



# **Biomass - The Revelstoke Experience**

**Presentation at the  
Community Energy Association's  
Renewable District Energy in Cities  
Conference  
February 28, 2008**

# Outline

- Brief description of the Revelstoke community energy project
- Reasons for doing the project
- Project financing
- Keys to success
- What did we learn ?
- The future



## Project Description

- Heat Only Project
- 1.5 Megawatt Biomass Boiler
- Wood “waste” from Downie Sawmill
- Plant produces steam for sale to Downie’s dry kiln
- 2.0 km of District Heating Piping to major buildings in the City Core for Heating and Domestic Hot Water



# Plant and Fuel Bin



**Plant Building**



**Fuel Bin**

# Boiler and Pipeline



**Plant Boiler**



**CES Pipeline**

# Heat Exchangers



**Main Plant**



**Minto Manor**



# Why Revelstoke Did This Project

- Improved air quality
- Step toward silo burner elimination
- GHG displacement
- Propane import displacement
- Alternate energy source
- Non-taxable, non tax source of City revenue
- Incremental plant expansion opportunity
- Value-added use of wood “waste”
- Local processing of local resources



# Advantages to Downie and CES Customers

- Long term stable energy pricing
- No need for a boiler and maintenance of same, with space saving in building
- A “Win-Win” solution to wood “waste”

# Client Base

- Arena
- Revelstoke Senior Secondary
- Minto Manor
- Community Centre
- Aquatics Centre
- Powder Springs Inn



# Project Costs

- \$5.6M Project
- ~\$3.0M for Central Plant and Equipment\*
- ~\$1.6M for Phases 1 & 2 of CES\*
- ~\$0.6M for Energy Transfer Stations\*
- Balance for construction financing, developer's costs, etc.

\* Includes design and engineering



# Sources of Financing

- RCFC Holding Co. Equity \$1.25M
- City Pref Share Purchase \$1.0M
- FCM GMF Loan @ ~3.5% \$1.348M
- FCM GMF Grant \$1.348M
- Revelstoke Credit Union \$1.0M



# Financial Summary

- Simple Payback – 10 years
- Return on Investment – 6.5% (Over 25 years)
- Return on Equity – 13.8% (Over 25 years)



## The Results

- Approximately 2% over budget at commissioning
- Water contamination of thermal oil
- Heat exchanger failures
- Learning curve on boiler operation - fuel feed modifications, adjustments for variations in fuel
- Failure to meet first year revenue projections & significant extra costs to rectify problems



## Keys To Success

“Necessity is the Mother of Invention”

- A committed Council with a will to complete
- Availability of financing
- Broad support from an informed, self-confident community
- A project champion
- A committed corporate citizen
- Hiring of proven, effective staff & consultants
- Luck and timing

# What Did We Learn?

- Staffing rules in BC antiquated (Sweden <20 MW unmanned and remotely monitored).
- Fuel supply guarantee crucial.
- Start-ups are always fun.
- Customers have difficulty understanding seasonal boiler efficiency, and its impact on rates.

# What Did We Learn?

- Funding crucial – 10 year payback required 25% grant, 25% at 3%.
- Power generation on a small scale unlikely economical unless gov't subsidized.
- Private Sector Financing – frustrating
- Make sure you understand co-generation costs and financing.

# What did We Learn?

- Tax Payers must be protected with adequate guarantees and commitments.
- Citizens take great pride in being part of a community that works towards protecting the environment.
- Political climate much better now for environmental projects.
- Never be cheaper than now.

Would we do it again?

- Absolutely



# Future Potential

- Extensions of CES
- CED opportunities - veneering, additional dry kilns, green housing, log defrosting.
- Attractive energy source for new construction
- Plant expansion and/or satellite plants

# Thank you

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