CPD Course: Introduction to the fundamentals of bioenergy

Course date

13th – 15th April 2015

Course overview

Bioenergy is a rapidly growing market driven by government policies promoting the use of low carbon energy and waste recycling. Targets to increase the security of energy supply and reduce greenhouse gas emissions have been set for all EU member states, with the UK committed to achieving a 15% share of renewable energy by 2020.

Achieving this target will require a near 300% increase in renewable energy production before the end of the decade. Bioenergy is set to contribute more than 50% of this required increase. Most of the expected growth will depend on the development of new technologies for both bioenergy and biofuel production. This means that combustion, anaerobic digestion, pyrolysis and gasification all have a part to play. Biomass, waste and residues can offer a reliable and sustainable alternative to fossil fuels.

The need to understand the technical aspects of biomass to energy technologies to fully explore the benefits, limitations and challenges of biomass systems has never been more important. It is often the case that bioenergy technology design needs to be a compromise between innovation – which will make your project more appealing for financial support – and efficiency, scale, energy demand and capital cost; these are all crucial elements affecting your project payback time.

Current processes for biomass conversion are combustion, gasification, pyrolysis and anaerobic digestion. Each process has its own set of advantages, limitations and challenges, with some more established and widely used than others. The quality and availability of feedstock play an important role in the design of any biomass conversion system. Supply chain will affect the scale of the plant while biomass properties and the selected technology, along with environmental policies, will affect the design, size and complexity of the clean-up system.

This course will introduce participants to the bioenergy technologies available to convert biomass into energy and will allow them to develop concepts to enable the better understanding of the challenges and limitations that these technologies might face.

This course is accredited by the Institution of Chemical Engineers - IChemE

Course objectives

On successful completion of this course you will be able to:

- Understand the properties and classifications of biomass feedstocks
- Know what constitutes a suitable feedstock for bioenergy applications
- Understand bioenergy technologies, processes, reactions and energy conversion rates for Anaerobic Digestion, gasification, pyrolysis (fast, intermediate and slow) and combustion

- Evaluate the challenges and limitations of bioenergy technologies
- Effectively compare bioenergy technologies and their advantages and disadvantages

You will learn the importance of factors such as:

- Reaction temperature
- Heating rate
- Residence time
- Particle size
- Moisture content

Course topics

Fundamentals of biomass feedstock:	Biomass definition Biomass classification Biomass properties
Fundamentals of technology:	Anaerobic Digestion Combustion Gasification Pyrolysis
Fundamentals of bioenergy products:	Pyro-oil Bio-gas Product gas Char

Course tutors

Dr Veronica Mas
Applied research and Technical Officer
European Bioenergy Research Institute, Aston University

Dr Jim Scott
Research Associate
European Bioenergy Research Institute, Aston University

Course fee

This course is part of a pilot programme and currently has funding in place to allow participation in this course for free through EBRI's INTERREG IVB BioenNW project.

Course value

10 CPD credits.

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Course structure

A 3 day course followed by a 2000 word case study.

Booking your place

If you would like to book a place on the course, please reserve your place online. Please state the name of the course you are applying for when booking. In the Finance section, please select 'Other' from the drop down options as the fees will be covered through the INTERREG IVB BioenNW project.

Location and travel details

This course is being held at the European Bioenergy Research Institute, Aston University, Aston Triangle, Birmingham, B4 7ET. View location and travel details.