

SUMMERSIDE PEI: POWERING CLEANTECH BUSINESSES LOOKING TO EXPAND/BREAK INTO NORTH AMERICA



By Mike Thususka, Director of Economic Development at City of Summerside, Prince Edward Island, Canada

- Summerside the hub of Canada's "Green Province" a testbed for trialling renewable energy sources
- New funding to fuel cleantech growth
- Collaborative support infrastructure—including a "Living Lab"

As Canada strives to reach its net-zero carbon emissions target by 2050, and with the US pledging to slash greenhouse gas emissions in half by 2030, huge opportunities are opening up for companies with innovative cleantech solutions that could advance these ambitious aims.

Making that leap into North America or expanding to seize opportunities, of course, can seem daunting—especially to smaller to mid-size enterprises and spinouts. Just how do you test out the markets, navigate the regulatory processes, recruit the right people on the ground and establish yourself without a big budget?

That mission has been made significantly easier in Summerside Prince Edward Island, a proven testbed for cleantech products and services, and from where companies can readily penetrate the whole North American market and the addition of the Summerside Xchange (<https://www.summersidexchange.com/>). While Summerside is a smaller market, it's part of a very large eco-system—a region of 2.4 million people, a collective GDP of \$105.8 billion and strong trading connections with the USA.

A leader in renewables

Known as the "Green Province", PEI has established itself as a North American leader in renewable energy sources being championed by Summerside – helped by the ready availability of wind and solar power and driven by the fact that PEI has long had to import oil from other parts of Canada, has necessitated Summerside to be bold in its pursuits to make itself energy-independent as rapidly as possible.

Because of that determination, Summerside and PEI has become home to a well-funded public and private sector ecosystem grounded in Summerside, which nurtures innovators in renewable energy, battery storage, passive structures, decarbonization and other cleantech technologies. With the Government of PEI looking to invest further in the future of the sector with a newly-





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launched \$10 million fund for cleantech research and development projects, as well as establishing three tax-free development zones, the future is looking a whole lot greener for Summerside, with significant potential in various clean tech pursuits.

In addition, the nation’s rapid cleantech growth is being turbo-boosted by the recently-announced Strategic Innovation Fund – Net Zero Accelerator: \$3 billion over five years to support sustainable energy and decarbonization projects, scale-up new technology and encourage the adoption of cleantech solutions. Companies establishing a base here will be able to benefit from that.

Other initiatives to support inward-bound businesses into Summerside include a fund to secure investments in zero-emissions products and a plan to cut corporate tax rates for companies in the space by 50% being contemplated by our Provincial leaders.

Sustainability begin at home...

Businesses using Summerside PEI as their launchpad into North America tap into a well-established support network, with a municipally owned infrastructure and its own utility. The Municipal Government takes an active lead by testing innovations, collaborating with the private sector, providing competitive incentives, and offering space at the island’s world-class eco-business park

as well as being part of the island’s unique “Living Lab” initiative: a real-life test and experimentation environment where users and producers co-create innovations.

Skills for a zero-carbon future

Significant advantages for locating here include low labour costs and low corporate tax rates, while the workforce is loyal, with an average tenure rate of 9.3 years—one of the highest rates in the country. Moreover, a well-established skills base is constantly being supplemented by The University of Prince Edward Island producing a flow of qualified graduates with relevant industry experience – including Sustainable Design Engineering.

With many cleantech businesses now looking to tap into the burgeoning clean tech opportunities in North America, Summerside just makes sense as that perfect base of operations

And, if all that wasn’t enough incentive, PEI has to be one of the most attractive places in the world to live as well as work!

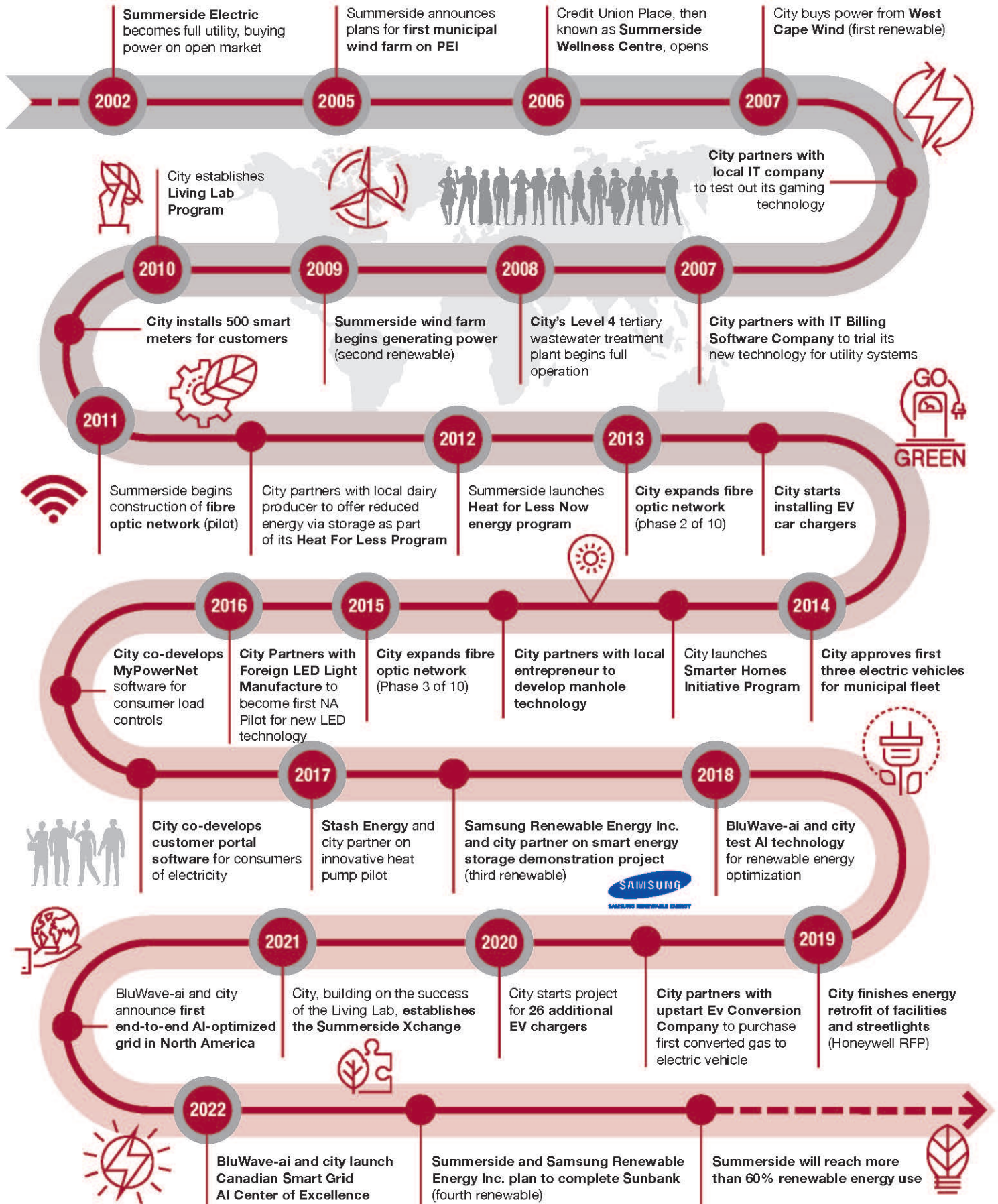
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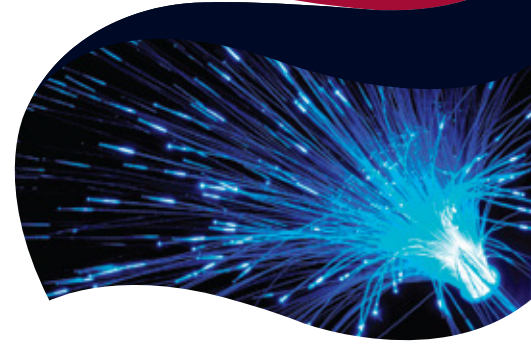
The Evolution of Summerside's Cleantech





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FIBRE PROVIDES NETWORK OF OPPORTUNITY FOR ENTREPRENEURS



The City of Summerside pioneered the bundling of telecommunications and electricity in Canada when creating a fibre optic network as part of its smart grid.

Now, the city wants to find other innovative uses for this sophisticated communications network and partners who can benefit from access to it.

The city started building the bi-directional communications network in 2011, as a way to transmit information between the electrical utility and the smart devices of consumers. The network not only helped modernize Summerside's electrical utility. It left another legacy: a unique opportunity for entrepreneurs to access the network to develop or test products and services.

As of 2022, the fibre optic network extends to approximately 40 per cent of the city—providing a pipeline to the premises of about 2,800 customers. Continued expansion means the city will eventually have fibre coverage to 7,600 customers (approximately 6,750 residential, 970 commercial, and 20 industrial), which could serve as a test bed for projects related to areas such as telecommunications and smart home metering.

Through its Living Lab, the City of Summerside offers a unique openness to work with entrepreneurs who can benefit from access to city infrastructure—such as this robust communications network—to create, refine, and validate their products.

Two internet service providers, Buzz Networkx and PEI Monitoring, now have agreements with the city to provide other services on the network.

SUMMERSIDE SEEKS THE DRIVE AND COMMITMENT OF LIKE-MINDED ORGANIZATIONS TO PARTICIPATE AS PARTNERS AND SHARE IN THE SUCCESS.

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HEAT FOR LESS MAKES THE MOST OF GREEN ENERGY IN SUMMERSIDE



After building its own wind farm, the City of Summerside wanted to ensure its residents benefitted from every green megawatt.

The wind farm generates more energy than the city can use at some times of day. Without storage capacity, the city could only sell the excess energy at a low price on the open market. In 2012, the Heat for Less Now program put that excess energy to use for the community. Under the program, residents and business owners buy special appliances—such as furnaces or hot water heaters—with electric thermal storage. The city's smart grid system detects extra energy produced in off-peak hours and transmits it to the appliances for later use.

Program users receive a guarantee they will never run out of heat or hot water. They also reap long-term savings. The utility can sell the power produced in off-peak periods more cheaply, and the savings from not using oil cover the cost of an appliance in less than five years. The city's energy exports have dropped from 8,500 MWH to 2,615 MWH per year under the program. Overall, the program reduces costs for consumers, cuts oil consumption, boosts utility efficiency, and promotes the city's green agenda.

The program has also left an impressive legacy of high-tech infrastructure. Through extra revenues from federal government funding, efficiency, and selling the wind power in the community, the city paid for the fibre optic network used for electrical communications.

This fibre optic network has modernized the utility for other developments, such as solar panel interfacing. The network also provides endless opportunities under the city's Living Lab—since the city and its entrepreneurial partners now have a communications network they can use to design and test products for use across the globe.

COME AND GROW WITH US HERE, IN BEAUTIFUL SUMMERSIDE!

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SUMMERSIDE HELPS YOUNG INVENTORS TAKE INNOVATION FROM LAB TO MARKET



Three UNB engineering students had an innovative idea: create an eco-friendly heat pump that could store energy, reduce peak loads on the electrical grid, and save consumers money.

Heat pumps reduce the thermal demands of home comfort but put a huge strain on the grid during peak hours. If heat pumps store energy, that energy can be used during peak times and reduce peak loads.

Stash had validated a heat pump with a cost-effective storage solution in their tabletop experiments but not in a real-world setting. How could these young students take their brilliant idea from the lab to the marketplace? The City of Summerside provided the answer.

Staff with the electrical utility and economic development wanted to help the upstart innovator prove its product, deliver real-world market validation, and add to its suite of energy-saving appliances.

Through the addition of storage and control, the Stash heat pumps allow the utility to manage the appliances. In turn, the consumer benefits from lower heating and cooling costs.

The city and Stash Energy officially signed a deal in 2017, with the city investing venture capital dollars, purchasing two prototype units, providing space for testing, and giving the young entrepreneurs technical support as they refined their product. In exchange, the city obtained some equity in the firm and forged a partnership with the up-and-coming Fredericton business that could further the city's own green vision.

The partnership operates under the City of Summerside's Living Lab, which creates connections between entrepreneurs and city infrastructure—in this case opening up Summerside Electric and its expertise to innovative students.

In late 2018, **The Globe and Mail** named Stash Energy a Canadian clean-tech company to watch. By 2022, Stash Energy and the city had reached the pilot phase of their partnership, with five units in use in local residences. The partnership has allowed Stash Energy to move the product closer to commercialization—with the company making inroads in New York, Vermont, Maine, Massachusetts, Nova Scotia, and PEI.

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SUMMERSIDE AND SAMSUNG CREATE GLOBAL FIRST IN SMART ENERGY STORAGE



When Samsung Renewable Energy Inc. wanted to model a large-scale solar energy battery for the North American market, it chose Summerside as the site.

Renewable energy users face a challenge in storing excess energy for later use. Samsung had developed a ground-breaking solar battery for that purpose. However, the global technology leader needed to demonstrate its product and prove the technology.

Creating a demonstration project required Samsung to find an ecosystem with sophisticated technology, a larger scale power user, and an electrical utility with an openness to try innovative products. The City of Summerside could offer a large-scale energy user in its new recreation centre that included two NHL ice arenas, 3,700-seat facility, aquatics centre, fitness centre, bowling lanes, and conference and meeting rooms. The city also boasted the required technical experience at its electrical utility and its willingness to work with entrepreneurial partners in its Living Lab environment.

Samsung Renewable Energy and Summerside officially began their partnership in 2017. Their demonstration project at the city's recreation facility, Credit Union Place, illustrated how a smart storage system could green a facility and save money. With the help of funding partners, the project included the installation of 1,548 solar panels and a 250 KW lithium-ion battery with 890 KWH (a little

over 3.5 hours) of storage capacity. The battery serves as a peak shaver for Credit Union Place and provides 3.5 hours of backup generation. The system saves the facility about \$105,000/year in energy costs, reduces greenhouse gas emissions, and provides a green venue to city residents and the many national/ international events that the facility hosts every year.

The demonstration project has also added to the city's expertise in renewable storage—paving the way for even larger projects in the future.

In the process, Samsung Renewable Energy has showcased the success of its product as the company works to market and install similar systems throughout the continent. A strong commercialization relationship has developed between the city and Samsung Renewable Energy due to this demonstration project, the first of three initiatives by the partners to bring green energy to the community and beyond.

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SUMMERSIDE DRIVES ADOPTION OF ELECTRIC VEHICLES



As part of its commitment to build a sustainable community, the City of Summerside has become a catalyst for the adoption of electric vehicles in the province.

As early as 2010, the city began investigating the purchase of an electric vehicle for its municipal fleet. At the time, electric vehicles were not even available in Atlantic Canada. Four years later, the city planned to purchase three electric vehicles for the fleet. The province, however, needed dealers certified to maintain and support the vehicles.

Still, the city forged ahead. The economic development department urged local dealers to obtain certification in maintaining electric vehicles—a process that eventually enabled the city's purchase of two Nissan Leafs and one GM Spark. By encouraging the certification, the city pushed forward greener transportation in PEI.

The city also showed forward thinking in boosting the availability of vehicle chargers. Through an innovative partnership with Canadian company Sun Country Highway, the city had 40 chargers installed in the municipal area. The city provided green energy credits generated by the wind farm to pay for the chargers, meaning the chargers themselves came at no cost to the city or its residents.

Ten of the chargers were installed at city facilities. Another 30 became part of the Smarter Homes Initiatives Program, bundled into a package of options for residents in a new smart subdivision. The program helped the developer attract buyers, keep workers employed year-round, and sell out the subdivision within a year.

As of 2022, the City of Summerside has five electric vehicles in its fleet and 62 chargers installed in the municipal area. The city now looks to the future when it can add electric half-ton trucks and heavy equipment to its fleet.

SUMMERSIDE CREATES BUSINESS OPPORTUNITIES THROUGH INNOVATION

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SUMMERSIDE SMART GRID SERVES AS TESTING SITE FOR AI TECHNOLOGY



When BluWave-ai needed to validate its AI technology for renewable energy optimization, it found the ideal partner in the City of Summerside.

The Ontario-based company offers software to make use of “big data”—using algorithms to help utilities predict generation from renewable sources like solar and wind to forecast overall energy requirements.

BluWave-ai, however, needed access to real-world utility data to test and refine its artificial intelligence technology.

The company found a partner in the City of Summerside in 2018. Summerside provided the large dataset required for testing and an openness to work with entrepreneurs in its Living Lab environment. For testing, the Summerside grid offered a valuable mix of wind power, solar power, battery storage, smart metering, and utility loads.

The partners conducted a six-month pilot, with BluWave-ai software used side by side with the in-house system at Summerside’s electrical utility.

Using the BluWave-ai algorithms, Summerside Electric saved more than \$200,000 per year and reduced CO2 emissions by thousands of

tonnes. By 2021, BluWave-ai and Summerside had announced the first end-to-end AI-optimized power grid in North America.

As a result of the pilot, BluWave-ai verified and improved its algorithms and documented results it could showcase when marketing to potential clients. The company has since signed multi-year contracts in India, the United States, and Scotland.

BluWave-ai continues to help optimize Summerside’s utility manager software and further the city’s leadership in green energy and net zero emissions. The company has also established a permanent presence.

In 2022, BluWave-ai and Summerside launched the Canadian Smart Grid AI Center of Excellence in Summerside. This real-world AI testing centre for BluWave-ai will develop artificial intelligence software and optimization programs for renewable energy utilities over the globe.

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Ai

SUMMERSIDE GENERATES BENEFITS OF WIND ENERGY



The City of Summerside has become a renewable energy leader, building the first municipal wind farm in Prince Edward Island.

Summerside had three main goals in constructing the wind farm: increase the proportion of electricity generated by renewable sources, reduce the amount spent on power from New Brunswick, and keep more money in the local community.

The city announced its plans for the wind farm in 2005, and had the 12 MW farm operational by 2009. Exploring federal funding opportunities, the city succeeded in constructing the farm with low capital expenditure debt.

The city had previous experience using wind power, through its agreement to purchase 9 MW of wind energy from what is now the ENGIE wind farm in West Cape.

The wind energy from West Cape plus the city's own wind farm provide a total of 21 MW of green energy. That 21 MW displaces the amount of energy the city must buy from NB Power, allowing the city to spend more money at its own utility and in the province. Profits from the city wind farm and money saved from NB Power purchases mean an extra \$2.5 million per year in city coffers for local projects.

Summerside expects its reliance on renewables to reach 60 to 65 percent (21% from the West Cape wind farm, 21% from the Summerside wind farm, and 21% from the Sunbank solar project) by the end of 2022.

SUMMERSIDE HAS BECOME A LEADER IN THE ADOPTION, DEVELOPMENT, AND ADVANCEMENT OF GREEN TECHNOLOGY

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SUMMERSIDE WILL MOVE TO 60% RENEWABLES WITH SUNBANK



An innovative project by the City of Summerside and Samsung Renewable Energy Inc. will demonstrate and commercialize the endless potential of renewable energy.

The use of renewable energy is often limited by the perception of its volatility. An electrical utility can generate power using fossil fuels, but it cannot control when the sun shines or the wind blows. What if technology could help store and manage such renewable energy more efficiently to maximize its use?

That is exactly what Summerside and Samsung Renewable Energy have planned for the Summerside Sunbank. Scheduled for completion in 2022, this clean technology project combines a solar farm and large-scale battery storage to provide a stable power source. The project offers the potential to further green Summerside's electrical grid, generate wealth in the community, and break down some of the technical barriers in green energy use for power utilities.

The \$66-million project includes a 21 MW solar power farm (48,000 solar panels) plus a 10 MW/28 MWH battery storage system, with the solar farm located on a city well-water field to maximize the use of the land base as a source of clean drinking water and clean energy for residents.

Completing the project will increase Summerside's reliance on renewables to more than 60 per cent (approximately 42 per cent wind and 21 per cent solar) of its energy use. With

more renewable power generated and stored in the city, the project will also keep more dollars in the community.

Finally, this municipal project will showcase the potential of net zero energy to other communities and utilities across the globe.

Other key partners in the project include Aspin Kemp & Associates, the Federation of Canadian Municipalities, and the federal and provincial governments.

Samsung Renewable Energy has been a key partner in Summerside's Living Lab, which offers access to city infrastructure to explore entrepreneurial opportunities that offer real-world solutions.

Sunbank incorporates similar technology as that used in a demonstration project by Summerside and Samsung Renewable Energy at the city's recreation facility in 2017.

The two partners have plans for a third-phase project and a joint venture to explore related opportunities in Summerside and beyond.

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SUMMERSIDE TAKES GREEN LEAD IN WASTEWATER TREATMENT



When the City of Summerside needed to replace aging wastewater infrastructure, it saw an opportunity to build a greener community.

The city built the first Level 4 tertiary plant in PEI. The goal was simple: ensure the highest level of treatment for effluent before it reaches Summerside Harbour.

The city began construction in 2006 and had the plant fully operational by 2008. The tertiary BNR system removes ammonia, phosphorus, and nitrogen from the wastewater. In the process, the plant helps preserve the local environment, including nearby grounds harvested in Prince Edward Island's famous shellfish industry.

The Summerside project also incorporated an innovative use of the waste sludge that results from wastewater treatment. Instead of simply shipping off the sludge as little more than a waste for land application, the plant uses it to produce biofertilizer for local farmers. As of 2022, the Summerside plant produced about 5,000 tonnes of the biofertilizer every year—reducing costs for farmers and offsetting the production of synthetic fertilizers in the process. In building its high-level plant, the City of Summerside took advantage of funding programs through partnerships with federal and provincial governments.

Though the city's water and sewer rates increased after the construction, the new plant provides invaluable benefits. Summerside has become a greener city, protected the local shellfish industry, and provided a valuable product for farmers. The high-level treatment also works to keep clean both Summerside Harbour and Green's Shore Beach on the city's waterfront.

The city is now looking to reduce the carbon footprint of the plant's processes, as it continues its commitment to a green agenda.

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