollment of approximately 600 customers<sup>11</sup>.

In the SolarShares program, customers pay a fixed monthly fee to participate in the program, and receive monthly kWh credits for the estimated output of their solar subscription<sup>12</sup>. Although customers entering the program pay a premium for the electricity being generated through the solar PV system, the rate for solar is locked in upon enrollment, which enables the investment in solar to act as a hedge against future electricity price increases<sup>10</sup>.

#### **4.2. Solar Energy Cooperatives**

A cooperative is an organization that is collectively owned and democratically controlled by its members. In a cooperative, all members have a say in decision-making processes on the basis of a one-member, one-vote principle, regardless of the shareholdings of each member.

Solar energy cooperatives are an organizational and financial model that has been used to establish and administer the majority of community-based solar PV generation projects in Canada. Approximately 95% of renewable energy generation cooperatives in Canada are found in Ontario, due to supportive provincial policies.<sup>13</sup>

The basic way a solar energy cooperative works is that a group of people establish a cooperative organization according to the laws of their jurisdiction for the purpose of creating a solar PV generation project. In Canada, regulations concerning the establishment of cooperatives are a provincial jurisdiction. Cooperatives are run by a volunteer board of directors, meet at a specified frequency and conduct their financial

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<sup>11</sup> NREL, A Guide to Community Shared Solar: Utility, Private, and Nonprofit Project Development, 14.

<sup>12</sup> SMUD, *SolarShares: Solar for Everyone!*

<sup>13</sup> People, Power, Planet, *Co-operatives*.



and organizational affairs according to the one-member, one-vote principle. Cooperatives must comply with provincial securities legislation.

Residents of a particular jurisdiction can become members of a solar co-op, and then can choose to purchase shares in a solar PV generation project. Solar co-op members receive regular dividends based on the amount of solar energy being generated by the solar project and the number of project shares they have purchased. Some solar energy co-operatives have arranged to have project shares be registered retirement savings plan (RRSP) and tax-free savings account (TFSA) eligible investments.

In Canada, prior to a solar cooperative being able to make shares in a project available to investors, the co-op must create a document called an offering statement that describes the risks and benefits of investing, and how dividends will be paid. The provincial securities commission must approve this offering statement prior to shares being made available to investors.

#### **4.2.1. SolarShare Co-operative**

SolarShare is a provincial solar energy cooperative in Ontario with more than 1,000 members that has developed solar PV projects around the province with a total installed capacity of more than 5 MW of electricity. Membership in the SolarShare Co-operative is limited to residents of Ontario; a lifetime membership in the Co-op costs \$40. Members of the SolarShare Co-operative can purchase 5-year solar bonds with a minimum investment of \$1,000 and receive 5% annual interest rate, or 15-year solar bonds with a \$10,000 minimum investment and 6% annual interest rate. The 5-year bonds are RRSP eligible. SolarShare Co-operative is able to offer stable rates of return to participating investors because the Ontario Power Authority has agreed to purchase power from the community shared solar projects at a set rate for 20 years through a power purchase agreement. SolarShare was founded in 2011 by the Toronto Renewable Energy Co-op<sup>14</sup>.

#### **4.2.2. Ottawa Renewable Energy Co-operative**

The Ottawa Renewable Energy Co-operative (OREC) formed in 2012, and currently has over 380 members across Ottawa. OREC has 13 approved solar projects ranging from 10 to 400 kW in size with a total generating capacity of 1 MW. OREC has received approximately \$3.5 million in investment from Ottawa investors during this time<sup>15</sup>.

OREC enters into 20-year lease agreements with property owners of large commercial, institutional and non-profit buildings in Ottawa to use their land or rooftops for the

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<sup>14</sup> Solar Share, *Solar Share: Invest in a Brighter Future*.

<sup>15</sup> OREC, *OREC: Our Community-Owned Power Model*.

installation of renewable energy systems that are owned by the Co-operative's members<sup>14</sup>.

Eastern Ontario residents are eligible to become members of OREC for \$100. Membership fees support the existence of the cooperative organization, project development and advocacy efforts to support community-shared solar energy generation. Members of the cooperative can purchase shares in solar projects, with a minimum investment of \$2,500 and a maximum investment of \$100,000, in increments of \$500. Revenue generated from the co-op's solar projects is distributed to members in proportion to the size of their investment. The co-op sells all power it generates to the Ontario Power Authority through 20-year feed-in tariff contracts, which enables OREC to guarantee that it will fully repay invested capital over a 20-year period in addition to a reasonable rate of return, with a target of 5% annual interest.<sup>14</sup>

#### **4.2.3. Green Energy Co-operative of Ontario**

The Green Energy Co-operative of Ontario (GECO) incorporated in 2012 and has a portfolio of 18 solar projects in progress across Ontario with a total generation capacity of 6.2 MW<sup>16</sup>. Ontario residents are eligible to become members and shareholders in the cooperative. Membership in GECO costs \$10 and the minimum amount that can be invested in a particular project is \$400.<sup>16</sup>

In the majority of its solar projects, GECO has partnered with the building owner where it has established a solar array, so that the building owner owns half the system, and GECO owns half the system<sup>17</sup>. This provides the building owner with the opportunity to share the financial investment and benefits of installing a solar system. GECO enters into a 20-year property lease with the building owner for the duration of the 20-year feed-in tariff contract it holds with the Ontario Power Authority. The majority of GECO's projects are between 100 kW and 500 kW in size.<sup>16</sup>

#### **4.2.4. Saskatchewan Environmental Society (SES) Solar Co-op**

The Saskatchewan Environmental Society (SES) Solar Co-op has recently been incorporated and is in the process of developing its first community-based solar projects in and near Saskatoon. Jason Praski, a volunteer with the SES Solar Co-op, has found that the co-operative model has been a good fit to bring together community members who are interested in working together to develop an organizational structure and pool their financial resources to create financially viable solar PV generation projects<sup>18</sup>.

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<sup>16</sup> Green Energy Co-operative of Ontario, *Welcome to GECO - Community Power*.

<sup>17</sup> Epp, Kevin. *Personal communication, January 2016*.

<sup>18</sup> Praski, Jason. *Personal communication, January, 2016*.

The SES Solar Co-op has set a membership cost of \$50, and shares in its solar projects cost \$950. The solar co-op will sell electricity into the grid, and return the net income generated to share owners. Share owners will receive a cheque by mail each year from the co-op for the revenue generated by each member's share(s) less expenses incurred in the operations of the solar installations. The SES Solar Co-op's goal is to provide an average return on investment of at least 2% at the start, with an expectation that this percentage will increase with time<sup>19</sup>. One of the biggest challenges for the SES Solar Co-op to date has been to achieve this financial goal within the current electricity policy framework in Saskatchewan<sup>18</sup>.

#### **4.2.5. Alberta Solar Co-op**

Recently, a group of Albertans has created the Alberta Solar Co-op, whose mandate is to support the development of community-scale shared solar projects in communities around Alberta<sup>20</sup>. The Alberta Solar Co-op is currently working to develop a community shared solar project in Starland County, Alberta. Alberta Solar Co-op board members have expressed interest in being involved in a community shared solar project in Banff, as described further in Sections 5 and 6.

#### **4.2.6. Other Special Purpose Entities in U.S.**

A cooperative is one 'special purpose entity' which can be used as the organizational and financial structure to establish a shared solar project.

In the United States, there have been fewer cooperatives used to establish community shared solar projects than in Canada. In many U.S. states, there are specific tax benefits to structuring a community shared solar project as a business, and therefore numerous companies have been formed to initiate shared solar projects, rather than cooperatives<sup>21</sup>. These companies have developed solar installations by selling shares to people who invest in the solar project, and then receive a specific rate of return on their investment. Similar to co-operatives, these businesses must meet securities regulations if offering an investment opportunity to investors.

### **4.3. Non-Profit Community Shared Solar**

Across Canada, and around the world, there is increasing participation of the non-profit, charity and social enterprise sector in solar and other renewable energy projects<sup>22</sup>. For

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<sup>19</sup> SES Solar Co-op, *SES Solar Co-op Frequently Asked Questions*.

<sup>20</sup> Alberta Solar Co-op, *Alberta's First Solar Co-op*.

<sup>21</sup> NREL, *A Guide to Community Shared Solar: Utility, Private, and Nonprofit Project Development*, 19.

<sup>22</sup> People, Power, Planet, *Not-for-Profits*.

these organizations, ownership of a renewable energy project can generate additional economic resources, through added income and/or energy savings, which can be used to pursue their mandates. A non-profit organization may also facilitate a community shared solar project by organizing and administering a project that shares benefits with participating members. In this model, the non-profit organization may be the host organization for the solar array, or the solar array may be located at another location. In some jurisdictions, supportive policy has encouraged the development of solar projects by the non-profit sector.

Examples of types of non-profit organizations involved in community shared solar projects are faith-based organizations, housing associations and co-operatives, cultural associations, environmental organizations, professional associations and charities.<sup>21</sup>

#### **4.3.1. Faith-Based Organizations Leading Community Shared Solar**

In Ontario, the terms of the feed-in-tariff program stimulated many faith-based organizations to create solar projects that benefit their congregations.

For example, in 2012, the Agricola Lutheran Church of Toronto spent \$85,000 to install a solar PV array on its church roof. The system is expected to generate \$12,000 to \$13,000 per year and to reach payback within 7 years. The church has a 20-year feed-in-tariff contract, and therefore will be able to use the solar installation as an income source for many years<sup>23</sup>.

The non-denominational organization Faith and the Common Good has created a *Greening Sacred Spaces* initiative which provides faith communities of any religion across Canada with tools to assist in 'greening' places of worship, including installing renewable energy sources and carrying out building retrofits. This organization reports that there are currently more than 137 faith groups in Ontario that have installed solar arrays<sup>24</sup>.

#### **4.3.2. Winthrop Community Solar Project, Washington State**

An example of a non-profit led community shared solar project is in the community of Winthrop, Washington State. The non-profit organization Partnership for a Sustainable Methow in Winthrop has a mission to initiate, encourage and support projects that support sustainability and community well-being in its local area. This non-profit organization has been administering a community shared solar project at a site owned by a local municipality since 2011 when 49 community members invested amounts ranging from \$500 to \$15,000 to create a 23 kW ground mounted solar array. Investors signed an ownership contract with the non-profit organization. The non-profit

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<sup>23</sup> Tarhan, *Agricola Lutheran Church Injects Faith in Other Groups with their Solar Project*.

<sup>24</sup> Faith and the Common Good, *Renewable Energy Revival for Faith Communities*.

administers the project by receiving owners' investments, paying bills and distributing the production incentive available for the project through the project lifespan, until 2020. In 2020, system ownership will transfer to the municipal project host.<sup>25</sup>

#### **4.3.3. Saskatchewan Environmental Society (SES)**

A Canadian example of a non-profit organization facilitating the establishment of a community-shared solar project is the Saskatchewan Environmental Society. Over the past few years, the Saskatchewan Environmental Society accessed grants which it used to support the establishment of Saskatchewan's first solar co-op, and to develop a legal structure, set of by-laws and a business model which can be replicated by other solar co-ops. The SES Solar Co-operative now operates independently of the Saskatchewan Environmental Society, furthering the Society's goals to promote sustainable living in Saskatchewan.<sup>26</sup>

#### **4.4. Municipality-Led Community Shared Solar**

In a municipality-led community shared solar model, a municipality makes a municipal building or property available for a community-shared solar project, sometimes through a lease. Under this model, the municipality can have can have varying levels of involvement in administering and coordinating the project.

In some cases, the municipality's involvement may be limited to providing or leasing space on a building or property for a community shared solar project, while all project coordination is undertaken by another entity such as a cooperative or company. In other cases, the municipality may take a more active role in coordinating the project construction, sale of shares and long-term administration of the community-shared solar project. One of the potential challenges for a municipal-led community shared solar project is that the project can be a strain on municipal project organizers, especially if the majority of project coordination and organization falls to municipal staff<sup>27</sup>.

While the economic benefit to a municipality of hosting a community-shared solar project may be less than if the municipality installed a solar array itself, and benefited from the energy savings, such an arrangement can enable the municipality to achieve other benefits. By hosting a community-shared solar project, a municipality can support community members' desires to be more directly involved in a solar PV project and to learn more about solar PV energy. Also, facilitating a community-shared solar project

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<sup>25</sup> NREL, *A Guide to Community Shared Solar: Utility, Private, and Nonprofit Project Development*, 29.

<sup>26</sup> SES, *Energy Solutions*.

<sup>27</sup> Massachusetts DOER, *Community shared solar: Implementation guidelines for Massachusetts communities*, 13.

will mean the municipality is able to increase its use of renewable energy, without needing the up-front capital to invest in its own solar PV system.



**Figure 4.** The Town of Banff installed solar panels on the roof of the Town Hall in 2013.

(Image source: SkyFire Energy: <http://www.skyfireenergy.com/solar-commercial/grid-tied-electric-systems/banff-town-hall-alberta/>)

#### **4.4.1. Brewster Massachusetts Community Solar Garden Cooperative**

An example of a community shared solar project established in close cooperation with the local municipality is the Brewster Community Solar Garden Cooperative. In 2010, the Town of Brewster issued a Request for Proposals to develop solar projects on town-owned property. In 2011, a group of people formed a non-profit corporation entitled the Brewster Community Solar Garden, and signed a lease with the Town of Brewster to use a Town facility to host a 346 kW community shared solar array<sup>28</sup>.

### **4.5. Comparison of Models**

Table 2 compares of some of the main features of community shared solar projects led by utilities, cooperatives, non-profit organizations and municipalities.

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<sup>28</sup> Brewster Community Solar Garden Cooperative, *The first community shared solar in Massachusetts*.

**Table 2. Features of various community shared solar models**

Feature	Model			
	Utility	Co-operative	Non-profit	Municipality
Owned By	Utility or third party	Co-operative members or partnership between co-operative and host	Non-profit or project investors	Municipality or third party
Financed By	Utility, ratepayer shares, grants	Member investments, grants, incentives	Member investments, donor contributions, grants, incentives	Municipality, community investor contributions, grants, incentives
Hosted By	Utility or third party	Third party	Non-profit	Municipality
Investors	Ratepayers of the electric utility	Community investors	Non-profit members/donors; community investors	Community investors
Primary Investor Motive	Offset personal electricity use	Return on investment; offset personal electricity use	Return on investment; contribution to non-profit	Return on investment; offset personal electricity use

Adapted from NREL 2012.

## 5. What Community Shared Solar Models Could Work in Banff?

Based on current opportunities and constraints in Banff, development of a community shared solar project through a solar energy co-operative working in collaboration with the Town of Banff appears to be the most promising organizational and financial model at this time. Such a project would be a co-operative led model, with elements of a municipal-led model.

A clear opportunity that would support the development of a community shared solar project in Banff is that the Town of Banff is interested in helping to facilitate such a project, and may be able to provide a host location at the Fenlands Recreation Centre, as further described in Section 8.3. This is particularly beneficial given that the Alberta government announced in early February that it has earmarked five million dollars for a solar energy incentive program for Alberta municipalities. Municipalities can receive rebates of up to \$0.75 per watt for solar PV systems installed on municipal buildings, to

a maximum of \$300,000 per project<sup>29</sup>. If the Town of Banff acts as a host location for a solar project, and is able to access this municipal solar incentive, the economic feasibility of a project would be improved.

The Town has also indicated that it may be able to provide some support in contracting and program design to a community shared solar project. Despite the interest and high level of support from the Town of Banff, Town of Banff staff time for this project is limited. As a result, the Town is not able to facilitate the detailed creation and long-term administration of a community solar project, which makes it necessary that this be carried out by another entity such as a co-operative.

The Alberta Solar Co-op has demonstrated interest in supporting Banff residents to explore options for developing a community shared solar project using a co-operative model. The opportunity to create a Banff community shared solar project under the organizational and financial structure of the Alberta Solar Co-op would likely significantly reduce administrative and financial barriers to using a co-operative model.

Banff residents have demonstrated much interest in solar PV generation over the past few years, including interest in the concept of community shared solar. Interested residents may be keen to help create a local team that can work collaboratively with the Alberta Solar Co-op to move the idea of a co-operative-led community shared solar project forward.

A utility-based community shared solar model does not appear to be a possible option in Banff at this time, as there is no locally-based electric utility to create a project in which residents could invest. In addition, given Banff's unique location in a National Park, it is unlikely that there are any open areas in and around Banff that would be suitable for constructing a large, ground-mount solar array. This factor may limit interest from an electricity generator in creating a utility-led community shared solar project in Banff, as there would be other locations in Alberta where finding a location for such a project would be easier and more financially viable due to economies of scale. At the current time, it is likely that any solar PV projects that proceed in Banff will be under the provincial Micro-Generation Regulation, as further described in Section 6.8.

It is possible that a non-profit led community shared solar project could proceed in the future. However, at the current time there are no specific non-profit organizations that have expressed keen interest in initiating or hosting a community shared solar project. Even if a community-shared solar project is not being led or hosted by a local non-profit organization, it would be valuable for project coordinators to collaborate with local environmental organizations such as the Biosphere Institute to promote awareness and participation in the project.

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<sup>29</sup> Alberta Government, *Alberta is leading on climate change and creating jobs with solar power*.



Although it appears that the most viable option for a community shared solar project that is open to investment from all Banff residents is through a solar energy co-operative led model with collaboration from the Town of Banff, there may be opportunities for smaller-scale community shared solar partnerships between commercial businesses and residents, as described further in Section 7.

## **6. Banff Community Shared Solar Developed by a Co-operative**

### **6.1. Partnering with the Alberta Solar Co-op**

Board members of the Alberta Solar Co-op have expressed interest in the concept of a community shared solar project in Banff, and suggested that such a project could potentially take place as a co-operative-based project through the Alberta Solar Co-op<sup>30</sup>.

There are numerous advantages to a community shared solar project being developed through the Alberta Solar Co-op. There is quite extensive legal, financial and administrative work required to establish an opportunity development co-op such as the Alberta Solar Co-op. In January 2016, the Alberta Solar Co-op launched a crowd-funding campaign that raised just over \$35,000 to recoup some of the initial legal and administrative costs to establish the co-op. Rather than each co-operative solar project in Alberta needing to establish its own co-operative structure, there is much less administrative burden and cost by setting up projects under the umbrella of the Alberta Solar Co-op. Also, Alberta Solar Co-op board members have extensive experience with solar energy projects in Alberta, and community-based solar projects in other jurisdictions, and would be able to provide guidance and support for Banff residents in developing a community shared solar project.

If a community shared solar project in Banff was developed under the Alberta Solar Co-op, a local board of directors comprised of Banff residents would be chosen to oversee and guide the creation and long-term decision-making about the Banff solar project. These local directors would collaborate with the Alberta Solar Co-op board of directors. It is possible that there could be more than one community shared solar project developed in Banff over time through the Alberta Solar Co-op.

Alberta Solar Co-op board members have put extensive work into establishing their organization and working within the parameters of the Alberta Securities Commission to ensure that investment in projects developed by the Co-op will be RRSP and TFSA eligible. Given current circumstances, there appears to be value for Banff residents to partner with the Alberta Solar Co-op to develop a community shared solar project.

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<sup>30</sup> Vonesch, D, *Personal communication, January 2016*.

An alternative to collaborating with the Alberta Solar Co-op is for a group of Banff residents to form their own co-operative organization to create and administer a community shared solar project. This could give Banff residents full autonomy and control over all aspects of a community shared solar project. Jason Praski, a board member with the Saskatchewan Environmental Society (SES) Solar Co-op has offered to share templates and documents they have used to establish their co-op in Saskatchewan. Board members of both the SES Solar Co-op and Green Energy Co-op of Ontario have suggested that with a group of dedicated volunteers with diverse backgrounds, it should be feasible to establish a co-operative organization<sup>31</sup>. If for some reason, it is not possible for a Banff community shared solar project to proceed as part of the Alberta Solar Co-op, there would remain other options and support to help create a local co-operative entity, including support from the Alberta Community and Co-operative Association.

## **6.2. Who Could Purchase Shares in a Banff Community Shared Solar Project?**

All Alberta residents are eligible to become members of the Alberta Solar Co-op. However, the opportunity to purchase shares in a Banff Community Shared Solar Project may be limited to residents of the Town of Banff.

The Town of Banff Solar PV Production Incentive is only available for ratepayers in Banff. As a result, if the Town of Banff offers the Solar PV Production Incentive to a Banff community shared solar project, this Production Incentive would only be available to Banff residents who participate in the project. To avoid an overly complex organizational and financial structure for the project, it would likely make sense to only allow Banff residents who would be eligible for the Production Incentive to purchase shares in the Banff community shared solar project.

Alternatively, if the Alberta Solar Co-op develops a solar project in Banff, but does not access funds from the Town of Banff Solar PV Production Incentive, the opportunity to purchase shares in the Banff solar project could be extended to all Alberta residents who are members of the Alberta Solar Co-op.

If the community shared solar project is established through the Alberta Solar Co-op, shares in the project would be RRSP and TFSA eligible, as the Alberta Solar Co-op has formally established as an opportunity development co-op in Alberta, which makes it possible to offer these investment benefits.

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<sup>31</sup> Praski, J. and Epp, K., *Personal communication, January 2016.*

### **6.3. Project Leadership and Coordination**

The Alberta Solar Co-op is an independent legal entity, and together with a local Banff board of directors would likely lead and coordinate all aspects of a Banff community shared solar project. Decisions that would be made by the Co-op include financial and organizational management for all aspects of the project, including administration of membership in the co-operative, selling shares and distribution of dividends in the solar project. The Co-op would be the entity that would determine the host and location for the solar array, arrange and uphold an agreement with the building or landowner where a project is located, and would oversee long-term maintenance and eventual decommissioning and/or sale of the solar array at the end of its lifespan.

If a Banff community shared solar project went forward as a project under the Alberta Solar Co-op, project leadership and coordination would be carried out by members of the Alberta Solar Co-op and a local team consisting of the local project board of directors and interested volunteers.

In Ontario, it has been common for renewable energy co-operatives to hire a private company to help provide technical guidance, oversight and administration for co-operative solar projects including tasks such as designing the solar array, arranging and obtaining regulatory approvals, overseeing the construction phase of the project and planning and determining the funding which must be set aside each year to cover project close-out at the end of its lifecycle.

Together with the Alberta Solar Co-op, Banff residents interested in this project would determine what aspects of project coordination and leadership would be carried out by local volunteers and what aspects it would be suitable to contract out to complete.

The on-going functioning and administration of the Alberta Solar Co-op and the local decision-making structure and board of directors for the Banff community shared solar project would be led by co-op volunteers. The Alberta Community and Co-operative Association is available to provide support, webinars and community presentations on the establishment and functioning of opportunity development co-operatives, which are the category of co-op used for community shared solar projects.

### **6.4. Roles in Community Shared Solar Developed by a Co-operative**

A community shared solar project is created through the vision, energy and work of many people. Table 3 summarizes the roles a solar co-operative, Town of Banff, Banff residents and electricity retailer would have in implementing a community shared solar project as described in this model.

**Table 3. Distribution of roles in a co-op led community shared solar project**

Entity	Roles
Solar Co-operative	<ul style="list-style-type: none"> <li>• Provides overall project coordination and leadership.</li> <li>• Facilitates participation of Banff residents in the project.</li> <li>• Creates and coordinates the organizational and financial structure which enables community shared solar project to proceed.</li> <li>• Decides on the host and location for the solar array; enters into a long-term (20- or 25-year) agreement with the solar array host.</li> <li>• Coordinates the procurement, installation and maintenance of the community shared solar array; potentially contracts out some of this work to an experienced company.</li> <li>• Coordinates the ongoing administration and financial organization for the community shared solar project, including membership in the co-operative, distribution of project dividends to investors, etc.</li> </ul>
Town of Banff	<ul style="list-style-type: none"> <li>• Could potentially provide a Town facility where the co-op could locate its solar PV system (see Section 8.3).</li> <li>• If the project is located at a Town of Banff facility, the Town could choose to purchase power from the solar co-operative through a power purchase agreement.</li> <li>• May provide production-based top-up payments to the co-op for distribution to eligible Town of Banff residents, based on their share in the project.</li> <li>• Could provide contract and design support to the co-op.</li> </ul>
Banff Residents	<ul style="list-style-type: none"> <li>• Actively participate in community meetings to learn about the concept of a community shared solar project.</li> <li>• Join the solar co-operative and help facilitate its creation, development and organization.</li> <li>• Purchase shares in the community shared solar project.</li> <li>• Realize economic benefits from holding shares in the solar co-op; investment in the co-op would be RRSP and TFSA eligible, if developed through the Alberta Solar Co-op.</li> </ul>
Electricity Retailer	<ul style="list-style-type: none"> <li>• Role of electricity retailer is dependent upon the size and location of the project; role of the retailer may be quite minimal.</li> <li>• A number of electricity retailers, including Alberta Cooperative Energy, Bow Valley Power and Enmax have expressed interest in the concept of virtual net billing, which could provide an alternative mechanism for providing financial returns to investors in the project.</li> </ul>

### **6.5. Choosing a Host and Location for a Community Shared Solar Array**

The Alberta Solar Co-op would likely require that a project be of a minimum size and maximum cost / kWh before accepting a potential project into its portfolio. Sections 8.1 and 8.2 describe some of the criteria that would be evaluated to determine a suitable

host and location for a community shared solar project, and some potential locations for a community shared solar project in Banff.

## **6.6. Distribution of Solar Project Benefits**

The Alberta Solar Co-op and local Banff board of directors would be responsible for establishing how the costs and benefits of the community shared solar installation would be distributed among project participants in an equitable manner. Table 4 provides an overview of a potential distribution of project benefits.

Under this co-operative-led model, the Alberta Solar Co-op would likely pay to plan, construct and operate the Banff community-shared solar project, and the Alberta Solar Co-op would likely be the owner and responsible party for the solar installation.

The institution or business that hosts the community-shared solar project would enter into a long-term agreement with the Alberta Solar Co-op that specifies how project benefits and costs would be distributed. In some cases, a solar co-op pays an annual rental fee to the host organization or business in exchange for hosting the solar installation on its roof. Alternatively, the co-op may not pay rent for use of a building roof or site, but may be able to offer other potential benefits to the roof or site owner, including the following:

- Help the project host to increase the proportion of renewable energy being generated at its building or site, without the project host needing to invest capital into the project, or if a partnership project is created, the host would need to invest less capital than if they were to undertake a solar project on their own;
- The Solar Co-op may be able to sell the electricity generated to the project host at a set rate through a power purchase agreement, which can provide electricity price stability for both entities;
- By partnering with the Alberta Solar Co-op to establish a solar array, the project host does not need to plan, administer and oversee construction and management of the solar array itself; and,
- A public institution or business that provides a host location for a community-shared solar project will gain positive public perception in the community as an environmentally- and community-minded entity.

Banff residents who purchase shares in the community shared solar project would receive financial dividends at an established frequency, in relation to the number of shares they purchased in the project, and the amount of electricity produced by their share of the solar project. These dividends may be paid from the Alberta Solar Co-op to shareholders via a cheque on an annual, semi-annual or other established basis.

Another mechanism for shareholders to receive dividends is for the Alberta Solar Co-op to set up an agreement with an electricity retailer to provide virtual net billing.

**Table 4. Potential distribution of community shared solar benefits**

Benefit	Likely Benefit Allocation Options
Electricity from solar system	<ul style="list-style-type: none"> <li>• Co-op sells the electricity produced by its array to the project host, under a power purchase agreement.</li> <li>• Co-op pays project shareholders a dividend proportional to the value of production of their portion of the project, or assigns kWh to utility accounts of shareholders proportional to their investment through a virtual net billing arrangement with a utility.</li> </ul>
Town of Banff Solar PV Production Incentive	<ul style="list-style-type: none"> <li>• The co-op could receive the Production Incentive, and pass along the economic benefits of the incentive to project shareholders.</li> </ul>
Ownership of project assets	<ul style="list-style-type: none"> <li>• The solar array will likely be owned by the Alberta Solar Co-op. The Alberta Solar Co-op may give the project host the option to purchase the array after 20 or 25 years.</li> </ul>
Positive public image of supporting a community project and greater production of renewable energy	<ul style="list-style-type: none"> <li>• The project host will increase the proportion of renewable energy generated at its facility, and be viewed as a progressive institution or business that is community-minded and supports an initiative which benefits numerous Banff residents and the environment.</li> </ul>

### 6.7. Financial and Tax Considerations

The Alberta Solar Co-op would raise the money to plan, construct, operate and maintain the solar installation by selling shares in the project to Banff residents. It is possible that additional funding to pay for a project could be raised through a loan from a financial institution. In some other jurisdictions such as Saskatchewan, solar co-ops have raised some funding for project construction through loans from a local credit union.

The dividends that each Banff shareholder would receive from investing in the project would be proportional to the electricity produced by the portion of the project they have invested in. A financial goal of the project will likely be to provide a rate of return for investors which is similar to investing in a guaranteed investment certificate or savings bond under current market conditions. The actual rate of return on investment for shareholders in the project will depend on a number of factors such as the following:

- The per kWh cost to install the solar installation. This cost will depend on market prices for solar panels and construction costs, the specific site where the solar array

will be established and how large a solar array will be constructed, as there are economies of scale in establishing arrays.

- whether a power purchase agreement is signed with the project host, and the terms of the agreement
- whether the community-shared solar project is able to benefit from the Town of Banff Solar PV Production Incentive
- Whether the project is eligible for financial support from any provincial programs, such as the Alberta Municipal Solar Incentive Program.

Under the current Banff Solar PV Production Incentive program, individual home-, and condo-owners that have an electricity account with ENMAX can purchase a home solar system from ENMAX that includes solar system design and a one-year maintenance and repair warranty. ENMAX customers may also access a flexible lease payment option which can extend the pay-back period for a solar system over 15 years, which includes a limited maintenance, repair and replacement warranty over the duration of the lease<sup>32</sup>.

ENMAX is willing to explore the option for Banff residents who wish to purchase shares in a community shared solar project to do so through its ENMAX home solar program, which includes leasing options and a maintenance and repair warranty<sup>33</sup>. However, given the many project design details that remain to be determined for a community shared solar project, it is not advisable that Banff residents count on this being an option to support the purchase of shares in a project. In order for ENMAX to provide such services, it would likely involve the Solar Co-op contracting ENMAX to install the community shared solar project and for ENMAX to be the retailer for the project host location.

## **6.8. Applicable Provincial and Municipal Regulations and Policies**

A Banff community shared solar project will need to be established under and comply with the Alberta Micro-generation Regulation of the Electric Utilities Act<sup>34</sup>. This regulation states that a micro-generator cannot produce more electricity than the anticipated load at the project site. In addition, a micro-generator cannot produce more than 1 MW of electricity. Micro-generators are classified as 'small' if they produce up to 150 kW and 'large' if they produce between 150 kW and 1 MW of electricity. In 2016, the Micro-generation Regulation will be reviewed by the Alberta Government<sup>35</sup>. Any

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<sup>32</sup> ENMAX, *ENMAX Solar*.

<sup>33</sup> Huang, *Personal communication with M. Huang*.

<sup>34</sup> Province of Alberta, *Micro-generation Regulation*.

<sup>35</sup> Alberta Climate Leadership Panel, *Climate Leadership Report to Minister*, 77.

changes to the Regulation would not take effect until at least 2017. It is anticipated that any changes to the Regulation would reduce restrictions to the generation of renewable energy, rather than impose further restrictions. The Alberta Climate Leadership Panel (2015) recommended that the Alberta government investigate creating a small-scale community generation regulation, which would allow slightly larger community-based electricity generation facilities than under the current Micro-generation Regulation.

Under the current Micro-generation Regulation, it is beneficial to locate a community shared solar project on a large institutional or commercial building with a relatively high electricity demand, so project size is not limited by production limits of the Regulation.

As described in Section 5, in February 2016, the Alberta government announced new funding support for Alberta municipalities that install solar arrays on municipal buildings. This funding opportunity may make installing a community shared solar project on a municipal building more economical than on a commercial or other institutional building at the current time.

Municipally, solar installations must comply with the Town of Banff Solar Panel Design Guidelines, which including aesthetic considerations related to various town zones.



**Figure 5.** Residential and commercial solar installations in Banff must comply with the Town of Banff Solar Panel Design Guidelines.

## **7. Community Shared Solar through a Partnership between a Commercial Business and Residents**

Although it appears that the most viable option to create a community shared solar project that is open to investment from all Banff residents is through a co-operative led model with collaboration from the Town of Banff, there may be opportunities for smaller-



scale community shared solar partnerships between commercial businesses and residents.

There are a set of commercial buildings in downtown Banff which have a good solar resource and are owned by a local business person who has expressed much interest in the idea of hosting a community shared solar project at this downtown Banff location. A small-scale community shared solar project could be developed at a commercial location if the business owner formed a business partnership with a group of Banff residents to install and benefit from a shared solar installation.

Under this model, the business owner interested in community shared solar would set up an agreement with a group of Banff residents who are interested in helping to create and/or finance a shared solar project. It would be up to the site owner and participating residents to establish an administrative and financial agreement amongst themselves that specifies how responsibilities, costs and financial benefits of the project are shared amongst them over the duration of the project. The opportunity to invest in such a project could not be advertised as a public investment opportunity unless a public offering statement is created and approved by the Alberta Securities Commission.

Potential benefits for a commercial business owner to create a community shared solar project include the opportunity to install a solar array and produce renewable energy on-site without needing to invest the entire capital cost up-front, and the opportunity to market the business as an environmentally- and community-focused enterprise. Potential benefits for Banff residents that partner with the business to organize and invest in the project include the opportunity to be directly involved in the creation of a solar installation and economic benefits from investing in the generation of solar energy.

There may also be potential for a community shared solar project to be installed on an apartment building or condominium in a manner that financially benefits a group of or all residents of the apartment or condominium.

If the Town of Banff chooses to support community shared solar projects such as these through the Solar PV Production Incentive, it would interact with single community shared solar project entities. It would be the responsibility of the organizers of each community shared solar project to distribute costs and benefits of the project, including the Solar PV Production Incentive, among participants in an established and equitable manner.

## **8. Main Design Elements for a Community Shared Solar Project**

There are basic design elements for a community shared solar project that remain the same, or very similar, regardless of the exact organizational and financial structure that is used to develop the project. This section describes these main design elements and discusses them within the Banff context.

## 8.1. Choosing a Host for a Community Shared Solar Project

A community shared solar project can be successfully hosted by a number of different organizational entities, including municipalities, businesses, utilities and community groups.

In Banff, some potential hosts for a community shared solar project could include:

- A Town of Banff municipal building or property;
- A public building owned by the provincial or federal government or agencies, including schools; and/or,
- A local business, individual or organization that is interested in the concept and owns a property or location with a good solar resource. This could include a condominium.

## 8.2. Choosing a Location for a Community Shared Solar Project

It is helpful to evaluate numerous criteria to determine a suitable location for a community shared solar project. The following list of recommended criteria are based on suggestions made by Jason Praski, volunteer with the Saskatchewan Environmental Society Solar Co-op, Alex Love and Carmen Proctor, coordinators of the Nelson Community Solar Garden Project, and the Community Shared Solar Guidelines for Massachusetts Communities.

**Table 5. Criteria for selecting a project location for community shared solar**

Recommended Criteria	Description
Quality of Solar Resource	An ideal project location will have an optimal solar resource for the region where it is located, including having a south-facing aspect with no to minimal shading. The quality of the solar resource in Banff varies throughout the community according to the amount and timing of shading from surrounding mountains.
Potential Size of Solar Array	In order to achieve sufficient economies of scale to make a project economically viable, a minimum project size is usually required. Often, the larger the potential solar array that can be installed, the more economically feasible the project. In certain circumstances, such as in the context of particular financial incentives, there may be a 'sweet spot' for project size, which is most economical, and may not be the largest possible system. Currently, the Saskatchewan Environmental Society Solar Co-op finds that 25 kW projects are most economical with provincial financial incentives.
Electrical Load at Project Location	If the solar project is to be installed under Alberta's current Micro-generation Regulation, the solar installation on a given building or at a given site cannot be designed to exceed the estimated

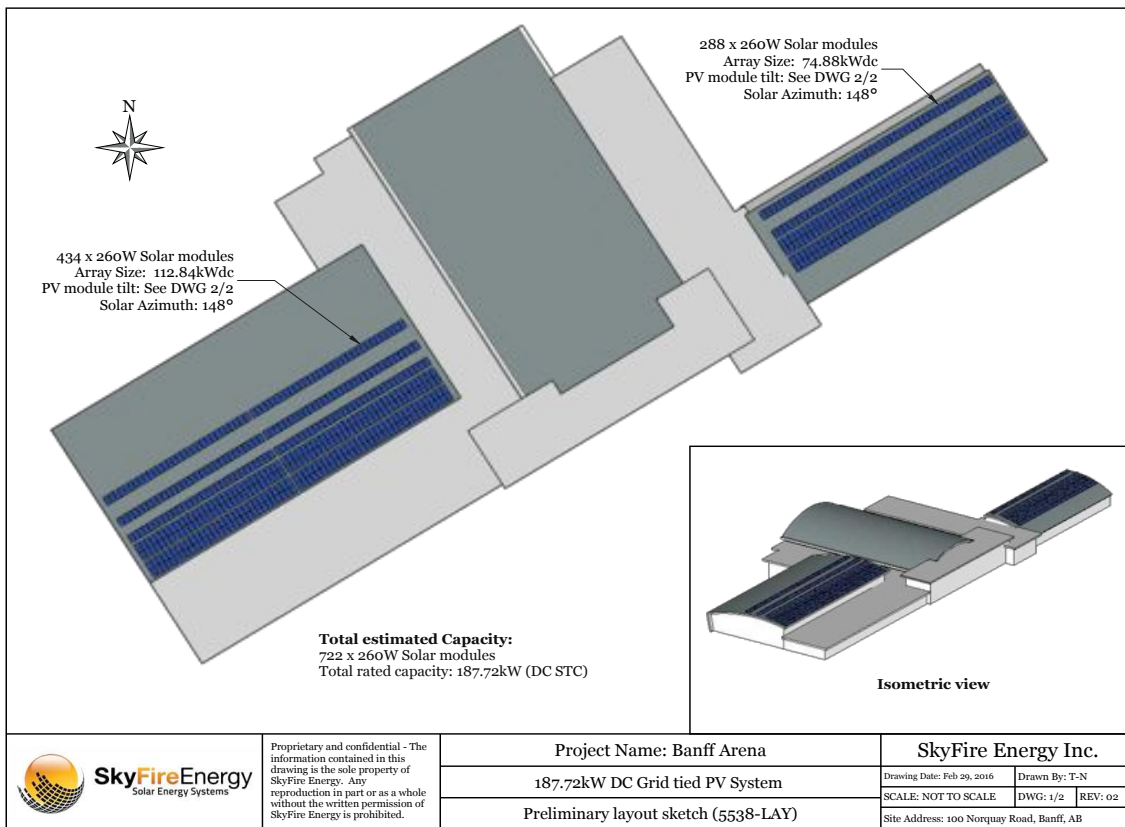
	annual electricity consumption at the building or site, and must be smaller than 1 MW.
Cost / kWh of Project	Many factors contribute to the final cost per kWh to install a solar PV array, including the size of the potential host location and roof / land characteristics. Minimizing the unit cost of energy production is one of the most important criteria for determining the feasibility of a project location.
Project Partner	A smooth and cooperative relationship with the host location site owner is a critical part of a successful community shared solar project. The building or landowner must be interested in the community shared solar project and willing to enter into a long-term agreement with the group undertaking the project.
Visibility	If educating community members about solar energy is a priority goal for the project, locating the solar installation in a central and/or visible location will facilitate easier and more educational opportunities.
Zoning	Are there zoning restrictions that limit the size or configuration of a solar installation at the proposed building or site?
Roof Considerations	If planning a roof-mounted solar array, it is important to ensure that the host roof has had a structural engineering assessment completed to ensure it can adequately and safely support the desired solar array, and that the roof is in good condition and will not require major repairs which would require removal of the solar panels throughout the lifespan of the solar project (ie. 25 years).
Insurance Options	There may be various options for obtaining insurance to cover vandalism, fire or other accidental destruction of the solar array. The cost and types of insurance options available for the solar array can vary according to the site location and site / building owners' current insurance policy. It may be possible for a building owner to pay a marginal increase in annual building insurance to insure a community shared solar project, and then for the solar project to pay for these marginal increased costs. Alternatively, the solar project may need to obtain its own insurance, which may be more expensive.

It can be valuable to engage community members in suggesting potential locations for a community shared solar project, and to invite suggestions for additional decision-making criteria to choose a project location. Coordinators of the Nelson Community Solar Garden Project found that inviting Nelson residents to make suggestions for potential solar project locations led to a more comprehensive list of potential locations, and increased community interest in the project. It is also valuable to communicate to community members the final criteria that are used to determine a project location.

### 8.3. Potential Community Shared Solar Hosts and Locations in Banff

There are many potential locations for a community shared solar project in Banff. One potential location for a project is the roof of the Fenlands Recreation Centre, which is owned by the Town of Banff. The Fenlands Recreation Centre is a large, new building with a new roof. Initial solar assessments at the site indicate that the building has a good solar resource, and that the metal roof could support a rack-mounted system where necessary, in addition to flat-mounted panels<sup>36</sup>. As depicted in Figure 6, initial estimates indicate that the roof could support a 187 kW system, if panels are installed on both south-east facing roofs.

In addition to having an excellent solar resource, the Fenlands is a prominent location in the community for educational purposes. If the Town of Banff acts as a host location for a solar project, and is able to access funding from the new provincial municipal solar incentive, the economic feasibility of a project at this site would likely be favoured over other projects where such provincial incentive funding is not available.



**Figure 6.** Preliminary layout sketch of an 187 kW grid-tied PV system at the Fenlands

<sup>36</sup> Vonesch, D., *E-mail communication with Chad Townsend, February 16 2016.*

Another potential community shared solar host location is a set of commercial buildings in downtown Banff which have a good solar resource and are owned by a local business person who has expressed much interest in the idea of hosting a community shared solar project at this downtown Banff location. This central location could provide good opportunities for community education about the project.

There is also good potential for a community shared solar project to be hosted on one or a series of large commercial and industrial buildings in the Banff industrial area; most of which have metal roofs. These buildings would very likely have a better solar resource than locations in downtown Banff, given that they are farther from the shading impacts of Sulphur Mountain. A potential drawback of installing a community shared solar project at such a location is that the project would be less visible to the broader community.

A preliminary assessment of the solar potential on the new Banff Elementary School being constructed indicates that the school roof could support a 140 kW solar PV installation<sup>37</sup>. Similar to the Fenlands Recreation Centre, the central location and public institution would provide great opportunities for public education about the project.

There may also be potential for a community shared solar project to be installed on an apartment building or condominium. There are likely many more potential community shared solar hosts and locations that could be identified and considered in the evaluation of a potential project site.

#### **8.4. Choosing a Unit of Investment in Community Shared Solar**

For all community shared solar projects, it is necessary to choose a unit of investment in the project. It may be useful to designate a minimum investment in the project, keeping in mind that a high financial threshold to participate in the project will exclude some potential participants, while a very low threshold may create unreasonable administrative burdens. A maximum proportion of investment in the project may be desirable to optimize public participation in the project.

In its Community Solar Garden project, the City of Nelson has chosen a unit of investment in the project to be one solar panel, and it estimates that this unit of investment will cost approximately \$925, or potentially less, according to how many panels are sold<sup>38</sup>. An advantage of choosing a solar panel as a unit of investment is that it is a tangible amount that people can observe and demonstrate to others. Other options include enabling participants to purchase kW of electricity generation capacity or kWh of electricity production.

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<sup>37</sup> KCP Energy, *Banff Elementary School, 140 kW Solar PV System*.

<sup>38</sup> Nelson Hydro, *Community Solar Garden*, 13.

Some programs include options to purchase shares outright at the start of a project, and the option to access financing at an established rate to pay for the value of a share of the project over time. For example, in the case of the Nelson Community Solar Garden, Nelson Hydro customers can choose to pay the entire cost for the panel(s) they wish to purchase up-front at the start of the project, or customers can set up a payment plan using financing through their utility bill or obtain a loan from the Nelson & District Credit Union.

### **8.5. Fostering Public Participation in Community Shared Solar**

Facilitating the active participation of local residents in the development and implementation of a community shared solar project is one of the over-arching keys to success. The importance of facilitating active and positive community participation was emphasized by all participants in the panel discussion on "Opportunities and Constraints for Community Solar in Western Canada" at the Canadian Solar Industries Association conference in October, 2015.

The Town of Banff is able to support local residents in learning more about the concept of community shared solar at its Connect open house events and through other public meetings. The Town may wish to support the formation of a community shared solar project team that includes a combination of municipal officials, staff and community volunteers who are interested in the project.

Coordinators of the Nelson Community Solar Garden emphasize that there is much value in including local residents in the design and implementation of a community shared solar project, as this public engagement raises awareness and increases interest and support for the project<sup>39</sup>.

### **8.6. Facilitating the Entry and Exit of Project Participants**

Given that a community shared solar project will very likely operate for a time-span of 20 to 25 years, it is important to create a mechanism by which people can leave and enter the project. If participation in a project requires that a participant be a resident of a particular jurisdiction, there will be people throughout the lifespan of the project who move and are required to sell their share in the project.

The City of Nelson has established the following mechanisms to facilitate participants in their Community Solar Garden project to leave and new participants to enter:

- 1) The City of Nelson has calculated and created a table which shows the value of a share in the Community Solar Garden project on an annual basis for each year past the

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<sup>39</sup> Love, A. *Personal communication with Alex Love, Nelson Hydro, October 2015.*

initial year when the project started and shares were purchased. The value of each share diminishes in time, as members are paid contributions for the energy their portion of the community shared solar project generates, and the potential future energy their panel(s) will generate declines. The City of Nelson would be willing to share their methodology for calculating this decline in the value of the community solar garden shares<sup>40</sup>. There could be designated date(s) each year when a transition of community shared solar participants can occur, to reduce the administrative burden of coordinating the transition of participants.

2) The City of Nelson maintains a waiting list of people who are interested in joining the Community Solar Garden project. If a project participant wishes or needs to sell his/her share in the project, the Community Solar Garden project coordinator will contact people on the waiting list to enquire if they would be interested in purchasing the share(s) in the project that will become available when the exiting participant leaves, at the price set in the table described above.

3) There is an option for participants leaving the Community Solar Garden project to donate their shares to a local non-profit organization, instead of receiving monetary payment for the share. The non-profit organization would then become the owner of the share, and would receive the benefits of being a participant in the community shared solar project.

4) If no other eligible residents are interested in purchasing a share in the Community Solar Garden, then the resident departing from the project is not reimbursed by the City for the remaining value of the share in the Community Solar Garden.

### **8.7. Decommissioning of Solar Array at the End of Its Lifespan**

It is necessary to set aside some funding at the beginning or throughout the life of a solar PV project to cover costs to decommission the solar installation at the end of its lifespan and return the site to its pre-installation condition. A common projected lifespan of a solar installation is 25 years, and solar panels are often sold with a warranty of at least 20 years. A solid project plan will define what the operational and financial options are for exiting from the community shared solar project and potentially restoring the site to its original condition.<sup>41</sup>

The Saskatchewan Environmental Society Solar Co-op has developed a financial model and wording in its agreements with land and building owners to account for project

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<sup>40</sup> Love, A. *Personal communication with Alex Love, Nelson Hydro, October 2015.*

<sup>41</sup> NREL, *A Guide to Community Shared Solar: Utility, Private, and Nonprofit Project Development*, 49.

decommissioning. The Saskatchewan Environmental Society Solar Co-op is willing to share these documents with other co-operatives<sup>42</sup>.

## 9. Solar PV Production Incentive and Community Shared Solar

Currently, the Town of Banff Solar PV Production Incentive is used to support solar projects for single applicants as individuals or businesses, including condominiums. Individual property owners can apply to be accepted to this program, and successful applicants are chosen through a lottery. In 2015, there were 16 successful applicants.

Section 3 summarized the many advantages of community shared solar projects, in relation to individual residential or commercial solar arrays. If the Town of Banff wishes to support the creation of community shared solar projects, it would be helpful for the Town to make community shared solar projects eligible to apply for the Solar PV Production Incentive. The Town may wish to prioritize community shared solar projects under the Solar PV Production Incentive program, considering that such projects have the potential to involve and benefit a much greater number of Banff residents.

If the Town chooses to prioritize community shared solar in the Solar PV Production Incentive, it would likely be beneficial to set a minimum number of participants required for a project to be considered community shared solar and be eligible for prioritization. For example, the Town could set a minimum of five or ten Banff residents that must participate in and benefit from a community shared solar project in order for the project to be eligible for prioritization under the Production Incentive. Another option would be to assign prioritization relative to the number of Banff residents that are involved in a project. In this case, the greater the number of Banff residents that are participating in and benefitting from a community shared solar project, the greater the prioritization of the project in the Solar PV Production Incentive program.

Prioritization of community shared solar projects within an incentive program can play a critical role in fostering the development of these projects. In Ontario, the 2009 *Green Energy Act* led to the development of several mechanisms to encourage community-owned renewable energy projects, including slightly higher feed-in tariff rates for community projects, awarding additional points to community projects in the feed-in tariff selection process and contract set-asides for community projects<sup>43</sup>. These mechanisms facilitated the development of many solar co-operatives and community shared solar projects.

Internationally, Germany and Denmark have had legislation and policies that specifically support renewable energy generation co-operatives for 25 years. This has led to a

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<sup>42</sup> Praski, J., *Personal communication with Jason Praski, January 2016*.

<sup>43</sup> People, Power, Planet, *Community Energy*.



proliferation of community-owned renewable energy projects in these countries. For example, as of 2014, approximately 80% of the approximately 3,000 renewable energy co-ops in Europe were located in Germany and Denmark.<sup>44</sup>

## 10. Recommendations and Next Steps

This document has given an overview of a number of community shared solar models, and evaluated the feasibility of using these models in Banff. Under current provincial and municipal policies and regulations, it appears that collaborating with the Alberta Solar Co-op to explore options to establish a Banff community shared solar project on a municipal building would be the most practical and feasible option for a large-scale community shared solar project. Such an initiative may be able to benefit from new provincial funding that has been made available for municipal solar projects.

An Alberta Solar Co-op led community shared solar project in Banff will take some time to develop, and opportunities to invest in such a project would likely not be available to Banff residents until at least 2017. In the meantime, there are opportunities for the Town of Banff to encourage and incentivize Banff residents and businesses to partner to create smaller-scale community shared solar initiatives.

Following are some recommended next steps for the Town of Banff to undertake in 2016 and 2017 to further support and promote the development of community shared solar projects in Banff.

### 2016

- Start a local dialogue about community shared solar and provide information about the concept at the Banff Connect 2016 event. Generate project support by proactively addressing public questions and concerns, and encouraging public participation in the project.
- Modify the Solar PV Production Incentive program to prioritize community shared solar projects that include participation of and benefit a minimum number of Banff residents. This may encourage the creation of some small-scale community shared solar projects in the short-term.
- Form a project team to lead further exploration of options for a community shared solar project in collaboration with the Alberta Solar Co-op. Coordinators of similar initiatives elsewhere recommend that the project team include a combination of municipal officials, staff and community volunteers who are interested in the project. It may be wise to also include representatives from the Alberta Solar Co-op in this project team.

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<sup>44</sup> People, Power, Planet, *Community Energy Models: Co-operatives*.

- Continue to pursue options to finance and install a solar array on the Fenlands Recreation Centre. Explore options to transfer the solar array to a locally-based community shared solar project of the Alberta Solar Co-op in the near future and/or to develop a future phase of the building's solar installation as a community shared solar project.
- Continue to identify potential community-shared solar project sites and evaluate the potential benefits to the municipality and the broader community of a community shared solar project at specific sites.

## 2017

- Follow-up on work conducted in 2016 to support the development of a large community shared solar project, potentially in collaboration with the Alberta Solar Co-op.
- Continue to support the activities of the project team formed to explore and lead development of a large community shared solar project in Banff.
- Evaluate the effectiveness of any prioritization of community shared solar projects in the Solar PV Production Incentive, and make any adjustments, if required.

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