



First Nations Renewable Energy Projects in Saskatchewan

Background

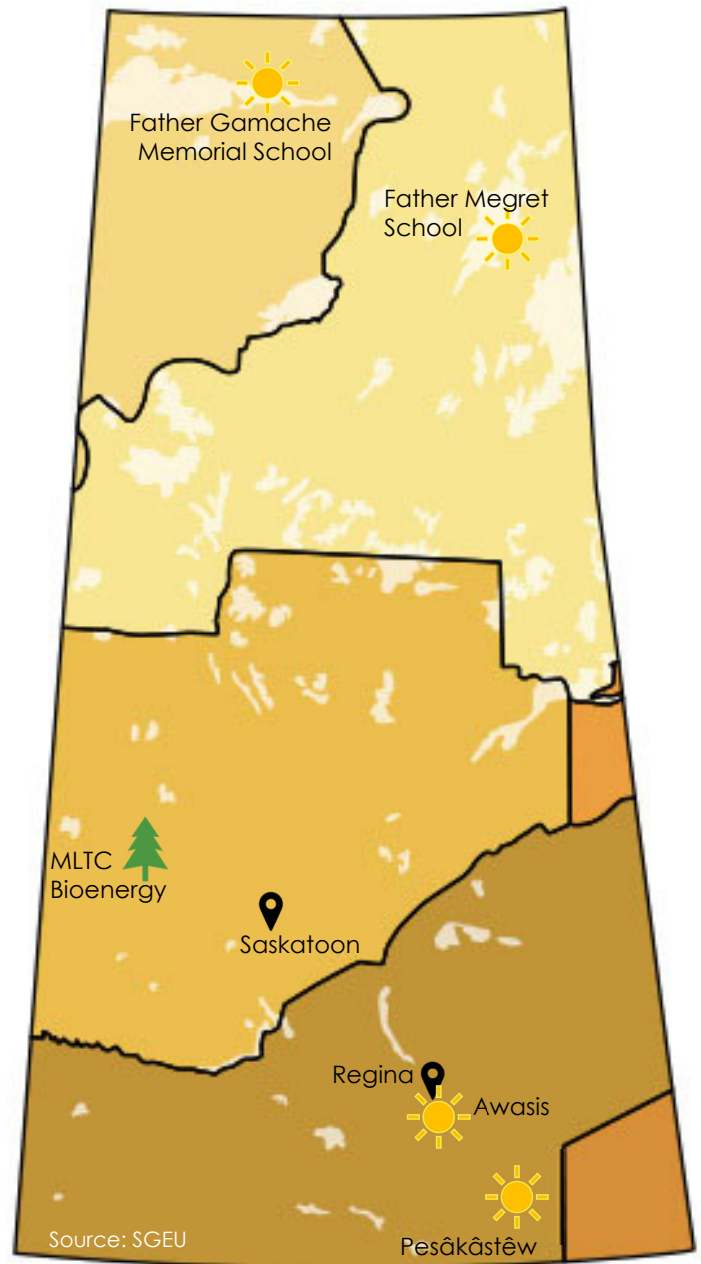
Renewable energy projects are on the rise in Saskatchewan and First Nations are taking part in this movement. In 2022, three major renewable projects started producing electricity for Saskatchewan communities. These are two solar farms on First Nations land and a bioenergy project near Meadow Lake. Among these three projects are other existing and planned renewable energy projects. See the locations of some of these projects on the map.

Truth & Reconciliation Commission: Call to Action #92

The 2015 Truth & Reconciliation Commission made 94 recommendations. Recommendation #92 calls on large companies to adopt the **United Nations Declaration on the Rights of Indigenous Peoples** (UNDRIP) as a guideline for their business. This includes the following:

1. Meaningful consultation with First Nations before projects are developed
2. Giving opportunities to:
 - Aboriginal peoples to have fair access to jobs and education
 - First Nations communities to gain sustainable benefits from economic projects
3. Education for companies' staff to learn about the history of Aboriginal peoples

Below are some recent First Nations' renewable energy projects. As you learn about these projects, consider how the projects are meeting the Call to Action #92.





Pesâkâstêw Solar Project

**George Gordon First Nation
& Star Blanket Cree Nation**

Capacity: 10MW

**~15,000 – 18,000 tCO_{2e} per
year reduced**

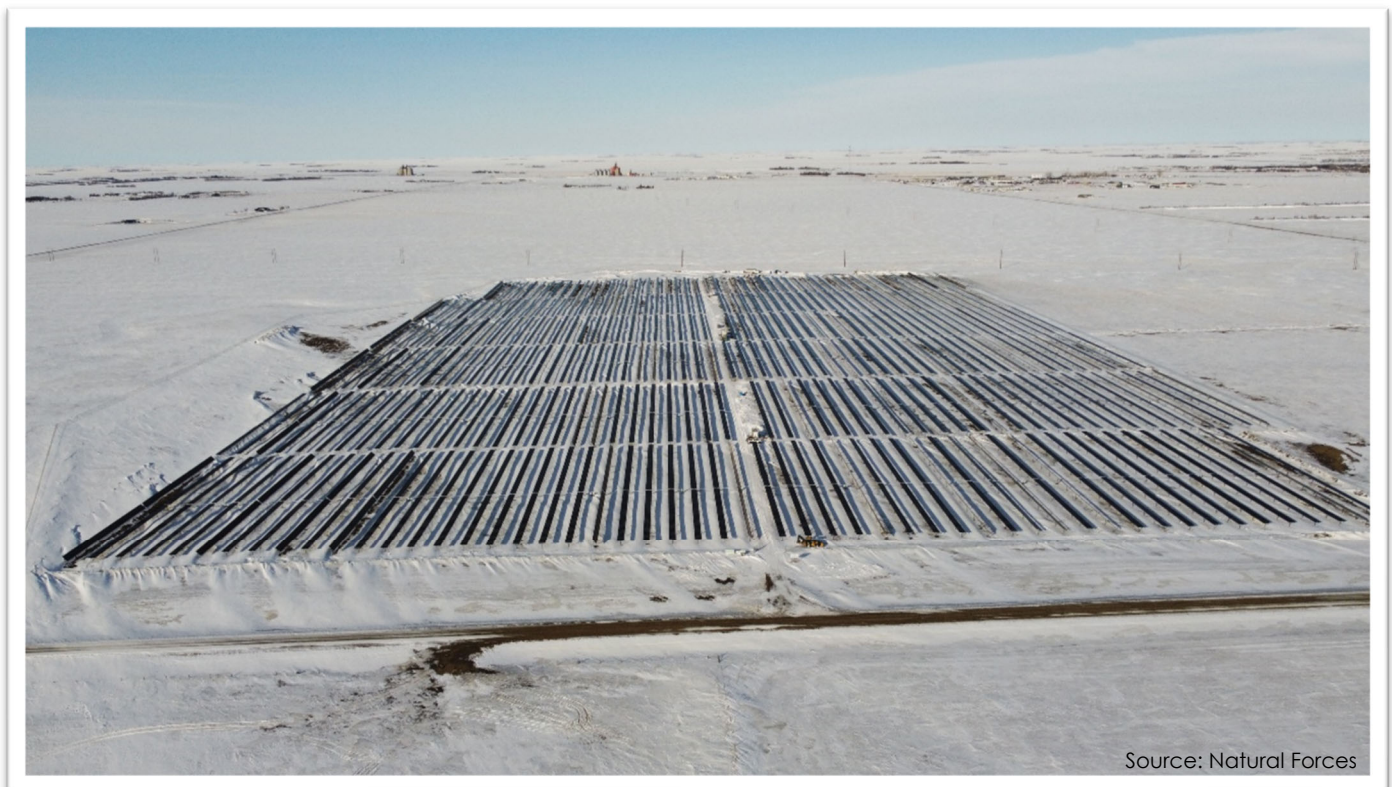
Another 10MW capacity solar facility – this one just outside of Weyburn, SK – is owned by partners George Gordon First Nation, Star Blanket Cree Nation, and Natural Forces Inc. 51% is owned by the First Nations.

Environmental Impact Assessment: Projects like this need to consider the health of the natural environment. Wildlife and vegetation surveys, and visual impact assessments found minimal impact of installing the solar project. The

positive environmental impact is the reduction in greenhouse gases by displacing the need for electricity generated by non-renewable, fossil fuel sources: between 15,246 – 18,150 tonnes of CO_{2e} will be reduced per year.

The project will operate for 20 years. Then the project will be evaluated for:

1. Site reclamation to its former state, OR
2. Retrofitting the panels for continued power generation





Awasis Solar Project

Awasis Solar is a 10MW (megawatt) capacity solar facility (see page 6 for details on **generating capacity**). It has 33,000 solar panels and is located on Cowessess First Nation reserve land. It began operating in 2022.

The project is owned by Awasis Solar Limited Partnership, a partnership between Cowessess First Nation and Elemental Energy.

**Cowessess First Nation
Capacity: 10MW
33,000 solar panels**

Next to this solar farm is an existing renewable demonstration facility:



- 800kW capacity
- Wind generation is variable
- Electricity generated enough for about 300 homes



- 740 kWh storage
- Stores power for calm and cloudy days



- 500kW capacity
- an addition to the wind & storage facility to boost power production



Photo taken by Ynot Media



School Roof Projects

Father Megret Elementary School in Hatchet Lake Denesuline Nation and Father Gamache Memorial School in Fond Du Lac Denesuline Nation had solar panels installed on their rooftops in 2015. The 64kW capacity installations produce some of the schools' electricity.



Did you know?

Most solar panels are designed and tested up to 25°C. Hotter temperatures result in less efficient solar power production. On the other hand, solar panels typically are extra efficient in cold temperatures. (Source: Energy Sage, 2020)

The parts: what is needed for a solar array?

Photovoltaic (PV) panels absorb the sun's energy.

Panel racking system mounts the panels at the best angle to absorb the sun's energy.

Electrical inverters convert the DC (direct current) electricity to alternating current (AC) electricity before it is sent to the grid (see page 6 for description of **the grid**).

Access roads are needed to drive to and from the solar installation.

Additional electrical equipment like wires and control/monitoring systems.





Meadow Lake Tribal Council (MLTC) Bioenergy Centre

This is a bioenergy generating facility fuelled by the waste from the NorSask Sawmill, located about 10km East of Meadow Lake, SK. A sawmill is an industrial plant that collects and processes trees into wood products that people use, like lumber.

Meadow Lake Tribal Council
Capacity: 6.6MW
100% Indigenous owned

Wood processing like these below, generates a lot of wood waste:



How it works: the sawmill waste is burned to heat thermal oils, changing oil to vapour. The vapour then turns a generator to produce electricity.

By doing this, the bioenergy centre generates carbon neutral power: while the waste is burned like before, it now produces electricity. Before, the waste material was burned in one of Canada's last "beehive burner", which is pretty much a big, cone-shaped fireplace for getting rid of all the wood waste.



This project is another example of a way to produce electricity without burning fossil fuels.

"... to complete the process for the usage of **the tree**, that's something that's very important for our Indigenous people so that **there is no waste**" – Tina Rasmussen, Project Lead

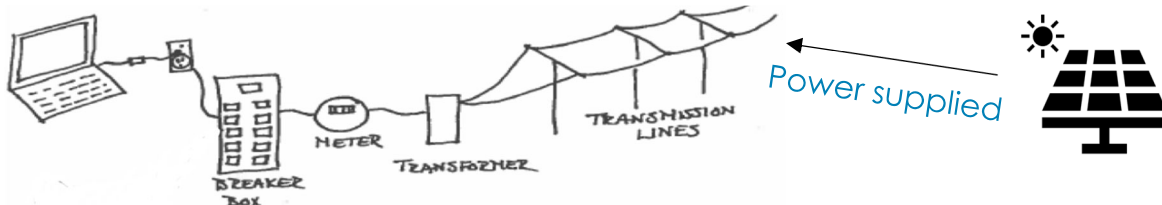


Supplied vs. Capacity

How much is a megawatt (MW)? A megawatt is a measure of power and is equal to 1 million watts. A solar installation with a 1MW capacity supplies enough power for about 200 Saskatchewan homes.

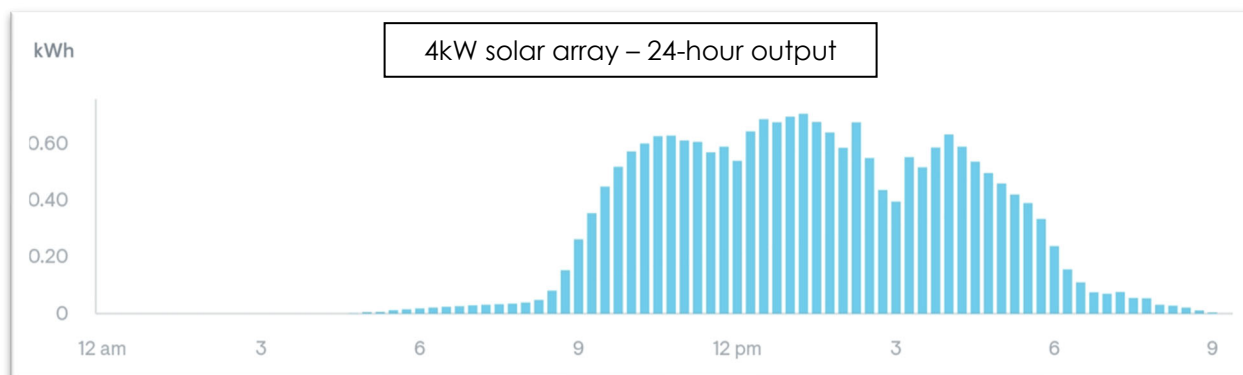
There is a big difference between **generating capacity** of a system and how much electricity it supplies. When we talk about solar panel installations, it is common to mention the **generating capacity**. This is the maximum amount of power that a system can produce at any given time. The **power supplied** is different. It is a measure of the actual power produced, over time. **Power supplied** depends on how much sun energy is available.

Power supplied is delivered to **the grid**. The grid is a system of electrical wires and equipment that transmits electricity around the province from where it is made to where it is produced.



Consider this: The 10MW generating capacity Awasis Solar project can produce up to 10MW (10,000kW) in the best conditions, for example at noon on a sunny day. But at night, those solar panels are generating no electricity. The **generating capacity** remains 10MW, but the **power supplied** changes throughout the day with the changing sunlight.

Below is an example of a 4kW solar array. The generating capacity is 4kW but notice throughout the night it is generating 0kWh, then gradually as the sun rises the **power supplied** increases to a peak supply when the sun's energy is strongest, between 12–2pm. The power supplied is also affected by the cloud coverage and daily temperature. Notice in this example the fluctuating daytime power, most likely caused by periods of cloud coverage.





Curriculum Connections

Grade 5 English Language Arts CR5.4 Read and demonstrate comprehension of a range of contemporary and classical grade-appropriate fiction, script, poetry, and non-fiction (including magazines, reports, instructions, and procedures) from various cultures including First Nations, Métis, and Inuit and countries (including Canada).

Science MC5.3 Assess how the production, use, and disposal of raw materials and manufactured products affects self, society, and the environment. **WE5.2** Investigate local, national, and global weather conditions, including the role of air movement and solar energy transfer.

Social Studies DR5.2 Assess the impact of the environment on the lives of people living in Canada.

PA5.3 Develop an understanding of the nature of the treaty relationship between First Nations and Canada's federal government. **RW5.1** Explain the importance of sustainable management of the environment to Canada's future. **RW5.2** Hypothesize about economic changes that Canada may experience in the future.

Grade 6 English Language Arts CR6.2 Select and use appropriate strategies to construct meaning before (e.g., considering what they know and need to know about topic), during (e.g., making connections to prior knowledge and experiences), and after (e.g., drawing conclusions) viewing, listening, and reading. **CR6.3** Use pragmatic (e.g., function and purpose of texts), textual (e.g., form/genre, sequence of ideas), syntactic (e.g., word order and emphasis on particular words), semantic/lexical/ morphological (e.g., capture particular aspect of intended meaning), graphophonic (e.g., sound-symbol patterns and relationships), and other cues (e.g., the speaker's non-verbal cues) to construct and confirm meaning. **CR6.7** Read independently and demonstrate comprehension of a variety of information texts with some specialized language including grade level instructional materials, non-fiction books, reports and articles from magazines and journals, reference materials, and written instructions.

Mathematics P6.1 Extend understanding of patterns and relationships in tables of values and graphs.

SP6.1 Extend understanding of data analysis to include: line graphs, graphs of discrete data, data collection through questionnaires, experiments, databases, and electronic media, interpolation and extrapolation.

Science EL6.1 Assess personal, societal, economic, and environmental impacts of electricity use in Saskatchewan and propose actions to reduce those impacts.

Social Studies RW6.1 Examine and analyze factors that contribute to quality of life, including material and non-material factors. **RW6.2** Contribute to initiating and guiding change in local and global communities regarding environmental, social, and economic sustainability.

Grade 7 English Language Arts CR7.2 Select and use appropriate strategies to construct meaning before (e.g., formulating questions), during (e.g., recognizing organizational structure), and after (e.g., making judgements supported by evidence) viewing, listening, and reading. **CR7.3** Use pragmatic (e.g., author's purpose and point of view), textual (e.g., how author organized text), syntactic (e.g., main and subordinate ideas), semantic/lexical/morphological (e.g., figurative language and specific word meanings by their context, common affixes, and allusions), graphophonic (e.g., word patterns), and other cues (e.g., non-verbal cues, headings, charts, and diagrams) to construct and confirm meaning when viewing, listening, and reading. **CR7.7** Read independently and demonstrate comprehension of a variety of specialized information texts including non-fiction books, grade-level instructional materials, articles, reports, reference materials, instructions, advertising and promotional materials, and websites.

Mathematics P7.1 Demonstrate an understanding of the relationships between oral and written patterns, graphs and linear relations.

Science IE7.1 Relate key aspects of Indigenous knowledge to their understanding of ecosystems.



IE7.4 Analyze how ecosystems change in response to natural and human influences, and propose actions to reduce the impact of human behaviour on a specific ecosystem. **MS7.2** Investigate methods of separating the components of mechanical mixtures and solutions, and analyze the impact of industrial and agricultural applications of those methods.

Social Studies RW7.2 Investigate the influence of resources upon economic conditions of peoples in circumpolar and Pacific Rim countries. **RW7.3** Assess the ecological stewardship of economies of Canada and the circumpolar and Pacific Rim countries.

Grade 8 English Language Arts CR8.2 Select and use appropriate strategies to construct meaning before (e.g., previewing and anticipating message), during (e.g., making inferences based on text and prior knowledge), and after (e.g., paraphrasing and summarizing) viewing, listening, and reading. **CR8.6** Read and demonstrate comprehension and interpretation of grade-appropriate texts including traditional and contemporary prose fiction, poetry, and plays from First Nations, Métis, and other cultures to evaluate the purpose, message, point of view, craft, values, and biases, stereotypes, or prejudices. **CC8.8** Write to describe a landscape scene; to narrate a personal story or anecdote and a historical narrative; to explain and inform in a presentation of findings, a biography, a documented research report, and a résumé and covering letter; and to persuade in a mini-debate and a review.

Health Education USC8.6 Examine and assess the concept of sustainability from many perspectives, and develop an understanding of its implications for the well-being of self, others, and the environment.

Mathematics P8.1 Demonstrate understanding of linear relations concretely, pictorially (including graphs), physically, and symbolically. **SP8.1** Analyze the modes of displaying data and the reasonableness of conclusions.

Social Studies DR8.1 Develop an understanding of the significance of land on the evolution of Canadian identity. **DR8.2** Describe the influence of the treaty relationship on Canadian identity.

RW8.1 Analyze the social and environmental consequences of living in the Canadian mixed market economy based on consumerism. **RW8.3** Critique the approaches of Canada and Canadians to environmental stewardship and sustainability.

Grade 9 Science CE9.3 Assess operating principles, costs, and efficiencies of devices that produce or use electrical energy. **CE9.4** Critique impacts of past, current, and possible future methods of small and large scale electrical energy production and distribution in Saskatchewan.

Social Studies IN9.4 Determine the influence of worldview on the choices, decisions, and interactions in a society. **PA9.3** Investigate the roles and responsibilities of members of the societies studied and those of citizens in contemporary Canada. **RW9.1** Compare differing perspectives regarding the acquisition and distribution of resources and wealth in the societies studied. **RW9.2** Appraise the significance of trade and transportation in the development of the societies studied.

Grade 10 SCI10-CD1 Assess the implications of human actions on the local and global climate and the sustainability of ecosystems.

Environmental Science 20 ES20-ES1 Examine the methods, mindsets and purposes of environmental science. **ES20-AH1** Assess the impact of human activities on indoor and outdoor air quality and the need for regulations and mitigating technologies to minimize risks to human health. **ES20-AH2** Analyze the production, reliability and uses of geoscience data to investigate the effects of a changing climate on society and the environment. **ES20-HP1** Investigate technologies and processes used for mitigating and managing resource use, waste generation and pollution associated with a growing human population.