

Department for Environment, Food and Rural Affairs

Anaerobic Digestion Strategy and Action Plan Annual Report 2014

February 2015

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Ministerial foreword

I am pleased to publish this third and final Annual Report to mark the significant progress industry and Government have made together since the Anaerobic Digestion Strategy and Action Plan was launched in June 2011.

Anaerobic digestion offers a local, environmentally sound option for waste management which helps us divert waste from landfill, reduce greenhouse gas emissions and produce renewable energy. It is the best environmental option currently available to deal with unavoidable farm and inedible food waste. The Anaerobic Digestion Strategy represented a commitment to increasing energy from waste through anaerobic digestion. The industry has grown rapidly since 2011, with markets building in the heat and power sectors. The number of anaerobic digestion plants has more than doubled. In the electricity sector alone, installed capacity from anaerobic digestion was nearly four times as much by late 2014 as when the Strategy was published in 2011.

With the support of the Waste Resource Action Programme (WRAP), Government and industry have also worked to build confidence in markets for digestate to demonstrate its quality, safety and usability, and to lay the foundation for sustainable, long term markets. We have developed innovative technologies to reduce the cost of anaerobic digestion. Over 130 plants have successfully achieved accreditation under the Feed in Tariff scheme. An encouraging pipeline of projects is working towards heat supply. This is all testament to the strength of the sector.

In the long term, we look to the industry to continue to develop long term sustainable growth. To maintain competitiveness, we want to see industry take opportunities to increase the value from anaerobic digestion and expand into new markets. We want industry to realise anaerobic digestion potential on farms and maximise use for feedstock of unavoidable wastes. Not least, we welcome industry's continued work on training and competence to address operational and environmental performance.

I am confident that the anaerobic digestion sector will continue to build on the substantial progress to-date and rise to the challenges ahead.

Dan Rogerson

Parliamentary Under Secretary of State for Water, Forestry, Rural Affairs and Resource Management

Summary

This third and final annual report on the Anaerobic Digestion Strategy and Action Plan 2011¹ underlines the collaborative progress made between Government and industry to develop and deliver on the Government's commitment to increase energy from waste, and the treatment of unpreventable food waste, through anaerobic digestion (AD) – and points to where work should continue over the next few years.

The 56 actions in the Strategy and Action Plan aimed to tackle barriers to the increased uptake of AD in England. Almost all of the actions are now complete.

Progress under the Action Plan was monitored by a Steering Group of industry members and Government Departments.

The eight major areas of work in the Action Plan were:-

- Improving our understanding of the Anaerobic Digestion (AD) landscape
- Building UK skills
- Building safe and secure markets for digestate
- Raising awareness of AD – Community AD and localism
- Building markets for biomethane and transport fuels
- AD in the rural community
- Finance
- Regulation

In 2014, the Steering Group was reframed to provide an ongoing role forum for Government and industry discussion of AD and waste. It has now been renamed as the AD Forum. Its membership and revised Terms of Reference are set out in Annex A.

¹ <https://www.gov.uk/government/publications/anaerobic-digestion-strategy-and-action-plan>

Highlights of the year

- By September 2014, the number of plants in the UK had risen to 140, up from the baseline of 68 established by the Strategy in September 2011. More than 200 additional AD projects had received planning permission.
- Installed capacity of electricity from AD was nearly four times as much by late 2014 as when the Strategy was published in 2011.
- Renewable energy generation from AD is increasing year on year. In the electricity sector alone, nearly 1.5TWh were generated in 2013. This indicates that the potential set out in the Strategy to achieve 3-5TWh by 2020 is within reach.
- The Feed in Tariff, Renewables Obligation and Renewable Heat Incentives generated a high number of applications and strong growth in the biomethane to grid market. 8 installations are registered under the Renewable Heat Incentive with more than 20 in the pipeline.
- The Safety Alert System run by the Renewable Energy Association (REA), and collation of details on incidents by the Anaerobic Digestion and Bioresources Association (ADBA), seek to improve industry's operating performance by disseminating details on environmental and safety-related incidents.
- New tools have been developed by the Waste and Resource Action Programme (WRAP) to help businesses procure and implement food waste collections.
- The Driving Innovation Programme supports projects to introduce new technologies and reduce costs. The DC-Agri Project implements field experiments on digestate use in agriculture and trials in non-agricultural sectors. The AD Loan Fund helps farmers assess the feasibility of and implement on-farm AD. (All run for Defra by WRAP.)
- The Feedstock Quality Package published by the REA seeks to reduce plastics and other contaminants in feedstocks for composting and dry AD. It may be feasible to adapt the Package for use with the liquid digestate generated by most AD plants.
- The "Voluntary Guidelines on Best Practice for Crop Feedstocks in Anaerobic Digestion" was published by ADBA to manage and mitigate environmental risk.
- A study on the use of waste and gaseous fuels in the transport sector was published by the Department for Transport.
- The Gas Vehicle Hub website was re-launched to support take-up of cleaner vehicle fuels and technologies to reduce harmful emissions.
- The Environment Agency's Biomethane Quality Protocol was published in January 2014 to remove biomethane use from waste regulatory controls.

Section 1 - Improving our understanding of the AD landscape

Where were we in 2011?

Improving our understanding of the AD landscape, and collecting and making widely available information on AD, were key components of the AD Strategy and Action Plan.

In June 2011, when the AD Strategy and Action was published, AD in the UK was an emerging industry. According to the baseline report established by the Strategy in September 2011, there were just 68 operational plants. AD was used extensively to treat sewage sludge, but only a small sector operated on-farm to treat manures. Very few plants treated food waste. Few local authorities collected food waste from households. Collection of food waste from food processing and manufacturing facilities was rare, and food waste from the hospitality sector was untapped.

Where are we now?

The AD industry has expanded significantly in all sectors since 2011. Growth has been driven by increased interest in resource and energy management, confidence in the security of financial incentives for renewable energy, and increasing investor confidence.

A Survey of the UK Anaerobic Digestion Industry (ASORI Report) in 2013² published data on actual throughput for the UK AD industry. In 2013, the AD sector grew to 117 plants processing over 2.55 million tonnes of feedstock materials. Operational sites increased by 34%, input by 55%, and employment by 36%, compared to the previous survey in 2012.

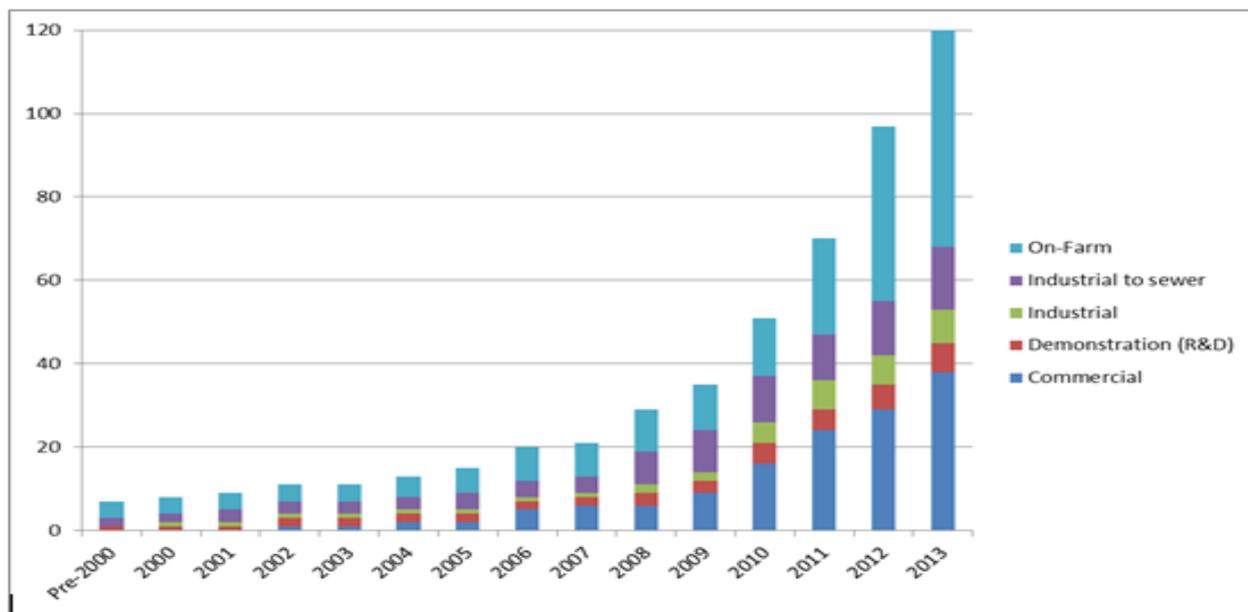
By the end of October 2014 there were 140 operational AD plants in the UK with a reported capacity of 9.9 million tonnes (including large industrial effluent type facilities). This capacity included approximately 2.3 million tonnes for the treatment of food waste from domestic and commercial sources³.

² WRAP's annual Survey of the UK Anaerobic Digestion Industry (ASORI Report) for 2013
<http://www.wrap.org.uk/content/survey-uk-anaerobic-digestion-industry-2013>

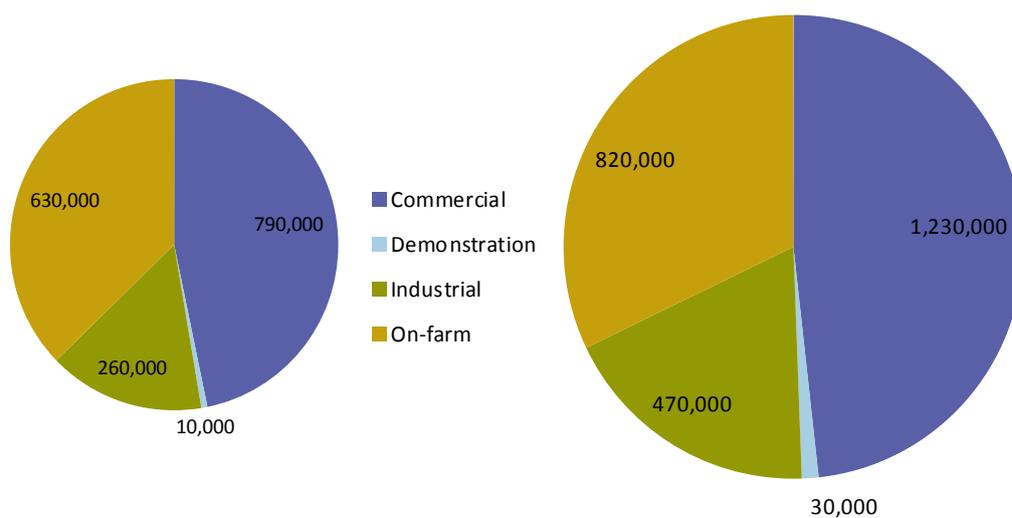
³ As the industry expands, different organisations now track and analyse its growth. WRAP continues to collect, collate and disseminate data on existing plant numbers and capacity, and disseminates these data to AD trade bodies and organisations such as the NNFCC. These bodies then undertake further analysis and data sourcing to add context to the baseline data. It is almost inevitable that there will be discrepancies in numbers used and reported by different organisations. The 9.9 million tonnes capacity figure is taken from the WRAP baseline database.

In the electricity sector, installed capacity from anaerobic digestion was nearly four times as much by late 2014 as when the Strategy was published in 2011. The Feed in Tariff, Renewables Obligation and Renewable Heat Incentives have generated a high number of applications and significantly increased gas to grid projects. The latest annual statistics shows that the generation from AD and sewage sludge digestion was nearly 1.5TWh in 2013⁴. This data indicates that the potential set out in the AD Strategy to achieve 3-5TWh by 2020 is within reach.

Year on year increases in the number of plants operating in the UK



Grossed estimates of UK AD sector input tonnages in 2012 and 2013 by type



⁴ : <https://www.gov.uk/government/collections/renewables-statistics>

Data on the size and type of plant in the AD industry are reported via WRAP's website⁵. These data are used by NNFCC⁶ and trade bodies such as ADBA to publish maps of the locations of all AD sites in the UK with some details of plant type, feedstock and capacity⁷. NNFCC continue to undertake detailed analysis of these and additional data on planned facilities, which can be used by industry and government. Copies of this detailed report can be purchased from NNFCC⁸.

Sites operational in the UK (September 2014):



⁵ <http://www.wrap.org.uk/content/operational-ad-sites>

⁶ NNFCC: The Bioeconomy Consultants – formerly known as the National Non-Food Crops Centre.

⁷ <http://www.biogas-info.co.uk/ad-map.html> and <http://adbioresources.org/about-ad/ad-map>

⁸ <http://www.nnfcc.co.uk/bioenergy/ad-deployment-report>.

The largest fraction of feedstock treated by AD is food waste. Significant quantities of other materials are also used⁹:

| Feedstock | 2012 (Tonnes) | 2013 (Tonnes) | % Increase |
|----------------------------|---------------|---------------|--------------|
| Purpose Grown Crops | 200,000 | 300,000 | 50% |
| Manures | 160,000 | 260,000 | 62.5% |
| Separated Solid Food | 390,000 | 830,000 | 112% |
| Liquids | 150,000 | 610,000 | 306% |
| Mixed Food and Green Waste | 10,000 | Not reported | Not reported |
| Other | 40,000 | 10,000 | -75% |

There has been an increase in all the types of feedstocks processed: separated solid food, liquids, manures and crops. Food and drink waste continues to constitute the largest proportion of material processed. Solid food accounted for 38% of feedstocks reported in 2013. Liquids materials showed the largest increase, the majority from commercial sources reflecting the increasing uptake of AD by food producers and processors. The use of agricultural materials such as purpose grown energy crops and manures also increased, but constituted a smaller proportion of total materials treated. The volume of material sourced from local authority collections increased by more than a third. These data are discussed in more detail in the ASORI Report¹⁰. Changes in the amounts and types of feedstocks treated reflect the changing landscape of the AD industry. The industry is growing strongly. Treatment of food waste from local authority and commercial sources is the most rapidly growing sector.

Best practice models and guidance on food waste collections, and implementation in the workplace, have been produced by WRAP¹¹. The Government expects businesses to follow the food waste hierarchy, and consider first whether food is suitable for redistribution to people or, if not, animal feed. WRAP has produced guiding principles with industry for redistributing surplus food¹². Where there is unavoidable waste, the best route is AD.

⁹ Changes here are due to increased accuracy in reporting by the survey

¹⁰ Feedstock type as % of total reported tonnages, UK 2012 v. 2013 (ASORI Report)

¹¹ <http://www.wrap.org.uk/content/food-waste-resources-portal>

¹²

[http://www.wrap.org.uk/sites/files/wrap/Our%20guiding%20principles%20for%20redistributing%20surplus%20of%20-%20v5%20\(2\).pdf](http://www.wrap.org.uk/sites/files/wrap/Our%20guiding%20principles%20for%20redistributing%20surplus%20of%20-%20v5%20(2).pdf)

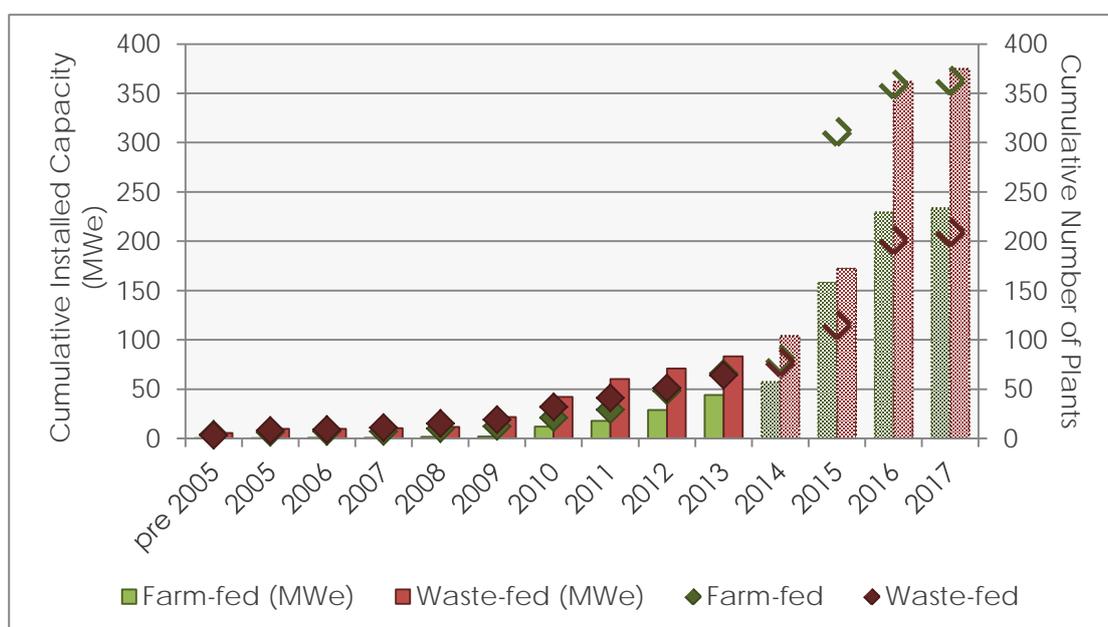
Forward look

Growth is likely to continue as long as confidence in the security of financial incentives for renewable energy, and investor confidence, remain stable.

Feedstock supply will remain a key issue. Changes in supply and demand for contracts and feedstock sources will deliver changing economic models. It is encouraging to see the recent expansion in plant numbers treating commercial food waste from food manufacture. Collection of separately collected food waste from both domestic and commercial sources will remain critical and will dictate the rate of expansion of the food waste treatment sector.

The industry is still in a very active growth phase. NNFCC analysis of current projects in planning stage shows that the sector as a whole has the potential to continue to increase for several years, and estimates maximum potential for a fourfold increase in capacity by 2017 (if all planned plants are commissioned and not considering feedstock constraints).

Estimated potential for increase in AD¹³:



Section 2 – Building UK skills

Where were we 2011?

The Strategy recognised the importance of skills and training to support the growth of AD, and investor confidence in operator competence, environmental performance, health and safety management, and compliance with environmental permitting requirements.

¹³ Source: NNFCC (2014) AD Deployment in the UK (Copyright: NNFCC, 2014).

Where are we now?

Operators of permitted AD facilities must demonstrate they are technically competent through one of two Defra-approved schemes. One is operated jointly by the Waste Management Industry Training & Advisory Board (WAMITAB) and the Chartered Institution of Wastes Management (CIWM). The other is managed jointly by Energy and Utility Sector Skills Council (EU Skills) and the Environmental Services Association (ESA).

Competent managers must maintain technical competence by updating their skills and knowledge, and passing a regular assessment, to prove they understand changes affecting the waste industry. Competent managers are tested every two years and the competence management system is audited every year.

Since 2011, EU Skills has developed and published National Occupational Standards (NOSs) for the AD sector. Using NOSs, ADBA and the CIWM have developed a Skills Matrix comprising 22 training standards to identify training needs, including the most recent, EUSAD01, on maintaining site biosecurity and personal hygiene on AD plants¹⁴.

A Level 2 Diploma for AD operatives has been developed by the Waste Management Industry Training and Advisory Board (WAMITAB), in conjunction with EU Skills, based on the NOS qualification structure and the Skills Matrix.

However, the number of serious or potentially serious pollution incidents at AD plants remains a serious concern. EA data show that the biowaste treatment sector, particularly AD, had proportionately more serious and significant pollution incidents than the other waste treatment sectors regulated by the EA. Recorded incidents increased from 0 in 2010 to 21 for every 100 permits in 2012. Compliance with environmental permits for biowaste treatment over the same period was the poorest in the waste sector. The latest data (2013) showed biowaste treatment permit compliance was still the poorest of the waste sectors; AD permit compliance was only marginally better than composting. These incidents and poor compliance issues are preventable. While they continue to occur, they undermine public and investor confidence in the AD industry and hinder its growth.

In consultation with the biowaste treatment sector, the EA has produced draft guidance on environmental operating standards for both AD and composting to address these issues. The REA and ADBA collaborate on Safety Alerts to improve industry performance through dissemination of details on environmental and safety-related incidents and near-misses. The REA Safety Alert System was launched in 2014. ADBA collates details on incidents.

¹⁴ http://www.ciwm.co.uk/CIWM/InformationCentre/AtoZ/APages/AD_TrainingandSkills_Matrix.aspx
<http://adbioresources.org/wp-content/uploads/2012/08/ADBA-Competency-Skills-Matrix.pdf>

The Waste Industry Safety and Health Forum (WISH) has also published a pocket guide to help businesses identify minimum legal requirements on health and safety.¹⁵

The REA and ADBA also participate in a stakeholder group to improve sector competence. This group is producing core minimum training for all operators, a draft syllabus, and a framework to establish “on the job” training at all AD plants in the UK, to steer trainers to develop courses in line with core requirements and establish on-site training venues.

These initiatives recognise the necessity for the AD sector to improve its environmental and operational compliance.

Forward look

It is important that the AD industry works to improve its environmental and operational performance and compliance. It is therefore pleasing that industry recognises the importance of training and competence to address operational problems and environmental incidents and continues to work actively to address these areas.

It is also encouraging that operators and representative organisations, such as ADBA and the REA, are developing minimum core training requirements for all AD plants. Industry needs to continue work to share best practice and develop sound management systems to improve its performance record.

Section 3 - Building safe and secure markets for digestate

Where were we in 2011?

In 2011 digestate from AD plants was a relatively new material. Little digestate was produced or used, particularly from waste-fed facilities. The fertiliser value (or potential) of waste-derived digestate and its potential environmental impact was little understood.

The Strategy sought to build confidence in existing markets for digestates: to address concerns, develop new uses and markets, demonstrate quality, safety and usability, and build sustainable long term outlets.

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https://networks.euskills.co.uk/sites/default/files/uploads/Agrivert%20WISH%20A6%20Pocket%20Guide%20HR_1.1.pdf

Where are we now?

Over a million tonnes of digestate was applied to agricultural land in 2012-13. That is 90% of total digestate produced and clearly demonstrates the benefits of readily available nutrients, as well as reducing reliance on inorganic fertilisers.

The Digestate and Compost in Agriculture Project (DC-Agri Project), run for Defra and other partners by WRAP, is a four year research project looking at the use of quality anaerobic digestate (biofertiliser) and compost in agriculture¹⁶. The Project has delivered a series of scientific field experiments to help farmers maximise digestate potential to grow quality crops while protecting soils, and integrate digestate into nutrient planning. Experimental sites have shown that compost and digestate perform well alongside livestock manures and provide a nutrient boost which increases crop yields. All organic material out-performed “fertiliser only” treatments. The integrated knowledge exchange programme disseminates project results to thousands of farmers, advisers and students.

Good practice guidance for digestate use in agriculture, including a Renewable Fertiliser Matrix, has been developed by WRAP to outline how digestate should be used where livestock are grazed or crops are grown for human consumption.

Uptake of the EA’s Quality Protocol for Anaerobic Digestate, first published in September 2009 and revised in March 2014, grew from a single plant in 2011 to 17 plants in 2014. Another 20 plants have uptake in the pipeline. The Quality Protocol sets out end of waste criteria for the production and use of quality outputs from AD of source-segregated biodegradable waste. To be Quality Protocol compliant, operators must be certified against the Biofertiliser Certification Scheme managed by the EA in England and Scottish Environment Protection Association rules in Scotland¹⁷.

Subject to further treatment, the application of digestate for non-agricultural use has been shown to be feasible. Digestate can be successfully used as a sports / amenity turf fertiliser, in hydroponic cropping systems and as a component of growing media.

However, the physical quality of digestate is vital to secure a sustainable agricultural digestate market. Plastics in digestate resulting from inappropriate feedstocks (for example, contaminated with plastics), or inadequate de-packaging or subsequent screening, present a particular problem. In Scotland, one incident of plastics contamination has resulted in a demand from one quality assurance scheme for much higher quality than is specified under the BSI PAS110 certification scheme. To address contamination, the REA published in December 2014 a Feedstock Quality Package, a best practice guide to reduce plastics and other physical contaminants (plastics, glass, etc). The Package is designed for use with feedstocks for composting and dry

¹⁶ <http://www.wrap.org.uk/content/digestate-compost-agriculture>

¹⁷ <https://www.gov.uk/government/publications/quality-protocol-anaerobic-digestate>

digestion. The REA is working with industry to assess the feasibility of adapting the Package for use with the liquid digestate generated by the majority of AD plants in the UK, and other actions to improve quality of feedstock. WRAP is coordinating an industry-wide initiative to improve quality elsewhere in the supply chain.”

In addition, the DC Agri Project has shown that most readily available nitrogen in digestate can be lost to atmosphere as ammonia unless digestate is applied at the right time of year and in the right way: when there is maximum crop demand for the applied nutrients. AD operators need adequate, properly covered storage capacity to minimise ammonia losses.

Forward look

Despite growing recognition of digestate as a fertiliser, the market is still generally of low economic value to AD operators unless they can enhance its nutrient value. Recent research by WRAP has uncovered digestate management options that could produce high value products or even feedstocks for high value chemical engineering chains. This area needs further exploration. Further research to determine the long-term effects of digestate to improve its marketability was a recommendation of the Environment, Food and Rural Affairs Select Committee in its report on Waste Management in England¹⁸. The Government agreed with this recommendation in its Response¹⁹.

It will be necessary to build on the work started by the REA and WRAP to reduce contamination of digestate to improve its physical quality.

With gate fees reducing at the front end and costs associated with digestate at the back end, operators are challenged to maximise value from outputs and provide inputs. This means that AD plants in the future may need to co-locate with other enterprises to maximise value from outputs and provide inputs. Very few examples of “biorefinery” approaches have yet been implemented in the UK.

The potential for non-agricultural uses for digestate needs to be explored further.

¹⁸ <http://www.parliament.uk/business/committees/committees-a-z/commons-select/environment-food-and-rural-affairs-committee/>

¹⁹ <http://www.publications.parliament.uk/pa/cm201415/cmselect/cmenvfru/921/92102.htm>

Section 4 - Raising awareness of AD - community AD and localism

Where were we in 2011?

The AD Strategy recognised the need to raise awareness of AD as a flexible technology with benefits to local communities, particularly for generating renewable energy and managing unavoidable waste. It sought to highlight a range of working models representing the flexible nature of AD technology.

Where are we now?

The Government's Community Energy Strategy, launched in January 2014, strives to power up to 1 million homes on electricity generated by community projects by 2020²⁰.

Under this Strategy the £15 million Rural Community Energy Fund (RCEF) and £10 million Urban Community Energy Fund (UCEF) offer grants and loans to kick start community energy generation. Grants of up to approximately £20,000 are available for the more speculative, early stages of project development such as feasibility reports and public consultation. Loans of up to approximately £130,000 are available for detailed business planning and planning applications to attract investment.

In addition, funding is available for a "One Stop Shop" information resource for community energy and partners. A £1 million fund for the Big Energy Saving Network supports third sector and community groups which deliver outreach to vulnerable customers to reduce energy costs. This initiative also seeks to overcome barriers to community energy.

The £80 million Green Deal Communities Scheme encourages partnerships between community groups and local authorities to improve local energy efficiency.

Finally, the Energy Bill proposes to increase the maximum threshold for the Feed In Tariff from 5MW to 10MW for community renewable projects.

The Driving Innovation in AD Fund managed for Defra by WRAP supports the introduction of new technologies to reduce the cost of AD and improve efficiency. This Programme has shown technologies with significant benefits which can be brought to market. One example is Evergreen Gas's containerised technology for small-scale upgrading of biogas for vehicle fuel.

Alongside these initiatives to facilitate loans and drive innovation NNFCC worked with other stakeholders to develop case studies of all types of AD²¹.

²⁰ <https://www.gov.uk/government/publications/community-energy-strategy>

Forward look

Driving innovation has shown that there is substantial potential for further innovation at community scale to reduce costs and provide demonstrable benefits for local communities.

A £200 million Innovation Fund for low carbon technologies, provided by the Department for Energy and Climate Change for 2011-2015, has included successful applications from AD developers, which has contributed to the development of the AD sector as a whole²².

Section 5 - Building markets for biomethane for transport fuels

Where were we in 2011?

Vehicles fuelled with biomethane can provide an alternative to diesel in reducing road transport emissions - greenhouse gases and emissions affecting air quality and health.

In 2011, the use of biomethane powered vehicles – whilst widespread globally – was relatively low in the UK and little refuelling infrastructure existed. The AD Strategy recognised the considerable potential for the gas to be used as transport fuel, particularly for road haulage where there is no other viable alternative to diesel, and to be injected directly into the national gas grid.

Where are we now?

In 2012 a £11m competition for demonstration funding and subsequent trial was launched for low carbon trucks and their infrastructure to encourage and assist road haulage operators to buy and use low carbon medium and heavy goods vehicles.

The competition and subsequent trial are being run by Innovate UK²³ which supports the development of innovative technologies and products. The £11m funding was provided jointly by Innovate UK and the Office for Low Emission Vehicles (OLEV) which works across Government to support the early market for ultra-low emission vehicles (ULEV). The evaluation project is being funded by the Department for Transport. This initiative has resulted in over 250 vehicles now operating, most using gas including some biomethane, and around 20 refuelling stations open.

²¹ <http://www.biogas-info.co.uk/ad-case-studies.html>

²² <https://www.gov.uk/innovation-funding-for-low-carbon-technologies-opportunities-for-bidders>

²³ Previously the Technology Strategy Board (TSB)

The Government's 2014 HGV Methane Recommendations – which include biomethane - seek to overcome long term barriers to the greater use of gas as a transport fuel for HGVs.

There are now 119 gas-powered buses on the roads in 6 regions, and more planned. This initiative is helping to establish biomethane as an alternative fuel to diesel.

In addition, a programme of research and analysis has been initiated by the Government on a range of gaseous fuels to determine their feasibility in contributing to the UK's targets on renewable energy²⁴ and greenhouse gas emissions²⁵.

In July 2014 a detailed study into the use of waste and gaseous fuels in the transport sector was published. It included analysis of the performance, greenhouse gas emissions and cost-effectiveness of compressed and liquefied natural (fossil) gas (CNG and LNG), as well as their biological equivalents, compared to conventional fossil fuels. Whilst compressed and liquefied natural gases were shown to offer some CO₂ savings in certain applications when compared to petrol or diesel, biomethane emerged as offering significant greenhouse gas reduction potential compared to fossil gas or petrol / diesel. The potential savings already identified will be further verified by more testing on the greenhouse gas emissions of methane / biomethane use in roads goods transport. This testing is currently under way through the Low Carbon Truck and Infrastructure Trials²⁶.

The growth of the gas vehicle sector is supported by the Gas Vehicle Hub website²⁷. The Hub provides information on the location of refuelling infrastructure and gas-powered fleets, case studies and details of gas vehicles available in the UK, and information on the Government's ongoing Low Carbon Truck and Infrastructure demonstration trial.

Informed debate on barriers to commercial development of biomethane projects in the energy market and development of evidence and analysis have been facilitated by Ofgem's Energy Markets for Biomethane (EMIB) review group. This was launched to support the AD Strategy and related policy instruments.²⁸

²⁴ The Renewable Energy Directive requires Member States to source a percentage of their overall energy from renewable sources by 2020 (for the UK this percentage is 15%, with a sub-target of 10% of overall transport energy).

²⁵ The UK Climate Change Act requires the UK to reduce domestic greenhouse gas emissions by at least 80% by 2050 based on 1990 levels. The UK has set the first four carbon budgets in law and committed to halving domestic greenhouse gas emissions relative to 1990 levels during the fourth carbon budget period (2023-2027). In addition to the Renewable Energy Directive and UK Climate Change Act, the Fuel Quality Directive requires 6% greenhouse gas savings across all road transport fuels and non-road mobile machinery by 2020).

²⁶ <https://www.gov.uk/government/publications/waste-and-gaseous-fuels-in-transport-final-report>

²⁷ <http://www.gasvehiclehub.org>

²⁸ <http://www.gasgovernance.co.uk/sites/default/files/EMIB%20Report%20V1.0.pdf>

Overcoming barriers and facilitating debate has been an important step to develop the renewable natural gas market, promote sustainable development and protect consumers' interests. The Group has identified the potential to more than halve entry costs in the short term with further gains possible in the longer term. This work is now being taken forward by a biomethane campaign group established by ADBA and Energy Networks Association, including gas distribution networks, the REA and other stakeholders.

In addition, the EA has developed a Quality Protocol on biomethane, "Biomethane from waste: End of waste criteria for the production and use of biomethane from landfill gas and anaerobic digestion (AD) biogases". This Protocol sets out end of waste criteria for the production and use of biomethane arising from the degradation of organic wastes in a landfill site or AD plant, for injection into the gas grid, or use in appliances suitably designed and operated for natural gas. If these criteria are met biomethane will normally be regarded as having been fully recovered and to have ceased to be waste. This Quality Protocol will be used by businesses and industry without the need for waste controls²⁹.

Forward look

The Government is undertaking further research on the supply and availability of biomethane for UK road transport to 2020–2030; potential supply from landfill gas; and the impact of different incentive mechanisms.

Section 6 - AD in the rural community

Where were we in 2011?

The AD Strategy recognised the potential for small-scale on-farm AD (<250kW) dealing with feedstocks generated on-farm. This cycle contributes to the circular economy, maximising value from resources and recovering products and materials. Government support for AD is as a technology to generate renewable energy and process unavoidable food waste. The Strategy also recognised the need to examine the impact of purpose-grown crops and their impact on food security, land use change, farming competitiveness and wider environmental impacts such as diffuse pollution or habitat loss.

²⁹ <https://www.gov.uk/government/publications/quality-protocol-biomethane-from-waste>

Where are we now?

Support for farmers to decide if AD is right for them is available through grants for business cases through the £10 million AD Loan Fund, run for Defra by WRAP.

Significant success has been achieved so far. The Fund is currently supporting 41 farm-based projects which have generated 22 feasibility studies, and 5 business plans. These will be published in due course and more will follow.

In addition the Driving Innovation in AD Fund (see Section 4) supports the introduction of new technologies that reduce the cost of AD and improve efficiency. One example is the Agri-Digestore, an engineering solution to support the establishment of on-farm AD. Slurry and waste storage is integrated (and can be retrofitted). Host farm benefits include minimising fugitive emissions, easy construction and operation, relatively low cost, and maximisation of nutrient cycle whilst delivering some heat and power.

However, of concern is the use of purpose-grown maize to feed AD. It now accounts for 17% of the total maize area in England. This crop has grown rapidly since 2012, though it still constitutes only 0.5% of total arable area in England for maize and non-maize crops. It is causing local environmental concerns in some areas where best practice is not followed. We are aware of some concerns that the maize may lead to increases in land rental prices where the presence of an AD plant stimulates market competition.

Defra worked collaboratively with industry members including ADBA, the Country Land and Business Association (CLA), National Farmers Union (NFU), NNFCC, and the REA on the “Voluntary Guidelines on Best Practice for Crop Feedstocks in Anaerobic Digestion” (published by ADBA in September 2014) to mitigate environmental risk from these crops³⁰.

The Government has commissioned a project to analyse the economic impact of maize use in AD on land rental prices and the environment. It will improve understanding of the dominant causal factors driving agricultural land rental prices and test the hypothesis that bioenergy cropping for AD is driving local increases in land rental prices. The likely impact of changing land rental prices on food production, nationally and in the locality of AD plants, will be projected and the environmental footprint of maize production quantified.

Forward look

The Government will be working with industry to monitor the effectiveness of the “Voluntary Guidelines on Best Practice for Crop Feedstocks in Anaerobic Digestion”.

³⁰ <http://adbioresources.org/library/crop-best-practice-document>

In addition the Renewable Heat Incentive sustainability rules (which take effect in autumn 2015) encourage the use of crop residues and waste as a feedstock for AD, and deter the use of feedstock and practices which are less environmentally sound.

Section 7 - Finance

Where were we in 2011?

In 2011 AD did not fit into existing financial products such as project finance or engineering procurement and construction contracts. AD projects were too big for retail banks and too small for corporate investment. Feedstock supply was insecure. Consequently, due diligence was expensive and only limited debt financing was available.

However, investment opportunities were underpinned by: incentives to generate electricity, heat and transport fuel from biogas; research and market development for digestate products; support for innovation; and the Green Investment Bank.

Where are we now?

The growth in AD shows that money is available for new AD capacity where a project can meet the requirements of potential funders. The Green Investment Bank continues to make equity investments in new AD facilities. The £10m AD Loan Fund managed by WRAP (see Section 4) has been used to finance the development of 2 large scale food waste treatment plants. A third is expected to complete the loan application process in Quarter 1 of 2015. In 2013, the remit of the fund was expanded to include the provision of funds for farm scale (<250kW) AD plants. To date this farm scale AD fund has been used to deliver 21 farm feasibility studies and 5 full business cases.

However, whilst growth indicates that there is no longer a true market failure in the sector, AD is still an immature industry. As more plants come on-stream, some banks are active in the AD financing market. Their degree of involvement in AD depends on confidence in and knowledge of the technology.

Due diligence templates have been produced by WRAP and ADBA to simplify and reduce the time and cost of obtaining finance. ADBA has consolidated a list of financial schemes to provide clear guidance for funders entering the sector. Both ADBA and the REA have set up Finance Forums. ADBA's Forum meets twice yearly and supports interaction between different funders. The REA's Forum meets quarterly and supports improved access to affordable finance and accelerated deployment of renewable technologies.

The Government's Feed in Tariff Scheme has resulted in over 130 plants securing accreditation, supporting nearly 90MW installed electricity generation capacity. Successful accreditation rose by 46% in 2014 alone, due to the very high rate of pre-accredited plants

that successfully commissioned within the accreditation validity period. The biomethane to grid market is also growing strongly, with 8 installations registered under the Renewable Heat Incentive and more than 20 in the pipeline. These plants will receive over £100 million a year in Renewable Heat Incentive payments and are expected to generate 1.5 TWh of renewable heat per year, a significant contribution to our Renewable Energy Directive targets. The Government Response on the Biomethane Tariff Review was published in December 2014³¹.

Forward look

The Government's long term aim is to remove subsidies for the energy sector and for renewable energy projects to operate on a level playing field with other sources of low carbon energy. The Government encourages developers to take opportunities to increase the value of AD and expand into new markets; and to reduce costs through innovation, efficiencies, and diversification of income and energy production to digestate and heat and transport fuels.

The 2015 Review of the Feed in Tariff in summer 2015 will need to address the challenges of budget management and consider scheme improvements. The Government recognises the importance of the Feed in Tariff to those deploying AD in the electricity sector and will consider the views of the AD industry in the course of the review.

Section 8 - Regulation

Where were we in 2011?

The AD Strategy recognised that significant steps were needed to ensure proportionate and risk-based regulation to support industry growth whilst protecting human health and the environment, and help developers improve their understanding of regulatory process.

Where are we now?

The Biowaste Regulatory Forum, led by the EA, monitors regulatory issues across the biowaste sector. It brings together representatives of the AD and composting sectors to consider biowaste sector performance, and make recommendations to improve regulation, maximise the benefits of biowastes and minimise impacts on the environment.

As a result of Regulatory Forum activity the EA and Forum members are working with industry to monitor AD pollution incidents to help industry improve its poor environmental

³¹ <https://www.gov.uk/government/consultations/rhi-biomethane-injection-to-grid-tariff-review>

performance. The EA takes enforcement action where necessary and seeks to support industry in learning lessons to improve future performance.

The EA has revised its standard rules permits for AD (which now cover most AD plants) and extended the range of feedstocks and scale of activities allowed. The application process for standard rules permits is simpler and cheaper than for bespoke permits. These are only required for sites which are very large, complex, or in or close to sensitive locations where additional risk assessments and control measures may be necessary.

The EA's briefing note on crop residues used as AD feedstocks clarifies whether particular crop residue feedstocks are waste or not, and hence whether plants and the digestate produced are regulated by the EA or not. AD plants with feedstock consisting of or containing waste, and use of digestate classified as waste, require an environmental permit or a relevant exemption. Plants taking only non-waste feedstocks do not. This clarification from the EA has led to an increase in the range of AD plants which do not require an environmental permit³². This change in environmental regulation was underpinned by WRAP research on the effectiveness of AD in killing pathogens and weed seeds³³, which provided the basis for evidence-based change.

The EA has also developed new processes for assessing the suitability of new waste types for AD. Operators are now more readily able to assess "new" or "novel" feedstocks to ensure feedstocks will not harm the AD process and digestates will not harm the land.

In addition EA Regulatory Position Statements effectively reduce the full requirements of the Environmental Permitting Regulations by applying a proportionate response to certain low risk activities such as the burning of biogas collected from covered slurry stores.

Finally the Government introduced Permitted Development Rights for on-farm AD plants using feedstocks generated on that farm and falling below a specified size. This step removed requirements for obtaining planning permission.

Forward look

The Government continues to engage to reduce legislative burdens. The Government is considering whether environmental permitting should be extended to AD plants that do not process waste feedstocks. The initial assessment is that the environmental risks of AD plants are similar irrespective of feedstock and regulation and management of risk should be implemented in a consistent and proportionate way. The Government is making plans

³² http://www.r-e-a.net/images/upload/news_270_140910_EA_Briefing_note_-_crop_residues_used_as_feedstocks_in_AD_plants.pdf

³³ <http://www.wrap.org.uk/sites/files/wrap/LitReviewPlantPathogensNematodes.pdf>

to look at the relative risks further and the costs and benefits of different approaches including non-regulatory ones.

The Government is following European Commission proposals on a proposed replacement to Fertiliser Regulation EC 2003/2003. The new Regulation would bring organic fertilisers within scope, and could over-ride domestic end of waste criteria. Such changes could disrupt UK composting and AD markets. The Government would need to look at full impact and economic assessments in the UK context before formulating the UK's position.

As the AD industry expands it faces new regulatory challenges. These challenges are to be expected as the regulatory framework evolves in a changing industrial landscape. The Government continues to engage where appropriate, and monitor implications for industry, with the aim of ensuring that initiatives deliver benefits rather than raise new barriers.

Appendix A- AD forum - terms of reference

Objective

- To provide a forum for horizon scanning and consideration of strategic issues on Anaerobic Digestion that require Government and industry discussion. To support the continued growth of the AD industry and its role in the management of organic waste.

NB Regulatory issues will continue to be discussed at the Bio-waste Regulatory Forum led by the Environmental Agency.

Role

- To horizon scan and raise issues that require cross Government and industry discussion.
- To discuss and respond to strategic matters relating to the continued delivery of the AD Strategy and Action Plan and the growth of the AD industry for waste treatment.
- To monitor the development of the AD industry.

Meeting frequency

- Anticipated frequency is no more than twice a year subject to demand, with email updates in between as necessary.

Membership

Membership will reflect the main industry stakeholders, Government Departments and delivery bodies with an interest in Anaerobic Digestion. This will include one representative each from the organisations listed below. Other organisations with a strong interest in AD may be invited to attend.

Royal Agricultural Society of England; Renewable Energy Association; Anaerobic Digestion and Bioresources Association; Water UK; Environmental Services Association; Country Land and Business Association; National Farmers Union; National Grid; Department for Environment, Food and Rural Affairs; Department for Business, Innovation and Skills; Department for Transport; Department of Energy and Climate Change; Department for Communities and Local Government; Environment Agency; National Non Food Crops Centre; WRAP; Chartered Institution of Wastes Management; EU Skills; Low Carbon Vehicle Partnership; National Energy Foundation.

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