



# RETSCREEN<sup>®</sup> INTERNATIONAL

RENEWABLE ENERGY  
DECISION SUPPORT CENTRE



## CASE STUDY

REAL PROJECT

03

## BIOMASS HEATING PROJECT

COMMUNITY/DISTRICT HEATING / QUEBEC, CANADA

RETScreen<sup>®</sup>  
Customer Support

www.retscreen.net  
rets@nrcan.gc.ca  
+1-450-652-5177  
+1-450-652-4621

*Cette publication est aussi  
disponible en Français.*

CANMET Energy  
Diversification Research  
Laboratory (CEDRL)

In collaboration with:



### Disclaimer

This publication is distributed for informational purposes only and does not necessarily reflect the views of the Government of Canada nor constitute an endorsement of any commercial product or person. Neither Canada, nor its ministers, officers, employees and agents make any warranty in respect to this publication nor assume any liability arising out of this publication.

© Minister of Natural  
Resources Canada 2001 - 2002.

### RESULTS

In 1992, the Oujé-Bougoumou Cree Band Office near Chibougamau (approximately 250 km north west of Roberval, Quebec, Canada) contacted the CANMET Energy Technology Centre of Natural Resources Canada. The Band Office was planning a new community and wanted to know whether it would be possible to install a district energy system similar to that used in the recently closed Distance Early Warning (DEW) radar station in Chibougamau. Specifically, they wished to know whether a biomass-fired district energy system would be more cost-effective than heating with electrical baseboard heaters or oil-fired furnaces in each building.

The original study, prepared by a consulting engineer and sponsored by CANMET, demonstrated that a district energy system using biomass for base load and oil-fired boiler for peak load would be cost-effective. During the summer of 1992 construction started on the village with a low temperature (90 °C) biomass-fired district energy system.

In 2000, biomass provided 89.2% of the energy used to fuel the district heating system and accounted for approximately 17.8% of the fuel costs. In that year, the system generated 7,688 MWh of heat using biomass and 873 MWh using oil.

The community of Oujé-Bougoumou has received many awards in the domain of sustainable development:

- The United Nations honoured the community with the "We the Peoples: 50 Communities Award," in the category of Human Settlements. This was an award issued to commemorate the 50th anniversary of the founding of the United Nations.
- The Together Foundation and the United Nations Centre for Human Settlements (UNCHS) worked as partners in 1995 to compile a "knowledge base" of best practices for human settlements, collected from communities around the world. The Technical Advisory Committee cited Oujé-Bougoumou as one of the top initiatives, and the community was awarded a Best Practices designation.
- In 1994 the Canada Mortgage and Housing Corporation (CMHC) awarded Oujé-Bougoumou honourable mention in a competition for housing innovations in the category of "Technology and Production."
- In 1995 the United Nations Association awarded the community the "Global Citizen" award in recognition of Oujé-Bougoumou having built a community which was both environmentally and people-friendly.



Natural Resources  
Canada

Ressources naturelles  
Canada

Canada

## SYSTEM DESCRIPTION

In 1992 the community installed a 1,200 kW biomass boiler from KMW Energy of Ontario and a 1,500 kW oil-fired standby and peaking boiler. The biomass boiler was also fitted with a back-up oil-fired burner. The distribution system consisted of 600 metres of steel pipe and approximately 2,300 metres of plastic pipe. Pipe sizes varied from 108 mm down to 32 mm. The first years construction included 40 residential units and 5 public buildings.

The energy system, district heating pipes and energy transfer stations that were installed in 1992 cost approximately \$1.3 million. The boiler plant and main distribution lines were designed to accommodate the growth of the community expected during the first 5 years.

The village expanded and by the year 2000 the system was connected to 89 detached homes, 11 duplexes, 11 four-plexes and 17 public buildings. By that time, the system consisted of two wood-fired boilers and two oil-fired boilers for back-up and peaking.

Sawdust is purchased for \$6/tonne and residents pay \$192, on average, every two months for their heat and hot water.

## LESSONS LEARNED

- The use of local labour must be maximised to build competence and reduce installation costs and time.
- The relatively short construction season in a northern location makes careful planning critical.
- Construction can be slowed significantly when a few critical parts or tools are missing. It is important that spare parts and all tools are transported to the site.
- The building of the community should be planned to avoid empty lots.

## THE BIG PICTURE

When a community is built or expanded a district energy system should be considered. With a central energy production plant, biomass and other renewable technologies can provide base load energy and thus be utilised more efficiently. These system can also take advantage of variable utility rates better and include technologies, such as heat storage, that are not suitable for smaller loads. District heating and central boiler plants incorporating renewable energy systems have been built around the world and have proven to be reliable and cost-effective.



Oujé-BOUGOUMOU COMMUNITY

PHOTO CREDIT: Oujé-BOUGOUMOU CREE NATION

## REFERENCES

- Meloche, Nathalie, "Personal communication," CANMET Energy Diversification Research Laboratory, 2000.
- Natural Resources Canada, Buyer's Guide to Small Commercial Biomass Combustion Systems, 2000.
- Oujé-Bougoumou – The Place Where People Gather, website: <http://www.ouje.ca/expo2000/index.html>
- Snoek, Chris, "Personal communication," CANMET Energy Technology Centre (CETC), 2000.
- Ziegler, Urban, "Personal communication," PEMtec, 2000.