

Overview of Potential Municipal Approaches

Planning/Policy Approach

Generally speaking, a planning or policy approach will require fewer civic resources (though some planning, legal and technical expertise is required to establish the initial approach and guide overall implementation).

Adopting new or revised policies supportive of solar to benefit public and private opportunities

- (a) Changes can be made to the City's suite of development-related policies to achieve maximum solar orientation and access. These include changes to the Official Community Plan, Zoning Bylaw, Subdivision Regulations and Infill Guidelines. These changes would not only support the installation of solar panels, but also provide passive solar benefits that include:
 - Daylighting – reduced reliance on electric lighting (utility savings) and increased productivity and health (time and health cost savings)
 - Reduced heating requirements (opportunity to right-size equipment to save on capital costs and to reduce ongoing utility costs as equipment is used less)
 - Improved building comfort and increased satisfaction by building users
- (b) Select and set-aside parcels suitable for solar energy in the same manner that parcels are set aside for care homes today.
- (c) Develop policies supportive of district energy systems, electrical micro-grids and battery storage systems. This approach addresses concerns associated with intermittent energy supply within an electrical grid that must have 24-hour availability.
- (d) Changes can be made to various Council and Administrative Policies:
 - Develop a clear permit and code review process that is outcomes based and utilizes a simplified inspection approach.
 - Creating a virtual net metering program - The City is installing an Advanced Metering Infrastructure (AMI) and Meter Data Management System. With these technologies it becomes possible to allow AMI customers to net meter electricity generated at a different location than their home or business and credit against their electrical bill. For example, electricity could be generated by a City-owned, private or non-profit solar array and the electricity could be credited on the electrical bill of subscribing businesses and residents. This approach also supports the concept of a micro-grid whereby properties make use of someone else's roof/property (having better solar orientation and access) and supports higher utilization of solar energy production by the property rather than sending back to the electrical grid.
 - There is an opportunity to change the operating policies and programs of Saskatoon Light and Power to create a '0% hurdle rate for projects'. Many solar projects would become more attractive if the expected Internal Rate of Return (IRR) over 20 years was 0% rather than $\geq 7\%$.

Direct-Investment/Project Approach

These approaches involve significant technical resources (engineering and financial), initial capital, site selection processes, project management, Power Purchase Agreements (particularly if outside the Saskatoon Light and Power franchise area), and ongoing operations and maintenance.

Directly-investing in solar panel arrays and systems

In addition to the investments already made at the Green Energy Park and at 2 civic indoor pool facilities, there is an opportunity to develop solar projects on civic lands and buildings that may total between 80 to 800 MW.

The City owns a number of undeveloped locations (bare land) that can accommodate utility scale (large) installations. It is also possible for other strategic locations to be acquired for this purpose. Preliminary estimates of the potential to install either permanent or temporary solar arrays on vacant City-owned land have revealed several opportunities:

- 136-acre parcel south of the Queen Elisabeth Power Station could generate ten (10) MW based on current panel technology.
- Creating a 'bright-field' that generates 300 kW at 1202 19th Street West where the City owns a portion of a brownfield site (the other portion is currently owned by Imperial Oil).
- 8030 acres of City-owned land are currently listed as undeveloped vacant land and could generate up to 400 MW if 50% of this land were used for solar development at 1 MW per 10 acres.

As discussed in the Report, Civic buildings could also accommodate small rooftop installations. Approximately 70 City-owned buildings have a combined potential to generate 1.8 MW of solar energy on their rooftops. This opportunity will be explored as part of the energy performance contracting (EPC) project.

Rights-of-ways are estimated to provide between 42 to 425 MW of solar potential assuming only 5% to 50% of the land can be used at 1 MW per 10 acres. However, the current practice in the City is to keep these areas clear to minimize safety concerns and a detailed analysis will need to be conducted so ensure all site specific parameters are accounted for at each proposed site.

The City also owns a variety of under-utilized sites that can accommodate small-scale installations. Administration has not yet determined the scale of generating capacity that may come from constructing shelter structures over parking lots and sport field fan areas, or adding panels to sound attenuation walls, transit shelters and future bus rapid transit stations.

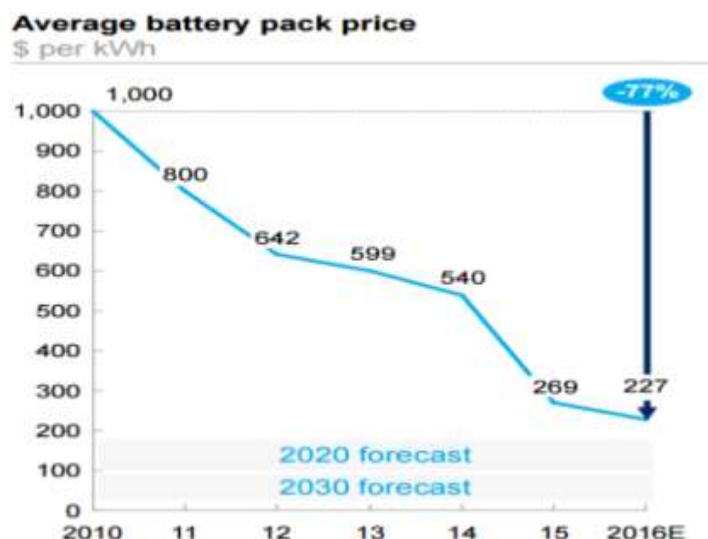
Investing in infrastructure enhancement projects such as micro-grids and energy storage facilities

Conventional electrical generation in most developed countries use high density power to meet electrical demand. High density power are large power plants (generally >1 MW) like coal, hydro, natural gas, solar and wind farms, and nuclear power to provide electricity to a large region. This approach has the following disadvantages:

- Large capital and operation costs associated with large power plants;
- Electrical distribution losses from distributing electricity large distances from power plants to point of consumption;
- Heavy reliance and costs to maintain large electrical grid; and
- Large power plants are usually fossil fuel based or require nuclear energy in areas where large scale hydro is not available.

These disadvantages have led to the increased use of micro-grids which promote the use of low density power sources. Micro-grids are small scale community based electrical grids that use low density power sources such as small scale solar and wind, combined heat and power (CHP), fuel cells, diesel, and natural gas to generate and distribute energy efficiently in a small area. In 2016 micro-grids were forecasted to grow 115% and reach a capacity of 4.3 GW in the next 5 years in the United States. Currently in the United States most micro-grids are composed of fossil fuel sources, however use of renewables such as solar energy is expected to grow in micro-grids. From 2015-2016 renewable energy capacity in micro-grids more than doubled, increasing from 6 to 14%.

Research into efficient battery technology to promote electric vehicles and the use of low density power over high density power has resulted in decreasing battery costs. Tesla's recent construction of their Gigafactory in 2014 has helped contribute to decreasing battery costs by 80% in the last 6 years and is expecting to reduce battery costs by another 35% in the coming years.



Source: *electrek* <https://electrek.co/2017/01/30/electric-vehicle-battery-cost-dropped-80-6-years-227kwh-tesla-190kwh/>

Decreased battery costs will help promote the use of solar electricity by providing users an option to disconnect from the grid and self-generate their electricity independently.

There is an opportunity for the City to invest in these technologies through demonstrations, partnerships, and pilot projects to enhance the grid infrastructure in the City to become more solar compatible.

Program Approach

Programs attempt to tackle barriers (perceived or real) to the installation of solar energy. Technical resources are required to create and administer the program. Some legal, financial and marketing resources are also required. Capital funding is also often required.

Programs providing financial incentives

- (a) Property tax abatements - The City could abate all or a portion of property taxes owed for a period up to five (5) years on properties that install solar panels. The maximum abatement amount could be equal to the total installed cost for the system and could be as high as \$3/kilowatt.
- (b) Grants - To address the barrier posed by the significant capital costs required to install solar panels, the City could provide cash grants to cover a portion of the costs associated with installing solar panels. Grant programs typically range in value in Canada from a minimum of \$650 to \$20,000 for residential systems (0-100 kW) and up to \$500,000 for commercial systems.
- (c) Providing a loan loss reserve or guarantee to support third party lending - The City could provide funding to be managed by a third party organization that provides preferred-rate loans to cover the costs of solar panel systems. The third-party would be responsible for the qualification of participating lenders and hold an agreement for repayment with the property owner.
- (d) Preferential pricing for solar / Feed-In-Tariff (FIT) - The City could create a temporary Feed-In-Tariff (FIT) Program. A FIT pays a premium for solar electricity supplied to the electrical grid. There are different models for FIT programs. The municipality of Banff has recently created the first municipal FIT in the country, and pays their customer a pre-determined amount (typically \$1,400) yearly for seven years. The province of Ontario paid up to 31.1 cents per kilowatt-hour of electricity supplied to the electrical grid under the final year of their microFIT program in 2017.
- (e) Provide cheap or free land leases for solar installations – Rather than develop solar projects itself, the City could lease City-owned land at reduced or no cost to solar companies or co-operatives. The City currently utilizes leasing arrangements with community associations/groups and businesses such as SaskEnergy,

Cosmopolitan Industries, and the Western Development Museum for the use of City facilities.

Non-financial incentives

- (a) Education - Communicate the benefits achieved by systems installed on City sites or develop awareness campaigns.
- (b) Technical assistance - Consulting/pathfinding (as envisioned under the Solar City program proposal made in 2014)
- A person to make the complex process of installing solar panels simple by guiding or explaining the planning, procurement, and installation process.
 - A person to work with permitting agencies to advocate for fast-tracked permitting (from the Building Standards Division, Saskatoon Light & Power and SaskPower) and power-purchasing (especially from SaskPower whose current permitting time is greater than 8 months. Advocacy has been shown to be successful in the past when SRC was involved in delivering a recent Provincial solar panel incentive program. This program provided a cash grant for a limited time only).
 - A guide and on-line resources to explain how solar panel systems work, their benefits, how residents can purchase them, and what they should expect from solar companies.
 - A person to develop and maintain relationships with solar companies to keep abreast new technologies and processes (and pass this information on to potential customers).
 - Right-sizing solar installations (avoid sending any back to the grid – esp. in Central Business District)
- (c) Density and other development bonuses (such as available in City Centre incentive policy) – Building developers may be offered height bonuses if their developments include solar panels. The bonus will allow additional height and/or reduce the correlation of height to land area when solar panels are included in the development.
- (d) Direct sale of land – Saskatoon Land is currently investigating the benefits and methodology of offering an incentive program to Eligible Contractors to create a residential photovoltaic solar power demonstration project in Aspen Ridge. The methodology is currently being investigated however, consideration is being given to offering a selected block of lots with preferred active solar potential. These lots would be allocated outside of the normal lot draw process. Further study is required as to whether it would be possible and beneficial to offer a financial incentive in addition to the direct sale lot selection incentive. In this regard, following due process to request permission to price and sell land, Saskatoon Land will be reporting to the Standing Policy Committee on Finance prior to lot allocations and sales.