

False Bay School: Community Partnering for an Off-Grid Solar Switch



Community partnering and dedicated support for a solar energy installation on Lasqueti Island paid off in cost savings, reduced greenhouse gas (GHG) emissions, educational spin-offs, and a more tranquil community setting. This kind of solar energy project can work for many remote, coastal, off-grid communities, and is scalable to larger populations.

Project Summary

In 2008, a local resident and parent of a student at False Bay School on Lasqueti Island began looking into ways of reducing the school's carbon footprint. At the time, the school's electrical/heating system was running two 25-kilowatt generators more than 12 hours a day, 7 days a week. It burned a lot of diesel, over 90 litres a day, and made a lot of noise, with the generators sometimes starting up at 5am if the batteries were low.

Students and staff were onboard immediately. Lasqueti Island is the only sizeable Gulf Island that is off the provincial power grid, and many of its 400 or so locals were already using alternative energy sources to power their homes. Students commenced a fundraising initiative, an annual 'Climb to the Top of the Mountain' for pledges, and in the first few years, raised \$3000. That seed money eventually grew into more than \$300,000, with federal, provincial, and foundation contributions.

The False Bay School solar energy project consists of five ground-mounted solar arrays, each 20 meters long by 3 meters wide and tilted to the south on a 3 meter high aluminum bracket. The arrays feed energy into an electrical building, where converters deliver power to the school and charge batteries to store electricity for future use. The project supplies heat and electricity for the two-classroom, 460 square meter school, along with teacher residences and a telephone system.

Today, the generators are silent for almost six months of the year. Instead of running 4550 hours per year, they average 1550 hours, and the summer months are peaceful. Diesel consumption is down almost 75% and service costs have been cut in half. Battery life has almost doubled. When the payback period is over in less than 10 years, Lasqueti will essentially be powering their school for free.

The school district is now planning to add one solar project per year for the next few years, beginning with a solar panel installation on a high school roof in Qualicum Beach. The board of trustees has embraced the goal of clean energy, and SD#69 is looking ahead to a sunny future.

GHG Reductions & Savings

- The project is expected to reduce CO₂ emissions from diesel for electricity generation by about 27 tonnes per year.
- Fuel costs alone are down almost 75%. Lifetime replacement costs of generators and batteries, along with their maintenance costs, will add to the long-term savings.
- Total budget was \$300,000. The solar component has a payback period of 7.1 years, with a minimum 25-year expected lifetime.

System Specs

- Ground-mounted photovoltaic, hybrid diesel-photovoltaic system plus storage
- 134 x 315W polycrystalline (42.2kW) photovoltaics
- Inverters: 3 x SB 9000TL-US, 2 x SB 7000TL-US, 2 x SI6048-US (plus 2 existing)



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Making the Case

In November 2011, the Board of Education was asked by the Ministry of Energy and Mines to confirm its support for a BC Remote Community Integrated Energy Project proposed for Lasqueti Island, and to outline its financial commitment. The Board replied with a letter of support for the project.

In October 2014, the Director of Communities and Transportation contacted the school district to inform that a funding arrangement had been reached with partners, including a Natural Resources Canada contribution of \$237,000. They were also interested in discussing project timelines, budget and investment plan.

From there things began to move quickly with a presentation to the Board in December, which included a request for additional funding for the project. On January 27, 2015 a Memorandum of Understanding was signed between the Islands Trust, SD69 Qualicum, and the Province to work collaboratively to finish the project. The Board of Education committed an additional \$75,000 to support completion of the project.

Once the solar installation was complete, the Board committed an additional \$100,000 for improvements to the school building to ensure that energy saving gains were not lost through an inefficient building envelope.

In the early planning phase the team considered wind, micro-hydro, wood gasification, biomass (solid wood, chips, pellets) and solar hot water, but the return on investment did not look promising. Solar photovoltaic looked better, so they conducted a feasibility study, an analysis using custom models of power and heat, and a financial analysis before developing a preliminary design for tender. HAKAI Energy Solutions was awarded the job, and construction began in 2015.

Other schools in the province were going solar, but were connected to the BC Hydro grid. The False Bay School project would be off-grid, with a hybrid of solar, batteries and diesel all working together. Working in a remote community like Lasqueti presented formidable logistical challenges, with building materials not readily available. Everything, including concrete poured for foundations, had to be brought in on a barge. Inclement weather, shallow bedrock, limited communications and a restrictive ferry schedule added to the complications and expense.

There was some disruption to the normal flow of life on the island, but the community was fully supportive, dropping by frequently to check on progress, and chatting with the crews. The contractor, HAKAI Energy Solutions, treated it like a community project, engaging with the townsfolk and hiring locals whenever possible.

Lessons Learned

1. Find a 'champion' to lead the project, ideally someone knowledgeable about high-level systems planning.
2. Leverage internal funding and community support into bigger contributions from government.
3. Demand management is essential. Figure out exactly where the power is going and why; each system is unique.
4. Consider solar even if your area gets a lot of precipitation. It's not exceptionally sunny in Lasqueti, but there were still huge reductions in GHG emissions and costs.
5. A project like this is a huge undertaking. If you think you need three years, allow five.



Results

The project was expected to reduce the use of diesel fuel to generate electricity from about 16,000 litres to about 6,000 litres per year, resulting in savings of about \$16,500 per year. In fact, diesel consumption is turning out to be lower than expected, reduced by almost 75% to about 4,000 litres per year.

In addition, several thousand dollars will be saved each year on maintenance and capital costs of the diesel generators, as well as reduced CO₂ offset fees. Over the lifetime of the facility there will be a CO₂ emission reduction of 814.65 tonnes and a savings of \$587,800.

One of the most visible benefits of the project is a monitoring display screen in the lobby of the school. Every day students and parents walk by it and see real time and historical production figures for the solar array and batteries, including carbon offset, equivalent number of trees planted, and costs savings per hour. The dashboard is a valuable educational asset, and keeps the project top of mind among the public.

The False Bay School solar energy project was part of a larger Lasqueti Community Integrated Energy project, which also included a solar PV installation at the Judith Fisher Health Centre, the fire hall, recycling centre, internet centre, and the central telephone equipment building. Project support came from all levels of government and several foundations:

- \$203,000 in federal funding from NRCan's ecoENERGY Innovation Initiative which was delivered via the Province's BC Remote Community Integrated Energy Project and the Islands Trust;
- \$44,000 in provincial funding through the Remote Community Implementation Program (administered by the Fraser Basin Council);
- \$22,500 from the Solar BC Program which was delivered by the BC Sustainable Energy Association;
- \$17,000 from Vancity/Real Estate Foundation of BC's Green Building Program;
- ~\$13,000 from the Islands Trust (through the Province's Community Action on Energy and Emissions initiative);
- \$75,000 from School District 69;
- an initial \$3000 that was raised by False Bay School student fundraising efforts to start the project off; as well as
- additional funds, in-kind contributions or donations from the Province's Ministry of Energy and Mines, Lasqueti Last Resort Society, False Bay PAC, and the Lasqueti Community Association.

The project culminated in Lasqueti receiving the 2016 Community of the Year award from the Clean Energy Association of BC.



Related Resources & Links

- SD69 Article, "Solar Energy comes to False Bay School" June 2016
<https://www.sd69update.ca/2016/06/01/solar-energy-comes-false-bay-school/>
- BC Sustainable Energy Association, "Solar Photovoltaic"
<https://www.bcsea.org/solar-photovoltaic-0>
- Lasqueti Integrated Community Energy Project Final report
https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/electricity-alternative-energy/transportation/lasqueti_public_report_en.pdf
- BC Government Community Energy Case Studies
<https://www2.gov.bc.ca/gov/content/industry/electricity-alternative-energy/community-energy-solutions/community-energy-case-studies>
- Natural Resources Canada, BC Remote Community Integrated Energy Project (BCRCIE)
<http://www.nrcan.gc.ca/energy/funding/current-funding-programs/eii/19388>
- Environment Canada Report (2010), "Assessment of the environmental performance of solar photovoltaic technologies"
https://www.ec.gc.ca/scitech/B53B14DE-034C-457B-8B2B-39AFCFED04E6/ForContractor_721_Solar_Photovoltaic_Technology_e_09%20FINAL-update%202-s.pdf
- EcoSmart Provincial Maps
<https://ecosmartsun.com/canadian-solar-maps-province/>

Government Funding Programs

- Natural Resources Canada, Energy funding
<http://www.nrcan.gc.ca/energy/funding/4943>
- B.C. Government, PSO Funding Information
<https://www2.gov.bc.ca/gov/content/environment/climate-change/public-sector/resources>

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