

Technical Reports

BC Coastal Forest Sector Hem-Fir Initiative

Forest Biomass Availability for Bio-Energy in Small Communities on the BC Coast

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Abstract

This study presents estimates of energy consumption and logging residue availability for bio-energy in 37 small and remote communities on the BC Coast. Eight communities had sufficient biomass available from logging residues to sustain their entire heating and electricity consumption, while 17 communities had sufficient biomass to sustain only their heating consumption. If forest biomass was utilized for heat and electricity in these communities, approximately 5,000 tonnes of CO₂ emissions could be avoided annually.

Considering the energy efficiency of various combustion technologies, chips for district heating boilers and modular combined heat and power (CHP) units required the least expensive feedstock, at 0.13 \$/kWh and 0.14 \$/kWh, respectively. When capital costs of combustion technologies (chip/cordwood boilers, modular CHP units), their pipe networks and operating and maintenance (O&M) costs were included, none of the communities with sufficient forest biomass were economically feasible compared to their current energy costs. The pipe network was the highest cost component (37-56% of total cost), followed by combusting technologies (14-45% of total cost) and O&M costs (11-37% of total cost). The biomass feedstock costs were 6-11% of total cost.

Although the heat demand is significantly higher than that of electricity in small communities of the BC Coast, the high pipe network cost is a major obstacle in implementing biomass heating projects in these communities. To minimize the pipe network costs, biomass heating projects could be implemented for large public buildings or clusters of buildings. The results also suggested that electricity generated with biomass modular gasification CHP systems may be feasible in off-grid communities that rely on diesel generators and have sufficient biomass supply. A combination of government support and conservation programs may be required to encourage investments in small scale bio-energy projects on the BC Coast.

Keywords: Small scale, biomass, BC Coast, community, heating, residue and energy consumption

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