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# Developing an Implementation Plan for Anaerobic Digestion

Report of the Anaerobic Digestion Task Group

July 2009



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# Executive Summary

## Priorities for Action

This report sets out the recommendations of the Anaerobic Digestion Task Group for practical action to achieve a major increase in the uptake of anaerobic digestion in England. The opportunities and challenges this presents can vary significantly between different sectors, such as agriculture, waste management and water industry. The Task Group would, nevertheless, highlight the following as the overall priority areas for action.

- **Economics and Infrastructure:** The economic framework for anaerobic digestion should encourage each of the potential uses of biogas (used locally or injected into the gas grid) for heat and power and transport fuel. It should also encourage the use of digestate as a fertiliser and as a soil conditioner. Key actions needed to ensure this include: developing the new feed-in tariff for small-scale renewable electricity generation and the renewable heat incentive; establishing cost effective collection systems for food waste; and increasing awareness and confidence in the value and safety of digestate.
- **Regulation:** The regulatory framework needs to encourage a growth in the use of anaerobic digestion in a way that is both cost effective and beneficial to the environment. Key actions include: finalising the standard and Quality Protocol for digestate; developing environmental permitting arrangements appropriate to the different scales of plant; clarifying how to meet the regulatory requirements for co-digesting sewage sludge with other feedstocks and using the resulting digestate; increasing understanding of planning issues relating to anaerobic digestion to avoid unnecessary obstructions in the planning process; and ensuring the regulatory requirements facilitate the injection of biomethane into the gas grid.
- **Technology:** Knowledge of anaerobic digestion technology and its use must continue to be improved. Continued research and development should therefore be a priority. The Government funded Anaerobic Digestion Demonstration Programme (delivered by WRAP<sup>1</sup>) will provide a natural platform for ongoing research and development. Priority areas for future work include: improving digester performance; developing innovative food waste collection techniques; enhancing digestate and its use; and improving performance of equipment for upgrading biogas to biomethane.
- **Demonstration and Communication:** Greater awareness and understanding needs to be built of the many benefits of anaerobic digestion among potential developers, investors, customers and those involved in planning decisions. This requires the practical demonstration of its cost effective, innovative and beneficial uses. Key actions include: maximising the value of the demonstration and research outputs from the Anaerobic Digestion Demonstration Programme; developing and publicising additional case studies of projects at a variety of locations and scale; maximising the value of the new online advice portal being developed by the NNFCC<sup>2</sup>; and disseminating findings from national and international research and development.

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<sup>1</sup> WRAP: Waste and Resources Action Programme

<sup>2</sup> NNFCC: National Non-Food Crops Centre

- **Measuring Progress:** Effective mechanisms for measuring progress towards the Shared Goals are essential. These will highlight where actions are working well and, importantly, where changes are needed. Key information to monitor includes: biogas production and use; digestate quality and use; number and location of new plants; and reductions in greenhouse gas emissions.

## Headline Recommendations

This report contains 46 recommendations to address these issues. The Task Group would particularly draw attention to the following headline recommendations.

- **Recommendation 1:** The new feed-in tariff for small-scale low-carbon electricity generation and the renewable heat incentive should: complement the existing Renewables Obligation and Renewable Transport Fuel Obligation so as to incentivise the most efficient uses of biogas; be clear on timescales and levels of support; and recognise the relative costs of different scales of plant.
- **Recommendations 3-5 & 22:** Support and encourage separate collection of food waste through, for example, advice and guidance to local authorities and the private sector. Research and development on innovative collection technologies should be a priority.
- **Recommendations 13-15:** Clarify the regulatory framework for the co-digestion of sewage sludge with other feedstocks.
- **Recommendations 17-19:** Develop guidance on the gas regulatory regime and review requirements on calorific value and metering.
- **Recommendations 21-27:** Deliver a coherent research and development programme to support and promote the use of both the gas and the digestate products from anaerobic digestion.
- **Recommendations 32-33:** Deliver the Anaerobic Digestion Demonstration Programme as a priority and regularly review it to identify any further demonstration needs.
- **Recommendation 35:** Deliver the new web-based anaerobic digestion advice portal as a priority.
- **Recommendations 41-42:** Develop systems to monitor and report on the uptake of anaerobic digestion.
- **Recommendations 43-45:** Set up a central Government team to deliver the recommendations in the report and an independent stakeholder advisory group to support this team.

## Introduction

1. This report has been prepared by the Anaerobic Digestion Task Group. It sets out recommendations for practical actions that Government and stakeholders should take individually and collectively to achieve a major increase in the uptake of anaerobic digestion in England on a variety of scales. The Task Group is an independent body set up by Government whose members have been appointed on a personal basis. The contents of this report therefore do not necessarily represent the views of Government or the organisations for which Task Group members work.

2. The aim of the recommendations in this report is to deliver the collective ambitions for anaerobic digestion nationally and in key sectors that are set out in *Anaerobic Digestion – Shared Goals*<sup>3</sup>. The Shared Goals were developed jointly by Government and a broad range of stakeholders and published on 17 February 2009. These set the ambition that:

*“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.*

*“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. The Task Group 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.”*

3. The Government appointed the Anaerobic Digestion Task Group in March 2009 to develop recommendations to deliver these goals. The Task Group was chaired by Steve Lee, Chief Executive Officer of the Chartered Institution of Wastes Management (CIWM). The other members, drawn from a wide range of organisations, are listed in Annex 2.

4. This work has greatly benefited from dialogue and contributions from the broader stakeholder community. It included: a successful experts’ workshop on how to achieve a major increase in the uptake of anaerobic digestion, held in Reading on 18 May 2009; the use of working groups on key issues; and written comments from individuals and organisations.

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<sup>3</sup> Defra (2007): ‘*Anaerobic Digestion – Shared Goals*’  
<http://www.defra.gov.uk/environment/waste/ad/pdf/ad-sharedgoals-090217.pdf>

## Key Milestones and Drivers

5. The Task Group has identified the following key milestones and drivers for the development of anaerobic digestion in the period to 2050. A timeline is shown at Annex 1.

Date	Milestone
2010	Government to introduce feed-in tariff for small-scale low-carbon electricity generation
	EU Landfill Directive requires member states to reduce biodegradable municipal waste sent to landfill by 25% from 1995 levels.
2011	Government to introduce renewable heat incentive. Includes support for injection of biomethane into gas grid.
2012	UK carbon budget requires reduction of all UK greenhouse gas emission by 22% from 1990 level.
2013	EU Landfill Directive requires member states to reduce biodegradable municipal waste sent to landfill by 50% from 1995 levels.
	Landfill tax to reach £72/tonne.
2017	UK carbon budget requires reduction of all UK greenhouse gas emissions by 28% from 1990 level.
2020	EU Renewable Energy Directive requires 15% of UK's energy consumption to come from renewable sources.
	EU Landfill Directive requires member states to reduce biodegradable municipal waste sent to landfill by 65% from 1995 levels.
	EU Waste Framework Directive requires member states to meet a 50% reuse and recycling target for household waste.
2022	UK carbon budget requires reduction of all UK greenhouse gas emission by 34% from 1990 level.
2050	Climate Change Act requires UK to reduce all UK greenhouse gas emission by at least 80% from 1990 level.

## Approach of Task Group

6. The Task Group considered the issues that arise at different phases in the lifecycle of anaerobic digestion:

- a) inputs (eg availability of feedstocks);
- b) process (eg regulation of the anaerobic digestion plant); and
- c) outputs (eg markets for biogas and digestate).

7. The Task Group identified the opportunities and challenges that arise at each stage, in five categories:

- a) Economics and Infrastructure;
- b) Regulation;
- c) Technology;
- d) Demonstration and Communication; and
- e) Measuring Progress.

8. The Task Group established work streams to focus its attention on each of these categories. The key issues, actions already taking place and recommendations for additional actions for each work stream are outlined below. The details of the full list of recommended actions are set out in the Table of Actions on page 25. This table identifies the parties which the Task Group suggests will play a major role in delivering these actions. In many cases, individual Task Group members or their organisations will be prepared to take a lead. However, at this stage, the Task Group wants other stakeholders to confirm their commitment to these actions and, particularly, actions which they would be prepared to lead, as well as input to.

## **Priorities for Key Sectors**

9. In each work stream the Task Group considered the opportunities and challenges for different sectors. Many of these are common across sectors. However some issues are of higher priority to particular groups.

### **All Sectors**

10. The economic framework is key to the growth in the use of anaerobic digestion across for all sectors of the economy. The successful introduction of the proposed new feed-in tariff for small-scale renewable electricity generation and the renewable heat incentive is therefore a priority (see paragraphs 17-22). Building awareness and understanding are also priorities for all sectors (see paragraphs 47-59). The upgrading of biogas to biomethane presents an exciting new opportunity, particularly for the operators of larger plants (see paragraphs 34 & 45-46).

### **Waste Management**

11. For the waste management sector, cost effective collection systems that ensure the quality of feedstocks (eg for source segregated food waste) are a particular priority (see paragraphs 24-25 & 39). Another priority is understanding and then developing markets for the digestate (see paragraphs 26-27).

### **Agriculture**

12. For farmers and land managers, it is particularly important that the feed-in tariff provides adequate support for small scale anaerobic digestion plants (see paragraph 21). The value of digestate as a fertiliser and soil conditioner is another important factor (see paragraphs 29, 41-42 & 57). Effective and proportionate regulation is important for all sectors. However for operators of small on-farm plants, a particularly priority is that this is appropriate to the nature and scale of the plant (see paragraph 30).

### **Water Industry**

13. For the water industry, a top priority is to ensure there is a clear and robust environmental and economic regulatory framework that facilitates the co-digestion of sewage sludge with other feedstocks and enables the appropriate use of the resulting digestate (see paragraph 31).

### **Food and Drink Industry, and Retailers**

14. For the food and drink industry, and retailers, the establishment of cost effective systems for the collection of food waste is a priority (see paragraphs 24-25). Another priority is to build confidence that digestate can be used safely within agricultural systems (see paragraphs 24-25 & 39).

### **Local Government**

15. For local government, the establishment of cost effective systems for the collection of food is also priority (see paragraphs 24-25). This includes increasing the level of participation in separate household collection (see paragraphs 39 & 49).

## **Energy and Transport Sectors**

16. For the energy and transport sectors, a top priority is to ensure that the different support mechanisms complement each other, so as to incentivise the most efficient uses of biogas (see paragraph 20).

## Economics and Infrastructure

### Market Support

17. The Task Group welcome the work by the Government to develop market support mechanisms for renewable energy. Biogas can produce renewable energy in several ways. It can be used for heat and power or as a transport fuel. It can be used locally, treated and injected into the gas grid or compressed and transported for use. To enable the market to develop solutions for the most efficient and environmentally beneficial use of biogas, an economic framework needs to be developed that places these different uses on a level playing-field. It is essential that this framework is clear, set out over appropriate timescales and provides certainty on investment for all parties.

18. Electricity from anaerobic digestion is eligible for ROCs (Renewable Obligation Certificates). On 1 April 2009 the Government introduced differentiated support levels for different renewables technologies (known as “banding”). Anaerobic digestion is in the top banding at 2 ROCs/MWh. Fuel suppliers can also use biogas to meet their obligation under the Renewable Transport Fuel Obligation (RTFO).

19. The Energy Act 2008 gives the Government powers to introduce a feed-in tariff for small-scale low-carbon electricity generation. This will provide support for installations up to 5 megawatts – which will include most anaerobic digesters. The Act also gives the Government powers to develop a renewable heat incentive. This will allow generators of renewable heat to claim financial support for that heat. The Act specifically allows for producers of biomethane injected into the gas grid to receive support from the renewable heat incentive.

20. These measures, together with increases in Landfill Tax, are providing important incentives for investment in anaerobic digestion. However there need to be much clearer links between the policies on the Renewables Obligation, feed-in tariff, renewable heat incentive and Renewable Transport Fuel Obligation. If not, there is a risk of failing to incentivise the most efficient uses of biogas.

21. In developing the feed-in tariff, it will be necessary to ensure that it provides adequate support for small scale anaerobic digestion plants. These can have proportionately higher costs but can offer other benefits. For example, on-farm anaerobic digestion can reduce greenhouse gas emissions from slurry management.

22. As the renewable heat incentive will not be introduced until April 2011, it is important to take steps to encourage early investment in anaerobic digestion infrastructure and to avoid missed opportunities. The Task Group therefore recommend that an early indication is given of the level of the renewable heat incentive. The Task Group also recommend that the Government give an undertaking that all projects completed after 27 November 2008, which meet the criteria for the renewable heat incentive, and not just those completed after April 2011, will be eligible for support from April 2011. (The Energy Act 2008 became law on 27 November 2008 and gave the Government powers to develop a renewable heat incentive.)

- ***Recommendation 1: Implement the feed-in tariff for small-scale low-carbon electricity generation and the renewable heat incentive by the dates already announced. In developing these mechanisms, the Government should:***

- ***ensure that the Renewables Obligation, feed-in tariff, renewable heat incentive and Renewable Transport Fuel Obligation complement each other, so as to incentivise the most efficient uses of biogas;***
- ***ensure that the timescales for each are clearly defined and of an appropriate length to ensure that developers can be certain about return on investment;***
- ***ensure that support under the feed-in tariff reflects the relative costs of different scales of plant;***
- ***give an early indication of the level of the renewable heat incentive; and***
- ***give an undertaking that the renewable heat incentive will be applied to all eligible projects completed after 27 November 2008.***

### **Infrastructure Support**

23. Anaerobic digestion projects are among the measures eligible for support under the Bio-energy Capital Grants Scheme, the Rural Development Programme for England 2007-2013 (RDPE) and the WRAP Organics Capital Grant Programme. The construction of new plants will help build confidence among potential investors and customers in what, for many, is still an unfamiliar technology. This will in turn encourage future investment. The Task Group therefore recommend continued support for anaerobic digestion through programmes of this kind.

- ***Recommendation 2: Continue to support the construction of anaerobic digestion infrastructure of all scales through relevant grant programmes.***

### **Revenue**

24. To maximise the potential of anaerobic digestion it is essential to make the most of the economic opportunities at each phase. Obtaining the right feedstocks is crucial and food waste will be an important feedstock for many plants. This may come from source segregated municipal collections or commercial sources, such as food processors, food service or the retail sector. Also, the anaerobic digestion of renewable bioplastics offers businesses a useful option for dealing with food packaging waste.

25. Increasing collection rates of food waste from all sources is a priority. Cost effective collection systems need to be established that ensure that high quality feedstocks are supplied. However, there are different issues associated with each source. For example, the collection method and the condition of the feedstock may vary between sources. Consequently different levels of pre-processing may be required prior to digestion. Local authorities and businesses should consider anaerobic digestion as part of integrated solutions for their waste. Issues for local authorities to address include the need to ensure that new collection and treatment contracts, and any necessary variations in existing contracts, facilitate the collection of food waste.

- ***Recommendation 3: Support the separate collection of food waste by local authorities to provide confidence in feedstock supply to anaerobic digestion plants.***

- ***Recommendation 4: Provide advice and guidance to local authorities – particularly in two-tier situations with different waste collection and disposal authorities – to ensure that decisions on collection methods are based on an assessment of all the relevant information.***
- ***Recommendation 5: Provide information and guidance to private sector organic waste producers to raise awareness of the importance and potential cost effectiveness of segregated organic waste collection, including the impact of packaging in providing a suitable feedstock for digestion.***

26. Digestate can be used as fertiliser and soil conditioner and it is essential that markets are developed for these products. Without an outlet for the digestate, the operator risks having to face costs for disposal of a valuable fertiliser that represents significant potential revenue. However farmers and others in the food supply chain are still unfamiliar with digestate and its uses. There is therefore a need to increase awareness of the value of the products and confidence that they can be used safely within agricultural systems. Actions to address these issues are covered below in the sections on Regulation (see paragraph 29), Technology (see paragraph 41-42) and Demonstration and Communication (see paragraph 57).

27. The location of anaerobic digestion plants is also important. Plant operators need to consider the distance travelled for feedstocks and outputs (both biogas and digestate) to minimise transport costs and emissions, as well as to maximise economic opportunity. An important aid to this will be the Defra funded ALLOWANCE project. This will develop a strategic management tool which will quantify and locate, temporally and spatially, the national capacity of agricultural land to accept organic material. Useful work to map information about food waste has also been done by various organisations, including WRAP, the Food and Drink Federation and Regional Development Agencies. It is important to build on this to improve the quality of data and fill gaps in information. Actions relating to this are also covered below in the section on Measuring Progress (see paragraph 64).

- ***Recommendation 6: Map and disseminate information about the availability of feedstocks.***
- ***Recommendation 7: Map land bank availability through the ALLOWANCE project and disseminate the findings.***

## **Other Issues**

28. The economic framework for anaerobic digestion also requires a supportive regulatory framework and sound knowledge and understanding about the available technology among the various interest groups. Recommendations on how to achieve this are covered in the following sections.

## Regulation

### Environmental Permitting

29. The regulatory framework needs to encourage a growth in the use of anaerobic digestion in a way that is both cost effective and beneficial to the environment. An important step has been the development by the Environment Agency and WRAP, with industry, of a Quality Protocol which lays down an approved standard for the production of quality anaerobic digestate, including conditions for its production and use. This will provide greater regulatory certainty on the issue of when this material has been fully recovered and has ceased to be waste under the Waste Framework Directive (WFD). It will also help build confidence in the products, as discussed above. This will help to facilitate the development of the market for digestate as a fertiliser and soil conditioner.

- ***Recommendation 8: Clarify "waste" status of inputs including by-products, sewage sludge and on-farm wastes in guidance documents.***
- ***Recommendation 9: Ensure that the current work on regulation of digestate covers digestate from all potential feedstocks.***

30. Government should consider the entire regulatory framework for anaerobic digestion so that the industry has a robust framework that covers all scales of anaerobic digestion operations from farm scale through to large scale commercial plants. This should be proportionate to the risks that each scale represents, and should be achieved via the ongoing review of the exemptions system, the delivery of robust standard permits and consideration of the Environmental Permitting Regulations (EPR) and Integrated Pollution Prevention and Control (IPPC) regimes where appropriate.

- ***Recommendation 10: Ensure that the thresholds for permitting anaerobic digestion plants and for burning biogas under the Environmental Permitting Regulations (EPR) and Integrated Pollution Prevention Control (IPPC) are proportionate to risk.***
- ***Recommendation 11: Clarify the regulations and thresholds that trigger exemptions to standard permits and bespoke permits, for farm, industrial, commercial and municipal wastes and for sewage sludge.***
- ***Recommendation 12: Change the status of biogas to non-waste via a Quality Protocol. Clarify the position at which biogas ceases to be waste.***

### Co-digestion

31. An important area for the growth of anaerobic digestion is in the co-digestion of other feedstocks with sewage sludge. The water industry has a well established infrastructure of anaerobic digestion plants and extensive experience of the technology. However sewage sludge and waste are covered by different regulatory regimes. The Task Group are therefore recommending actions to clarify how to meet the requirements of both regimes when co-digesting feedstocks. At the same time the water industry and Ofwat need to continue discussions to resolve outstanding financial regulation issues.

- ***Recommendation 13: Prepare generic guidance on allocation of costs and incomes for co-digestion of sewage sludge with other feedstocks.***
- ***Recommendation 14: Clarify and define regulatory arrangements (including Animal By-products Regulations (ABPR) requirements) for the production and use of digestate from co-digestion of sewage sludge with other feedstocks.***
- ***Recommendation 15: Amend the Sludge Use in Agriculture Regulations to ensure the maintenance of confidence levels in this vital route for the recovery of sewage sludges and maximise the efficient use of existing infrastructure in the water industry.***

## **Planning Permission**

32. As with any new development, obtaining planning permission for a new anaerobic digestion plant can be a challenge. An added complication is that anaerobic digestion for the treatment of waste is still not widely deployed in this country. Therefore many of those involved in planning decisions can be unfamiliar with how the procedures apply to anaerobic digestion. The Task Group are therefore recommending actions to increase understanding of planning issues relating to anaerobic digestion among planners, developers and the wider public. These issues are covered below in the section on Demonstration and Communication (see paragraphs 47-49 & 57).

33. *Planning Policy Statement 23: Planning and Pollution Control (PPS23)* gives guidance on how the pollution control regimes interacts with the planning system. This needs to be updated to avoid duplication between planning and environmental permitting processes for anaerobic digestion plants.

- ***Recommendation 16: Review and update PPS 23. Provide clarification on the differentiation of responsibilities in the planning and environmental permitting processes for anaerobic digestion plants to avoid duplication between the two.***

## **Injection of Biomethane into Gas Grid**

34. There are a number of issues that need to be addressed to facilitate the use of biomethane via direct injection into the grid. This does not yet happen in this country but represents an important additional market for biogas. The Task Group therefore welcome the work by the Government, in partnership with Ofgem, the gas grid companies, and trade associations to develop guidance on the gas regulatory regime for potential biomethane producers. The Task Group also recommend the following actions to facilitate injection into the grid.

- ***Recommendation 17: Complete development of guidance on the gas regulatory regime for potential biomethane producers.***
- ***Recommendation 18: Develop requirements in respect of calorific value to enable biomethane to be injected without the need for propane enrichment.***
- ***Recommendation 19: Review the current metering and monitoring requirements, in liaison with the Health and Safety Executive (HSE) and***

*other relevant parties, to ensure that these are not unnecessarily onerous for small renewable gas installations.*

- *Recommendation 20: Consider the need to set targets for biomethane production and use, to provide an indication of the Government's commitment to the expansion of this renewable technology.*

## Technology

35. To make the most of the potential benefits of anaerobic digestion it is important to continue to develop knowledge of the technology and its use. Valuable research has already been carried out and is continuing to be done by Government, industry and the research community – both in this country and overseas. The Task Group recommend that continued research and development should be a priority.

36. The Government has recently launched its Anaerobic Digestion Demonstration Programme. This is managed by Defra and forms part of DECC's National Environmental Transformation Fund. It is being delivered on their behalf by WRAP with support from the Carbon Trust. This Programme will include an exciting range of projects which will provide an ideal research and development platform for many of the research needs that the Task Group has identified. The Programme has been developed to demonstrate five key Government policy objectives:

- a) maximising the cost effective production of biogas;
- b) maximising the environmental benefits from the use of anaerobic digestion and its products;
- c) maximising the potential of anaerobic digestion to reduce the carbon footprint of the food supply chain;
- d) maximising the opportunity for the injection of biomethane into the gas grid; and
- e) maximising the potential of anaerobic digestion to reduce the carbon footprint of water treatment infrastructure.

### Optimising the Anaerobic Digestion Process

37. Conventional anaerobic digestion does not maximise the production of biogas from feedstocks. It is known that conventional mesophilic digestion processes can be run effectively. However evidence from UK water industry funded research, from other countries and from academic studies confirms that the efficiency of the digestion process could be improved to give a higher yield of biogas containing a greater concentration of methane. Research needs to be undertaken on optimising feedstock mixtures, on pre-treatment processing, on digester design optimisation and on optimising the actual digestion process to maximise gas yield and quality.

38. The research base needs to cover the optimisation of digestion technologies of all scales and should include work to accelerate the development of low-cost digesters for farms and for communities.

- ***Recommendation 21: Research into the optimisation of feedstock mixtures, pre-treatment processing, digester design and the digestion process to maximise gas yield and quality for digesters of all scales.***

### Feedstocks

39. The successful operation of commercial scale anaerobic digestion will be dependent on the supply of high quality feedstocks. Research already completed by

Defra and WRAP has shown that the best way to treat food waste is to separately collect it and treat it via anaerobic digestion. However, there are still relatively few local authority schemes for separate collection of food waste from households. This issue would benefit from the further development of novel and innovative collection strategies. This work also needs to consider the opportunity to collect food waste from commercial premises, such as food service outlets.

- ***Recommendation 22: Develop innovative food waste collection and separation techniques for household and commercial sources of food waste. Determine the best recovery routes for various types of organic materials.***

40. Across Europe, there is relatively little experience of running anaerobic digestion plants on feedstocks containing a high proportion of nitrogen, such as food wastes. However, this country is focussing on the development of plants of this type and, indeed, the delivery of some of Defra's key objectives will depend on the use of anaerobic digestion specifically for the treatment of food waste. Some technical issues regarding the digestion of food waste therefore need to be addressed, such as ensuring that stable digestion conditions can be maintained over a long period and ensuring that a quality digestate can be produced.

- ***Recommendation 23: Improve the anaerobic digestion of high nitrogen feedstocks, in particular food waste and poultry manure, through targeted research and development.***

### **Quality Digestate**

41. The production and use of digestate is an integral part of the operation of a successful anaerobic digestion plant at any scale. The digestate has a real economic value. Any operator must consider the ultimate fate of the digestate and of any liquors arising from the dewatering of digestate and maximise the efficient use of the nutrients that these contains. There is a need to improve understanding through a combination of research into best practice in other countries and research into the short-term and long-term benefits of applying digestate to farm land in the context of the UK climate, soils and agricultural crops. This links to the need for case studies and the dissemination of information through the new anaerobic digestion web portal (see paragraphs 41-42 & 57).

42. The ultimate destination for the majority of quality digestate will be in agriculture. It is vital that data and information about the digestate are provided for farmers and the rest of the food supply chain. Without this there is a risk of undermining confidence in the use of this very valuable product from anaerobic digestion. Recovery of pure nutrients from dewatering liquors is possible using existing technology. Research and demonstration is required into the refinement of the technology and into the development of markets for the recovered nutrients as fertilisers.

- ***Recommendation 24: Research best practice in digestate applications in other countries.***
- ***Recommendation 25: Research the short-term and long-term benefits of applying digestate to farm land in the context of the UK climate, soils and agricultural crops.***

43. Anaerobic digestion can be scaled and adapted to provide a waste treatment solution in a range of different locations and scenarios – rural to urban, large scale to small scale. Where the anaerobic digestion plant is operating in a rural location and where there is access to suitable land, then the digestate will be used as an agricultural fertiliser. However, where anaerobic digestion plants are located in urban situations, the cost of transporting digestate over long distances will become an important consideration when determining the economic feasibility of a plant. The potential for anaerobic digestion of food waste will therefore be aided by improving the range of solutions that can be found for the beneficial use of digestate. This will require the development of innovative digestate products such as composts or fertiliser granules, or by looking at alternative ways of transporting or treating the materials.

- ***Recommendation 26: Develop digestate enhancement technologies and markets for the resulting enhanced products, such as recovered single nutrient fertilisers. Understand fully the impacts of liquors and leachates arising from dewatering of digestates.***

### **Biogas Use**

44. Biogas generated by anaerobic digestion is a mixture of methane and carbon dioxide. There is a significant potential value in the CO<sub>2</sub> which could be harnessed for other applications. This includes enhancing horticultural production by pumping it into greenhouses and various biotechnology applications, as well as providing a raw material for several manufacturing processes. There is therefore a need for research and development into cost effective and energy efficient gas separation techniques, as well as into developing efficient, novel uses for the CO<sub>2</sub> from anaerobic digestion.

- ***Recommendation 27: Research the beneficial use of CO<sub>2</sub> from biogas.***

45. The injection of biomethane into the gas grid is not currently carried out in this country. There is a particular research and demonstration need associated with making this viable. In particular, it is necessary to ensure that high quality gas clean up equipment that can operate at optimum efficiency in terms of both economics and energy is developed and demonstrated. In addition, to date, biogas upgrade to biomethane is currently only commercially available on a large scale. Further research and development is therefore needed that will enable the development and demonstration of smaller scale opportunities for biomethane injection into the grid in rural and in urban areas.

- ***Recommendation 28: Carry out research and development to improve performance and reduce costs of biomethane upgrading plants.***

46. Similarly, confidence needs to be built in this country in the use of biomethane. Research already carried out in other countries shows that the limited levels of non-methane constituents in biomethane do not adversely affect consumers or domestic appliances. This research needs to be confirmed for domestic equipment used in this country.

- ***Recommendation 29: Confirm research already carried out on the safety of biomethane in consumer appliances.***

## Demonstration and Communication

### Public Engagement

47. The recommendations in this report aim to stimulate and accelerate the growth of anaerobic digestion. The development and planning of new plants can be a long and difficult process. Currently, anaerobic digestion is a relatively unfamiliar technology choice. It is important that tools are available to help build positive public perception and acceptance in the communities where anaerobic digestion plants are planned.

48. There is a need for proactive engagement to ensure that a lack of understanding and concerns over new technology do not lead to opposition to proposed plants and, ultimately, the refusal of planning permission. To support planners and decision makers, the Task Group believe that there is a need for targeted and impartial information campaigns for local residents and planners alike, such as anaerobic digestion site visits, public meetings and drop-in sessions. These will enable them to make a more informed judgement about the deployment of technology in their community.

49. It is also important to increase participation in schemes for the separate collection of household food waste. This is crucial to the success of many anaerobic digestion facilities (see paragraph 24-25). There is a need for strong cross-sector demonstration of support, among the media, the water industry (given their experience), environmental groups and regulators to help provide confidence in both the importance and benefits of the technology to communities and encourage participation in separate food waste collection.

- ***Recommendation 30: Ensure proactive engagement and increase awareness among communities of opportunities offered by anaerobic digestion through a series of workshops, or through a dedicated regional 'anaerobic digestion community champion'.***
- ***Recommendation 31: Develop tools to raise awareness of the benefits of anaerobic digestion, help address potential concerns and increase participation in separate food waste collection. This should include a leaflet to introduce anaerobic digestion opportunities and facts to communities.***

### Demonstration of Technology

50. The Task Group recognises the importance of demonstration in allowing potential users and advisors to learn from both the challenges and successes of projects. A demonstration plant has already been constructed under the New Technologies Demonstrator Programme and the Task Group welcome the Government's new £10 million Anaerobic Digestion Demonstration Programme. The Programme (which will be delivered by WRAP on behalf of Defra) will support a series of projects demonstrating the cutting edge use of anaerobic digestion to create renewable energy, reduce greenhouse gas emissions and avoid waste being sent to landfill. The Task Group recommend that the Demonstration Programme is regularly reviewed to identify any further demonstration needs, with particular attention paid to looking at the use of anaerobic digestion in rural communities.

51. One of the greatest challenges to implementation of anaerobic digestion projects is the wide range of variables including: feedstocks, technologies, scale, and end-uses for the biogas and digestate. The Task Group therefore recommend the demonstration of as many different variables within a single project as possible. Demonstration plants should be constructed in a variety of locations, including areas where limited options are available for the use of biogas, such as areas not connected to the gas grid or away from transport infrastructure. This would demonstrate how anaerobic digestion can be implemented in a wide range of situations and help to inform decisions on optimal locations for plants. Public finance packages should include an element of funding specifically for the dissemination of demonstration outputs. Currently virtually all of the funding is applied to capital spend.

- ***Recommendation 32: Deliver the Anaerobic Digestion Demonstration Programme to demonstrate the cutting edge use of anaerobic digestion to create renewable energy, reduce greenhouse gas emissions and avoid waste being sent to landfill.***
- ***Recommendation 33: Regularly review the Anaerobic Digestion Demonstration Programme to identify any further demonstration needs. In doing so, the following should taken into consideration:***
  - ***as many different variables should be demonstrated within a single project as possible;***
  - ***demonstration plants should be constructed in a variety of locations; and***
  - ***public finance packages should include an element of funding specifically for the dissemination of demonstration outputs.***

52. A series of case studies should also be developed and publicised to promote the benefits of anaerobic digestion, address concerns and improve confidence among other key stakeholders, such as potential developers, investors and customers. This should build on successful work already taking place. For example, Business in the Community have already brokered cross-sector discussions to identify industry actions needed to remove barriers to uptake. The Task Group welcome their planned *Seeing is Believing* event in November 2009, which will provide an opportunity for key industry heads to see examples of successful anaerobic digestion schemes and identify how they might lend their collaborative support to further projects, especially those at the community scale.

- ***Recommendation 34: Develop and publicise case studies, demonstrating risks and opportunities and projects in a variety of locations and scale.***

## **Information and Advice**

53. There is a very wide range of publically available information, often specialist in nature, on anaerobic digestion from an equally wide range of sources. This can be rather confusing for those new to the area. The Task Group therefore welcome the new web based anaerobic digestion portal being developed by the NNFC with the support of DECC and Defra. This will provide a single credible source of information and signposting for different users and will act as a first point of call for all those with

an interest in anaerobic digestion. The Task Group recommend that this portal provide direct links to the full range of existing and new sources of information and advice on anaerobic digestion. The success of this will require the support and input of a broad range of stakeholders.

- ***Recommendation 35: Complete development of the new anaerobic digestion web portal to act as a gateway to information on anaerobic digestion technologies for a range of potential stakeholders.***

54. Within the web portal a series of 'decision trees' should be developed to guide potential developers of anaerobic digestion plants through: the initial options; levels of feedstock needed; sources of information; appropriate upgrade technologies; and end uses of biogas. Specialist advice will be required by developers of community, on-farm and other small scale anaerobic digestion plants to aid the transition from initial scoping to realisation of projects.

55. Regional Development Agencies (RDAs) can contribute to providing advice on anaerobic digestion schemes through the RDPE and by funding the further roll-out of 'anaerobic digestion community champions'. Such schemes are currently operating in Yorkshire and the Humber, the North East and the South East. These could develop and cascade 'how to' guides and provide advice on implementing schemes and overcoming barriers.

56. The Task Group welcome the work by the NNFCC to further develop the existing anaerobic digestion calculator developed for them by the Andersons Centre. This would extend the range of potential input and output scenarios and further develop the financial scenarios. This would provide an initial assessment of the feasibility of a particular scheme, allowing decisions to proceed to the next stage.

57. The Task Group recommend that targeted best practice guides are produced for farmers and planners, covering the various stages of implementation and output use. These should be backed up by information events. At the same time there is a need for the publication and dissemination of more generic advice and training, including health and safety guidance for small scale operators. Examples include the operators' guide for anaerobic digestion being developed by WRAP and the WRAP funded anaerobic digestion training.

- ***Recommendation 36: Improve information resources to demonstrate the viability of anaerobic digestion for investors and developers, through decision support software, awareness of case studies and up to date information on the policy framework, potentially as an anaerobic digestion 'guide for investors'.***
- ***Recommendation 37: Develop a farmers' guide to digestate use, perhaps accompanied by a series of on farm demonstration events of successful use to improve confidence, and an information campaign in the farming press.***
- ***Recommendation 38: Develop a 'local planners guide to anaerobic digestion' to help address public issues with anaerobic digestion throughout the planning process and help successful public communication.***

## Sharing Knowledge

58. Government, industry, the research community and international networks have produced a wealth of useful information. Centralised dissemination of reports and papers would be useful in helping transfer knowledge across the UK.

- ***Recommendation 39: Develop systems to disseminate information from Government, industry, the research community and international networks about best practice and new developments in anaerobic digestion technology and its application.***

59. The Task Group believe that involvement in international and EU projects, such as the Methane to Markets Partnership, the International Energy Agency's (IEA) Task 37, the EU's Seventh Framework Programme (FP7) and ERA-NET Bioenergy, is crucial in allowing the UK to benefit from research and development and best practice from abroad, as well as funding work which may not otherwise be funded. It also allows UK input into policy development and raises the profile of work by UK companies.

- ***Recommendation 40: Increase UK participation in EU and International projects by signposting sources of match funding support, and developing mechanisms to facilitate awareness of opportunities and consortia building.***

## Measuring Progress

60. To ensure successful progress towards the Shared Goals, it is essential to have effective mechanisms for measuring progress. This will enable us to identify where actions are working well and, importantly, where additional actions or changes to existing actions are needed. Also, as stated in the introduction, this report aims to set out how anaerobic digestion will contribute to a number of different UK Government and European targets. It is therefore vital to set out how progress against these targets should be monitored.

61. The recommended actions to develop monitoring and reporting systems are set out below. These actions can be divided into two categories – those that can be achieved via a standard periodic report and those that can be delivered via a live geographical information system (GIS) mapping tool. In both cases data should be retrieved and reported in such a way as to minimise the burden of providing data. For example, where data is collected via a regulatory regime, links should be built to enable direct data transfer rather than requesting the same data set to be sent to a second party for reporting.

62. The periodic report and the mapping tool should be formatted in such a way that the collated data can be used to report on and provide commentary on the progress towards Government targets. For example, it should be possible to use the report to look at the proportion of waste going to anaerobic digestion as a percentage of total potential waste that could be so directed.

### Periodic Reporting

63. The Task Group recommends that periodic reports are produced covering the following issues.

a) **Biogas Production and Use:** Measuring the production and use of the biogas that is produced by anaerobic digestion will be the key to determining how the technology will contribute to the production of renewable energy in the UK. Currently this relates primarily to the production of renewable electricity. However, as the provisions in the Energy Act 2008 are implemented, the proposed feed in tariff and payment for the production and use of renewable heat will also allow the measurement of other benefits of the technology, such as the direct use of the gas by injection into the grid, the use of gas as vehicle fuel and the use of the heat that is produced via CHP (combined heat and power) units.

b) **Digestate Quality:** Monitoring the production and the use of the digestate from anaerobic digestion plants will provide data on the value of fertiliser replacement in agriculture and the consequent carbon saving within the agricultural production system. It will also provide us with the data that will provide confidence to both farmers and the food supply chain that the digestate is fit for purpose and can be used safely within agricultural systems.

c) **Carbon Saved:** A reliable and robust mechanism needs to be developed for determining carbon savings via the use of anaerobic digestion. Once this is agreed and in place it will be possible to report on progress towards important climate change and renewable energy objectives.

d) **Collection methods and their impact on the downstream technology:**

The method of collection and the treatment of feedstock prior to digestion are critical to many digester applications. The current collection infrastructure in the UK – both in the public or private sectors – is not designed to support the development of anaerobic digestion technologies. The development of appropriate systems must be planned and their implementation monitored.

- **Recommendation 41: Develop systems to monitor and report periodically on:**
  - **biogas production and use;**
  - **digestate quality and use;**
  - **reductions in greenhouse gas emissions resulting from use of anaerobic digestion; and**
  - **methods of feedstock collection.**

## **GIS Mapping**

64. The Task Group recommend that a GIS function is developed from the existing WRAP work package. This would present current organic waste treatment facilities, markets for quality products and use the Defra ALLOWANCE GIS base (see paragraph 27). This should cover the following:

- a) **Number and Capacity of New Plants:** It is vital to keep track of the number of plants that are being built and coming into production. There are a number of aspects to this, including monitoring of: feedstock use; capacity expansion; and location within regions. With this information it will be possible to map the expansion of the industry and monitor progress against trajectories for waste diverted from landfills and renewable energy production. The information can also be actively used by those planning to change their waste management processes and who choose to divert waste to anaerobic digestion in the future.
  - b) **Accurate Mapping of Waste Arisings:** The work already undertaken by several Regional Development Agencies and by WRAP should be built upon and then centrally mapped to provide a GIS layer that will quantify where wastes that are suitable for anaerobic digestion are located.
- **Recommendation 42: Develop a GIS tool to record and map:**
    - **number and capacity of new plants;**
    - **where the digestate is being used; and**
    - **waste arisings.**

## Delivery of an Implementation Plan

65. It is essential to establish effective systems to take forward the recommendations in this report. The Task Group recommend that Government puts in place a team to oversee development and delivery of an anaerobic digestion Implementation Plan. An essential part of the team's work will be to monitor and report on how the actions in the Implementation Plan are progressing. This will enable potential problems to be identified early on and the necessary steps taken promptly to address these.

66. It will also be important to monitor and report against the indicators for the Implementation Plan. (The Task Group recommendations for indicators are set out in Measuring Progress above.) The extent to which the actions in the Implementation Plan are contributing to the aims of the Shared Goals can then be assessed. If insufficient progress is being made against these indicators, this will highlight the need to consider changes or additions to these actions. The Task Group recommend that WRAP are appointed to carry out this reporting.

67. The success of an Implementation Plan will require the support and active participation of a broad range of stakeholders. The Task Group therefore recommend that the Government consider appointing an independent advisory group to support its future work. This would provide an essential link with the wider stakeholder community, as well as bringing a breadth of knowledge and experience of anaerobic digestion issues.

68. The advisory group should be drawn from a broad range of sectors with an interest in anaerobic digestion, including: the biogas industry, energy companies, the waste management sector, water utilities, agriculture, the food and drink industry, the finance sector, retailers, regulators, local government, Regional Development Agencies and the community sector. It would:

- a) consider reports on progress from the anaerobic digestion team and WRAP;
  - b) identify gaps in actions to support anaerobic digestion; and
  - c) make recommendations to Ministers for any new actions.
- ***Recommendation 43: Set up a central Government team to oversee development and delivery of the actions an Implementation Plan.***
  - ***Recommendation 44: Appoint WRAP to monitor and report on progress.***
  - ***Recommendation 45: Appoint an independent advisory group to support the work of the central Government anaerobic digestion team.***

69. The Task Group's remit was to consider how to achieve a major increase in the uptake of anaerobic digestion in England. However many of the issues considered are relevant throughout the UK. Also, each of the nations has examples of best practice which the others could find useful.

- ***Recommendation 46: Share best practice on anaerobic digestion between the UK Government and Devolved Administrations who should work together to address common concerns.***

## **Cost of Recommendations**

70. A number of the recommendations address how best to implement measures already in place or being developed. Examples include the market support mechanisms for renewable energy and the Anaerobic Digestion Demonstration Programme. They should therefore not place a direct additional cost on the Exchequer.

71. Some of the other recommendations do have cost implications for Government Departments, industry and other stakeholders. Examples include the development and dissemination of case studies.

72. The Task Group anticipate that the development of the market for anaerobic digestion and its products will drive much of the research and development highlighted in the Technology section of this report. Nevertheless, in the short term, there may be a need for Government funded research – often in partnership with industry.

## Table of Actions

This table lists the Task Group's recommended actions sets out in this report. Against each, it sets out our proposals for the organisations to lead their delivery and the milestones for doing so.

	<b>Recommendation</b>	<b>Lead Organisation</b>	<b>Milestones</b>
	<b>Economics and Infrastructure</b>		
1.	<p>Implement the feed-in tariff for small-scale low-carbon electricity generation and the renewable heat incentive by the dates already announced. In developing these mechanisms, it should:</p> <ul style="list-style-type: none"> <li>• ensure that the Renewables Obligation, feed-in tariff, renewable heat incentive and Renewable Transport Fuel Obligation complement each other, so as to incentivise the most efficient uses of biogas;</li> <li>• ensure that the timescales for each are clearly defined and of an appropriate length to ensure that developers can be certain about return on investment;</li> <li>• ensure that support under the feed-in tariff reflects the relative costs of different scales of plant;</li> <li>• give an early indication of the level of the renewable heat incentive; and</li> <li>• give an undertaking that the renewable heat incentive will be applied to all eligible projects completed after 27 November 2008.</li> </ul>	DECC	<p>April 2010 – Feed-in tariff introduced</p> <p>April 2011 – Renewable heat incentive introduced</p>

2.	Continue to support the construction of anaerobic digestion infrastructure of all scales through relevant grant programmes.	Defra, DECC, WRAP, RDAs	Bio-energy Capital Grants Scheme runs until 31 March 2011 Rural Development Programme for England runs until 31 March 2013 WRAP Capital Grants run until 31 March 2011
3.	Support the separate collection of food waste by local authorities to provide confidence in feedstock supply to anaerobic digestion plants.	Defra, CLG, WRAP and LGA	Ongoing
4.	Provide advice and guidance to local authorities – particularly in two-tier situations with different waste collection and disposal authorities – to ensure that decisions on collection methods are based on an assessment of all the relevant information.	Defra, CLG, WRAP and LGA	December 2009
5.	Provide information and guidance to private sector organic waste producers to raise awareness of the importance and potential cost effectiveness of segregated organic waste collection, including the impact of packaging in providing a suitable feedstock for digestion.	Defra	December 2009
6.	Map and disseminate information about the availability of feedstocks.	WRAP, FDF, BRC, LGA	
7.	Map land bank availability through the ALLOWANCE project and disseminate the findings.	Defra, WRAP	December 2009
	<b>Regulation</b>		
8.	Clarify "waste" status of inputs including by-products, sewage sludge and on-farm wastes in guidance documents.	EA, water industry	December 2009 – Draft guidance published

9.	Ensure that the current work on regulation of digestate covers digestate from all potential feedstocks.	WRAP, EA, Defra, water and waste industry	Ongoing
10.	Ensure that the thresholds for permitting anaerobic digestion plants and for burning biogas under the Environmental Permitting Regulations (EPR) and Integrated Pollution Prevention Control (IPPC) are proportionate to risk.	Defra, EA, UK water industry	September 2009 – New Policy Position
11.	Clarify the regulations and thresholds that trigger exemptions to standard permits and bespoke permits, for farm, industrial, commercial and municipal wastes and for sewage sludge.	Defra, EA	April 2010 - Standard permits for anaerobic digestion available April 2010 – Exemptions review completed October 2002 – publication of Guidance for Environmental Permitting Regulations
12.	Change Status of biogas to non-waste via a Quality Protocol. Clarify position when biogas ceases to be waste.	Defra, EA, WRAP, water industry, landfill sector, REA	January 2010
13.	Prepare generic guidance on allocation of costs and incomes for co-digestion of sewage sludge with other feedstocks.	Ofwat, water industry	December 2009 – Guidance published
14.	Clarify and define regulatory arrangements (including Animal By-products Regulations (ABPR) requirements) for the production and use of digestate from co-digestion of sewage sludge with other feedstocks.	EA, Defra, WRAP, water and waste industry	December 2009

15.	Amend the Sludge Use in Agriculture Regulations to ensure the maintenance of confidence levels in this vital route for the recovery of sewage sludges and maximise the efficient use of existing infrastructure in the water industry.	Defra, water and waste industry	December 2009
16.	Review and update PPS 23. Provide clarification regarding differentiation of responsibilities in the planning and permitting process for all anaerobic digestion plants to avoid duplication between planning and environmental permitting.	EA, local authority planning officers, Defra, ESA, CIWM, CLG	December 2009 – First draft of guidance April 2010 – Final guidance
17.	Complete development of guidance on the gas regulatory regime for potential biomethane producers.	DECC, Ofgem, gas grid companies, trade associations	December 2009 – First draft of guidance
18.	Develop requirements in respect of calorific value to enable biomethane to be injected without the need for propane enrichment.	DECC, Ofgem, gas grid companies, trade associations	December 2010 - Policy Position
19.	Review the current metering and monitoring requirements, in liaison with the Health and Safety Executive (HSE) and other relevant parties, to ensure that these are not unnecessarily onerous for small renewable gas installations.	DECC, Ofgem, HSE, gas grid companies, trade associations	Ongoing
20.	Consider the need to set targets for biomethane production and use, to provide an indication of UK Government commitment to the expansion of this renewable technology.	DECC	Ongoing
	<b>Technology</b>		

21.	Research into the optimisation of feedstock mixtures, pre-treatment processing, digester design and the digestion process to maximise gas yield and quality for digesters of all scales.	Defra, WRAP, Universities, UKWIR	October 2009 to March 2013 – Research programme
22.	Develop innovative food waste collection and separation techniques for household and commercial sources of food waste. Determine the best recovery routes for various types of organic materials.	Defra, WRAP, industry (including UKWIR)	October 2009 to March 2013 – Research programme
23.	Improve the anaerobic digestion of high nitrogen feedstocks, in particular food waste and poultry manure, through targeted research and development.	Defra, WRAP, universities	October 2009 to March 2013 – Research programme
24.	Research best practice in digestate applications in other countries.	Defra, WRAP, Task 37 (UK)	October 2009 to March 2010 – Research programme
25.	Research the short-term and long-term benefits of applying digestate to farm land in the context of the UK climate, soils and agricultural crops.	Defra, WRAP universities, independent research organisations	October 2009 to March 2015 – Research programme
26.	Develop digestate enhancement technologies and markets for the resulting enhanced products, such as recovered single nutrient fertilisers. Understand fully the impacts of liquors and leachates arising from dewatering of digestates.	Defra, WRAP industry, UKWIR	October 2009 to March 2013 – Research programme
27.	Research the beneficial use of CO <sub>2</sub> from biogas.	Defra, WRAP universities, independent research organisations	October 2009 to March 2013 – Research programme

28.	Carry out research and development to improve performance and reduce costs of biomethane upgrading plants.	DECC, universities, independent research organisations, manufacturers, gas suppliers and, or gas networks, UKWIR	October 2009 to March 2013 – Research programme
29.	Confirm research already carried out on the safety of biomethane in consumer appliances.	DECC, universities, independent research organisations, manufacturers, gas suppliers and, or gas networks, UKWIR	October 2009 to March 2013 – Research programme
	<b>Demonstration and Communication</b>		
30.	Ensure proactive engagement and increase awareness among communities of opportunities offered by anaerobic digestion through a series of workshops, or through a dedicated regional ‘anaerobic digestion community champion’.	Defra, WRAP RDAs	Ongoing
31.	Develop tools to raise awareness of the benefits of anaerobic digestion, help address potential concerns and increase participation in separate food waste collection. This should include a leaflet to introduce anaerobic digestion opportunities and facts to communities.	Defra, RDAs	Summer 2010
32.	Deliver the Anaerobic Digestion Demonstration Programme to demonstrate the cutting edge use of anaerobic digestion to create renewable energy, reduce greenhouse gas emissions and avoid waste being sent to landfill.	Defra, DECC, WRAP, Carbon Trust	March 2011 – All projects constructed

33.	<p>Regularly review the Anaerobic Digestion Demonstration Programme to identify any further demonstration needs. In doing so, the following should be taken into consideration:</p> <ul style="list-style-type: none"> <li>• as many different variables should be demonstrated within a single project as possible;</li> <li>• demonstration plants should be constructed in a variety of locations; and</li> <li>• public finance packages should include an element of funding specifically for the dissemination of demonstration outputs.</li> </ul>	Defra, DECC, WRAP, Carbon Trust	Ongoing
34.	Develop and publicise case studies, demonstrating risks and opportunities and projects in a variety of locations and scale.	Defra, WRAP, NNFCC, BITC, NFU, LGA, independent developers	Late 2009 – Start developing case studies
35.	Complete development of the new anaerobic digestion web portal to act as a gateway to information on anaerobic digestion technologies for a range of potential stakeholders.	NNFCC, DECC, Defra	Late 2009 – Portal goes online
36.	Improve information resources to demonstrate the viability of anaerobic digestion for investors and developers, through decision support software, awareness of case studies and up to date information on the policy framework, potentially as an anaerobic digestion 'guide for investors'.	Defra, WRAP	Mid 2010
37.	Develop a farmers' guide to digestate use, perhaps accompanied by a series of on farm demonstration events of successful use to improve confidence, and an information campaign in the farming press.	Defra, WRAP, NNFCC, EA, NFU, CLA	Summer 2010

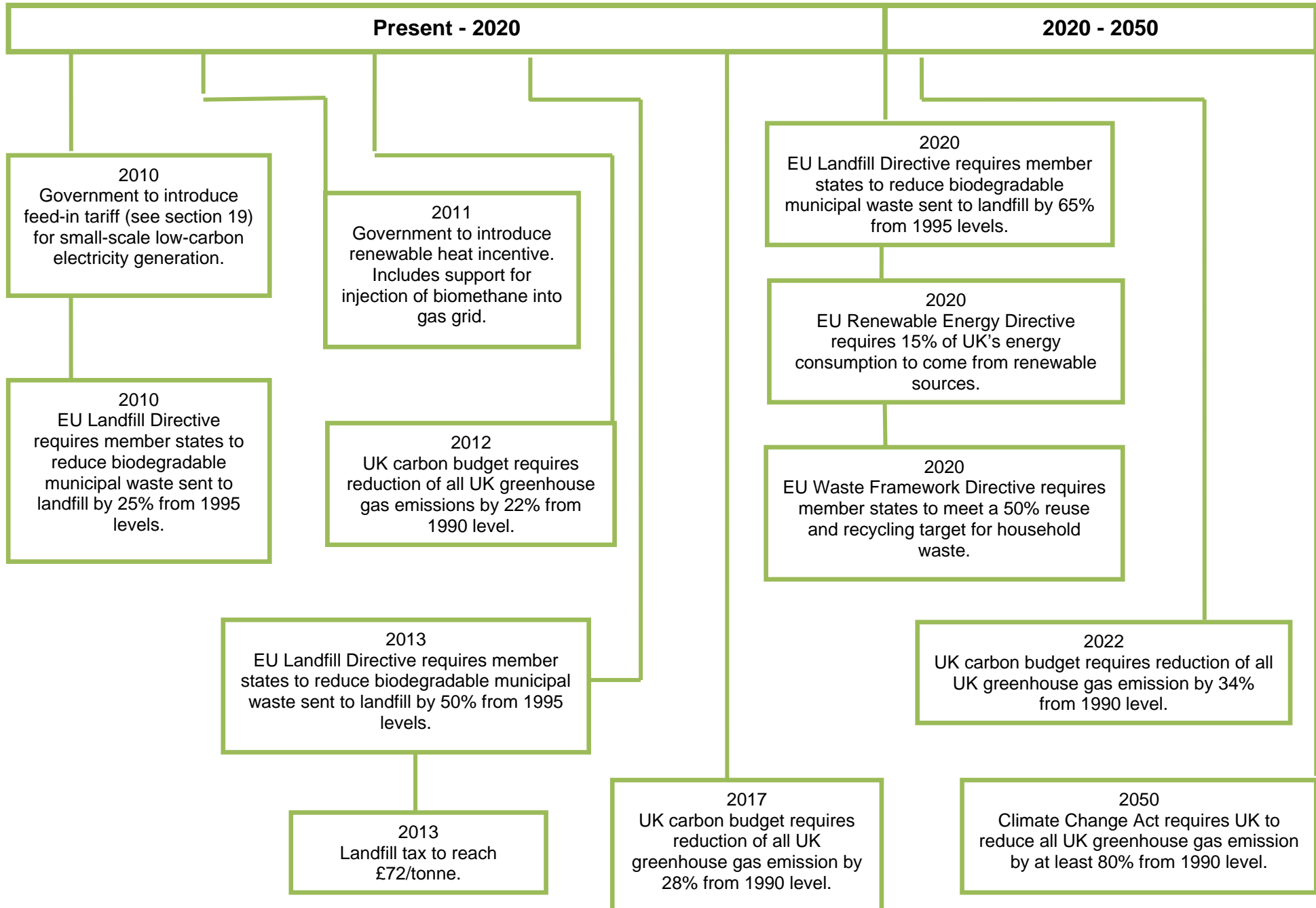
38.	Develop a 'local planners guide to anaerobic digestion' to help address public issues with anaerobic digestion throughout the planning process and help successful public communication.	CLG, RDAs, LGA	Early 2010
39.	Develop systems to disseminate information from Government, industry, the research community and international networks about best practice and new developments in anaerobic digestion technology and its application.	Defra, DECC, WRAP, NNFCC, industry, universities, independent research organisations	Late 2009
40.	Increase UK participation in EU and International projects by signposting sources of match funding support, and developing mechanisms to facilitate awareness of opportunities and consortia building.	Defra, DECC, industry, universities, independent research organisations	Mid 2010
	<b>Measuring Progress</b>		
41.	Develop systems to monitor and report periodically on: <ul style="list-style-type: none"> <li>• biogas production and use;</li> <li>• digestate quality and use;</li> <li>• reductions in greenhouse gas emissions resulting from use of anaerobic digestion; and</li> <li>• methods of feedstock collection.</li> </ul>	Defra, DECC, WRAP, CT, NISP, EA, Ofgem, RDAs, REA	Baseline assessment by March 2010 Assessment repeated annually
42.	Develop a GIS tool to record and map: <ul style="list-style-type: none"> <li>• number and capacity of new plants;</li> <li>• where the digestate is being used; and</li> <li>• waste arisings.</li> </ul>	Defra, DECC, WRAP, CT, NISP, EA, Ofgem, RDAs, REA	Mid 2010 – Tool available

	<b>Delivery</b>		
43.	Set up a central Government team to oversee development and delivery of the actions in an Implementation Plan.	Defra	Summer 2009 – Team set up
44.	Appoint WRAP to monitor and report on progress.	Defra, WRAP	Baseline assessment by March 2010 Reports published annually
45.	Appoint an independent advisory group to support the work of the central Government anaerobic digestion team.	Defra	Autumn 2009 – Advisory group appointed
46.	Share best practice on anaerobic digestion between the UK Government and Devolved Administrations who should work together to address common concerns.	Defra, Devolved Administrations	

Key

BITC	Business in the Community
BRC	British Retail Consortium
CIWM	Chartered Institution of Wastes Management
CLG	Department for Communities and Local Government
CT	Carbon Trust
DECC	Department of Energy and Climate Change
Defra	Department for Environment, Food and Rural Affairs
EA	Environment Agency
ESA	Environmental Services Association
FDF	Food and Drink Federation
LGA	Local Government Association
NISP	National Industrial Symbiosis Programme
NNFCC	National Non-Food Crops Centre
RDA	Regional Development Agency
REA	Renewable Energy Association
WRAP	Waste and Resources Action Programme

# Annex 1: Timeline



## **Annex 2: Members of Anaerobic Digestion Task Group**

Steve Lee (Chair)  
Chief Executive Officer, Chartered Institution of Wastes Management (CIWM)

Emily Ball<sup>4</sup>  
Rural Climate Change Manager, Business in the Community (BITC)

David Bellamy  
Sustainability Manager, Food and Drink Federation (FDF)

Paul Bettison  
Chair of Environment Board, Local Government Association (LGA)

Michael Chesshire  
Technology Director, BiogenGreenfinch and Chair, Renewable Energy Association (REA) Biogas Group

Samantha Fuller  
Waste to Energy Development Manager, Scottish and Southern Energy

Bob Gordon  
Environment Policy Executive, British Retail Consortium (BRC)

Steve Ntifo<sup>5</sup>  
Environment and Science Adviser, Water UK

Keith Riley  
Managing Director - Veolia Environmental Services (UK) Ltd

David Sillett  
Rural Development Manager, East of England Development Agency (EEDA)

Richard Swannell  
Director of Retail and Organics Programmes, Waste & Resources Action Programme (WRAP)

Jeremy Tomkinson  
Chief Executive, National Non-Food Crops Centre (NNFCC)

John Varley  
Estate Director, Clinton Devon Estates

Michael Warhurst  
Senior Campaigner, Resources and Waste, Friends of the Earth (FoE)

Owen Yeatman  
Managing Director, Biogas Nord UK Ltd

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<sup>4</sup> On behalf of Jim Haywood, Environment Director, Business in the Community (BITC)

<sup>5</sup> On behalf of Pamela Taylor, Chief Executive, Water UK

## **Annex 3: Acknowledgements**

The Anaerobic Digestion Task Group is grateful for the input of participants at the anaerobic digestion workshop in Reading on 18 May 2009.

The Task Group should also like to thank the contributors to the work streams for their expertise, time and inputs.

### **Economics and Infrastructure**

The Economics and Infrastructure work stream was led by Keith Riley, Veolia, and Samantha Fuller, Scottish and Southern Energy, with input from: Paul Bettison, Local Government Association; Owen Yeatman, Biogas Nord UK Ltd; Michael Warhurst, Friends of the Earth; and Prab Mistry, AEA Energy and Environment.

### **Regulation**

The Regulation work stream was led by Steve Ntifo, Water UK, with input from: Ken Shapland, Severn Trent Water; Viv Dennis, Environment Agency; Steve Lee, CIWM; Tina Benfield, CIWM; Stuart Reynolds, CSR Associates; David Pickering, National Grid; and Caroline Ashton, United Utilities.

### **Technology**

The Technology work stream was led by Michael Chesshire, BiogenGreenfinch and Chair of the Renewable Energy Association UK Biogas Group, with input from: Nina Sweet, WRAP; David Collins, Renewable Energy Association; John Baldwin, CNG Services Ltd; and John Pavitt, Mike Tobin Consultancy.

### **Demonstration and Communication**

The Demonstration and Communication work stream was led by Jeremy Tomkinson, NNFCC, with input from: Claire Smith, NNFCC; David Sillett, East of England Development Agency; Emily Ball, Business in the Community; and Huw McKee, United Utilities.

The Task Group would like to highlight the additional input of Tim Burns of WasteWatch and Brian Chambers, Phil Metcalfe and John Williams of ADAS in developing some of the aspects of this work stream.

### **Measuring Progress**

The Measuring Progress work stream was led by Richard Swannell of the Waste and Resources Action Programme (WRAP) with input from Nina Sweet and Claire Kneller from WRAP.

The Task Group would like to highlight the additional input of ADAS, the Association for Organics Recycling and the Renewable Energy Association in developing some of the aspects of this work stream.