Lignin recovery

A technology worth replicating

Fast facts

Technology: **Lignoforce System™**
Replicability: **Strong potential**
Capital cost: **$14 to 33 million**
Output: **High quality lignin from black liquor**

Success story

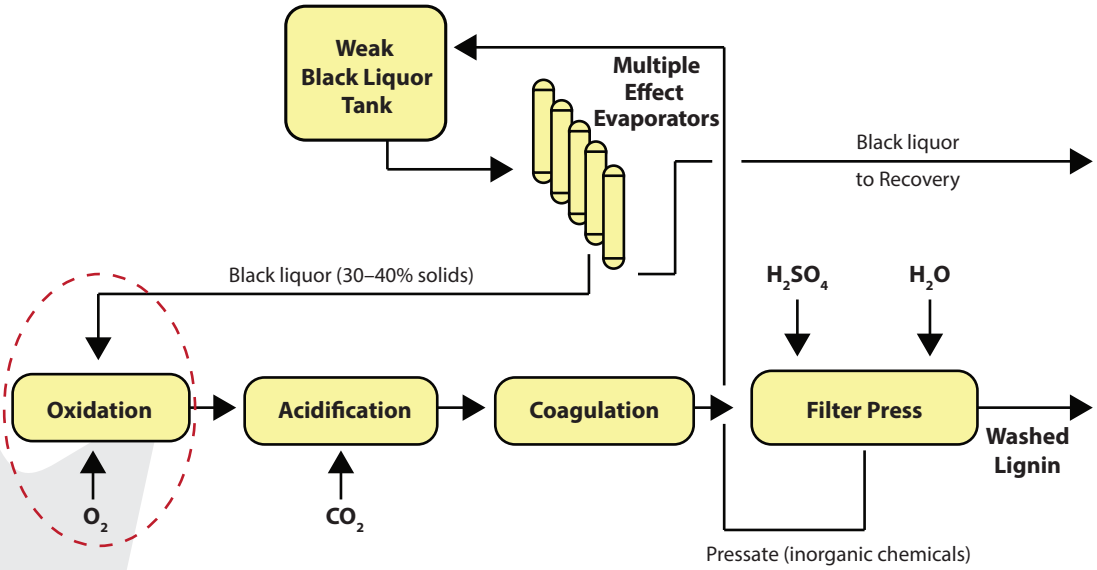
West Fraser implemented a technology to produce 30 tonnes per day of high-quality lignin from black liquor. Lignin can be used to add value by increasing strength and other properties of materials, as an **anti-oxidant, a renewable substitute or a fuel source.**

The new lignin recovery plant is based on extensive pilot plant operations and is the **first of its kind in the world.**

Advantages of lignin recovery[1]

- Low capital cost
- "Bolt on" technology for a pulp mill to debottleneck their recovery boiler and produce additional pulp
- Potential to leverage a pulp mill's existing, capital-intensive infrastructure to produce high-quality lignin, the value of which can be up to ten times higher than that of its current use as a fuel
- Production of high-quality lignin that would maximize the benefits of forest resources

How it works



Source: KSH Consulting

Need funding? Access the Canadian Business Network database of government grants, loans and financing options at **canadabusiness.ca/eng/program/search/** for opportunities in your region.

[1] KSH Consulting

Canada

Technology maturity (very high)

Has the technology been commercialized outside Canada?

- West Fraser's operation is the first of its kind in the world.
- Lignin precipitation technology has proven effective at the pilot level and now on a commercial scale. The main risk is the possibility that the quality of the lignin will not meet expectations, which could reduce the possibilities for product substitution in some value-added applications and push the replication site to use the extracted lignin as a fuel.

Ease of implementation (very high)

How easily can the technology be replicated, with regards to process complexity, capital costs or intellectual property issues?

- Similar lignin technologies have been shown effective on a commercial scale and implementation of the unique aspects of the lignoforce system™ would not represent an insurmountable risk for a potential replication site.

Potential for replicability (high)

Are there multiple sites available with the potential to facilitate such a project?

- This technology has the potential to be replicated in over 25 operating kraft mills in Canada.
- The replication of this technology for the internal use of lignin as fuel can be attractive. It also debottlenecks the recovery boiler in order to produce more pulp.

Market opportunities (high)

Is the relative market size targeted by this technology accessible?

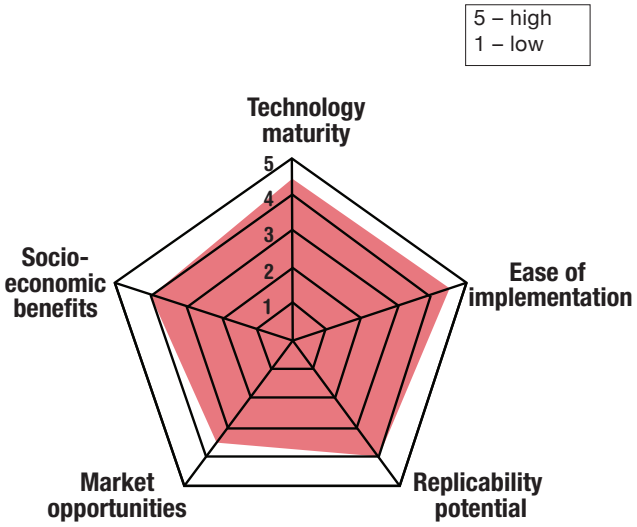
- One of the main challenges will be to find and develop new market applications. Several product lines that might be of interest for market development have already been identified, such as phenols and polyols, motor fuel, binders, activated carbon, carbon fibres, plastic materials and sorbents, with some of this market already being occupied by sulphite-based lignosulphonates.
- Recent changes to provincial and federal building codes will further open markets in Canada for Passive House standard applications on both residential and commercial building sectors.

Socio-economic benefits (high)

Would the project lead to job creation opportunities, environmental benefits and the potential to transform the industry?

- The Hinton project has created an estimated 7.5 new full-time positions required for lignin plant operations, product handling, transportation and product development.

Replicability Radar Diagram



Disclaimer: This replication analysis is based on the technology implemented under the project funded by IFIT. The IFIT program does not endorse any specific technology provider and has produced this brief analysis for the benefit of those considering implementing this type of project.

Is it suitable for you?

- ☑ The first requirement for this process is a source of lignin, in this case black liquor from a kraft mill.
- ☑ Oxygen is necessary for the process as it is a key component in bleaching operations.
- ☑ Carbon dioxide is used to precipitate the lignin prior to filtration and needs to be readily available.

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