



# Using wastewater to irrigate short rotation crops delivers dual dividend

By Tony Kryzanowski

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The Canadian Wood Fibre Centre (CWFC) can help communities and the forest industry use short rotation woody fibre crops like willow and hybrid poplar to safely dispose of treated municipal wastewater and municipal and pulp mill biosolids.

This method also helps produce a valuable cash crop that can be harvested for use in energy production or bio-chemicals, and as such contributes to rural sustainability in forestry and agriculture communities.

The practice of using short rotation woody crops for bioremediation is already well established in Europe and CWFC has been working since 2006 to create a model suitable for use in North America.

Through coordination with Alberta Innovates Bio Solutions, Alberta Municipal Affairs, forestry companies, and municipalities, it has been established five demonstration sites that successfully show how treated municipal wastewater and biosolids can be safely used to irrigate and fertilize short rotation woody crops. The same opportunity is available to other communities across Canada faced with having to improve their municipal waste treatment systems.

In addition to costing substantially less than an investment in a conventional engineering waste treatment system, communities also benefit by creating a valuable cash crop and local jobs related to the management and harvesting of plantations. Municipalities have the option of using the woody fibre themselves as a potential energy resource or selling it to

forestry companies. Martain Blank, CWFC Wood Fibre and Bioremediation Technician, says,

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**One of the benefits of the woody fibre crop could be as a potential biomass stream for use in biomass boilers and heating systems**

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That is exactly what Camrose Country is doing with a demonstration site it has established in the community of Ohatan, Alberta. The short rotation woody fibre grown as a result of the community using its municipal wastewater to irrigate a willow plantation will be used as a fuel source to provide 80 per cent of the country's municipal building heating needs. CWFC also has demonstration sites in Beaverlodge, Whitecourt, Clairmont and the City of Edmonton.

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Blank says that there is strong evidence showing that developing a system to dispose of municipal wastewater by using it to irrigate and fertilize a short rotation woody crop costs only 30 to 40 per cent compared to the cost of an engineered waste treatment system. This represents a significant financial saving to rural forestry and agricultural communities that may have a limited tax base to draw upon to invest in new wastewater treatment systems to deal with either population growth or loss of population.

To help communities decide on their best option, CWFC is developing an online decision support tool that can be used to compare the capital costs of the short rotation woody fibre disposal method versus an engineered waste treatment system. The tool will also factor in the financial benefit derived from using or selling the wood fibre. Communities will also be able to fine-tune their calculation depending on if their purpose is simply to treat wastewater as well as generate a sustainable short rotation woody fibre crop. This second option requires more land so that communities have a crop to harvest each year. The decision support tool is expected to be available by April 2012.

CWFC research has shown that municipalities could dispose of five million litres of treated wastewater per hectare per year, irrigating short rotation willow plantations of about 15,000 stems per hectare. To a great extent, this will determine the size of community where this system would be viable because it is highly dependent upon available plantation land. The plantation will generate a cash crop every three years and it must be harvested.

Forest companies can also benefit by tying their fibre needs into this disposal method. Richard Krygier, Canadian Forest Service intensive fibre management specialist, says forest companies using municipal wastewater to fertilize hybrid poplar and aspen in large stem, high yielding afforestation plantations – where the end product is a log rather than biomass – can shorten the crop's growing cycle. On one demonstration site near the town of Clairmont, Alberta involving the use of municipal wastewater generated by the town and Grande Prairie Country to irrigate a hybrid poplar plantation, the growth cycle of the plantation is expected to be reduced from about 25 years to 18 years.

CWFC has partnered with Ainsworth Engineering Forest Products, the Country of Grande Prairie, Aquaterra Utilities Ltd. And Grand Prairie Regional College on this project. In addition to generating new fibre sources for existing production of forest products, Krygier says using this method may also help forest companies produce woody fibre as feedstock for new ventures.

“A lot of this wood can potentially be channelled toward new bio-product systems that are being installed by forestry companies,” he says. In addition to wastewater, municipal and pulp mill sludge that typically builds up at the bottom of storage lagoons can also be used as an organic fertilizer on short rotation woody fibre plantations.

CWFC is working to develop a network among existing demonstration site communities and industry representatives that the public can access as a resource to help answer questions about using this method of wastewater and sludge disposal as well as production of short rotation woody fibre crops.

Visit [www.albertainnovates.ca](http://www.albertainnovates.ca) for more information on Alberta's public research and innovation system or <http://bio.albertainnovates.ca/> for more information on AI Bio.

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