The Bioeconomy Consultants

NNFCC

YOUR PARTNERS FOR BUSINESS INSIGHT AND MARKET INTELLIGENCE

Providing clients with a strategic view of feedstock, technology, policy, and market opportunity across the bioeconomy

News Review

Feedstocks

Issue Seventy-Nine

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

Contents

Foreword

Welcome, all, to October's free edition of NNFCC's Feedstocks News Review.

One of the biggest environmental news stories of recent weeks, and arguably of the whole year, has been the very sobering publication of the Intergovernmental Panel on Climate Change (IPCC)'s report on global warming. Previous editions of this report have highlighted the potentially disastrous effects of the planet warming far beyond pre-industrial levels, including the oft-touted melting of the polar ice caps, resulting in a rise in sea-levels, but perhaps more significantly, a major disruption of ocean currents, and thus dramatic changes in weather patterns. The latter presents a potentially huge threat to global agriculture, throwing doubt on the sustainability of future food supplies. The IPCC has previously recommended that global temperature not be allowed to rise more than 2°C above pre-industrial levels, but now, in light of further research, the IPCC has chosen to lower this to 1.5°C, citing research that has found the effects of this temperature rise would be less drastic than those of a 2°C rise, including a greater prevalence of polar sea ice, and less of a decline in coral reef ecosystems.

In order to mitigate this potential damage, the IPCC highlights the priority of reducing carbon dioxide emissions from all sectors. Total CO2 emissions will need to almost halve over the next twelve years, before dropping to net-zero twenty years later. This is a challenge that will require significant investment and change of habits across the board.

The bioeconomy aims to help bring about these large-scale changes, and in many cases the technologies, particularly in the energy and fuels sectors, are available and to greater or lesser degree deployed. Most of the remaining questions relate to sustainable acquisition of feedstocks. This issue remains hotly political, and this year has become even more volatile, with the European Union's continued drive to remove palm oil from its biofuel feedstock pool. Palm oil has a reputation of leading to unsustainable deforestation of rainforests to clear lad for plantations. In response, the Council of Palm Oil Producing Countries recently met to issue a statement decrying the EU's policy decisions, claiming that the reasoning behind the EU's shunning of palm oil equally applies to other forms of vegetable oil that the EU has shown a policy preference for, such as rapeseed oil. This also comes in the wake of another report by the IPCC, previously reported by NNFCC, which found palm oil to be the vegetable oil that makes most efficient use of land resource, and that phasing out of palm oil would in all likelihood result in an *increase* in indirect land-use change. In the light of uncertainty, the EU proposes to cap support available to crop-derived biofuels as part of its proposals for reform of future support for renewable energy sources. The issue remains a hot topic of debate, and this debate, much like the planet, is not expected to cool down anytime soon.

Read on for the latest news.

Policy

Palm Oil producers come out swinging in face of EU legislation

Pxhere

The Council of Palm Oil Producing Countries (CPOPC) referred to a recent meeting held between Ministers, Ambassadors and Business leaders of Colombia, Indonesia and Malaysia in Cartagena, Colombia on September 26, 2018. The purpose of the meeting was to lay the grounds for the expansion of CPOPC and to discuss relevant issues regarding palm oil and its significant contribution in achieving the respective countries' Sustainable Development Goals by 2030.

Under the proposed Renewable Energy Directive II (RED II), the Commission of the European Union is mandated to establish criteria to help distinguish between feedstocks delivering high and low risk of Indirect Land Use Change (ILUC). There are several proposed EU models for addressing ILUC impacts, none of which CPOPC believes could provide definitive evidence that would allow for a clear distinction between high and low risk ILUC. Nevertheless, the Commission is mandated to establish criteria by February 2019 to allow for such a distinction to be made. The ILUC concept is of US and EU origin, but it is not a globally accepted approach or standard for assessing the impact of ILUC on climate change. It helps underpins EU policy, but according to CPOPC it is not an international norm upon which palm oil producing countries could build their environmental policies. CPOPC draws attention to the fact that there is over 1.7 billion hectares of land devoted to the production of crops globally, of which only 4% is devoted to biofuel.

CPOPC supports the global agreement embarked by all Members of the United Nations to achieve Sustainable Development Goals by 2030 (SDGs). In this context, there is no doubt that palm oil has contributed to the reduction of poverty and to social and economic progress in palm oil producing countries. The CPOPC fully recognizes the importance of addressing environmental issues to ensure that palm oil is produced sustainably. In contrast to the direction of EU RED II, CPOPC believes that the promotion of first-generation biofuel is an essential element for achieving the SDGs in palm oil producing countries. The use of vegetable oils in biofuel is essential to combating climate change and it is also important for all Governments in Palm Oil Producing Countries to reassure and give certainty to their industries that investment in biofuels will not be undermined.

Click here for more information.

European Commission announces bioeconomy measures for 2019

Geograph

Delivering a sustainable circular bioeconomy requires a concerted effort by public authorities and industry. To drive this collective effort, and based on three key objectives, the European Commission will launch 14 concrete measures in 2019.

To unleash the potential of the bioeconomy to modernise the European economy and industries for long-term sustainable prosperity, the Commission will establish a €100 million Circular Bioeconomy Thematic Investment Platform. The aim of this is to bring bio-based innovations closer to the market and de-risk private investments in sustainable solutions, including facilitating the development of new sustainable bio-refineries across Europe.

Member States and regions, particularly in Central and Eastern Europe, have a large underused biomass and waste potential. To address this, the Commission will develop a strategic deployment agenda for sustainable food and farming systems, forestry and bio-based products; set up an EU Bioeconomy Policy Support Facility under Horizon 2020 to develop national and regional bioeconomy agendas; launch pilot actions for the development of bioeconomies in rural, coastal and urban areas.

The EU's ecosystem is faced with severe threats and challenges, including a growing population, climate change and land degradation. In order to tackle these challenges, the Commission will implement an EU-wide monitoring system with the aims of tracking progress towards a sustainable and circular bioeconomy; enhance its knowledge base and understanding of specific bioeconomy areas (by gathering data and ensuring better access to it through the Knowledge Centre for the Bioeconomy); and provide guidance and promote good practices on how to operate in the bioeconomy within safe ecological limits.

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Markets

High pellet prices predicted in future

In the September edition of Pellet Mill magazine, Future Metrics describe the issues affecting pellet pricing and the workings of their modelling tool to predict pricing and uncertainty. Prices reflect a mix of more stable long-term trades and more volatile short-term spot pricing that reflects current market conditions. Smoothing over this the model shows that over recent years average long-term offtake price delivered to the UK has ranged between $180 and $190/metric tonne. The most important contributing factors to costs of pellets are the costs of wood delivered to the pellet mill, which is strongly influenced by transport distances and associated fuel costs.

Looking to the future, Future Metrics indicate that unless oil prices fail to follow predicted upward trends and cost inflation remains low. then without improvements in efficiency or reductions in margins taken, prices of pellets will rise to around $250/tonne by 2030.

Click here for more information.

Versalis purchases Italian bioeconomy companies

Versalis (Eni) has won the bidding process ordered by the Court of Alessandria for Mossi & Ghisolfi's Group's "green" activities. The transfer of the related business units will be formally agreed in the coming weeks, in compliance with legal procedures and deadlines.

The operation includes assets and resources related to development activities, industrialisation, licensing of technologies and bio-chemical processes based on the use of renewable resources, especially biomass, of the four companies Biochemtex, Beta Renewables, Ipb (Italian Bio Products) and Ipb energia.

The innovative aspect of these processes is the Proesa® technology, which is used to convert biomass into second generation sugars and the subsequent production of biofuels or, potentially, other biochemical intermediates. The industrial plant at Crescentino (Vercelli) produces bio-ethanol, as well as green electricity.

Purcase of this know-how reinforces Versalis' competitive position in the bio-based chemical industry, creating synergies with ongoing research projects, and will allow the development of an integrated technological platform of chemicals from biomass, in line with its strategy undertaken in recent years.

Click here for more information.

Research & Development

Capturing CO2 from air to make fuel

Pixabay

Swiss-based company Climeworks has launched a further Direct Air Capture plant (DAC-3), this time in Italy. Every year the DAC-3 facility will filter up to 150 tons of CO2 directly from ambient air. The new plant is part of the Horizon 2020 research project STORE&GO, which demonstrates that Power-to-Gas technologies can be used for large-volume energy storage. In addition to the demonstration plant in Italy, further STORE&GO pilots are being realized in Germany and Switzerland.

The DAC plant, using CO2 from ambient air for methanation, was installed in July and has started operation. It consists of three DAC collectors using the latest Climeworks' technology and requires less energy than the DAC-18 plant in Hinwil, Switzerland. Making use of excess on-site photovoltaic energy, an alkaline electrolizer (200 kilowatt) locally generates 240 cubic meters of renewable hydrogen per hour.

The captured CO2 and renewable hydrogen generated on-site are catalytically methanated

(Power-to-Gas) in modular reactors by French company ATMOSTAT. Waste heat retrieved from the reactors' cooling circuits is extracted for the operation of Climeworks' DAC-3 facility. The methane is then liquefied and used to fuel natural gas lorries.

The primary objective of the STORE&GO research project is to demonstrate the viability of large-volume energy storage through Power-to-Gas technology in real-life applications. To this end the technology will be operated for 4,000 hours in the next 17 months. So far, large-volume energy storage is scarce in Europe. But the European Union plans to move towards delivery of 43% renewable energy by 2030 rising to 50% by 2050. In order to do so, to counter supply intermittency problems it will need more energy storage. Making use of the Europe-wide natural gas network in conjunction with STORE&GO technology has considerable potential.

Click here for more information.

Latest IPCC report recommends global warming threshold of 1.5C

Limiting global warming to 1.5ºC would require rapid, far-reaching and unprecedented changes in all aspects of society, the IPCC said in a new report. With clear benefits to people and natural ecosystems, limiting global warming to 1.5ºC compared to 2ºC could go hand in hand with ensuring a more sustainable and equitable society, the Intergovernmental Panel on Climate Change (IPCC) has said.

One of the key messages that comes out very strongly from this report is that we are already seeing the consequences of 1°C of global warming through more extreme weather, rising sea levels and diminishing Arctic sea ice, among other changes.

The report highlights a number of climate change impacts that could be avoided by limiting global warming to 1.5ºC compared to 2ºC, or more. For instance, by 2100, global sea level rise would be 10 cm lower with global warming of 1.5°C compared with 2°C. The likelihood of an Arctic Ocean free of sea ice in summer would be once per century with global warming of 1.5°C, compared with at least once per decade with 2°C. Coral reefs would decline by 70-90 percent with global warming of 1.5°C, whereas virtually all (> 99 percent) would be lost with 2ºC.

Limiting global warming would also give people and ecosystems more room to adapt and remain below relevant risk thresholds. The report also examines pathways available to limit warming to 1.5ºC, what it would take to achieve them and what the consequences could be.

The report finds that limiting global warming to 1.5°C would require "rapid and far-reaching" transitions in land, energy, industry, buildings, transport, and cities. Global net human-caused emissions of carbon dioxide (CO2) would need to fall by about 45 percent from 2010 levels by 2030, reaching 'net zero' around 2050. This means that any remaining emissions would need to be balanced by removing CO2 from the air.

Allowing the global temperature to temporarily exceed or 'overshoot' 1.5ºC would mean a greater reliance on techniques that remove CO2 from the air to return global temperature to below 1.5ºC by 2100. The effectiveness of such techniques is unproven at large scale, and some may carry significant risks for sustainable development, the report notes.

Click here for more information.

"Lignin-first" approach to utilisation of lignocellulosic biomass

PxHere

The lignin-first concept offers an opportunity to utilize the entirety of lignocellulosic biomass efficiently. Current biomass to fuels and materials conversion strategies looking to utilise lignin rely on high-temperature hydrogenolysis by supported metal catalysts, leading to low-functionalized products or difficulty in separation of solid catalyst from cellulose/hemicellulose. IN this new research the authors report the fractionation and valorisation of lignocellulose via solar energy-driven conversion of native lignin at room temperature. They found that cadmium sulphide quantum dots not only catalyse the cleavage of β-O-4 bonds in lignin models quantitatively but also are efficient for the conversion of native lignin within biomass into functionalized aromatics under visible light, while cellulose/hemicellulose remain almost intact. Further, the colloidal character of quantum dots enables their facile separation and recycling by a reversible aggregation–colloidization strategy. The β-O-4 bond in lignin is cleaved by an electron–hole coupled photoredox mechanism based on a Cα radical intermediate, in which both photogenerated electrons and holes participate in the reaction.

Click here for more information.

Project investigates fructose production from woody biomass

The EU-funded Horizon 2020 ReTAPP project investigated the production of fructose sugar using lignocellulosic biomass from hardwood and softwood feedstocks.

Compared to other lignocellulosic feedstocks like straw, wood-based feedstocks for biorefineries have the greatest potential to replace large-scale fossil derived compounds in the chemical industry. Establishing competitive value chains based on lignocellulosic feedstock will not only secure an abundant alternative industrial feedstock but is also expected to strengthen the competitive position of biobased chemicals and materials compared to their fossil-based counterparts.

ReTAPP researchers employed enzyme solutions to derive wood derived fructose which was used to replace food/starch-based-fructosein a range of chemical products.

The initiative conducted activities in two main areas. The first involved testing, scaling-up and demonstrating the effectiveness of the enzymes as well as the innovative technology developed by project partners in industrial settings. The second series developed the technology into a commercially viable enterprise by producing a business case, identifying potential customers and markets for the product, and preparing commercial partners.

Click here for more information.

Wood & Crop

Increase in UK woodland area

The latest Forest Research Statistics for the UK show that the UK woodland area stands at 3.17 million hectares, of which 0.86 million is managed by public sector forestry bodies across England, Scotland and the Devolved Administrations. This includes 1.30mha of conifer and 1.33 million hectares of broadleaved woodland. Overall the UK woodland area has risen by 250,000 ha since 1998 (to 2017), an increase of 8% over the period.

Sixty-one percent of the coniferous woodland area in Great Britain is occupied by stands of 40 years old or younger. A further 9% of stands are aged over 60 years. Around one half (53%) of the broadleaved area is occupied by stands of 40 years old or younger. More than one quarter (28%) of stands were aged over 60 years. This reflects the degree of active forest management taking place in UK woodland.

The area of farm woodland in the UK has increased from 663 thousand hectares in 2007 to 978 thousand hectares in 2016.

6.5 thousand hectares of new woodland were created in 2016-17, (a 16% year on year increase) and 17,000 hectares were restocked. New planting is heavily influenced by access to support schemes and through previous tax incentives, and new planting rates had fallen in recent years.

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UK cereal production down in 2018

Picryl

AHDB reported on official Defra statistics for cereal production in 2018. Initial estimates made by Defra have shown declines in UK wheat and total barley production in 2018. UK wheat production is estimated at 14.1Mt in 2018, which represents a 5.1% year on year reduction and the lowest production since 2013. In addition, 2018 production would also be 0.8Mt below five-year average production (2013-17). 2018 UK barley production is estimated at 6.6Mt, a year on year reduction of 7.9% and the lowest recorded since 2012.

The difficult weather was cited as the main reason for this decline. The high rainfall in spring was followed by a prolonged dry and hot spell during summer, negatively impacting yields. Estimations of yield were not given by Defra in this release, but the production figure for wheat is in line with previous AHDB estimates. These are based upon an estimated yield of 7.8-7.9t/ha from ADAS harvest progress reports for AHDB and a provisional UK wheat area of 1.8Mha.

In addition, Scottish rapeseed production in 2018 has been provisionally estimated at 125Kt by the Scottish Government. This represents a decline of 13% from last year's total of 144Kt, and is also 6Kt below the 2013-2017 five year average. The reduction also comes as a result of the difficult weather conditions faced in the 2017/18 season.

Sappi adopts Verve brand for dissolved wood pulp

Sappi

Building on its reputation for quality, service and responsibility, Sappi has moved to strengthen its leadership in the dissolving wood pulp (DWP) market with the launch of the Sappi Verve brand.

Demand for DWP continues to grow as consumer preference increases for products made from renewable, sustainably sourced and processed wood fibre. As a significant producer of DWP over the past decades, Sappi today produces close to 1.4m tons per annum, enjoying a significant 16% share of the DWP market.

The majority of dissolving wood pulp is consumed in the viscose industry where pulp is converted through the value chain to yarn and ultimately textiles providing naturally soft, breathable fabrics. DWP cellulosic fibre is also used for a myriad of household, industrial and pharmaceutical applications including for tablets, personal hygiene, cellophane, washing sponges etc.

In the past, DWP sold by Sappi was unbranded and industry generic names were used as product names. This did not reflect the specific benefits which has always differentiated Sappi's DWP. The new Sappi Verve brand creates a very specific identity within the DWP market.

Click here for more information.

France set for black pellet production plant

Valmet has agreed with FICAP on the delivery of the world's first continuous steam explosion system, BioTrac, for production of black pellets. The black pellet plant will be part of an existing large industrial area, located in the Region of Champagne-Ardenne in France.

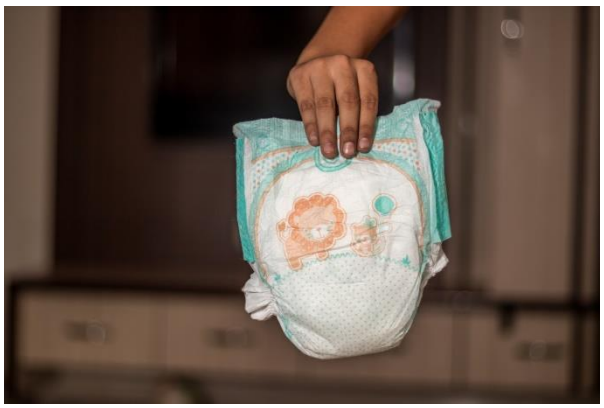
The start-up of the black pellet production plant is planned for 2020.

The pellet plant will produce both white and black pellets and has an annual capacity of 120,000-tons per year of pellets. The black pellets produced will be used mainly by district heating network operators and coal fired power plants as a substitute to fossil fuels.

Click here for more information.

Other Feedstocks

Utilising disposable nappies as feedstock



PxHere

Thousands of soiled nappies that were destined to clog Italian landfill sites or incinerators are being redirected to a recycling plant that is turning them into streams of high-quality raw materials, in a new process that it is hoped will be replicated around Europe.

Every day, new parents find themselves sucked into the environmentally controversial disposable nappy cycle. Tens of billions of these clusters of plastic, plant matter and human waste are thrown away globally each year, most of them incinerated or sent to landfill where they take centuries to decay.

Italian company Fater has developed what it claims is the first industrial-scale process that can extract valuable materials from nappies, and it is already up and running in Treviso, Italy.

Fater, which has been trying to recycle disposable nappies for a decade, has found the trickiest stage is at the start: opening it. Conventional approaches such as high temperatures and pressures only make it collapse on itself.

But, ten years and 108 patents later, Fater has found a way to relax the nappy so it opens up and can be sterilised and dried, ultimately yielding its constituent parts. The plant also processes incontinence and sanitary pads and tampons.

The plastic stream that emerges is of a higher quality than much recycled plastic on the market, created as it was 'to be extremely thin, be elastic and be compatible with the most delicate skin.'

Another reason for the quality is that collected nappies are generally uncontaminated with other waste – a problem that plagues the plastics recycling industry.

Click here for more information.

EMBRACED project pursues alternative waste biorefinery for nappies

It is with an eye to making better use of alternative waste streams that Horizon2020-funded project EMBRACED has begun. The partners on the project – drawn from all stages of the process – want a new biorefinery for nappies to extract nutrients from the faeces and urine in waste water, for example, which could be used for fertiliser.

But the prize will be harnessing the cellulose in disposable nappies.

As a bonus, the cellulose emerging from the recycling plant turns out to be more yielding even than virgin cellulose to the fate that awaits it. For example, the recycling process renders it more vulnerable to enzymes that break it down into glucose ready for fermentation into ethanol.

The project is investigating two schemes: turning the cellulose into a feedstock for the manufacture of biodegradable polymers that could ultimately be used to package some of Fater's products, and making biostimulants, part of the new generation of more environmentally friendly fertilisers.

It will produce the latter through a two-stage process. First the cellulose will be heated to a high temperature without oxygen so that it breaks down into simple gases such as hydrogen and carbon monoxide. Then, this so-called syngas is fed to bacteria for metabolising into bioplastics for medical devices, with the deactivated bugs destined for biofertiliser.

If things go well, an industrial scale biorefinery will be built in Amsterdam by 2020.

Click here for more information.

Coffee waste for biofuel

Pexels

Biofuels news reports South African recycling company Verda Waste is to build a plant that will process coffee waste into biofuel. The plant will be located in Johannesburg and is expected to be built in 2019.

The company intends to lead the industrialising process of converting waste coffee grounds into biofuels. It proposes to do so by recycling 17million kilogrammes/year of spent coffee grounds into 1.8million litres/year of biodiesel as well as 4.5million kilogrammes/year of biomass fire logs and pellets.

Verda Waste reports that the demand of coffee is so high, that large amounts of residues are created in the industry that are toxic and could cause severe environmental problems.

The plant is set to recycle around 70,000 tonnes of coffee waste that if not used, would have ended up in South African landfills over the next 5 years. This would lead to a saving of 476,000 tonnes in carbon emissions.

Click here for more information.

Non-food biomass for aromatic chemicals production

BioBTX B.V., a sustainable technology development company, recently announced the official opening of the pilot plant for the production of sustainable platform chemicals in Groningen, the Netherlands.

BioBTX is developing a technology to convert non-food biomass and end-of-life feedstock materials into cornerstone aromatic chemicals, with a focus on benzene, toluene and xylenes (BTX), which as drop-in chemical intermediates are widely used for the production of plastics.

The pilot plant will initially convert non-food liquid biomass, like glycerol and fatty acids. In a second stage, the unit will be made suitable for process solid biomass and end-of-life materials, like plastics and composites. The pilot plant is located at Zernike Advance Processing site in Groningen the Netherlands, a semi-industrial environment with a focus on bio-based products.

Click here for more information.

Fischer-Tropsch process licensed for municipal solid waste conversion

BP and Johnson Matthey have signed an agreement with Fulcrum BioEnergy to license their Fischer Tropsch (FT) technology to support Fulcrum's drive to convert municipal solid waste into biojet fuel.

BP and JM have developed a simple-to-operate and cost-advantaged FT technology that can operate both at large and small scale to economically convert synthesis gas, generated from sources such as municipal solid waste and other renewable biomass, into long-chain hydrocarbons suitable for the production of diesel and jet fuels. Fulcrum will use the BP and JM technology in their new Sierra BioFuels Plant located in Storey County, Nevada, approximately 20 miles east of Reno.

The Sierra plant will be the first commercial-scale plant in the U.S. to convert municipal solid waste feedstock, or household garbage that would otherwise be landfilled, into a low-carbon, renewable transportation fuel. When the plant begins commercial operation, planned for the first quarter of 2020, Sierra is expected to convert approximately 175,000 tons of household garbage into approximately 11 million gallons of fuel each year.

Click here for more information.

Events

European Biomass to Power Conference Stockholm, 7th-8th November 2018

Already on its 8th edition, this two-day event will bring together key industry stakeholders to join our forum discussions and excellent networking, including senior representatives from Power Companies, Biomass Producers, Biomass Traders & Distribution Companies, Trade Associations, Renewable Energy Consultancies, EPC Contractors and OEMs, Regional & National Governments and Regulatory & Research Bodies.

This year's conference will give updates on the European biomass market and its new developments, as well as focus on sustainability and commodity challenges. Over the two days, the event will give you in-depth look into case studies giving practical examples of planning, finance and technology strategies utilised for biomass co-generation projects.

Click here for more information.

European Biosolids & Organic Resources Conference Leeds, 13th-14th November 2018

Now in its third decade, the conference provides an essential annual update on the latest industry innovations, best practice, cutting-edge technology and research in the waste water and resource management industries.

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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	285-316 (–-–)	60-80 (–-–)	45-65 (–-↓)

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

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)
Nov-18	176.7 (↑)		372.2 (↓)			856.75 (↑)
Dec-18		201.2 (↑)		514.7 (↑)	367.0 (↑)	
Jan-19	178.7 (↑)					870.50 (↑)
Feb-19			378.0 (↑)			
Mar-19	180.0 (↑)	204.2 (↑)		534.2 (↑)	379.5 (↑)	883.50 (↑)
May-19	181.0 (↑)	205.5 (↑)	378.2 (↑)	547.0 (↑)	387.0 (↑)	897.00 (↑)
Jul-19	182.0 (↑)			552.7 (↑)	392.7 (↑)	907.50 (↑)
Aug-19			372.0 (↑)			911.75
Sep-19		189.0 (↑)		562.5 (↑)	394.5 (↑)	
Nov-19	163.2 (↑)		376.0 (↑)			
Dec-19		191.0 (↑)		576.7	400.0	
Jan-20	164.7 (↑)					
Feb-20			375.0 (↑)			
Mar-20	166.1 (↓)	193.7 (↑)				
May-20	167.2 (↓)	194.0 (↑)				
Sep-20		186.7				
Nov-20	160.4 (↓)					

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

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

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