INTRODUCTION

Over the last decade, the number of biomethane plants in the UK has grown considerably, rising from 5 units in 2011 to 106 in 2020, producing a total of almost 7 TWh of biomethane. Agricultural waste is the most important feedstock for the UK’s biomethane production; 57% of all biomethane produced in the UK in 2019 originated from agriculture-based biomethane plants. With several projects at various stages of development, biomethane production in the UK is expected to increase further in the coming years. Indeed, given the nature of the current government incentives, it is likely that more biomethane plants than biogas plants will be built in the future.

Regarding the British biogas production, by the end of 2020, 1,183 biogas plants were under operation, with a total biogas production of approximately 20 TWh, making the UK the country with the third highest number of biogas plants in Europe. Most biogas plants in the UK are landfill-based (37%) or agriculture-based (32%).

The growth perspectives for the UK’s anaerobic digestion market are positive, with 50 biomethane projects at various stages of development by mid-2021. Eleven plants are currently under construction and a further 39 plants are at the planning and application stage. Most of these are scheduled to become operational in 2022.

The United Kingdom produced a total of 138 GWh of Bio-CNG and 37 GWh of Bio-LNG in 2020, meaning that the share of UK’s biomethane production which is used in transport is 2.5%. The UK is home to 21 Bio-CNG and 12 Bio-LNG filling stations.

According to official Government statistics, heat produced by biogas combustion, totalled 1,254 GWh in 2020. This is 8% of the total heat produced under the non-domestic RHI for 2020 and an increase of 29% from 2019 (973 GWh). The heat produced by biomethane is estimated to be 3,960 GWh in 2020.

Power generation through anaerobic digestion (AD) has continued to see steady growth with a rise of 7% between 2019 and 2020. Growth rates have been relatively consistent for the last three years, with annual generation reaching 3,1000 GWh in 2020.

At present there are no government mandated targets for biogas and biomethane, however the Government has put in place new measures to advance the decarbonisation of the gas grid. In autumn 2021 the UK introduced the new ‘Green Gas Support Scheme’ to support new biomethane production and injection into the grid. The scheme is anticipated to support another 45 biomethane plants across its life before the end of 2025. The support scheme provides flexibility to biomethane producers to supply certain portions or consignments of biomethane for use in transport under the Renewable Transport Fuel Obligation, as long as they can prove to the energy regulatory that they have not claimed both subsidies.

Currently, there are no viable Government incentives to support new generation of power and/or heat from biogas combustion.
The United Kingdom has been successfully developing its biogas sector since the early nineties. In 1989, the UK introduced indirect subsidies for biogas production via the Non-fossil Fuel Obligation, which required electricity supply companies to provide a set amount of electricity generated from non-fossil sources. This support system was replaced by a succession of different frameworks, including the Electricity Act in 2002, the Energy Act in 2008 and the Renewable Heat Incentive in 2011.

By the end of 2020, the number of biogas plants in the UK had reached 1,183. Although the number of biogas plants in the UK has increased steadily over the past decade, growth is expected to stagnate in the coming years as governmental incentives are directed towards biomethane production instead. UK biogas production has remained largely constant over the last 5 years, with around 20 TWh of biogas being produced each year. The decrease in production from landfills has been largely offset by increased production from other types of feedstocks, causing the total biogas production to remain stable.

Renewable electricity
Until 2017 the Renewables Obligation (RO) was the main support mechanism for largescale renewable electricity projects in the UK. Coming into effect in 2002 in England, Wales, and Scotland, followed by Northern Ireland in 2005, it placed an obligation on UK electricity suppliers to source an increasing proportion of the electricity they supply from renewable sources. Many biogas power facilities were funded through the RO, securing support for 20 years, with some coming to an end as early as 2027.

Small-scale (<5MWe) renewable electricity generation was supported through a Feed-In-Tariff (FIT) scheme, but this closed to new applications in March 2019. A Smart Export Guarantee (SEG) was introduced in January 2020, to support the export of small-scale renewable power to the national power grid, in the absence of the FIT mechanism. This is an obligation on suppliers rather than Government to support generation below 5MWe.

The Contracts for Difference (CfD) scheme is currently the government’s main mechanism for supporting low-carbon electricity generation and despite being available for all scales, its structure and functionality is tailored towards larger-scale generators (> 5 MWe). CfDs incentivise investment in renewable electricity by providing a protection against volatile future wholesale electricity prices.

Renewable Heat Incentive
To encourage decarbonisation of the heating sector, the Renewable Heat Incentive (RHI) was introduced in 2011 and 2014 for domestic and non-domestic-scale projects, respectively. The non-domestic RHI (NDRHI) provided support for renewable heat generation from biogas combustion through a tariff-based mechanism, but the scheme closed to new applications in March 2021.
SUPPORT SCHEMES FOR BIOMETHANE

The most influential factor in the UK biomethane market has been the support scheme developed under the Renewable Heat Incentive (RHI). The RHI offers a Feed-in Tariff (FiT) for biomethane produced from anaerobic digestion and injected into the natural gas network. Biomethane installations are paid per amount of energy injected; the rate they receive varies according to plant size and year of commissioning. The subsidy lasts for 20 years. The scheme was implemented in 2011, explaining the increase in biomethane plant numbers from that year onwards. The RHI only applies to Great Britain (England, Wales and Scotland). Northern Ireland has a separate subsidy system for renewable energy that does not include a feed-in-tariff for biomethane.

For biomethane to be eligible for this subsidy the installation must show that certain sustainability criteria have been met including:

- That the lifecycle emissions of the production process including any emissions from energy crop cultivation are no more than 34.8 gCOe/MJ (LCV)

- That any energy crops do not impact on land which acts as a carbon sink.

In addition, the scheme includes feedstock restrictions, requiring at least 50% of the biomethane output to be derived from wastes and residues before RHI payments are reduced.

Biomethane use in transportation is supported by a Quota system called the Renewable Transport Fuel Obligation (RTFO). Obligated suppliers must show that a certain percentage of fuel they supply is renewable and they may do this by suppling renewable fuel themselves or buying Certificates generated from others that have.

Aside from the FiT level other important factors are:

- Feedstock supply: developers have been successful in negotiating supplies of energy crops; however, the government has moved to reduce incentives for these projects. Sourcing reliable and secure waste and residue streams e.g. domestic and commercial food waste collections is a challenge and projects have had to adjust their expectations of income generation via gate fees.

- Domestic food waste collection is mandatory in Scotland and Wales but England has lagged behind, which has limited the supply of waste feedstocks. The Environment Act 2021 introduces mandatory food waste collections in England, but the exact timing has not been confirmed yet.

- Grid capacity: new plants must find sites where there is enough capacity to inject their gas, which is a particular problem on parts of the grid which have very low demand in the summer.

A new support mechanism has been introduced in the UK by autumn 2021 to support further biomethane injection – the so-called Green Gas Support Scheme.

Green Gas Support Scheme (GGSS)
The Green Gas Support Scheme is a levy funded scheme designed to support the deployment of new biomethane injection into the gas grid produced via anaerobic digestion. The GGS launched on 30th November 2021.
and Ofgem opened their application portal on the same day.

The scheme is scheduled to close on 30th November 2025. The tariff length period is 15 years, for comparison the RHI was 20 years. An annual tariff review is expected to take place to ensure the tariff continue to provide value for money and there will also be a mid-scheme review to begin in late 2023. Similarly to the RHI, at least 50% of the biogas in the Green Gas Support Scheme must be derived from wastes or residues to encourage more processing of wastes and residues rather than energy crops. In addition, to minimise ammonia emissions from digestate, all digestate from plants supported under the scheme must be applied with low-emission spreading equipment as per COGAP for Reducing Ammonia Emissions. If spread by a contractor, digestate must follow the relevant industry standards (NAAC).

The table below shows a comparison between the tariffs provided under the GGSS and those provided under the RHI.

<table>
<thead>
<tr>
<th>Technology</th>
<th>Injected annual volumes</th>
<th>Tariff (p/kWh)</th>
<th>RHI rates (p/kWh, since Jan 2019)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomethane injection</td>
<td>Tier 1: First 60,000 MWh</td>
<td>5.51</td>
<td>4.92 (first 40,000 MWh)</td>
</tr>
<tr>
<td></td>
<td>Tier 2: Next 40,000 MWh</td>
<td>3.52</td>
<td>2.90</td>
</tr>
<tr>
<td></td>
<td>Tier 3: Remaining MWh</td>
<td>1.56</td>
<td>2.24</td>
</tr>
</tbody>
</table>

Government will consult in due course on a successor scheme to support green gases after the GGSS is closed. This is likely to be a more market-based obligation and could include other green gases such as low carbon hydrogen.

**Renewable Transport Fuel Obligation**

The Renewable Transport Fuel Obligation (RTFO) is the Government policy for reducing GHG emissions from fuels supplied to transport. The scheme functions as a traded obligation on fuel suppliers to supply an increasing volume of renewable fuels - set to 2032.

Obligated suppliers can either redeem sufficient Renewable Transport Fuel Certificates (RTFCs) or buy out at 50p/litre. RTFCs are awarded to each litre of renewable fuel (or Kg for gaseous fuels) supplied at the duty point.

Biomethane is eligible under the RTFO and is awarded 1.9 RTFCs per Kg and double the number of certificates (3.8) if made from wastes. Biomethane is seen as a key solution to decarbonise diesel and gas HGVs and gas fleets, especially in heavier and long-haul applications and in the near-term, where other options such as battery EVs or hydrogen vehicles are not ready.
OTHER TYPES OF SUPPORT
As described above, biomethane use in transportation is supported by a quota system called the Renewable Transport Fuel Obligation (RTFO). Any biomethane used within the RTFO is reported by the UK government against its targets for renewable fuel.

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SUSTAINABILITY CONDITIONS
All AD plants producing biomethane or biogas are subject to feedstock restrictions, with payments limited where more than 50% of feedstocks come from crops or other non-waste sources.

Under the new Green Gas Support scheme, the carbon intensity of biomethane must be < 24.0 gCO2e/MJ, which is tighter than the threshold of 34.8 gCO2e/MJ set out under the RHI.

Participants must use the REDII Annex V method for calculating GHG emissions.

Under the GGSS, averaging of life cycle GHG emissions across different consignments of biomethane is allowed to meet the threshold (this wasn’t possible under the RHI, but it is aligned to the methodology in RED II).

Finally, the GGSS gives a Bonus of 45 gCO2eq / MJ for manures, attributed for improved agricultural and manure management.
MORE INFORMATION

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About EBA

The EBA is the voice of renewable gas in Europe. Founded in February 2009, the association is committed to the active promotion of sustainable biogas and biomethane production and their use across the continent. The EBA today counts on a well-established network of over 200 national organisations, scientific institutes and companies from Europe and beyond.