

## **Determination of the energy content in the biomass fraction of a mixed waste stream**

### **BRIEF**

#### **AN INTRODUCTION TO SBRI**

SBRI is a mechanism which enables public sector bodies to connect with innovative ideas and technology businesses to provide innovative solutions to specific Public Sector challenges and needs.

The Public sector is able to find innovative solutions by reaching out to companies from different sectors including small and emerging businesses. New technical solutions are created through accelerated technology development, whilst risk is reduced through a phased development programme. SBRI also provides business with a transparent competitive and a reliable source of early-stage funding.

SBRI competitions are open to all companies. The SBRI scheme is particularly suited to small and medium-sized business, as the contracts are of, relatively, small value and operate on short timescales. Developments are 100% funded and focused on specific identified needs, increasing the chance of exploitation. Suppliers for each project will be selected by an open competition process and retain the intellectual property generated from the project, with certain rights of use retained by the contracting Department. This is an excellent opportunity to fund development of a new technology.

#### **Summary**

Defra and the Technology Strategy Board are launching this competition to fund work on the development of technology to determine the biogenic energy content of a range of mixed waste streams prior to their use for energy recovery.

#### **Department for Environment, Food and Rural Affairs (Defra)**

Defra is the government department responsible for Waste policy. The UK Government believes that renewables have a significant role to play in the future energy generation mix and that the stimulus provided by the development of a carbon market through the EU Emissions Trading Scheme (EU ETS) and the Renewables Obligation will lead to growth in the development of renewable heat and power in the future.

## Background and Challenge

The UK has responded to the EU Renewable Energy Directive by committing to generate 15 percent of its energy requirement from renewable sources by 2020. While pure biomass is an important feedstock for renewable energy generation, there are also significant volumes of biomass arising in the municipal, commercial, industrial, construction and demolition waste streams. The aim of this competition is to develop capability within the UK to supply technology capable of providing on-line evidence of the biogenic energy content of a range of mixed waste streams prior to their use for energy recovery, on a basis acceptable to Ofgem, in order to enable renewable obligation certificates (ROCs) to be claimed without the need for off-site testing.

The Renewables Obligation Order 2009 (ROO 2009) included provisions to make it easier for operators using waste for eligible electricity generation under the RO to claim ROCs on the renewable energy content of that waste. Under these provisions the fossil fuel energy content of municipal mixed waste is deemed to be 50% from 2009 to 2013; 60% from 2013 to 2018; and 65% from 2018.

The ROO 2009 allows Ofgem to award ROCs<sup>1</sup> on up to 50% of the total energy content of the waste fuel stream to operators who satisfy evidential requirements without necessarily requiring those operators to directly measure the renewable energy content of the waste. Where an operator wishes to claim ROCs on more than 50% of the total energy content of the waste fuel stream they will be required to directly measure the renewable energy content of the waste.

While the practice of deeming allows project developers to base their pre-investment financial models on a fixed, albeit declining, financial assumption concerning the level of ROC income this is only an interim solution and it is widely recognised that cost effective direct measurement could bring a number of advantages, namely:-

- Certainty of outcome: if biomass measurement equipment and supporting methodologies are approved by Ofgem then projects can be developed with much greater certainty over ROC income levels. This in turn will help keep waste treatment gate fees lower
- On-site measurement apparatus can be built into projects and included as part of the initial investment cost thereby avoiding the cost and logistics of off-site testing
- Allow operators to claim ROCs on more than the deemed level of biomass, where appropriate

There are significant challenges in sampling and measuring the renewable energy content of mixed waste streams in a cost-effective way, owing to its variable composition. This is particularly relevant for fuels produced from intermediate waste management technologies like mechanical and biological treatment (“MBT”), anaerobic digestion (“AD”) and autoclaving in addition to the gaseous or liquid fuels produced from gasification or pyrolysis.

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<sup>1</sup> For illustration the value of a ROC to a supplier was £49.16 per MWh at June 2010 making this by far the most valuable element of support for renewable energy projects. This can vary on a daily basis.

## Scope

The objective of this competition is to identify and develop technologies capable of determining the renewable energy content of a range of mixed waste streams prior to their use for energy recovery. For Phase 1 of this competition, the main deliverable will be a proof of concept study for equipment / methodologies to achieve the competition objective.

In assessing both proposals and proof of concept studies we will take into account the following:

- Suitability of the approach to a range of waste management treatment options.
- Robustness and accuracy of the approach including a thorough (ideally quantitative) consideration of sources of error
- Speed of acquisition / processing of data; in the ideal case the approach would be suitable for in-line, real-time operation. Whatever method is employed, the approach should allow the collection, analysis and presentation of data in a form that is acceptable to Ofgem<sup>2</sup>
- Cost-effectiveness and practicality of the approach for operation with high-volume, potentially highly heterogeneous waste streams

Subject to a satisfactory response to Phase 1 of this competition, a Phase 2 competition may take place in 2011 to further develop promising approaches to this challenge.

## APPLICATION PROCESS

Directions on how to enter this competition can be found in the Invitation to Tender (SBRI\_Defra\_048\_Energy Content of Waste 001 Invitation to Tender). The Invitation to tender and instructions on how to register for the full set of competition documents will be available on the SBRI competitions website when the competition opens on 20 September.

<http://www.innovateuk.org/deliveringinnovation/smallbusinessresearchinitiative/competitions.ashx>

More information on other competitions may be obtained at [www.innovateuk.org.uk](http://www.innovateuk.org.uk)

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<sup>2</sup> For example, see Ofgem's Fuel Measurement and Sampling guidance at <http://www.ofgem.gov.uk/sustainability/environment/RenewablObl/Documents1/FMS%20final.pdf>