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Anaerobic Digestion – Shared Goals

February 2009

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Introduction

This document sets out the shared goals that businesses, regulators, Government and other stakeholders aim to achieve by the cost effective, innovative and beneficial use of anaerobic digestion in England. An Implementation Plan will set out the practical measures that each of these actors will take individually and collectively to achieve these goals.

Anaerobic Digestion – Shared Goals

What Anaerobic Digestion Could Deliver Nationally

1. By 2020 anaerobic digestion will be an established technology in this country, making a significant and measurable contribution to our climate change and wider environmental objectives. It will produce renewable energy in the form of biogas that will be used locally or injected into the grid for heat and power and for transport fuel. At the same time, it will capture methane emissions from agriculture. It will also divert organic waste, especially food waste, from landfill. The digestate will provide organic fertiliser and soil conditioner for agriculture and land use. Anaerobic digestion and its products will be used in a way that is both beneficial to the environment and cost effective for that particular location.
2. Anaerobic digestion will play an important role in achieving key national targets. It will help us to achieve the Climate Change Act's legally binding targets to reduce UK CO₂ emissions by at least 26% by 2020 and all UK greenhouse gas emission by at least 80% by 2050. It will contribute to the UK's share of the EU's binding target for renewable energy, which is proposed to be 15% by 2020. And it will help us to achieve the EU Landfill Directive's requirement to reduce the amount of biodegradable municipal waste sent to landfill to 35% of 1995 levels by 2020.
3. This country will be recognised as a world leader in the cost effective, innovative and beneficial use of anaerobic digestion and in anaerobic digestion technology and expertise. We will learn from experience both in this country and worldwide, making use of and building upon best practice, and will share our experience with others.
4. We will achieve these goals by working in partnership to deliver the commitments set out in the Implementation Plan. We will develop at a regional and local level the infrastructure suited to local needs and priorities within this national framework.

What Anaerobic Digestion Could Deliver in Key Sectors

Waste Management

5. Anaerobic digestion will be an established technology in this country for treating organic waste, particularly food waste. It will make a significant contribution to the recovery of energy from waste and the diversion of organic waste from landfill. The opportunities will also be maximised for the recovery to land of digestate produced from source separated organic waste, which will be used as a fertiliser in a way that is both cost effective and beneficial to the environment.
6. In developing solutions for their organic waste, the **food and drink industry**, and **retailers**, will consider where anaerobic digestion can contribute. Businesses will consider opportunities to work with each other and their supply chains. Similarly, **local authorities** will consider where anaerobic digestion can contribute to achieving their waste management, recycling and low carbon emission goals.
7. The **waste management and recovery sector** will continue to work with its business and municipal customers to provide additional cost-effective, regulated and safe anaerobic digestion processing for appropriate waste streams.

Key Stakeholder Aims

Food and Drink Federation (FDF) members will seek to send zero food and packaging waste to landfill from 2015, in line with the principles of the waste hierarchy. Anaerobic digestion will make an important contribution to achieving this.

The Milk Roadmap sets out the vision for the dairy industry towards 2020. This sets targets of 30 dairy farms piloting on-farm anaerobic digestion by 2010 and 3 centralised anaerobic digesters at processing sites by 2015. By 2015 the target is for 10% of non-transport energy use to come from renewable energy or combined heat and power systems for large processors, and for zero ex-factory waste to go to landfill for large processors. In the long term the target is for 40% of energy used on dairy farms to be from renewable sources. Dairy UK is working with its members on feasibility studies to ensure that anaerobic digestion will make an important contribution to achieving these goals.

Energy Sector

8. Anaerobic digestion will also be an established technology in this country for producing renewable energy for both heat and power. It will be an integral part of a diverse low carbon energy mix, contributing to tackling climate change and a secure energy supply, both distributed and grid-connected.

Transport Sector

9. Anaerobic digestion will be an established technology in this country for producing renewable transport fuel. It will produce sustainable biofuels that contribute to tackling climate change and enhance security of supply.

Water Industry

10. The **water industry** will be an important part of a national anaerobic digestion infrastructure. Anaerobic digestion will remain one of the most important methods for treating sewage sludge. Where appropriate, water companies will generate additional renewable energy by using their spare capacity to process other feedstocks such as food waste. At present, properly controlled spreading of sewage sludge to agricultural land offers the best practical environmental option in most circumstances. Water companies will therefore maximise the potential for recovery of treated sewage sludge (biosolids) and co-digested organic materials to land in such circumstances.

Key Stakeholder Aim

The water companies will seek to ensure that at least 20% of all energy used by the UK water industry comes from renewable sources by 2020. Anaerobic digestion will make an important contribution to this.

Agriculture

11. Anaerobic digestion will make an important contribution to a **farming sector** that is profitable in the marketplace and makes a positive net environmental contribution. Anaerobic digestion plants on farms will generate renewable energy in the form of

biogas. This will be used to produce renewable energy for use on farm or sold for off-farm use. Where appropriate, these plants will be integrated into manure and slurry management systems and so contribute to the mitigation of greenhouse gas emissions and improved nutrient management. The feedstocks will vary between different types of plant and in addition to manure and slurry may include food waste, crop residues and energy crops. Digestate will be recognised throughout the food supply chain as a valuable fertiliser and soil conditioner. Farmers will make full use of its potential, in a way that is both cost effective and beneficial to the environment.

Key Stakeholder Aim

The NFU vision for anaerobic digestion sets an aspiration of 1,000 farm-based anaerobic digestion plants by 2020, alongside at least 100 larger waste-linked anaerobic digestion facilities in which farmers may also have an interest.

Government and Regulators

12. The **Government** will provide the leadership to drive the development and delivery of anaerobic digestion across the economy. It will ensure that the economic and regulatory framework exists in which the market for anaerobic digestion and its products can develop and thrive. **Regulators** will ensure that the regulatory framework encourages a growth in the use of anaerobic digestion in a way that is both cost effective and beneficial to the environment.

Regions

13. **Regional** and **sub-regional organisations**, for example Regional Development Agencies and local authorities, will help to guide the development and delivery of infrastructure to meet local needs and priorities.

Research and Development

14. The **research community**, including academics, Government, research councils and the private sector will provide the underpinning knowledge and technical solutions to enable a cost effective, innovative and beneficial use of anaerobic digestion by further improving and disseminating knowledge and understanding of the technology and its use.

Key Facts

Current Use of Anaerobic Digestion

15. Anaerobic digestion is a well-proven renewable energy and waste management technology. It is widely deployed in many countries, both developed and developing. The water industry in this country already has a well established system of anaerobic digestion plants. It currently treats 66% of this country's sewage sludge by anaerobic digestion. It plans to generate 0.8 TWh/yr of electricity from anaerobic digestion by 2010. Anaerobic digestion is, however, still under deployed within the UK waste and farming sectors.

International Engagement

16. The UK is already taking a leading role in driving forward thinking about the role of anaerobic digestion internationally, in particular through the international Methane to Markets Partnership and in its bilateral programme of collaboration with China on sustainable agriculture. The UK is also looking to learn from and share experience with other countries through, for example, the International Energy Agency (IEA) Bioenergy Implementing Agreement on biogas ("Task 37").

Key Drivers for Anaerobic Digestion

Description of the Technology

17. Anaerobic digestion involves harnessing the natural process whereby organic matter is broken down by bacteria in the absence of oxygen to produce biogas. This can be used as a renewable energy source, both for heat and power. Alternatively, the carbon dioxide and other impurities can be removed to produce biomethane which can be used as a transport fuel or injected into the gas grid. The treated material (or digestate) can be used as a fertiliser and soil conditioner.

Benefits of Anaerobic Digestion

18. Anaerobic digestion has significant potential to contribute to the UK's climate change and wider environmental objectives. The diversion of biodegradable wastes to anaerobic digestion can reduce greenhouse gas emissions from landfill. For example, if digested, rather than sent to landfill, capturing the biogas from one tonne of food waste will save between 0.5 and 1 tonne of CO₂ equivalent. Similarly, it offers the opportunity to capture methane from manures and slurries and so reduce emissions to the atmosphere. By producing renewable energy, anaerobic digestion offers the opportunity for farmers, water companies and companies with large volumes of food waste to cut their energy bills while, at the same time, reducing their environmental footprint. The sale of surplus energy and digestate (treated material from anaerobic digestion plants) offers a potential additional revenue stream and valuable diversification for rural businesses.

Potential for Energy Production

19. The UK produces over 100 million tonnes of organic material per year that could be used to produce biogas. This breaks down as follows:

- 12-20 million tonnes of food waste (approximately half of which is municipal waste collected by local authorities, the rest being hotel or food manufacturing waste);
- 90 million tonnes of agricultural material such as manure and slurry;
- 1.73 million tonnes of sewage sludge.¹

20. Biogas can also be produced from energy crops such as maize or grass leys.

21. The Government's initial analysis suggests that the anaerobic digestion of food waste, livestock slurries, sewage sludge and energy crops to produce biogas could contribute approximately 10-20 TWh of heat and power by 2020.² This represents 3.8 – 7.5% of the renewable energy we estimate will be required by 2020.

Commitments and Targets

22. Anaerobic digestion has the potential to help the UK meet a number of important commitments and targets, including:

- The legally binding long term framework to cut carbon emissions and adapt to climate change provided by the Climate Change Act. A key provision in the Act, which became law on 26 November 2008, is to set legally binding targets to reduce greenhouse gas emissions through action in the UK and abroad, by at least 80% by 2050 and to reduce CO₂ emissions by at least 26% by 2020, against a 1990 baseline.
- The EU's ambitious target to source 20% of the EU's total final energy demand from renewable sources by 2020. The UK's contribution to this target will require us to increase our share of renewables in our energy mix from around 1.5% in 2006 to 15% by 2020. The Government will publish the UK Renewable Energy Strategy in 2009. This will set how the UK will drive up the use of renewable energy, as part of our overall strategy for tackling climate change, and to meet our share of the EU target.
- The EU Landfill Directive target for the diversion of biodegradable municipal waste from landfill, namely by 2020 the volume of biodegradable municipal waste sent to landfill will be cut to 35% of the 1995 level. The Waste Strategy for England 2007 maps out, at a high level, the direction of travel over both the medium and longer term for all waste. Its objectives include meeting and exceeding the Landfill Directive diversion targets.

¹ Water UK (2007)

² DEFRA-DTI-DfT (2007) and Enviro (2008). These numbers are based on estimates calculated for the Biomass Strategy and work done by consultants, Enviro on renewable heat to estimate the potential contribution of any individual technology in 2020, where the higher end of the range can only be achieved if steps are taken to overcome constraints to the maximum deployment of the technology – taking into consideration only non-financial constraints.