

## **Markets and Policy for Forest Biorefining: Current Status and Outlook**

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Increasing demand for energy, rising energy prices, environmental concerns over the use of fossil fuels, national security concerns over the dependence on foreign oil, and growing public preferences for a cleaner environment are stimulating the demand for forest-based bioenergy. One potentially important concept for achieving these objectives is the so called integrated forest biorefinery (FB), i.e. a production unit integrated to existing pulp and paper plant producing pulp, paper and biofuels (e.g. biodiesel, ethanol, mixed alcohols) and power. The concept has received increasing attention particularly in Finland, Canada, Sweden and USA. Pilot plants have already been constructed, and commercial scale plants are hoped to be ready some time after 2010.

Issues related to FB are complex and depend on particular circumstances and production processes, and on a number of uncertain developments (energy and carbon credit prices, policies supporting bioenergy, etc.). Also, the concept of FB is of a recent nature, and the research on FB is typically still very much scattered under different disciplines, specialized on particular issues, and somewhat different across countries. Currently, there is a lack of research giving an overview and syntheses of the knowledge across the disciplines and countries. The purpose of this paper is to provide a synthesis of the current knowledge of FB, particularly as related to Canada, Finland, Sweden and USA. It summarizes the results from various studies, points out the essential implications, and discusses the open questions. The paper concludes by discussing how the energy and forest products markets, and national and international policies may affect the outlook for FBs.