

LOW CARBON STORY: GREEN LAKE, SASKATCHEWAN

GREEN LAKE'S SLOGAN:

“Proud of Its Past ... Planning for Its Future”

The Mervin Sayese Memorial Arena
with 96 solar panels on the roof



SUMMARY

- 31.5 kilowatt solar array provides about half of the electricity needed by the community hall and arena
- Local school was the hub of community support
- Project is the starting point for the community which hopes to build more solar installations in the future

WELCOME TO GREEN LAKE, SASKATCHEWAN

Situated in northern Saskatchewan's beautiful boreal forest and alongside Green Lake, the Northern Village of Green Lake is one of a kind. The village is steeped in the history of the fur trade. Ninety-five percent of its residents are Métis and every year Village Council makes a declaration affirming its status as a Métis village. Its colonial history dates back to 1782, making it the third oldest colonial settlement in Saskatchewan.¹ The village's 122 square kilometers were originally set aside in 1942 as the "Green Lake Experiment,"² as an attempt to entice Métis to agriculture. The area obtained village status in 1990s, establishing it as the largest (by area) village in Saskatchewan and one of the largest in

Canada. It is situated in the largest and lowest density federal riding in Saskatchewan.

Another thing that makes Green Lake unique is the 31.5 kW solar array, visible from the highway, on top of the community hall. Green Lake was the first municipality in northern Saskatchewan to "go solar."

Mayor Ric Richardson and his wife Rose say that the solar array is a source of pride for the community of just under 500 residents. It links the traditional and historical Métis values of working with nature with a vision for the community's future.

GREEN LAKE'S SOLAR JOURNEY

The community's solar journey started in 2015 when Mayor Ric Richardson, Village Councilor Phane Ray and Village Administrator Tina Rasmussen attended a First Nations Power Authority³ conference. By the end of the conference, the trio was convinced of the need to investigate renewable energy for their community. With the support of the rest of council, a consultant was hired to do a feasibility study for both short-term and long-term renewable energy options for the village. Based on that study, a solar photovoltaic installation to generate electricity emerged as the most feasible option for the village. Photovoltaics require less maintenance than other technologies and, once established, can easily be expanded over time.

Council started to look for sources of funding, a challenge for a very small, remote community with a limited tax base. But luck seemed to be on its side. Council wanted to start with a small installation with an estimated cost of \$140,000.

The project would be eligible for a SaskPower rebate of \$20,000, so that was their starting point. They applied for a Canada 150 grant, which successfully provided them with another \$58,000. The fund unexpectedly grew by another \$20,000 when BullfrogPower⁴, a green energy broker, came forward as a partner on the project. The remaining \$42,000 was financed by the village.

Initially there was skepticism about the project in the community, but eventually the community came around to supporting it. Rose and Ric say that when you come from a culture that is grounded on working with nature to provide the necessities of life, making the leap to using the sun to provide electricity is not difficult. The local school was at the hub of this support. Ric and Rose had given the school a solar panel to use for education and MiEnergy, the solar company that had been contracted to do the installation, visited the school to help the students learn about solar power.

¹ North West Company trader Angus Shaw documented a winter post at Green Lake dating back to 1782. See document entitled "Green Lake, Lac Vert, Saskatchewan" at www.metismuseum.ca

² See document entitled "Green Lake, Lac Vert, Saskatchewan" at www.metismuseum.ca ". . . the provincial government set aside Townships 57 to 62 in Ranges 12 and 13 West of the third Meridian as an agricultural project for the Métis. The goal of this "Green Lake Experiment" was to reduce the government expenditures for social assistance. This land was leased to the Métis under 99-year leases. Unfortunately, these forty-two acre parcels were too small to sustain commercial farming. . . In 1944, the government moved large numbers of Métis who were receiving social assistance in the south to Green Lake, . . . To offset the continued poverty of the Métis at Green Lake the government then set up a government-run farm known as the Central Farm. It was to teach farming as well as some industrial skills. In effect though, this government colony at Green Lake was used to train semi-skilled labour to the lumber and fishing industries that were growing in size in northern Saskatchewan."

³ fnpa.ca/about-fnpa/

⁴ www.bullfrogpower.com

The project's ribbon cutting was held on May 24, 2017. It was attended by a variety of politicians and representatives of BullfrogPower and MiEnergy. The event received considerable media attention.⁵

The 31.5 kilowatt system is grid-tied and net-metered.⁶ This means that their solar panel system is linked to SaskPower's electrical grid. Any excess electricity generated is fed into the grid and credited toward usage when electricity is not being generated.⁷ Because the system is grid-tied, electrical outages can still occur.

Mayor Richardson views the project as a success. It has significantly reduced the operating expenses of the community hall and arena and has fostered a sense of pride in the community. However, he emphasizes that the project is only a starting point. It shows that solar power works and can be considered for other applications in the community. For instance, he would like to see community infrastructure, like the water treatment plant which consumes a lot of electricity, be connected to solar.

Although the solar array on the community hall is currently exclusively grid-tied, he would like to see it converted to a hybrid solar system in the medium-term. A hybrid system is a grid-tied system with some battery storage back-up that allows it to function off-grid when needed. This would allow the community hall to act as an emergency centre during power outages, especially in the winter. While many of the community's 168 homes heat with wood or propane, many are also heated electrically. The residents of these homes are at special risk during outages during the cold northern Saskatchewan winter. Mayor Richardson estimates that the community experiences about two or three outages per month. Given the remote location of the community and the electrical infrastructure that services it, it can take days before the source of a power outage is discovered, let alone repaired.

Inspired by solar installations he visited during a trip to Germany, his long-term vision is even more ambitious: community electrical self-sufficiency through solar. Not only would this make the village less vulnerable to power outages, but could provide needed economic development opportunities for a community



Rose & Mayor Ric Richardson

⁵ www.mbcradio.com/2017/05/green-lake-powers-up

⁶ www.saskpower.com/our-power-future/powering-2030/generating-power-as-an-individual/using-the-power-you-make/net-metering-program

⁷ The electrical meter for grid-tied installations effectively runs in two directions, depending on whether you are putting electricity into the grid or pulling electricity out. SaskPower allows credit and debits to be carried over from month to month for up to three years.

with high unemployment. He knows that this is not something that will be easily or quickly attained. Financing would be a major issue. Another obstacle is provincial regulation that limits the size of solar arrays to 250 kW

in Saskatchewan's north. The obstacles are significant, but Mayor Ric Richardson is not one to give up on a dream. Only a few short years ago, naysayers insisted that the current installation was a pipe dream.

ASSESSING THE IMPACTS

The most obvious impact of the project has been the reduction of operating costs at the community hall and arena. But the project has also had other benefits: it has increased community pride and has helped to put Green Lake on the map. The Climate Atlas of Canada produced a video on the project.⁸ Green Lake hosted a symposium⁹ on renewable energy, economic development and tourism put on by the North West Communities Management Company.¹⁰ It was invited to join the First Nations Power Authority, the only non-status, non-reserve community to be invited. In addition, the community was awarded a Clean 50 Award¹¹ for clean capitalism.

Asked if he would do anything differently, Mayor Richardson says the main thing would be to not mount the panels directly on the roof of the community hall. The village had made the decision to mount the panels directly on the roof rather than at a better angle to keep costs down. The roof is slanted toward the south, but not enough to allow snow to slide off in mid-winter. When they are covered in snow, the panels produce no or very little electricity. What had been a cost-saving measure at the time of installation is costing the village over the long-term. Luckily, because of the long summer days in northern Saskatchewan, electricity production during the summer months helps to compensate for this lost potential production.

BY THE NUMBERS

Based on actual costs and assuming a price on carbon¹² and annual SaskPower rate increases of 5%, the initiatives will pay for themselves in approximately 7.1 years (annual return of 14.1%) Without the Canada 150 and BullFrog grants, the initiatives would have paid for themselves in approximately 20.33 years (annual return of 4.9%).

Over the first 10 ten years of operation, Green Lake's solar array will save an average of \$5,950 a year. About 17.5 tonnes of greenhouse gases (carbon dioxide equivalent) will be avoided annually. Based on current carbon pricing, Green Lake will save \$88 in carbon levies in 2019, growing to \$219 per year by 2022.

	Electricity \$ Saved	GHGs Avoided (Tonnes CO ₂ e)	Electricity (kWh) Not Purchased	Simple Payback	Return
2017 (partial year)	\$2,532	11.5	17,720	On full cost: 20.33 years	On full cost: 4.9%
2018 (full year)	\$4,054	17.5	26,960	On cost with grants: 7.1 years	On cost with grants: 14.1%

⁸ climateatlas.ca/video/first-Métis-community-owned-solar-project-canada

⁹ www.mbcrradio.com/2018/05/northwest-stakeholders-meet-in-green-lake-to-discuss-economic-development

¹⁰ skfn.ca/2018/05/25/north-west-communities-management-company-westside-economic-development-and-investment-attraction-conference/

¹¹ clean50.com/project/northern-village-green-lake-community-solar-installation/

¹² This will start at \$20/tonne in 2019 and grow to \$50/tonne by 2022. SaskPower is not charged on its full emissions; rather, it is only charged on those above a natural gas generation standard, so only on about 25% of its overall emissions.



MOVING FORWARD

Other northern Saskatchewan communities are looking at what Green Lake has accomplished. Ric Richardson hopes that they will consider how they can implement their own projects, whether they are solar installations or other sustainability innovations. He is hopeful that communities in northern Saskatchewan will learn from each other, and perhaps even come to collaborate on some regional projects. He says that a key to moving forward is to not let the naysayers get you down.

Closer to home, Ric will continue to share his vision of a community that is self-sufficient in terms of electricity. The dream may not

come true for many years, or indeed during his lifetime, but he believes that communities like Green Lake need to dream big to help overcome the economic and social marginalization that history has imposed on them.

Change is difficult, but Ric and Rose see change as an inevitable part of life. The trick is whether we choose to steer that change to address global issues like climate change and local issues like community development, or if we only react to changes imposed on us. The Northern Village of Green Lake is trying to steer the change in its favour.

FOR YOUR INFORMATION

Northern Village of Green Lake: www.nvgreenlake.ca

BullfrogPower: www.bullfrogpower.com

SaskPower Net Metering Program: www.saskpower.com/about-us/media-information/news-releases/saskpower-updates-net-metering-program

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