Department for Energy Security & Net Zero

Evaluation of the Green Gas Support Scheme and Green Gas Levy

First Annual Interim Report

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Glossary

Anaerobic Digestion – Anaerobic digestion (AD) is the process by which organic matter is decomposed to generate biogas.

Biomethane – Biomethane is produced by processing and enriching biogas to increase the calorific value of the gas to the equivalent of natural gas.

Contribution Analysis – Contribution analysis is a theory-based evaluation method used to understand whether an intervention has contributed to an outcome observed or not.

Contribution Claim – A component of a contribution analysis framework, encompassing a hypothesis of how expected impacts will occur as a result of the programme, an alternative explanation of how the impacts may be realised, and the evidence that is expected to be observed for each account if it is true.

Digestate – Digestate is a by-product of the AD process that is typically spread on agricultural land as a bio-fertiliser but also contains nitrogen which can be lost to the atmosphere as ammonia.

Feedstock – A feedstock refers to the organic matter that is used in the AD process. A feedstock can either be a product (i.e. the primary reason that the material was produced was for AD, for example, energy crops), a residue (i.e. the by-product of a production process, for example, straw), or a waste (i.e. matter that would otherwise be discarded, for example, food waste).

Gate Fee – A gate fee is the charge levied by a waste processing facility for a given quantity of waste that is received at the facility. The fee can be charged per load, per tonne or per item depending on the source and type of waste.

Grid Injection – Biomethane can be injected directly into the gas grid, substituting the need for the equivalent natural gas required by the grid to meet customer demand.

Ofgem – Ofgem refers to the Office of Gas and Electricity Markets and is the Great Britain energy regulator. Ofgem administer the Green Gas Support Scheme (GGSS) and the Green Gas Levy.

Non-Domestic Renewable Heat Incentive – The Non-Domestic Renewable Heat Incentive (ND RHI) was a scheme that was open for applications between 2011 and 2021, designed to increase uptake of a range of renewable heat technologies, including biomethane generation from AD plants, by making quarterly payments based on the amount of eligible heat generated (for all heat technologies other than biomethane) and on the amount of biomethane injected into the gas grid (for biomethane).

Renewable Transport Fuel Obligation – The Renewable Transport Fuel Obligation (RTFO) supports transport decarbonisation by encouraging the production and use of renewable fuels.

Obligated suppliers can meet their obligation by either redeeming Renewable Transport Fuel Certificates (RTFC) or by paying a fixed sum for each unit of fuel they wish to 'buy-out' from their obligation. RTFCs are created and provided to participants who supply renewable fuels based on the quantity of biofuel they generate.

Tariff Tier – Support payments for biomethane injection are based on an agreed tariff amount for the volume of eligible biomethane injected. The GGSS has a three-tier tariff structure such that as the volume of biomethane increases, tariffs decrease, to reflect potential economies of scale.

Theory of Change – A theory of change is a visual and narrative representation of how a policy intervention is expected to lead to change, by identifying the interim steps and causal pathways leading from a set of inputs and activities to outcomes and impacts.

Executive Summary

The Green Gas Support Scheme and Green Gas Levy

The Green Gas Support Scheme (GGSS) opened for applications in November 2021, following the application closure of the Non-Domestic Renewable Heat Incentive (ND RHI) scheme for new biomethane sites earlier that year (March 2021). The GGSS aims to incentivise the deployment of new anaerobic digestion (AD) biomethane plants to produce and inject biomethane into the gas grid, thereby helping to decarbonise Great Britain's gas supplies by increasing the proportion of 'green' gas in the grid. Ofgem is the authority responsible for the administration of the GGSS. The GGSS incentivises new AD plant deployment by making quarterly payments to GGSS participants, for up to 15 years, based on the volume of biomethane that is injected into the grid by the participating plant.

The GGSS is funded by the Green Gas Levy (GGL). The GGL applies to licensed providers of fossil fuel gas. These providers are required to make quarterly levy payments, the amount of which is determined by the number of meters they serve. While it is anticipated that these costs may be transferred to consumers, suppliers are not legally obligated to do so. Gas suppliers who supply 95% or more green gas (certified biomethane generated through anaerobic digestion) during a scheme year are exempt from paying the levy.

Evaluation Purpose and Approach

This evaluation report is the first published output of the evaluation of the GGSS and GGL, reflecting and synthesising the findings of evaluation activities and outputs to date. The report is written to ensure transparency on the performance of the GGSS and GGL and release useful policy learning into the public domain.

Over the lifetime of the evaluation, the evaluation team will deliver process and impact evaluations. Evaluation research to date has focused on process research questions, and therefore this will be the focus of this first annual evaluation report.

The evaluation takes a theory-based approach using contribution analysis as a framework, drawing on a Theory of Change (ToC) and a set of Contribution Claims[1] for the GGSS and GGL. The evaluation has also developed and refined a process map for the GGSS and the GGL which provides a framework through which the scheme processes have been analysed and seeks to understand what has worked well and less well at different points in this journey.

[1] The evaluation uses a 'contribution analysis' methodology as way to synthesis and weigh different strands of evidence to produce a narrative on how the programme, relative to other factors, led to observed impacts. A contribution claim is a component of a contribution analysis framework, encompassing a hypothesis of how expected impacts will occur as a result of the programme, an alternative explanation of how the impacts may be realised, and the evidence that is expected to be observed for each account if it is true. These 'claims' are tested as part of the evaluation research activity and accepted or rejected and refined based on evidence gathered.

This research has been structured around five evaluation questions covering both the scheme and levy, focusing on design, implementation, external context, and participant experience of the GGSS and GGL. This report draws on two process evaluation reports, one each for the GGSS and GGL, the first annual pulse survey of GGSS applicants and AD plants funded on the ND RHI scheme (undertaken between August and September 2023), a review of literature on the UK biomethane market and its context, and analysis of scheme and levy application and monitoring data. The report includes findings from 31 interviews (of a target sample of 45) and 13 survey respondents (of a population of 26). A full breakdown of stakeholders interviewed and surveyed is shown in Table 1 and

Table 2.

Key Findings

What is working well?

- The GGL has been successfully implemented in its first two years, collecting the funds that it sought to collect, with minor non-compliance from suppliers and no reported evidence of an excessive burden placed on either suppliers or customers.
- Ofgem have been praised for their administration and communication on both the levy and the support scheme.
- The GGSS application processes were commended as being smooth and straightforward and an improvement compared to the ND RHI.
- Eligibility and sustainability requirements were not seen as being too onerous. Only in a minority of cases did respondents push back on evidence requirements and eligibility requirements, and generally respondents were content with, for example, 50% waste feedstock thresholds.
- As of July 2023, those applicants with full tariff guarantee, at peak injection[2] represents an estimated 1,000GWh of new biomethane production (42% of the impact assessment central scenario, 69% of the low scenario). These figures are based only on those plants that have either completed their registration (1 at the time of analysis), or, have tariff guarantees and are now working to commission their plant and register onto the scheme (11 at the time of analysis). This does not account for any deployment that may come in the future based on the current GGSS pipeline of applicants.
- The GGSS budget is set once a year, with several mechanisms and safeguards (i.e. Annual Tariff Review and degression) in place to prevent overspend[3]. These mechanisms include quarterly trigger points for the scheme tariffs to be reduced if expenditure thresholds are reached or if it is felt tariffs do not offer value for money to billpayers. Budget caps work by placing applicants in a queue where application budget caps are met, until budget becomes available. Despite these mechanisms, there was little evidence from the evaluation that these have deterred applicants or influenced scheme attractiveness.

What is working less well?

- The GGSS has received fewer applications than anticipated, and, it has taken applicants a longer time than expected to progress from receiving their full tariff guarantees to commissioning and registering their AD plants on to the scheme. Both

[2] Peak injection reflects the point at which no further plants can deploy onto the GGSS, and all plants are injecting biomethane at their peak capacity. This level of injection is expected until plants begin to decommission as they reach the end of their operational lifetime. In the GGSS final stage Impact Assessment, peak injection was estimated to occur between 2029/30 and 2040/41.
[3] Reg 4(13)(d) gives DESNZ power to change budget each quarter.

challenges may be explained (at least in part) by wider contextual factors (see below) beyond the control of the GGSS.

- The amount of money collected by the GGL exceeded the amount required by the GGSS, due to actual deployment being lower than forecast. This may be explained by the inherent uncertainty in forecasting deployment and the underspend can be explained by wider contextual factors, discussed below. It should be noted that the mechanism designed to resolve this issue (i.e. carrying over the year end surplus) is judged to have worked as expected and levy rates for Scheme Year 3 are lower as a result.

What contextual factors influenced implementation?

- The evaluation has found that the scheme has been impeded by wider contextual challenges in the feedstock market and the supply chain. An already constrained feedstock market, combined with delays to the Department for Food, Environment and Rural Affairs (Defra) food waste collection policies (at the time of writing this report Defra have since published their Simpler Recycling government response[4]) has meant that the number of applications received have been lower than anticipated. AD plants have also taken longer to commission than expected due to supply chain disruption and delays, and although developers have received tariff guarantees and are currently constructing their AD plants, completing construction has been challenging.

Reflections for further consideration

- The two contextual factors detailed above have limited the number of applications to the GGSS and the ability of developers to commission and register onto the GGSS. As such, progress has been slower than anticipated. Given these wider challenges, the evaluation suggests consideration should be given to extending the planned closure date to give sufficient time for AD plants to take up the support and ensure that the scheme can receive the benefits of the Defra Simpler Recycling food waste regulations when they are delivered. It is noted that at the time of writing, it was announced that the scheme would be extended to March 31, 2028, as a result of the GGSS Mid-Scheme Review, which aligns with the evaluation findings.
- There was some evidence that unexpected behaviours for AD developers may be induced as a result of GGSS eligibility requirements, including demolishing existing plants and rebuilding them to qualify as new plants, and decommissioning existing plants where current subsidies are coming to an end. A small number of prospective applicants suggested they might consider such approaches, but the evaluation team found no instances of plants acting on this consideration and therefore should be viewed as a hypothetical scenario only. The department could consider these issues and, if appropriate, communicate its expectations to the market.

[4] Simpler Recycling government response

- There was some suggestion that innovation on the scheme may not currently be facilitated (e.g. use of shared injection hubs). Consideration could be given to how best the scheme should unlock innovative approaches and share learning in the market.
- Points raised to reduce the burden of the levy, which could be further considered by the Department, include introducing de minimis rules where suppliers owe a minimal amount[5] and having the ability, if required, to change the levy rate mid-year in response to lower than forecast GGSS payments[6].

[5] During the drafting phase of this report, de minimis rules for the GGL were introduced to the GGL regulations.
[6] The Department have considered this suggestion extensively and given a number of additional challenges this would introduce, and have rejected this as a potential suggestion.

Introduction and Report Scope

RSM UK, supported by Winning Moves and Ricardo Energy, are appointed by the Department for Business, Energy and Industrial Strategy (now the Department for Energy Security and Net Zero) (the Department) to evaluate the Green Gas Support Scheme (GGSS) and Green Gas Levy (GGL) from November 2022 to May 2026. This report summarises findings from the first year of the evaluation of the GGSS and GGL.

Context of the Green Gas Support Scheme and Green Gas Levy

Biomethane is methane sourced from organic feedstocks. Typically, biomethane is produced through anaerobic digestion (AD), where organic matter undergoes decomposition within an AD reactor, yielding extractable methane. This biomethane is primarily injected into the gas grid or can be bottled for direct sale to customers. In essence, injecting biomethane into the grid reduces the need for natural gas, without affecting the end consumer's experience or requiring modifications to their heating systems.

By December 2022, the UK had 143 fully accredited sites producing biomethane under the Non-Domestic Renewable Heat Incentive (ND RHI)[7]. The UK is a prominent biomethane producer in Europe, largely due to the success of the ND RHI. Since 2011, the number of UK biomethane sites has increased from 5 to over 140[8]. Agricultural residues are the primary feedstock used in UK AD Plants, although food waste (both domestic and commercial), and industrial food processing waste are also common feedstocks and energy crops remain a significant source[9].

In 2022, the UK achieved 6.8 TWh[10] of biomethane injection[11], accounting for 22% of all UK biogas generation, compared to just 11% in 2016[12]. The government's Net Zero strategy[13], published in October 2021, and the Carbon Budget Delivery Plan[14] envision an annual injection of 12TWh of biomethane into the gas grid by 2030, supporting delivery against carbon budget targets and the transition to Net Zero. It is important to note that this figure represents an initial assessment rather than an official government target for biomethane production.

The Energy Security Plan, published in 2023, outlines the declining demand for natural gas during the Net Zero transition and acknowledges the role of increased biomethane production

[7] BEIS (2022). Non-domestic and domestic renewable heat incentive (RHI) monthly deployment data (Great Britain): December 2022.
[8] DESNZ (2023). RHI Monthly Deployment Data: March 2023 (Quarterly edition).
[9] SIAPARTNERS, 2022. *European Biomethane Benchmark*.
[10] Terawatt-hour, equal to 1,000 GWh
[11] BEIS (2023). Digest of UK Energy Statistics, Chapter 4: Natural Gas, DUKES 6.4
[12] BEIS (2023). Digest of UK Energy Statistics, Chapter 6: Statistics on energy from renewable sources, DUKES 6.1, updated 27 July 2023. Estimates include biogas generation from anaerobic digestion, sewage gas, and landfill gas.
[13] HM Government (2021). Net Zero Strategy: Build Back Greener. October 2021.
[14] Department for Energy Security and Net Zero (2023). Carbon Budget Delivery Plan. March 2023.

in decarbonising and diversifying gas supplies. However, at 6.8 TWh in 2022[15], biomethane production currently represents a small fraction of total demand for natural gas, which in the same year was 787.1TWh[16] (meaning biomethane represented 0.9% of the total natural gas demand).

The Biomass Strategy further emphasised biomethane's role in optimising the path to net zero cost-effectively by 2050 and increasing UK energy security. It outlined that around 30 – 40 TWh of biomethane production in 2050 would help the UK achieve net zero cost-effectively, based on best utilising feedstocks such as animal slurries, food waste and maize, sewage sludge and the upgrade of landfill gas[17].

As such, while the proportion of gas demand met by biomethane is expected to rise in the Net Zero transition, feedstock availability is a key dependency. This could be a limitation as preferred feedstocks may not be accessible for all AD plants across the country.

Overview of the Green Gas Support Scheme and Green Gas Levy

The Green Gas Support Scheme

The GGSS opened for applications in November 2021, following the application closure of the ND RHI for new biomethane sites earlier that year (March 2021). The GGSS aims to support the development of new AD biomethane plants to produce and inject biomethane into the gas grid, thereby helping to decarbonise Great Britain's gas supplies by increasing the proportion of biomethane in the grid. Ofgem is the authority responsible for the administration of the GGSS.

The GGSS incentivises new AD plant deployment by making quarterly payments to GGSS participants for up to 15 years based on the volume of biomethane that is injected into the grid by the participating plant. The GGSS has a three-tier tariff structure, with the following tariffs correct as of October 1, 2023[18]:

- Tier 1: Up to 60,000 MWh pa – 6.33 p/kWh[19].
- Tier 2: the next 40,000 MWh pa – 4.06 p/kWh.
- Tier 3: 100,000 MWh to 250,000 MWh pa – 3.59 p/kWh.

The application process for the GGSS is comprised of 3 stages. Stage 1 requires the applicant to provide initial information, including evidence of planning permission and details of how biomethane will be produced and injected into the grid. Stage 2 requires the applicant to

[15] DESNZ (2022) Digest of UK Energy Statistics Annual Data for UK, 2022.
[16] DESNZ (2023) Digest of UK Energy Statistics (DUKES): Natural Gas. (July 2023)
[17] DESNZ (2023) Biomass Strategy: https://www.gov.uk/government/publications/biomass-strategy
[18] Tariff table: https://www.ofgem.gov.uk/publications/green-gas-support-scheme-tariff-table
[19] Pence per kilowatt-hour

demonstrate that "financial close"[20] has been met. Finally, stage 3 requires the applicant to provide evidence of plant commissioning and the ability to inject biomethane into the grid. At this point, they can be registered, assuming all other conditions have been met.

Once registered on the scheme, the participant must provide evidence to Ofgem that they are meeting all ongoing requirements. This includes providing evidence that the biomethane is sustainable, that the equipment is being maintained, and that all environmental permits are up to date, among other requirements. Participants must also submit metre readings that demonstrate the quantity of biomethane injected into the grid, along with measurements of other aspects of the biomethane production process. From these metre readings, payments can be calculated.

An important requirement for the GGSS is that a minimum of 50% of the feedstock used to produce biomethane needs to be from waste feedstocks.

On October 21, 2023, it was announced that the GGSS would be extended. When regulations come into effect, the closure of the application period will move from November 2025 to March 2028. This is in part to mitigate the challenges affecting AD plant deployment, thought to be constraining the number of plants able to register on the scheme[21].

The Green Gas Levy

The GGSS relies on funding from the GGL to make quarterly payments to participant AD plants for the biomethane they produce and inject. The GGL applies to licensed providers of fossil fuel gas. These providers are required to make quarterly levy payments, the amount of which is determined by the number of metres they serve. While it is anticipated that these costs may be transferred to consumers, suppliers are not legally obligated to do so. Gas suppliers who supply 95% or more biomethane (certified biomethane generated through anaerobic digestion) during a scheme year are exempt from paying the levy. As of July 2023, there are 87 obligated suppliers under the GGL[22], with one supplier provisionally exempt from paying for 2023/24. Notably, the ND RHI was government-funded, making this new funding mechanism a shift away from exchequer funding.

Gas suppliers are required to register an account with Ofgem and provide the requested information. This account registration enables suppliers to report their metre point data on a quarterly basis. Metre point data refers to the number of metres served each day throughout the quarter. At the start of each quarter, all licensed suppliers are required to submit the cumulative total number of meter points they served for each day of the previous quarter for each gas supply licence that they held during that period. Once confirmed, Ofgem issues an

[20] i.e., the funding for the project has been agreed, with the applicant providing evidence that those agreements are robust. This gives Ofgem assurance that, should they allocate budget to the project, the project will go ahead.
[21] Department for Energy Security and Net Zero (2023). GGSS mid-scheme review: extending the scheme (update 21 October 2023). https://www.gov.uk/government/publications/green-gas-support-scheme-ggss/ggss-mid-scheme-review-extending-the-scheme-update-21-october-2023
[22] Ofgem (2023), Green Gas Support Scheme Quarterly Report, October to December 2022. Now available at https://webarchive.nationalarchives.gov.uk/ukgwa/20231103132828/https://www.gov.uk/government/publications/green-gas-levy-ggl-rates-and-exemptions/green-gas-levy-ggl-rates-underlying-variables-mutualisation-threshold-for-the-first-and-second-scheme-years

invoice equal to the metre point days multiplied by the levy. The levy rate, established annually by the Department for Energy Security and Net Zero, is published by December 31, preceding the financial year. This rate encompasses projected GGSS expenses, including Ofgem's administrative costs and a contingency for uncertainties surrounding expenditure and levy collection.

Ofgem requests the submission of metre point data within 7 days of a quarter's commencement. Suppliers then have 5 days to provide and verify this data through an online portal. Ofgem generates the invoice based on this information, granting suppliers 14 days to settle it. In cases of non-payment, Ofgem may employ its enforcement framework. Initially, Ofgem engages in discussions with the supplier to resolve the issue. If this approach fails, an enforcement notice is issued before Ofgem initiates the credit cover drawdown process.

Levy rates are as follows:

- November 2021 – March 2022: 0.484 pence per meter per day (£0.59 per meter annually)[23].
- April 2022 – March 2023: 0.576 pence per meter per day (£2.10 per meter annually)[24].
- April 2023 – March 2024: 0.122 pence per meter per day (£0.45 per meter annually)[25].

Tariff lifetimes for the GGSS are 15-years, meaning that tariff payments for eligible biomethane and associated GGL collections may continue being made until 2043/44.

Taking feedback from the ‘Future Support for Low Carbon Heat’ consultation, the government stated they would consider a transition to a volumetric GGL in 2024/25 or when it is considered feasible to do so. The possibility of transitioning the levy is kept under review and any new proposals in this area would be fully consulted on.

Purpose of this Report

This evaluation report is the first published output of the evaluation of the GGSS and GGL, reflecting and synthesising the findings of evaluation activities and outputs, with research occurring between January and September 2023. This report draws on two process evaluation reports, one each for the GGSS (March to June 2023) and GGL (June to September 2023), the first annual pulse survey of scheme applicants and AD plants funded on the ND RHI scheme (August and September 2023), a review of literature on the UK biomethane context (December 2022 to March 2023), and an analysis of scheme and levy application and monitoring data

[23] BEIS (2022), Green Gas Levy (GGL): rates, underlying variables, mutualisation threshold for the first and second scheme years (period from 30 November 2021 to 31 March 2023). Now available at https://webarchive.nationalarchives.gov.uk/ukgwa/20231103132828/https://www.gov.uk/government/publications/green-gas-levy-ggl-rates-and-exemptions/green-gas-levy-ggl-rates-underlying-variables-mutualisation-threshold-for-the-first-and-second-scheme-years
[24] BEIS (2022), Green Gas Levy (GGL): rates, underlying variables, mutualisation threshold for the first and second scheme years (period from 30 November 2021 to 31 March 2023)
[25] DESNZ, Green Gas Levy (GGL): rates, underlying variables, mutualisation threshold for the 2023-2024 financial year

(August and September 2023). This evaluation report focuses on processes and outcomes for the period from the start of the scheme and levy to the end of July 2023 (the point at which data was extracted) The report is written to ensure transparency on the performance of the GGSS and GGL and release useful policy learning into the public domain.

As evaluation work to date has focused on process rather than impact elements, this will be the focus of this first annual evaluation report, and the findings of this report will respond directly to process-focused evaluation questions. A full list of the evaluation questions that the evaluation will answer, including those under investigation in this report, can be found in Annex 1.

Report Structure

Subsequent chapters of the report are structured as follows:

- Evaluation Methodology: This chapter summarises the theoretical underpinnings of the evaluation, the evaluation approach, the methods chosen for data collection and analysis, and any limitations to the study's findings.
- Evaluation Findings: Design and Delivery of the Green Gas Support Scheme: This chapter synthesises evaluation evidence relating to the GGSS (interview analysis, survey analysis, application data analysis) to draw out findings for each evaluation question considered and contextualises where necessary with insights from the UK biomethane context rapid evidence review.
- Evaluation Findings: Design and Delivery of the Green Gas Levy: This chapter follows the same approach and structure as the previous, but with a focus on the GGL evidence and evaluation questions.
- Learning and Implications: This chapter translates findings from the two previous chapters into key conclusions for the GGSS and GGL. The chapter discusses findings in relation to the theories of change and assesses evidence collected against the expected pathways that the GGSS and GGL were anticipated to take to deliver impact (evaluation contribution hypotheses). It concludes with suggested implications for scheme and levy.

The report is supplemented by eight annexes, namely:

- Annex 1: Evaluation Questions: a list of evaluation questions for the full evaluation, highlighting those under investigation in this evaluation report.
- Annex 2: Evaluation Methodology: a more detailed overview of the evaluation methodology, supporting the methodology chapter of the main report.
- Annex 3: Theory of Change: a presentation of the two theories of change developed for the evaluation.
- Annex 4: Research Tools: the key research tools used as part of the evaluation to date, including process maps, topic guides, and survey questionnaires.

- Annex 5: Qualitative Thematic Analysis: the detailed thematic findings from interviews conducted with stakeholders and beneficiaries of the levy and support scheme.
- Annex 6: Application and Monitoring Data Analysis: the summary data tables, analysis and visualisation of scheme and levy performance indicators, and application and monitoring data.
- Annex 7: Survey Analysis: the data tables and analysis from survey activities.
- Annex 8: Green Gas Support Scheme (GGSS) & Green Gas Levy (GGL) Literature Review: the findings from a literature review of the UK biomethane context.

Evaluation Methodology

This chapter provides a summary of the research approach and activities undertaken as part of the first year of the evaluation, including: an overview of our theory-based evaluation approach; a description of our primary research activities and secondary data sources reviewed; an overview of our analysis and synthesis approach; and a note on the limitations of findings.

Evaluation Approach

Given the methodological challenges in apportioning impact between policy and wider factors by exclusively counterfactual means in this complex setting, the approach that the evaluation of the GGSS and GGL has adopted is theory-based using a contribution analysis structured around two linked theories of change (for the GGSS and GGL). Contribution analysis develops hypotheses of how interventions are expected to lead to impact, providing a structured approach to gather evidence to test the plausibility of each hypothesis and weigh the relative contribution of the intervention compared to other explanatory factors. This will be supplemented in later stages of the evaluation with quasi-experimental analysis, if sample sizes permit.

At present, given that the focus of the evaluation has been on processes, rather than impacts, our methodology has focused less on contribution analysis and quasi-experimental methods and more on testing the validity of the two theories of change through evidence gathered in interviews and surveys and from available scheme data. This has included assessing the evaluation team's assumptions about causal pathways in the theory of change based on how the scheme and levy have worked in practice and the factors that have enabled or constrained the realisation of outcomes. The evaluation has also produced two process maps to provide a 'zoomed in' look at how the scheme and levy are intended to operate, providing an additional framework through which processes have been assessed.

A detailed description of our methodology, including the process undertaken to develop the theories of change, contribution analysis framework, and process maps, is presented in Annex 2, and the two theories of change developed are shown in Annex 3. Although at this stage of the overall evaluation, it is too early to deliver in-depth contribution analysis (this is better suited to impact rather than process evaluations), an initial overview assessment against relevant contribution claims is included in the learning and implications chapter.

Data Collection

Stakeholder Interviews

As part of evaluation activities to date, semi-structured interviews have been conducted with 31 stakeholders, summarised in Table 1. The evaluation identified relevant stakeholder

populations for interview recruitment and sampled on a stratified or purposive basis, or a census-approach was taken (where sample sizes were small) as described below:

- GGSS applicants included all those who had made an application to the GGSS, either successfully registering their scheme, currently in the process of applying (i.e. having achieved provisional or full tariff guarantees and progressing the next stage of their application) and those whose applications had been rejected. Given the small population size, the evaluation team reached out to all GGSS applicants.
- GGSS non-applicants were identified by the Department for Energy Security and Net Zero and represented organisations that had expressed interest in applying to the GGSS but had not yet applied. The evaluation team were provided with contact details for 8 organisations and given the small population size, they reached out to all of these organisations.
- ND RHI Biomethane Plants were identified as those organisations who had applied to the ND RHI scheme after the announcement of the GGSS. 6 organisations were identified and given the small population size, the research team reached out to all organisations.
- Ofgem stakeholders involved in either the GGSS or GGL were sampled purposively to ensure those with the most relevant knowledge and insights were interviewed.
- Department for Energy Security and Net Zero stakeholders were interviewed as part of evaluation scoping and again in the evaluation research stage. As above, participants were sampled purposively to ensure those with the most relevant knowledge and insights were interviewed.
- Gas suppliers were sampled on a stratified basis to ensure our sample had a suitable cross-section of large and small suppliers (e.g. to consider differences in bearing administrative costs), as well as cross-market and non-domestic suppliers. An initial sample of 25 was identified, and following challenges in recruitment, an additional sample of 10 were added to boost responses.

Interviewees were invited via email to participate in an online interview via Microsoft Teams, lasting between forty-five minutes and an hour, depending on respondent type. Interviews were based on segmented topic guides and followed a semi-structured approach. Topic guide questions focused on evidence required to answer evaluation questions and are included as an annex to this report (see Annex 4). Interviews were recorded using Microsoft Teams where consent was obtained for recording.

Table 1: Stakeholder Interviews Conducted

Stakeholder Group	Population Size[26]	Target Sample Size	Achieved Sample Size
GGSS applicants (registered plants, ongoing applications, unsuccessful applicants)	12	4	5
GGSS non-applicants	8	4	3
ND RHI Biomethane Plants (who applied to the RHI scheme after the announcement of the GGSS)[27]	6	4	2
Ofgem	N/A	5	5
Department for Energy Security and Net Zero (inclusive of evaluation scoping interviews)	N/A	8	8
GGL Registered Gas Suppliers	~90	20	8
Total	**N/A**	**45**	**31**

Application and Monitoring Data

The evaluation has identified and particularly drawn on five sources of application and monitoring data to identify and track key performance indicators for both the scheme and the levy. In some cases, these are publicly available, and in others, they were provided by the Department for Energy Security and Net Zero to the evaluation team for the purposes of evaluation. These sources are as follows:

- GGSS Application summary data, extracted in July 2023 and provided by the Department for Energy Security and Net Zero.
- GGSS Annual Report dataset, published July 2023 and available online via Ofgem's website.
- GGSS Quarterly Reports, published quarterly and available online via Ofgem's website.
- GGL Default Register, published August 2023 and available online via Ofgem's website.
- ND RHI Scheme Year 12 Annual Report Dataset, and a bespoke ND RHI data request, provided by the Department.

[26] Population size correct at the time of fieldwork
[27] These plants have been included as, at the time they applied to the ND RHI scheme, the GGSS had already been announced, and therefore, understanding their rationale for applying to the RHI scheme rather than wait for the GGSS is of interest in the evaluation.

Analysis of these datasets focused on key scheme benefit areas and metrics that would provide specific insights to answer evaluation questions.

Annual Pulse Survey

The evaluation also delivered the first annual pulse survey of GGSS participants and applicants, along with participants from the ND RHI. The intention of the survey was to provide contextual evidence on the AD sector for the evaluation and to provide inputs to help answer direct evaluation questions. The survey was piloted in early August 2023, launched in mid-August 2023, and closed to respondents on the September 22, 2023. The survey will be repeated in later stages of the evaluation, revisiting the population from the 2023 survey along with additional AD plants that have since applied for or registered on the GGSS. A text version of the survey questionnaire is included as an annex (see Annex 4) to this report.

Survey recruitment occurred through both telephone and email, and the survey itself was delivered online. The population consisted of 26 AD plants. These comprised one successfully registered GGSS plant and fourteen sites with ongoing applications (details were provided by Ofgem), as well as eleven organisations / plants who are accessing the ND RHI for biomethane production (details were provided by the Department). The ND RHI sample included only those from the post-policy reform period given the alignment of the GGSS and post-reform ND RHI policy. Given the relatively small size of the populations of interest, the evaluation team approached all plants with the aim of surveying as many as were willing to contribute to the work. In total, thirteen responses were received. These comprise:

- 4 complete or near-complete responses. These respondents provided an answer to at least the majority of the questions in the survey.
- 6 nil returns. These respondents told us that their plant was not operational in the financial year 2022/23 and therefore their answer to many of the questions in the survey about operations, volumes and costs was ’0’. Some of these respondents provided responses to some questions in the survey where relevant and appropriate to the operational status of the plant.
- 3 partial responses. These respondents provided an answer to some of the questions in the survey, but in particular were unwilling to provide commercially sensitive data.

A summary of survey response rates is shown in

Table 2.

Table 2: Annual Survey Respondents

Respondent type	No. of contacts in the database	No. of survey responses
GGSS applicants (includes successful applicants)	15	9 (2 complete, 5 nil returns, 2 partial)
ND RHI recipient (post-policy reform)	11	4[28] (2 complete, 1 nil return, 1 partial)
Total	**26**	**13**

Rapid Evidence Review

As part of desk-based evaluation research, the evaluation team conducted a rapid review of available evidence from policy, academic, and industry literature sources, focusing on the market, technical, regulatory, and policy context of the GGSS and GGL, scheme and levy processes, and stakeholders. The purpose of the review is to provide context regarding why the GGSS was created, how it fits into the UK decarbonisation roadmap, and how the GGSS evolved from the ND RHI. The review is presented in Annex 8.

Analysis and Synthesis

Thematic Analysis

For all stakeholder interviews conducted, the evaluation team produced, cleaned, and anonymised interview transcripts for case-level and thematic analysis. This was conducted using NVivo, a Computer-Assisted Qualitative Data Analysis Software (CAQDAS) package. Interview transcripts were added to NVivo and were reviewed initially for internal consistency. Transcripts were then coded against an initial coding framework based on the evaluation questions, with coding also occurring inductively, driven by emerging findings[29]. An initial set of codes were combined to develop themes that respond to the evaluation questions. Themes were presented along with an explanation and supporting quotes. Thematic analysis outputs are presented in Annex 5.

Application and Monitoring Data Analysis

Relevant variables were identified from the available datasets, and the datasets were cleaned and collated to produce a dataset for further analysis. Descriptive statistical analysis was applied alongside data visualisation. In some cases, to unpack the data further, additional calculations were completed, such as an estimate of biomethane injection from applicant

[28] One contact that was categorised as a GGSS applicant in the database responded as an RHI recipient and so is counted here and has been treated as such in analysis.
[29] A coding framework provides a list of categories or codes that allow researchers to simplify complex qualitative data into a set of themes and categories that can be analysed.

plants and the duration between each phase of the application. For the purposes of comparison, some data from the ND RHI was also included as part of the analysis. Analytical outputs were compiled thematically, and summary text was used to draw out findings from data analysis. This is presented in Annex 6.

Survey Analysis

Following the closure of the survey, the data was collated, checked (within and across cases to ensure coherence, self-consistency, and plausibility), and call backs and follow-up emails used to resolve issues. At this stage of the survey research, analysis of survey findings has been predominantly descriptive, including reporting means, ranges, and sub-group comparisons. For future analysis, the evaluation will undertake both trend analysis and comparisons with industry data. Survey analysis is detailed in Annex 7.

Challenges and Limitations

The findings of the evaluation thus far are limited, due to the following challenges:

- The research has been conducted at a relatively early stage in the lifetime of the GGSS, with only one fully registered participant plant. This has meant that the evaluation has not been able to report on post-award processes due to concerns of disclosive findings and due to analytical challenges associated with the small population of scheme participants.
- In a number of cases, interview samples are relatively small. For GGSS applicants, the total population was twelve, meaning in practice there have been fewer opportunities to resample and reach out where invitations were declined. Additionally, recruitment of gas suppliers proved challenging, and measures to boost sample sizes were only partially effective. Therefore, for these stakeholder groups, findings are based on a limited number of perspectives.
- Survey findings are also limited by the fact that (despite assurances) some respondents were reluctant to provide commercially sensitive data, and therefore responses have data gaps. Additionally, some of the GGSS respondents to the Annual Survey have effectively provided ‘nil returns’, as plants were not operational in the year the survey asked about, they have provided ‘0’ to most of the questions.

Evaluation Findings: Design and Implementation of the Green Gas Support Scheme

This chapter provides an assessment of how the GGSS has been implemented to date, considering the barriers and enablers, key success, and challenges, expected and unexpected outcomes of the scheme, and crucially, which aspects have worked, and which have not worked in the delivery process thus far. This chapter draws on monitoring data, a review of evidence in the biomethane sector, and the process evaluation undertaken between March and June 2023. It also draws on the first annual evaluation pulse survey of scheme beneficiaries and AD plants not funded by the GGSS, undertaken between August and September 2023. Findings are provided under themes that reflect the core elements relevant in process evaluation (design, implementation, and external context) and by evaluation question.

Findings by Theme and Evaluation Question

Implementation of the Green Gas Support Scheme

Process Evaluation Question:

How effective has the implementation and delivery of the scheme been?

(a) What has been the experience of the administration of the scheme (by Ofgem), including payments processes by applicants? Has it created an unnecessary applicant burden or any barriers to further deployment under the scheme?

(b) What problems have applicants faced during the application process?

Application to the GGSS

As shown in Table 9 (in Annex 6), the GGSS has received twenty-five applications from AD plants and has granted provisional tariff guarantees to twenty of these applications and full tariff guarantees to twelve[30]. To date (end July 2023), only one plant (of the twelve with full tariff guarantees) has successfully completed stage three of the application process, commissioned their AD plant, and registered onto the scheme to begin generating and injecting biomethane into the gas grid. As the level of uptake is lower than what was expected initially for the GGSS, the evaluation has explored reasons why application numbers have been lower to date than anticipated. We have identified the following findings:

[30] Not including those where full tariff guarantees were granted and then withdrawn.

- **Application process:** The application process (e.g. the GGSS application portal, the online application guidance, the pre-application support provided by Ofgem) was viewed positively and was not considered off-putting to prospective applicants. GGSS applicant respondents praised the clarity, logic, and straightforwardness of the process. Those with experience of both GGSS and ND RHI commented that, although similar, the GGSS was an improved process. Adding weight to this is the fact that seven of the twelve plants that had applications rejected have since reapplied to the scheme, with only five having dropped out (see Table 10 in Annex 6).
- **Application evidence requirements:** GGSS applicants, for the majority, felt that the application requirements were proportionate to the support offered. They did, however, highlight a number of challenges posed by some of the evidence requirements, which included difficulties in demonstrating: quotes and agreements for elements of project development (e.g. feedstock contracts, gas purchasing agreements, equipment quotes) where commissioning dates were far away; financial close when investor decisions were incumbent on Tariff Guarantee confirmation; and network connection without guarantee of GGSS support. However, these issues were raised by GGSS applicants rather than non-applicants, which may suggest that, although these issues are challenges to be overcome, they are not fundamental barriers to application.
- **Scheme eligibility criteria**: There was some evidence that the GGSS eligibility criteria was a barrier to scheme applications. One of the key barriers raised by non-applicants was the ineligibility of existing biomethane plants to apply for the GGSS. For the respondents who raised this point, the rationale for not allowing existing plants was understood, but they explained that their plants were on subsidies that were coming to an end and that although they were close to a gas injection point, without the subsidy the plants would end up being decommissioned as they would no longer be financially viable. In addition, one stakeholder did raise a concern that the strict eligibility requirements were a limitation on innovative AD plants (for example, plants that use injection hubs or shared equipment). There was also some suggestion from interviews that plants would consider decommissioning an existing plant and rebuilding a new one on the same site to meet GGSS requirements for new AD plants.
- **Feedstock availability**: There was strong evidence from interviews that feedstock availability was a barrier to applying to the scheme. A number of non-applicants highlighted issues with the availability of food-waste feedstock in the market as constraining their ambitions and ability to progress AD plants on the GGSS, specifically citing delays to Defra's Simpler Recycling food waste collection policies[31] that would provide a significantly increased supply of food waste and give them the confidence to make an application. In addition, both applicant and non-applicant respondents explained that the limited feedstock availability and increased competition had altered the economics of AD plants, as waste feedstock that previously would have received a gate fee, now comes at a cost to the plant. This concurs with the view of the Department, who held the view that feedstock availability was a key barrier to

[31] As set out in Defra's Simpler Recycling government response, local authorities in England must introduce mandatory collections of municipal non-household and household and food waste, which can be used as a waste feedstock, by 31 March 2025 and 31 March 2026, respectively.

deployment on the GGSS. Given that the Department had engaged with Defra in the policy design phase, and had anticipated a symbiotic relationship between the Defra Simpler Recycling food waste collection policies and the GGSS, the delays to the food waste policies and their knock-on impact on deployment did not align with the Department's expectations. Despite this context, there was very little evidence that applicants or non-applicants viewed the 50% waste threshold as too high or something that should be changed, further suggesting that the feedstock availability barrier was external rather than a result of ineffective scheme design.

- **Planning permission:** There was some evidence that planning permission delays were a barrier to applications. A small number of non-applicants highlighted prolonged delays and uncertainties in obtaining planning permission as a factor in delaying or deterring applications to the GGSS. One non-applicant explained they could not progress any GGSS applications due to planning challenges, and another explained that, although they intended to apply, the lead-in time for planning would be sixteen weeks (further extending what is already a lengthy preparatory process to achieve full scheme registration).
- **Reach of the scheme**: Analysis of when GGSS applications (excluding re-applications) were received shows that ten were submitted in the first two quarters after the scheme opened and only eight new applications over the subsequent six quarters (six in FY2022/23 and two in FY2023/24 as of July 2023). This may indicate that the initial ten applicants were waiting for the opening of the GGSS following the closure of the ND RHI, and that the scheme may have struggled to reach new potential applicants since then. However, there is no evidence from interviews that this was the case, and we suggest that the reach of the GGSS be interrogated further in the second GGSS process evaluation to provide greater clarity on this point and identify any lessons.
- **The ND RHI Scheme**: Highlighted by the rapid evidence review (Annex 8), ND RHI data suggests one further explanation for the scheme receiving fewer applications than expected upon opening. The number of biomethane sites registered under the ND RHI increased rapidly in 2022. An additional 44 sites were registered in this final year of the ND RHI (to 141 registrations, up from 97 in 2021 and 95 in 2020). It is expected that many sites had ND RHI applications in the final stages of the registration process and were waiting for further information to be released by Ofgem regarding the GGSS before completing the RHI process. As the value of the biomethane tariffs does not differ greatly between the GGSS and ND RHI, the additional five years of payments under the ND RHI are likely to have been the decisive factor in applicants opting for the ND RHI over the GGSS.

Deployment of new AD plants on the GGSS

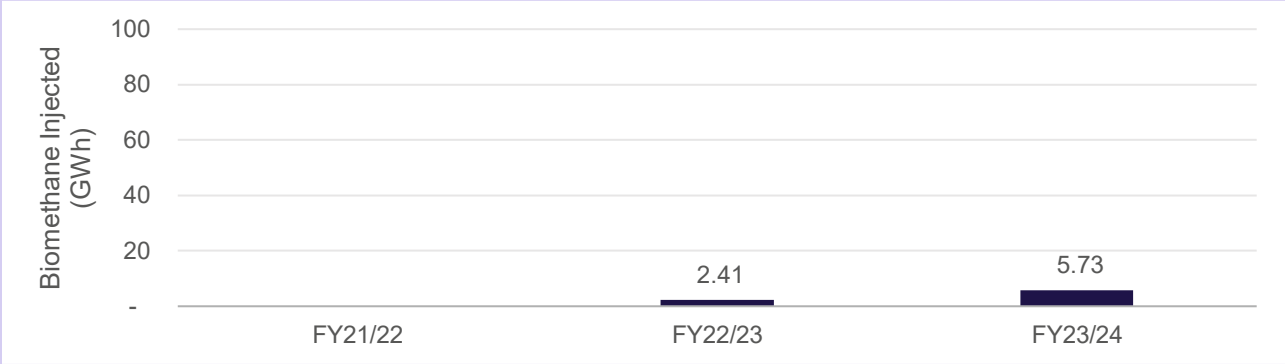
As is shown in Table 3, of the twenty-five applications received to the GGSS, the scheme has one fully registered, commissioned, and injecting biomethane site. This has resulted in a total

of 8.14 GWh of biomethane injected into the gas grid by Q1 FY23/24 (shown in Figure 1). This represents 1.1% of the central scenario set out in the GGSS and GGL Impact Assessment[32].

Table 3: GGSS Total Applications Received and Granted[33]

Application Stage	Total Received	Total Granted
Stage 1 (Provisional Tariff Guarantees)	25	20
Stage 2 (Full Tariff Guarantees)	20	12
Stage 3 (Registration)	2	1

Figure 1: Actual Biomethane Injections (by financial year)

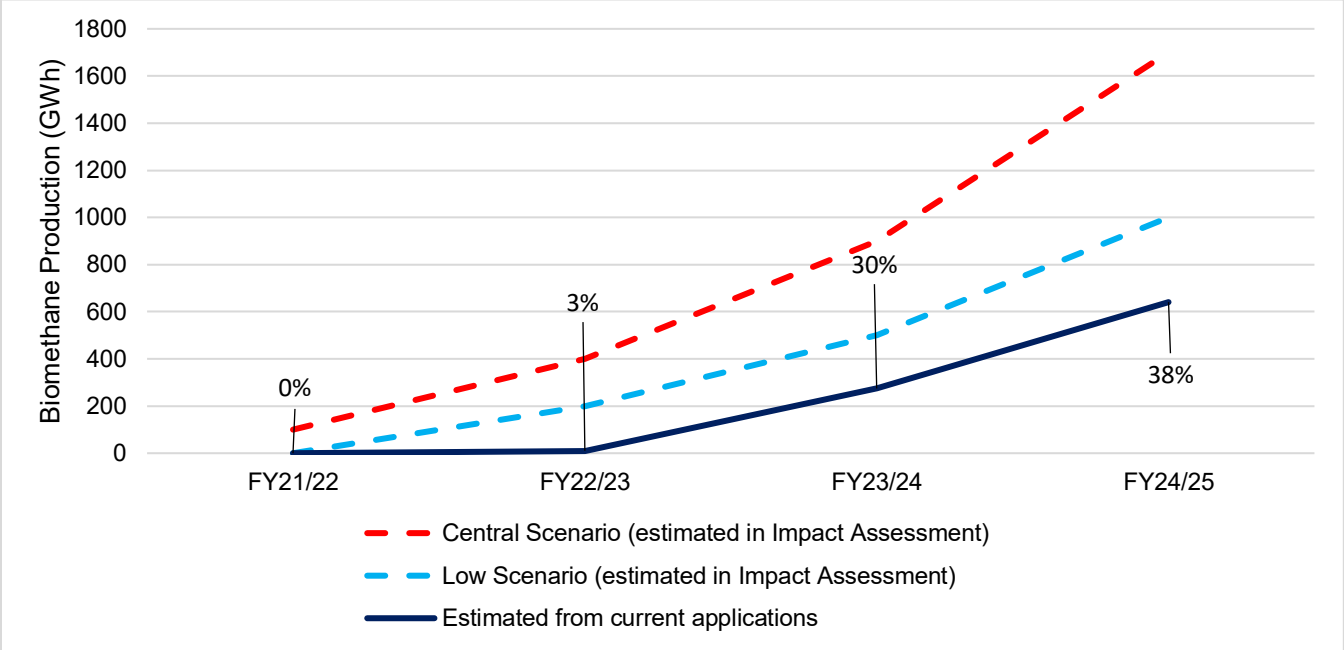


Source: Ofgem (2023), GGSS Quarterly Report (July 2023)

Beyond the one registered plant, eleven plants have been awarded full tariff guarantees and are currently working to commission their AD plant and register on the scheme. Figure 2 represents the biomethane injection that would have been expected from plants that have either registered or been awarded full tariff guarantees based on the stated volumes and commissioning dates provided by plants at the application stage. At the time of this analysis, six of the eleven non-registered plants that have received full tariff guarantees had already missed their commissioning dates (see Figure 3). Due to data availability, the analysis is based on estimates at the application stage and does not consider where commissioning dates have been missed. Therefore, the analysis in Figure 2 does not reflect actual or anticipated biomethane injection by current applications. The volume of eligible biomethane expected to be claimed on the GGSS should have represented 30% of the anticipated injection in FY2023/24[34] (Figure 2). The Impact Assessment scenarios are used to contextualise and show what was anticipated, rather than used as a benchmark of success, given the considerable uncertainty associated with making these estimates.

[32] BEIS (2021).Green Gas Support Scheme and Green Gas Levy: final stage Impact Assessment: https://assets.publishing.service.gov.uk/media/61422e36d3bf7f05aa5f92d8/green-gas-impact-assessment.pdf
[33] This table shows the total number of applicants to each stage, and therefore, those in stage 2 are a subset of stage 1, and similarly those in stage 3 are a subset of stage 2. It is also the case that some applicants may have applied multiple times to the GGSS with each separate application recorded in this table.
[34] Measured relative to the Central Scenario estimated in Impact Assessment.

Figure 2: Expected volume of Eligible Biomethane injected, estimated from Successful or Current Applications



Source: GGSS Application Data

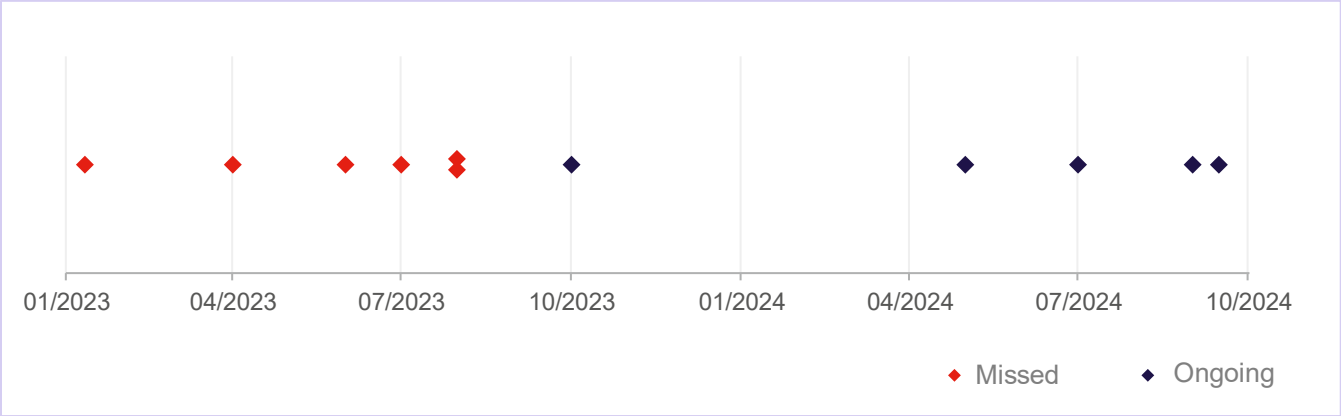
For FY2024/25, 38% of the expected injection (central scenario) is met by current applicants[35]. Peak injection, based on current applicants, is estimated at approximately 1,000 GWh per year. This compares to the expected peak injection[36] (central scenario) of approximately 2,800 GWh per annum.

As only one plant has progressed to registering and injecting, it is evident that the scheme has faced challenges not just in attracting applications, but in applicants progressing to full deployment. The challenge has been mainly in relation to applicants being able to commission their AD plant. As of July 2023, applicants in receipt of tariff guarantees had on average held these for over seven months (thirty-two weeks) without completing their plant construction. In the most extreme case, one applicant had received their tariff guarantee sixteen months prior, but had still not yet commissioned their plant (see Table 11 in Annex 6). As is shown in Figure 3, more than half of plants with ongoing applications (at the time of analysis) had missed their commissioning dates.

[35] This analysis reflects expected biomethane injection, if plants had injected biomethane in line with the volumes and commissioning dates provided at the application stage. Where commissioning dates have already been missed, this analysis does not change the modelled profile of biomethane injection, as there is insufficient information to update this. Some of the plants in this analysis have not yet missed their commissioning date. Breakdowns of missed commissioning dates are provided in Figure 3.

[36] Peak injection reflects the point at which no further plants can deploy onto the GGSS, and all plants are injecting biomethane at their peak capacity. This level of injection is expected until plants begin to decommission as they reach the end of their operational lifetime. In the GGSS final stage Impact Assessment, peak injection was estimated to occur between 2029/30 and 2040/41.

Figure 3: Expected injection start dates for applicants with current (ongoing) applications



Source: GGSS Application Data, July 2023

The evaluation has explored potential reasons that applicants have faced difficulties in progressing to commissioning and the registration stage, to begin injecting biomethane into the grid. We have identified the following findings:

- **Supply chain delays:** There was strong evidence that supply chain related delays were a key factor in limiting deployment on the scheme. Most of the respondents currently in the application and registration process highlighted the difficulties in commissioning their respective plants as a result of supply chain challenges. They identified that specific crucial components (e.g. microchip for Programmable Logic Controller) have a lead-in time of one year. Additionally, the number of UK suppliers of some components (e.g. grid entry unit) has decreased (in one example, from four during the ND RHI period, to just one). Respondents felt that the contraction in the number of suppliers amplifies the supply chain risk. This concurs with the view held by some stakeholders from both Ofgem and Department , who highlighted wider factors such as the war in Ukraine (and resultant interruption of gas supply) and Covid-19 pandemic (and resultant supply chain interruptions) as barriers. With supply-chain-related delays in accessing critical components and no alternative source, build times for plants have been impacted.
- **Industry immaturity:** As was identified in the rapid evidence review, the AD industry in the UK is still relatively immature. AD sites have been injecting biomethane into the gas grid in the UK for less than 10 years. Compared to other countries in Europe, such as Germany (which first started injecting biomethane into the gas grid in 2006[37]), there is potential for improvement with regard to commercial routes to engineering, procurement, and construction in the UK. It is also the case that there are a limited number of experienced operating contractors. These factors are likely to also contribute to challenges in commissioning AD plants.
- **Inflation-related cost increases:** Several applicants highlighted that inflation and supply-chain related costs had increased significantly over the period between planning and delivery. One respondent suggested that final costs could potentially be double the

[37] European Commission (2016) Report on the biomethane injection into national gas grid. Available at https://ec.europa.eu/research/participants/documents/downloadPublic?documentIds=080166e5abba7376&appId=PPGMS

levels originally anticipated. In this context of increased costs, AD plant developers may be forced to alter their approach to construction to find less expensive options to deploy their plants.

- **Scheme administration:** There was no strong evidence that scheme administration has played a role in delaying plant commissioning. One applicant did raise that in some cases, delays in decision-making with Ofgem impacted project timelines. However, Ofgem have no designated timeframe in which to make decisions (Ofgem have explained their preference is to ensure that the right decision is made on each application). Also, it is not clear to the evaluation team how delays in decision making prior to the Full Tariff Guarantees would impact the time taken from Tariff Guarantees to commissioning.

Had all current applicants with Full Tariff Guarantees deployed as per the date provided in their application, the Department would have expected biomethane injection volumes just below the impact assessment's[38] low scenario (shown in Figure 2 above). Although it is not within the scope of the evaluation to review the data concerned, we note that the Department has updated their estimates of biomethane injection under the GGSS, following the scheme extension announcement. The latest Application Budget Cap estimates increase from £51.7m in 2024/25 to £174.2m in 2027/28[39]. Although the Application Budget Cap estimates are not forecasts of spend, they indicate a level of spend the Department believes to be a realistic possibility. At scheme launch, peak annual GGSS spend was estimated at £150m[40]. Hence these estimates show that, plants are expected to commission later than initially anticipated but biomethane production could exceed impact assessment estimates by FY 2027/28. The need for plants to be able to commission at a later date reflects part of the Department's rationale for extending the GGSS to March 2028, as it should enable expected deployment levels to be met given the current context of supply chain (and feedstock) challenges.

Ofgem Administration of the GGSS

Evidence on participant experience of scheme processes and administration post-award has been relatively limited to date, as only one participant has successfully registered on the GGSS. Given the analytical challenge of drawing conclusions from such a small sample and the risk of being disclosive in discussing feedback from a single respondent, this report will not draw out findings specifically on the post-award administration of the GGSS (for example, making payments, sustainability audits). These topics will be considered more fully in the

[38] Green Gas Support Scheme and Green Gas Levy: final stage Impact Assessment (2021) available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1018133/green-gas-impact-assessment.pdf

[39] GGSS budget caps, production factors and inflation forecasts for 2024-25: https://www.gov.uk/government/publications/green-gas-support-scheme-budget-management/ggss-budget-caps-production-factors-and-inflation-forecasts-for-2024-2025

[40] Green Gas Support Scheme and Green Gas Levy: final stage Impact Assessment (2021) available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1018133/green-gas-impact-assessment.pdf. Note that this spend estimate is provided in 2020 prices, whereas Application Budget Cap estimates are provided in nominal terms. Spend was estimated to peak from 2028/29 until 2035/36 at scheme launch.

second GGSS process evaluation report. However, the following findings were identified on how Ofgem has been delivering the scheme:

- **Communication from Ofgem:** There was strong positive feedback on how Ofgem had communicated with GGSS applicants and prospective applicants. Respondents identified that having one single point of contact within Ofgem for applicants to direct their queries towards was a significant factor in smoothing the communications processes and avoiding inefficiencies associated with dealing with a central inbox. GGSS processes were therefore felt to be an improvement on the ND RHI process. Ofgem were praised for being proactive and front-footed in their approach to applicants and were also felt by applicants to be knowledgeable and able to provide the necessary support to address issues in their applications.
- **Scheme published guidance:** A small number of applicants specifically highlighted that Ofgem's online guidance documents were clear and helpful and there were relatively few negative comments. Only in some cases were these criticised as being too broad for specific project contexts, which respondents agreed was unavoidable and necessary given various types of applicants to the scheme, and different operating models.
- **Unnecessary requests:** GGSS applicants highlighted that some elements from the ND RHI scheme had been carried over into the GGSS where it was not logical to do so. Examples included accounting and reporting on heat used in the AD process and in the format of data templates for claim submissions. It was suggested by one applicant that a critical review of GGSS templates and requirements should be completed to identify unnecessary information requests.
- **Application deadline enforcement:** A small number of applicants felt a negative aspect of the delivery was that the hard line taken by Ofgem on submission deadlines did not take account of real-world delays. However, it is important to note that the deadlines enforced by Ofgem are set in the Regulations from the Department, and so Ofgem is unable to apply leeway. A potential lesson to be taken from this is that there is scope for better communication between projects (or prospective applicants) and Ofgem on why the hard deadlines are in place.

Design of the Green Gas Support Scheme

Process Evaluation Question:

How has the GGSS budget management (budget caps / Annual Tariff Reviews / degressions) affected the scheme's attractiveness?

Budget Management

The GGSS's budget management has been designed to minimise the risk of overspend on the scheme relative to the amount collected by the GGL. The key mechanisms include budget caps, the Annual Tariff Review, and degression. Processes to support budget management also includes forecasting deployment and estimating payments to GGSS plants. The

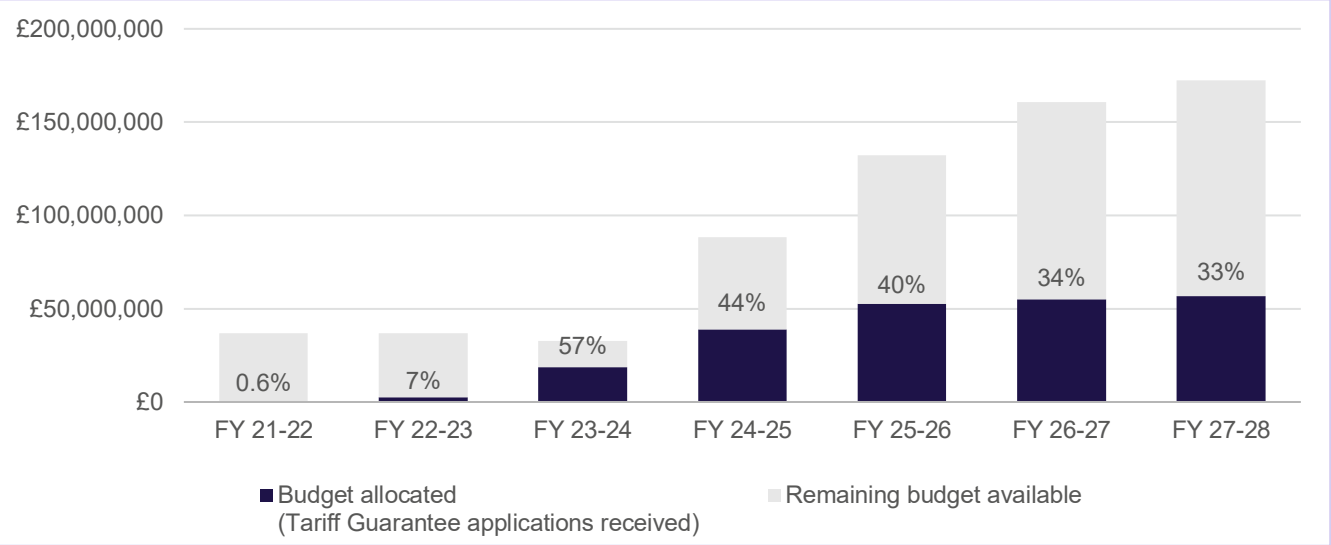
evaluation explored the extent to which these mechanisms influenced respondents' perceptions of the attractiveness of the scheme:

- **Budget management mechanisms:** There was little evidence from interviews with applicants and non-applicants that the budget management mechanisms were a significant factor for applicants deciding whether to apply to the GGSS. One applicant indicated that they had submitted their application earlier than they might have done otherwise, given their concern that the GGSS annual budget would be fully consumed immediately on scheme opening. The transparency of the scheme through quarterly reports was praised as it gives prospective applicants a sense of the number of applicants and the likelihood of degression. Given that at the time of interviewing it was recognised by applicants and non-applicants that application numbers to the scheme were low, and therefore that potential for degression or the annual budget being fully used up were unlikely, it is to be expected that these two mechanisms were less prominent in respondents' motivations.
- **Annual Tariff Review:** At the time of interviewing, there had been one GGSS Annual Tariff Review and no tariff changes have occurred, and therefore evidence of the impact of this on scheme attractiveness is limited.

Forecasting deployment: As shown in

- Figure 4, only 7% of the FY2022/23 Annual Budget cap and 57% for the current financial year Annual Budget cap has been committed to projects. Budget caps are set using deployment forecasts to estimate the level of biomethane production and likely spend in the scheme year, based on market intelligence. The Annual Budget cap aims to strike a balance between controlling spend, and therefore collection through the GGL, with ensuring that, as far as possible, projects can access the GGSS without being placed in a queue because the annual budget is fully committed. The process of estimating deployment is inherently uncertain, given the influence of changes in external factors on plants' ability to deploy. It is evident that this process did not get as close to actual deployment levels as it intended to.

Figure 4: Annual GGSS budget allocated compared to Annual Budget caps, correct as of September 2023



Source: Ofgem Website, 26th September 2023[41]

It should also be noted that across the scheme years considered in this evaluation report (Year 1 to Year 3 Quarter 1), there has been no overspend or instances where there were insufficient funds to pay for biomethane production. Therefore, it can be understood that the budget management mechanisms have worked sufficiently to mitigate this risk.

Level of Incentive

The evaluation also explored other factors relating to the design of the scheme, beyond budget management mechanisms, to understand whether and how these have influenced scheme attractiveness. Our findings include:

- **Level of incentive:** Although deployment of to the scheme has been slower than anticipated, the consensus from Department and Ofgem interview responses was that the issue is with external supply chain and feedstock challenges rather than the level of incentive offered by the GGSS. When this was explored with AD plant respondents, there was strong evidence and consensus that tariff tier one provided plants with suitable levels of support for plants to be economically viable and that it matched their expectations on the level of incentive they would need as well as the level of returns sought by investors. However, respondents reported that tiers two (to a lesser extent) and three (to a greater extent) posed more of a challenge to commercial viability, reducing the incentive to inject biomethane in these tiers.
- **Plant size:** The evaluation has found that the level of incentive (tariffs) available has influenced the size of the plant deployed. A number of respondents indicated that the AD design of the plant that they have applied for on the GGSS would have been smaller had they instead applied to the ND RHI, due to the lower tariff thresholds. Indeed, when

[41] Available online https://www.ofgem.gov.uk/environmental-and-social-schemes/green-gas-support-scheme-and-green-gas-levy/applicants

plant sizes on the GGSS were compared to the ND RHI, taking into account plants that have not yet been commissioned, GGSS applicants were on average larger, as shown in Table 4 (and the difference between these two means was found to be statistically significant). Qualitative evidence shows that applicants perceived the GGSS scheme to favour a 60 to 80 GWh plant size, given the incentive structure. As shown in Annex 6 Figure 18, although more GGSS applicants have applied with plants over 80 GWh output (n=12) than below, the amount of biomethane applicant plants intend to claim on the GGSS (reported to Ofgem in application forms) is less than 80 GWh for half of all applicant plants. This matches a tendency towards 'oversizing' AD plants deployed relative to the amount intended to be claimed on the GGSS, making use of other support available (e.g. the Renewable Transport Fuel Obligation) for the additional capacity. AD plants will get the most favourable returns for the first 60 GWh of biomethane they claim, but for biomethane produced above this, a more favourable financial reward may be achieved on the RTFO, compared to the GGSS second and third tariff tiers. This will be discussed in more detail in the following section.

Table 4: GGSS Average Plant Size compared to Non-Domestic RHI Plants

Scheme	Average Plant Size (MWh)	Sample
GGSS	89,700 MWh	18
ND RHI	52,000 MWh	170

Source: GGSS Application Data, July 2023; Data request to DESNZ for ND RHI data.

- **Years of Support:** As referenced previously, there was some evidence from interviews and from the review of the literature that the shorter time period of support offered under the GGSS, in comparison to the ND RHI, led applicants to prefer the latter scheme and, where they had the option to apply for either scheme, opted for the ND RHI.

Wider Policy Context of the Green Gas Support Scheme

Process Evaluation Questions:

How has interaction between the GGSS and other directly linked policies, such as the Renewable Transport Fuel Obligation (RTFO) and proposed Defra Food Waste Collection policies, impacted applications and participants?

Additional Revenue Streams

The Renewable Transport Fuel Obligation (RTFO) (administered by the Department for Transport) requires fuel suppliers that supply at least 450,000 litres per annum of fossil and renewable fuels to show that a percentage of the fuel they supply comes from renewable and sustainable sources. Obligated suppliers can meet their obligation by either redeeming Renewable Transport Fuel Certificates (RTFC) or by paying a fixed sum for each unit of fuel they wish to 'buy-out' from their obligation. RTFCs are created and provided to participants who supply renewable fuels based on the quantity of biofuel they generate. These certificates

can then be traded on the open market to allow other suppliers to meet their obligations. Biomethane can be compressed and used as a transport fuel, and therefore provides an alternative revenue stream for AD biomethane producers. The GGSS is a tiered system: therefore, the financial benefits decrease as the quantity of energy injected into the grid increases. Hence, some operators may choose to claim ND RHI or GGSS payments for a portion of the injected biomethane before claiming RTFC for the remaining portion. As the price of an RTFC is directly linked to the obligation amount, any increase in the obligation could promote RTFOs over the GGSS. This competition could reduce the amount of injected biomethane under the GGSS if operators deemed the RTFO to be a more attractive option.

A Guarantee of Origin (GoO) is a certificate detailing the origin of renewable electricity or fuel. The Green Gas Certification Scheme (GGCS) is responsible for issuing certificates to biomethane producers[42] acting as the mechanism by which injectors of biomethane in the UK can receive GoO certificates[43]. Biomethane producers voluntarily participate in the scheme, and for each kWh of biomethane generated and injected into the grid under the GGCS, a Renewable Gas Guarantee of Origin (RGGO) is created. This can be sold to gas market entities (e.g. a natural gas supplier) who wish to provide a green gas offering to customers (for example, to comply with climate targets or to improve profitability). When green gas is purchased by end consumers, the certificate is passed to the customer and retired from the certification system to avoid double counting. This provides additional revenue to AD plants beyond that from the physical sale of the biomethane.

Findings on how these wider schemes interacted with the GGSS gave the following insights:

- **Improved flexibility:** Respondents found that the GGSS was more flexible than the preceding ND RHI scheme in allowing switching between GGSS tariffs and RTFO. GGSS participants have the flexibility of apportioning biomethane production to both the GGSS and the RTFO to gain the most favourable return, whilst ND RHI plants were required to choose between the two on a quarter-by-quarter basis. This flexibility was viewed positively by investors as something which added to the appeal of the GGSS.
- **Revenue optimisation:** Respondents viewed the RTFO to be an important component of plant revenue stacks, but crucially, it was viewed by most as an *"added bonus"* or *"optimisation strategy"* to improve returns rather than a driver of biomethane production in its own right. Respondents explained that the RTFO carried greater risk for investors, due to its price fluctuation, and therefore offered a less secure case for investment. Three respondents highlighted the significance of the GGCS, enabling the transfer of Renewable Gas Guarantees of Origin (RGGO) as a revenue stream for plants that was growing in importance, and was increasingly recognised in its significance by funders.
- **Use of these revenue streams:** Nearly all respondents indicated that they had planned to, or would consider, utilising the RTFO and the GGCS to supplement their revenue

[42] Previously, there were two certification schemes, the Green Gas Certification Scheme (GGCS) and the Biomethane Certification Scheme (BCS). The BCS is no longer issuing certificates and is currently winding down certificates already issued.
[43] The GGCS is not a government run scheme but was established by the Association for Renewable Energy and Clean technology, in partnership with a number of other organisations.

streams, and whilst these may not have acted as key motivators for applications, they improved the overall attractiveness of the scheme. Interestingly, the Annual Survey (Annex 7) found that in practice, GGSS applicants are not currently participating in these policies as of yet and no respondents were producing RTFO certified biomethane to date. This may be interpreted by the limited number of GGSS participants that are producing biomethane, and that applicants intended to participate in these schemes once operational.

Waste Feedstocks

At the GGSS design stage, it was intended that there would be a symbiotic relationship between the scheme and proposed Defra policies for consistent separate food waste collection across local authorities. This policy was hoped to increase the supply of waste feedstock available for anaerobic digestion, but delays in implementing these policies have meant that this increased supply of waste feedstock has not been realised[44]. The evaluation explored how this policy not being implemented influenced the GGSS:

- **Market confidence:** The evaluation found evidence from interviews of high demand and increasing competition for existing waste feedstocks within the AD biomethane market, and in this context, there was strong evidence across all stakeholders engaged that this had limited deployment on the scheme. A number of non-applicants have not progressed with an application as a result of these regulations not being implemented, and more generally, there was a lack of confidence in the market for food waste feedstock availability. In no case in the Annual Survey was it reported that food waste from either local authority collections or other commercial/industrial food waste was part of respondent plants' feedstock mix[45].
- **Improved pipeline:** A majority of respondents felt that the roll out of these regulations would unlock a pipeline of plants, assuming that policy developments would occur within the lifetime of the GGSS. One AD plant interviewee took a different view however (speaking prior to the scheme extension announcement), suggesting that there would be too little time between the regulations coming online and the scheme closing to new registrations, to make a difference. A minority of applicants suggested that extending the deadline for applications would allow the scheme to capture additional demand that would otherwise be missed.

[44] Defra have now published the Simpler Recycling government response, setting out deadlines for local authorities in England to introduce mandatory collections of municipal non-household and household food waste, which can be used as a waste feedstock, by 31 March 2025 and 31 March 2026, respectively.
[45] Caution is required in interpreting this finding given the very small sample sizes and that GGSS plant respondents were not necessarily operational for the period in question in the survey.

Evaluation Findings: Design and Implementation of the Green Gas Levy

This chapter presents synthesised findings for the Green Gas Levy, drawing on process evaluation and monitoring data analysis. Findings are provided under themes that reflect the core elements relevant in the GGL process evaluation (design, implementation, and supplier experience) and by evaluation question.

Findings by Theme and Evaluation Question

The Design of the Green Gas Levy

Process Evaluation Questions:

Were the compliance and enforcement measures effective in mitigating against non-compliance and in addressing non-compliance when it arose?

Were the administration timings suitable, giving gas suppliers enough time to pay the levy, lodge credit cover, pay mutualisation costs, and pay penalties?

Levy Design Features

Both Ofgem and Department respondents expressed positive sentiments toward how the levy had been designed (although the role of the Department in designing and Ofgem in implementing the levy should be noted when interpreting this finding). Although some stakeholders did highlight minor areas that posed more of a challenge, the strong consensus was that the levy so far had been a success. It was found to be fulfilling its purpose to collect sufficient funds to make payments to biomethane producers on the GGSS and providing confidence to Ofgem and Department stakeholders that it would continue to do so. Certain design features were highlighted as working well to enable the levy to be so effective.

- **Compliance and enforcement:** Supplier non-compliance with the GGL has been minor, with six reported instances of late credit cover[46] provision, and seven instances of late levy payment (as shown in Table 18 **Error! Reference source not found.** in A nnex 6). In all of these cases, issues have been resolved within a few days (on average, it has taken less than two days to resolve issues, with the longest time taken being 6 days) and were quick and easy to deal with. Given this low level of non-compliance, Ofgem have not had to use any of the specific mechanisms to ensure that it can recover sufficient funds (e.g. credit-cover draw down, mutualisation). For instances of minor

[46] All suppliers, except those that have been granted provisional exemption, are required to lodge credit cover in the form of cash credit cover and/or an acceptable letter of credit to help ensure funds are collected in a timely manner and to reduce the likelihood of mutualisation events being required. Once in place, suppliers' credit cover may be drawn down on by Ofgem in instances where a supplier fails to pay all or part of a levy or mutualisation payment by the relevant due date.

non-compliance, Ofgem have sought to engage in dialogue with those suppliers to bring them into compliance as quickly as possible and have mitigated accidental non-compliance by proactively providing reminders to gas suppliers.

- **Administrative timings:** A majority of suppliers felt that the timings for various levy requirements were appropriate and enabled their organisation to meet deadlines relatively easily. A single supplier did suggest that although they were able to meet deadlines on submissions, in some cases it can be quite a challenge to do so. One supplier also specifically commended the levy for the clarity of timings related to requirements placed on suppliers, which are published in a timetable by Ofgem.
- **Setting the levy:** The consistent view across all department respondents was that the process to set the levy each year worked well, and the steps to set the levy were clear and easily repeatable year-on-year. Respondents felt that the analysis, mechanisms, and processes in place to minimise the potential of the levy not collecting sufficient funds were effective. These included building in headroom to cover an unexpected drop in the number of suppliers and fewer metre points over a financial year than expected.
- **Provisional exemption:** With only one supplier provisionally exempt, there was limited evidence on how this process was working. However, the general view from Ofgem was that there were no significant challenges in this process and that it was functioning effectively. One reason suggested for the ease of administration of the provisional exemption measures was the early stage at which the supplier advised Ofgem that they believed they would be exempt.

Challenges of the Levy

Although not a design flaw of the levy mechanism, the levy has collected more funds than was required to make GGSS payments, given lower than forecasted deployment on the GGSS. As shown in Table 5, of the £53.9m collected by the levy in its first two years, only 0.19% of this has been disbursed on the GGSS (£0.1m). When Ofgem administration costs for year 1 and year 2 are included, this proportion is 5.12%.

Table 5: Funds Received from the GGL and Disbursed on the GGSS

Year	Total Levy Collected	Funds Disbursed on GGSS (£)	Funds Disbursed on GGSS (%)
Year 1	N/A	£0	N/A
Year 2	£53,953,882.28	£104,860.84	0.19%
Year 3[47]	£12,923,645.02	£228,414.58	1.77%

Source: GGSS quarterly report issue 7, July 2023

[47] Includes Q1 of year 3 only.

The evaluation has unpacked how mechanisms have worked and not worked regarding the challenge of underspend on the GGSS compared to Overall Scheme Expenditure Budget (OSEB)

- **Forecasting challenges:** Given the nature of the scheme, one main challenge that was identified in particular by the department (but also Ofgem) stakeholders was related to forecasting and uncertainty. The levy rate is determined by the OSEB, which is in turn based on forecasting of GGSS deployment. As the GGSS is a demand-led scheme, forecasting applications will always be uncertain, meaning uncertainty is a feature of the levy and poses a challenge for levy setting. The lower-than-expected uptake of the GGSS has led to a mismatch of funding collected and disbursed.
- **Underspend mechanisms:** This scenario of underspend on the GGSS was, however, envisaged in the design phase and mitigations have been put in place. The levy has a mechanism built in to utilise underspend on the GGSS by reducing the levy rate in the following years. As is shown in Table 6, the levy rate has reduced from £2.10 per meter per period from the second scheme year (2022/23), to 45p per meter per period for the third scheme year (2023/24), having factored in a £46.8m forecast surplus at the stage of levy rate setting. This is evidence of the levy working as expected.

Table 6: Levy Rate

Scheme Year	Levy Rate per meter per day	Levy Rate per meter per period
Year 1	0.484p per meter per day	59p per meter over the period
Year 2	0.576p per meter per day	£2.10 per meter over the period
Year 3	0.122p per meter per day	45p per meter over the period

Source: Department for Energy Security and Net Zero (2022), Green Gas Levy (GGL): rates, underlying variables, mutualisation threshold for the 2023-2024 financial year.

In the context of underspend on the GGSS, a minority of policy/delivery respondents have suggested that being able to amend the levy-rate mid-year where necessary to respond to expected surpluses could reduce over-collection. The department has considered this approach but has opted not to make this change because it would significantly increase the administrative burden of delivering the GGL without providing sufficient benefits for the consumer. The Levy is designed so that surplus funds from any year are ringfenced and rolled over to the next, reducing the levy rate for that year.

The Implementation of the Green Gas Levy

Process Evaluation Questions:

How effective has the implementation of the GGL been?

What opportunities exist for reducing the administrative burden of the levy?

Levy Administration

The consensus amongst department stakeholders and gas suppliers is that the levy is well run by Ofgem. Although some minor challenges with the implementation were raised, suppliers did not identify any significant negative aspects of Ofgem's administration, emphasising the positive view the suppliers have of levy implementation. The evaluation explored factors that have contributed to the positive experience, and has found:

- **Collaborative levy design and delivery:** The most frequently cited reason for successful implementation from Ofgem and Department respondents was the collaborative nature of levy design, both between the Department and Ofgem, and extensively engaging industry stakeholders with the design and testing of the levy.
- **Well-defined and repeatable responsibilities:** Respondents also identified the well-defined and pre-determined roles and repeatable or automated processes that have been put in place as key enablers of successful implementation. Ofgem and DESNZ respondents specifically highlighted the value of investing in automating levy processes.
- **Data-driven approach:** An additional success factor that was identified by respondents was the analytical and data-driven way in which the levy is implemented. As part of setting budget caps and levy rates, the Department undertakes a range of modelling and forecasting activities, for example, modelling the number of metre points served by gas suppliers, providing GGSS deployment forecasts, and estimating the number of exempt gas suppliers. By following detailed modelling and using clearly defined inputs and market evidence, many of the policy decisions on the levy rate are driven by this data. Although forecasting has been challenging given the uncertainty of deployment onto the GGSS, in the long run, this data-driven approach will be of benefit to the GGL. Policy decision-making therefore involves consideration of the level of risk the Department is willing to take on, for example, the amount of headroom to build in. In this way, the need for policy-decision making is reduced, and the process is therefore felt to be relatively straightforward to carry out. Ofgem has also sought to use previous knowledge and experience of implementing other schemes and apply learning to levy processes.

Neither Ofgem nor the Department raised significant issues in administering the levy, and only mentioned relatively minor and unavoidable challenges, or challenges that have now been resolved. These included:

- **Data sharing:** Both the Department and Ofgem referenced challenges in setting up data sharing agreements, however these have been addressed and are working well.

- **Data limitations:** There was also some evidence that limitations of available data posed a challenge for levy administration. Issues referenced included the inconsistent data that some suppliers had on file related to the number of meter points that they serviced, which meant Ofgem could not have full confidence in the data that they were receiving (prior to the introduction of Xoserve data). The introduction of Xoserve (although very well-received) posed new challenges, with difficulties in resolving minor discrepancies in numbers and calculations between suppliers and Xoserve.
- **Returning surpluses to Treasury:** There was some evidence of difficulties and complexity relating to HM Treasury rules of returning surpluses and being repaid the following financial year. The challenge related to a lack of clarity and shared understanding in the respective processes of the Treasury, the Department for Energy Security and Net Zero and Ofgem in relation to this process, and the challenges of communication across the three organisations. As this was the first year that this process was undertaken, it is expected that subsequent years should see an improvement. There was acknowledgement from a small number of stakeholders that this was neither the optimal nor most efficient approach to dealing with surplus levy funds. Despite this being complex and difficult to implement, there was no indication that this process did not deliver its intended result.

Reducing the Administrative Burden

Evaluators explored ways in which Ofgem could be supported to minimise the administrative burden of the levy with interview respondents. The most common response was that the status quo and division of responsibilities between Ofgem and the Department were working well, and no further support was required. Any suggested changes to improve the day-to-day delivery were minimal in scope, reflecting the success of the current implementation model:

- **Straightforward improvements:** It was suggested that more of Ofgem's internal administrative processes could be automated.
- **Changes to levy design:** It was also suggested that introducing de minimis rules[48] to make efficiencies where suppliers owe a minimal amount that isn't cost effective to request payment for would also streamline Ofgem's administration (and also the experience of small gas suppliers). In the period between primary research and report drafting, de minimis rules have been added to the GGL regulations.

Supplier Experience of the Green Gas Levy

Process Evaluation Questions:

Have the costs/burdens imposed on gas suppliers due to administrative processes been proportionate to the size of the levy/expectations?

[48] De minimis rules would mean that suppliers who owe a small amount (below a certain threshold level) would not be required to pay the levy.

Are gas suppliers satisfied with the performance of Ofgem administering the GGL, such as in collecting levy payments, chasing non-compliance etc.?

Levy Cost and Administrative Burden

In the first two years that the GGL has been active, the number of suppliers eligible to pay the levy (i.e. serving gas metre points in the UK) has fluctuated between 85 at its lowest and 98 at its peak. Since Year 2, these suppliers have been obligated to pay the quarterly levy amount and have contributed to the levy collecting £53.95 million. Across the gas suppliers interviewed, all passed on the cost of the levy to their customers (where this was possible), either by adding a fixed cost to the standing charge based on estimations of levy costs or by passing through the cost for those on pass-through contracts. Suppliers had the following reflections on the financial and administrative burden that the levy placed on their organisations:

- **Minor cost of the levy:** There was strong consensus across the gas suppliers interviewed, regardless of size, that the levy represented a minor cost to their organisations in terms of administrative effort. In no cases was it reported that suppliers took on additional staff to meet the requirement (instead absorbing time within existing teams). The most significant cost incurred was in the initial set-up phase, with costs relating to the time to understand requirements, adjust pricing, organise data systems, determine governance procedures, and develop explanatory procedures. On an ongoing basis, processes have generally been embedded and where possible automated, minimising costs.
- **Minimal requirements:** Related to the above finding, gas suppliers in general have found the effort of meeting data requirements and making payments to be relatively minimal, expressing a view that the systems and processes in place to validate data, lodge credit cover and make payments are efficient and effective. The introduction of Xoserve[49] data to support with providing meter-point data was particularly credited with minimising effort, explained by the fact that it was felt to be easier to check figures than provide them from scratch. One supplier suggested that the quarterly requirements take one-to-two hours to address. In no cases was it expressed those suppliers felt the cost and effort was particularly disproportionate.
- **Cost to customers:** Although levy costs generally are passed on to customers[50,51], there was some evidence from interviews with suppliers that given the small scale of the costs to individual consumers, customers generally do not notice them.

[49] Xoserve is the designated Central Data Services Provider for Great Britain's gas supply. To support suppliers in meeting their levy obligations, Ofgem will endeavour to routinely obtain meter point data each quarter for every supplier licence from Xoserve and ask all suppliers (including any with provisional exemption) to confirm that the data is correct.
[50] The majority of responses reported that they passed on the levy costs to customers, although the method by which this occurred depended on the type of customer and nature of the contract that the customer was on. A small number of suppliers reported not being able to pass on levy costs to customers (e.g. because the supplier reaches the price cap before costs are fully accounted), suggesting that in some cases suppliers were unable to pass on full levy costs.
[51] As part of the Energy Price Guarantee (EPG) scheme, introduced in 2022 following significant increases in the wholesale price of gas, green levies were removed from consumer gas bills and paid by the UK Government.

- **Gas supplier engagement:** The methodology section of this report referenced challenges in securing interviews with gas suppliers. A frequent response when suppliers specifically declined to engage in the interviews was that the levy costs to their organisation were so small and the impact minimal, that they did not feel it was worthwhile to offer their views on it.
- **Improvements to reduce administrative burden:** When asked what, if any, changes to the levy would lessen the burden on suppliers, the most common view of suppliers was that no significant changes were required (and indeed that making significant changes now would increase the burden on suppliers as they would need to re-incur set up costs to re-develop automated processes). One improvement referenced by a number of suppliers was for Ofgem to provide a longer-term view of future dates (of levy payment and credit cover lodgement dates) and costs (e.g. levy amounts), in order to better plan and automate processes. One supplier, although acknowledging the benefits of quarterly payments in the context of mutualisation, suggested that given the size of the levy, an annual process might be more cost effective and proportional than a quarterly requirement. Finally, it was suggested by some gas suppliers that supplier experience of the levy portal could be improved, for example, by adding a feature that shows when tasks on the portal have been completed so suppliers can see what still needs to be done.

Levy Implementation and Administration

Suppliers were content overall with how the levy had been implemented by Ofgem, highlighting how few hiccups in delivery there have been and describing the implementation as *"smooth"* and *"well-managed"*.

- **Communications from Ofgem:** Gas Suppliers concurred that the pre-implementation communications regarding the levy had been sufficient to meet their needs and, in most cases, timely enough to put processes in place (with one example of longer-term contracts minorly impacted). Two suppliers specifically praised the clarity in which the levy is communicated and have expressed that the levy has been easy to understand. As one Ofgem participant pointed out, given non-compliance has been minimal, this indicates that the communications have been sufficient, and another gas supplier felt that they would be "surprised" if other suppliers were making errors.
- **Clarity of guidance:** The levy guidance published online was received positively, and most suppliers interviewed reported using the guidance as a key tool in understanding how the levy is intended to work and the actions that they needed to take. Ofgem were also commended by one supplier for how responsive they have been to queries and support requests.
- **Transition to a volumetric levy:** The only criticism of the communications around the levy has focused on the uncertainty regarding a transition to a volumetric levy. It should be noted that this policy decision sits outside of Ofgem's remit, and although suppliers may attribute a lack of clarity to Ofgem, this proposition is something that is still being considered and worked on by the Department for Energy Security and Net Zero. It is clear that the prospect of changing to a volumetric approach is of concern to gas

suppliers, particularly as they seek to make decisions about the future. Although this topic was not included in the interview topic guides, a number of suppliers highlighted concerns with the potential additional set-up costs involved with making the transition and the impact on pricing and bills.

- **Data discrepancies:** The other areas where suppliers referenced challenges or deficiencies with levy processes were reconciling discrepancies between Xoserve figures and internal metre-point figures and the different views on what constitutes 'live-on supply' metre points between suppliers and Xoserve. For the suppliers interviewed, discrepancies were relatively minor and did not have a material impact on costs.

Learning and Implications

This chapter uses the evaluation findings of the preceding chapter to test the evaluation theories (theory of change and contribution claims). It also provides an initial assessment of the efficacy of the evidence used to do this. In addition, the chapter draws learning and implications from the tested theories for how the GGSS and GGL are operating in practice compared to the theorised understanding.

Discussion of Findings compared to the Theories of Change

This section of the report will discuss the synthesis of evaluation findings relative to the GGSS and GGL theories of change. As a theory-based process evaluation, the method has focused on testing the validity of the theory of change, assessing the assumptions that underpin causal pathways (based on how the scheme and levy have worked in practice), and the factors that have enabled or constrained the realisation of outcomes. Annex 3 **Error! Reference source not found.**input, activity, output, outcome, and impact categories. Key points to take away from testing of the theory of change are summarised below:

GGSS Inputs and Activities

For the input and activity section of the GGSS theory of change, the scheme has operated as anticipated, with the exception of the 'available feedstock' input. This is discussed in detail below.

- The scheme was able to make all required payments for biomethane claimed on the scheme, with no overspend. As such, the levy's role in supplying funding for GGSS tariff payments has worked as expected, as will be discussed in greater detail below. The levy has also funded Ofgem's role in administering the support scheme and levy, meaning the only costs to government were the internal department staff and policy development costs, as well as the costs of the programme evaluation.
- An assumption at the input stage was that feedstock for AD plants would be available at a financially viable price in the market. Feedstock availability was included as a necessary input for successful applications. The ToC showed two relevant contextual factors for this input: i) the barrier of increased competition for and price of feedstock, and ii) an enabler of the Defra Simpler Recycling food waste collection regulations. The evaluation found that the delays in the Defra food waste policies, coupled with an already constrained feedstock market, meant this input was not as available to applicants, constraining scheme applications and therefore how effectively the scheme could attract AD plant applicants.
- It was theorised that participants would have to draw together a series of pre-application inputs themselves to be able to meet eligibility criteria and successfully apply. These included planning permissions, feedstock agreements, investor willingness, and confirmation of funding. There was limited evidence to suggest that these were a challenge for prospective applicants. A few non-applicants highlighted planning

permission challenges as a barrier to application, and a number of applicants referenced challenges in demonstrating agreements and financial close, but such pre-application requirements were not found to be a significant constraint on deployment onto the scheme and consequent scheme outcomes and impacts.

- The exclusion of existing plants from the eligibility criterion was identified as a barrier by some developers despite the rationale of the scheme aiming to overcome high capital costs of deployment and therefore, incentivise the commission of new AD plants. There was some evidence from a small minority of respondents that the exclusion of existing AD plants may incentivise unexpected behaviours among developers, including removing and rebuilding existing plants (to qualify as a new plant) or decommissioning existing AD plants when current subsidies come to an end. These options had only been considered as hypothetical actions by respondents at the time of interviewing.
- Wider supporting policies, such as the RTFO, were theorised to be enabling inputs for the scheme. The evaluation found some evidence that the flexibility of the scheme permits revenue-optimising options (i.e. leveraging the RTFO), which helped motivate applications by improving the attractiveness and potential returns of the scheme. However, no biomethane produced by GGSS participants has been claimed on the RTFO so far (likely as a result of low deployment to date), and therefore the causal chain leading to transport decarbonisation has not yet been realised as theorised. This is expected to change as more plants come online.

GGSS Outputs, Outcomes, and Impacts

The timing of the evaluation has meant that not all points in the GGSS theory of change have been tested. The evaluation suggests that the assumptions in the ToC of how the scheme could operate to deliver impact are broadly valid, but that wider contextual barriers have inhibited pathways to impact. This is discussed below:

- The rationale of the GGSS is to provide tariffs for biomethane injection and therefore provide a sufficient rate of return for projects to be viable for investors / AD plant developers, enabling new AD plant deployment. It was assumed in the ToC that by providing tariffs for biomethane, more AD plants would deploy. For those that have been able to make an application (i.e. have not been constrained by feedstock availability or pre-application requirements[52]) the evaluation has found that the GGSS does provide suitable returns (certainly, when biomethane is injected within the first tariff tier). The rationale for non-applicants in not applying was not found to be a consequence of low returns from GGSS tariffs (although those who applied to ND RHI instead of waiting for GGSS were attracted to the longer repayment period of 20 years on the ND RHI scheme).
- Although the evaluation reports the first tariff tier as providing a suitable return to drive AD plant deployment, there appears to be diminishing incentive for tiers two (to a lesser extent) and three (to a greater extent). This has meant that the very largest AD plants may have been inhibited (although there was some debate as to whether the availability of feedstock could support very large plants).

[52] Both inputs in the ToC

- In practice, with only eight new applicants reached overall in the second and third years of the GGSS scheme. External supply chain and feedstock challenges have been identified as the key barriers to applications and may provide a suitable explanation for the lower-than-expected applicant reach, but this should be tested more fully in the second process evaluation of the GGSS. A number of AD plant respondents to interviews suggested anecdotally that they expected a pipeline of applicants to be unlocked following Defra food-waste collection announcements.
- The fragile and specialist supply chain was referenced as a contextual barrier in the ToC, and there was strong evidence from the evaluation that this has been the most significant constraint to plants deploying onto the scheme. The ToC anticipated the linkage between capital investment and AD plant deployment to be straightforward (i.e. that investing in capital development would lead to deployment) but given this context, the causal linkages following capital investment have been constrained.
- It was too early at this interim stage to assess participant compliance with sustainability requirements. However, as an indication, there was little pushback from AD plant developer respondents on the 50% waste feedstock requirement as a principle. The requirements on limiting greenhouse gas emissions from biomethane production are also as-yet untested, given the stage at which evaluation research was conducted.
- It was theorised that the government's continuity of support for biomethane would drive business and investor confidence. In reality, external factors have had a marked influence on market confidence. Interview evidence has highlighted that waste feedstock challenges and delays to Defra's Simpler Recycling food waste collections have collectively reduced the confidence of investors and businesses to make investment decisions, as feedstock levels and contracts remain uncertain.
- The ToC anticipates that innovation will diffuse from plant construction and operation. One respondent specifically highlighted that innovation may be hindered to some extent by scheme eligibility criteria, referencing the exclusion of sharing of equipment and use of injection hubs (which may be an innovative solution to support AD plant deployment far from grid injection points). It was also the case that evaluation did not identify innovative approaches to resolve either supply chain or feedstock challenges at this stage[53]
- Given only one AD plant had deployed at the time of the research being undertaken, it is difficult to comment with certainty on the other revenue streams identified in the ToC and how the benefits of these revenue streams could materialise. These revenue streams include: the use of green gas certificates, sale of captured carbon dioxide, and sale of bio-fertiliser.

[53] The use of innovative approaches were not explicitly considered in interviews; however, respondents did not raise evidence of such approaches being taken when discussing supply chain and feedstock challenges.

GGL Inputs and Activities

The GGL inputs and activities are found to have followed what was anticipated in the GGL ToC.as discussed below:

- A number of inputs (including lessons from previous levies, agreement on levy principles, and input from stakeholders) came together as part of the levy design process. How positively the levy has been received across stakeholders in its design and implementation is evidence that this process of levy design worked as intended.
- It was considered that there would be sufficient lead time for gas suppliers to prepare to implement the levy. Consultation suggests that this assumption was correct, with only one reported instance of gas suppliers not having enough time to make necessary changes to bills and to understand how the levy process works.
- Having a suitable payment system was considered to be an enabling input for the levy. No gas suppliers highlighted particular challenges with making payments and identified the whole process as smooth and straightforward.
- The processes for confirming suppliers as provisionally exempt worked as planned [54]. The ToC assumption that a relatively low proportion of the market would be exempt from the levy also proved to be the case, meaning the levy was not at risk of under collecting against its target collection.
- The most significant challenge for the levy was accurately forecasting GGSS deployment, given inherent uncertainties. The annual budget cap is based on forecasted GGSS deployment. As actual GGSS deployment did not match forecast GGSS deployment, the levy rate was set higher than it needed to be in this period. This was not a design flaw of the levy, but a consequence of uncertainty inherent in a demand-led scheme.

GGL Outputs and Outcomes

The expected outputs and outcomes from the GGL ToC match what was seen in the evaluation, with causal pathways leading to the expected outcomes. This is detailed below:

- Quarterly payment by gas suppliers of the levy rate per metre served per day, is intended, as per the theory of change, to sufficiently fund biomethane generated by producers on the GGSS. This pathway was supported by a compliance regime to ensure payment (or fund shortfalls). The levy was able to fully fund GGSS payments and Ofgem administrative costs, with pathways in the ToC working as expected.
- It was assumed that the design of the policy compliance mechanisms would minimise supplier non-compliance with levy payments and credit cover lodgements. The theory of change envisages both collaborative and punitive[55] approaches to compliance. Both

[54] Suppliers notify and provide evidence that they are likely to be exempt in the following scheme year and are granted a provisional exemption, and then following that scheme year are required to provide evidence that they supplied at least 95% green gas.
[55] Punitive approaches include the publication of those not in compliance, as well as issuing an Anticipated Default Notice (where it is expected that suppliers will not meet their levy obligations) to warn of future

working with suppliers and publishing a list of those not complying has occurred in practice, although they have not been extensively tested (there have been thirteen cases of non-compliance). These appear to have been effective in ensuring compliance, evidenced by the short timeframe it took on average for suppliers to be brought back into compliance, and in the fact that there have been limited instances of non-compliance.

- The assumption that the policy costs / admin burden placed on fossil fuel suppliers would be minimal and comfortably tolerated held true in practice. No supplier interviewed saw the levy as unduly burdensome.
- The risk that the levy would return a surplus given underspend on the GGSS has been realised, but this has triggered the mechanism envisaged in the ToC where surplus is 'held' for the following year and has contributed to funding the GGSS, thus decreasing the amount that the levy needs to collect in the following year, as expected. Although the process of returning the collected levy was felt to be challenging and complicated, it achieved the intended effect that it intended, of ensuring gas suppliers were not asked to pay more than the cost to cover GGSS payments and Ofgem scheme administration.
- The assumption that costs would be passed on but would be comfortably tolerated by customers also seems to be accurate, at least from the initial consultation. No supplier respondents reported any issues that customers raised regarding their individual payments.
- At this stage of the evaluation, longer-term impacts (e.g. wider acceptance of green gas and normalisation of these types of levies) and mechanisms for how they would come about have not been tested.

Evaluation Learning: Initial Contribution Analysis

As part of the evaluation's approach to test and validate the Theory of Change, a set of contribution claims have been developed for the scheme and levy, presented in full in Annex 3. Contribution claims draw on the Theory of Change and existing evidence to assemble hypotheses for how an intervention delivers outcomes and impacts. This evaluation has undertaken an initial assessment of the contribution claims and the strength of the evidence collected, although has not undertaken full contribution analysis given full contribution analysis is best reserved for later stages of the evaluation when more evidence of outcomes and impacts are available. Each contribution claim is presented in turn below.

enforcement action if payment is not made. An Enforcement Notice can be issued where Ofgem are satisfied that a supplier has failed to meet its levy obligation, which specifies the amount outstanding and when it is due. Non-compliance with this may lead to a financial penalty and where payment is still not received, Ofgem are empowered to recover amounts as a civil debt.

GGSS CC1: Guaranteeing the revenue stream of AD plants for 15 years incentivises their deployment and operation. This in turn increases the volume of new biomethane coming online (to at least the lower range of expected deployment in the Impact Assessment) in order to effectively contribute to carbon budget targets and provide cost-effective decarbonisation.

Initial Assessment of Causality

At present, deployment and actual biomethane injection is lower than was envisaged. The scheme injected 2.4 GWh in FY2022/23 and has so far injected (up to July 2023) 5.7 GWh in FY2023/24, against the low scenario estimates of 200 GWh and 500 GWh respectively.

However, when the expected biomethane injection from currently commissioning AD plants is considered, the scheme would have gotten closer to its impact assessment's low scenario for FY2023/24 (as shown in Figure 2) had there not been external challenges to deployment. The levels of application have also been lower than what may have been expected (explained in part by a lack of certainty with feedstocks) which has also meant that the programme has not been able to reach its target.

Initial Assessment of Strength of the Evidence

The evidence for this contribution claim is mixed. It was evident from interviews that AD plants would be unable to function independently of government support (e.g. plants planning to decommission due to ineligibility on the GGSS). As all AD plants on the GGSS are new, it is a reasonable assumption that most, if not all, of these would not have come online without the GGSS. Quantitative data is available on the actual level of biomethane injected, allowing the evaluation to be confident in the volume of biomethane, as well as the contribution of the scheme. However, the actual injection level falls well short of the low scenario, and only when applicants that are currently constructing their plants (i.e. in receipt of the full tariff guarantee, but not yet registered on the scheme) are included do levels of expected injection reach close to the low scenario. However, this injection has not yet been realised.

GGSS CC2: Through effective policy design and implementation measures (including those intended to ensure compliance), and in order to receive the payment for injection, plants must comply with lifecycle emissions (sustainability) requirements and ensure greenhouse gas emissions from bio generation do not exceed the threshold level. This means that emissions reduction benefits are not offset by emissions in biomethane production (e.g. through leakage).

Initial Assessment of Causality

The timing of evaluation research was too early to provide evidence on plant compliance with sustainability requirements. Only one submission from the successful applicant has been made, and no Ofgem audits and site inspections have occurred[56].

[56] Ofgem intend to conduct a site visit with plants in their first year after commissioning, and on an ongoing basis across the time period that plants are registered, based on any concerns, risks identified, or through random sampling.

Initial Assessment of Strength of the Evidence

N/A – this will be examined in future fieldwork and analysis.

GGSS CC3: Where plants have access to and utilise waste feedstocks (e.g., through Defra food waste policies), GGSS requirements (of at least 50% waste feedstocks to be eligible to receive GGSS tariff) mean that waste and residues are utilised within new AD plants as they become operational. As a result, potential upstream emissions (e.g. through landfill and therefore methane release) are avoided.

Initial Assessment of Causality

Waste feedstock constraints were a significant barrier to deployment for a number of plants, as plants do not have access to sufficient waste feedstocks. However, there was no strong pushback against the waste feedstock criterion itself, with most prospective participants responding positively to the requirement, suggesting an intent to comply. There was insufficient evidence collected on participant compliance with the sustainability requirements.

Initial Assessment of Strength of the Evidence

Qualitative evidence across stakeholder groups was consistent that waste feedstocks have not been readily accessible to new AD plants.

Given the stage at which the evaluation research was conducted with only one deployed plant (one claim submitted to Ofgem, declaring the amount of eligible biomethane injected in the previous quarter in order to receive tariff payments, and no sustainability audits[57]), the evidence collected so far is insufficient. Additional evidence on compliance, beyond intentions, is required to make a judgement on this contribution claim.

GGSS CC4: The GGSS enables new AD plants (where they have secured feedstock supply, a suitable site, and the ability to build a plant) by supporting the case for investment, enabling plants to become operational and therefore inject biomethane into low-pressure distribution networks used for home and business heating, and thus contributing toward renewable heat generation in the UK.

Initial Assessment of Causality

There has been minimal injection on the scheme to date. There was some evidence from consultation that biomethane generated above tier one was likely to be claimed on the RTFO, given potentially more favourable returns. In interviews, a majority suggested they would use this scheme, and therefore this may reduce the level at which renewable heat generation is supported as some biomethane is diverted to transport decarbonisation.

[57] All participants must provide an annual sustainability audit report each year. This report must consider, and report on, each consignment of biomethane produced in the 12-month period prior to the anniversary of the date on which they were first registered on the scheme.

Initial Assessment of Strength of the Evidence

There is too limited evidence at this stage to make a judgement on this contribution claim. Evidence required will include the volume of biomethane claimed on the GGSS versus the volume claimed on other schemes. The intention of the Annual Survey was to capture information from GGSS (and ND RHI) AD Plants on the volume of biomethane claimed on the scheme versus other policies, but as many GGSS respondents have not commissioned on to the scheme and therefore have not produced any biomethane, the evidence to assess this claim was not available.

GGSS CC5: GGSS tariff rates are set and monitored to enable prospective AD plant developers to implement a business model that provides an appropriate rate of return to secure private investment in AD plant construction, leading to new AD plants deploying.

Initial Assessment of Causality

There was evidence from AD plant developers that tariff tier one did provide a suitable rate of return to justify investment, but that to a lesser extent tier two, and a greater extent tier three were more challenging to make economically viable. Other factors, including the flexibility of the scheme to claim on the RTFO were also highlighted as an important factor for attracting investors. There is limited evidence on the extent to which tariffs overcompensate.

Initial Assessment of Strength of the Evidence

Evidence has been somewhat sufficient to understand if the tariffs were sufficient to attract investment, however, it has not been possible to determine whether plants are being overcompensated due to the lack of data. Data on construction (from application forms, although redacted) and operation costs (from surveys, although plants have been unwilling to share[58]) would be valuable to make this judgement. The evaluation has had to rely on qualitative evidence from developers who are unlikely to present that tariffs can overcompensate.

GGSS CC6: In affirming the government's supportive position through continued funding for biomethane production and injection, as well as increased visibility of the benefits from biomethane more broadly, developers and investors within the sector have the confidence to continue operating in the sector on a long-term basis and others have the confidence to enter, growing the market.

Initial Assessment of Causality

It is too early to assess the contribution of the GGSS on the wider UK biomethane market, particularly given challenges in deployment and limited plant operations.

[58] Due to concerns on commercial sensitivity of data, despite reassurances.

Initial Assessment of Strength of the Evidence

N/A – this has not yet been assessed at this stage of the evaluation. This will be examined in future fieldwork and analysis.

GGSS CC7: By ensuring continued government support for biomethane production, supply chains and AD plant developers maintain the confidence to continue in the market and grow to meet opportunity. In turn, the UK AD sector retains and grows the required skills and expertise, meaning that required resources are in place (and at a reduced cost due to competition) to enable wider market growth.

Initial Assessment of Causality

It is too early to assess the contribution of the GGSS to the UK biomethane supply chain, however, the evaluation has highlighted weaknesses in the supply chain that have inhibited deployment on the scheme.

Initial Assessment of Strength of the Evidence

N/A – this has not yet been assessed at this stage of the evaluation. This will be examined in future fieldwork and analysis.

GGSS CC8: The design of tariff tiers and the limited availability (and increasing cost) of feedstock encourages developers to test business models to provide greater efficiencies and revenues. This practice, facilitated by knowledge sharing, leads to cost savings in biomethane production and improved returns, and therefore a less subsidy-dependent market.

Initial Assessment of Causality

It is too early to assess how the scheme has driven innovation in the market. However, there was some initial evidence from the first GGSS process evaluation that there are some concerns around innovation. Firstly, there was no evidence of plants taking innovative approaches to overcome challenges with either feedstocks or the supply chain. Secondly, one respondent highlighted that not allowing shared injection hubs, for example, was a limitation on potentially innovative approaches.

Initial Assessment of Strength of the Evidence

Evidence relied on for this finding is anecdotal and therefore weak in nature. In future evaluations, it would be helpful to further understand the typologies of innovations and efficiencies that may be expected. This would support with assessing the extent to which, if at all, the scheme is driving these.

GGL CC1: Fossil fuel gas suppliers are charged a levy per meter point each supplier serves. Through effective policy design, intelligence on the number of projected meter points being served, and accurate deployment forecasts for the GGSS, the GGL rate is set appropriately such that it collects sufficient money to fund the GGSS with no under- or over- spend between the years 2022 – 2043/44.

Initial Assessment of Causality

For FY 2022/23, the levy collected just under £54m from gas suppliers and made payments for biomethane production of £0.5m to registered biomethane producers, as well as funding Ofgem administrative costs of the levy. As such, the mechanism has collected a significant surplus to fund the GGSS payments and has collected what it intended to, based on the GGSS budget cap (£37 million for FY 2022/23). Qualitative interviews highlighted a number of measures to ensure the levy does not under collect, including detailed forecasting and building in headroom to the levy amount. The levy has over-collected compared to the actual deployment on the GGSS, but the mechanism to account for this is working as intended to reduce future levy rates.

Initial Assessment of Strength of the Evidence

The evidence collected on this contribution claim is strong. By documenting the levy amount collected and spent on the GGSS as well as Ofgem administrative costs, we have sufficient evidence to say whether the levy has sufficiently funded the GGSS. This funding would not have been collected without the levy.

GGL CC2: Effective policy design provides the necessary headroom, payment in advance, compliance and surplus management mechanisms. Therefore, the Department has confidence the GGL will collect sufficient money to fund the GGSS.

Initial Assessment of Causality

Stakeholder responses were consistent in that they had confidence in the levy and that it would sufficiently collect the funds required. The levy setting process was described in interviews as being heavily data-driven and based on in depth forecasting and risk analysis (including building sufficient headroom into the collection amounts to fully cover spend and collection risks). The compliance regime was also found to be effective, with minimal non-compliance, and although untested at the time at which fieldwork was undertaken, there was confidence in the measures that could be used to recover funds through mutualization. Although uncertainty is a necessary challenge of the scheme, there was neither evidence that the levy requires any redesign nor additional mechanisms to cover costs.

Initial Assessment of Strength of the Evidence

Evidence was collected from both the Department and Ofgem on confidence levels in i) levy processes to collect sufficient money and ii) the processes (credit cover and mutualisation) to ensure sufficient funds if a supplier does not pay. The evaluation has sought to target relevant stakeholders within these organisations. However, this finding should be read in the context of

low GGSS deployment and therefore less risk that the levy would not be able to fund biomethane claimed on the GGSS.

GGL CC3: By designing mechanisms to reduce the overall administrative burden, taking a relationship-focused approach to engage with suppliers, and effective enforcement strategies, gas suppliers comply with their GGL obligations.

Initial Assessment of Causality

In no cases did suppliers feel that the GGL administrative burden was disproportionate, and there were no cases of organisations having to increase their headcounts to accommodate the additional obligation. The GGL was viewed as less burdensome than other levies (i.e. a number of suppliers interviewed are part of large energy companies with multiple levy obligations) and was a straightforward process to follow. There was minimal non-compliance on the levy, which was resolved quickly in each case.

Initial Assessment of Strength of the Evidence

Although there was consensus from suppliers who did engage in the evaluation research that the levy requirements were minimal (a finding shared by both large and small suppliers) it is still based on a small sample size and therefore should be caveated. Stronger evidence was the minimal non-compliance (approximately 1% to 3% of suppliers per quarter). Evidence from additional suppliers would strengthen this claim.

GGL CC4: By managing the available budget for the GGSS through annual caps, after which applicants are placed in a queue, the total impact of the GGL on consumer gas bills is kept to an acceptable level while still enabling the GGSS to be fully funded.

Initial Assessment of Causality

No research was undertaken directly with consumers, but gas suppliers were asked for their reflections on this point. The impact on consumer gas bills is minimal and was described by one supplier as unnoticeable to customers and not something on which they have had any queries or push back. Across all types of suppliers interviewed, the effects of the levy on bills were felt to be fairly minimal, representing only a small amount added to customers' costs. There was no initial evidence to suggest that the levy was not at an acceptable level.

Initial Assessment of Strength of the Evidence

Evidence for this claim is derived from gas suppliers, and no consumer views have been collected. Further complexity is added to this assessment of evidence as the GGL was covered by the UK government as part of the Energy Price Guarantee (2022/23). As direct consultation with consumers is out of scope for this evaluation, the study team would look to discuss potential avenues for gaining further feedback, perhaps via gas suppliers in future rounds of consultation.

GGL CC5: The experience of the GGL normalises this sort of levy on fossil fuel suppliers and provides the Department with the necessary experience to design and develop further gas levies in the future.

Initial Assessment of Causality

The process evaluation did not cover this contribution claim and will do so in the impact evaluation of the GGL.

Initial Assessment of Strength of the Evidence

This has not yet been assessed at this stage of the evaluation. This will be examined in future fieldwork and analysis.

Evaluation Learning: Implications for the GGSS and GGL

This section provides a summary of the core evaluation learning for the implementation of the GGSS and GGL. This draws together findings from the previous chapter with the reflections on evaluation theories.

What is working well?

- The GGSS application processes were commended as being smooth and straightforward and an improvement compared to the ND RHI.
- Eligibility and sustainability requirements were not seen as being too onerous. Only in a minority of cases did respondents push back on evidence requirements and eligibility requirements, and generally respondents were content with, for example, 50% waste feedstock thresholds.
- As of July 2023, 12[59] applicants received full tariff guarantees, which at peak deployment represents approximately 1,000 GWh of new biomethane production (36% of the impact assessment central scenario). These figures are based only on those plants that have either completed their registration (1 at the time of analysis), or, have tariff guarantees and are now working to commission their plant and register onto the scheme (11 at the time of analysis). This does not account for any deployment that may come in the future based on the current GGSS pipeline of applicants.
- The GGSS budget is set once a year, with several mechanisms and safeguards (i.e., Annual Tariff Review and degression) in place to prevent overspend. These mechanisms include quarterly trigger points for the scheme tariffs to be reduced if expenditure thresholds are reached or if it is felt tariffs do not offer value for money to billpayers. Budget caps work by placing applicants in a queue where application budget caps are met, until budget becomes available. Despite hypothesising that these mechanisms could affect scheme attractiveness, there was little evidence from the evaluation that these have deterred applicants or influenced scheme attractiveness.

[59] Not including those who have received Full Tariff Guarantees and have had these withdrawn.

- The GGL has been successfully implemented in its first few years, collected the funds that it sought to collect, with minor non-compliance from suppliers and no reported evidence of an excessive burden placed on either suppliers or customers.
- Ofgem have been praised for their administration and communication on both the levy and the support scheme.

What is working less well?

- The GGSS has received fewer applications than anticipated, and it has taken applicants a longer time than expected to progress from receiving their full tariff guarantees to commissioning and registering their AD plants on the scheme. Both challenges may be explained (at least in part) by wider contextual factors (see below) beyond the control of the GGSS.
- The amount of money collected on the GGL exceeded the amount required by the GGSS because of actual deployment was lower than forecast. This may be explained by the inherent uncertainty in forecasting deployment, and the underspend can be explained by wider contextual factors, discussed below. It should be noted that the mechanism designed to resolve this issue (i.e. carrying over the year end surplus) is judged to have worked as expected and levy rates for Scheme Year 3 are lower as a result.

What contextual factors influenced implementation?

- The evaluation has found that the causal pathways in the theory of change have been impeded by wider contextual factors at two key points: i) feedstock availability feeding into successful applications, and ii) capital investment leveraged leading to new AD plant deployment. An already constrained feedstock market, combined with delays to the anticipated feedstock enabler in the form of Defra Simpler Recycling food waste policies, has meant that the number of applications that have been received has been inhibited. AD plants have also taken longer to commission than was expected due to supply chain disruption and delays, and although developers have received tariff guarantees and are currently constructing their AD plants, completing construction has been challenging. This has therefore constrained causal pathways from this point, including operational plants, biomethane injection, emissions reduction, and increased renewable heat.

Reflections for further consideration

- The two contextual factors detailed above have limited the number of applications to the GGSS and the ability of developers to commission and register on the GGSS. As such, progress has been slower than may have been anticipated. Given these wider challenges, the evaluation suggests consideration should be given to extending the planned closure date to give sufficient time for AD plants to take up the support and ensure that the scheme can receive the benefits of the Defra Simpler Recycling food waste regulations when they are delivered. It is noted that at the time of writing, it was announced that the scheme would be extended to the March 31, 2028, as a result of the GGSS Mid-Scheme Review, aligning with the evaluation findings.

- There was some evidence that unexpected behaviours for AD developers may be induced as a result of GGSS eligibility requirements, including demolishing existing plants and rebuilding them to qualify as new plants, and decommissioning existing plants where current subsidies are coming to an end. A small number of prospective applicants suggested they might consider such approaches. The Department could consider these issues and, if appropriate, communicate to the market on whether such approaches are appropriate or acceptable.
- There was some suggestion that innovation on the scheme may not currently be effectively facilitated. Consideration could be given to how best the scheme should unlock innovative approaches and share learning in the market.
- Points raised to reduce the burden of the levy, which could be further considered by the Department, include introducing de minimis rules where suppliers owe a minimal amount[60] and having the ability, if required, to change the levy rate mid-year in response to lower than forecast GGSS payments.

[60] During the drafting phase of this report, de minimis rules for the GGL were introduced to the GGL regulations.

This publication is available from: www.gov.uk/government/publications/green-gas-support-scheme-ggss-and-green-gas-levy-ggl-evaluation

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