The Bioeconomy Consultants

NNFCC

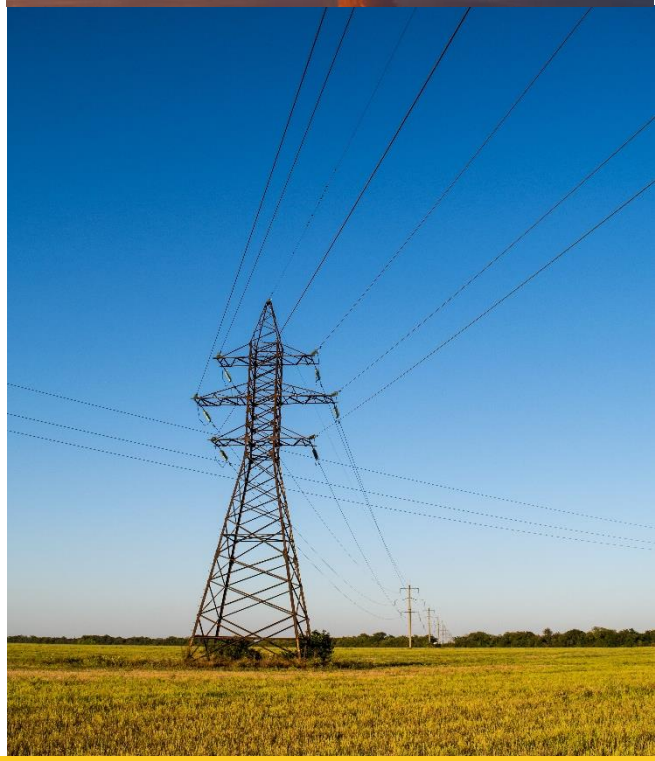
Bioenergy

News Review

Issue Sixty-Four

July 2017

Each month we review the latest news and select key announcements and commentary from across the bioenergy sector.



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Foreword

A (very) warm July welcome to NNFCC's Bioenergy News Review.

We begin with two giants of the biomass power sector. Both have been leading the charge for large-scale bioenergy in their respective countries, converting their existing power stations to run on wood pellets, or by co-firing; they are separated by just under 400 miles of the North Sea. We are, of course, referring to Drax here in the UK, and DONG over in Denmark. While they may have a lot in common, this month their stories contrast quite significantly.

Over in Demark, DONG Energy have put pen to paper on an agreement with Novo Nordisk, Novozymes, and Kalundborg, Forsyning for the conversion of Asnæs power station – Denmark's largest coal-fired station – to burn wood chips. A new unit is also slated to be added, which will mean coal can be completely phased out from Denmark's energy sector from late 2019. The wood chips are all to be sustainably sourced, and this overhaul could see an 800,000tpa reduction in Denmark's CO_2 emissions.

By contrast, some media reports are suggesting Drax may head in the opposite direction. Over recent years they have championed the conversion of their coal-fired units to run on wood pellets or cofiring, but thanks to changes in the UK government's approach to renewables subsidies, and the shift to a capacity auction system, Drax is now considering converting the unit to run on natural gas instead. This would be more profitable for Drax, as it would allow them to provide the backup energy, filling the gap left by renewables. This indicates they believe the market is going to shift away from bioenergy and towards other renewables such as solar and wind, which are more intermittent in their generation and require backup supply. Generating from gas will also allow Drax to secure a 15-year contract with the capacity market, extending the life of the generating asset.

In reality, bioenergy can provide the same function in the energy sector as fossil gas: it is not subject to the seasonal fluctuations of solar and wind, and thus can provide the required backup, but this news highlights the great effects that changes in legislation can have on energy markets, and particularly developing sectors such as renewables.

Read on for the latest market news.

Research & Development

ETI to pursue gasification in the UK

US Air Force Civil Engineer Centre

A new report published today by the ETI has concluded that using waste and biomass for gasification can produce low carbon power efficiently particularly at a town scale.

The ETI's latest report "Targeting new and cleaner uses for wastes and biomass using gasification" sets out why it believes the technology could be so important to a future low carbon UK energy system, what the current UK landscape looks like along with analysis of earlier ETI research into waste gasification technologies.

ETI analysis of the UK energy system indicates that bioenergy should be a crucial part of the UK's future energy mix as it can reduce the cost of meeting the country's 2050 carbon targets by more than 1% of GDP.

Gasification, which can use a variety of feedstocks, is a key technology for delivering low carbon energy as electricity, heat and power as well as chemicals and other materials. This is because it converts the energy held within a difficult to use solid fuel into an easier to use gas.

It is especially useful when operated at a town scale because the waste heat generated can be used in district heat networks to provide heat and power for commercial operations.

Currently, the technology and commercial risks are too high for typical investors and developers. To accelerate the technology to the point where these risks are more acceptable, the ETI is investing £5m in the construction of a 1.5 MWe waste gasification demonstration project incorporating an engine fuelled by "ultra-clean", tar free syngas.

The 1.5MWe facility being built in Wednesbury in the West Midlands will produce enough electrical power to supply 2,500 homes and will use advanced gasification technology to produce power at high efficiency and high reliability from sorted and processed municipal waste.

Click here for more information.

Welsh Water now running on 100% renewables

Welsh Water has reached a key milestone in its drive to cut carbon emissions by ensuring that its sites across Wales and Herefordshire are now powered by green energy.

The not-for-profit utility company already generates its own energy from renewable sources but a new energy contract with DONG Energy will ensure that energy Welsh Water uses from the grid will also be guaranteed green energy.

The move to secure green energy is a major step forward for the company which has an annual energy bill of more than £44 million pounds - the

majority of which is used for pumping water and wastewater through thousands of miles of pipes. To help it reduce its energy costs, the company already generates 20% of its own energy needs through wind, hydro, solar and advance anaerobic digestion – with the aim to increase this to 30% by 2019.

Welsh Water's announcement about becoming a green only energy user comes as the company signs a £250 million loan facility with the European Investment Bank. The loan will help finance the company's extensive capital expenditure programme and its plans to further develop renewable energy generation capacity at its sites.

To see first-hand how the company will make use of the loan to invest in renewable generation, the EIB visited the company's Five Fords wastewater treatment works in Wrexham. Welsh Water is investing around £36million to transform Five Fords wastewater treatment works into an innovative energy park - incorporating solar and hydro and the UK's first project to inject bio-methane gas into the national gas distribution network. The company is also developing an advanced anaerobic digestion plant on the site which once complete will use the waste the site treats to generate enough energy to supply around 3,000 homes.

Click here for more information.

Glastonbury powers signs with festival-goers' urine

Wikimedia Commons

At the UK's Glastonbury festival, a portable toilet was installed to turn festival goers' urine into energy.

'Pee Power', developed by scientists at the Bristol Bioenergy Centre BBiC, has already been shown to be capable of powering lights and charging mobile phones. At Glastonbury, it was used to power displays giving music fans information and festival updates.

Pee Power works via stacks of microbial fuel cells that use urine as a fuel for direct electricity generation when live bacteria consume urine for their growth and maintenance, according to a BBiC statement.

The MFC technology taps a portion of that biochemical energy used for microbial growth, and converts it directly into electricity.

This technology can utilise any form of organic waste and turn it into useful energy, without relying on fossil fuels, which is something that renders the MFCs green and beneficial to society.

Click here for more information.

Biomass Heat & Power

DONG paves way for complete phase-out of Danish coal

Wikimedia Commons

With a new 20-year agreement recently concluded between Novo Nordisk, Novozymes, Kalundborg Forsyning and DONG Energy, a sustainable alternative has been found to Denmark's largest coal-fired power station unit, enabling a complete phase-out of coal.

The 20-year steam and district heating contract involves a conversion of Asnæs Power Station and the connection of a new wood chip-fired plant to the power station's existing installations and systems. This will enable Asnæs Power Station to supply steam, district heating and power from sustainable wood chips from the end of 2019. Kalundborg is thereby retaining the advantages of the symbiosis between power station production, steam supply and district heating.

The conversion from coal to wood chips at Asnæs Power Station will result in an annual reduction in CO2 emissions of around 800,000 tonnes. This corresponds to the annual CO2 emissions from more than 400,000 cars, and the new agreement thereby contributes significantly to Denmark's green conversion.

The conversion also means that the energy consumption at Novo Nordisk's largest production unit in Kalundborg will become carbon-neutral, and as a result, the total CO2 emissions from Novo Nordisk's global production will be reduced by as much as 45 per cent.

The wood chips for Asnæs Power Station will primarily come from by-products, such as branches, twigs and thinning trees, and all suppliers must ensure that the wood chips come from sustainable forestry where the forests are replanted, and biodiversity is protected.

The conversion of Asnæs Power Station will begin in the summer 2017, and the power station is expected to be ready for wood chip-fired production by the end of 2019.

Click here for more information.

Drax to forego biomass in favour of gas?

Media reports (Diarmaid Williams, Power Engineering) suggest the UK's biggest power producer Drax is considering the conversion of its remaining coal-fired power units to gas, instead of biomass power, as originally planned.

Management believe a gas-fired power conversion would allow the company to qualify for 15-year contracts in the country's capacity market auctions. As the government has already changed is stance on renewable energy subsidies which previously had made biomass conversion attractive, this would be a logical step for Drax.

The company has already converted half of its Yorkshire coal plant to burn wood pellets but plans to switch the remaining units to biomass have since halted due to the government decision.

Drax is banking on the need for back-up electricity production capacity to complement solar plants and wind turbines and is forecasting a trebling in earnings by 2025.

It is already planning to build four modern open-cycle gas turbine (OCGT) plants, provided they obtain contracts in the capacity market auctions.

Click here for more information.

Japanese wood chip power plant comes online

Max Pixel

Marubeni Corporation has begun commercial operations of a biomass plant in Tsuruga, Japan, on 1 July 2017.

The biomass power plant is owned by Tsuruga Green Power, which was set up by Marubeni Thermal Power, a fully owned subsidiary of Marubeni.

The new power plant will utilize unused wooden chips that are imported and will generate 37MW of electricity that is equal to electricity used by 70000 homes in Fukui, Japan.

It will act as a new source of power for Power Producer & Supplier (PPS) business of Marubeni Power Retail.

The power plant's construction on 22000m2 area, which is leased from Toyobo and located on the premises of its Tsuruga Factory II, commenced in November 2015 and its trials and performance tests began from April 2017.

Marubeni's renewable energy portfolio includes over 18 projects such as solar power, wind power and hydro power in Japan.

In March, Marubeni and JinkoSolar have signed a power purchase agreement (PPA) with Abu Dhabi Water and Electricity Company (ADWEC) for the 1.18GW photovoltaic power plant to be built near the town of Sweihan in Abu Dhabi, United Arab Emirates (UAE).

For the construction of the PV plant, a special purpose company has been created by Marubeni (20%), JinkoSolar (20%) and Abu Dhabi Water and Electricity Authority (ADWEA) (60%).

Click here for more information.

Portugal to build 15MW biomass plant

The Portuguese municipality of Viseu has signed a memorandum of understanding for the development of a 15-MW forest biomass project.

The Biomass Centre of Viseu will be in charge of the project. Overall, the new plant requires investments of EUR 52 million (USD 59.3m) to come through the municipal programme "VISEU INVESTE".

Located in the parish of Mundao, the new biomass plant, which is scheduled to commence operations by March 2019, will cover an area of 10 hectares and meet the power demand of over 40,000 local homes, the local government said.

With an 140,000-tonnes annual forest waste requirement, the biomass plant will operate 24 hours a day, with a one-month stop for the required annual maintenance.

In addition to help boost the clean energy sector of the region, the facility will also contribute to the maintenance, cleaning and reduction of fires in Viseu's forests and will play a central role in local economic development and job creation, the government noted.

Click here for more information.

New pellet plant opens in Latvia

Flickr

Biomass magazine reports Estonia-based Nelja Energia recently announced the opening of a wood chip-fuelled cogeneration facility and 120,000 metric-ton per year pellet plant in Brocēni, Latvia. The cogeneration facility has a thermal capacity of 19.4 MW and an electrical capacity of 3.98 MW.

According to the company, test production of pellets began in early 2017, with first orders delivered earlier this year. Most of the plant's pellet output is exported to the European market, while excess power generated at the cogeneration plant is sent to the Nordic and Baltic power market. Fuel for the cogeneration plant is sourced from surplus bark and chipped wood from the pellet production process. Nelja Energia is mainly known as the biggest producer of wind power in the Baltic states.

Click here for more information.

Fife Biomass plant denied planning permission after public outcry

Council planners have formally knocked back Glenrothes Biomass Energy's blueprint for a 19.8MW facility at Southfield Industrial Estate. It would have seen the creation of a 60-metre high chimney stack and associated infrastructure.

The move, comes days after local people vented their anger at a public meeting.

Most of those who objected were local residents concerned about how the plant would impact upon air quality, the environment and human and animal health in the area.

The Scottish Environment Protection Agency (SEPA), Fife Airport, local company Flexon and the local Hedgehogs Nursery were among others who voiced their opposition.

Many of the 280 objections noted the prevailing winds could carry emissions from the plant in the direction of the Finglassie and Stenton residential areas of Glenrothes, and stressed the chosen site would, therefore, be inappropriate.

Neighbouring business Flexcon, which relies upon clean air for the quality control of its products, warned it would have to close with the loss of 77 jobs if the development went ahead.

Fife Airport chiefs said the proposed 60m high chimney stack could be a potential aviation danger, raising the risk of collision and the creation of disturbed air from stack emissions.

Click here for more information.

Biogas

Latest RHI statistics released

BEIS has released the latest RHI statistics (form scheme establishment to May 2017)

In all there 18,369 non-domestic and 60,237 domestic RHI accreditations.

70% of deployment under the non-domestic RHI is accounted for by small biomass boilers. However due to the recent falls in tariff levels all preliminary applications are currently either medium (200kW-1MW) or large (>1MW) scale boiler applications, and there are only 31 of these currently. There are 12,374 domestic biomass systems in receipt of RHI payments currently.

Click here for more information.

Amur launches new "soup" AD feedstock

Amur

UK-based anaerobic digestion (AD) specialist Amur has launched a feedstock which it claims is the first to be blended to a specification designed expressly to optimise productivity.

The blended 'soup' – manufactured from food waste and sold under the Ch4rger brand – is mixed to a fixed specification.

According to the company, it provides AD operators with a consistent product, which supports a finely-tuned biocommunity that "eats" waste to produce valuable biomethane. This maintains peak performance and, in turn, leads to a more regular production of gas.

Nigel Lee, general manager at Amur – which produces Ch4rger – described the new product as a natural development for the company. Amur's parent company, AB Agri, has been routing food manufacturing by-products into animal feeds for 36 years.

He explained that by buying into the concept, food manufacturers will be able to fully exploit the value inherent in co-products and wastes, by pushing them through the channel which generates the most value (animal feed or AD), while also guaranteeing the best possible environmental performance.

Click here for more information.

ADBA launches Biogas Best Practice Scheme

ADBA launched the pilot of a pioneering new scheme to improve the environmental, operational and safety performance of the AD industry at its global tradeshow UK AD & Biogas and World Biogas Expo 2017, held 5-6 July 2017.

ADBA's Best Practice Scheme aims to support operators of AD plants to meet the highest environmental, health and safety, and operational standards. ADBA has worked with a range of industry partners to develop the pilot for the scheme, including a steering group made up of representatives from trade associations, professional bodies and the insurance sector,

alongside key regulators, to help guide the scheme's delivery.

The first stage in this process was the publication last year of three checklists on risk management, procurement, and operational performance setting out how to achieve best practice in key aspects of operating AD plants and highlighting existing tools, guidance and legislation. Following this, the pilot scheme was developed. Once the pilot scheme has been tested over the next few weeks, the next stage will be to develop a voluntary certification scheme that defines best practice and enables AD plants to be recognised as meeting it. A certification process is essential in ensuring that regulators, insurers and investors have confidence in the scheme, allowing the industry to realise the full range of potential financial and regulatory benefits of signing up.

The scheme pilot will be launched by ADBA Environment & Regulation Manager Jess Allan at a panel session at UK AD & Biogas and World Biogas Expo 2017, which is being jointly organised by ADBA and the World Biogas Association. The panel session will also feature contributions from project management and engineering consultancy GOALS, insurance broker Jelf Group, malt supplier and AD plant operator Muntons, and the Environment Agency, all of whom have been involved in the scheme's development. A range of AD operators will take part in the pilot to give a full picture of how the proposed certification process will work and identify improvements for the launch of the full scheme later this year.

Click here for more information.

ISO standard for Green Gas Trading's Biomethane Certification

Green Gas Trading

UK based biomethane certification registry Green Gas Trading (GGT) has achieved ISO14065 standards for its verification scheme. GGT believe they are the first company in the world to be able to issue biomethane certification to this standard.

The achievement was announced at the recent Anaerobic Digestion Bioresources (ADBA) show at the NEC in Birmingham.

Green Gas Trading was set up to provide both a credible process for certifying biomethane and a trading platform to facilitate the trading of certificates. In May 2017, they became the first company in the UK to sell over 500,000MWh worth of biomethane certificates.

ISO14065 is a set of requirements for greenhouse gas validation and verification bodies for use in accreditation and other forms of recognition. It provides requirements for organisations or persons to quantify and verify their GHG emissions.

A unique feature of the organisation's certification scheme is that it also includes audit rules for biomethane plants, something which gives additional certainty to end users.

Click here for more information.

ReFood opens 3rd AD plant

ReFood has opened a new state-of-the-art anaerobic digestion (AD) facility in Dagenham following the success of their Doncaster and Widnes sites. The plant was opened by Shirley Rodrigues, Deputy Mayor (Environment and Energy) and Norbert Rethmann, Honorary Chairman of the RETHMANN Group Supervisory Board. The site will act as a showcase of industry-leading food waste recycling technology.

One of the most important single site investments in the history of the SARIA Group, ReFood Dagenham will convert inedible food waste (collected from customers in and around London) into renewable energy and sustainable biofertiliser. The site is capable of processing more than 160,000 tonnes of food waste every year, generating 14 million m3 of biogas (enough to power 12,600 homes per annum).

As well as displacing 73,600 tonnes of CO2, the equivalent of taking 14,431 cars off the road, ReFood Dagenham will support Transport for London's (TfL) Clean Air Action Plan through the generation of biomethane for gas-powered vehicles. At a later date, state-of-the-art gas upgrading equipment may also be installed on site to supply high quality road fuel.

ReFood Dagenham is the company's third facility in the UK, adding to existing sites in Doncaster and Widnes. Alongside state-of-the-art AD operations, the site will also feature a transfer facility for Category 3 animal by-products (ABP), collected from butchers' shops across the region. The facility continues the company's long association with London, dating back more than 200 years through fat and bone collections in Silvertown under the John Knight brand.

Click here for more information.

Agrivert opens fifth AD plant

Agrivert

Councillor Richard Thake, Chairman of Hertfordshire County Council, joined Agrivert to officially open their fifth AD facility.

Agrivert North London AD Facility, located at London Colney, just off the M25, is the latest plant to join their now 5-strong AD network and adds a further 50,000 tonnes of food waste recycling capacity to the network.

Councillor Thake and some 50 local dignitaries were present at the launch which included a tour of the £14million plant.

Designed and constructed by the Agrivert team, the new North London AD Facility was built in just 11 months and is already operating at full power converting waste into renewable energy and nutrient rich biofertiliser.

The facility was built to service Hertfordshire's municipal food waste and local businesses although it also currently serves Essex County Council under a short-term contract. Located 18 miles from central London's Marble Arch and the same distance from Park Royal, one of the UK's largest food manufacturing hubs, Agrivert also expect to attract some waste from the wider London area.

The plant is set to process 50,000 tonnes of food and liquid wastes per year, generating 3MW of electricity which is enough renewable energy to power around 5,900 homes. The energy produced is generally used at its closest point of need;

therefore, this facility is likely to directly power the local homes and businesses from which the food waste originated.

In addition to renewable power, the digestate will help to displace fossil fuel derived fertilisers on over 3,000 acres of local farm land. In fact, the net impact of CH4 removal, energy production, and replacement of fossil fuel fertilisers means that this AD facility has the equivalent net green benefit of taking 86,000 cars off the road annually.

Click here for more information.

Energy from Waste

Resource Recovery Solutions receives first waste shipment

The first shipments of waste have been received at Resource Recovery Solutions' Mechanical Biological Treatment and energy recovery facility in Derby.

RRS is a joint venture between international waste and recycling firm Renewi plc, and Interserve Group plc. The Waste Treatment Centre comprises an MBT operation, a recycling plant and a gasification waste to energy facility.

The company explained that the testing period will ensure that the equipment is working properly – a key stage in the development of a waste treatment facility.

The facility is the flagship part of a long-term waste contract with Derbyshire County Council and Derby City Council. It has been built to process waste from Derby and Derbyshire that residents do not or cannot recycle.

The new plant will divert up to 98% of residents' residual waste from landfill, while also generating enough green electricity to power approximately 14,000 homes. This electricity will be supplied to the national grid, offsetting the cost of the waste treatment to the Councils

Interserve said that it expects to substantially complete the building and testing of the centre during 2017 with the facility expected to be fully operational in spring 2018.

Click here for more information.

Events

Value from Unavoidable Food Waste York, 21st September 2017

Join us to discuss the opportunities, barriers and latest technologies for extracting high-value products from unavoidable food waste. With the help of a panel of experts from industry, policy and academia, we will be exploring the issues over breakfast.

Click here for more information.

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.

Future of Biogas Europe
London, 15th-16th November 2017

ACI's Future of Biogas Europe 2017 Summit will be taking place in London, UK, on 15th — 16th November 2017. The two-day event will bring together senior executives and experts from the full value chain to provide a forum for all parties active in the field of anaerobic degradation of organic matter and renewable energy production in the form of biogas.

Already on its 3rd edition, this two-day conference will bring together power producers, technology providers, agricultural sector, food and beverage industry, waste industry and leading technology and solution providers to join our forum discussions and excellent networking, including key industry figures from leading companies in this field from across the globe.

Join us in London to exchange on your point of view and experience with your peers, and engage in excellent networking opportunities.

Click here for more information.

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

Now in its third decade this event provides practitioners with an annual update on legislatory 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.

MBRE 2018
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

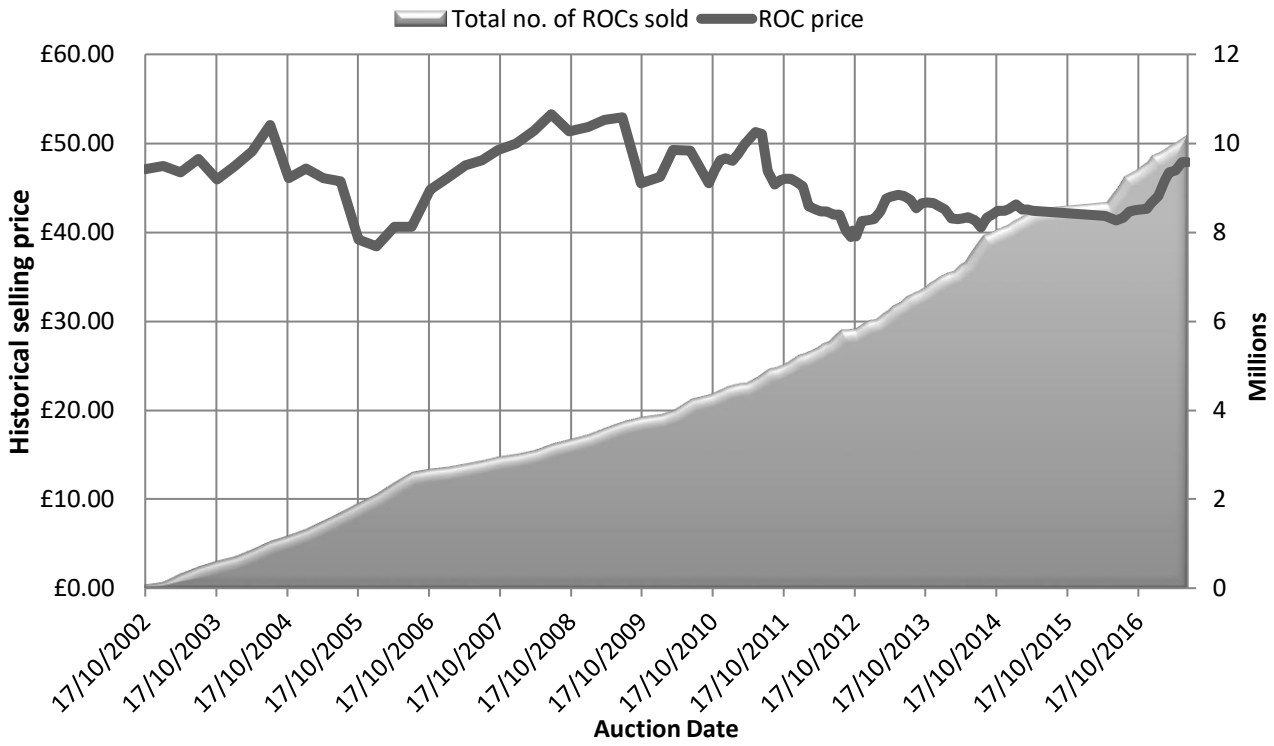
be grown in a variety of climates and in different types of production methods. These can be from photo bioreactors, ponds and fermenters.

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.

Prices

Historical auctioned prices of ROCs in sterling pounds, and total amounts of ROCs historically sold.



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