



BioChoice™ Lignin: the Launch of a New Bio-Based Product Platform

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Michigan Biomaterials Conference

Traverse City, MI
October 3, 2013

About Domtar



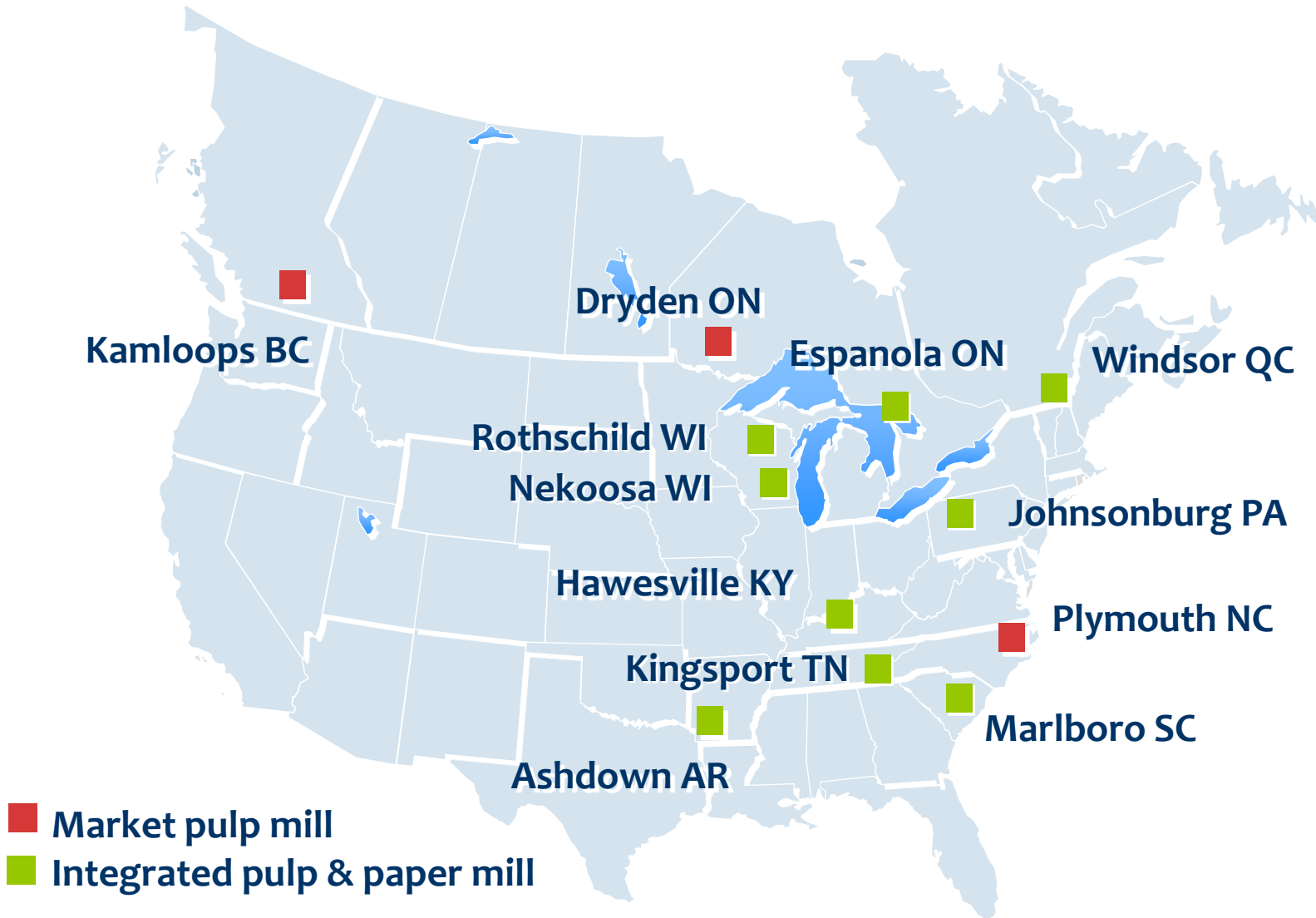
- Primarily pulp and paper with growth in personal care and consumer products
- “The Sustainable Paper Company”; EarthChoice™ paper brands, 15 years of FSC certified grades, partnerships with WWF, Rainforest Alliance, others.
- More than 9,000 employees worldwide.
- Listed on NYSE and TSX. Greater than \$5 Billion annual sales, approximately \$1 Billion EBITDA
- Primary manufacturing sites in Canada and the U.S.

Fortune 500
S&P 400 Mid Cap
Russell 1000 Index

Index Listing



Domtar's Chemical-Pulp Manufacturing System (12 sites)



Domtar's Fleet of Pulp Mills (or Bio-refineries)



Operational supply chain for procurement and conversion of more than 20 million tons per year of woody biomass



8 million tons per year of biomass processed in boilers and co-generation turbine systems



Over 500 Megawatt hours of power generation



Process over 6 million tons cellulose, 2 million tons lignin, 1.5 million tons hemicellulose and 15,000 tons extracted wood chemicals per year.



Over 4.5 million tons of bleached pulp fiber per year in both market pulp and integrated paper facilities (high volume and specialty grades)

Innovation is a Core Value at Domtar



Our vision is to be a leader in fiber-based innovation

- We will partner with best-in-class collaborators to develop new fiber-based products and markets.
- Seek to capitalize on our existing supply chain, infrastructure, and the unique capabilities and opportunities they offer.
- Create a portfolio of
 - different products
 - short-, intermediate-, and long-term initiatives
 - both tactical and strategic elements.
- Several “small” bets; recognizing likelihood of delays and some failures.

Domtar Bio-Refinery Program: Three Major Collaborations Announced



Battelle

The Business of Innovation

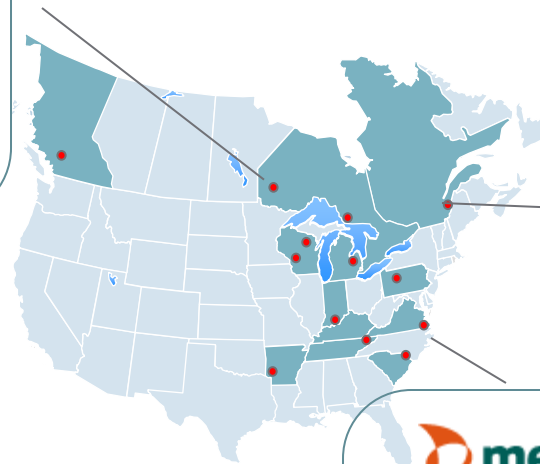
Catalytic Fast Pyrolysis Dryden, Ontario

- Bio-fuels/bio-chemicals from available, low value wood streams
- With support from CRIBE



Nano-crystalline Cellulose (NCC) Windsor, Quebec

- First scale plant for manufacture of NCC
- Market and applications development.
- In partnership with FP Innovations, and supported by NRCAN and Quebec Provincial Government.



LignoBoost™ Technology Plymouth, North Carolina

- De-bottleneck mill, increase production
- Start with Lignin as a bio-fuel for internal and external applications
- Use as a platform for new product and applications development
- Lignin – a new family of material?
- With support from USDA-NIFA BRDI program

- Three major initiatives announced.
- Several others in pipeline.
- Numerous smaller, application-type collaborations also in progress.

Introduction: BioChoice™ Lignin



- BioChoice™ Lignin is Domtar's newest pulp mill by-product offering.
- A low ash, kraft lignin isolated from pulp mill black liquor.
- First grade is produced in Plymouth, NC mill (Southern Pine) using Metso's Lignoboost™ process.
- Long term aspiration: multiple grades and mills; different wood sources; modified or upgraded lignin grades.
- The largest, and most advanced of several new bio-based product development initiatives.
- A platform for building a new, bio-based product portfolio.

Why Kraft Lignin, the Lignoboost™ Process, and the Plymouth, NC Mill?



Kraft Lignin in Black Liquor:

- Domtar already produces over 2 million tpy of black liquor, all presently used for internal fuel. Processes and chemistry part of our core business and competencies.
- 25 to 50% of this can (potentially/practically) be isolated and made available for external sales.
- Industry wide, 20x to 30x these volumes are available - practical market drivers and critical mass exist.
- “Relatively” easy access and low capex and opex. Most of the work already accomplished in pulping.
- Most importantly, the present gap between internal fuel value and anticipated external sales values (less capex/opex) suggest acceptable margins can be achieved ***if and when*** markets are developed.
- Potential volumes/revenues from isolated lignin could make a significant contribution to core business. Potential for even greater contribution exists through modified or upgraded lignin.

Kraft Lignin: The Market Development Dilemma



Supply Assurance Requirements: The development of suitable applications and markets requires a sufficiently large/reliable/consistent supply of quality product.

+

Take-Away Assurance Requirements: In order to produce such a supply, major capital investment and risk required. Furthermore, an economic disposition for this supply is needed during the interim market development period.

+

Unfavorable Risk/Reward and Market Conditions: Historical spread between lignin internal fuel value and external nets did not warrant capital investment/risk. Nor did market receptiveness.

=

Limited Supply and/or Market Development (especially for Kraft lignin).

Kraft Lignin: The Market Development Dilemma (cont.)



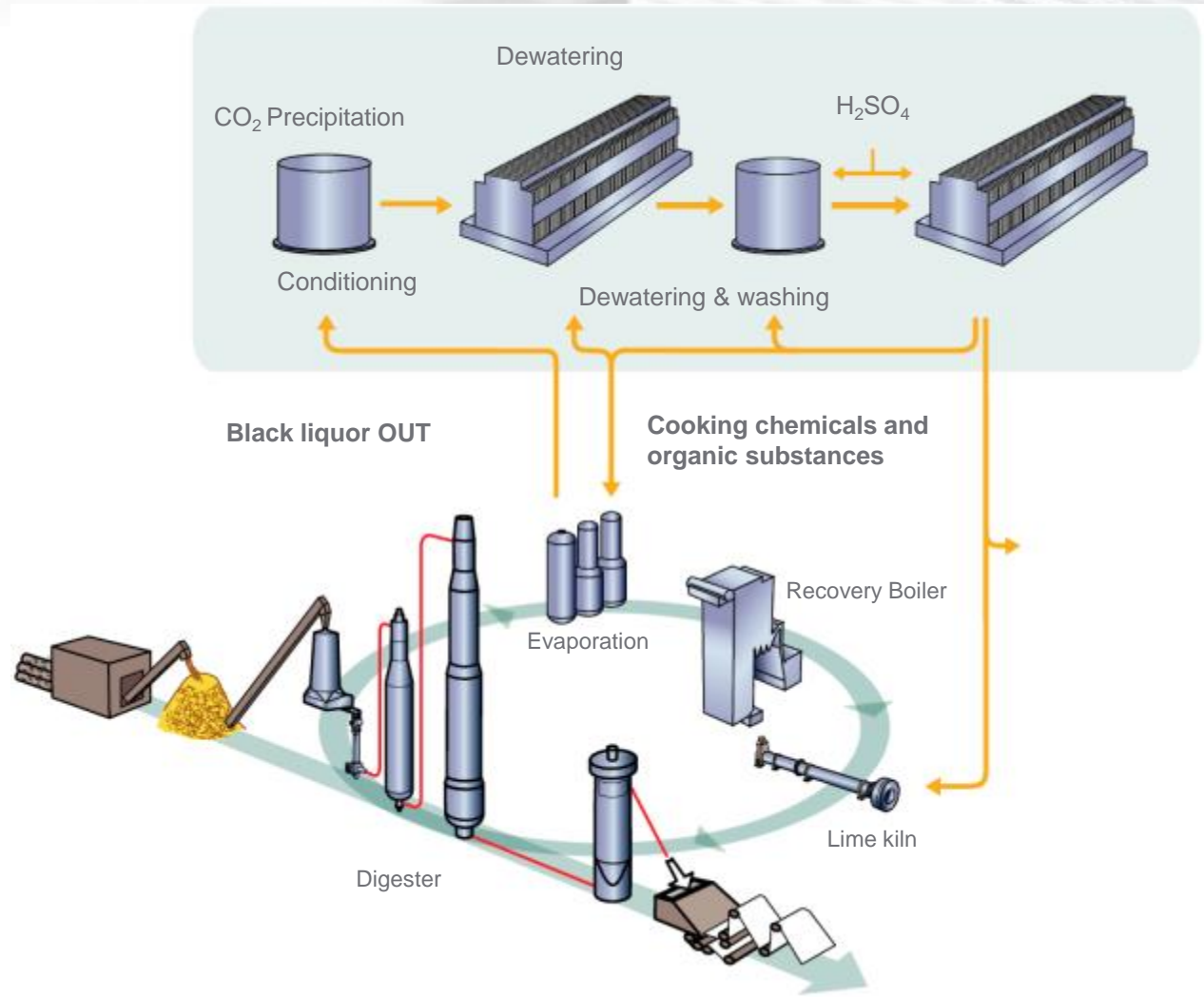
Recent Developments Have Changed the Dynamic:

1. Anticipated spread between internal fuel value and anticipated external sales value (net of capex/opex) has improved → acceptable returns.
2. Lignin as a renewable alternative to fossil fuel derived feedstock - sustainability now more than a tie-breaker, a potential market-pull?
3. Unique synergies specific to the Plymouth NC mill resulted in capital risk and cost mitigation, and an assured interim takeaway.

Rationale for Metso Lignoboost™

Why Lignoboost™?

- Reliable technology supplier; an established vendor and project partner.
- Advanced process and machinery design with acceptable references.



Rationale for Plymouth NC Mill



A Good Starting Point: Lignin Removal as a Stand Alone Project

1. Historical shift in grade structure led to Recovery Boiler bottleneck of 5%. All other unit operations/permits are good for an additional 75 tpd of pulp. Lignin removal from black liquor enables incremental production increase.
2. Market/business demand for additional pulp production.
3. Ability to shift lignin fuel load to existing (oversized) biomass boilers.

As a result, lignin removal at Plymouth was a stand alone capital project based on marginal production, reduced unit costs, and improved mill efficiencies.

A Platform for Development of New Bio-Based Product Portfolio

1. Ability to eventually displace lignin in biomass boilers with low cost regional biomass (hog fuel). Lignin available for external use as required.
2. Low cost and low risk demonstration of reliable/consistent supply.
3. Low cost and low risk platform for development of new, value added products.

Lignin Product Applications Development



1. ***Solid fuel*** for internal and external applications (*NCSU, customers, others*)
2. ***Lignin/Thermoplastic compounds*** (*NCSU, NRC, customers*)
3. ***Emulsifiers*** for different applications (*NCSU, customers, others*)
4. ***Fuel additives*** (*NCSU*)
5. ***Polymer precursors*** (*NCSU*)
6. High performance ***adhesives and resins*** (*FPL, customers*)
7. ***Polyurethanes*** (*Georgia Tech, customers, others*)
8. ***Carbonaceous*** applications including fiber (*NCSU, ORNL, FPL*)

“Integrated Bio-Refinery” at Plymouth



- Domtar leveraged our stand alone, self funded lignin removal project to win support for the broader, far reaching “Integrated Bio-Refinery” demonstration at Plymouth.
- A major USDA-NIFA award that has resulted in five additional collaborative partnerships with nine additional development projects starts to date.

NC STATE UNIVERSITY



Project Status as of September 2013



- Lignoboost™ at Plymouth commissioned in early February, 2013. Culmination of a 2 ½ yr, major capital project.
- Commercial quantities being produced on a 24/7 basis.
- Product used both as internal fuel and for external sales.
- Goal is to use all product for external sales and replace fuel value with low cost biomass.
- Production ramp-up (target of 30,000 tpy) proceeding as planned.
- Market development and sales proceeding as planned.

Summary



- The first production scale installation of Metso's Lignoboost™ process is successfully underway at Domtar's Plymouth, NC pulp mill.
- The product, Domtar's BioChoice™ Lignin is presently being used for internal fuel and external sales. Production and sales ramp-up both proceeding well.
- Successful commercial launch of a new, bio-based product line.
- Short- to intermediate-term:
 - a high quality bio-fuel for internal and external use.
 - sold to intermediate and end users for different applications.
 - used to create a platform for (collaborative) development of new applications and bio-based product lines for Domtar.
- Intermediate- to long-term:
 - higher value applications as bio-chemicals and bio-materials.
 - development of other grades of BioChoice™ Lignin at other Domtar mills.
 - potential development of (modified) lignin product lines.

Acknowledgements



For their contributions, thanks to:

Bruno Marcoccia, Director of R&D, Domtar.

W. Dale Mitchell, Director of Bio-Materials Business Development, Domtar.

Domtar Plymouth Project Team: Brian Spear, Marty Barfield, Dianne Hardison.

Our collaborators on the Plymouth Lignin Project:



Domtar also wishes to acknowledge the USDA-NIFA's Biomass Research Development Initiative for its financial support of this project.

THE FIBER *of* Domtar

AGILE | CARING | INNOVATIVE

