The Bioeconomy Consultants

NNFCC

Feedstocks

News Review

Issue Fifty-Eight

January 2017

Each month we review the latest news and select key announcements and commentary on feedstocks used in the bioeconomy.

Contents

Policy 4

Markets 6

Research & Development 6

Wood & Crop 7

Other Feedstocks 11

Feedstock Prices 13

Foreword

Welcome to this month's edition of the NNFCC Feedstocks News Review.

December was a successful month for Drax, as they were not only given the go-ahead for their third wood pellet fuelled power station, but they also landed a major contract at the late 2016 capacity auctions. The high seems to have rubbed off on other companies elsewhere, as both BWSC and DONG recently launched biomass power stations, in the latter case converting Denmark's largest power station to run on biomass instead of fossil fuels. This willingness of energy companies more traditionally associated with fossil fuels to adopt greener biomass alternatives to fire their power stations is encouraging for the sector going forward.

In other news this month, we have the startling revelation that corruption in the global forestry industry costs over 29 billion US dollars annually. Interpol has published a report on this very subject as part of international anti-corruption day, and the findings suggest that the principal forms of forestry corruption are bribery of officials and the use of legal forestry practices to hide the trafficking of illegally logged timber as well as other illegal trades.. The example they cite concerns a network of logging sites in Peru with a deep-set penchant for bribing officials, allowing them to export illegal timber – over $79m of illegal assets were seized upon arrest of those involved.

In a more positive story from the past month: Enviva, the largest global wood pellet producing company, has introduced a scheme to track the history of all the wood they use – no company may sell to them without providing such information – in order to ensure they are not unwittingly sourcing their wood from potentially unsustainable sources. This practice, if introduced more commonly, would have the direct effect of counteracting any unsavoury business like that described above, and would allow those in the feedstocks industry to rest easy about the wider sustainability applications of their business, and with no monsters hiding under the bed.

Read on for all of the latest feedstocks news.

Policy

SBRI review to improve innovation to market opportunities for SME's

The UK Department for Business, Energy and Industrial Strategy will undertake a new review to help small businesses access the support needed to take their products from innovative ideas to reality.

The review of the Small Business Research Initiative will be undertaken to improve access to support and funding to develop new technologies. The review will identify existing barriers and provide recommendations to improve the programme: part of the government's Industrial Strategy to build on the UK's strengths to generate further growth. The review was announced by the Prime Minister in her first speech to the CBI.

The SBRI is a cross-government programme, managed by Innovate UK. It enables small businesses to bid for government research and development contracts to develop new technologies. It provides companies with £50,000 to £100,000 to test an idea, and then up to £1 million to develop prototypes.

Click here for more information.

Identification of sustainable feedstock resources in the US

The U.S. Department of Energy and the Sun Grant Initiative established the Regional Feedstock Partnership to address information gaps associated with enabling the vision of a sustainable, reliable, billion-ton U.S. bioenergy industry by the year 2030. The Partnership is composed of representatives from land-grant universities organized under the Sun Grant Initiative, the U.S. Department of Energy, the U.S. Department of Agriculture, and industry.

The Regional Feedstock Summary Report produced by the initiative summarizes the accomplishments of the Regional Feedstock Partnership throughout the 7-year period of 2008 through 2014. It captures the progress made in validating assumptions regarding crop yields in the 2005 Billion-Ton Study, informing and revising the assumptions in the 2011 U.S. Billion-Ton Update and the 2016 Billion-Ton Report: Advancing Domestic Resources for a Thriving Bioeconomy, and in advancing biomass feedstock research and development.

The summary report covers nine different energy crops within the five Sun Grant regions (Northeast, North Central, Southeast, South Central and West), and contains more than 400 scientific presentations and publications produced by the partnership. The partnership also developed comprehensive national and regional yield potential estimates for all species it evaluated.

Click here for more information.

Strong public support for bioenergy in UK according to ETI study

There is strong public support for producing bioenergy in the UK from both biomass and waste, with 80% in favour of bioenergy playing a bigger part in the UK's energy mix, according to a new survey carried out for the Energy Technologies Institute.

The YouGov survey commissioned by the ETI questioned over 5,300 GB adults to gauge public perceptions of bioenergy in the UK.

It found that 74% of people surveyed support producing bioenergy from biomass and 81% support producing biomass from waste.

Generating energy from waste and being a renewable source of energy were seen as the most positive features of bioenergy and the public would be comfortable with a mix of imported and domestic biomass feedstocks, provided imports are used in addition to, not instead of, domestic resources.

Over a third of respondents were concerned about biomass competing with other land uses such as food production, but ETI case studies have shown that they can complement each other.

The Government (31%) is seen as the most popular choice to lead the development of the UK bioenergy sector.

Bioenergy can play a significant and valuable role in the future UK energy system, helping reduce the cost of meeting the UK's 2050 greenhouse gas emissions reduction targets by more than 1% of gross domestic product (GDP).

The ETI recently published a report "The Evidence for Deploying Bioenergy with CCS (BECCS) in the UK" which highlighted the importance of combining bioenergy with carbon capture and storage (BECCS) if the UK is to meet its 2050 greenhouse gas emission reduction targets cost-effectively.

The ETI's internationally peer-reviewed Energy System Modelling Environment (ESME) suggests that bioenergy, in combination with Carbon Capture and Storage (CCS), could meet around 10% of projected UK energy demand, whilst delivering net negative emissions of approximately -55Mt CO_2 per year in the 2050s. This is roughly equivalent to half the UK's emissions target in 2050 and reduces the need for more expensive decarbonisation measures in other sectors such as aviation and shipping.

In the absence of CCS, bioenergy is still a cost-effective means of decarbonisation and should play an important role in meeting the 2050 emissions target.

Click here for more information.

Forestry Fraud costs $29bn annually

An Interpol report published on Anti-Corruption Day in December 2016 highlights the staggering cost of corruption throughout the Forestry industry. This corruption takes several forms, but most notably bribery of officials in order to facilitate the trafficking of illegally harvested timber, drugs, or firearms. The estimated cost each year runs up to 29 billion US dollars.

Interpol's Project Leaf, funded by the Norwegian Agency for Development, aims to counter forestry related crime, and has been in action since 2012.

Click here for more information.

Markets

Vegetable oil stocks on a low

AHDB Cereals Market Intelligence reports the climate effects of the previous El Niño continue to linger for Malaysian palm oil production, with November output the lowest for the month in six years. Also, the Indonesian Palm Oil Research Institute have pegged Indonesian output for 2016 down 2.3% from last year at 34.71Mt. Oilworld forecast global stocks of all vegetable oils and fats at the end of this month down 6Mt year-on-year and suggest this will continue to support markets until at least March 2017.

Underpinning the vegetable oil complex has been the recent strength in crude oil prices, with nearby Brent crude oil futures hitting a 17-month high in the week ($55.72 per barrel). There have been steady gains since OPEC announced coordinated output reductions earlier this month. Crude oil prices can support the vegetable oil complex by making biofuel blending more attractive.

World total oilseed production is now forecast at 540Mt (up 30Mt year-on-year) by Oilworld, 2Mt higher than last month's forecast. This is now expected to exceed consumption by 4-5Mt.

Click here for more information.

Drax wins in capacity market auction

Drax Group PLC announced that it has secured contracts to provide 1,203 megawatts of de-rated electricity capacity from its existing assets from October 2020 to September 2021 under the UK's latest capacity market auction used to secure power generation capacity in advance to ensure that electricity remains available during times of high demand, such as on dark winter evenings.

This winter, two capacity market auctions and the second transitional arrangements auction, which supports the capacity market, will take place in total, securing electricity supply for the winters of 2020/21 and 2017/18. Companies will be paid a clearing price of £22.5 per kilowatt hour under the auction.

Click here for more information.

Research & Development

Switchgrass restores topsoil fertility

Switchgrass is a crop commonly used as a feedstock for bioethanol, but Biobased News has reported that its uses may extend beyond that: A University of Missouri report indicates that switchgrass grown where topsoil has eroded will lead to an increase in the fertility of the soil.

The study compared the effects of growing corn, soybean and switchgrass on soils with varying levels of topsoil. During the 5 year period switchgrass was shown to increase the water permeability of soils with little or no topsoil by 11%, leading to an improvement in soil quality. The researchers believe that switchgrass may be an excellent alternative for farmers struggling with eroded topsoils, as not only can switchgrass be sold as a feedstock in the bioenergy sector, but it may pave the way for other crops to be grown in better conditions once the soil has recovered,

making it an economically viable recovery method for poor soils.

Click here for more information.

Wood & Crop

Sorghum and pearl millet to fuel 2G biofuel in India

The advantages of newly developed high biomass sorghum and pearl millet developed by ICRISAT and Indian Institute of Millets Research (IIMR) for use as feedstock in second generation or lignocellulosic (2G) biofuel production in India was highlighted at a recent workshop.

The advantageous traits of these dryland crops are wider adaptability, fast growth, high biomass production potential, resilience to drought, and compatibility with food security issues as the grain is used for human consumption.

ICRISAT's work in partnership with IIMR and distilleries over the years in developing sweet sorghum value chain for first generation (1G) ethanol production was recognised. The estimated production of ethanol in India is in the range of 2.5-3.0 billion litres which is primarily used for potable alcohol, chemical industries and for ethanol blending.

Click here for more information.

Long term crop forecasts by EU and US released

The UK AHDB Cereals and Oilseeds has reviewed the newly released 10-year agricultural projections by the USDA and EU Commission, which covers one of the most uncertain eras for future agricultural policy in modern times. The difficulty in forecasting that far forward, particularly for the EU, is emphasised by the number of assumptions being made.

Nonetheless, as the forecasts currently stand, for the EU cereals balance, the EU Commission is expecting higher production, increased demand, greater prospects for exports and heavier ending stocks. The most pronounced output growth amongst the main cereals is expected for maize, up 23.5% between 2016 and 2026. Wheat production is pegged 14% higher by 2026. Much of this is driven by a predicted growth on animal feed demand.

The EU Commission assume more use of maize in bioethanol production but it is acknowledged that most of the increase in biofuel demand will come from non-agricultural feedstock and imports rather than domestic feedstock. This comes against a backdrop of new proposals to cap crop-based liquid biofuels at 3.8% by 2030. In addition, access to technology i.e. GM and agricultural policy will influence ultimate trends.

For the US, the USDA are expecting more land to be used for soyabean plantings, at the expense of

maize and wheat in the next 10 years, and for stocks of all three to decline.

As they presently stand, these predictions could point to agricultural prices remaining pressured in the longer term, particularly for maize and soyabeans, but there is much that could change in the interim.

Click here for more information.

UK wheat supply and demand balance - UK could be losing its net export potential

The first official UK cereals balance sheets for 2016/17 for wheat, barley, maize and oats have been published by Defra, AHDB Reports.

The standout aspect of the supply and demand estimates is the more finely balanced wheat picture, following two previous years of significant stocks accumulation. The substantial reduction in the size of the 2016 wheat crop, compared to last year, means that this season will be more of a balancing act between supply, demand and trade. Considering 2016 production alone against forecast demand, this could be the third season in the last five that domestic consumption would outweigh the size of the year's crop.

Opening stocks of 2.8Mt, at the beginning of 2016/17 are estimated to be the highest on record going back to 1991/92, and this has gone some way to cushioning the UK market from the approximate 2Mt drop in production this season.

The recent volatility of £ exchange rates over the last five or so months, as well as continued uncertainty into next year, makes forecasting of trade flows especially difficult.

Good milling quality of UK wheat samples has led to assumptions that imports of wheat will for breadmaking will be low.

In general terms growth in the demand for UK wheat is increasing at a steady rate, whereas UK production is not in line to keep up with demand, according to the historical data. Yield growth needs to increase in the UK to keep pace if the UK is not to become a more regular net importer of wheat.

Click here for more information.

US EIA reports on wood pellet data

Biomass Magazine reports that The U.S. Energy Information Administration has published the initial results of a new survey launched in January 2016 to gather information on US wood pellets and other densified biomass production, sales and inventory.

The data shows the U.S. currently has 11.52 million metric tons of existing pellet production capacity, with an additional 2.74 million metric tons planned or under construction. Most pellet production capacity was concentrated in the South U.S., with 10.82 million tons, followed by 2.86 million tons in the East and 1.15 million tons in the West.

During the first half of 2016, the EIA noted U.S. manufacturers produced approximately 3.3 million tons of wood pellets and sold 3.1 million tons, mostly into foreign markets. Also during the first half of the year, approximately 82 percent of pellet sales were utility pellets sold into export markets, with more than 85 percent of that volume sold to the Drax power plant in the U.K. The remaining 18 percent of pellet sold were sold into the U.S. heating market.

Click here for more information.

DONG converts Danish Avedøre Power station to biomass

From the autumn of 2016, the largest power station in Denmark will be able to generate heat based entirely on wood pellets and straw instead of coal and gas.

VEKS and DONG Energy have just signed a new agreement which means that from 2016 until 2033, unit 1 at Avedøre Power Station will be able to supply green heat to VEKS' customers. The agreement forms the basis of the investment in converting and prolonging the lifetime of the CHP unit and is a significant contribution to the Danish capital's ambition of being CO2 neutral in 2025.

The second unit is a multi-fuel plant consisting of a main boiler, which uses wood pellets as fuel, a straw-fired boiler and two gas turbines.

Click here for more information.

Snetterton generates power

In a news communication from the Snetterton dedicated biomass plant, it was announced that on 14 December 2016 the Snetterton Renewable Energy Plant generated its first renewable electricity. The plant will steadily increase its electrical generation to 100% load over the next few days to 44MW meaning the straw fired plant will generate enough green electricity to supply 82,000 homes and save over 300,000 tonnes of CO2 every year.

In 2013 BWSC and Copenhagen Infrastructure I established a pioneering financial/industrial investor joint venture with the aim to create, own and run power plants. The company closed its first contract for the Brigg project in 2013 and the project entered commercial operation in January 2016. The second project is the Snetterton project where the investment decision was taken in November 2014.

The construction of the plant has already seen economic benefits delivered in the local area and across the region. At its peak, nearly 300 people were working on the build phase of the project, also supporting local businesses through the purchase of equipment, materials and services. Now the plant is moving into the operational phase the number of construction staff has reduced to around 150, with 30 new staff being employed for the O&M phase of the plant.

Click here for more information.

GB Railfrieght has won a rail haulage contract with Lynemouth Power

GB Railfrieght has won a rail haulage contract with Lynemouth Power – it is to build 50 purpose built high capacity biomass hopper wagons for the company. GB is planning to run 27 trains every week, delivering 37k tons per week.

The train service is to run between the Port of Tyne and Lynemouth Power Station. The contract comes as part of a 10-year investment project for

the power station. GBRf previously demonstrated its reliability along this route whilst running coal services to Lynemouth power station when it was owned by RWEST. The last coal train into the station was April 2015.

Click here for more information.

Drax - green light for 3rd unit conversion

The third generating unit at Drax Power Station has been given European Commission (EC) approval to be fully powered by sustainable biomass.

Drax can now complete the upgrade of the third of its six units to run on wood pellets. The third unit upgrade started in July 2015 and now half the power station will produce renewable electricity, saving 12 million tonnes of carbon each year.

Drax produces enough renewable electricity to power three million homes. In the first six months of this year 20% of the country's renewable power was provided by Drax.

The government has set out proposals to end coal-fired generation by 2025 as part of its plan to stimulate more clean energy generation. The EC's decision gives approval to the government's support for the upgrade of Drax power station from coal to biomass, and marks the culmination of a £650 million investment.

Two other units at the power station in North Yorkshire were previously upgraded in 2013 and 2014. This makes Drax Britain's biggest single site renewable power generator, generating 20% of the UK's renewable power.

Drax was awarded a renewable energy subsidy contract by the UK government in 2014 to switch the third unit of its coal power station in North Yorkshire over to biomass. That prompted a state-aid investigation by the European Commission, which was concerned the estimates of the plant's performance were too generous and Drax would be overcompensated.

On Monday, the investigation cleared the subsidy, which sees a guaranteed price paid for electricity generated by the plant. The commission said its analysis found the support would "not result in overcompensation" and would not unduly distort the wood market that will supply the plant with 2.4m tonnes of pellets a year.

Click here for more information.

Enviva biomass launches feedstock tracing programme

Track & Trace (T&T) is a proprietary system that enables Enviva to track every truckload of US wood the company procures from the forest back to its source, providing a detailed understanding of the characteristics of the wood the company uses. Enviva Holdings LP, the world's largest producer of wood pellets, recently publicly released the first data from its T&T tracking system.

Enviva makes pellets using low-grade wood from Southern working forests, procuring only low-quality materials such as pulpwood and "leftovers," including undersized or crooked trees, limbs, tops, wood chips and sawdust. Enviva also does not source wood from independently identified bottomland forest ecosystems that demonstrate high conservation value attributes, or from any forest where the landowner plans to convert to a non-forest use.

Before selling wood to Enviva, a supplier must provide detailed data on the specific forest tract

being considered for harvest, including each tract's precise geographic location, acreage, forest type, species mix, age and the share of wood from each harvest that goes to Enviva versus other consumers. Enviva does not accept any wood without this information, and the company verifies the accuracy of its procedures through third-party audits.

Click here for more information.

Other Feedstocks

Role of Hydrogen in UK energy system - ERP review

Hydrogen is already entering the energy system and appears to be a convincing pathway in the mix of technologies to decarbonise heat and transport. Its widespread use requires deliberate intervention, which includes a strategic, long-term plan to make hydrogen zero-carbon and to address challenges, including its impact on energy security.

The biggest challenges are where large volumes of hydrogen will come from and how to decarbonise it. The report highlights concerns around the associated costs and deliverability of the necessary steam methane reforming plant and Carbon Capture and Storage (CCS) infrastructure needed to handle the large volumes of CO2.

The report highlights concerns around the associated costs and deliverability of the necessary steam methane reforming plant and Carbon Capture and Storage infrastructure needed to handle the large volumes of CO2.

Click here for more information.

US funding for algae projects

Biomass Magazine reports that that U.S. Department of Energy Office of Energy Efficiency and Renewable Energy's Bioenergy Technologies Office has announced a funding opportunity of up to $8 million, subject to appropriations, for innovative technologies and approaches to help advance bioenergy and bioproducts from algae. The funding opportunity announcement (FOA), entitled "Productivity Enhanced Algae and Tool-Kits (PEAK)," is now open for those who wish to learn more and apply on the EERE Exchange.

Topic areas of interest include strain improvement and cultivation biology improvement.

Click here for more information.

Lanzatech awarded US DOE funding for biofuel demonstrator

LanzaTech has been selected by the Department of Energy's Bioenergy Technologies Office (BETO) to receive a $4M award to design and plan a demonstration-scale facility using industrial off gases to produce 3M gallons/year of low carbon jet and diesel fuels.

The facility will recycle industrial waste gases from steel manufacturing to produce a low-cost ethanol intermediate "Lanzanol". Both Lanzanol and cellulosic ethanol will then be converted to jet fuel via the "Alcohol to Jet" (ATJ) process developed by LanzaTech and the Pacific Northwest National Laboratory (PNNL). The ATJ technology was initially developed with DOE funding by PNNL and subsequently scaled-up by LanzaTech to produce 4000 gallons of sustainable jet fuel from Lanzanol and other sources, as well as 600 gallons of diesel fuel, for fuel quality testing, certification and a proving flight with Virgin Atlantic.

LanzaTech is currently building its first commercial ethanol facilities using waste gases, including one in China with China's largest steel company, Shougang, and one in Belgium with the world's largest steel manufacturer, ArcelorMittal. In the DOE funded project, LanzaTech will work with ArcelorMittal to evaluate US opportunities for leveraging this expertise to demonstrate an entirely new pathway to low carbon fuels from industrial wastes that are either flared or underutilized.

To demonstrate process versatility, ethanol from other waste gas streams will be converted, including cellulosic ethanol produced via fermentation of biomass syngas by Aemetis.

Click here for more information.

Feedstock Prices

UK spot prices of bagged wood pellets, and wheat and barley straw. Arrows indicate rise ↑, unchanged – or fall ↓ from previous month.

Date	UK Wood Pellets Delivered (£/tonne, 5% VAT)	UK Ex-Farm Barley Straw (D1000) (£/tonne)	UK Ex-Farm Wheat Straw (D1000) (£/tonne)
10 Feb	236-260 (↑-↑)	42-60(↑-–)	40-55(↑-↓)

For wood pellets prices, we considered UK pellet traders selling prices.
For details on straw spot prices, see http://www.fwi.co.uk/business/prices-trends/

UK (LIFFE), French (MATIF) and US (CBOT) future prices for wheat, rapeseed, maize, and soybean. Arrows indicate rise ↑, unchanged – or fall ↓ from previous month's predictions.

Date	UK (LIFFE) Feed Wheat (£/tonne)	MATIF Wheat (€/tonne)	MATIF Rapeseed (€/tonne)	CBOT Wheat (cnts/bsh)	CBOT Maize (cnts/bsh)	CBOT Soyabean (cnts/bsh)
Jan 17	143.3 (↑)					1005.
Feb 17			414.7 (↑)			
Mar 17	144.4 (↑)	170.2 (↑)		426.7 (↑)	358.2 (↑)	1013. (↓)
May 17	145.7 (↑)	172.0 (↑)	412.2 (↑)	439.7 (↑)	365.2 (↑)	1022. (↓)
Aug 17			385.7 (↓)			1028. (↓)
Sep 17		172.7 (↑)		467.2 (↑)	379.0 (↑)	1013. (↓)
Nov 17	137.8 (↑)		388.2 (↓)			
Dec 17		175.0 (↑)		482.5 (↑)	386.5 (↑)	
Jan 18	138.9 (↑)					
Feb 18			386.7 (↑)			
Mar 18	140.2 (↑)	178.2 (↑)		494.0	394.7	
May 18	141.5 (↑)	178.2 (↑)	387.2 (↓)			
Nov 18	140.7 (↑)					
Dec 18		180.0				

For details on future prices see http://www.hgca.com

Other biomass feedstock prices are available upon request, simply contact enquiries@nnfcc.co.uk

Credits and Disclaimer

NNFCC Market Review is edited by Robert Horton for NNFCC members. Feedback is welcome. The Review has been compiled in good faith and NNFCC does not accept responsibility for any inaccuracies or the products or services shown.

The Bioeconomy Consultants

NNFCC

NNFCC
Biocentre, York Science Park
Innovation Way
Heslington, York
YO10 5DG

Phone: +44 (0)1904 435182
Fax: +44 (0)1904 435345
Email: enquiries@nnfcc.co.uk
Web: www.nnfcc.co.uk
Twitter: @NNFCC