

The Bioeconomy Consultants



## News Review

Issue Sixty-Seven

October 2017

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



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# Foreword

Welcome to October's free issue of NNFCC's Feedstocks News Review.

Growing crops is all well and good, but unless there is a profitable end-market for those crops, it can prove costly for the grower: not only are there the unit costs of production, but any surplus must either be stored or disposed of, both of which incur further costs. Thus, it always pays to find a new market opportunity for crops, and the bioeconomy has the capacity to provide many such opportunities. This has led to some intriguing end-uses for crops (normally detailed in our Biobased Products News Review), but this month sees some interesting stories regarding the development of crops for bioeconomy use.

Biofuels are probably the most widely-known use for crops in the bioeconomy, certainly as far as the layman is concerned. But with the ever-fervent land use debate continuing, crops must be continually developed and improved to increase biofuel production. The USA seems to be leading the way on this, with multiple stories this month about US Department of Energy grants being utilised to improve the biofuel output of crops. Michigan State University are focusing on improving yields of both camelina and switchgrass in subtly different ways: in the former case, metabolic processes are being analysed to increase direct oil production of camelina plants, which can then be extracted for biodiesel, whereas with switchgrass, researchers are aiming to marry the disease resistance of northern American strains with the drought tolerance of southern ones in order to increase overall crop yields, so they can be used for cellulosic ethanol production.

Elsewhere, this month sees a potential breakthrough in crop-based jet fuel, with a new process being developed at Washington State University to synthesise energy-dense biofuels from the gum of plants such as eucalyptus. This discovery has huge potential, as the scientists describe finding similar fuel chemicals from crude oil as "processing diamonds from dirt". This month we've also seen bike tyres produced from dandelion rubber, and brown seaweed used as a water purifier. These examples demonstrate that sometimes it is not the conventional crops that lead to bioeconomy breakthroughs.

Read on for the latest news.

# Policy

## UK Government publishes Clean Growth strategy

On 12 October the UK government published its long-awaited Clean Growth Strategy, setting out its policy aims and objectives of building on performance to date in reducing UK greenhouse gas emissions.

The strategy sets out how £2.5 billion will be spent between 2015 and 2021 in low carbon innovation, not all of this is new money and much reflects policies already in-train.

Many of the future actions the Government will be taking, expanding on the proposals, will be set out in the 25 Year Environment Plan, which will be designed to be a sister document to the Clean Growth Strategy, and in a long-term strategy for the UK's transition to zero road vehicle emissions. Taken together, these set out the Government's approach to fulfilling its commitment to leave the environment in a better state than it inherited. Along with the Industrial Strategy White Paper, to be published later in 2017, these will form a critical part of the governments future progress.

Click [here](#) for more information.

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## China seeks to reduce corn stocks by producing bioethanol



*Wikimedia Commons*

Biofuels International reports that China's plans to increase the use of bioethanol will not have a significant impact on the grain market, as it would be unrealistic for the country to import large amounts of corn for the industry's development, a government official told Xinhua Net.

China launched corn-to-ethanol pilot programmes in 2004 as part of efforts to cut emissions and advance new energy, and it is the world's third-largest bioethanol producer, using nearly 2.6 million tonnes a year.

Earlier this month, China said it wanted nationwide use of bioethanol gasoline by 2020, and aimed to have an advanced liquid biofuel system and demonstration facility in operation by then, capable of producing 50,000 tonnes of cellulosic ethanol a year.

Years of support for corn farmers has left China with a substantial stockpile of the crop. In 2016, China's corn output stood at around 220 million tonnes, while stocks amounted to 230 million tonnes.

According to government estimates, China's stockpile will suffice to meet demand in the short term, achieving a supply-demand balance in the corn market in three to five years.

For China, the basic principle of developing biofuels is not to pose a threat to food security. To reduce corn stocks, China said it would reduce its corn planting area by around 670,000 hectares and switch to other crops in 2017.

Click [here](#) for more information.

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## Markets

### **Small number of major players dictates pellet market**

Bioenergy insight reports the industrial wood pellet market in Europe is characterized by relatively few offtakers, with Drax Power in the U.K. (annual demand of roughly 7.4 million metric tons (MT)) and DONG Energy in Denmark (annual demand of about 2.1 million MT) having the strongest positions in the market. Of the total expected industrial pellet demand of 11 million MT for 2017, these two players jointly account for a market share of 86 percent. Over the next few years, only a handful of new offtakers are expected to enter the market. In the U.K., Lynemouth Power is expected to start operating in 2018, and MGT Power in 2020. In the Netherlands, five biomass cofiring projects have received support contracts, which help diversify the offtake side. The general market situation, however, characterized by a high level of demand concentrated on a few players, will not change markedly.

There is also a limited number of very large pellet suppliers in this market, with only seven able to offer volume from production capacities above half a metric ton each— Enviva, Drax Biomass, Pinnacle Renewable Energy, Graanul Invest, Pacific Bioenergy, Fram Renewables and Georgia Biomass. These large suppliers, with a combined annual capacity of approximately 9.2 million MT, often have mid- to longer-term direct supply agreements with European consumers, and are able to manage their export infrastructure and distribution operations in an efficient way.

This development often leads to smaller pellet manufacturers supplying premium heating markets due to lack of infrastructure to support larger trades. To resolve this high level of fragmentation on the supply side, and to bring more of these volumes to market, the industry requires market participants who can effectively aggregate these smaller volumes, and channel them as larger packages through strategically located export and storage hubs. The requirement for such strategic hubs on the export and import side can present a significant market entry barrier. Nevertheless, there are some examples for the successful implementation of such an aggregation model already emerging within the market.

Click [here](#) for more information.

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# Research & Development

## Over \$20m US grant includes funding for Florida feedstock crop development



*Flickr*

The U.S. Department of Agriculture's (USDA) National Institute of Food and Agriculture (NIFA) has announced six grants totalling nearly \$21.1 million to support the development of new jet fuel, biobased products and biomaterials from renewable sources. Funding is made through NIFA's Agriculture and Food Research Initiative (AFRI), authorized by the 2014 Farm Bill.

These grants are awarded through the Sustainable Bioenergy and Bioproducts Challenge Area, which supports integrated public/private partnerships that lead to industrial production of biobased materials, products and fuels to create jobs, stimulate rural economic vitality, improve existing agricultural systems and contribute to our nation's energy security.

Among the grants, the University of Florida project will identify and deploy regionally adapted *Brassica carinata* (an oilseed member of the mustard family) as the basis of a biofuel and

bioproduct supply chain that will produce biobased jet fuel for civil and military aviation, industrial chemicals, and animal feed. The work will result in sustainable commercialization of *carinata* in the Southeast as well as training a workforce to support it. The University of Arizona project supports the further development of a domestic source for natural rubber from a desert shrub *guayule* which can be grown on marginal lands and in addition to rubber latex can produce sugars that may be made into biobased jet fuel, and a resin that can be made into valuable industrial chemicals. Bridgestone USA a major tire manufacturer is a key partner on the project. A North Carolina State University project will use online courses to prepare students and teachers from underrepresented and rural areas to meet the workforce demands and advance the future of bioenergy and bioproducts in America's bioeconomy.

Since 2010, NIFA, has awarded more than \$164 million through the Sustainable Bioenergy and Bioproducts Challenge Area.

Click [here](#) for more information.

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## US Dept. of Energy grant aims to improve sorghum for bioenergy

One of the world's largest plant science research institutes has received a five-year, \$16 million (€13.6 million) grant from the US Department of Energy (DOE) to enhance the use of sorghum for bioenergy.

The Donald Danforth Plant Science Centre will use the funding to build on earlier research using the model grass, green foxtail (*Setaria viridis*). The latest project will aim to identify new genes and pathways that can contribute to photosynthesis and enhanced use efficiency. The researchers will deploy these genes using tools of the emerging

field of synthetic biology to accelerate development of elite energy sorghum varieties for production under marginal environments.

Understanding the network of genes involved in photosynthesis and drought tolerance will provide targets for plant breeders and genetic engineers to re-design sorghum specifically as a high value bioenergy feedstock to be grown on marginal soils and thus not compete with food crops.

The aim of the project is to deliver stress-tolerant sorghum lines, addressing DOE's mission in the generation of renewable energy resources. According to a statement from the Donald Danforth Centre, the development of a low input, environmentally safe and highly productive sorghum germplasm will help establish a lignocellulosic energy economy that can provide jobs to rural communities, ensure energy security and benefit the environment.

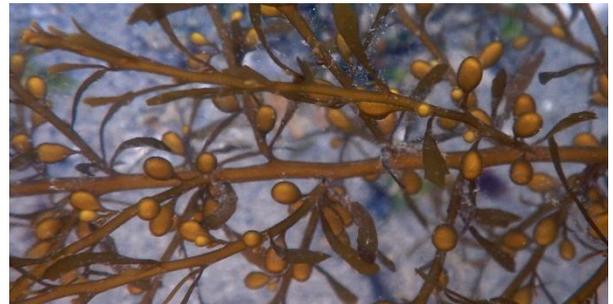
A member of the grass family, Sorghum is grown worldwide and very resilient to drought and heat stress. Natural genetic diversity in sorghum makes it a promising system for identifying stress-resistance mechanisms in grasses that may have been lost during the domestication of related cereal crops.

Click [here](#) for more information.



*Wikimedia Commons*

## **Brown seaweed removes arsenic from drinking water**



*Wikimedia Commons*

The removal of arsenic from water using a brown seaweed (*Sargassum muticum*), coated with iron hydroxide, has been tested in a recent study. Under optimal pH conditions, the method removed 100% of the arsenic, indicating the viability of this method for treating contaminated water.

Arsenic is a toxic and carcinogenic semi-metal, which can enter waterways through natural deposits and human activity, including mining, agriculture and industrial activities.

Contamination of groundwater, which is used for drinking water, has been reported in many developing countries including Argentina, Bangladesh, Chile, China, India, Taiwan and Thailand. Waste water released from activities such as mining also requires efficient methods for removing arsenic. The two main forms of arsenic — arsenite and arsenate — are commonly found in water discharged from mines.

This study proposed a novel process of removing arsenite and arsenate forms of arsenic from water by adsorption on brown seaweed coated with iron-oxy (hydroxides).

The researchers say this is probably the first test using iron treatment of seaweeds to remove arsenic. They say the main disadvantage of the new method was the leaching of iron from the

seaweed into the water. However, this problem is mitigated by using a pH above 6, which also makes the treated water more suitable for uses such as irrigation.

Although quantity of arsenic removed was similar for the new and the conventional treatment methods (under the conditions studied) the new method does reduce the use of additional reactants (other substances used as part of the process) and sludge produced as a result of the process. Overall, the study indicates that using iron-coated seaweeds is a viable method of removing arsenic from water.

Click [here](#) for more information.

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## **Novel process for jet fuel from eucalyptus**

Biomass Magazine reports that a research team led by Hongfei Lin, associate professor from Washington State University's Gene and Linda Voiland School of Chemical Engineering and Bioengineering, has developed a novel process for synthesizing dense jet fuel from mint, pine, gumweed, eucalyptus or other plants. The research is a significant step towards making high-energy density biofuels affordable in the aviation industry.

The process, known as biphasic tandem catalytic process (biTCP), synthesizes cyclic hydrocarbon compounds for jet fuel from terpenoids, the natural organic chemical compounds found in many plants. Cyclic hydrocarbons are molecular compounds with structures that can store high levels of energy. The researchers were able to create a high yield of the cyclic hydrocarbon p-menthane from eucalyptus oil.

Petroleum-based super dense jet fuels, which can make airplanes fly faster, further and with bigger

payloads, are expensive to produce. For instance, Lin says, refining the molecule in JP-10 fuel, exo-tetrahydrodicyclopentadiene, from crude oil is comparable to "processing diamonds from dirt." Because of their structure, terpenoids are an attractive economic alternative to petroleum fuels.

Collaborating with the University of Nevada-Reno, the researchers' work was recently published in the journal Green Chemistry.

Click [here](#) for more information.



*Wikimedia Commons*

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## **US researchers seek to improve biofuel yield of switchgrass**

Just as sequencing the human genome has netted major health and medical benefits, switchgrass genomics will pay dividends through the development of advanced liquid biofuels.

Researchers at Michigan State University will use a \$1.1 million U.S. Department of Energy grant to fight disease in switchgrass by identifying regions of the genome that cause disease resistance. Locating these disease-fighting regions will help improve switchgrass' viability. Those thriving switchgrass plants could play a crucial role in the emerging bio-based economy by providing a

consistent source of biofuels and diverse bioproducts.

Switchgrass can be found across much of the eastern U.S. However, switchgrass plants have different traits in the north and the south. Southern switchgrass, for example, do well in heat and can fight off fungal diseases that thrive in warm, wet climates. Northern grasses survive freezing winter temperatures, but they wither when exposed to heat, drought or disease – elements that barely bother their southern cousins.

Breeding programs, ones that take advantage of natural genetic variation in disease resistance, have great potential to improve resistance.

The team will utilize new genetic mapping populations to identify genomic regions responsible for divergence in disease resistance between northern upland and southern lowland switchgrasses. The scientists also will conduct a genome wide association study to identify genes involved in disease resistance. Together these approaches will uncover the causes of disease resistance in switchgrass and provide valuable insights that can be used by breeders to produce more resilient crops.

Click [here](#) for more information.

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## **New enzyme isolated for rapid hydrolysis of crystalline cellulose**

The crystalline nature of cellulose microfibrils is one of the key factors influencing biomass recalcitrance which is a key technical and economic barrier to overcome to make cellulosic biofuels a commercial reality. To date, all known fungal enzymes tested have great difficulty degrading highly crystalline cellulosic substrates. Researchers have demonstrated that the CelA cellulase from *Caldicellulosiruptor bescii* degrades highly crystalline cellulose as well as low crystallinity substrates making it the only known cellulase to function well on highly crystalline cellulose. Unlike the secretomes of cellulolytic fungi, which typically comprise multiple, single catalytic domain enzymes for biomass degradation, some bacterial systems employ an alternative strategy that utilizes multi-catalytic domain cellulases. Additionally, CelA is extremely thermostable and highly active at elevated temperatures, unlike commercial fungal cellulases. Furthermore, they have determined that the factors negatively affecting digestion of lignocellulosic materials by *C. bescii* enzyme cocktails containing CelA appear to be significantly different from the performance barriers affecting fungal cellulases. Here, they explore the activity and degradation mechanism of CelA on a variety of pre-treated substrates to better understand how the different bulk components of biomass, such as xylan and lignin, impact its performance.

Click [here](#) for more information.

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# Wood & Crop

## Above average wheat yields in the UK



*Pixabay*

UK wheat output in 2017 was provisionally pegged at 15.2Mt by Defra in early October. This is 5% larger than last year's crop despite declines in crop area, pointing to above average UK yields. This follows news that the Scottish wheat crop is estimated to grow by 7% (65Kt) to almost 1Mt due to larger yields. Meanwhile, UK barley production was provisionally estimated at 7.36Mt, up 11% from 2016 and similar to the levels seen in 2015 (7.37Mt). The rise in barley output is partly driven by the increase in area seen this year in England and Scotland.

The year on year increase in wheat output could help reduce the impact of lower carry-over stocks. However, unless higher imports are recorded in 2017/18, availability is still set to be lower than 2016/17 (16.92 v 17.14Mt (new production plus stock)).

Overall this represents a recovery in wheat output, but still falls below 2014 and 2015 production levels.

Meanwhile, AHDB reports Brazilian maize exports totalled over 5Mt in September following a record harvest of the second crop of maize. Cumulative

maize exports since June have reached 15Mt, a figure which equates to a 113% increase from the drought-ridden 2016 crop harvest, and 37% above the 2015 exports. The substantial exports look set to continue in October and are already near the level exported in October 2015 with three weeks still remaining. The combined high maize production forecasts for Brazil and the US this season; albeit below last year's record production levels, will likely increase competition with other cereals, which could lead to negative price pressures on European cereal prices.

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## Looking to boost oil output of camelina

Biomass Magazine reports that Michigan State University will lead a \$10 million U.S. Department of Energy grant to explore ways to boost Camelina crop's yield, a promising biofuel candidate.

The scientists will generate metabolic models to predict how the plant is converting sucrose from photosynthesis, which eventually produces oil. The team's overall goal is to achieve up to a 300-percent increase per acre in oil production. Traditional breeding approaches could take as long as 20 years to produce positive results. Taking a genomic approach could cut that time in half.

Camelina, when compared to canola, has a smaller genome and it's easier to study and engineer. Identifying what genes control key mechanisms should be less complicated than unravelling the genetic control panel of canola. Camelina also serves as a model plant, meaning that it's genetically similar to other important oil-producing crop plants.

Along with aeronautical fuel, camelina oil can be used in a number of other bioproducts, including nutritional and potential pharmaceutical, cosmetic

and other products. Additionally, it can be grown on agriculturally marginal lands, requires less fertilizer and doesn't take special equipment to be planted or harvested. This should appeal to farmers, who'll be able to add this crop to their rotation with existing agricultural implements and practices.

Click [here](#) for more information.

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### **Bioplastics still have low land-use demand**

European Bioplastics figures show that bioplastic production is set to grow by 350% by 2019 to reach 7.8m tonnes per annum of biodegradable and biobased non-biodegradable bioplastics, with the latter dominating production.

Production capacities are growing fastest outside Europe, with significant global production capacity locating in Asia which will come to dominate global production (anticipated to account for 81% of global production capacity by 2019).

Bioplastics currently account for production on 0.68mha compared to 53mha for biofuels and 106mha for conventional non-food use (e.g. natural fibres). Use for bioplastics currently accounts for around 0.01% of the global arable area, a figure that at best might double to 0.02% by 2019. Increasing yields of agricultural production and process fermentation yields could temper the impacts of increasing demand on land use for bioplastics.

Click [here](#) for more information.

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### **Dandelion rubber used for bike tyres**



*Pixabay*

Apollo Vredestein showcased a prototype of its Vredestein Fortezza Flower Power at the Eurobike exhibition in Friedrichshafen, Germany. This innovative road tyre is made of rubber extracted from the roots of dandelions, the result of a joint initiative with Wageningen University and Research (WUR) called DRIVE4EU, co-financed by the European Union. Vredestein's involvement illustrates the importance that the company attaches to sustainability and innovation.

This unique product is the first bicycle tyre in the world produced with natural rubber extracted from the roots of the Russian dandelion (*Taraxacum kok-saghyz* or TKS). This is why it was named Flower Power (Fortezza is the successful line of Vredestein road bicycle tyres). This particular series of prototype tyres are made with rubber extracted from flowers grown and harvested in the Netherlands.

Apollo Vredestein has worked closely together with WUR to develop this special natural rubber, make production viable and test various compounds. Each improvement in the process of rubber extraction has also led to a direct enhancement of the quality of the rubber. As a result, the special compound now used as a test on the Fortezza Flower Power prototype provides better grip than traditional compounds.

Click [here](#) for more information.

## Verdo sells pellet plant to Arensis

The Verdo biomass pellet plant in Grangemouth has been sold to US off-grid energy supplier Arensis for an undisclosed sum.

The sale by Verdo Renewables will see all 18 staff transfer over to Arensis and the company plans to double the workforce at the site within two years.

The Verdo plant produces more than 60,000 tonnes of wood pellets a year from local and sustainably grown virgin timber.

Arensis said the acquisition is part of a wider £50 million UK investment plan to add a pellet supply offering alongside sales of micro-grid biomass generators from German manufacturer and sister company, Entrade.

Arensis said it currently has 185 power systems in operation across the UK accounting for around 85 per cent of all small-scale biomass generation in the UK.

The Verdo biomass pellet plant will provide Arensis with a fuel supply for its biomass energy generation. Verdo are committed to using local, sustainable sources for biomass, reducing the transport carbon footprint and maintaining local jobs.

Arensis plans to install 30 Entrade biomass generators at the Grangemouth pellet plant site to power manufacturing operations in what is billed as a £15 million investment.

Click [here](#) for more information.

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# Other Feedstocks

## UK's residual waste treatment has shown significant growth

The twelfth issue of Eunomia's Residual Waste Infrastructure Review highlights the significant growth in residual waste treatment capacity that has taken place since tracking facility development started in 2009.

The report finds that since 2009/10, the UK has more than doubled its residual waste treatment capacity, which has increased from 6.3 million tonnes to 13.5 million tonnes. Over the same period, the quantity of residual waste suitable for treatment has fallen from an estimated 30 million tonnes per annum (tpa) to 26 million tpa. There is a lack of clear, reliable data for commercial and industrial waste – and as the gap between treatment capacity and arisings closes, the need for better information becomes increasingly urgent. With more facilities still in the construction pipeline, the report forecasts that the UK's supply of treatment capacity will exceed the available quantity of residual waste in 2020/21. Were all facilities to operate at full capacity, together they would limit the UK's recycling rate to no more than 63%.

Developers remain interested in the UK market, seeing opportunities to out-compete existing facilities on price – or perhaps assuming that, outside the EU, the UK will focus less on resource efficiency. However, it appears that any further development of residual facilities would either further constrain recycling, or lead to some facilities operating below capacity.

The report also estimates the current and future residual waste treatment 'capacity gap' across Northern Europe. Currently, waste arisings exceed treatment capacity by some 57 million tonnes, but the report forecasts that, thanks to changes in existing directives that are expected at the EU level, the gap will be reduced to zero by 2028. By 2030, there would be an excess supply of treatment capacity of 8.7 million tpa.

Click [here](#) for more information.

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### **UK's 2016 waste-derived fuel exports expected to exceed 3m tonnes**

Exports of waste derived fuels from England in 2016 look to have exceeded 3 million tonnes, latest Environment Agency figures indicate. According to provisional Agency data released for January to November 2016, a total of 2,884,866 tonnes of waste derived fuel was approved for export – roughly 262,000 tonnes per month

The feedstock material predominantly consists of refuse-derived fuel (RDF), but a growing amount of solid recovered fuel (SRF) has also been highlighted by the Agency in its monthly figures.

The total already puts export tonnages ahead of the final figure for 2015, which saw 2,822,708 tonnes of material approved for export across the 12 months. Provided average monthly tonnages for 2016 carry through to December, England looks set to pass the 3 million tonne export mark – achieving an estimated annual figure of around 3.1 million tonnes.

However, the provisional figures also provide further evidence that RDF exports from England are continuing to level out.

In 2014, exports of waste derived fuels shot up to 2.37 million tonnes – more than 750,000 tonnes

greater than the amount exported in 2013. But in 2015 the gap began to close, with exports rising by an estimated 450,000 tonnes on the previous year.

A decline in the rate of increase of RDF exports has long been predicted as more opportunities arise on the domestic energy from waste market and incinerators in Europe begin to reach capacity.

The largest recipient of RDF from England during the first 11 months of 2016 was the Netherlands, by a large margin, accepting 1,419,884 tonnes – around half of all material shipped out. This was followed by Germany, which received 620,488 tonnes of RDF, Sweden at 363,349 tonnes and Denmark at 189,818 tonnes.

Industry comments that the growth was mainly from new SRF contracts with RDF demand capping out.

Click [here](#) for more information.

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## **Biocoal to be tested as blast furnace feedstock**

Sweden's SSAB (a Nordic and US-based steel company) said it will invest SEK13 million (approximately US\$1.6 million) in a research project that will explore the use of a coal and coke substitute in blast furnaces.

The company said the project, which is being run by Swedish public-private research group Swerea in cooperation with SSAB's Oxelösund plant, will study the use of a biocoal made from wood chips. The intent is to see whether the use of biomass in blast furnaces can reduce carbon dioxide emissions.

SSAB said there have been promising results in small blast furnaces injected with biocoal, but it's never been tested on an industrial scale.

Click [here](#) for more information.

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## **Events**

### **Total Food Norwich, 31st October - 2nd November 2017**

Total Food 2017 will be the 5th in a series of international conferences which focus on the sustainable exploitation of agri-food co-products and related biomass, thereby helping to minimise waste.

Under the auspices of the Royal Society of Chemistry (Food Group), this three-day event organised by staff from the Biorefinery Centre provides an open forum to highlight recent developments and to facilitate knowledge transfer between representatives of the agri-food industries, scientific research community, legal experts on food related legislation and waste management, and consumer organisations.

Click [here](#) for more information.

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### **Focus on Feedstock York, 1st November 2017**

Join BioVale for a half-day workshop to discuss the issues around feedstock: how to get your feedstock right and what to do when you get it wrong. There will be a series of talks, followed by a question and answer session with the panel of speakers, networking and an 'ask the expert' session.

Click [here](#) for more information.

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## **European Biomass to Power Aarhus, 8th-9th November 2017**

Already on its 7th edition, this event will give latest updates on the European biomass market and its new developments, as well as focus on sustainability challenges. Over the two days, ACI's conference will give you in-depth look into case studies giving practical examples of planning, finance and technology strategies utilised for biomass co-generation projects.

Four Exclusive Site Visits: during the afternoon of 7th November a limited number of conference delegates will receive a unique opportunity to visit Dong Energy's Skaerbaek & Studstrup Power Stations and on 8th of November a delegation will be invited to visit Biomass fired CHP plant in Lisbjerg and Verdo's CHP Plant (KVR) in Randers. There is no extra charge to attend, but spaces are strictly limited and allocated to conference delegates on a first-come, first-served basis, so it is highly recommended to book early to guarantee availability.

Click [here](#) for more information.

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## **European Biosolids & Organic Resources Conference Leeds, 20th-21st November 2017**

Now in its third decade this event provides practitioners with an annual update on legislative changes; new technologies; best practice and site-experiences with existing technologies and an insight into relevant research in the science and engineering of biosolids and organic resources. The conference is attended by recognised experts from around the world both, as speakers and delegates.

The programme covers the latest innovations and updates of existing technologies. Presentations from respected industry experts and newcomers follow the development of technologies and legislation from inception to full-scale installations.

Click [here](#) for more information.

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## **Energy from Waste 2017 London, 6th-7th December 2017**

A move towards greener energy makes Energy from Waste (EfW) a fundamental cog in energy provision. Supported by the Environmental Services Association (ESA) and European Suppliers of Waste to Energy Technology (ESWET), SMI's 10th annual conference on Energy from Waste will draw critical updates from those shaping the industry.

It will strengthen knowledge in key topics such as EfW feedstock, advanced waste gasification and new financing initiatives, whilst looking at the practicalities of community engagement schemes and keeping attendees at the forefront of technological breakthroughs to adapt to the growing need for sustainable energy.

Understanding current UK policy, potential changes after BREXIT and EU initiatives surrounding the circular economy will be a major focus, as will hearing a selection of case studies from international markets and local authorities currently implementing waste projects including the City of Westminster and the North London Waste Authority CHP Plant.

Click [here](#) for more information.

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## **Bioeconomy Investment Summit Helsinki, 14th-15th December 2017**

Over 30 speakers from across the globe will share their views on how we can bring together the economy and the environment.

New advances in technology mean that everything that can be made out of oil can be made from renewable, biological resources. There are huge environmental and business opportunities for a wide range of industries: construction, chemicals, textiles, energy, plastics.

The bioeconomy gives us a unique opportunity for building a sustainable future. Our speakers will focus on what investment steps we need to take to make it happen.

Click [here](#) for more information.

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## **2nd International Conference on Marine Biomass as Renewable Energy Glasgow, 5th-6th March 2018**

One source of biofuels has been identified as marine biomass or marine algae. Many researchers are working on the feasibility of using algae as a feedstock for producing bio-fuels. One example of biofuel from marine algae would be the conversion of Marine biomass to methane via anaerobic digestion, which can generate electricity. Another potential for algae is its potential for biodiesel.

One great characteristic of micro-algae is that it doesn't rely on soil and land. They thrive in water which is salty or dirty. Therefore, they do not need fresh water resources. Algae also have high growth rates, good growth densities which also makes them a good source for biofuels. Algae can be grown in a variety of climates and in different

types of production methods. These can be from photo bioreactors, ponds and fermenters.

The conference aims to explore the challenges and opportunities in the area of marine algae as a source of biofuel. It will highlight the recent developments in research areas such as cultivation of marine algae and research & development of algal—biofuel production.

Click [here](#) for more information.

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## **EUBCE 2018 Copenhagen, 14th-18th May 2018**

We look forward to the 26th EUBCE in 2018 in Denmark and to the many vibrant topics that will be included in the agenda. The core of the traditional EUBCE conference will be held over 4 days.

There will however be an extension to the core conference and exhibition in order to showcase the many achievements in the field of full scale biomass utilisation in Denmark that are an integral and major part of the country becoming fossil-free by 2050. Members of the national organising committee will organise special technical visits to sites in the centre of the country where biomass is the key renewable feedstock into processes producing renewable energy, biofuels, biochemicals and biomaterials as well as integrating bioproducts into traditional established fossil-based systems.

Click [here](#) for more information.

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## **RRB 14**

### **Ghent, 30th May - 1st June 2018**

The 14th edition of the International Conference on Renewable Resources & Biorefineries will take place in Ghent, Belgium from Wednesday 30 May until Friday 1 June 2018. Based on the previous RRB conferences, this conference is expected to welcome about 350 international participants from over 30 countries.

Delegates from university, industry, governmental and non-governmental organizations and venture capital providers will present their views on industrial biotechnology, sustainable (green) chemistry and agricultural policy related to the use of renewable raw materials for non-food applications and energy supply. The conference further aims at providing an overview of the scientific, technical, economic, environmental and social issues of renewable resources and biorefineries in order to give an impetus to the biobased economy and to present new developments in this area.

The conference will provide a forum for leading political, corporate, academic and financial people to discuss recent developments and set up collaborations.

The three-day international conference will consist of plenary lectures, oral presentations, poster sessions and an exhibition. Companies and research organizations are offered the opportunity to organize a satellite symposium.

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 | UK Ex-Farm Barley Straw | UK Ex-Farm Wheat Straw |
|--------|---------------------------|-------------------------|------------------------|
|        | (£/tonne, 5% VAT)         | (D1000)<br>(£/tonne)    | (D1000)<br>(£/tonne)   |
| 10 Feb | 215-260 (–↓)              | 50-75(–→)               | 45-70(–↑)              |

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<br>Wheat<br>(£/tonne) | MATIF<br>Wheat<br>(€/tonne) | MATIF<br>Rapeseed<br>(€/tonne) | CBOT<br>Wheat<br>(cnts/bsh) | CBOT<br>Maize<br>(cnts/bsh) | CBOT<br>Soyabean<br>(cnts/bsh) |
|--------|---------------------------------------|-----------------------------|--------------------------------|-----------------------------|-----------------------------|--------------------------------|
| Nov-17 | 141.5 (↑)                             |                             | 363.7 (↑)                      |                             |                             | 966.00 (↑)                     |
| Dec-17 |                                       | 162.0 (↑)                   |                                | 435.2 (↑)                   | 349.2 (↓)                   |                                |
| Jan-18 | 144.1 (↑)                             |                             |                                |                             |                             | 976.25 (↑)                     |
| Feb-18 |                                       |                             | 370.5 (↑)                      |                             |                             |                                |
| Mar-18 | 146.1 (↑)                             | 167.7 (↑)                   |                                | 455.2 (–)                   | 362.7 (↓)                   | 985.75 (↑)                     |
| May-18 | 147.0 (↑)                             | 171.2 (↑)                   | 372.2 (↑)                      | 468.7 (↓)                   | 371.5 (↓)                   | 995.00 (↑)                     |
| Jul-18 | 150.4 (↑)                             |                             |                                | 482.7 (↓)                   | 379.2 (↓)                   | 1003.5 (↑)                     |
| Aug-18 |                                       |                             | 358.5 (↑)                      |                             |                             | 1004.2                         |
| Sep-18 |                                       | 174.0 (↑)                   |                                | 498.5 (↓)                   | 386.0 (↓)                   |                                |
| Nov-18 | 148.3 (↑)                             |                             | 363.0 (↑)                      |                             |                             |                                |
| Dec-18 |                                       | 177.5 (↑)                   |                                | 517.0                       | 395.2                       |                                |
| Jan-19 | 149.9 (↑)                             |                             |                                |                             |                             |                                |
| Feb-19 |                                       |                             | 364.2 (↑)                      |                             |                             |                                |
| Mar-19 | 152.1 (↑)                             | 180.5 (↑)                   |                                |                             |                             |                                |
| May-19 | 152.9 (↑)                             | 182.7 (↑)                   |                                |                             |                             |                                |
| Sep-19 |                                       | 180.5 (↓)                   |                                |                             |                             |                                |
| Nov-19 | 147.5 (↑)                             |                             |                                |                             |                             |                                |

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

**Other biomass feedstock prices are available upon request, simply contact [enquiries@nnfcc.co.uk](mailto:enquiries@nnfcc.co.uk)**

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