

Examining the Benefits of Combined Heat and Power Plants

By Aselia Urmanbetova

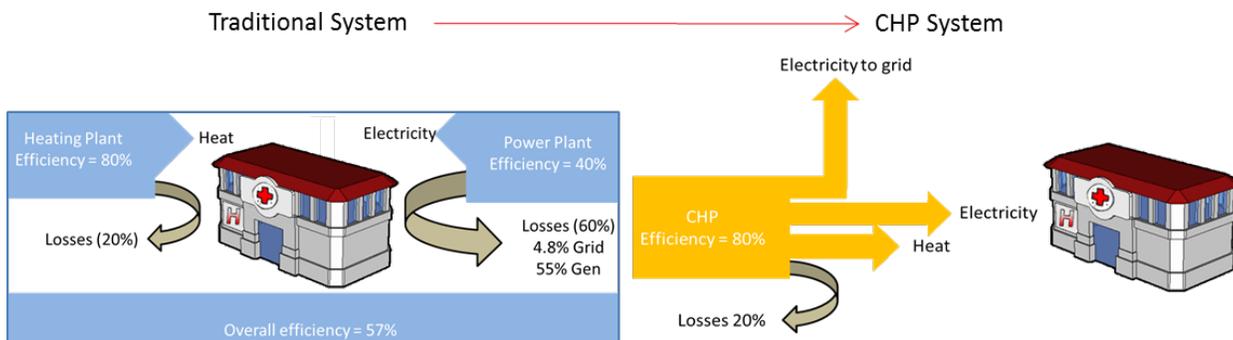
As readers of this newsletter know, CPBIS presents its current research and working papers at a number of academic conferences. Yet, it continuously strives to participate in the annual Industry Studies Association (ISA) conference in order to stay connected to the researchers and institutions focused on industry-oriented research. This year, the conference was held in Minneapolis, MN at the University of St. Thomas, and CPBIS was represented by two working papers: (1) Policy Instruments and Adoption of Pollution Prevention Activities and (2) Responsive Regulation: Target- vs. Budget-Driven Regulation. Both were well received and the Center was recognized with a full-page print ad for its Mills Online database in the Conference Program.

This year’s conference was marked by a larger than usual number of research papers focusing on current

energy issues. One, authored by Vivek Bhandari, Stephen Rose, and Elizabeth Wilson, all from the University of Minnesota, was entitled “CHP within a Renewable-Rich World.” It examined the effect of location on the emissions and profitability of combined heat and power (CHP) systems. Using the data from a large (unnamed) hospital, the authors developed an optimization model that minimizes operating costs, while simultaneously enabling one to calculate total profit, emissions and avoided emissions associated with specific plant locations.

For a bit more detail on their research, consider the following two figures from their PowerPoint presentation. In Figure 1, one can see that the traditional stand-alone heat and power generating plants run at 80% and 40% efficiencies, respectively. The overall efficiency can be as low as 43%. Contrast this with combined heat and power systems, which reduce the losses to 20%, while providing heat and electricity to local communities through power grids and also directly to institutions.

Figure 1. Traditional vs. CHP Systems



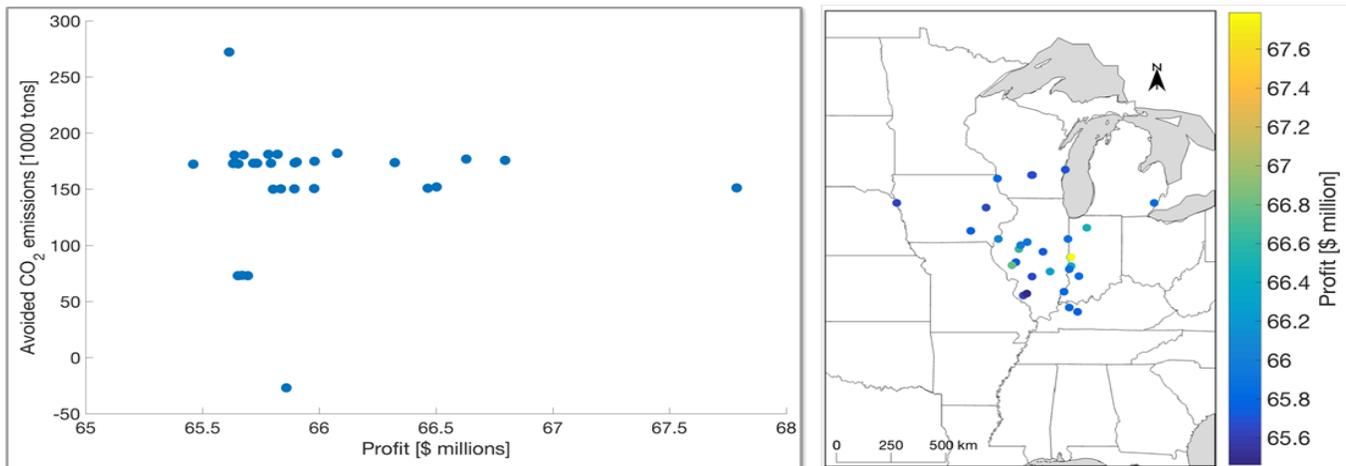
They placed a CHP system feeding a large hospital, at several Commercial Pricing nodes in MISO’s (Mid-

Continent Independent System Operator’s) footprint and assumed that this CHP can trade in the wholesale

electricity day-ahead market. Their most exciting findings were not just the efficiency gains. They were the estimates of total avoided emissions and profits associated with the CHP systems. In Figure 2, the authors presented their estimates of both profits and avoided CO₂, and the two graphs show significant gains in terms of profits and avoided CO₂ emissions. Specifically, the left hand side panel shows that avoided CO₂ emissions can be as high as 275 thousand tons

while running a profit of up to \$65.5 million. The researchers noted, however, that the relative trade-offs depend on specific plant locations as can be seen on the right hand side panel of Figure 2. Here, the map clearly identifies certain locations as being a lot more profitable (yellow site on the border of Indiana and Illinois) than others (navy-colored site points on the border of Illinois and Missouri).

Figure 2. Initial Findings



During an informal discussion after their presentation, the authors noted that the pulp and paper industry is another great example to analyze potential environmental and financial gains of running CHP systems. To get a sense of how many mills may be employing the CHP systems, we looked up the U.S. DOE CHP Installation Database (<https://doe.icfwebservices.com/chpdb/>) and found 227 facilities listed within the 2600 4-digit Standard Industrial Classification (SIC) for Paper and Allied Industries. Currently, we are working on merging these facility-level data with the Mills Online data base and will provide a quick snapshot of the location, production, and power generation information of the mills with the CHP capabilities in a subsequent issue of this newsletter.

The author would like to thank Vivek Bhandari, Stephen Rose, and Elizabeth Wilson for their generous cooperation in providing the initial materials for and feedback on this write-up.

Trend Indicators from Industry Intelligence Inc.

Industry Intelligence Inc. has provided market intelligence to more than 600 companies worldwide since it began as Forestweb in 1999. Industry Intelligence delivers a daily report featuring news of the paper and forest products industries. For your subscription visit: <http://www.industryintel.com>

Below is a sampling of recent Industry Intelligence headlines, chosen to mirror significant trends and other interesting developments in and around the paper and forest products industries.

Seventeen Kenyan companies currently processing elephant dung into paper, a segment that is growing in eastern Africa; reportedly, average elephant produces about 50kg of dung daily, enough fiber to manufacture 125 sheets of A4 paper

John Matano's Nampath Paper is just one of 17 Kenyan firms that process elephant dung to make high quality paper.

JK Paper forecasts strong growth in coming years, noting its new facility at Odisha, India, is operating well, expects 7% growth in uncoated papers and 9% growth in coated papers

The company has absorbed all costs and is prepared to grow faster.

Nippon Paper plans to retain workforce after it buys Weyerhaeuser's Longview, Washington, liquid packaging board mill, which now supplies Nippon's plants in Japan, has no plans to buy out remaining stake in its NorPac JV mill in Longview from Weyerhaeuser

Tokyo-based Nippon Paper operates four plants in Japan that make milk and beverage containers, most of which are sold in Japan and account for about a 30% share of the Japanese market.

Port Hawkesbury SC paper mill in Nova Scotia to shut down for one week due to weak market conditions, but company officials confident about business in busier fall months; more than half the mill's 330 workers will be laid off during shutdown

A union spokesman says the shutdown is disappointing, but not surprising, given the downturn of the industry as a whole.

FPAC, Canadian government launch new, first-of-its-kind online tool to match job seekers with job openings at Canadian forest products companies, provide detailed labor market information about the industry; new service supported by C\$1.1M federal grant

The new tool, called The Greenest Workforce Job Match Tool, will provide those looking for work with one-stop access to job openings in Canada's forest products sector and allow them to post resumes and search for jobs across the country.

Victoria's Secret officially ends print catalogs

A company official cited an experiment of cutting print catalogs without a meaningful dent in sales. Meanwhile, in the fourth quarter, catalog activity was reduced by 40% but direct channel sales increased.

Paper Excellence intends to reopen its kraft pulp mill in Prince Albert, Saskatchewan, in 2020, with mill modernization, refurbishment to start as early as 2018, says company official, noting plans could change depending on market conditions

Under a non-compete clause in its agreement with Domtar Corp., which sold the Prince Albert mill to Paper Excellence in 2011, kraft pulp cannot be produced at the mill until 2020.

Syassky Pulp & Paper Mill in Syasstroy, Russia, starts up 45,000 tonnes/year, crescent-former tissue machine; the Toscotec-supplied Ahead 1.5m PM No. 3 is designed to produce high-quality tissue from dry and slush pulps, allowing for reduced energy costs

It will be one of the most efficient Russian paper mills, employing over 2000 people to make 110,000 tons a year.

Brazil's January-April production of pulp increases 10.9% year-over-year to 6.1 million tonnes, while paper output inches up 0.7% to 3.4 million tonnes; exports for the period increase 16.7% for pulp and up 7.8% for paper: Ibá

Revenues from exports from January to April 2016, amounted to \$2.6 billion, an increase of 7.3% compared to the same period last year.

NBSK pulp market forecast to improve in 2017, with higher demand now being experienced in China and North America and prices expected to rise in Q2, Q3 of 2016, followed by increasing volumes in 2017, says president of Södra Cell International

The company is expanding its pulp mill in Varö, which will be one of the largest pulp mills in the world with a capacity of 700,000 tonnes annually.

World market for synthetic paper that is not woodpulp-based forecast to reach US\$454.5M by 2024, driven by growing consumer awareness about using environmentally friendly products, supportive government rules; Asia Pacific dominates market in 2015: report

The report is available from Grand View Research, a market research company headquartered in San Francisco.

Fibria says increase in production capacity of Horizonte 2 expansion in Três Lagoas, Brazil, to 1.95 million tonnes/year from 1.75 million tonnes/year does not change total planned investment of 8.7B reais; project is 32.5% complete after one year

The average distance from the forests to the company's two production lines will be less than 100 kilometers.

UPM sets new responsibility targets for 2030 in 11 areas; among these are zero process waste to landfills or to incineration without energy recovery, 100% of wood fibers will be from certified sources, and 30% cut in CO2 emissions from 2008 baseline

The goals were inspired by the UN sustainable development goals in economic, social and environmental dimensions.

Prices in France of uncoated woodfree papers under pressure in May from weak consumption, with copy paper leading the markdowns that emerged during the month

Slow demand since February is now being reflected in actual paper consumption, with customers only buying what they needed

UAE looking for ways to minimize exports of recyclable materials such as paper, due to shortage of raw materials for local factories; three of the country's six paper mills use wastepaper as feedstock to produce paperboard, says government official

Government officials are seeking the imposition of fees on wastepaper and raw leather waste exports.

Paper Quotes

“The debate about Brexit has overlooked the advantages that EU regulations have brought not just to consumers, but also to manufacturers like us. We sell our products all over the world to sectors ranging from luxury goods to aerospace. Our customers demand information on the environmental impact and sustainability of our processes and on working practices. We comply with the EU’s strict regulations in these areas and – contrary to popular opinion – this gives us an immediate competitive advantage. This is not an area that is standing still – consumers and brands expect their suppliers to comply with best practice as it develops, often led by the EU. The EU brand has value.” –*Mark Cropper, chairman of James Cropper,*

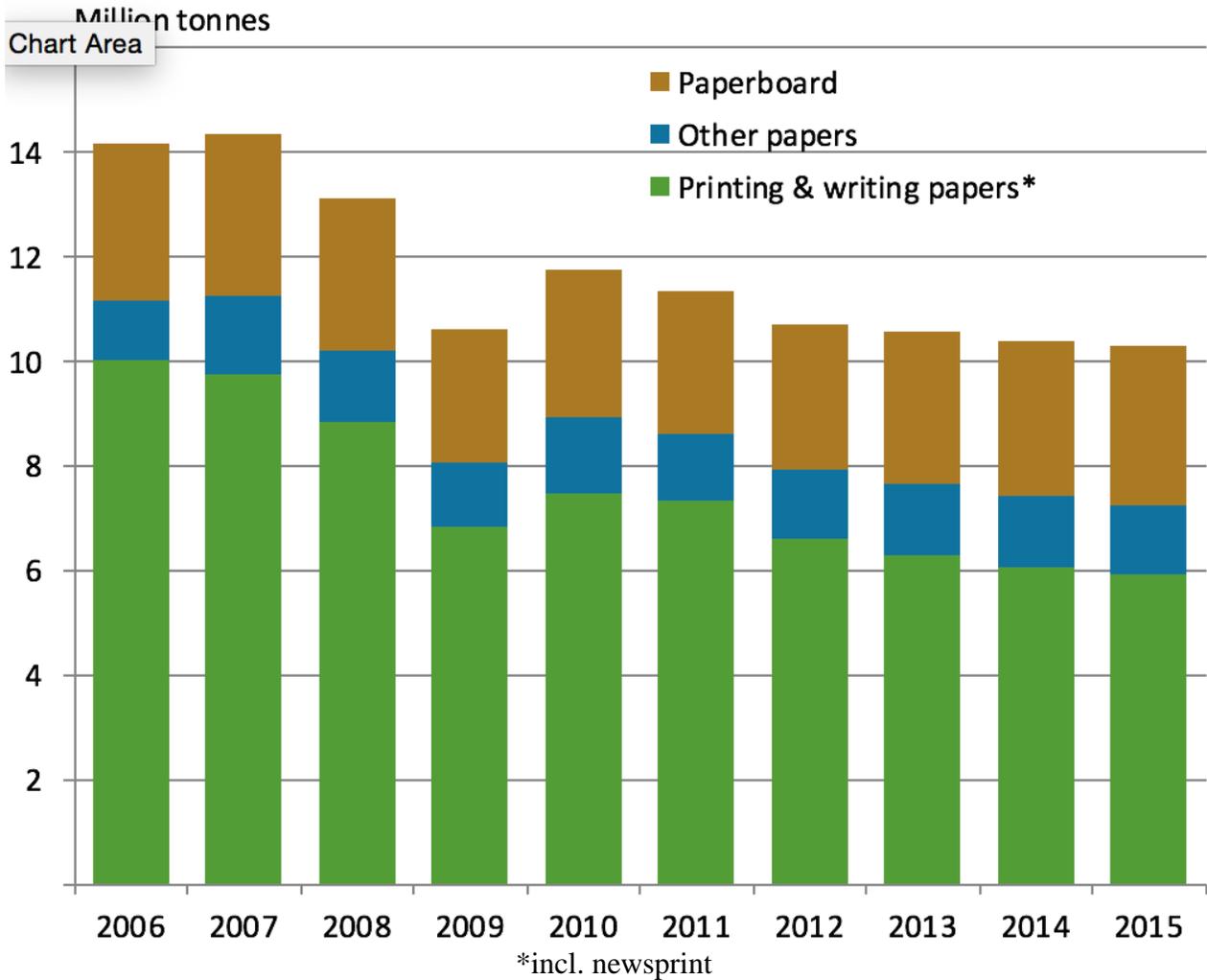
commenting on the “Brexit” debate (before the referendum).

“Greenpeace’s accusations ... are absurd and indefensible. Resolute had planted over a billion trees in the boreal - that’s a billion more than Greenpeace - and caused virtually zero permanent deforestation... These false claims malign a good company, run by good people who care about the boreal, and unnecessarily hurt all those who benefit from Resolute’s responsible use of this renewable resource.” – *Michael Bowe, attorney representing Resolute Forest Products in their defense against a Greenpeace lawsuit (as reported by the Financial Post).*

“Those who made predictions about the death of the book may have underestimated just how much people love paper.” – *Stephen Lotinga, chief executive of The Publishers Association, commenting on statistics that showed UK print books sales edged up 0.4% year-over-year to £2.76 billion (US\$4.05 billion) while digital sales fell 1.6% to £554 million.*

Statistics Corner: Paper and Board Production in Finland

Finnish paper and board production declined during the period 2006 -2015, as shown in the figure below. Most of the decline was due to a decrease in the consumption of printing and writing papers. The production of paperboard remained nearly unchanged during the period.■



Paper and Paperboard Production in Finland

(Source: Finnish Forest Industries Federation:

<http://www.forestindustries.fi/statistics/industry/15-Pulp%20and%20Paper%20Industry?order=newest-first>)