CELLULOSE FILAMENTS ARE A REVOLUTIONARY CHEMICAL-FREE GREEN MATERIAL THAT CAN DRAMATICALLY IMPROVE PULPS, PAPERS, BIO-PLASTICS AND OTHER COMPOSITES.

A NEW INNOVATIVE AND SUSTAINABLE MATERIAL

The future of a viable Canadian forest industry and its transformation lies in sustainable innovations based on the unique attributes of Canada’s forest resources and infrastructure that will reposition the forest products industry in new markets.

Cellulose Filaments (CF) — extracted from wood pulp fibres — is a unique new material that is revolutionary because of its unique properties. The material has major potential for Canada’s forest sector because of its wide range of applications from existing paper products to new products.

CF is obtained from peeling the filaments from wood fibres using a mechanical process that uses no chemicals or enzymes—this process provides an advantage unique to Canada. As the peeling is completed in a gentle manner very thin filaments are obtained while the length of the original fibre is preserved. This means CF is extremely flexible and has a unique bonding capacity that makes it an exceptional reinforcement additive to products such as packaging, paper, plastics, adhesives and composites.

The nature of CF allows them to be combined with many materials to develop a wide range of high-value products currently sought after by many Canadian and international industry sectors.

FPInnovations has developed a unique process (Patent pending) that uses only mechanical energy, and does not produce effluents. As the process is expected to use only commercially available and well-proven equipment the fabrication method leads to the potential for substantial savings in capital investment by modifying existing Canadian pulp and paper mills’ infrastructure to manufacture CF.

A MARKET GAME CHANGER

Cellulose Filaments are a key element in the transformation of the pulp and paper industry and will influence the development strategy of Canadian pulp and paper companies.

After only three years of intensive work, FPInnovations has developed novel processes and demonstrated the potential for innovative products using CF in short trials on commercial machines. By leveraging an abundant and renewable feedstock and a fabrication process amenable to full-scale manufacturing, FPInnovations expects this new material to be used in the development of highly profitable product lines, and in new applications.

The potential market for CF as a strength reinforcing agent for pulp and paper products is conservatively estimated at 120,000 tons per year in North America. In addition, a similar market size is forecast for thermoplastics, reinforced plastics, thermosets, adhesives, non-woven fabric and coatings. Combined, this represents a potential market value of $500M/year. The CF access to the Canadian company will give them a competitive edge by providing new product design and performance. As the research progresses, new potential applications of CF as film or solid material are quickly emerging that could represent significant new markets.

Many scenarios of mill conversions have been analyzed for manufacturing CF. Up to two large plants or several small ones will be needed to cover the North American market with much larger market are expected in emerging countries. FPInnovations is working with several of the top pulp and paper companies in Canada to maximize the value from these scenarios. Research teams have been conducting trials and working through detailed engineering studies of various sites across the country. The companies engaged are pushing for...
rapid implementation. The entire industry is showing great interest in either producing or using CF.

CANADA – A GLOBAL LEADER

Canada is currently in the pole position of global competition to develop the next generation of cellulose-based materials with 5 Patents filed or in the process of being filed.

The USA, Japan, China, Finland, Sweden, Germany and France are also in the race, as well as multinational petroleum-based polymer manufacturers. Nordic companies such as UPM and Stora Enso have already engaged in the production of products similar to CF and alliances have been made with large chemical supplier companies. In addition, many world-class research centres already have very advanced CF-like development programs.

FPInnovations is well ahead of its competitors thanks to the simplicity, and the IP protection, of the process and product it has developed; the availability of industrial refiners; and competitive manufacturing and energy costs. However, time is of the essence as the industry world-wide is racing to catch up.

BUILDING TOWARDS COMMERCIALIZATION

Up to now FPInnovations has produced a remarkable 30 tons of CF over months of intensive and very costly process trials. Although impressive, this inventory is far from sufficient to proceed with representative commercial trials that would consume in a day the CF production of one year in FPI’s laboratory.

To tackle the commercialization phase, FPInnovations estimates that the commercialization and application development of the CF would require a plant producing 5 tons per day with the possibility of rapid expansion to 15 tons. In addition an aggressive and intensive concurrent research and development program is required to support the industrial process scale-up; the applications in different commercial pulps, papers, packaging, tissues and towels; as well as in the development of new, innovative applications in non-traditional markets. The proposed demonstration plant and the large concurrent research program are the next crucial steps to give the Canadian industry a strategic advantage for the production and marketing of CF.

A CF PRE-COMMERCIAL DEMONSTRATION PLANT PRODUCING 5 TO 10 TONS PER DAY IS A CRUCIAL NEXT STEP IN THE DEVELOPMENT OF THIS NEW PRODUCT LINE.

FPINNOVATIONS: ENABLER OF RAPID & EFFICIENT INNOVATION DEPLOYMENT

FPInnovations is a unique industry/government partnership that serves as the innovation hub for Canada’s forest sector. Over 500 specialized staff, working with a $90 million annual budget, deliver and deploy world-class forest sector innovations to protect and create new jobs.

FPInnovations’ unique value chain capacity includes innovative approaches to maximize economic benefits in:

- Forest Fibre
- Forest Operations
- Wood Products
- Pulp & Paper
- Bio-products, bio-materials, bio-chemicals and bio-energy

FPInnovations is a market and industry driven organization with an excellent track record of developing and deploying innovations.

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