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Anaerobic Digestion Deployment in the United Kingdom

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12th March

Rushlights BioBriefing



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Overview

- NNFCC company background
- Anaerobic digestion (AD) introduction
- Incentives for AD
- UK AD deployment





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NNFCC – Who are we?

- Bio-economy consultancy based in York, originally established as a National Centre
- Expertise on the conversion of biomass to bioenergy, biofuels and biobased products





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The Bioeconomy Consultants

NNFCC – Who are we?

- Bio-economy consultancy based in York, originally established as a National Centre
- Expertise on the conversion of biomass to bioenergy, biofuels and biobased products
- Interests in AD:
 - » Involved in the development and delivery of the UK AD strategy and Action plan (2011)
 - » Maintain the Official AD Portal on behalf of Defra
 - » Soon to publish “Anaerobic digestion deployment in the United Kingdom” report

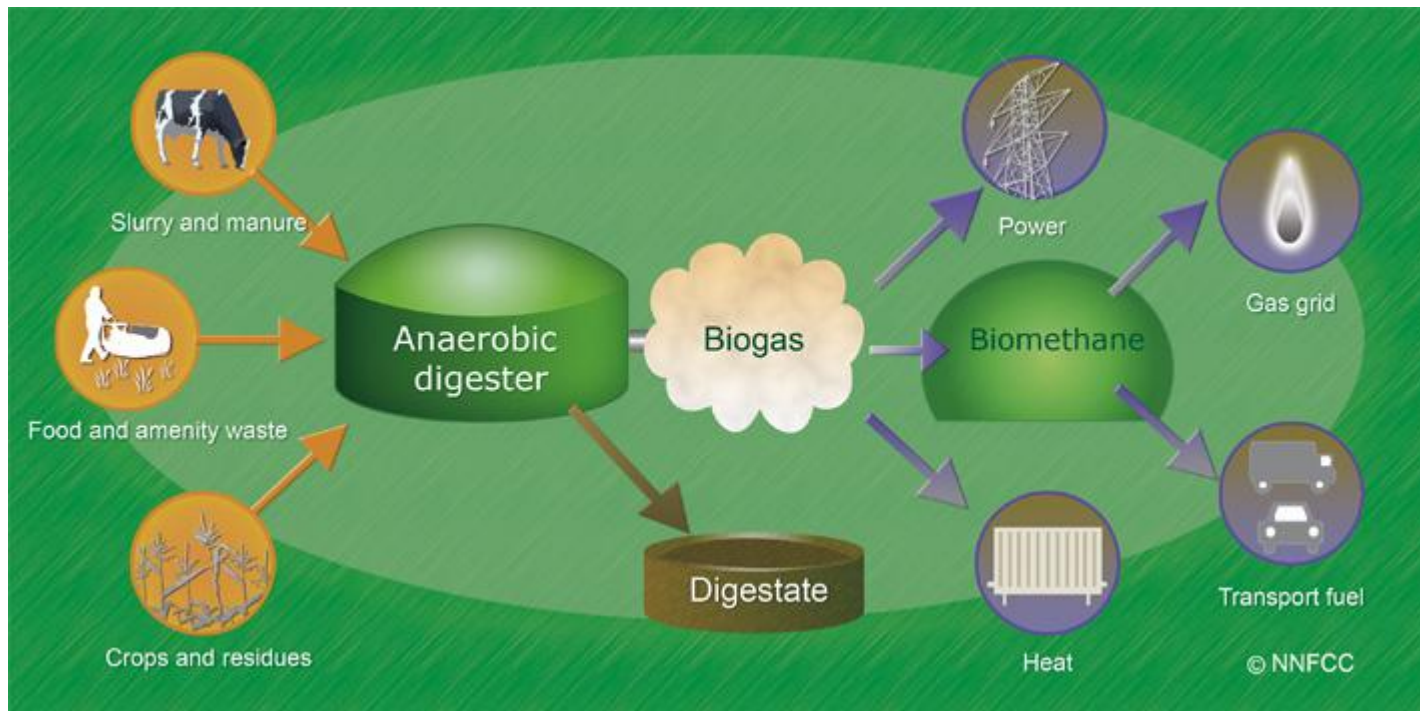




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Anaerobic Digestion Process





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AD Incentives (GB)

- Feed-in Tariffs
 - » Fixed tariff for electricity generated and exported
 - » Separate tariffs for small, medium and large scale





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- Feed-in Tariffs
 - » Fixed tariff for electricity generated and exported
 - » Separate tariffs for small, medium and large scale
- Renewables Obligation
 - » 2 ROCs received per MWh electricity generated
 - » ROCs tradable





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AD Incentives (GB)

- Feed-in Tariffs
 - » Fixed tariff for electricity generated and exported
 - » Separate tariffs for small, medium and large scale
- Renewables Obligation
 - » 2 ROCs received per MWh electricity generated
 - » ROCs tradable
- Renewable Heat Incentive
 - » Fixed tariff for usable heat generated
 - » Biomethane injection and small scale combustion currently supported
 - » Medium and large scale combustion supported from April 2014





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AD Incentives (NI)

- Northern Ireland Renewables Obligation
 - » 4 nROCs received for small and medium scale
 - » 3 nROCS received for large scale





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AD Deployment in the UK

March 2014



Anaerobic digestion deployment in the United Kingdom





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AD Deployment in the UK

Definitions

Plant scale

- **Small scale** refers to installations with an installed capacity of 250kWe and below.
- **Medium scale** refers to installations with an installed capacity of above 250kWe to 500kWe.
- **Large scale** refers to installations with an installed capacity of above 500kWe.





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AD Deployment in the UK

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Plant type

- **Waste-fed** refers to installations where the contribution of municipal (e.g. food waste; green waste), commercial (e.g. food waste) and industrial wastes (e.g. brewery waste; animal processing wastes) towards the total feedstock requirement is greater than 50%.
- **Farm-fed** refers to installations where the contribution of farm-based feedstocks (e.g. manure; slurry; energy crops; crop wastes) towards the total feedstock requirement is greater than 50%.



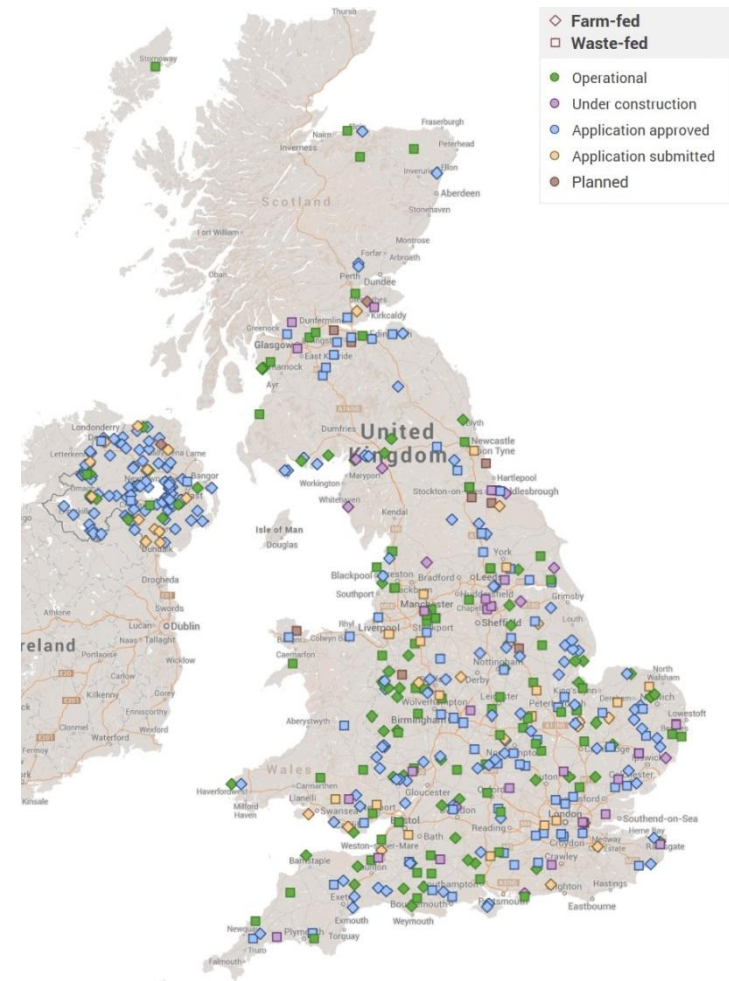


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AD Deployment in the UK

- 138 operational plants
 - 65 farm-fed (42 MWe)
 - 73 waste-fed (86 MWe)



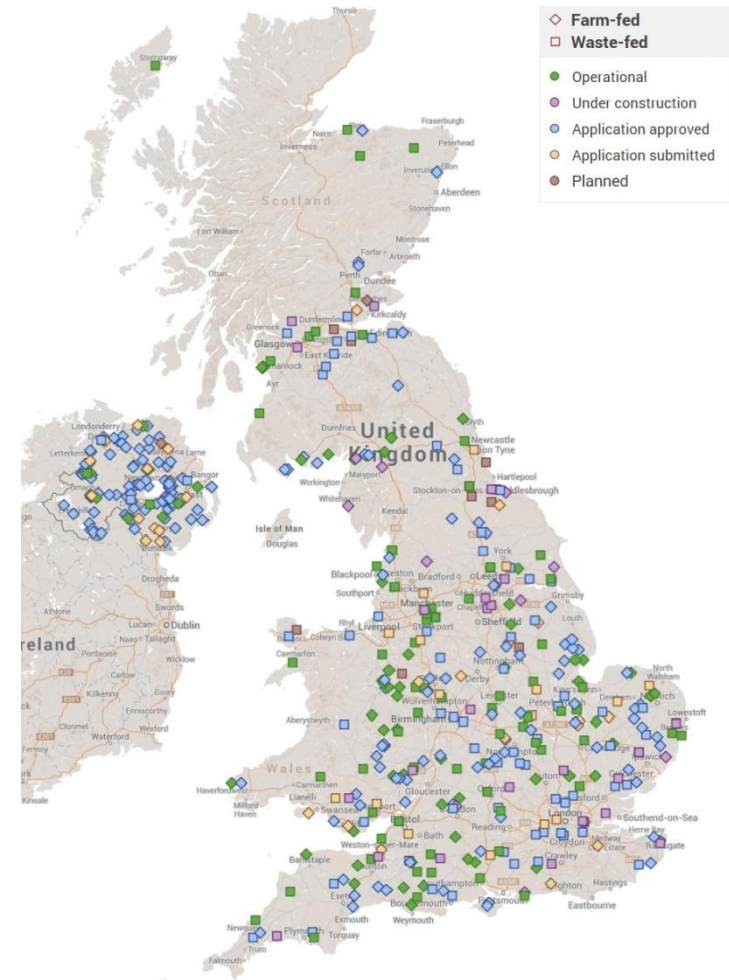


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AD Deployment in the UK

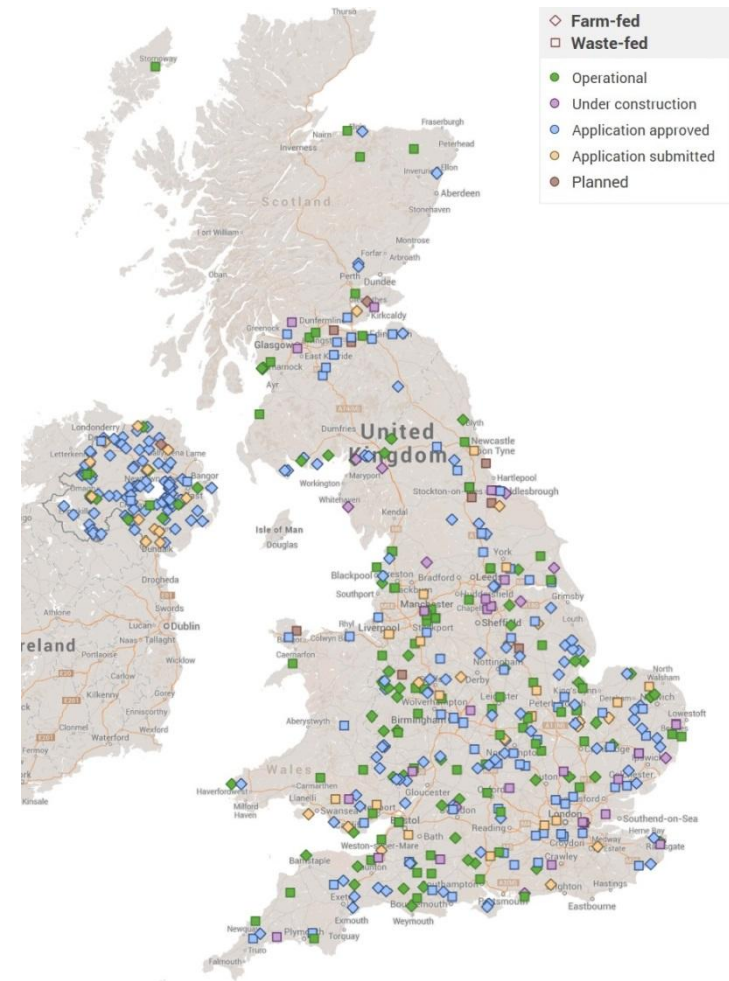
- 138 operational plants
 - 65 farm-fed (42 MWe)
 - 73 waste-fed (86 MWe)
- 342 plants under development
 - 213 farm-fed (130 MWe)
 - 129 waste-fed (249 MWe)





AD Deployment in the UK

- 138 operational plants
 - 65 farm-fed (42 MWe)
 - 73 waste-fed (86 MWe)
- 342 plants under development
 - 213 farm-fed (130 MWe)
 - 129 waste-fed (249 MWe)
- 15 biomethane-to-grid (BtG) projects
 - 5 operational plants
 - 10 plants under development





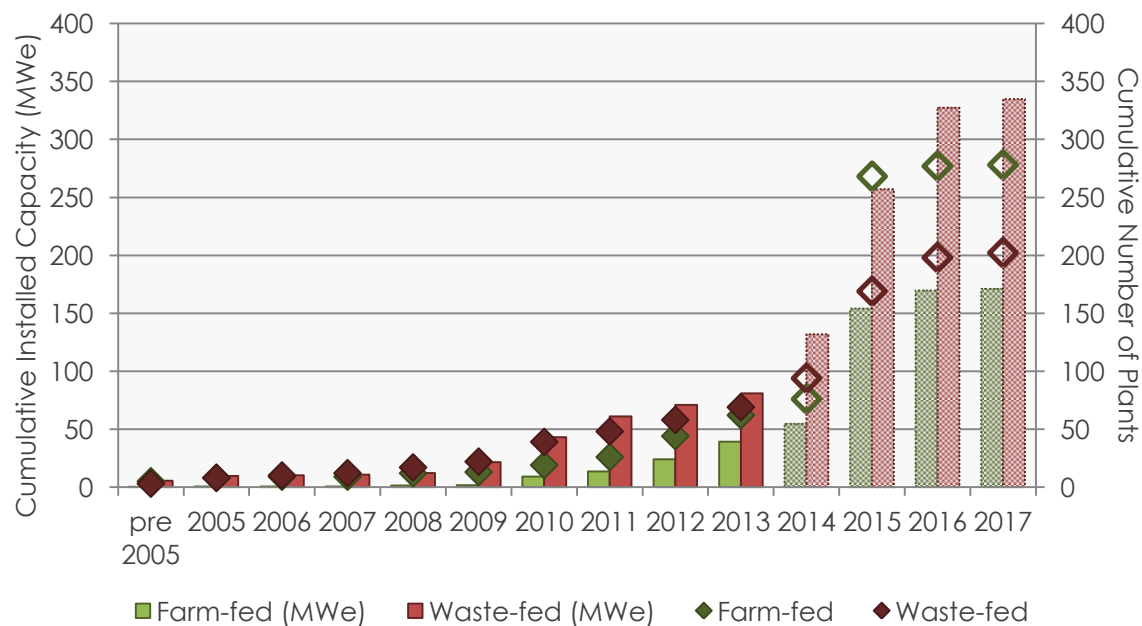
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AD Deployment in the UK

Future Deployment

- If all plants under development completed capacity would quadruple by 2017
- However, only around 30-50% of plants in pipeline expected to complete
- Feed-in Tariff degeneration to small and medium scale plants could restrict deployment even further

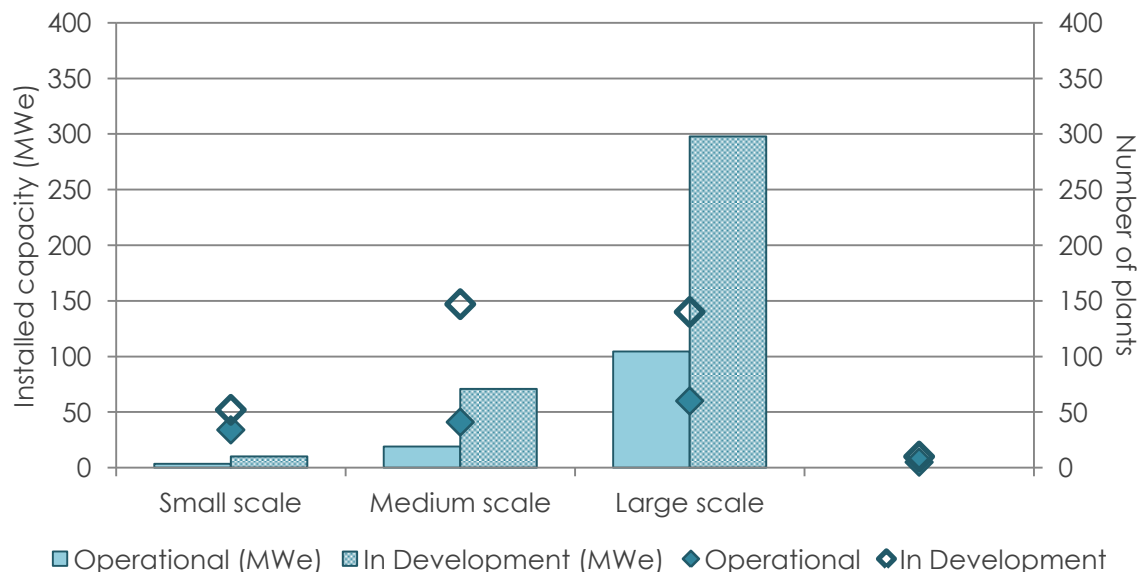




AD Deployment in the UK

Deployment by scale

- Large scale plants dominate in terms of capacity, while numbers similar to medium scale
- Deployment of small scale and BtG at low level
- Feed-in Tariff degression can be expected to distort the balance of plant scales even further





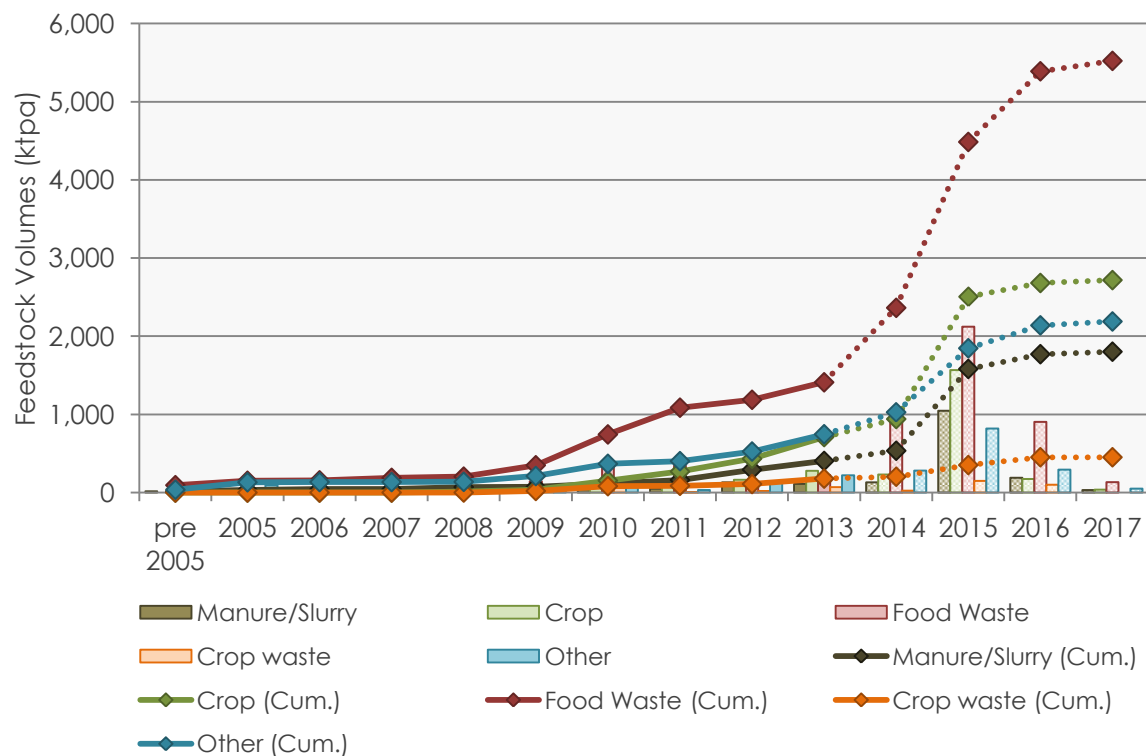
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AD Deployment in the UK

Currently required feedstock volumes

- 1,450,000 tpa food waste
- 750,000 tpa energy crops
- 700,000 tpa other waste
- 450,000 tpa manure/slurry
- 200,000 tpa crop waste





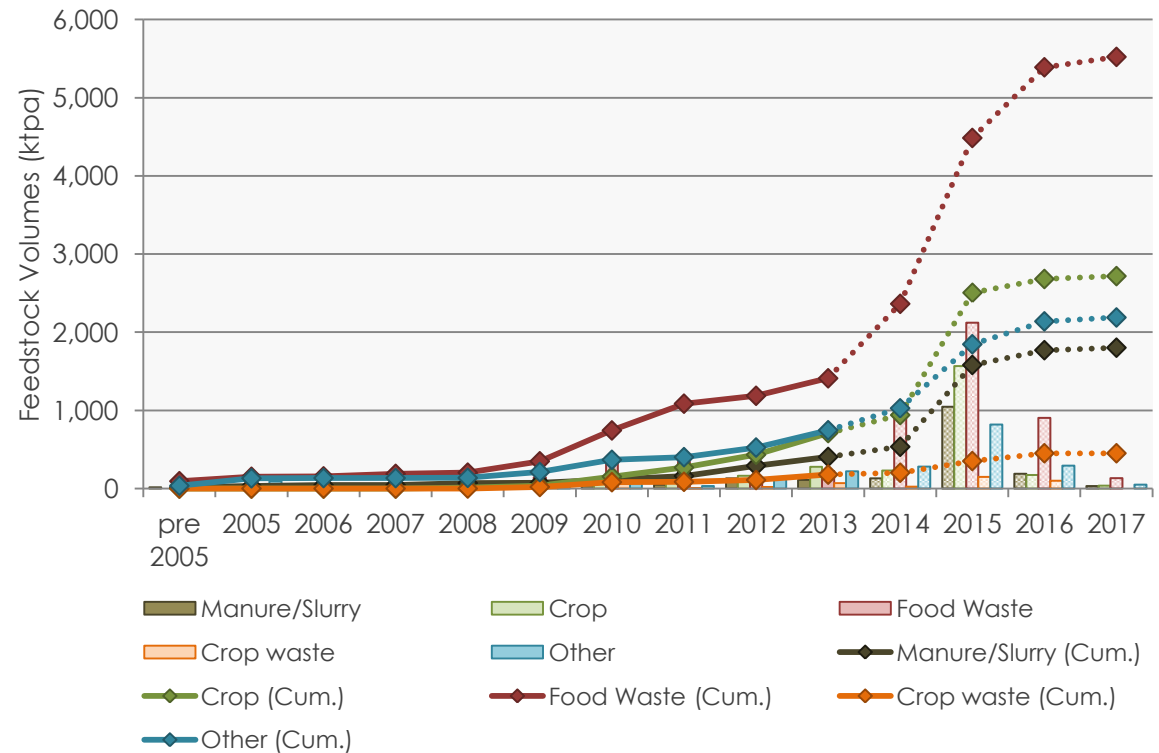
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AD Deployment in the UK

Future (theoretical) required feedstock volumes

- 5,500,000 tpa food waste
- 2,700,000 tpa energy crops
- 2,150,000 tpa other waste
- 1,800,000 tpa manure/slurry
- 450,000 tpa crop waste





AD Deployment in the UK

Required cropland

- Assuming an energy crop yield of 45 fresh tonnes/Ha the UK AD industry requires 17,000 Ha of land
- If all plants under development were to complete the UK AD industry would require 60,000 Ha of land
- Break crops often used for AD





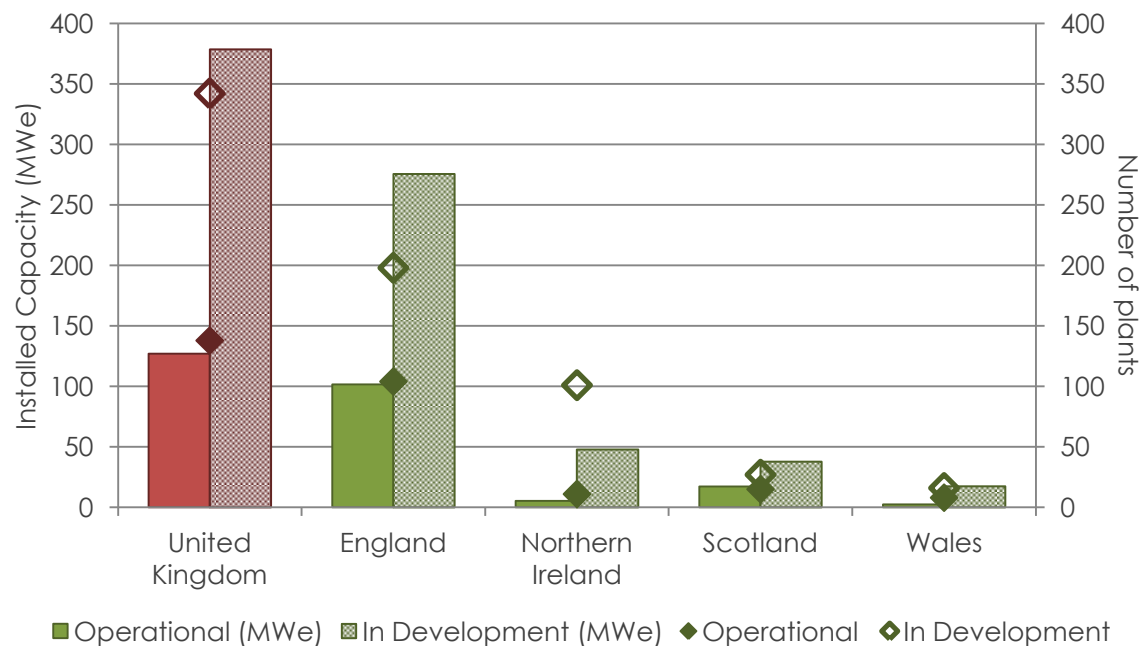
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AD Deployment in the UK

National Deployment

- Deployment currently strongest in England
- Attractive support under NIRO could see NI deployment increase over the next few years

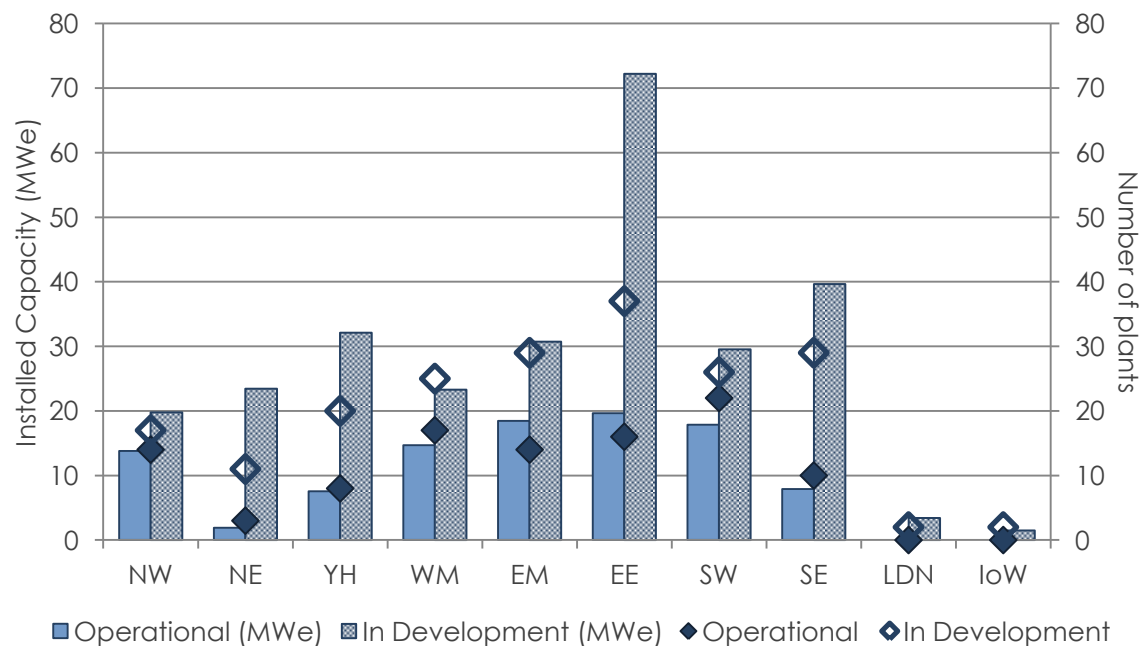




AD Deployment in the UK

Regional Deployment

- Deployment strongest in East of England
- Deployment weakest in North East
- Broadly consistent distribution in other regions





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AD Deployment in the UK

Summary and future development

- Development pipeline strong
- Considerable challenges ahead for the farm-scale AD sector
- RHI could become a more stable form of support in the future and result in further BtG deployment





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Celebrating 10 years of Bioeconomy development

NNFCC is a UK based consultancy with expertise on the conversion of biomass to **bioenergy**, **biofuels** and **biobased products**.

We help industry solve complex business challenges and provide vital evidence for policy makers.



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