

Not Your Father's Pulp Mill

Emblematic of the coming transformation of the pulp and paper industry, and perhaps a standard bearer for it, is a one tonne/day demonstration plant that will open the door to a radically new set of applications for forest-based materials. As described by Graeme Rodden in the April, 2012 issue of *Pulp and Paper International*, the plant is the result of a joint venture between FPInnovations and Domtar, dubbed "CelluForce," and is located at Domtar's Windsor, Quebec paper mill.

In an interview with Rodden, CelluForce Chief Technical Officer Dr. Richard Berry described the plant's process and its product, nanocrystalline cellulose (NCC). (NCC is distinct from nanofibrillar cellulose, another revolutionary product that is being developed elsewhere.) Purified cellulose (bleached pulp) is first ground to a powder, which contains both amorphous and crystalline components. The amorphous ones are chemically removed, and the remaining nanocrystalline material is converted to a dry, re-suspendable product having a range of unique properties that includes high strength (about a third of that possessed by carbon nanotubes, the strongest known material), self assembly (the ability to create impermeable barrier films), and magnetic susceptibility (which allows its strength characteristics to be oriented in one direction).

CelluForce envisions many applications for its products, including biocomposites for bone replacement, high-strength spun fibers, additives for coatings, paints and adhesives, reinforced polymers, and iridescent and protective films.

It seems likely that other applications will emerge as researchers outside of the company investigate the product's properties. An early example is provided by a May 8 press release reporting that a 16-year-old Canadian high school student, Janelle Tam, had won a national youth science competition by showing that NCC is a powerful antioxidant and may be superior to

Vitamin C or E because it is more stable and its effectiveness won't diminish as quickly. See <http://sanofibioneiuschallenge.ca/2012/04/27/south-western-ontario-student-discovers-powerful-anti-oxidant-in-tree-pulp/>)

CEO Comments on IP's Transformation

In a recent interview with the Memphis Daily News, International Paper CEO John Faraci commented on the substantial changes that have occurred at International Paper within the last few years.

On the most recent of these, the \$3.5 billion acquisition of Austin, Texas-based Temple-Inland, Faraci said, "It's a company that was focused on performance. They probably emphasize volume more than profitability. We emphasize profitability more than volume. We come from the same industry and we were competitors. So, I think it's a mistake to assume the cultures are similar. But that doesn't mean we can't get employees to buy into what International Paper is trying to do." Referring to IP's \$6 billion takeover of Weyerhaeuser's containerboard packaging and recycling business in 2008, Faraci said, "We're using the lessons we learned from Weyerhaeuser on Temple as opposed to kind of relearning new things. We bought the company not the business, which is a little different," he said. "International Paper has done a lot of consolidating over the last decade. One of our core competencies is we know how to integrate companies quickly and successfully."

On the company's transformation from one that makes paper products to a one with its own logistics network and printing distribution business (xpedx): "It's a different business than manufacturing. We're one of the largest national distributors of paper and packaging products. I'd say the main challenges in the marketplace are profitable sales and commercial printing. The commercial printing market, which is 60 percent of xpedx's revenues, is struggling. Our sales to

that channel, which is our biggest market, are pretty weak.”

On the outlook for the industry: “In North America, the markets are big and mature. Packaging has still got a little growth in it – probably 1 or 2 percent. Paper is declining we think this year about 2 percent, but probably 3 to 4 percent over time. ... It’s not going to shrink to zero,” Faraci said. “Markets like Russia, India, Latin America and China are growing because per capita consumption is so low. As those economies grow even with electronic substitution, the consumption of paper will grow as will the consumption of packaging.”

On the move of IP into new global markets: “I guess what we learned in operating in some of those environments where business practices are different is that it is hard to change things but it can be done. You can do business the way we need to do business in these emerging markets. But you’ve got to be clear. You’ve got to be persistent and no exceptions.”

Recent Forestweb/Industry Intelligence Headlines

Forestweb and its sister company, Industry Intelligence, publish daily and weekly news reports tracking recent developments in and around the paper and forest products industries. Subscription information is at

<http://www.forestweb.com/Corporate/index.cfm>

Below is a selection of particularly relevant recent headlines, together with brief synopses.

May 14

Resolute Forest Products says Fibrek cooperating for smooth transition to its control, all members of Fibrek board step down, outgoing management team agrees to assist as special advisers during transition; Resolute appoints new management

According to Resolute CEO Richard Garneau, it will be business as usual for Fibrek's operations, customers, suppliers and other business partners.

Woodland Pulp mill in Baileyville, Maine, completes US\$16M conversion to natural gas; project involved revamping two major boilers and building five-mile pipeline to connect to natural gas, expected to sharply cut energy costs

The mill produces about 400,000 tonnes per year of pulp that is mostly shipped to China and Indonesia.

Ontario high school student discovers anti-aging antioxidant in tree pulp that may be superior to

Vitamin C or E, says nontoxic, stable nanocrystalline cellulose is 'hot field of research in Canada'

The world's first large-scale nanocrystalline cellulose production plant opened in January at a pulp and paper mill in Windsor, Quebec.

May 6

Resolute Forest Products owns 63.3% of Fibrek, has accepted for payment 12,305,679 additional shares; offer extended to May 17

Fibrek produces virgin and recycled kraft pulp and has mills in Saint-Félicien, Québec, Fairmont, West Virginia, and in Menominee, Michigan.

IP expects to start testing equipment and systems at its reconfigured Franklin, Virginia, mill during the week of April 30 in preparation for producing fluff pulp starting in June, says mill manager

The mill will have an annual production capacity of 270,000 tonnes of fluff pulp.

April 29

Pöyry awarded contract for detail engineering at UPM Biorefinery project in Lappeenranta, Finland; services will be carried out 2012-2014

The biorefinery is UPM's first step in its strategy towards being a key player in advanced biofuels production and a vital part of its “Biofore” strategy.

NewPage discontinues involvement in 'Project Independence,' an integrated biorefinery for renewable biofuels at its Wisconsin Rapids, Wisconsin, paper mill, says economics did not justify its continued participation with project

In 2008, the U.S. Department of Energy (DOE) awarded NewPage a \$30 million grant in support of the project.

April 22

Personal-care packaging market to reach value of US\$40.99B in 2012, driven by Asian, Latin American markets, report says

The personal care packaging market is forecast by Visiongain to record strong and sustained growth over the next decade as the economy continues to recover, supported by frequent innovation and sustainability.

China plans to increase pulp, paper manufacturing by 30% over next five years, will invest up to €40B to acquire estimated 30-50 new paper machines, looks to Finnish technology expertise, says Finnish group Finpro

Total paper production in China was about 93 million tons in 2011.

Statistics Corner: Capacity and Capacity Utilization

Figure 1 below, shows how paper manufacturing capacity utilization (operating ratio) has largely (but not entirely) recovered from the recession-related

slowdown. In fact, the picture is not as rosy as this would suggest since, as Figure 2 shows, the recent gains in operating ratio are largely due to a decrease in capacity, not an increase in production. In fact current production is about 14% lower than pre-recession levels. ■

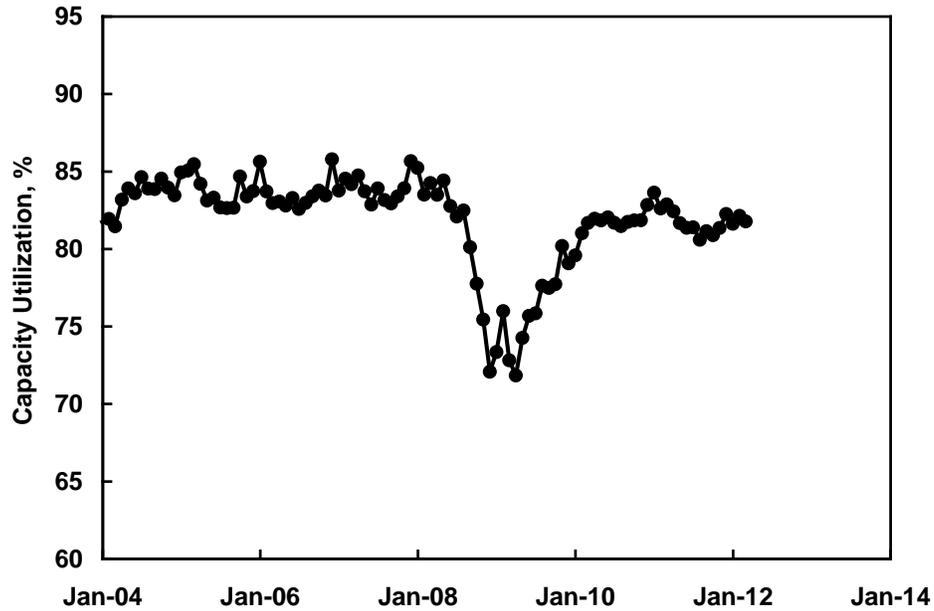


Figure 1. Paper manufacturing capacity utilization, Jan. 2004 – Mar. 2012 (*Federal Reserve*)

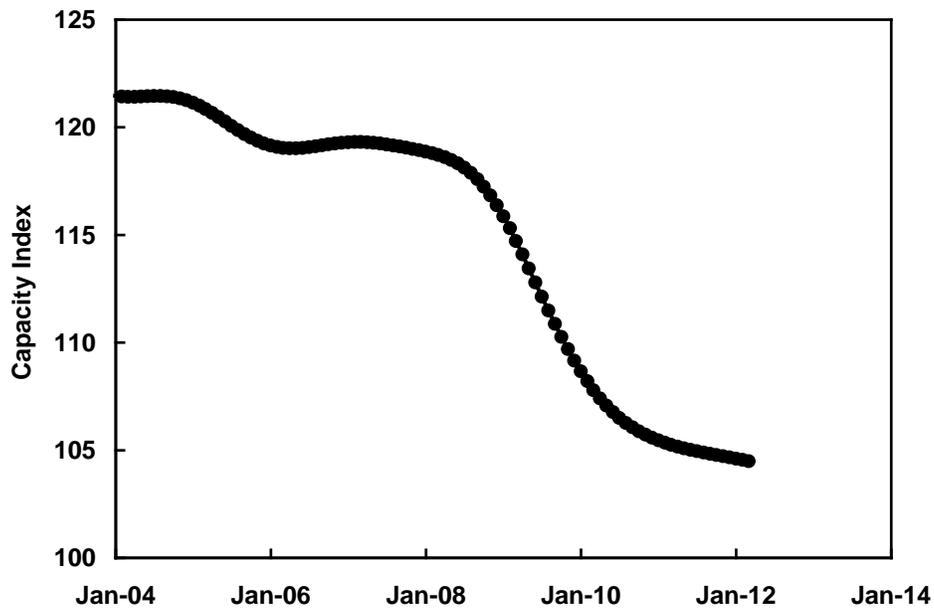


Figure 2. Paper manufacturing capacity, Jan. 2004 – Mar. 2012 (*Federal Reserve*)