Madison's Lumber Reporter

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News & Updates

Real World Logging Profits in Canada: New Report

Results of the *Canadian Forest Industries*' magazine **Canadian 2016 Contractor Survey** were released June 21, with findings that 41 per cent of all contractors saw some form of rate increase over the past three years. For the rest, rates were either stagnant (28 per cent) or had declined somewhat (23 per cent).

The US magazine Timber Harvesting also recently reported its own survey findings this year, and found that 25 per cent of US loggers reported no profit or a loss last year. On the other hand, 42 per cent reported pre-tax profits above seven per cent.
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CoreLogic US House Prices: May 2016

CoreLogic US Home Price Report, released Tuesday, shows prices up 5.9 per cent year-over-year in May 2016 and increased month over month by 1.3 per cent in May 2016 compared with April 2016.
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BC Lumber Exports: May 2016

British Columbia's exports of solid wood products climbed 16.3 per cent over the first five months of 2016, compared to the same period a year earlier, said BC Stats Wednesday.

Shipments of softwood lumber to the US jumped 38.7 per cent year-to-date to May, which helped boost the value of exports of softwood lumber to all destinations up 14.6 per cent.
CONT'D PAGE 7

Canada Sawmill Production: April 2016

Canadian softwood lumber production was 5.4 per cent higher in April than in the same month of 2015, said Statistics Canada Wednesday. Production volume was up in many of the other big lumber-producing provinces, including Quebec. Production of softwood lumber at BC sawmills was 2.1 per cent higher.
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Major Advancements in Cellulostic Biofuel

Some very exciting breakthroughs have been made recently in using fungii and sugars to break through tough wood cellulose cell walls and access the abundant energy inside to make various types of fuel.
CONT'D PAGES 8 & 9

New Biomass Fuel Production Facilities

Canada's Canfor Pulp completed a joint-venture deal with Australian energy company Licella this week, and revealed plans to install a biocrude project at a new facility in Prince George, BC, where it hopes to produce 400,000 barrels of fuel per year from wood waste at its pulp mills. This facility is expected to cost around US$70 million.

Elsewhere, Sweden's Fortum Värme, a company jointly owned by Finnish energy firm Fortum and the city of Stockholm, this week commissioned a new €500 million (US$569 million) biomass-fired combined heat and power plant, which will begin operations in autumn. This facility will use forest residues and wood waste to produce district heat for nearly 200,000 households and its daily consumption of wood chips will be approximately 12,000 cubic metres.

Both plants are expected to be the largest of their kind so far, when they are complete.
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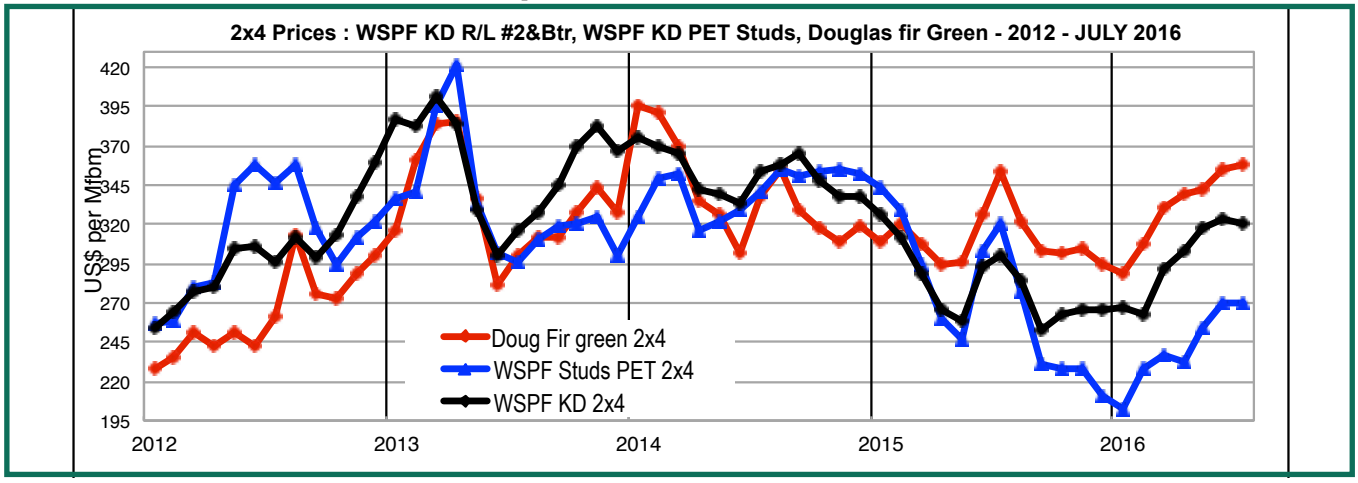
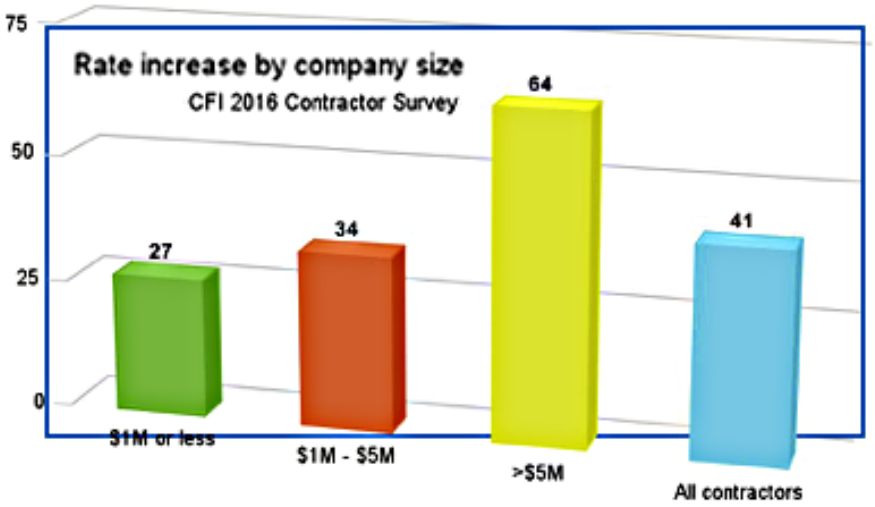


Canada Report: Real World Logging Profits

CONT'D FROM PAGE 2 **SOURCE:** *Canadian Forest Industries* **CFI 2016 Contractor Survey on www.woodbusiness.ca**

Results of the *Canadian Forest Industries*' magazine **Canadian 2016 Contractor Survey** were released June 21, with findings that 41 per cent of all contractors saw some form of rate increase over the past three years. For the rest, rates were either stagnant (28 per cent) or had declined somewhat (23 per cent). Just over eight per cent were either too new to have a trend or preferred not to say.

The US magazine *Timber Harvesting* also recently reported its own survey findings this year, and found that 25 per cent of US loggers reported no profit or a loss last year. On the other hand, 42 per cent reported pre-tax profits above seven per cent.



Canada-wide, forty per cent of contractors felt that in 2016 a fair profit range lay between 11 to 15 per cent. This sentiment varied slightly with company size – 54 per cent of the largest contractors, those with over $5 million in revenue, felt this range was fair. Almost a quarter (23 per cent) of all contractors felt a profit between 16 to 20 per cent was fair.

Canadian Forest Industries found that fewer than half of contractors have seen rate increases over the past three years, but how well they managed to negotiate a rate increase varies greatly by both region and company size.

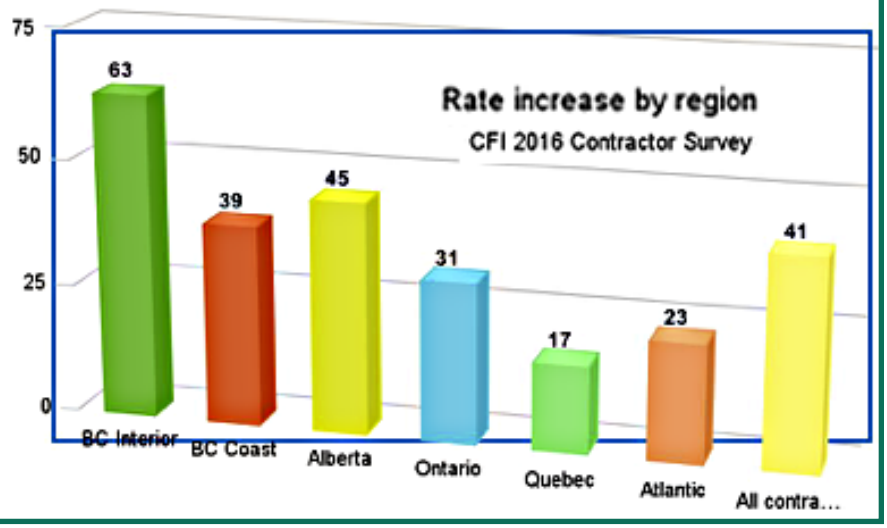
In general, the larger the contractor, the more likely they were to have negotiated or received some form of rate increase over the past three years. Only 27 per cent of smaller contractors (less than $1 million in annual revenue) saw any form of increase, while up to 64 per cent of the largest contractors enjoyed some form of increase (more than $5 million in annual revenue)

As for the question of what logging contractors saw as a fair profit margin for an established contractor (see report here). While expectations vary greatly by region, with expectations generally falling as you head east, the most popular answer was an EBITDA in the 11 to 15 per cent range.

The national breakdown was two-thirds making between one and 10 per cent profit margin (at EBITDA level), and 17 per cent making none at all.

These averages hide a lot of diversity among companies of different sizes or in different locations. Almost a quarter (24 per cent) of the smallest contractors reported no profit at all in 2015, while half, or only 12 per cent of the largest contractors, made the same claim.

When it comes to region, Ontario fared the worst as far as profit, with almost one-third seeing no profit (31 per cent), followed by the BC Coast (21 per cent), Quebec (17 per cent), Atlantic Canada (16 per cent), BC Interior (14 per cent), and Alberta (9 per cent).



A full half of BC Coastal loggers reported a profit of less than three per cent and 85 per cent report a margin of five per cent or less – both the largest showing of all regions in these ranges. In contrast, only 28 and 59 per cent of BC Interior contractors reported profits in these ranges.

When sawmill woodlands staff were asked the same question, the majority (55 per cent) felt that a margin above 11 per cent was fair, with another 33 per cent feeling six to 10 per cent was a fair profit margin for an established contractor.

Madison's Weekly Softwood Lumber Key Prices Table

www.madisonsreport.com

Prices are in U.S. dollars per 1,000 fbm (net FOB mill)	This Week	Last Week	Change	Month Ago	Change	Year Ago	Change
WSPF KD R/L 2x4	322	320	+2	329	-7	300	+22
WSPF KD R/L 2x6	290	298	-8	310	-20	305	-15
SYP KD R/L East Side 2x4	425	425	0	425	0	370	+55
SYP KD R/L East Side 2x6	340	340	0	310	+30	305	+35
ESPF KD R/L 2x4	425	420	+5	420	+5	390	+35
WSPF KD PET 2x4 Stud	270	270	0	270	0	315	-45
WSPF KD PET 2x6 Stud	250	250	0	245	+5	295	-45
Douglas Fir Green R/L 2x4	360	357	+3	355	+5	340	+20
Douglas Fir Green R/L 2x10	387	385	+2	415	-28	375	+12
ESPF KD 2x4 8ft Stud	360	355	+5	355	+5	370	-10
OSB Ontario 7/16" (CDN$/msf)	315	315	0	345	-30	235	+80
CSPlywood Toronto 3/8" (CDN$/msf)	440	440	0	448	-8	421	+19

Madison's Weekly Softwood Lumber News

US House Prices, May 2016

CONT'D FROM PG 2 Housing remained an oasis of stability in May with home prices rising year over year between 5 and 6 per cent for 22 consecutive months, said the CoreLogic report released this week. The consistently solid growth in home prices has been driven by the highest resale activity in nine years and a still-tight housing inventory

The index was up 1.3 per cent in May, and is up 5.9 per cent over the last year.

This index is not seasonally adjusted, and this was a solid month-to-month increase.

The index is still 7.2 per cent below the bubble peak in nominal terms (not inflation adjusted).

The year-over-year increase had been moving sideways over the last year.

The year-over-year comparison has been positive for 52 consecutive months.

Canada Sawmill Production, April 2016

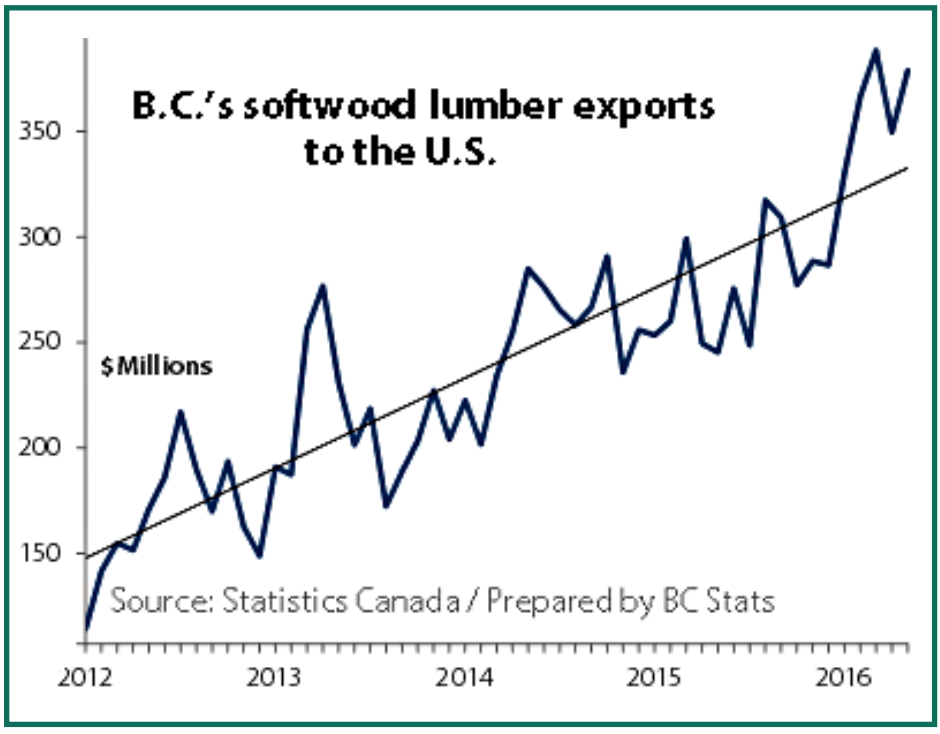
CONT'D FROM PG 2 Canadian softwood production was 5.4 per cent higher in April compared to 2016, said StatsCan Wednesday.

Production of softwood lumber at BC sawmills was 2.1 higher in April than in the same month of 2015. Ramped-up production from the Interior, up 2.4 per cent, where most of the province's mill activity occurs, was behind the overall increase, as mills in coastal regions saw very little change, up 0.1 per cent.

BC Lumber Exports: May 2016

CONT'D FROM PG 2 There was also double-digit growth in shipments of all other wood categories besides lumber, said BC Stats Wednesday, with the exception of logs, which bucked the overall trend, dipping 2.4 per cent.

Elsewhere in the forest sector, exports of pulp and paper products have not fared as well, slumping 8.6 per cent over the first five months of 2016. Shipments of pulp fell 4.8 per cent, while newsprint exports were almost halved, down by 46.7 per cent. Other paper and paperboard product shipments dropped 14.1 per cent, but there was growth in exports of other pulp and paper products , up 17 per cent.



Cellulostic Biomass Fuel Research: New Developments 2016

CONT'D FROM PAGE 2

Producing fuels from plants and other renewable sources requires breaking down the chemical cellulose, which traditionally has required the same amount of energy as is released when the cellulose cell walls are broken.

Scientists recently found a major candidate to drive, or catalyze, this stubborn chemical is a ubiquitous microorganism called Clostridium thermocellum that works well in hot environments without oxygen. Researchers found that C. thermocellum uses a previously unknown mechanism to degrade cellulose, in addition to other known degradation mechanisms.

This discovery helps explain C. thermocellum's superior ability to digest biomass and demonstrates the highly diverse strategies evolved in nature for biomass conversion, according to a new study published in Science Daily June 30. Researchers are using the study's findings to develop optimal systems for breaking down plant matter to produce biofuels and biobased chemicals.

Lignocellulosic biomass is the largest source of organic matter on Earth, making it a promising renewable feedstock for producing biofuels and chemicals. Currently, however, the main bottleneck in biofuel production is the low efficiency of cellulose conversion, which leads to high production costs. To date, C. thermocellum is the most efficient microorganism known for solubilizing lignocellulosic biomass. Its high cellulose digestion capability has been attributed to the organism's efficient cellulases consisting of both a free enzyme system and a tethered cellulosomal system, where multiple carbohydrate active enzymes are organized by primary and secondary scaffolding proteins to generate large protein complexes attached to the bacterial cell wall.

Recently, US Department of Energy BioEnergy Science Center (BESC) researchers discovered that C. thermocellum also expresses a type of cellulosomal system that is not bound to the cell wall, a "cell-free" cellulosomal system.

A link to the report can be found here: https://www.sciencedaily.com/releases/2016/06/160630102510.htm

Elsewhere, US-based scientists have altered the lignin in aspen trees in a way that increases access to biofuel building blocks without inhibiting plant growth.

The scientists based at the Department of Energy's Brookhaven National Laboratory and collaborators have been able to do this by engineering a novel enzyme involved in lignin synthesis.

Lignin is a natural component of plant cell walls, the scaffolding that surrounds each cell and plays a pivotal role in plants' ability to grow against gravity.

However, lignin is a problem for scientists interested in converting plant biomass to biofuels and other sustainable bio-based products. Lignin makes it hard to break down the plant matter so its carbon-rich building blocks can be converted into forms suitable for generating energy or running automobiles.

The scientists at Brookhaven said previous attempts to manipulate plants to produce less lignin have resulted in weaker plants and stunted growth, which has "put brakes on biomass production".

However, their research, described in *Nature Communications* June 29, resulted in an almost 50 per cent increase in ethanol yield from healthy aspen trees whose woody biomass released 62 per cent more simple sugars than native plants.

Lignin makes up about 20 per cent of aspen's woody structures, with cellulose and hemicellulose polymers making up approximately 45 and 25 per cent, along with other minor components.

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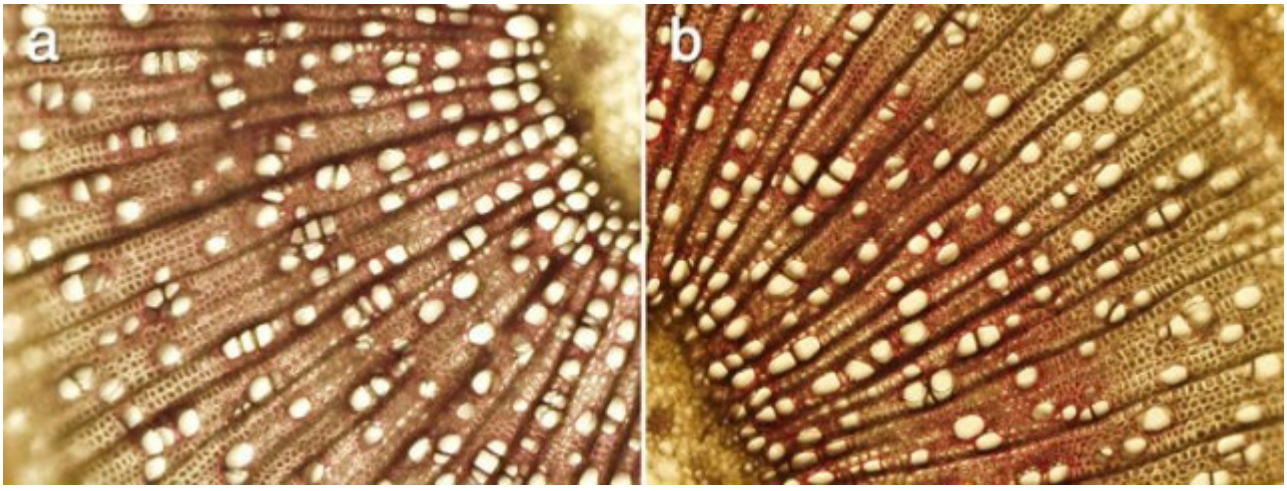

Microscopic images of wood tissues from wild type (a) and transgenic (b) aspen trees show similar anatomical and structural features, suggesting that the transgenic plant maintains normal growth and wood formation even with altered lignin composition.

CREDIT: Brookhaven National Laboratory

Streptomyces Bacteria to Break Down Cellulose

CONT'D FROM PAGE 8

Yet elsewhere, new research carried out on a specific group of bacteria known as Streptomyces shows how certain bacterial strains developed improved abilities to breakdown cellulose, according to *AZO Clean Tech* June 10. This research also highlights more effective methods by which we could imitate those capabilities to generate fuel from unused plant material.

A group of unique microorganisms handles the meticulous deconstruction of cellulose, which is an important structural constituent of plant cell walls and an organic compound that is abundantly available on land. Fungi growing on decomposing plants as well as bacteria in animals' guts, in the soil, and working together with insects, also do the job just as well.

Counter to long-held belief about the bacteria Streptomyces, seen growing here in a petri dish, the ability to break down a stubborn molecule in plant cell walls called cellulose may be limited to just a few gifted strains.

CREDIT: UW-Madison/Adam Book

These specific enzyme combinations make the research beneficial to researchers focused on biofuels.

Usually, biofuels are produced from the sugars extracted from the edible parts of the plant.

In the case of cellulose, a world of specialized microbes handles this careful deconstruction. Much of that work is done by fungi growing on decaying plants, but bacteria in the soil, in the guts of animals like cows and working alongside insects,

Streptomyces and other evolving microorganisms have been honing the way they exploit parts of the plants almost as long as the latter themselves have been growing on the land i.e. many millions of years ago. The Streptomyces study was sponsored by the Department of Energy's UW–Madison-based Great Lakes Bioenergy Research Center.

The key enzymes and new groups of enzymes, which are formed when Streptomyces flex specific genes, were identified by this study. The action of the microorganisms would turn out to be a great boon for bioenergy production if they improve over present industrial processes.

The successful Streptomyces strains—which were typically those found living in communities with insects—ramp up production of certain enzymes, the proteins that do the cleaving and dissolving and picking apart of cellulose.

Canfor Biocrude from Wood Waste New Production Facility

CONT'D FROM PAGE 2

Following Vancouver, BC, Canfor's announcement in February to create a joint venture with Australia's Licella for development of a biocrude project, the company this week further revealed plans to install the technology at a new facility in Prince George, BC, where it hopes to produce 400,000 barrels of fuel per year from wood waste at an approximate cost of US$70 million. It will be one of the world's largest biorefineries, and Licella spent eight years refining and scaling up the technology, having began trials converting sawmill waste in 2013.

The process can convert biomass, including wood residues from Canfor Pulp's kraft pulping processes, into biocrude oil that is ready to go into existing petrochemical refinery streams to generate renewable fuels.

Co-founded by University of Sydney chemistry professor Dr. Thomas Maschmeyer, Licella developed the unique process in partnership with the University of Sydney. Their Catalytic Hydrothermal Reactor (Cat-HTR™) technology converts low-cost, non-edible, waste biomass into biocrude oil.

The Canfor-Licella agreement follows a successful program of preliminary trials conducted on feedstock from Canfor Pulp's Prince George, British Columbia pulp mill at Licella's pilot plants located at Somersby, an hour north of Sydney in New South Wales, Australia. In these trials, wood residue streams from Canfor Pulp's kraft process were successfully converted into a stable biocrude oil.

Licella Pulp Joint Venture is a strategic relationship between the two companies that will investigate opportunities to integrate Licella's unique catalytic hydrothermal reactor (Cat-HTR) upgrading platform into Canfor Pulp's kraft and mechanical pulp mills to economically convert biomass, including wood residues from Canfor Pulp's kraft pulping processes, into biocrude oil, to produce next generation biofuels and biochemicals.

This additional residue stream refining would allow Canfor Pulp to further optimise their pulp production capacity. Upon successful integration of the Cat-HTR technology, the Licella Pulp Joint Venture would look towards offering this solution to other third party Kraft and mechanical pulp mills.

New Swedish Biomass-Fired CHP Plant

The Swedish biofuel-fired combined heat and power plant was inaugurated in early May 2016, and it is an important step in developing a sustainable energy supply for Stockholm. The plan is for district heating in Stockholm to be entirely produced from renewable and recovered energy by 2030.

The Fortum Värme plant, equally owned by the City of Stockholm and Fortum, will produce 750 GWh of electricity and 1,700 GWh of heat annually. That is enough to heat around 190,000 average-sized apartments.

Fuelling with forest residuals is expected to decrease carbon dioxide emissions by 126,000 tonnes a year, the equivalent of six weeks' worth of emissions from all the road traffic in Stockholm, according to *DistrictEnergy.org* June 14. Some 40 per cent of the bark and wood chips arrive by train at Värtahamnen, with the remainder arriving by ship from the Baltic countries.

Daily consumption of wood chips will be about 12,000 cubic metres.

The plant uses an old rock cavern—previously used for oil storage—that was converted into a massive underground wood chip storage facility. It is able to store about 60,000 cubic metres, or five days of fuel demand.

Karin Wanngård, finance commissioner of the city of Stockholm, said that with the new plant, "90 per cent of Fortum Värme's energy production is based on renewable and recovered energy sources. That is quite unique. Our goal is naturally 100 per cent renewable production."

Construction of the new plant started in 2013 as one of the main components of the strategy to have a system based only on renewable and recycled energy before 2030 in Stockholm. The fuel, forest residues, and wood waste, are transported by both sea and railway.

The plant is estimated to produce 750 gigawatt-hours (GWh) electricity and 1,700 GWh heat annually. It uses 12,000 cubic meters of wood chips per day, which means 3-4 shipments and 5 trains per week. The power plant's underground storage facility has a capacity of 50,000 cubic meters.

When fully operational, the new biomass power plant will reduce emissions by 126,000 tonnes annually. The emissions reduction corresponds close to 12 per cent of the annual emissions from the area's transport sector, said *Globe Newswire* in February.

The plant will to provide district heating for 190,000 households and electricity equivalent to 20,000 rooftops covered with solar panels. The new unit is one of the world's largest biomass-fuelled CHP facilities and will reduce CO2 emissions in Stockholm.

Fortum's president Pekka Lundmark said that "high emissions and low efficiency of heating, cooling and electricity production are typical problems in growing urban areas."

"Together with the City of Stockholm, we are taking steps towards a circular economy by utilising biomass, waste and recovered heat from data centres in energy production. Biomass is a renewable, largely local and carbon-neutral energy source. Its use increases the share of domestic energy resources particularly in Northern Europe, and it is an important building block of a sustainable energy system and bio economy."