

District of Chetwynd Windmill Project

Background



The District of Chetwynd is located in the foothills of the eastern slope of the Rocky Mountains in North Eastern British Columbia and is BC's entrance to the Peace River region. Chetwynd is a small community of approximately 3,000 residents but the area is rich in oil, gas, coal and timber. Local resources and manufacturing industries reflect these assets. Ranching, tourism and the service sector round out Chetwynd's diversified economy.

Chetwynd's 'Windmill Project' began in the fall of 2004 as one component of participation in the national 'WinterLights Celebration Program'. Organizers wanted to light up the trees that line the esplanades running along the boulevards on the north side of Highway 97, but found that using

traditional electricity to power the lights would be cost-prohibitive. Therefore, it was decided to use wind-powered generators (windmills) to run the lights.

Chetwynd installed four windmills, some 27 metres high, beside majestic 24 metre trees that line the esplanades on the boulevard. These windmills power a total of 5,250 decorative lights that are arranged on the tree trunks. The lights are white, energy efficient LED lights. While the project was essentially completed in 2004, 2005 saw improvements to the power storage systems as well as re-arrangement of the lights making the project an ongoing matter.

The lighted trees are lit all year round for everyone to enjoy. Eventually it is hoped that the windmills can be used to power other equipment and/or projects thereby reducing Chetwynd's dependence on conventional energy sources. The decision makers in Chetwynd have adopted leading edge technology and demonstrated the foresight and vision to understand the financial and environmental benefits of wind power.

To the best of our knowledge – at this time – Chetwynd is the first and only municipality in British Columbia to use wind power to supply part of its energy needs.

Innovation and Excellence

Electricity from the wind is a renewable energy system that does not deplete the world's finite fossil fuel resources. Nor does it pollute or warm the atmosphere or generate hazardous waste. Ultimately, most people will have to get their electricity from renewable resources such as wind or solar power to the benefit of all.

Perhaps coincidently, since the installation of these windmills, we have an investment of some \$800 million to install a 300-megawatt and a 94-megawatt commercial windmill project in our area. These projects are expected to create 250 construction jobs in 2006 and 2007 with 30 to 40 on-going operational jobs. The creation of the windmills has enhanced the District of Chetwynd's reputation as a progressive green municipality and as the most liveable community in BC.

Judges from the WinterLights Program were extremely impressed with the environmentally friendly initiative, noting that it is "very innovative, forward thinking". Even the lights used on the trees speak to Chetwynd's commitment to the environment by being white, energy efficient LED lights. Chetwynd has been both a pioneer and part of the solution to pollution prevention and the problems of eco-system management.

Implementation and Maintenance

In August of 2003, the Council of the District of Chetwynd passed a resolution to participate in the 2004 WinterLights Celebration Program – a partner program to the successful summer "Communities In Bloom" program in which Chetwynd has participated for several years. Planning for the event was passed onto the Community Improvements Committee and, in the fall of 2004, it was decided to light up the trees on the boulevards which line one side of the highway running through town. The trees would be lit year round and would provide illumination of the esplanades which run the lengths of the boulevards. To reduce the costs and usage of electricity, the Committee opted to use wind-powered generators (windmills) to run the lights.

Four 27-metre high windmills were built, each generating enough power to light up 25 trees and a total of 5,250 lights. The windmills are installed on free-standing Titan Self-Support Towers which require only minimal footprint area and are both lightweight and of commercial duty material. The towers can support a maximum antenna area of up to 8.9 square metres and maximum antenna weight (vertical force) of up to 660 kilograms. They can survive up to 160 kilometre per hour winds.

The towers/windmills were built on the boulevards beside the trees to be lit up. Tower height minimum is 7 metres above the trees or any obstacles within 100 metres. The original design called for guide wires over a forty foot radius but, due to the size/shape of the boulevards, this was not feasible and also would have been a major safety hazard. The new design, without guide wires, required pilings 7.5 metres in length/depth and movement is expected to be minimal.

The wind generator itself is a Whisper Wind Generator (Model H-80) manufactured by Southwest Windpower from Arizona and includes a generator, blades, tail fin, tail stalk and nose cone. A controller on the system monitors voltage, current, energy production and wind speed. These parameters are measured to ascertain system parameters (ie. battery voltage) and turbine state (i.e. whether power is being generated).

Chetwynd's windmills require winds of approximately 14 kilometres per hour to operate but have a battery which stores power for use during windless periods as well as periods of high demand. The lights could be run 24 hours per day, non-stop, but are currently on a timer set to

light up from 7:00 p.m. to 7:00 a.m. The blades can handle up to 120 kilometre per hour winds. There is the possibility of increased use of the windmills by the installation of additional batteries.

The total cost of the project was \$64,317.00, which can be broken down into two components:

- The cost of \$25,204.00 which would have been incurred regardless of whether the source of power was wind, solar or regular hydro; and
- The cost of \$39,113.00 incurred for the installation of the towers.

Maintenance of the system will cost approximately \$1,500.00 per year for all four towers. The windmills will need lubrication annually and maintenance of the lights will include re-tying and replacement as and when necessary. The battery life is expected to be better than five years.

Lessons Learned

Technology Issues: At first the project called for the use of guide wires attached to the boulevards to hold the windmill towers in place however said guide wires were not usable as designed – the wires would not fit on the boulevards. This led to a design/installation change from guide wires to self supporting towers. Then, the base plates supplied with the self-supporting towers were of insufficient size and did not meet specifications. New base plates had to be designed and fabricated. Both problems might have arisen because of a lack of knowledge as to what was required to safely hold the towers in place. More preliminary research into the subject of windmills and how they needed to be adapted for our use might have eliminated these problems.

Communication: At times, better communication between the various departments coordinating the project – Council, Council Committee, Public Works Department and an outside contractor – might have led to a smoother implementation of the project.

Project Sustainability and Policy Framework

Two of Chetwynd's goals in its Official Community Plan are "to improve the environmental quality within the Chetwynd area" and "to take advantage of the magnificent environmental features of the Chetwynd region". Chetwynd is located in a valley and therefore air quality is a very important issue. Harnessing Chetwynd's substantial wind energy to produce power which does not pollute the atmosphere is in perfect balance with both these goals.

With proper maintenance, there is no reason that the towers and windmills will not last for many years to come. With the installation of additional batteries on the existing windmills, more energy could be captured and used for many other purposes. As well, the successful use of windmills for this project lends credence to the idea of installing additional windmills in the future for use on a much larger scale. (See Page 2).

Project Rewards

The lighting of the boulevard trees in Chetwynd and the use of wind power has provided many social benefits for the municipality. The trees were “sold” for \$100.00 to members of the community for sponsorship. In front of the trees that were sold, miniature “North Pole” signs were placed recognizing the purchaser or memorializing a loved one or simply offering holiday wishes.

Community interest was proven by the purchase of fifty-seven trees (or 100% of the trees available) for a total initial public contribution of \$5,700.00 which covered some costs and which will help pay for maintenance in future years.

The entire project demonstrated Council’s commitment to Chetwynd and its economy by the hiring of a local contractor who has an extensive background in wind and solar power installations. Originally, the Committee investigated the use of solar power. However, we were fortunate to discover that we had a local person with the expertise and experience to guide us in this matter and the decision to switch from solar to wind power was made and the purchase of this equipment was based on the contractor’s recommendation and on price.

The windmills have also sparked interest from other communities and various groups which helps to enhance Chetwynd’s community identity and marketing plan. Information requests have been received from the ski club in nearby Dawson Creek as well as from businesses and individuals interested in using windmills for cottages, farms and various other projects.

Chetwynd has received special recognition from the (national) WinterLights Celebrations organization; recognition from Member of Parliament Jay Hill and MLA Blair Lekstrom; and personal compliments from Adriane Carr, Leader of the BC Green Party. As well, in September, 2005, Chetwynd received a 2005 Community Excellence Award from the Union of British Columbia Municipalities in the ‘Leadership and Innovation’ Category for the Windmill Project.

For More Information

To learn more about the wind-powered LED lights, contact Garry Kaulbach at the District of Chetwynd at kaulbach@gochetwyn.com.