

IEA Bioenergy

Gasification UK update

November 2019

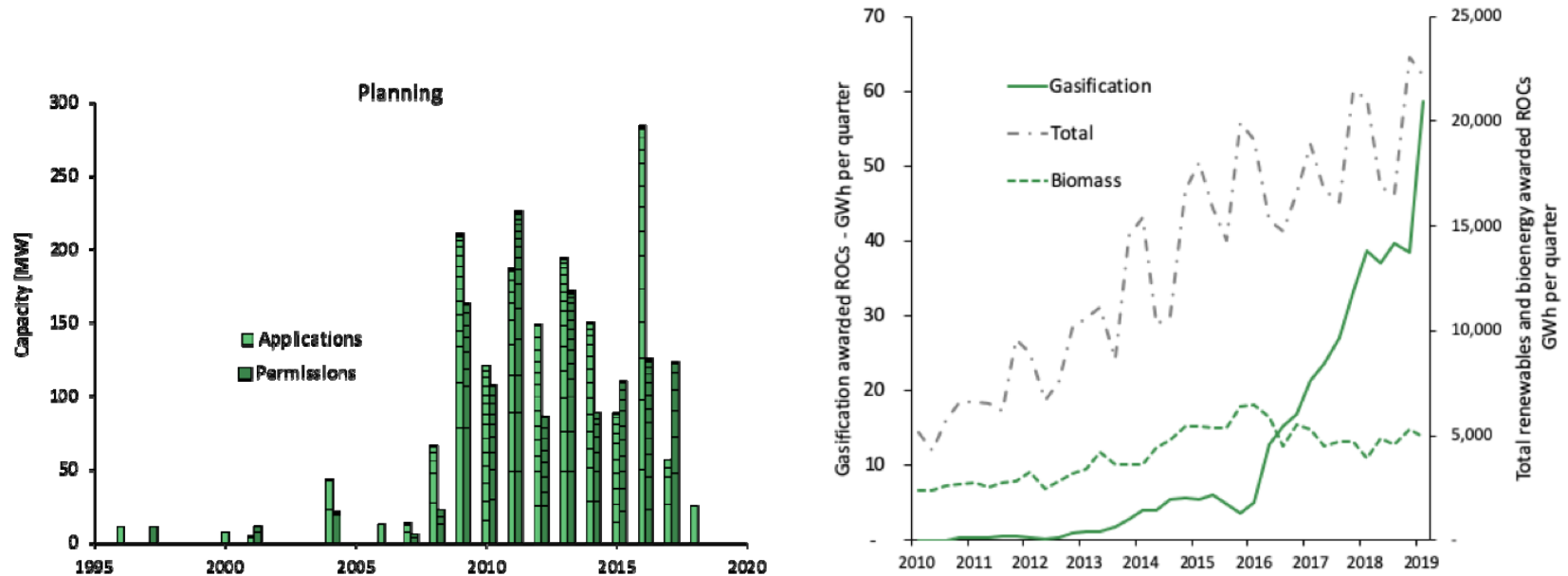


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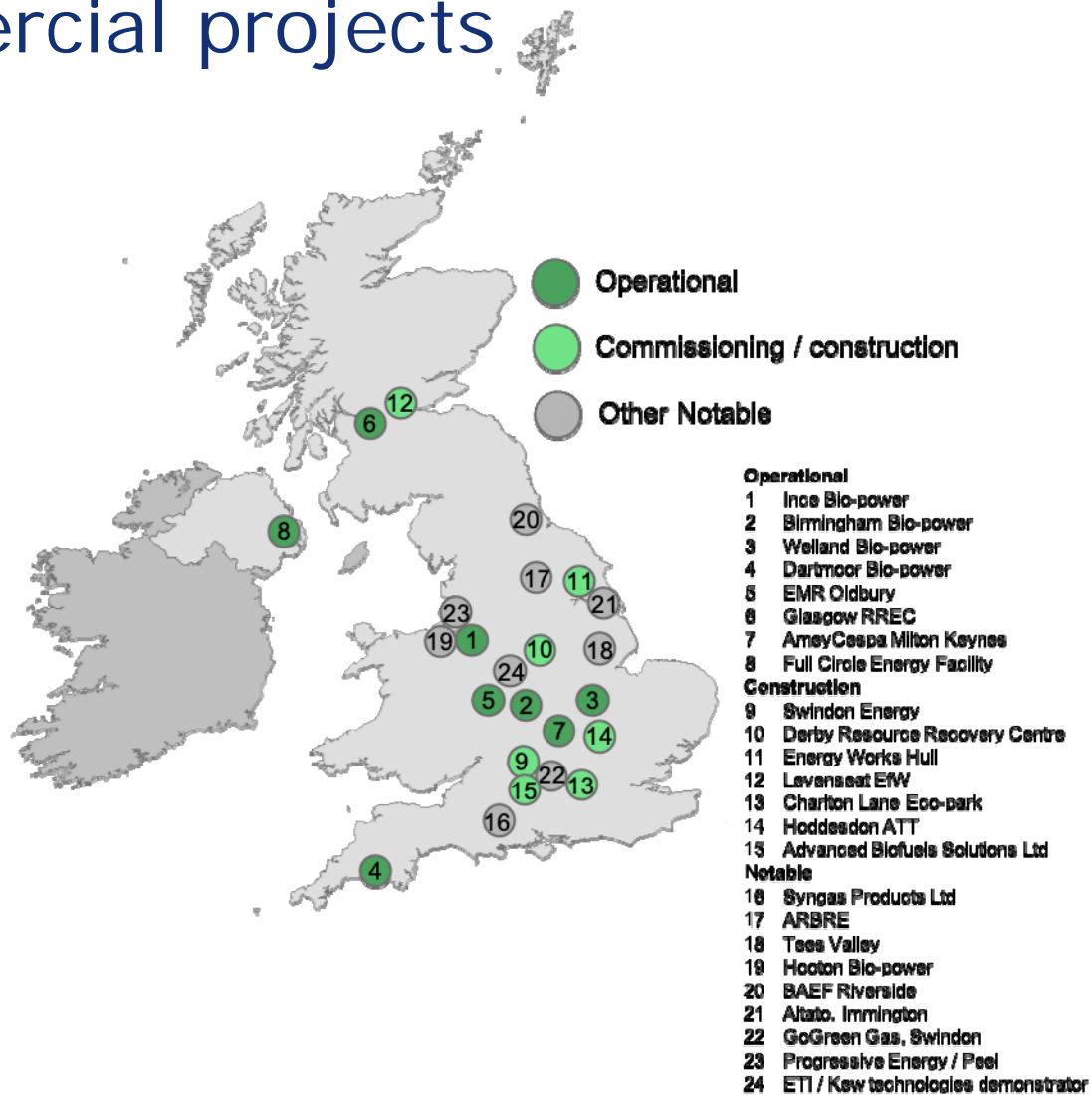
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Commercial projects – interest in developing Energy from Waste



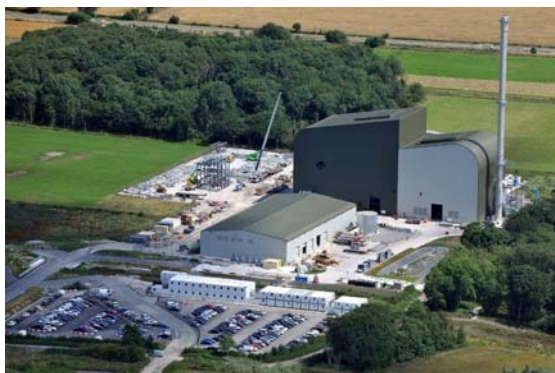
Increased interest but many projects not realised.
~30MW average ROCs generation in Q1 2019
>1% of bioenergy generation qualifying for ROCs in 2018
But... dramatic relative increase since 2016

Commercial projects



Commercial projects - operational

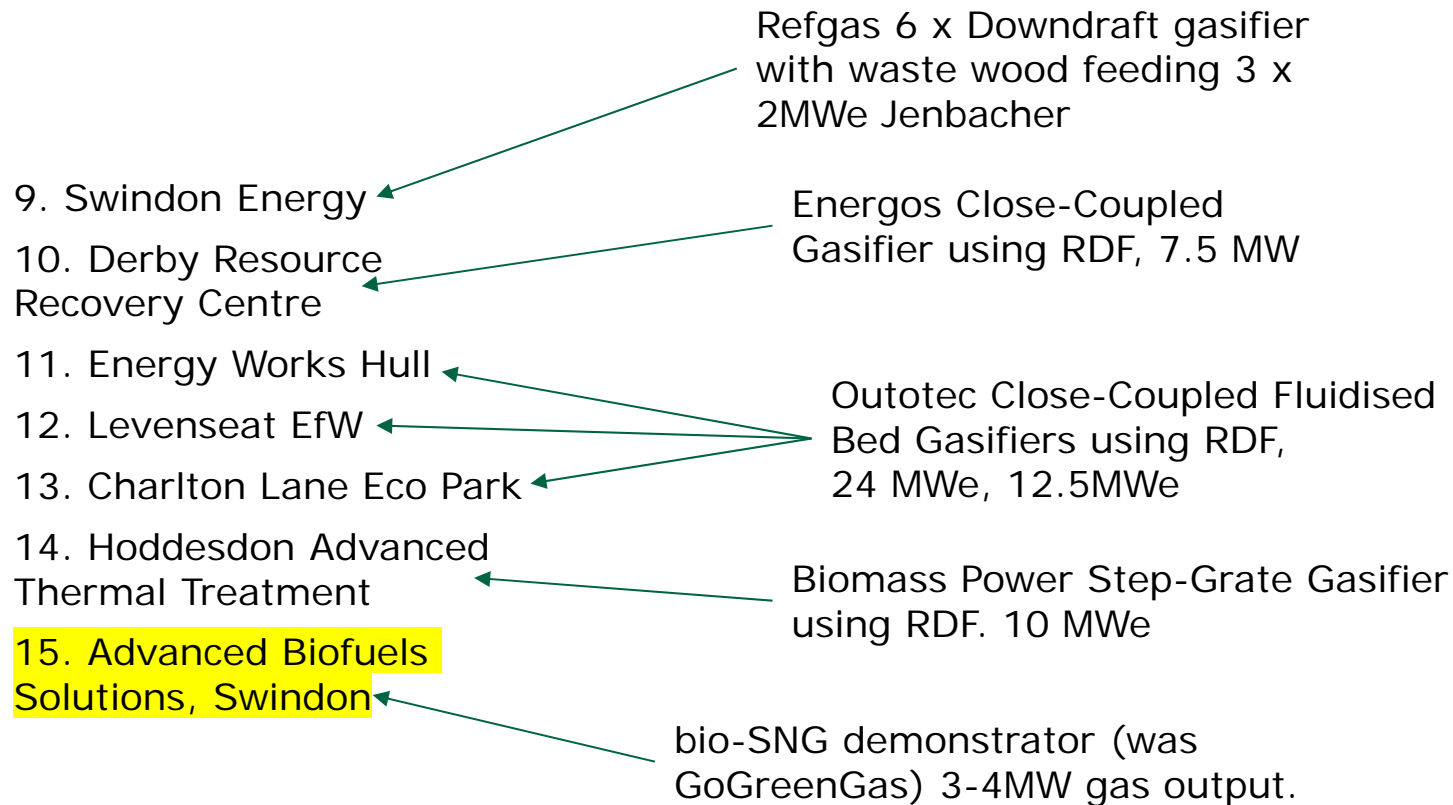
1. Ince Bio Power ← Cogen Outotec Close-Coupled Gasifier using waste wood, 26.5 MWe
2. Birmingham Bio Power ← Cogen. Up to 4 Nexterra Close-Coupled Gasifiers using waste wood. 10.3 MWe, 10.6 MWe, 4.3 MWe
3. Welland Bio Power ← Cogen. Up to 4 Nexterra Close-Coupled Gasifiers using waste wood. 10.3 MWe, 10.6 MWe, 4.3 MWe
4. Dartmoor Bio Power ← Cogen. Up to 4 Nexterra Close-Coupled Gasifiers using waste wood. 10.3 MWe, 10.6 MWe, 4.3 MWe
5. EMR Oldbury ← Chinook RODECS using Automobile Shredder Waste ~40 MW
6. Viridor Glasgow RREC ← Chinook RODECS using Automobile Shredder Waste ~40 MW
7. Amey Milton Keynes ← Energos Close-Coupled Gasifiers using RDF. 10 MW, 7MW
8. Full Circle Energy, Belfast ← Energos Close-Coupled Gasifiers using RDF. 10 MW, 7MW



from: www.cogenuk.com

Biomass Power gasifiers with C&I waste. 3x5MWe

Commercial projects – commissioning / late stage of construction



Commercial projects – other notable

- 1MWe modular demonstration using RDF (planning to expand to 10MWe).
Pyrolysis / Gasification process
Gas is clean and high calorific value – being used in spark ignition gas engine.
16. Syngas Products
17. ARBRE
18. Tees Valley
19. Hooton Bio Power
20. Boston Alternative Energy / Riverside
21. Altato, Immingham
22. GoGreen Gas
- (historic)*
- CoGen – Kobelco Eco Systems
Fluidised Bed Gasifier with RDF 24MWe
- Proposed 1000kt/a RDF - 80MWe
- Collaboration between Velocys, BA and Shell.
RDF Gasification, F/T to Jet ~30kt/yr fuel
Aiming for FID by end of 2019.
Phase 1 supported by F4C competition (Department for Transport), phase 2 announcement due.
- Pilot (50kW) plant operated successfully, producing bio-SNG.
Collaboration between Progressive Energy, Advanced Plasma Power and Cogent
Used to estimate costs for full scale (665GWh/yr) NOAK at £20/MWh

23. Project Bright

- Commercial scale bio-SNG plant.
- 320GWh/yr (equivalent to 30-40MW)
- Intended application – transport (HGVs)
- Progressive Energy development on Peel Environmental Protos site (Ellesmere Port).
- Planning permission has been approved and it is hoped that this plant will be operation around 2023 at an estimated cost of £150M

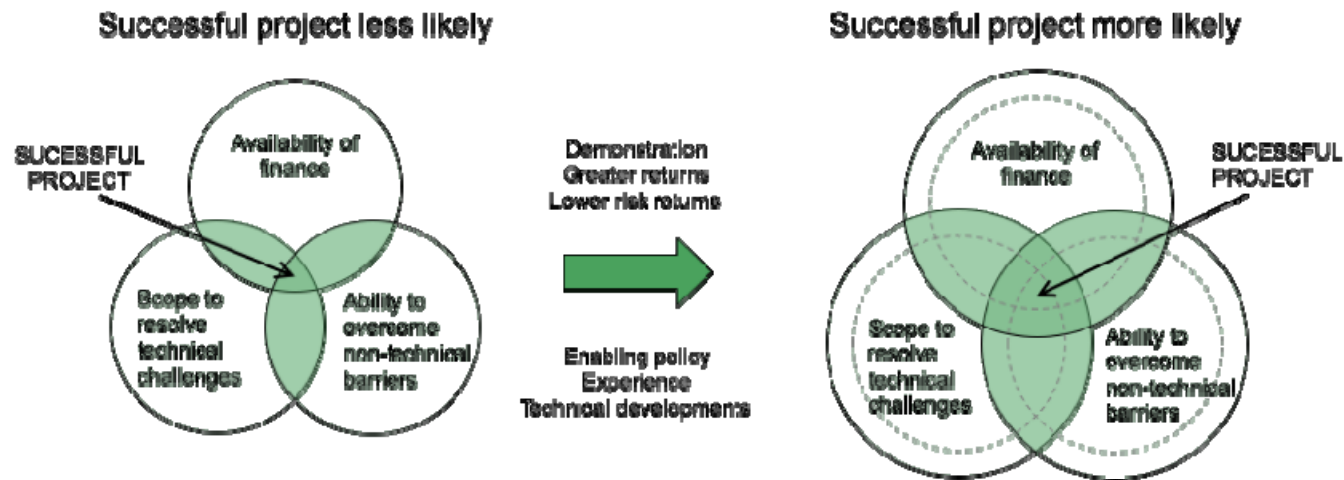
24. ETI / Kew demonstration

- 1.5MWe plant that will be capable of running from RDF, producing syngas of sufficient quality to run a gas engine. There will also be option for slipstream to other testing or applications.
- Tar identified as a key challenge. This is being resolved with partial combustion cracking enabled by tight control of the process. Details confidential but effective.
- Gasifier has been operated to produce syngas ($\sim 6\text{MJ}/\text{Nm}^3$). Tar clean-up is in commissioning / testing.
- Will run four x 1000 hour tests with different feedstocks including waste wood and RDF.

Academic gasification research

- Glasgow – real time control
- Queen Mary's, London – combustion kinetics modelling
- Leeds – plasma catalysis, experimental work on effectiveness
- Hull – catalytic thermal chemical conversion, solid CC absorbents.
- Aston – enhancing syngas quality, experimental work (1MW FBG), modelling.
- Sheffield – microwave pyrolysis, effect of feedstocks, modelling, efficiency
- UCL – pilot scale with commercial partners, effect of conditions on syngas properties.
- Liverpool – plasma catalysis tar cracking
- Cranfield – feedstock handling, small scale pyrolysis
- Nottingham – syngas cleanup techniques
- Strathclyde – modelling reaction mechanics, particle size and conditions effect on products
- Herriot-Watt – co-firing, kinetics
- Cardiff – effect of fuel characteristics
- Manchester – gasifier design
- Chester – effect of feedstocks and natural additives on characteristics

Barriers to commercial gasification



- Need for demonstration
- Support inappropriate
- Engineering evolution
- Non-technical barriers

*Thanks for listening
Any questions?*

IEA Bioenergy



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