



Department
of Energy &
Climate Change

RHI Biomethane Injection to Grid Tariff Review

Government Response

9 December 2014

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Summary of decisions

The Non-domestic Renewable Heat Incentive (RHI) was introduced in 2011 to incentivise the uptake of renewable heat in industry, businesses and public sector organisations. Since then it has become clear the significant role biomethane injection to grid could play in increasing renewable heat deployment. The Government announced a review of the biomethane injection to grid tariff on 28 February this year in response to market intelligence, stakeholder representations and updated evidence indicating that plants of much higher capacities than 1 MW are planned; and that the costs of those larger plants (that could achieve significant economies of scale) may not justify the current level of RHI support. Given the important role that biomethane injection to grid can play in renewables deployment and helping to tackle climate change, it is necessary that we offer the right levels of support, to ensure that the market can continue to grow with confidence.

This summary sets out our decisions in relation to the adjustments to the biomethane injection to grid tariff on which we consulted from 30 May to 27 June 2014. The final policy decisions reflect evidence obtained during the consultation from stakeholders, and our own analysis and judgement. More detail on the evidence and rationale behind all of these decisions is provided in the body of this Government Response and the accompanying Impact Assessment.

The aims of our final policy are to:

- Ensure continued growth in biomethane injection to grid deployment in order to support the Government's ambitions for renewable heat deployment and its commitments to carbon emissions abatement, including meeting the 2020 renewables target of the Renewable Energy Directive;
- Ensure value for money in the use of RHI budgets, which requires a tariff structure that incentivises deployment but does not routinely overcompensate biomethane to grid installations; and
- Recognise and maintain the important role of large scale biomethane plant in the RHI.

New tariffs

We have decided to implement a tiered tariff structure based around three tiers. Tiering was overwhelmingly popular amongst consultation respondents, particularly a three tier approach. Tiering is less prone to unintended consequences associated with the alternative option we consulted on, a banding solution, which encourages clustering of installations around the upper limit of tariff bands, which could lead to inefficient sizing of plants. Tiering the tariff also means there is no requirement to accurately determine the system capacity of the plant. This is because the meter readings relating to volume of gas injected can be used to determine the 'tiered' payments.

We have decided to set the new biomethane injection to grid tariffs at the levels in the table below, subject to parliamentary approval of the regulations in which those tariffs are brought into force. These new tariffs will apply to all installations that are registered on or after the regulations have come into force.

	Tariff p/kWh¹ (FY 2014/15)	Tier Break (Output at which tariff changes) – MWh per annum of eligible biomethane injected	Approximate biogas plant capacity that produces an annual output equivalent to tier break - MW
Tier 1	7.5	40,000	6
Tier 2	4.4	80,000	12
Tier 3	3.4	> 80,000	> 12

The tariffs have been modelled based on a feedstock mix of 70% unpackaged food waste and 30% energy crop. Feedback from the responses have indicated that it is necessary to include some energy crop in the feedstock mix to hedge against the risk inherent in short term waste contracts.

Feedback from the consultation indicated a broad consensus that the gate fees² presented in the consultation document were too high, that contracts offering that level of income are no longer available, and there is limited opportunity to secure the long-term contracts which have been available in the past. The tariffs have been modelled based on gate fees of £15 per tonne for unpackaged food waste based upon evidence received during the consultation. Evidence from the consultation showed that assuming crop feedstock costs of £35 per tonne is reasonable.

Degression

We are aware that by adopting a tiered tariff we are potentially introducing more complexity into the scheme which could impact the degression mechanism. In managing this interaction, we have tried to ensure additional complexity is kept to a minimum and can be clearly understood by stakeholders. We have also taken steps to ensure we continue to control spend within the allocated budget whilst maintaining the conditions necessary to allow the market to continue to grow.

We have decided that when the new tiered tariffs are introduced, the biomethane degression expenditure thresholds (triggers) will continue to be set based on total RHI expenditure for participants registered under both the old tariff and new tariffs; and that if a degression for the biomethane tariffs is triggered, it will be applied to all tiers equally e.g. for a 5% tariff degression, the tariff in each tier would be reduced by 5%. This means the relative levels of the tiers will be

¹ The tariff will be paid up to the maximum volume of biomethane the producer is entitled to inject under the Network Entry Agreement (NEA)

² A fee paid to a party receiving the waste another party wishes to dispose of.

maintained. We consider this approach avoids introducing further complexity into the scheme for stakeholders.

To provide further certainty, the new tariff will have temporary protection from degression between its introduction and the end of June 2015. This is to avoid the new tariff being degressed soon after its introduction, which would be destabilising for investor certainty. Furthermore, the tariff change we are making represents a reduction to the existing tariff so there is a risk that applying a further degression would “over-penalise” the tariff. However, there is a balance to be struck between providing tariff stability and enforcing budget control; as such, the new tariff will be eligible for degression from 1 July 2015 inclusive. Although no degression will be applied on 1 April 2015, the outcome of the degression assessment for both 1 January and 1 April 2015 will still apply for the purposes of assessing the level of any degression to be applied on 1 July 2015. The new tariffs will also be subject to any Retail Price Index uplift on 1 April 2015.

Future RHI budgets, i.e. any budget for the RHI from April 2016, will be determined as part of the next Spending Review, in accordance with the Treasury’s Consolidated Budgeting Guidance.

Additional Capacity

Biomethane injection to grid is a key RHI technology and we consider it important that additional capacity continues to be supported under the tiered tariff if market conditions create the necessary demand. We have decided that any additional capacity to existing plant will receive the prevailing tariff at the time it is registered i.e. if additional capacity is registered after the tiered tariffs have been introduced, it will receive the tiered tariff, or a degressed tiered tariff.

Biomethane slippage

The current biomethane tariff was modelled assuming 2% methane leakage from upgrader technologies which remove CO₂ from biogas. In light of views from the consultation that developers are already incentivised to use the best available technology, to minimise methane emissions and to increase their revenue and meet the Government’s objective to limit GHG emissions, we have modelled the tiered tariffs assuming 0.5% methane slippage to reflect better practice³.

Impact Assessment

The Impact Assessment that accompanies this Government Response provides more detail on the updated evidence base and tariff setting. Though uncertain, it also assesses the potential impact of the tariff change on biomethane deployment and the associated costs and benefits under four scenarios.

Timings

Consistent with the update to the consultation we published this summer, that any new tariff will not be introduced before 1 December 2014, we intend that the implementing regulations will come into force in February 2015, subject to Parliamentary approval.

³ We have assumed 0.5% methane slippage for the purposes of modelling the tariff. We are not requiring that plants achieve this in the regulations.

Producers of biomethane for injection will get the new tariffs if they are registered between the regulations coming into force expected to be February 2015 subject to Parliamentary approval and 30 June 2015, avoiding any potential degression of the tariff in April. The new tariffs will be subject to any Retail Price Index uplift on 1 April. Any producers of biomethane for injection registered on or after 1 July will receive a degressed tariff if the tariff is degressed on that date.

Introduction

- 1.1 When the Non-domestic Renewable Heat Incentive (RHI) was launched in November 2011, support for biomethane injection to grid was introduced in line with the Coalition Government's commitment to promote an increase in energy from waste through anaerobic digestion. The original tariff was based on a 1 MW waste feedstock biomethane injection to grid plant with the tariff of 7.5 p/kWh set to cover the capital and operating costs (net of wholesale gas revenue) and provide a 12% internal rate of return (IRR) on investment. At that time there were no commercial scale plants in operation. Given the important role that biomethane injection into the grid can play in increasing the use of renewable energy and helping to tackle climate change, it is necessary that we offer the right levels of support, to ensure that the market can continue to grow with confidence.
- 1.2 In early 2014, it became clear that the RHI had succeeded in kick-starting the market for biomethane to grid: with three plants already registered to the RHI and market intelligence indicating that many plants of much higher capacities (than we originally anticipated in 2011) were planned or in the pipeline. However, stakeholder representation and our own analysis suggested larger plants benefit from economies of scale and consequently their costs may not justify RHI support at current levels. This represents a value for money risk for the taxpayer and a potential breach of the scheme's state aid approval. Consequently on 28 February 2014 we announced a review of the tariff, in line with the stated policy on early tariff reviews, with the following aims:
 - To ensure continued growth in biomethane to grid deployment in order to support the Government's ambitions for renewable heat deployment and its commitments to carbon emissions abatement, including meeting the 2020 renewables target of the Renewable Energy Directive;
 - To ensure value for money in the use of RHI budgets, and compliance with our state aid conditions which require a tariff structure that incentivises deployment but does not routinely overcompensate such installations; and
 - To recognise and maintain the important role of large scale biomethane plant in the RHI.

Consultation

- 1.3 The biomethane tariff review launched on 28 February 2014 and the four week formal consultation period commenced on 30 May 2014. This formal consultation period was adopted to balance both the need to act quickly to address the value for money risk and reduce investor uncertainty, whilst also being long enough to enable stakeholders to collate and submit evidence to build upon that presented in the consultation.
- 1.4 In the consultation we sought views on our proposals to adjust the tariff to link payments more closely to the levelised costs of biomethane installations at

different scales. They aimed to address the potential risk of systematic overcompensation to ensure value for money and to ensure compliance with our State Aid approval.

- 1.5 Our proposals identified that relying solely on degression policy – the scheme’s budget management mechanism - to reduce the risk of overcompensation from the tariff is not an appropriate solution because it might not mitigate the value for money risk quickly enough and may unfairly penalise smaller plant.
- 1.6 We consulted on two tariff structures used for other RHI supported technologies, where there is tariff differentiation based on scale or output. These were banding and tiering. For both structures we provided scenarios to illustrate how tariffs for different capacities of biomethane plant might be derived. The scenarios served to illustrate the levels of support we were considering and sought views and evidence through the consultation on what the appropriate level of support for biomethane to grid across the capacity range should be.

The evidence base

- 1.7 The original tariff was set to compensate a reference biomethane plant for capital and operating costs it would face - net of the revenue earned from selling the biomethane - and provide for a 12% IRR⁴. The reference plant used was a 1 MW (gross biogas capacity⁵) waste feedstock plant with cost and performance evidence taken from a 2011 report by SKM Enviros and CNG Services Ltd, commissioned by DECC⁶.
- 1.8 Prior to the launch of the consultation, this evidence base was updated through desk research and dialogue with industry bodies, consultants, plant developers, equipment suppliers, gas grid operators and other government departments. We were open about the fact that this evidence base continued to carry some uncertainty, particularly concerning gate fees and feedstock costs. The consultation therefore presented illustrative tariff scenarios and sought to address this uncertainty in the evidence base; it made clear the weight we placed on the responses to the consultation to fill those gaps and enable us to structure our final approach.

Engagement

- 1.9 In addition to the publication of the consultation document, we invited stakeholders to meet with officials during the consultation period through a

⁴ An equivalent way of viewing this is that the tariff compensates for the difference in costs of supplying gas to the grid via a biomethane plant versus the costs of supplying the same amount of gas from natural gas. The latter cost is represented by the wholesale price of natural gas and is similarly subtracted from the costs associated with biomethane delivery under this view.

⁵ Gross biogas refers to the biogas capacity of the anaerobic digestion plant i.e. before any use is made of the biogas, including for the purposes of heating the anaerobic digester.

⁶ <https://www.gov.uk/government/publications/analysis-of-characteristics-and-growth-assumptions-regarding-ad-biogas-combustion-for-heat-electricity-and-transport>

series of consultation ‘surgeries’. In total 23 consultation surgeries were held, and DECC also attended two consultation sessions held by trade associations ADBA (Anaerobic Digestion and Bioresources Association) and the REA (Renewable Energy Association).

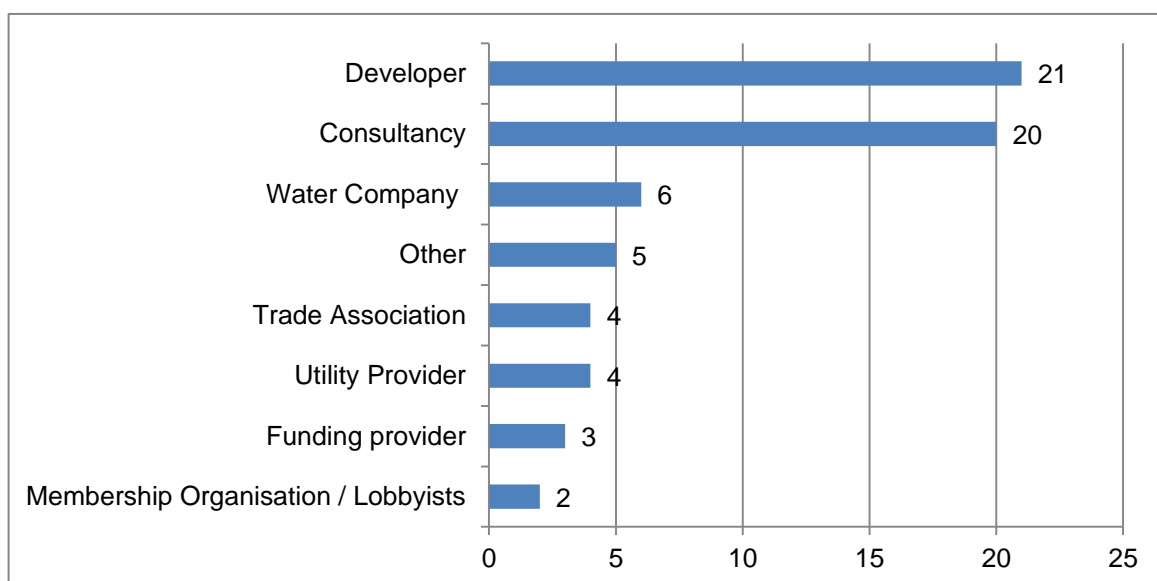
1.10 This engagement revealed some consensus among stakeholders that:

- Gate fees cannot be secured for every project and are not at the levels assumed in the consultation document;
- The support levels suggested by the illustrative scenarios would be too low and would prevent many projects from proceeding; and
- Tiering the tariff is a preferable, more workable solution than banding.

Overview of Responses

1.11 We received 65 formal consultation responses from a variety of stakeholders. The largest group represented were project developers and the second largest group were consultancies, with experience of either advising on or delivering biomethane to grid developments. A list of the organisations that responded is attached at Annex A.

Figure 1: Consultation respondents by category



1.12 Responses to the consultation focused primarily on the questions of how the tariff should be restructured (tiering versus banding), feedstock costs and gate fees and suggestions over the level of support required to sustain the industry. In summary the key points made by respondents to the consultation echoed points that were made during the consultation surgeries. More specifically:

- On tiering or banding, 55% of respondents preferred tiering, compared to 5% who preferred banding; 27% of respondents had no view, 11% had no preference for either and 2% advocated a cap on the tariff;

- On the precise number of tiers, 57% of respondents had no view, 6% support more than 2 tiers, 9% supported two or three tiers and 28% supported three or more tiers;
- There was a majority view that the gate fees presented were not at the level appropriate for tariff setting, with 63% of respondents of the view that they were likely to fall in the future; and
- Overall, responses to the consultation revealed a wide variety of feedstocks used or intended for use by either operational biomethane plant or those in development. Food waste, agricultural waste and energy crops were all cited as potential feedstocks.

All of these key points have been given significant consideration when developing our final policy and have fed into the Impact Assessment which should be read alongside this document.

Final Tariff

- 1.13 Based upon the consultation responses, our updated evidence base and additional analysis undertaken by DECC, we have decided to implement a 3-tiered tariff structure (shown in Table 1 on page 17). The new tiered structure aims to compensate plants in accordance with falling average costs as plant output increases. It will maintain a tariff of 7.5 p/kWh for annual output up to 40,000 MWh per year (tier 1) but the average tariff falls and is lower than the tier 1 tariff at higher output levels (see Figure 2 on page 18).

Timing and Next Steps

- 1.14 We are planning to lay amending regulations in December 2014 with the intention that they come into force in February 2015, subject to Parliamentary approval. The revised tariffs will apply to participants registered on and from the date the regulations come into force. Please refer to Annex B which provides an indicative timeline identifying the changes to the tariff in the first half of 2015.

Policy Decisions

Tiering

What we proposed

- 2.1 Tiering works by paying a tariff for the first designated amount of kilowatt hours of biomethane injected into the grid (the “tier 1” tariff), and lower tariffs for subsequent volumes of biomethane injected (the “tier 2” tariff, the “tier 3” tariff), over a period of 12 months from date of registration. Tiering provides a gradual average reduction in the tariff paid as annual output increases which, with falling levelised costs as scale increases, results in a relatively consistent rate of return across plant capacities.
- 2.2 Tiering is relatively straightforward to administer because Ofgem already use meter readings of the amount of gas injected into the grid by the biomethane to grid plant and it would be possible to apply tiering to this measurement. Consequently, tiering removes the need to determine system capacity before the plant is registered, although the maximum amount of gas that a plant can inject in a year will continue to be determined by its Gas Network Entry Agreement.
- 2.3 The consultation document presented illustrative tiering scenarios based on a two-tier structure with a tier break at 15,000 MWh. Two different gate fee scenarios were presented. Scenario 1 assumed a gate fee of £41 per tonne, paying 7.1 p/kWh for tier 1 and 0 p/kWh for tier 2. Scenario 2 assumed a £25 per tonne gate fee, paying 9.9 p/kWh for tier 1 and 2.1 p/kWh for tier 2.

What respondents said

- 2.4 The consultation responses showed a clear preference for a tiered approach to tariff setting rather than banding. When asked for views on the relative merits of banding and tiering, 55% of respondents preferred tiering, compared to 5% who preferred banding; 27% of respondents had no view; 11% had no preference for either; and 2% of respondents advocated a cap on the tariff payment.
- 2.5 Consultation respondents favoured a three tier approach with 25% supporting 3 tiers to accommodate small, medium and large installations. 57% expressed no opinion at all. A further 6% favoured two tiers exactly, 6% favoured more than two tiers and an additional 3% favoured two or three tiers. There was not strong support for four or five tiers, with only 3% favouring this approach.
- 2.6 However, 37% of respondents thought the tiering scenarios were not enough to drive growth at all scales, 11% thought they would encourage diversion of biogas to other purposes, 5% thought the target internal rate of return (IRR) was too low, 2% thought they were not enough to drive growth in the sewage industry, 3% thought they might be enough if the tier 1 break was higher and

2% thought the tariff for large plant should be lower. 42% of respondents had no view on the issue.

2.7 Of the numerous reasons given as to why the tariff level was wrong and would not drive growth, the top three most common reasons given were:

- Gate fee levels were wrong – 31%;
- The tariff levels were wrong due to uncertainty over feedstocks and that this meant that a blend of feedstocks is required – 13%; and
- Underlying cost assumptions are wrong – 10%.

Banding

What we proposed

2.8 Banding is an alternative approach to tiering aimed at ensuring that plants are appropriately supported as they increase in size and has already been adopted elsewhere in the scheme for other technologies. Banding works by defining capacity bands for the technology upfront and paying an appropriate tariff for each band. Capacity would be established at the point of registration of the participant for the RHI. In the consultation document, we proposed higher tariffs for the lower capacity bands and lower tariffs for higher capacity bands. The proposal was that by breaking up the tariff structure in this way, the risk of overcompensation of the subsidy would be reduced because the greater the level of capacity in MW of the plant, the lower the levelised costs and hence the level of subsidy required is lower.

2.9 Two illustrative banding options were shown in the consultation document, one based on a tariff curve and the second based on four capacity bands.

2.10 Banding option 1 (tariff curve) proposed that plants up to 2 MW biogas capacity would receive a single tariff, plants between 2 MW and 15 MW would receive a bespoke tariff, and all plants greater than 15 MW would receive a single tariff. This option was presented under two different gate fee scenarios; £41 per tonne with illustrative tariffs ranging from 7.1 p/kWh to 0.5 p/kWh and £25 per tonne with illustrative tariffs ranging from 9.9 p/kWh to 3.1 p/kWh⁷.

2.11 Banding option 2 proposed splitting the tariff into four capacity bands, with plants registered as being within a particular capacity band earning that band's tariff on all units of biomethane injected into the grid. Four bands were chosen to enable support to be tailored to the size of installation without making the scheme overly complex. Again, this option was presented under the two different gate fee scenarios, at £41 per tonne (with illustrative tariffs from 7.1 p/kWh to 0.5 p/kWh) and £25 per tonne (with illustrative tariffs from 9.9 p/kWh to 3.1 p.kWh).

2.12 The consultation document recognised that banding:

- Runs a greater risk (when compared to tiering) of operators deliberately sizing their installation around band thresholds to maximise returns, potentially at the expense of renewable heat deployment; and

⁷ <https://www.gov.uk/government/consultations/rhi-biomethane-injection-to-grid-tariff-review>

- Necessitates determining the system capacity of the plant, which is inherently difficult to establish accurately.

Views on these issues were also sought.

What respondents said

2.13 Overall, 54% of respondents did not express a view on the banding options presented and of the remainder of respondents who had views, some had more than one. The top three most common views expressed in relation to banding were:

- Banding would introduce unintended consequences – 28%;
- It is difficult to determine plant capacity – 9%; and
- Banding is too complex to administer – 8%.

2.14 Mirroring the views expressed on the tariff scenarios in relation to tiering, 42% of respondents felt, unequivocally, that the banding tariff level illustrations would not be sufficient to encourage growth.

2.15 The reasons identified as to why the tariff levels would not drive growth were similar to those expressed for tiering. The most common reasons given were:

- The gate fee assumptions were wrong - 33%;
- Underlying cost assumptions are too low - 19%; and
- The uncertainty of waste feedstock supply means that a blend of feedstocks is necessary - 17%.

Government consideration

2.16 It is clear that responses to the consultation showed a clear preference for a tiered approach to tariff setting rather than banding. In particular, responses have indicated that accurately defining plant capacity for banding would be very difficult. By comparison, measuring the actual volume of gas injected, as required for tiering, is relatively straightforward, avoids the unintended consequences associated with banding and can be implemented quickly.

2.17 In addition, there was a preference for 3 tiers expressed through the consultation that could be tailored to accommodate small, medium and large installations. Three tiers appear to strike the best balance between maintaining administrative simplicity, enabling change to be implemented quickly and providing subsidy levels that accurately match our cost data.

2.18 Our market intelligence on plant sizes and evidence provided through the consultation indicates that the majority of biomethane plants are up to around 12 MW (approximately 'small' and 'medium' plants) with a much smaller number of large plants at sizes above this. Our analysis has revealed that in order to support smaller sized installations (up to 6MW), a tariff of 7.5 p/kWh would need to be maintained up to the upper bound of the first tier. Evidence suggests that there is a sufficient reduction in costs from small to medium plants to justify a different second tier for medium sized plants (up to 12MW). Above this level of output, evidence on costs is limited, though there is some indication that average costs could be expected to continue to fall (e.g.

upgrader costs). This suggests a different third tier is warranted given that some plants are much larger. To summarise, three tiers should help keep small operators viable in the market whilst ensuring that medium and large plants are not overcompensated but continue to make a significant and important contribution to the increased use of renewable heat.

Final tariff

2.19 In light of the above, **we have decided to implement a tiered tariff structure of three tiers**. The key reasons for this are:

- Tiering is less open to gaming, as opposed to banding which can encourage clustering around the upper limit of bands and encourage inefficient sizing of plant;
- Tiering avoids the need to accurately determine the system capacity of the plant; and
- Tiering is relatively straightforward and Ofgem, the scheme's administrator, is familiar with the delivery of this type of payment structure through the biomass tariff arrangements that are currently in place. In addition, Ofgem already use meter readings for the amount of gas injected into the grid by the biomethane to grid plant to determine quarterly payments, so it will be relatively straightforward to apply tiering to this measurement.

Given the updated tariff analysis, we propose to set the new, tiered, biomethane injection to grid tariff at the levels shown in Table 1, subject to parliamentary approval.

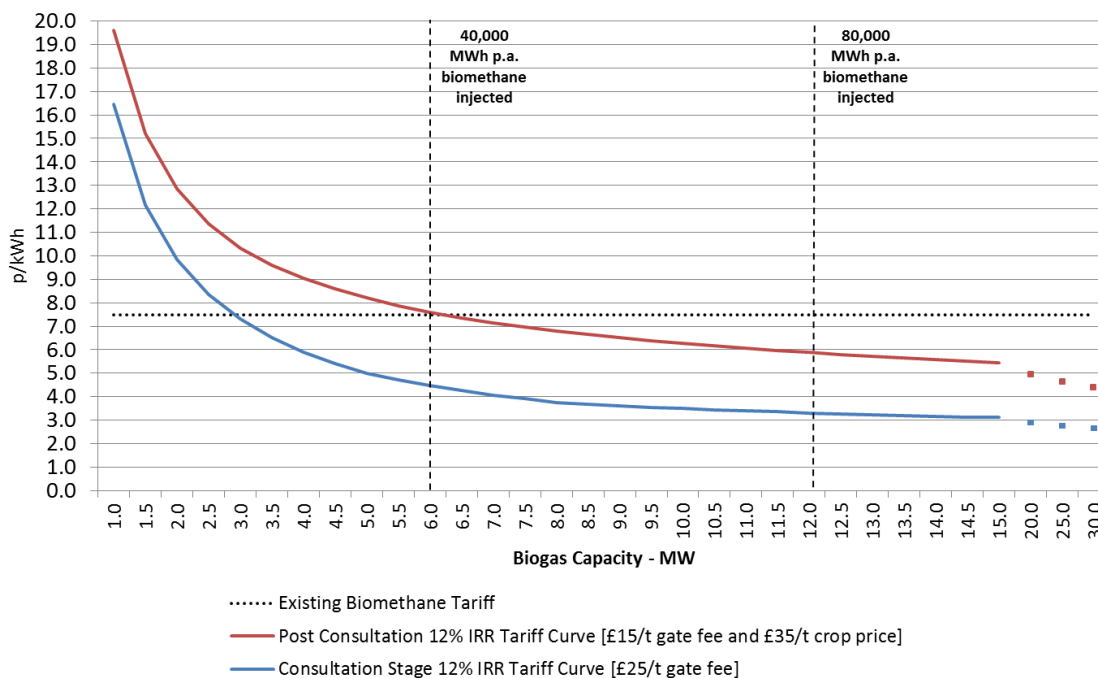
Table 1: New tariff levels

Tier	Tariff p/kWh ⁸ (FY 2014/15)	Tier Break – MWh per annum (Output at which tariff changes)	Approximate biogas plant capacity that produces an annual output equivalent to tier break - MW
Tier 1	7.5	40,000	6
Tier 2	4.4	40,000 to 80,000	12
Tier 3	3.4	> 80,000	> 12

⁸ The tariff will be paid up to the maximum volume of biomethane the producer is entitled to inject under the Network Entry Agreement (NEA).

- 2.21 Our decision over where to set the tier breaks has been made with the aim of ensuring that the average tariff delivered by tiering corresponds closely to the 12% IRR tariff implied at each output level by the evidence base (Figure 2).
- 2.22 This has been achieved by setting three different tiers. The first tier has been set to maintain the existing biomethane tariff with the associated tier break set according to the output level (or equivalent plant capacity) at which the existing tariff intersects the 12% IRR curve. This is a plant of approximately 6 MW biogas capacity producing 40,000 MWh per year. The first tier will pay 7.5p /kWh for the first 40,000 MWh of eligible biomethane injected per annum.
- 2.23 The second and third tier breaks were set in order that the tiering structure provides the average tariffs required for plants of 12 MW and 30 MW capacity, according to the 12% IRR curve. This ensures the average tariff delivered by the tiering structure adheres closely to the 12% IRR curve for plants above 6 MW. The second tier will pay 4.4 p/kWh for the next 40,000 MWh of eligible biomethane injected per annum (i.e. for biomethane output between 40,000-80,000 MWh per annum). The third tier will pay 3.4 p/kWh for any eligible biomethane injected above an output of 80,000 MWh per annum.
- 2.24 The evidence collected during the consultation has improved our understanding of the scale and capacities of biomethane plant. Overall, the tier output ranges correspond roughly to “small”, “medium” and “large” plants given feedback from consultation respondents and DECC’s market intelligence regarding plant currently in the pipeline.
- The updated tariff curve can be seen in Figure 2.

Figure 2: 12% IRR tariff curve based on updated post-consultation evidence base



Gate fees and feedstock models

What we proposed

- 2.25 The illustrative tariffs presented in the consultation document were based upon the costs and performance of a 100% waste feedstock (reference) plant. This model assumed a long-term contract for waste feedstock supply and assumed a gate fee was paid for the receipt of waste. The gate fee assumptions used were taken from WRAP's (2013) survey with scenario 1 reflecting the survey's median gate fee of £41 per tonne and scenario 2 reflecting the low end of the survey range at £25 per tonne.

What respondents said

- 2.26 Consultation responses indicated a majority view that the gate fees presented were not appropriate for tariff setting, with 95% of those respondents that had expressed a view on gate fees, stating they were likely to fall in the future. No respondent thought that they were likely to rise. They also indicated that Local Authority waste supply contracts (those reflected in the WRAP survey) account for only a fraction of the market. Shorter-term waste contracts with commercial and industrial suppliers are more prevalent and are not covered by the WRAP survey.
- 2.27 Many respondents identified the factors that may drive gate fee prices down, with some respondents providing more than one reason. The most commonly stated reasons were:
- Increased competition for waste will drive prices down – 46%;
 - Waste becoming a commodity – 8%; and
 - Total quantities of food waste are decreasing – 6%.
- 2.28 Overall, cost quotes on waste gate fee levels received during the consultation suggested an average gate fee of approximately £30 per tonne for packaged waste (with a range of £20-55 per tonne) and approximately £15 per tonne for unpackaged waste (with a range of £0-35 per tonne)⁹. Gate fees vary geographically according to waste supply and demand and also because waste is not homogenous but varies for example by calorific value and by the level of packaging and contamination. Responses also made the point that costs associated with waste feedstocks should be accounted for in tariff setting, for example landfill costs to dispose of unusable waste such as packaging.
- 2.29 A second key point made by respondents was the importance of feedstock security. Given the scarcity of long-term waste supply contracts, developers receiving waste on short-term contracts (typical of commercial and industrial waste supplies) are discounting the level of gate fees assumed in investment decisions and/or configuring plants to take other feedstocks such as agricultural wastes or energy crops as a means of mitigating feedstock supply risk. Responses indicated that some waste plants may be configured to

⁹ These ranges exclude some high gate fee quotes (outliers) on the grounds that these appeared atypical.

accommodate 'contingency feedstocks' such as energy crops, with these potentially accounting for up to around 30% of the feedstock mix.

- 2.30 When asked whether it was appropriate for us to set tariffs for all plant on the basis of waste plant costs, 23% of respondents had no view but 38% said that it was not appropriate and that the tariff should be based on a mix of feedstocks, including crop. A further 12% identified that feedstock costs for both waste and crop vary widely, particularly for waste. 17% simply said we should not use waste plant cost as a basis; 2% said there would be less waste available in future; 2% said we should assume a mix based on sustainability criteria. This compared to 6% of respondents who thought we should use waste plant costs as a basis for setting the tariff.

Government consideration

- 2.31 As a result of the views expressed and additional evidence provided by respondents through the consultation, we have reconsidered the gate fee and feedstock model assumptions that we used to set the illustrative tariffs in the consultation document. Specifically, we received evidence from stakeholders that the gate fees presented in the consultation were too high and not representative of the gate fees currently available. Additionally, evidence was presented that there may be a need to use 'contingency feedstocks', notably crop, to maintain digester availability, and the security of feedstock supply that investors look for.
- 2.32 To reflect the change in evidence base, the tariff analysis is now based upon a mixed feedstock model using 70% unpackaged waste and 30% energy crop. This mix is based upon typical ratios presented to us in the consultation. This change from a 100% waste feedstock model to a blended feedstock model is designed to capture feedstock security risk, particularly with respect to waste supplies.
- 2.33 Gate fee levels have been reduced from the original assumption in the consultation document of £25-£41 per tonne to £15 per tonne. This downward revision is based upon consultation responses and reflects an average gate fee of £15 per tonne for unpackaged waste.
- 2.34 The tariff setting continues to reflect capital and operating expenditure for the processing of waste prior to digestion, including a landfill cost of approximately £100 per tonne assuming 5% of waste tonnage is rejected i.e. reflecting waste with low levels of contamination and (any) packaging¹⁰. Crop feedstock costs have not been changed from £35 per tonne with most respondents agreeing with this assumption.
- 2.35 These assumptions give a blended feedstock cost close to £0 per tonne¹¹, which would be similar to assuming use of 100% waste in which gate fees are

¹⁰ The proportion of waste rejected to landfill has been reduced from 10% to 5% reflecting consultation responses including financial models based upon limited packaged / unpackaged waste as part of the feedstock mix.

¹¹ The ratio of food waste to energy crop assumed at digester stage is 70:30 (by weight). Given that 5% food waste purchased is rejected to landfill, this results in a 71:29 (by weight) ratio in terms of feedstock purchased. $(-£15/t \times 71\%) + (£35/t \times 29\%)$ gives a blended feedstock cost of $-£0.5/t$.

wholly discounted. It is felt that this feedstock cost level better reflects the risk of obtaining plant feedstock, given the increasing challenge of securing long-term waste contracts.

Degression

- 2.36 In order to control RHI expenditure to agreed limits we operate a budget management mechanism known as 'deggression'. Deggression reduces the tariffs for the individual technologies when overall scheme deployment, or deployment for an individual technology, presents a risk to scheme affordability.
- 2.37 The consultation set out our view that, in the case of biomethane injection to grid, deggression would not mitigate the value for money risk with the tariff set at its current level as it would not fully address any risk of overcompensation of large plants. Our evidence suggested multiple tariff deggressions of the current, single tariff would not address how the tariff changes with the scale of plants and would leave only the largest plants viable which could destabilise investor confidence and potentially unfairly penalise smaller plant.
- 2.38 The RHI Regulations set out what tariff reductions will apply when expenditure thresholds ('triggers') are met. When committed expenditure for a particular technology exceeds its expenditure trigger, the tariff is reduced by 5% in the first instance or 10% if the non-domestic scheme expenditure exceeds its total expenditure trigger. If technology and total expenditure trigger conditions continue to be met, an individual technology tariff could be deggressed further by for example, 15% or 25% in successive quarters.
- 2.39 As previously mentioned it is our aim that the outputs from this review will give clarity to the market, ensure sustainable growth, reduce the likelihood of multiple deggressions and the risk of overcompensation.

Government consideration

- 2.40 We are aware that by adopting a tiered tariff we are potentially introducing more complexity into the scheme. In our consideration of how to manage the interaction of tiering and deggression, we have tried to ensure that any additional complexity is kept to a minimum and can be clearly understood by stakeholders. We have also taken steps to ensure that we can continue to control spend within the allocated budget whilst maintaining the conditions necessary to allow the market to keep growing.

How deggression will be applied to tiered support – one biomethane trigger

- 2.41 When the new tiered tariffs are introduced, **we have decided that the biomethane trigger will be set based on total RHI expenditure for participants registered under both the old tariff and new tariffs.** We have considered assessing spend under the new tiered tariff separately against a trigger defined for the new tariff. We have rejected this approach as it would require defining a new set of triggers, adding complexity to the scheme with no clear benefit. Maintaining the existing trigger also avoids revising triggers

for other technologies supported under the scheme which would create unnecessary uncertainty in other markets.

Application of degression to tiered tariffs

2.42 **We have decided that if a degression for the biomethane tariffs is triggered, it will be applied to all tiers equally** e.g. for a 5% tariff degression - tiers 1, 2 and 3 would each be reduced by 5%. This means that the relative levels of the tiers will be maintained. We consider this approach is simple for Ofgem to administer and will not require any changes to the existing triggers. Given that all plant will receive tier 1, and very large plant will receive all tiers, we have decided that the RHI budget can be effectively controlled by applying degression in this way.

2.43 An alternative approach might be to use separate expenditure forecast profiles and degression triggers for each tier. This would have the potential advantage of more accurately managing any over-spend risk. For example, by allowing us to reduce the tier 3 tariff on its own to manage overspend on large plant, without impacting the income for smaller plant. However, we consider this is not a viable option because market intelligence on future deployment by plant size is too uncertain to enable us to set the triggers in this way. It would also introduce further complexity into the scheme for Ofgem and stakeholders.

Application of potential degenerations in 2015 to tiered tariffs

2.44 We have carefully considered how to manage the risk of multiple changes to the tariff to maintain investor confidence and ensure the sustainability of the biomethane market. In this particular case we have decided to protect the new tariffs for a short period to avoid a degeneration soon after implementation. The new tariffs will not be degenerated on 1 April 2015, even if the outcome of the degeneration assessment for 1 April 2015 indicates a degeneration to the tariff should be applied. However, the purpose of degeneration is to ensure effective management of the RHI budget such that committed expenditure remains within agreed spending limits, and that all technologies are subject to these budget management principles. Therefore, any future degenerations will apply to the new tariffs from 1 July 2015 onwards. The outcome of the degeneration assessment for 1 January and 1 April 2015 will still apply for the purposes of assessing the level of any degeneration to be applied on 1 July 2015¹².

2.45 This means that, subject to Parliamentary approval, the new tariff will not be degenerated between the regulations coming into force and 30 June 2015, specifically on 1 April 2015. The new tariffs will be subject to any Retail Price Index uplift on 1 April 2015. Any biomethane producers registered on or after

¹² The degeneration regulations are such that the level of degeneration in one quarter and spend growth between quarters affects the next degeneration assessment.

1 July 2015 will receive a degressed tariff, if the tariff is degressed on this date. Please refer to the non-domestic RHI degression factsheet at:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/209671/Degression_Factsheet.pdf

This identifies how degressions to tariffs under the non-domestic RHI are determined.

Additional capacity

2.46 For biomethane plants to which additional capacity¹³ is added, the tariff applicable at the time the additional capacity is registered (not the tariff prevailing at the time of registration of the original installation) will be paid for biomethane injected by the additional capacity up to the maximum volume¹⁴ the producer is entitled to inject under the Network Entry Agreement (NEA). The additional capacity will not receive payments beyond the tariff end date notified when the producer was originally registered as a producer of biomethane.

What we proposed

2.47 The consultation set out proposals for determining system capacity and the treatment of additional capacity under a banded system. As system capacity does not need defining under a tiered system the consultation document did not cover additional capacity in the context of tiering. However, the treatment of additional capacity does still need to be addressed in a tiered system for the purposes of determining the tariff the additional capacity should receive.

How additional capacity will be treated under tiered support

2.48 As stated above, existing policy allows participants to apply to have additional capacity supported under the RHI. We have applied this to the tiered tariff in the following way:

- Scenario 1 - a plant is accredited to which the existing, single tariff applies and at a later date, after the tiers have been introduced, new capacity is added. Under this scenario, everything produced under the old capacity (defined by the NEA for the original installation) will continue to receive the old tariff. Anything produced under the new capacity (the incremental amount defined by the new NEA) should receive the tiered tariff; and

¹³ Defined as any biomethane which exceeds the sum of the maximum initial capacity - or max flow rate specified in the original Network Entry Agreement.

¹⁴ The maximum volume (or flow rate) is defined in m³/hr of biomethane multiplied by the number of hours in the year (8760) and then converted into kilowatt hours based on the pre-determined calorific value of the biomethane to be injected. The capacity is therefore determined by the maximum possible amount of biomethane that could be injected in a year.

- Scenario 2 - a plant is accredited under the tiered tariff and at a later date, after a degression, new capacity is added. Under this scenario, biomethane injected under the existing capacity will continue to receive the original tiered tariff and biomethane injected under the additional capacity will receive the degressed tiered tariff.

2.49 In both cases gas injected up to the (pre-expansion) NEA volume of gas will count for the purposes of assessing which tiers are paid out on units of gas above the (pre-expansion) NEA volume of gas. Participants will not receive payments in respect of additional biomethane beyond the tariff end date notified when the participant was registered in respect of the original installation, which is consistent with how additional biomethane capacity is currently treated under the scheme.

2.50 We consider this approach balances maintaining incentives for expansion whilst allowing us to manage the budget within agreed limits and avoid overcompensation. We have provided a number of worked examples of how additional capacity will be treated under a tiered tariff at Annex C.

Update to the evidence base

What we proposed

- 3.1 The technical annex of the consultation document set out our evidence base for capital costs for different scales of biomethane injection. Where there were uncertainties in the evidence base, for example, the cost of the waste treatment unit and the digester, these were highlighted. The evidence base on the cost of the boiler, biogas upgrader, biomethane injection equipment, gas grid connection and development and civil works, were also outlined. A key consideration for the review is how these capital costs vary with scale i.e. are there economies of scale and over what scales do they persist?
- 3.2 Assumed operating costs were also outlined in the technical annex, which included equipment maintenance costs, propane costs, electricity costs, landfill costs (for packaging), digestate disposal costs and labour costs.
- 3.3 The technical annex also outlined assumptions around gate fee and other revenues, crop prices and performance assumptions for the plant.

What respondents said

- 3.4 Through the consultation process, we received useful information on the costs and performance of biomethane plants to update our pre-consultation evidence base. This covered waste, agricultural and mixed feedstock plants and encompassed a range of plant capacities.
- 3.5 Given the focus on feedstock costs we received over 100 price quotes relating to different feedstocks (food waste, agricultural waste, energy crops) but also information on capital and operating costs and key plant performance metrics such as availability. In addition to evidence provided in responses to the consultation questions, 8 respondents supplied supplementary financial models and a small number of respondents also provided invoices for plant equipment and feedstock contracts as proof of cost figures.
- 3.6 Across the responses there was a strong level of engagement with the analytical approach and evidence underpinning the tariff. We appreciate this input and the willingness of respondents to share detailed cost and performance information on projects under development.

Updated evidence – modelling assumptions

- 3.7 Using the evidence provided during consultation, the tariff analysis has been updated with key changes to cost and performance inputs summarised here. More detail on this evidence, the analysis updating the tariff setting and an assessment of the impact of the tariff changes is provided in the Impact Assessment that accompanies this Government Response.

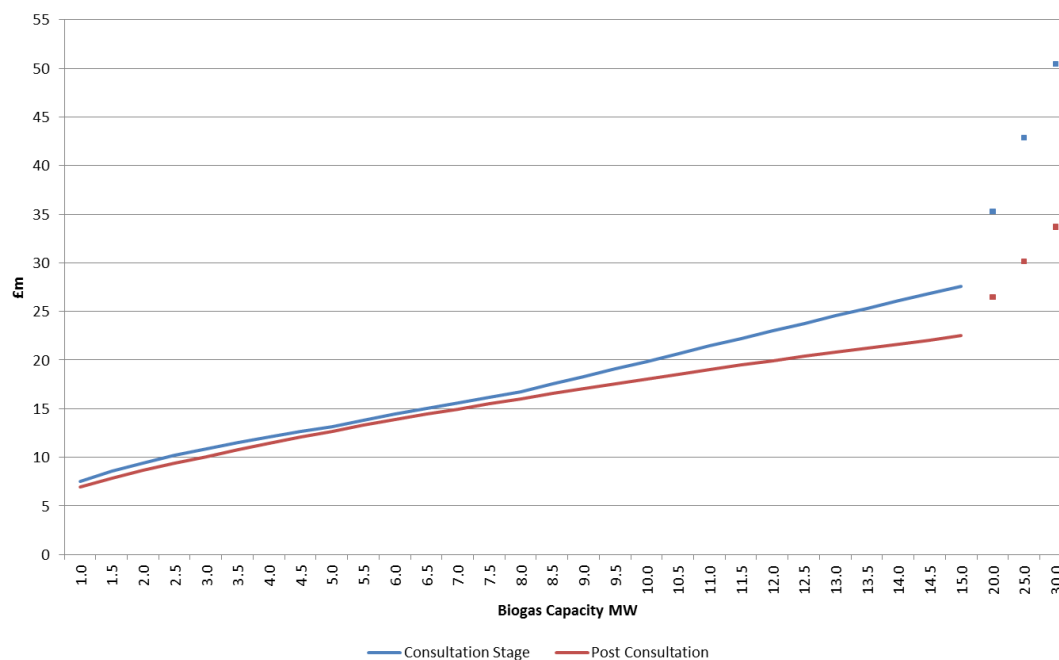
Feedstock Costs

- 3.8 As indicated, the feedstock model used for the purpose of tariff setting has been changed from a 100% food waste model to a 70% food waste, 30% energy crop model, in response to feedback that the tariff needs to account for the feedstock security risk faced by waste AD plants. Based upon consultation evidence we have used an energy crop price of £35 per tonne and a waste gate fee of £15 per tonne, reflecting unpackaged waste with a low level of contaminants.
- 3.9 The assumption of feedstock diversification captures feedstock security risk. Another method of accounting for this suggested by respondents was to discount the waste gate fees after a certain time. This has not been done here - the feedstock prices indicated are assumed over the lifetime of the plant. However, note that these assumptions give a blended feedstock cost close to £0 per tonne, which is similar to a 100% waste plant that fully discounts gate fee revenue.

Capital costs

- 3.10 Based upon consultation evidence, the capital costs of the AD plant (waste pre-treatment and digesters) have been revised. We now have evidence on costs for these components for plants up to 12 MW biogas capacity enabling us to update the relationship between cost and capacity over this range. We did not receive sufficient evidence on AD plant costs for plants of higher capacities and so have applied judgement and extrapolated the 'economies of scale' relationship observed over the 1-12 MW range.
- 3.11 Elsewhere we have reduced some capital cost components (development costs, injection costs), increased others (civil works, grid connection costs) and added others that were not included at consultation stage (silage clamps, digestate storage and equipment for the removal of H₂S and volatile organic carbons (VOCs) from the biogas). The costs of the upgrader, the other main component of capital expenditure have remained similar.
- 3.12 The overall impact of these changes (Figure 3) is that the capital costs have been reduced versus consultation stage and economies of scale have been extended further to larger capacity plant.

Figure 3: Total Capital Costs Pre and Post Consultation



Operating costs

- 3.13 Based on evidence gathered through the consultation, operating costs have been reduced. The main changes leading to this are a reduction in maintenance costs (in line with lower capital costs) and a reduction in landfill costs; the percentage of waste rejected to landfill has been reduced from 10% to 5% on the basis of consultation responses. Landfill costs (per tonne) have also been reduced slightly.
- 3.14 Digestate disposal costs have remained broadly the same though several adjustments to their calculation have been made that offset each other. Consultation evidence indicated that the ratio of digestate to feedstock, in the original consultation model, was too high, whilst digestate disposal costs have been increased in response to feedback that they were too low.
- 3.15 Other operating costs, (labour costs, propane costs, electricity costs, insurance costs) have changed only slightly or not at all.

Biomethane revenue

- 3.16 DECC has updated its fossil fuel price projections which for wholesale gas are slightly lower than the 2013 projection. The average wholesale gas price projection to 2030 has fallen from 2.5p/kWh to 2.2p/kWh (adjusted to December 2013 prices). The impact of this change is to reduce the assumed revenue from gas sales and increase the tariff.

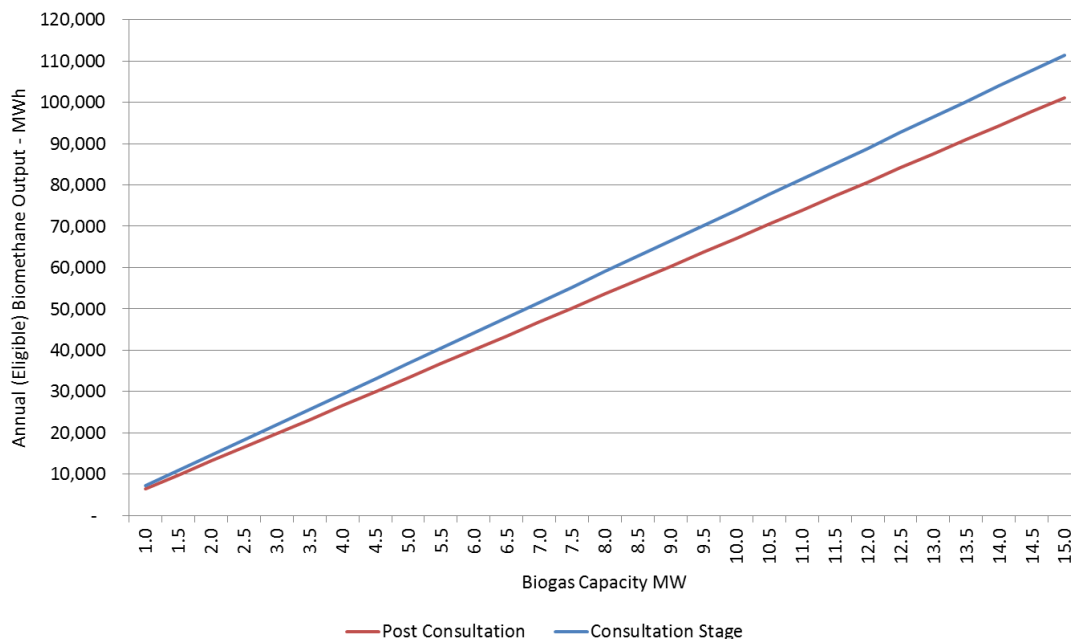
Plant performance

- 3.17 Feedback from consultation respondents identified that the assumption that the digester is available 100% of the time is unrealistic owing to interruptions to feedstock supplies and maintenance. Digester availability has been reduced from 100% to 90% based upon figures provided in consultation responses. The consultation evidence did not suggest we should change the

assumption of 95% for the upgrader plant. This change reduces the assumed overall plant availability from 95% to 86%.

- 3.18 The second change regarding performance has been to base the tariff upon an upgrader methane capture assumption of 99.5% rather than 98%. This reflects the fact that both membrane and amine upgrading technologies have been shown to achieve these levels of methane capture and we want to set the tariff on the basis of better performance in this area.
- 3.19 The overall impacts of these changes are to reduce the annual output for a given biogas capacity by approximately 10% (Figure 4) and to increase the required tariff at each capacity by approximately 10%, as the costs at each plant capacity are now divided by a smaller volume of output.

Figure 4: Annual biomethane output by biogas capacity pre and post consultation



Overall impact on the tariff

- 3.20 The levelised cost method for calculating the tariff has not been changed since consultation so the updates to the implied tariff at each output level are due to the changes to the cost and performance evidence summarised above.
- 3.21 Figure 5 reproduces Figure 1, illustrating the final “12% IRR tariff curve”, from which the tiered tariff we intend to implement has been derived. As is clear, the net change of the update to the evidence base has been to increase the tariff at all capacities by 2-3p/kWh compared with the consultation stage tariff curve. This is mainly due to the revision to the feedstock assumptions underpinning the tariff (Figure 6 illustrates this for a 6MW plant).

Figure 5: 12% IRR tariff curve based on updated post-consultation evidence base

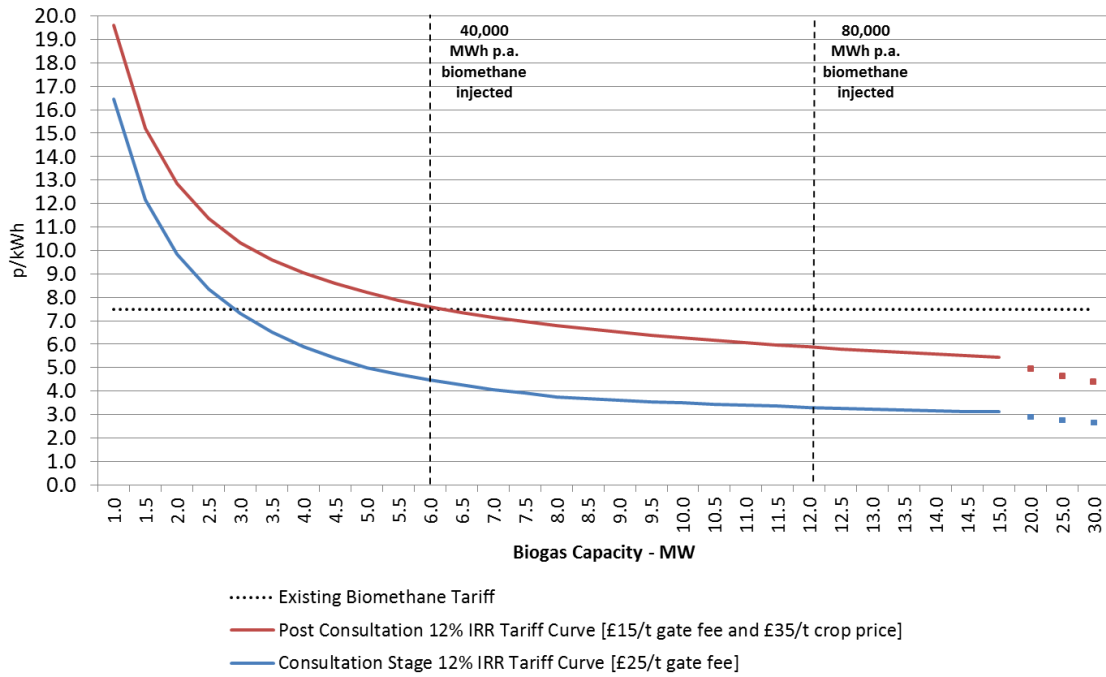
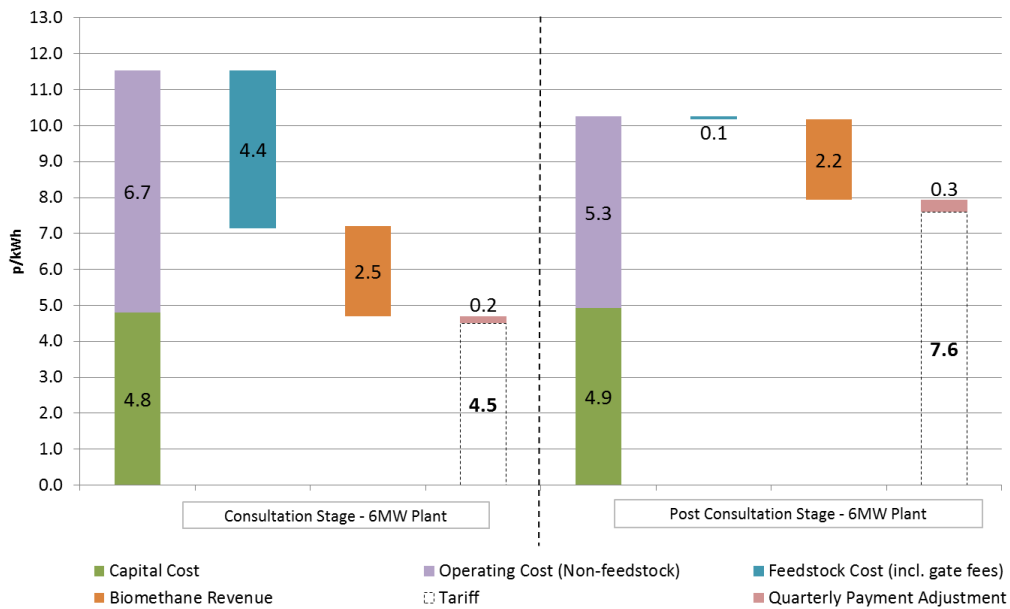


Figure 6: Comparison of net levelised cost components underpinning tariff for a 6 MW (gross biogas) plant at consultation stage and post consultation



Impact assessment

3.22 The Impact Assessment (IA) that accompanies this Government Response provides more detail on the updated evidence base and tariff setting. It also

assesses the potential impact of the tariff change on biomethane deployment and the associated costs and benefits under four scenarios.

- 3.23 The first scenario considers the impact if the new tariff addresses overcompensation without impacting biomethane deployment, relative to a counterfactual in which the existing tariff is maintained and there is no degression to the tariff. Although this is not necessarily the most likely outcome under either situation, this scenario best illustrates the RHI expenditure saving as a result of reforming the tariff structure (alone).
- 3.24 Based upon DECC's range of market intelligence scenarios for RHI heat deployment and spend in 2015/16 it would deliver annual RHI expenditure savings of approximately £5-10m for new plants coming forward in 2015/16 (or approximately £55-£145m savings over the corresponding plants' lifetimes in 2015/16 prices, discounted). This represents a 15% reduction in spend and would improve the cost-effectiveness of the biomethane tariff from £77/MWh to £65/MWh. With no impact on deployment there is no change to resource costs or carbon emissions savings under this scenario.
- 3.25 It is possible of course that introducing the tiered tariff will impact biomethane deployment and similarly that the existing tariff would be degressed anyway if left unaltered. These form the basis of the other scenarios considered in the Impact Assessment.
- 3.26 A scenario in which the tariff change reduces deployment of affected plants by 25% versus a counterfactual of no degression to the existing tariff results in correspondingly lower resource cost and carbon emissions savings (i.e. by 25%) relative to the counterfactual (full detail is given in the IA). Tariff cost-effectiveness is reduced to £67/MWh here, the slight difference with the previous scenario owing to the loss of some larger plants which require a lower p/kWh incentive.
- 3.27 Under corresponding scenarios in which the counterfactual involves a similar sized degression (approximately 15%) to the existing tariff, it can be seen that a degression would result in a similar improvement in the tariff cost-effectiveness to introducing tiering - but at the expense of reduced deployment of smaller plants i.e. lower (absolute) renewable heat deployment and carbon emissions savings. However, degression would not align the tariff with changing unit costs as plant scales increase, meaning the overcompensation risk would not be addressed as effectively.

Other issues

Existing assets

- 4.1 Earlier this year, stakeholders made representations to DECC that existing anaerobic digesters (existing assets), that are currently already being used to either treat waste or to produce biogas for combined heat and power production (CHP) may be converted to biomethane to grid production and this may represent a value for money risk because some of the capital investment has already been made and the plant subsidised from other support schemes (such as Renewables Obligation Certificates).

What we proposed

- 4.2 During the consultation, we sought views on whether owners with existing assets that install biomethane clean up kit to access the RHI represented a value for money risk. Such a risk might apply for two reasons:
- The biomethane tariff is set to compensate a developer for the cost of a new digester(s). Owners of existing anaerobic digesters that have already been paid for, might avoid the development and capital costs associated with having to install a new digester. For example, this might apply to sewage plants that already treat sewage waste with an anaerobic digester, or developers who are using biogas for CHP; and
 - Receiving the RHI might result in a double subsidy where owners of AD plant have already been in receipt of the RO or FiTs for CHP generation before choosing to convert to biomethane injection. This is because they will have already been compensated for some of the cost of their anaerobic digester through the RO/FiTs tariff.

What respondents said

Plant with existing anaerobic digesters

- 4.3 64% of respondents had no view on whether participants with existing assets should be allowed to register to the scheme. Of the remaining respondents, 6% thought that those with existing assets should not be permitted onto the scheme. 12% of respondents thought they should be allowed onto the scheme, compared to 12% who thought they should be allowed onto the scheme but with a different tariff. 2% thought sewage plant should not be allowed on to the scheme. Finally, 2% thought they should be allowed to access the scheme but with caveats and 2% thought this should be assessed on a case by case basis.

Sewage plant with existing anaerobic digesters

- 4.4 On the issue of whether the RHI should treat sewage plant in the same way they are treated under the RO and so offer a lower tariff to them, in total, 49% of respondents had no view on the issue, 24% felt that participants generating

biomethane from sewage plants should be paid a lower tariff, 17% thought that they should not receive a lower tariff, and 10% felt that biomethane generated from sewage plants should be ineligible for the scheme altogether.

- 4.5 Of those that answered that sewage gas should receive a different tariff, the issue of what to base the tariff on is relevant. However, only 15 respondents answered this question compared to 50 respondents who did not express a view.

The interaction of the RHI tariff with the RO and FiTs tariffs

- 4.6 63% of respondents had no view on the issue of the interaction of the RHI with RO and FiTs tariffs. Of those that did have a view, 11% thought that owners of AD plant who had previously been in receipt of the RO or FiTs should not be permitted to switch to the RHI, 18% thought that they should be permitted to switch and a further 8% thought that switching would be unlikely. 2% thought it inappropriate to consider whether assets have been paid for by existing subsidies as plants are constantly in the process of updating to meet new regulations
- 4.7 It is worth noting that although 19% of respondents thought that switching should be permitted, many felt that those that switch should have a lower tariff or the length of the tariff should be reduced by the number of years the participant had been in receipt of another subsidy.

Government consideration

- 4.8 Some suggestions were made about how existing assets should be treated but on the whole little evidence was provided in support of one particular approach, over another. It is therefore clear that more work needs to be done to establish a proportionate approach to this issue, particularly given that:
- Evidence used in the original tariff setting identifies that the lifetime of a digester is 20 years, the same as the lifetime of the RHI. Therefore, if an applicant with an existing anaerobic digester joins the scheme, it is likely that over the course of the 20 year payment period, the digester would need to be replaced at some point in any case, or significant maintenance undertaken, thus limiting the risk of over compensation of these plants; and
 - Although approximately one quarter of respondents thought that support for sewage plants should be reduced and a handful of respondents questioned whether sewage plant should be eligible at all, very little cost evidence was provided to support this. We therefore have not been able to establish whether such a tariff is necessary, nor do we have enough evidence on which to base a bespoke tariff.

4.9 In light of this lack of evidence and that the proposed changes to the biomethane tariff will apply to plant with existing assets, including sewage plants, we have decided against making any further policy change in this area at the current time.

Biogas scrubbing

4.10 There is an inevitable emission of methane from the biogas scrubbing process amounting to between 0.1% and 2% of the final injected methane - depending on the type of technology used¹⁵. As methane is a potent greenhouse gas, the consultation considered how we may address this in the future.

What we proposed

4.11 We noted that it is our intention that the RHI encourages the use of the best available technology for the biomethane scrubbing process, to avoid additional methane emissions. To develop our understanding of this, we invited views and suggestions as to how this could be achieved in practice.

What respondents said

4.12 In total, 48% of respondents to this question had no view on the issue. Of those that did have a view, there were some clear themes as to how to encourage use of the best available technology, with some respondents sharing more than one suggestion as to how to do this.

4.13 Of the suggestions put to us, the most commonly cited were:

- That we manage biomethane slippage through the biomass sustainability criteria – mentioned in 6 responses;
- More monitoring of the performance of in-situ installations was necessary – mentioned in 5 responses;
- A slippage limit or penalty for high slippage could be introduced – mentioned in 4 responses;
- That use of the best technology could be rewarded through the tariff structure – mentioned in 3 responses;
- CO₂ recovery could be rewarded through the tariff – mentioned in 3 responses;
- Introduce a voluntary system for the control of methane emissions, like the one in Sweden - mentioned in 2 responses

4.14 However, 8 responses made the point that developers are already incentivised to use the best available technology, to minimise methane emissions and to increase their revenue. 4 responses were of the view that no further regulation is required.

¹⁵ See Swedish Gas Technology Centre: Biogas Upgrading Technologies – Review of Commercial Technologies SGC Rapport 2013:270 <http://www.sgc.se/en/?pg=1445651>

Government Consideration

4.15 As set out in our policy update published on 4 November¹⁶, we propose to further develop policy on biomethane sustainability to ensure we are incentivising plant design and operation which yields increasingly cost-effective greenhouse gas savings. We will keep the issue of methane slippage under review, and if appropriate it will be included in any future review of biomethane sustainability.

Bio SNG

4.16 BioSNG, short for 'Bio Substitute Natural Gas', is a biomethane that is produced by a thermal process from a wide range of feedstocks, including feedstocks that cannot be used in a regular anaerobic digester (for example, most lignocellulosic material such as wood and mixed waste), whereas, thermal processes can be used to treat all waste and biomass types. BioSNG is currently supported under RHI biomethane to grid tariff.

4.17 We received one response to the consultation regarding Bio SNG requesting that we set a bespoke tariff for this technology. Given that the technology is at demonstration stage and first possible commercial deployment of the technology is not expected for 2 -3 years, we have decided it is not feasible to set a bespoke tariff for this technology at the current time. Bio SNG will continue to be eligible for the biomethane to grid tariff. In addition we will continue to keep a watching brief over future developments on Bio SNG sector.

¹⁶ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/370604/Non-domestic_RHI_-_Biomass_and_Biomethane_Sustainability_November_2014.pdf

Annex A: List of consultation respondents

AB Connect / AB Agri	Olleco /White House Consulting
AB Sugar	Organic Resource Agency Ltd
ADBA	Purac Puregas Ltd
ADOWG	REA
Advanced Plasma Power	Renewable Energy Assurance Limited
AeroThermal Group	Renewables Unlimited LLP
agriKomp Ltd	RLANDenergy LIMITED
AJB	Rob Heap Consulting
Anglian Water Services	RUR3 Environmental Ltd
Bio Collectors	Scotia Gas Networks
Bio Waste	Scottish Water
Bio-LNG for Road Transportation	Selborne Brick Company
BioWatt	Severn Trent Water
BOC UK & Ireland	Singleton Birch Limited
Buchan Biogas Ltd	St Nicholas Court Farms Ltd
Calor Gas Limited	Strutt and Parker (Farms) Limited
CLA	Summerleaze
CLA / Wight Farm Energy LLP	Synertree Ltd
Dairy and Rural Enterprise	T.I. Investments Ltd
Dwr Cymru Welsh Water	Tamar Energy
E.ON UK	Veolia Water Industrial Outsourcing
Ecotricity	Wales and West Utilities
Energy Networks Association	Waste Transition
EnviTec Biogas	Wyke Farms Ltd
Eternity Capital Management Ltd	Zebec Biogas Limited
Eunomia Research & Consulting Ltd	
Greencycle Systems on behalf of Wight Farm Energy LLP	
Greencycle Systems on behalf of Yelspa Ltd	
Greener for Life	
Grissan	
Grontmij	
HFH Management Ltd	
Icknield farm	
Iona Capital	
Jones Celtic BioEnergy	
Material Change Limited	
National Grid	
New Earth Solutions Group Ltd and NEAT Technology Group Ltd	
Northern Gas Networks	
Northumbrian Water	

Annex B: Changes to the biomethane injection to grid tariff January to July 2015

November 2014

- Degression assessment
- 28th November - 10% degression announced for existing biomethane tariff

December 2014

- Regulations amending biomethane tariff expected to be laid before Parliament

January 2015

- 1st January – 10% degression applied to existing biomethane tariff

February 2015

- Degression assessment
- Tiered tariffs for biomethane expected to be introduced subject to Parliamentary approval – this replaces existing tariff
- Degression announcement before 1st March

March 2015

- No actions relating to biomethane tariffs

April 2015

- RPI uplift applied to all RHI tariffs including new (tiered) biomethane tariffs
- 1st April - any degression resulting from the February degression assessment will not be applied to the new biomethane tariff

May 2015

- Degression assessment – although degression won't be applied to the new biomethane tariff on 1st April, the outcome of the degression assessment for both 1st January and 1st April will still apply for the purposes of assessing the level of any degression on 1st July
- Degression announcement before 1st June

June 2015

- No actions relating to biomethane tariffs

July 2015

- 1st July – any degression resulting from the May degression assessment will be applied to the tiered biomethane tariff for new applicants.

Annex C: Additional capacity worked examples

Scenario A

This scenario reflects a biomethane plant that is registered to the RHI and injecting before the tiered tariffs come into force. Additional capacity is registered to the scheme after the new tariffs come into force.

A biomethane plant is registered to the RHI scheme on 1 April 2014 (the tariff start date for the initial biomethane). Its maximum initial capacity, or the maximum amount of initial biomethane the plant can inject in a quarterly period, is 38,000 MWh (or 152,000 MWh per year) as specified in the Network Entry Agreement (NEA) though we note that under the regulations Ofgem must specify the maximum initial capacity in metres cubed per quarterly period.

Some additional capacity is then installed at the plant which is registered to the scheme on 1 July 2015 (the tariff start date for the first registered additional biomethane). The maximum additional capacity, or the maximum amount of additional biomethane the plant can inject is 5,000 MWh per quarterly period set by reference to the tariff start date for the initial capacity (i.e. any revised NEA allows the registered participant to inject at a flow rate which would result in a total of 43,000 MWh of biomethane per quarterly period).

A second batch of additional capacity is then installed at the plant which is registered to the scheme on 1 October 2015 (the tariff start date for the second registered additional biomethane). The maximum additional capacity for the second registered additional biomethane is 5,000 MWh per quarterly period set by reference to the tariff start date for the initial capacity (i.e. any revised NEA allows the registered participant to inject at a flow rate which would result in a total of 48,000 MWh of biomethane per quarterly period).

Assumptions:

- The plant's tariff on 1 April 2014 – 7.5p
- The plant's tariff on 1 April 2015 – 7.7p (assume 2.5% RPI adjustment)
- Tariffs on 1 April 2015 (assume 2.5% RPI adjustment):
 - Tier 1: 7.7p up to 40,000 MWh
 - Tier 2: 4.5p for next 40,000 MWh
 - Tier 3: 3.5p for remainder
- The plant injects the following over a 12 month period:
 - a total of 36,000 MWh of biomethane in the first quarter (that 12 month period being set by reference to the tariff start date for the initial capacity);
 - a total of 41,000 MWh of biomethane in the second quarter;
 - a total of 46,000 MWh of biomethane in the third quarter; and
 - a total of 46,000 MWh of biomethane in the fourth quarter.

Scenario A

Quarterly period		1 st	2 nd	3 rd	4 th
Date period commences		1 April 2015	1 July 2015	1 October 2015	1 January 2015
Tier status		Tier 1 not yet exhausted at end of period. 4,000 MWh remain.	Tier 1 exceeded during period. Additional biomethane receives tier 2. 3,000 MWh under tier 2 remain.	Tier 2 exceeded during period, remainder receives tier 3.	Only tier 3 payable.
Total biomethane injected		36,000 ¹⁷	41,000 ¹⁸	46,000 ¹⁹	46,000
Amount injected at tier 1 rate (up to 40,000 MWh/12 months (and applicable tariff))	Initial capacity (up to 38,000 MWh per quarter)	36,000 (7.7p)	38,000 (7.7p)	38,000 (7.7p)	38,000 (7.7p)
	1 st additional capacity	None registered	-	-	-
	2 nd additional capacity	None registered	None registered	-	-
Amount injected at tier 2 rate (next 40,000 MWh/12 months) (and applicable tariff)	Initial capacity (up to 38,000 MWh per quarter)	-	-	-	-
	1 st additional capacity (up to 5,000 MWh per quarter)	None registered	3,000 (4.5p – or less if tariff degressed on 1 July 2015)	-	-
	2 nd additional capacity	None registered	None registered	-	-
Amount injected at tier 3 rate (remainder) (and applicable tariff)	Initial capacity (up to 38,000 MWh per quarter)	-	-	-	-
	1 st additional capacity (up to 5,000 MWh per quarter)	None registered	-	5,000 (3.5p - or less if tariff degressed on 1 July 2015)	5,000 (3.5p - or less if tariff degressed on 1 July 2015)
	2 nd additional capacity (up to 5,000 MWh per quarter)	None registered	None registered	3,000 (3.5p – or less if tariff degressed on or post 1 July 2015)	3,000 (3.5p - or less if tariff degressed on or post July 2015)

¹⁷ All biomethane injected up to the maximum initial capacity in each quarter will receive the tariff prevailing at the time the original installation was registered i.e. the current, one size fits all tariff.

¹⁸ Biomethane injected up to the maximum initial capacity specified in the NEA will count for the purposes of assessing which tiers are paid out on units of gas above the maximum initial capacity. Tier 1 has been exceeded therefore the 3,000 MWh injected by the additional capacity receives the tier 2 tariff.

¹⁹ Tier 2 has been exceeded. All biomethane injected by additional capacity will receive the tier 3 tariff.

Scenario B

This scenario reflects a biomethane plant that is registered to the RHI after the tiered tariffs comes into force. Additional capacity is then registered to the scheme at a later date.

A biomethane plant is registered to the RHI scheme on 1 April 2015 (the tariff start date for the initial biomethane). Its maximum initial capacity, or the maximum amount of initial biomethane the plant can inject in a quarterly period, is 45,000 MWh (or 180,000 MWh per year) as specified in the Network Entry Agreement ((NEA (though we note that under the regulations Ofgem must specify the maximum initial capacity in metres cubed per quarterly period)).

Some additional capacity is then installed at the plant which is registered to the scheme on 1 July 2015 (the tariff start date for the first registered additional biomethane). The maximum additional capacity, or the maximum amount of additional biomethane the plant can inject is 5,000 MWh per quarterly period set by reference to the tariff start date for the initial capacity (i.e. any revised NEA allows the registered participant to inject at a flow rate which would result in a total of 50,000 MWh of biomethane per quarterly period).

A second batch of additional capacity is then installed at the plant which is registered to the scheme on 1 October 2015 (the tariff start date for the second registered additional biomethane). The maximum additional capacity for the second registered additional biomethane is 5,000 MWh per quarterly period set by reference to the tariff start date for the initial capacity (i.e. any revised NEA allows the registered participant to inject at a flow rate which would result in a total of 55,000 MWh of biomethane per quarterly period).

Assumptions:

- Tariffs on 1 April 2015 (assume 2.5% RPI adjustment):
 - Tier 1: 7.7p up to 40,000 MWh
 - Tier 2: 4.5p for next 40,000 MWh
 - Tier 3: 3.5p for remainder
- The plant injects the following over a 12 month period:
 - a total of 43,000 MWh of biomethane in the first quarter (that 12 month period being set by reference to the tariff start date for the initial capacity);
 - a total of 48,000 MWh of biomethane in the second quarter;
 - a total of 53,000 MWh of biomethane in the third quarter; and
 - a total of 53,000 MWh of biomethane in the fourth quarter.

Scenario B

Quarterly period		1 st	2 nd	3 rd	4 th
Date period commences		1 April 2015	1 July 2015	1 October 2015	1 January 2015
Tier status		Tier 1 exceeded at end of period. 37,000 MWh of tier 2 remain.	Tier 2 exceeded during period. Remainder receives tier 3.	Only tier 3 payable.	Only tier 3 payable.
Total biomethane injected		43,000	48,000	53,000	53,000
Amount injected at tier 1 rate (up to 40,000 MWh/12 months) (and applicable tariff)	Initial capacity (up to 45,000 MWh per quarter)	40,000 (7.9p)	-	-	-
	1 st additional capacity	None registered	-	-	-
	2 nd additional capacity	None registered	None registered	-	-
Amount injected at tier 2 rate (next 40,000 MWh/12 months) (and applicable tariff)	Initial capacity (up to 45,000 MWh per quarter)	3,000 (4.6p)	37,000 (4.6p)	-	-
	1 st additional capacity (up to 5,000 MWh per quarter)	None registered	-	-	-
	2 nd additional capacity	None registered	None registered	-	-
Amount injected at tier 3 rate (remainder) (and applicable tariff)	Initial capacity (up to 45,000 MWh)	-	8,000 (3.6p)	45,000 (3.6p)	45,000 (3.6p)
	1 st additional capacity (up to 5,000 MWh)	None registered	3,000 (3.6p or less if tariff degressed on 1 July 2015)	5,000 (3.6p – or less if tariff degressed on 1 July 2015)	5,000 (3.6p – or less if tariff degressed on 1 July 2015)
	2 nd additional capacity (up to 5,000 MWh)	None registered	None registered	3,000 (3.6p – or less if tariff degressed on or post 1 July 2015)	3,000 (3.6p - or less if tariff degressed on or post 1 July 2015)

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