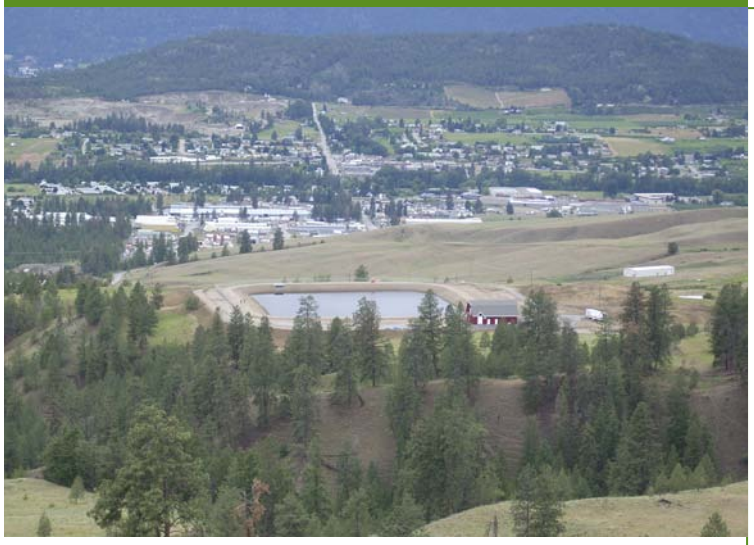
District of Lake Country explores hydroelectricity

District of Lake Country, British Columbia

energy

Green Municipal Fund Case Study



Lake Country's micro-hydroelectric generation plant will break the pressure of water as it enters this reservoir and simultaneously generate electricity (Photo: District of Lake Country).

District of Lake Country Eldorado Reservoir Hydroelectric Project (GMEF 7088)

Date project completed: August 2007
Total project value: $146,500
GMF grant: $73,250

- **The District of Lake Country evaluated the feasibility of building a small hydroelectric plant.**
- **One of three sites analyzed was deemed economical.**
- **The proposed plant will produce about 3,871 megawatt hours of electricity per year, enough to supply close to 400 homes and generate revenue of more than $332,000 per year.**
- **The plant will also eliminate about 68,000 tonnes of greenhouse gas emissions over 35 years.**

OVERVIEW The District of Lake Country investigated the feasibility of generating hydroelectricity within its existing water supply system. Analysis showed that using the mainline at the Eldorado reservoir would be economical and would not damage or disrupt current operations. The proposed micro-hydroelectric generation plant will break the pressure of water as it enters the reservoir and simultaneously generate electricity. The plant is expected to produce roughly 3,871 megawatt hours of emission-free renewable energy per year — enough to supply about 387 homes and generate about $332,589 in annual revenue.

PROJECT TEAM

District of Lake Country
Planit Management Inc.
Brazier-Vera and Associates
Sigma Engineering
Summit Environmental Consultants Ltd.

CONTEXT The District of Lake Country is a growing rural community north of Kelowna in the Okanagan Valley. Two pressure-reducing stations in Lake Country's waterworks had reached the end of their usable life. Instead of building new ones to break the pressure of water coming down the pipeline from Swalwell Lake, the idea of generating hydroelectricity resurfaced. It had been raised about 15 years earlier by a local electrical engineer, but wasn't considered feasible until a balancing reservoir was built to ensure the security of the water system for the area's 9,800 residents and the agriculture industry. In the spring of 2007, the Eldorado reservoir was installed to improve the water system's hydraulic stability and flexibility, and so the district's mayor and six councillors decided to pursue the hydroelectric project.

APPROACH Lake Country's district council asked staff to further explore the feasibility of generating hydroelectricity. Of the three sites that were initially reviewed, one was found to be economic.

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This site, the Eldorado reservoir, was then studied further to determine design details, regulatory feasibility and market feasibility.

The district applied to the province for an additional water licence to use the existing permitted water capacity to generate power. After examining the possibility of connecting to BC Hydro's grid, the district obtained a long-term electricity purchase agreement with BC Hydro at an economic price.

The district hired one consultant to handle project management, and another to oversee all electrical aspects. The mayor acted as liaison with environmental groups and First Nations in the province. The district also organized a watershed tour for councillors and key stakeholders. Council and the public received updates on the project's progress over the course of four public meetings, which were televised and often resulted in media reports. Newsletters were also mailed out regularly with utility bills.

RESULTS Capital costs to build a hydroelectric plant were estimated at $2.1 million. The project was awarded a $2-million grant from the federal Gas Tax Fund.

The plant was expected to include an offtake from the existing main water system to a powerhouse with a turbine generator, a channel leading into the reservoir and one kilometre of 25-kilovolt power line to connect to the grid. It would produce emission-free renewable energy, and the noise would be similar to that of a small pump station.

In producing 3,871 megawatts of renewable energy per year, the plant would displace the combustion of either natural gas or coal. The plant would also reduce greenhouse gas emissions by recovering energy that would otherwise be wasted by a pressure-reducing system in the waterworks. Nitrogen oxide and sulphur oxide emissions would be avoided, but the primary benefit would be a reduction of roughly 67,743 tonnes of carbon dioxide emissions over the plant's estimated 35-year life.

Although BC Hydro offered to buy the district's green credits associated with the clean energy produced, the district planned to use the credits against its other greenhouse gas emissions in support of its strategic sustainability plan.

NEXT STEPS Council approved implementation of the project in September 2007. General construction was to start in September 2008, with the plant scheduled to be commissioned in May 2009, about five months behind schedule primarily because of delays in the delivery of equipment. The estimated capital cost was also increased by about $1 million. The district planned to apply for the highest EcoLogo rating, which assures consumers that a product or service meets stringent environmental standards. Now council is looking for additional ways to be innovative, environmentally friendly and more sustainable.

LESSONS LEARNED District utility manager Jack Allingham's advice to any municipality considering a similar project is to "be patient." Although Lake Country owns the land and the pipeline involved, it still had to deal with numerous regulatory agencies. "It's like trying to swim in molasses," Allingham says. It was also "interesting to watch a government agency spun around and put into the shoes of a contractor," says Allingham, referring to the district having to bid to get the electricity purchase agreement with BC Hydro. "One moment we're getting treated like we're a private contractor whose only motive is profit, but then they realized we're local government, so we represent the community."

Overall, the project benefited enormously from educating the public and keeping citizens informed, Allingham says. "People hate nothing worse than to be left in the dark."

CONTACTS

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ADDITIONAL RESOURCES To read the full report or to learn about other GMF-funded initiatives, please visit the GMF website at <www.fcm.ca/gmf> or contact us at 613-907-6208 or at gmf@fcm.ca.

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About the Green Municipal Fund

The Government of Canada endowed the Federation of Canadian Municipalities (FCM) with $550 million to establish the Green Municipal Fund™ (GMF). The Fund provides low-interest loans and grants, builds capacity, and shares knowledge to support municipal governments and their partners in developing communities that are more environmentally, socially and economically sustainable.

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