

mill in Ontario, where it will burn mill waste. This technology produces gas for heat, and can be adapted to produce synthesis gas which can be used to produce liquid fuel (methanol). There are several other Canadian actors in wood gasification, including the B.C. Research Council.

- (vi) anaerobic digestion - considerable research is underway in this area in Manitoba, Ontario and Quebec, for digestion of farm wastes and sewage. Canada's principal contribution would be in the development of this technology for operation under cold weather conditions.
- (vii) alcohol fuels - Canada has enormous supply potential for methanol, from coal, natural gas or residual oil as well as biomass sources. The economics of large scale production favour coal or natural gas, but the advantages of renewability and wide distribution have sustained interest in biomass as a feedstock. The regional economic benefits have attracted some provinces to this option. In some locations, cheaper, more competitive biomass feedstocks are available.

Considerable research has been done in Canada on biomass-based production of methanol, particularly from synthesis gas produced by the fluidised bed gasification technique. The market in Canada however is currently limited by constraints on the use of methanol in engines designed for hydrocarbons, particularly in Canada's harsh climate. Further technological developments may resolve these problems. Because of its enormous supply potential Canada could become a leader in methanol technology, and could expand export markets for the fuel, and for technological expertise.

Less research has been done on ethanol or butanol from biomass, but the potential for major technical advances makes this now a very attractive option for Canada. Of the two main methods of hydrolysis, the basic process for producing ethanol or butanol, the enzymatic route shows greatest promise, and is advancing rapidly toward cost-effectiveness. Canadian firms have pioneered the development of an inexpensive pre-treatment process for lignocellulosic materials. Several private firms are active in this area, and government support of R&D is to be expanded. Cellulosics (wood) and wastes are the most likely candidates for feedstock: in Canada, agricultural crops tend to have a higher value as food or feed, although dedicated crops are grown for ethanol production in other countries. Canada now produces industrial grade ethanol from waste pulp liquor and