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**BUSINESS CASE**

**LONG-TERM PAYMENT STRUCTURE**

**FOR THE NORTHERN IRELAND**

**NON-DOMESTIC RENEWABLE HEAT INCENTIVE SCHEME**

**RHI TASKFORCE**  
**JANUARY 2019**

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## **EXECUTIVE SUMMARY**

### **Background**

The purpose of this business case is to assess the relative costs and benefits of the main options in respect of the future payment structure for the Northern Ireland (NI) Non-Domestic Renewable Heat Incentive (RHI) Scheme.

There were 2,128 applications to the NI RHI Scheme between it being opened in November 2012 and suspended in February 2016. Participants on the Scheme currently receive payments based on applying tariffs (p/kWh) to the amount of heat (kWh) generated. The tariffs were calculated with the intention of compensating for the additional costs of renewable heat as well as providing a 12% rate of return on the net capital investment. Tariff levels vary depending on the renewable heat technology being used to generate heat and the size of the installation.

The main focus of this business case is on the small and medium sized (0-200kW) biomass boilers and Combined Heat & Power (CHP) plants which account for over 97% of the applications to the Scheme.

Whilst a single tier tariff applied at the outset of the NI RHI Scheme, the extension of a tiered tariff structure to all small and medium sized biomass installations from April 2017 has largely removed the incentive to generate more heat than necessary, and has brought the cost of the Scheme back within budget. However, analysis by the RHI Taskforce suggested that participants are still being over compensated for the additional costs of producing renewable heat. In response, the energy consultancy Ricardo Energy & Environment was commissioned to undertake a review of the current tariff structure which identified three main tariff scenarios (Options A4(i), A5 & A6).

In addition, this business case also considers options based on ceasing payments (Option A1), the current/previous tariff structures on the NI RHI Scheme (Options A2/A3) and the current/previous tariff structures on the GB RHI Scheme (Options A7/A8). These are all based on continuing to provide participants with ongoing

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payments. The alternative is a Compulsory Buy-Out which would involve a one-off payment to participants in 2019-20, but no further ongoing tariff payments. The one-off payment would be calculated as the sum of the annual payments required to provide a rate of return on the additional costs of each participant's biomass boiler, net of payments received to date (Options B1-B4).

Summary details of each option are set out in Table 1 below. The ceasing payments option (Option A1) or the lowest cost Compulsory Buy-Out (Option B1) have the lowest Net Present Cost (NPC) but are not based on providing a 12% rate of return over 20 years which was a key principle for payments under the Scheme.

**Table 1: Summary of Options for Long Term Payment Structure for NI RHI Scheme (Tariffs in 2019-20 prices)**

Economic (tariffs in 2015-20 prices)						
Option	Basis of Payment			NPC £m	Non-Monetary Assessment	
		Tier1 (p/kWh)	Tier 2 (p/kWh)		Environmental	Rate of Return
Ongoing Payment Options						
A1	Do nothing- cease payments	0.0	0.0	0	Low/Medium	Medium
A2	Extend 2017 Regulations	7.2	1.7	293	Medium	Low
A3	Revert to 2012 Regulations	7.2		624	Low	Low
A4(i)	Tariff Review- Base Case	2.3	-0.4	45	Low/Medium	Medium
A4(ii)	Tariff Review- Base Case with zero Tier 2 tariff	1.7	0.0	51	Medium	Medium
A5	Tariff Review- Base Case excluding fuel costs	3.4	0.5	108	Medium	Low/Medium
A6	Tariff Review (hybrid)	2.9	0.0	81	Medium	Low/Medium
A7	GB Tariff Structure- Current	3.11	2.18	223	Medium	Low
A8	GB Tariff Structure- Oct 15	4.67	1.24	195	Medium	Low
Compulsory Buy-Out Options						
B1	5% rate of return over 10 years undiscounted, with no hassle costs			16	Low/Medium	Medium
B2 (unadj)	12% rate of return over 20 years undiscounted with no hassle costs			49	Low/Medium	Low/Medium
B2 (adj)	12% rate of return over 20 years discounted with no hassle costs			30	Low/Medium	High
B3	8.5% rate of return over 15 years undiscounted with no hassle costs			26	Low/Medium	Medium
B4	12% rate of return over 20 years undiscounted with hassle costs			78	Low/Medium	Low

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This is in the context that one of the main considerations in the development of the long term payment structure has been whether the preferred option is likely to be able to secure State aid approval from the European Commission. Whilst the Commission had referred to an 8-22% range of rates of return when providing initial State aid approval for the NI RHI Scheme in 2012, Commission officials have recently clarified that they would be unable to accept a tariff that provided participants with a rate of return significantly higher than 12%.

Applying the current/previous tariff structures for the NI and GB RHI Schemes would be expected to provide continuing overcompensation to participants with the projected rate of return for the typical installation significantly higher than the 12% target. It is for this reason that they have a low assessment in respect of Rate of Return criterion in Table 1. Although Option A6 is expected to provide a rate of return within the 8-22% range, it is also unacceptable to the Commission because its projected rate of return is higher than 12%.

### **Preferred Ongoing Tariff Option**

On this basis, only Option A4 has the potential to be acceptable to the European Commission as the two variants set out in Table 1 both provide a 12% rate of return for the typical installation. The Base Case tariff structure from the Ricardo tariff review, Option A4(i) would be expected to cost £5.7 million in 2019-20, including £2 million for a Voluntary Buy-Out (based on similar terms to Option B2 (adjusted)) which would continue over a three year period.

However, there is concern that this option would be difficult to administer due to the negative Tier 2 tariff, although this could be addressed by moving from quarterly to annual RHI payments. More fundamentally whilst the value of the Tier 2 tariff reflects the lower operating costs of a biomass boiler, there is a significant risk that participants on the Scheme would interpret the negative tariff as a signal to stop using their biomass boiler and revert to a fossil fuel boiler once the Tier 1 tariff threshold of 1,314 hours has been reached. This would be expected to have negative environmental consequences, contrary to the objective of the Scheme.

Option A4(ii) is an alternative approach to achieving a 12% rate of return for the typical installation by setting the Tier 2 tariff at zero and reducing the Tier 1 tariff to 1.7p/kWh. However, this option was not considered by Ricardo or subject to public consultation. Furthermore, it would provide insufficient compensation for participants with lower than average, but still reasonable, heat requirements. In response, A4(ii) includes £4 million in funding each year for a Voluntary Buy-Out with a total cost of £8.0 million in 2019-20.

Although the two Option A4 variants are expected to provide a 12% rate of return on a prospective basis, the level of overcompensation from the original and current tariff structures means that the typical participant would be expected to achieve a higher rate of return over the lifetime of the Scheme, even if no further payments were made. An ongoing payment option would need to have a negative Tier 1 tariff to offset previous overcompensation, which could not be implemented. This implies that no ongoing tariff option would be acceptable to the European Commission if it requires that previous overcompensation is reflected in the long term payment structure.

### **Preferred Compulsory Buy-Out Option**

Previous overcompensation is taken into account, to different extents, in the Compulsory Buy-Out options with Option B2 (unadjusted) based on the sum of annual payments required to provide a 12% rate of return over 20 years minus payments received to date. However, under this option the one-off payment is not discounted to take account of payment being received earlier than under an ongoing payment approach. As a result, the expected rate of return for the typical installation under Option B2 (unadjusted) is higher than the 12% target.

This issue is addressed (see Annex A) in Option B2 (adjusted) which is the option which would be expected to provide the most participants with the target 12% rate of return, even including previous overcompensation. This is in the context that over 800 participants would be expected to have received more RHI payments by the end of 2018-19 than required to deliver a 12% rate of return and would therefore receive no one-off payment. These installations will have a projected rate of return higher

than 12% which means that the overall rate of return for small and medium sized boilers under Option B2 (adjusted) is expected to be approximately 19%. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Under Option B2 (adjusted) just over half of installations on the NI RHI Scheme would be expected to receive a one-off payment of approximately £18,000 on average, resulting in a total cost of £21 million in 2019-20 and up to £800,000 per annum thereafter in payments for meter readings.

If this option was taken forward, the capital costs presented by participants in their application forms to the Scheme would need to be verified before the one-off payment could be made. The Ricardo analysis suggests that the actual capital costs of participants were 5% lower than set out in the application forms. In this context, if the actual capital costs of applicants were found to be 10% higher or lower than previously presented, it is estimated that the total cost in 2019-20 could be in the range £14-29 million.

It is recognised however that, there are practical issues with a Compulsory Buy-Out option. In particular, in taking previous overcompensation into account when setting the one-off payment, the implicit assumption is that participants will still have access to this funding to set against future costs. This assumption may not hold in reality. In addition, the switch to a grant based approach to RHI payments under the Compulsory Buy-Out might be considered too large a deviation from the original payment structure for the NI RHI Scheme.

There is also a risk that participants would take the one-off payment and use it to install a fossil fuel boiler instead, under the Compulsory Buy-Out options, resulting in a lower environmental impact. However, the lower cost of biomass fuel would suggest that this will not happen to a significant extent. This is in the context that only one third of boilers on the Scheme were replacing a fossil fuel boiler, although

this may in part be due the boilers being installed as part of a business expansion. In order to allow progress to be measured in terms of increasing the proportion of heat generated from renewable sources, the Compulsory Buy-Out options include provision to pay installers £100 for every quarterly meter reading submitted.

## **Other issues**

The findings from this business case have taken into account the responses to the public consultation on the long-term payment options for the NI RHI Scheme which ran from 14 June to 6 September 2018. A number of issues were raised by respondents in respect of the Ricardo analysis and the implications of changes in payment structure, which have been addressed throughout this business case. None of the evidence raised would suggest that the results from the Ricardo analysis should be changed. For example, many respondents to the public consultation referred to a 16.7% increase in the price of wood pellets since the Ricardo analysis was undertaken. However, this was in the context of a 21% increase in the price of oil over the same time period which would suggest that the fuel cost element of the tariff should not be reduced.

The business case also considers the most appropriate approach to the inflationary uplift in tariff levels. Although not relevant for the Compulsory Buy-Out option, if an option is instead chosen based on ongoing tariff payments to Scheme participants then it is recommended that the measure of inflation is changed from Retail Price Index (RPI) to Consumer Prices Index (CPI) in line with the recommendations from the Ricardo report. This would result in a £64 million cost for the remainder of the lifetime of the scheme under Option A4(i), compared with £69 million if the tariff was uplifted using the RPI instead (£70million and £75 million respectively for Option A4(ii)). [REDACTED]

[REDACTED]

[REDACTED]

The analysis produced by Ricardo concluded that no public subsidy was required in respect of the two very large CHP plants which had applied to the NI RHI Scheme. Whilst this business case includes other options, such as the application of the tariff



for large biomass boilers, the recommendation is that no tariff is offered for CHP plants.

This business case has not considered any change to the tariffs for the other technologies on the NI RHI Scheme as well as large biomass boilers. These are expected to receive total RHI payments of approximately £0.6 million in 2019-20, alongside projected spend of £3.0 million for the Domestic Scheme. Compared with £28.9 million in annual funding for the NI RHI Scheme in 2019-20, this implies that either the optimal Compulsory Buy-Out Option (Option B2 (adjusted)) or the optimal ongoing payment option (Option A4) would be expected to be affordable.

In respect of implementation it is expected that additional resources would be required to calculate and process the one-off payments. However, this would be more than offset by reduced expenditure on payments to Ofgem for the administration of the Scheme as well as a lower requirement for compliance and enforcement activity. Additional administrative resources may be required if the decision is taken to use the available funding to develop a new programme to encourage the increased deployment of renewable heat.

## **Conclusions**

The analysis set out in this business case shows that the main choice, between an ongoing payment or Compulsory Buy-Out approach, to the long term payment structure is not clear cut. It has therefore identified both a preferred ongoing payment option and a preferred Compulsory Buy-Out option with the choice between the two dependent on the requirements of the European Commission.

The preferred options would improve the operation of the NI RHI Scheme in respect of its original intention of covering the additional costs of a renewable heat boiler rather than “...*being used to support and subsidise business...*” as concluded in the judgment on the legal challenge to the 2017 Regulations. Whilst Option B2 (adjusted) is preferable in respect of returning the rate of return under the Scheme to the original objective and basis for State aid approval, there are practical difficulties in reflecting previous overcompensation in future payment levels.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

In this context, the recommendation of this business case is that Option A4 is implemented as the long term tariff structure for the Scheme. The choice between the two variants of Option A4 is finally balanced with the base case tariff structure from the Ricardo tariff review, Option A4(i) better in principle but with the disadvantage of having a negative Tier 2 tariff. On balance, reflecting the practical difficulties of a negative Tier 2 tariff and the potential negative environmental consequences of proceeding on this basis, the preferred ongoing tariff option is Option A4(ii). The finely balanced nature of this assessment should not be understated with Option A4(i) not significantly different to Option A4(ii) taking all factors into account.

However, there is a risk that either variant of Option A4 may not be acceptable under formal consideration by the European Commission because they do not take previous overcompensation into account. If the Commission insists that the long term payment structure must reflect previous payments, it would be necessary to close the Scheme and revert to Option B2 (adjusted). The implementation of Option B2 (adjusted) would also be required if there is insufficient time available to implement Option A4.

## SECTION 1: INTRODUCTION

- 1.1 The purpose of this business case is to assess the relative costs and benefits of the main options in respect of the payment structure to be applied to the Northern Ireland (NI) Non-Domestic Renewable Heat Incentive (RHI) Scheme ('the Scheme') from 1 April 2019 until payments end in 2036. Unlike the parallel scheme operating in the rest of the UK, the NI RHI Scheme has been suspended to new applicants from February 2016. However, the cumulative number of applicants to the NI Scheme, per head of population, continues to be significantly higher than in the rest of the UK.
- 1.2 This business case has been prepared by officials in the Department for the Economy's ('DfE' or 'the Department') RHI Taskforce which was established with the purpose of addressing the deficiencies in the NI RHI Scheme. One of the key objectives of the Taskforce was to review the management and control of the current approach to calculating the required level of public subsidy.
- 1.3 The NI RHI Scheme currently provides participants with financial assistance, in the form of tariff payments, to switch from the use of heat generated from fossil fuel sources to renewable heat technologies, with the ultimate aim of reducing the level of carbon emissions. However, the evidence available when the NI RHI Scheme was being developed suggested that the tariff levels may have been set at too high a level so that participants were being over compensated, with an incentive to generate more heat than required<sup>1</sup>. This contributed to the amount of committed expenditure under the Scheme being substantially in excess of the planned budget in 2015-16 and 2016-17.
- 1.4 In response, a series of measures has been taken to control costs and improve value for money. These have included the extension of a tiered tariff structure

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<sup>1</sup> Whilst the tariff calculated for medium sized biomass boilers in the February 2012 CEPA Addendum report was based on a capital cost of a biomass boiler of £608 per kW, the previous June 2011 CEPA Report (Table A.4) indicated that the capital cost was in the range £380-397 per kW. In addition, the 2011 Impact Assessment for the GB RHI Scheme referred to a capital cost of £448 per kW for a biomass boiler. Using the £448 figure rather than £608 would have reduced the initial tariff from 5.9/kWh to 4.5p/kWh reducing the level of overcompensation and the perverse incentive to generate more heat than required.

and annual usage limit to all small and medium biomass boilers on the Scheme by way of the Renewable Heat Incentive Scheme (Amendment) Regulations (Northern Ireland) 2017 ('the 2017 Regulations') which were passed by the NI Assembly on 24 January 2017 and came into operation in April 2017.

- 1.5 The 2017 Regulations were introduced at short notice in light of the need to take immediate action to reduce the cost of the Scheme to the NI Executive. The intention was that they would apply only in the interim to allow sufficient time for a longer-term tariff structure to be developed and secure the necessary approvals. As a consequence, the 2017 Regulations were time bounded, via a sunset clause, and ceased to have effect on 31 March 2018.
- 1.6 However, it was not possible to develop and obtain the necessary approvals to implement a sustainable long-term tariff structure for the Scheme before the start of the 2018-19 financial year. In this context, the Northern Ireland (Regional Rates and Energy) Act 2018 extended the provisions of the 2017 Regulations into 2018-19, for a maximum of one additional year.
- 1.7 This further extension has allowed time for the development of a number of options for the long-term tariff structure based on an independent review of the current approach by the energy consultancy Ricardo Energy & Environment ('Ricardo') who were commissioned by the Department to undertake this work in September 2017 with a final report produced in May 2018<sup>2</sup>.
- 1.8 The current tariff structure on the NI RHI Scheme for small and medium sized biomass boilers is similar to the GB RHI Scheme, but with different rates of tariff<sup>3</sup>. In particular, the current Tier 1 tariff on the NI RHI Scheme is based on previous analysis led by Cambridge Economic Policy Associates Ltd (CEPA) on behalf of the former Department of Enterprise, Trade and Investment (DETI) in 2011 and 2012.

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<sup>2</sup> <https://www.economy-ni.gov.uk/sites/default/files/consultations/economy/9.NIRHI-Biomass-Tariff-Review-Final-Report-22-May-2018-FINAL-for-publication.pdf>

<sup>3</sup> The Tier 1 threshold on the NI RHI Scheme (1,314 hours) is the same as that for applicants to the GB RHI Scheme up until 20 September 2017. Subsequent applicants to the GB RHI Scheme receive RHI payments based on a higher Tier 1 threshold (3,066 hours).

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- 1.9 The current Tier 2 tariff is based on analysis by officials in the College of Agriculture, Food & Rural Enterprise (CAFRE) in 2015 as well as the prevailing GB RHI Scheme Tier 2 tariff at that time. Although preliminary analysis by the RHI Taskforce suggested that the current tariff rates on the NI RHI Scheme are too high, it was important for the full formal assessment to be undertaken by expert technical advisers.
- 1.10 Ricardo also examined the tariff levels previously recommended by CEPA in 2013 in respect of Combined Heat and Power (CHP) plants. Although there were only two applications (for preliminary accreditation) to the NI RHI Scheme in respect of CHP plants, before the Scheme was suspended to new applications, these are both very large in size with potentially significant financial consequences.
- 1.11 At the outset it should be stressed that the principle continues to be that the typical installation on the NI RHI Scheme should achieve a 12% rate of return on the additional capital investment in renewable heat technology. This is in the context that the tariff rates on the equivalent scheme in the Republic of Ireland (RoI) are based on providing an 8% rate of return.
- 1.12 The overall objective of the NI RHI Scheme remains the same, to encourage an increase in the proportion of heat generated through renewable sources in NI in order to reduce the level of carbon emissions. However, the previous operation of the NI RHI Scheme meant that more heat was being generated than required which increased the level of carbon emissions.
- 1.13 In addition to the 3 main tariff scenarios that have been identified by the Ricardo Tariff Review, a number of other options are considered in this business case including the current and previous tariff structures from both the NI and GB RHI Schemes. In total there are nine options assessed which involve ongoing tariff payments being made to Scheme participants. Options are also considered in respect of a Compulsory Buy-Out whilst some of the ongoing payment options include provision for participants to voluntarily apply to be bought out. As the Scheme is suspended to new applications the relative assessment of each

option did not consider take up of the Scheme, but focused instead on providing existing participants with a fair rate of return.

- 1.14 This is in the context that there is a wide variation in the purchase price of boilers and the proportion of time that they are in operation (see Paragraph 6.19 below), which has a significant impact on the projected rate of return for each installation. A balance therefore needs to be struck between minimising the number of Scheme participants only achieving a low rate of return whilst also ensuring that substantial numbers of participants do not gain excessive returns. This is in the context that the Ricardo analysis suggests that by 1 April 2019, over 80% of Scheme participants will have already received sufficient payments for at least a 12% annual rate of return over 20 years, highlighting the scale of previous and ongoing overcompensation.
- 1.15 The options and assessment in this business case were informed not only by the Ricardo analysis, but also by the views expressed in the recent public consultation process as well as the previous pre-consultation exercise, the emerging findings from the RHI Public Inquiry and the judgment from a legal challenge to the 2017 Regulations.
- 1.16 There is a range of other technologies which are eligible for support under the NI RHI Scheme, including solar collectors and heat pumps as well as large (200kW+) biomass boilers. However, these other technologies account for only a small proportion (2.5%) of the overall number of installations that applied to the Scheme. Therefore, this business case is focused only on changes being made to the tariff structure for small and medium sized biomass boilers and CHP plants. However, the issues that have arisen in respect of the tariffs being considered as part of this business case mean that it would be prudent for the Department to also review the tariffs for other technologies once the payment structure for small and medium sized biomass boilers has bedded in. The business case does not cover the domestic element of the Scheme.
- 1.17 Section 2 considers the strategic context, whilst Section 3 reviews the need for a review of the current tariff structure and Section 4 outlines the objectives of

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the Scheme. Section 5 summarises the findings from the Ricardo Tariff Review, which are then incorporated into the options presented in Option 6, with the costs, benefits and risks of each option then assessed in Sections 7 to 9. Conclusions are set out in Section 10.

## SECTION 2: STRATEGIC CONTEXT

### Introduction and Background

- 2.1 The European Union (EU) Renewable Energy Directive (2009/28/EC)<sup>4</sup> set a target that 20% of the EU's energy consumption should come from renewable sources by 2020. This is based on the view that:

*The control of European energy consumption and the increased use of energy from renewable sources, together with energy savings and increased energy efficiency, constitute important parts of the package of measures needed to reduce greenhouse gas emissions and comply with the Kyoto Protocol to the United Nations Framework Convention on Climate Change, and with further Community and international greenhouse gas emission reduction commitments beyond 2012.*

- 2.2 This means that increasing the proportion of energy from renewable sources is not an end in itself, but instead a means to achieve a reduction in the level of carbon emissions, with a contribution to the reduction in the level of carbon emissions to also come from energy savings and improved energy efficiency. In this context, although renewable energy has a lower level of carbon emissions than fossil fuels, it does have some<sup>5</sup>. This implies that the additional renewable energy incentivised by public subsidy should be for energy that would otherwise be generated from fossil fuels<sup>6</sup>.

- 2.3 However, some concerns have been raised about the use of biomass as a renewable fuel. The May 2018 Public Accounts Committee report<sup>7</sup> on the GB RHI Scheme raised issues about the wider environmental impact of biomass, suggesting that “*Air pollution from sites funded by the RHI is a serious public health issue*”. Furthermore, in its response to the public consultation on the long-term future of the NI RHI Scheme, the Green Party indicated that “*...support for biomass is cautious and conditional*”.

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<sup>4</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009L0028&from=EN>

<sup>5</sup> The conversion factors used in the Government's greenhouse gas reporting indicate that there is 15kg of CO<sub>2</sub> for every MWh of energy generated from wood pellets compared with 247kg of CO<sub>2</sub> for Burning Oil. However, the actual amount of carbon emissions will depend heavily on the source of the wood pellets.

<sup>6</sup> Paragraph 25 of the European Commission approval letter for the NI RHI Scheme states “*Only useful heat is eligible for payment under the RHI scheme, that is, heat which would otherwise have to be met by fossil fuels*”.

<sup>7</sup> <https://publications.parliament.uk/pa/cm201719/cmselect/cmpubacc/696/696.pdf>



- 2.4 In Annex 1 of the Directive, the UK committed to increasing the national share of renewable energy to 15% by 2020. This was to be achieved through 3 sub-targets including that 12% of heat should be from renewable sources<sup>8</sup>. However, the February 2018 report by the National Audit Office (NAO), *Low-carbon heating of homes and businesses and the Renewable Heat Incentive*, reported that the “current ambition” is for 10% of heat to be generated from renewable sources by 2020<sup>9</sup>. This is in the context that whilst the original intention was that 86% of the target would be met from the RHI, the NAO report indicated that this had fallen to 36%.
- 2.5 The NI contribution to the national renewable heat sub-target is to increase the uptake of renewable heat locally to 10% of total heat by 2020 (baseline position of 1.7% in 2010). This target was included in the Department of Enterprise, Trade & Investment (DETI) Strategic Energy Framework published in September 2010<sup>10</sup>. An interim target of 4% renewable heat by 2015 was included in the 2011-15 NI Executive Programme for Government<sup>11</sup>.
- 2.6 In order to support the achievement of the UK renewable heat target, the Department of Energy & Climate Change (DECC) introduced a Renewable Heat Incentive for the non-domestic market in November 2011. NI was not included within this scheme because of the apparent differences in the two heat markets and the NI Executive launched its own Non-Domestic RHI scheme on 1 November 2012 through the Renewable Heat Incentive Scheme Regulations (Northern Ireland) 2012 (‘the 2012 Regulations’)<sup>12</sup>. The equivalent scheme for domestic properties was introduced in NI in December 2014.
- 2.7 As part of the 2010 Spending Review<sup>13</sup> (Paragraph 1.40), Government funding of £860 million was made available to support the introduction of the GB RHI

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<sup>8</sup> The other UK sub-targets were 30% in respect of electricity and 10% for transport.

<sup>9</sup> <https://www.nao.org.uk/wp-content/uploads/2018/02/Low-carbon-heating-of-homes-and-businesses-and-the-Renewable-Heat-Incentive.pdf>

<sup>10</sup> <https://www.economy-ni.gov.uk/sites/default/files/publications/deti/sef%202010.pdf>

<sup>11</sup> <https://www.northernireland.gov.uk/sites/default/files/publications/nigov/pfg-2011-2015-report.pdf>

<sup>12</sup> [https://www.legislation.gov.uk/nidsr/2012/9780337989193/pdfs/nidsr\\_9780337989193\\_en.pdf](https://www.legislation.gov.uk/nidsr/2012/9780337989193/pdfs/nidsr_9780337989193_en.pdf)

<sup>13</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/203826/Spending\\_review\\_2010.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/203826/Spending_review_2010.pdf)

Scheme over the period 2011-2015. Based on the relative size of its population, the NI Executive received a consequential allocation of £25 million in Annually Managed Expenditure (AME) funding over the same period, for the introduction of a scheme to support the uptake of renewable heat in NI. The allocation of funding from HM Treasury represented a maximum budget available, with any excess commitments, due to a more generous tariff, required to be funded by the NI Executive in normal circumstances, in line with the Statement of Funding Policy (SoFP).

- 2.8 The NI RHI Scheme was intended to increase the uptake of renewable heating technologies and reduce carbon emissions in NI, by providing ongoing payments to compensate boiler owners for the additional costs of renewable heat compared with the conventional fossil fuel alternative. It is therefore not intended to pay all the capital cost of a biomass boiler or the ongoing fuel costs. Whilst a number of the respondents to the public consultation on the future of the Scheme suggested that they were currently operating their biomass boilers at a loss, the accompanying supporting analysis tended to include costs that were outside the scope of the RHI as well as excluding the savings from no longer using a fossil fuel boiler.
- 2.9 Compensation under the RHI is delivered via ongoing payments linked to the amount of heat produced in kilowatt hours (kWh), as opposed to an up-front capital grant. The additional costs include capital costs, operating costs and the non-financial 'hassle' factors that are involved in replacing existing heating systems with renewable heating technologies. In order to encourage the uptake of renewable heat technologies, a 12% rate of return on the additional capital investment was approved by the European Commission and reflected in the original tariff calculations.

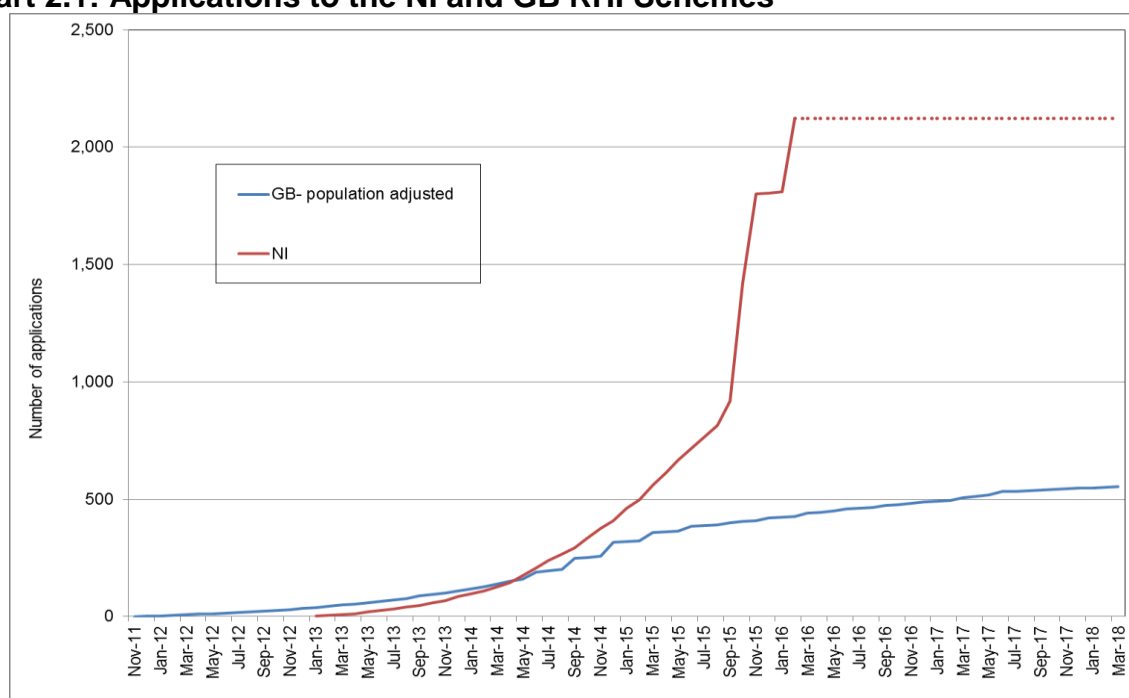
### **Performance of Scheme to Date**

- 2.10 Chart 2.1 below shows that between the opening of the NI RHI Scheme to applicants in November 2012 and its suspension in February 2016, there were

2,128 applications. Not all of these applications will have subsequently been accredited onto the Scheme.

2.11 On a per head of population basis the cumulative number of applications on the Non-Domestic NI RHI Scheme continues to be significantly higher than the rest of the UK, even though it opened later and was suspended to new applicants earlier. Chart 2.1 also shows the extent of the spikes in applications in autumn 2015 and early 2016. Whilst there were also some increases in the number of applications to the GB RHI Scheme in advance of the degression based tariff reductions, these were of a much smaller scale than experienced in NI.

**Chart 2.1: Applications to the NI and GB RHI Schemes**



Source: DfE, BEIS

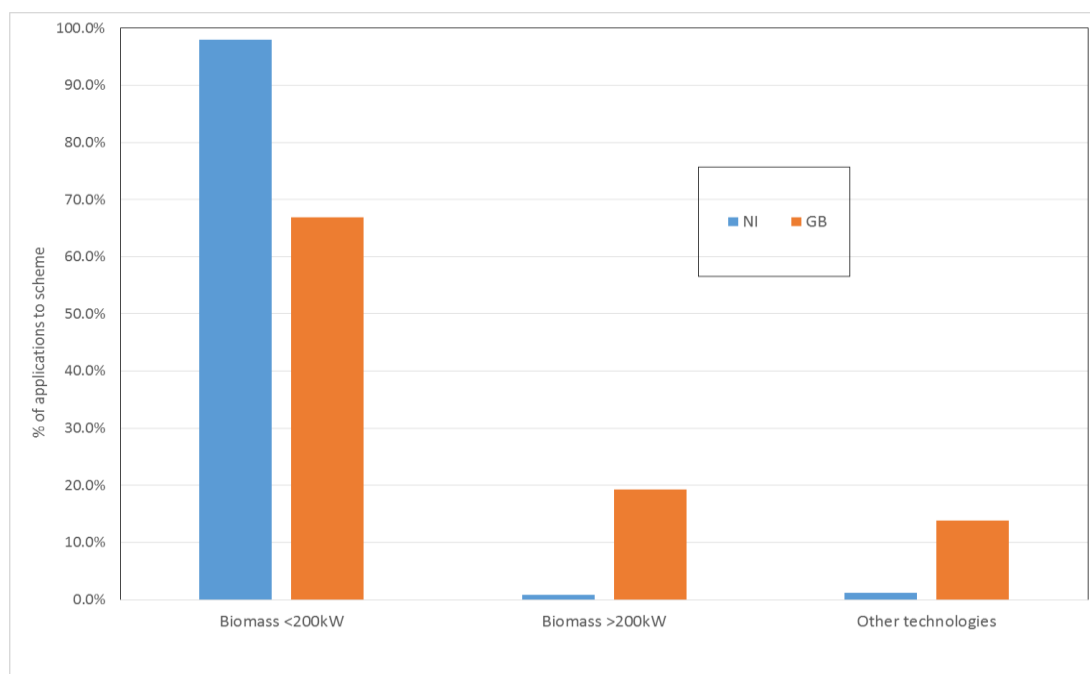
2.12 Although the intention of the NI RHI Scheme was to provide an incentive to “replace” fossil fuel heating with a renewable heat alternative, the application forms to the Scheme would suggest that a large proportion of applications were in respect of new heat requirements. Whilst it may have been the case that the renewable heat installation was being used as part of a new economic activity, where it was being used instead of a fossil fuel boiler rather than as a replacement, there is no indication of the extent to which this was the case. This implies that the Scheme has led to an increase in the amount of heat

generated in NI over and above that which would have been generated in the absence of the Scheme. This would appear to be inconsistent with the Energy Directive.

2.13 The original expectation<sup>14</sup> was that the most popular technology on the NI RHI Scheme would have been Air Source Heat Pumps (ASHP). However, Chart 2.2 below shows that the most popular technology and size band has actually been medium sized biomass boilers (20-99kW<sup>15</sup>), accounting for over 95% of applications to the Scheme. This is in contrast to the GB RHI Scheme where large biomass boilers and other technologies accounted for approximately one third of applications.

2.14 Furthermore, whilst it was originally expected<sup>16</sup> that there would be a roughly even split in payments on the NI RHI Scheme between urban and rural areas, over 90% of actual payments to date have been to rural areas. This reflects the sectoral composition of boilers on the Scheme.

**Chart 2.2: Proportion of applications to NI and GB RHI Schemes by Technology**



Source: RHI Taskforce Calculations, Ofgem, BEIS

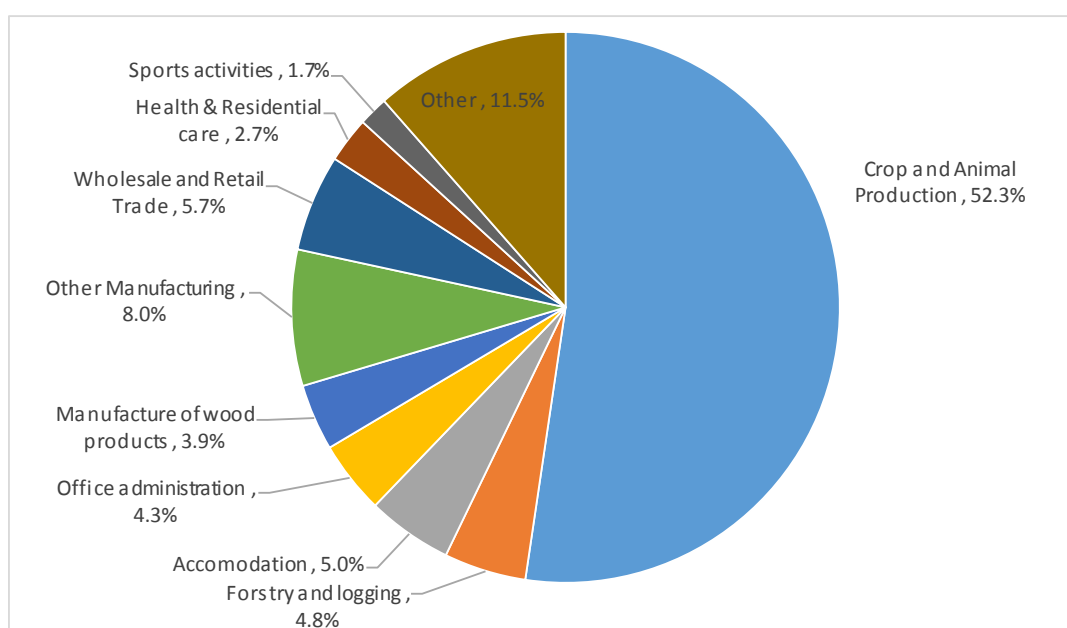
<sup>14</sup> Table 7.7 and 7.8 of 2011 CEPA Report projects that 47.2/48.5% of the heat generated on the Scheme would be from ASHP's compared with only 25.8/30.0% for biomass boilers.

<sup>15</sup> The medium biomass size band was later increased to 20-199kW in the 2015 and 2017 Regulations.

<sup>16</sup> Tables 7.9 and 7.10 of 2011 CEPA Report.

2.15 As part of the accreditation process, participants were asked to specify the sector in which their business operated. The proportion of users within each sector is summarised in Chart 2.3. The most popular sector was Crop and Animal Production (52.3%), predominantly poultry farming. The Department's analysis of responses to a question in the application form, in which applicants describe how heat generated by their installation would be used, suggests that potentially two fifths of all accredited boilers on the NI RHI Scheme are used in poultry farming.

**Chart 2.3: Applications to NI RHI Scheme by Sector**



Source: Ofgem, RHI Taskforce Calculations

### Initial Tariff Structure on NI RHI Scheme

2.16 At the initiation of the Scheme in NI it was decided that it would not be appropriate to adopt the tariff structure in place for the rest of the UK for each renewable technology. Instead, DETI commissioned research into the best approach for NI, reflecting local market conditions, although based on the same methodology as the rest of the UK. The recommended tariff structure from the research led by CEPA in June 2011<sup>17</sup> was revised in February 2012<sup>18</sup> following feedback from the public consultation on the design of the Scheme. It was then

<sup>17</sup> *Renewable Heat Incentive for Northern Ireland- A Report for the Department of Enterprise, Trade and Investment* (June 2011), Cambridge Economic Policy Associates Ltd and AEA Technology.

<sup>18</sup> *A Renewable Heat Incentive for Northern Ireland- Addendum* (February 2012), Cambridge Economic Policy Associates Ltd and AEA Technology.

incorporated in the 2012 Regulations, following business case approval by the Department of Finance & Personnel and State aid approval by the European Commission.

2.17 Based on the advice from CEPA, payments for each technology and size band were set on the basis of a single tariff to be applied to all heat generated. For medium sized biomass boilers, which has been the most popular on the NI RHI Scheme, the original tariff was set at 5.9p per kWh. As set out in Table 2.1 below, the largest single element of this tariff was 4.5p/kWh in respect of the compensation for the additional capital expenditure, plus a 12% return to encourage investment in renewable heat<sup>19</sup>. The 2012 Regulations included provision (Regulation 36(7)) for the total tariff to be uplifted each April in line with the annual increase in the Retail Price Index (RPI) for the previous calendar year<sup>20</sup>. As a consequence the latest equivalent tariff for 2018-19 is 7.0p/kWh.

**Table 2.1: Components of Original RHI Tariff for Medium Biomass Boilers**

Subsidy for	p/kWh
Annualised Capital Cost	4.5
Annualised Barrier Costs	1.5
Operating costs	0.1
Fuel Costs	-0.1
<b>Total</b>	<b>5.9</b>

Source: 2012 CEPA Addendum Report, RHI Taskforce calculations (Totals may not sum due to rounding)

2.18 However, it is unclear why there is a need for the tariff to increase in line with inflation when most of the costs that are being compensated for are not linked to the trend in general prices. Whilst it has been assumed by Ricardo as part of the review of the current tariff structure (see Section 5) that the rate of return on the Scheme was in real terms, it is unclear whether this was ever explicitly stated. Going forward, the NAO report (Section 3.9) into the GB RHI Scheme highlighted the potential risks from higher than expected inflation. This can be seen in the level of payment for the typical 99kW boiler on the NI RHI Scheme

<sup>19</sup> There are various inaccuracies and inconsistencies in the 2012 CEPA report and the supporting spreadsheet analysis. In this context, Table 2.1 sets out the RHI Taskforce assessment of the components of the original tariff, if it had been calculated correctly.

<sup>20</sup> The percentage increase in the RPI for the month of December compared with the previous December.

increasing by £600 in 2018-19, because the rate of RPI inflation at December 2017 was 4.1%.

2.19 The tariff structure was designed to provide an appropriate rate of return for the additional investment in renewable heat technology by participants. The 12% rate of return was assumed to have been required in line with the approach adopted for the GB RHI Scheme. In providing State aid approval for the NI Non-Domestic RHI Scheme in June 2012<sup>21</sup>, the European Commission made reference (Paragraph 63) to a report from an independent consultant that had been provided when approval was being sought for the GB RHI Scheme. This report suggested that the necessary rate of return to incentivise renewable heat production was in the range 8-22%. A 12% annual rate of return over 20 years implies a payback period on the additional capital investment of 7-8 years or 268% over 20 years in constant prices.

2.20 The tariff was calculated by estimating the average annual cost of installing and operating a biomass boiler minus the equivalent cost for a fossil fuel boiler. In light of the innovative nature of the Scheme, there was limited evidence available on actual costs and boiler usage/characteristics, with the result that assumptions had to be made. A number of these assumptions subsequently proved to be incorrect. For example, the CEPA work assumed that the typical boiler for the medium biomass tariff would be 50kW in size. However, the majority of boilers that came through the Scheme were nearly double this size (most often 99kW boilers) with less than 10% of installations being in and around the assumed typical size (ranging between 40kW to 60kW in size).

2.21 In addition, when converting the estimated additional annual cost of renewable heat into a tariff, it was necessary to make an assumption regarding the usage of the typical reference boiler, as measured by load factor i.e. the amount of heat generated as a % of the theoretical maximum. However, the actual load factor (circa 39% to date<sup>22</sup>) of those installations claiming RHI payment was, and is, more than double that assumed within the CEPA work (i.e. 17%). Taken

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<sup>21</sup> [http://ec.europa.eu/competition/state\\_aid/cases/244651/244651\\_1375577\\_58\\_1.pdf](http://ec.europa.eu/competition/state_aid/cases/244651/244651_1375577_58_1.pdf)

<sup>22</sup> This reflects the significant reduction in the amount of heat generated since the start of 2017-18.

together, this means that the assumed heat load for the Medium Biomass Tariff is more than four times (330,000kWh versus 74,460kWh) higher than what was envisaged in the setting of the initial tariff.

2.22 Whilst some of the costs are variable (fuel costs and maintenance costs) and rise in line with the amount of heat being generated, Table 2.1 shows that the main elements of the tariff (capital costs and upfront barrier costs) would have been fixed. This means that for boilers operating for more than the assumed load factor, payments would increase at a faster rate than costs. Without appropriate action, the rate of return on such installations would be significantly greater than that envisaged at Scheme initiation of 12%, as well as the range specified by the European Commission when providing State aid approval.

2.23 The potential for participants on the NI RHI Scheme to receive substantial overcompensation and earn excess rates of return was further exacerbated by the potential for the assumed capital, fuel and operating costs, when setting the tariff, to be overstated when compared with the actual operation of the Scheme- see Section 3 for more details.

## **GB RHI Scheme**

2.24 The issue of boilers generating more heat than assumed for the typical reference boiler when setting the tariff had been addressed at the outset of the GB RHI Scheme by the inclusion of a tiered tariff structure. This involved a reduced Tier 2 tariff being applied after the plant had operated for the equivalent of 1,314 hours a year.

2.25 The March 2011 DECC Impact Assessment<sup>23</sup> (Paragraphs 22-28) on the proposals for the GB Scheme set out why a tiered structure was required for small and medium sized biomass boilers but not required for other technologies or for large biomass boilers. In particular, the Tier 1 tariff aims mainly to cover the capital costs repayment whilst the Tier 2 tariff only covers the additional

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<sup>23</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/48042/1381-renewable-heat-incentive-ia.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/48042/1381-renewable-heat-incentive-ia.pdf)



variable costs of renewable heat generation. This approach not only reduces the perverse incentive to generate more heat than required, but also eliminates rents (higher payments than required) for installations that have higher heat requirements than the reference installation.

2.26 In presenting its findings in respect of the single tier tariff for the NI RHI Scheme, the 2011 CEPA report (Page 11) explained that it was lower than the Tier 1 tariff on the GB Scheme because of differences in the counterfactual fuel<sup>24</sup>. However, the application of the Tier 2 tariff in the GB RHI Scheme meant that overall RHI payment levels were higher in NI than on the original GB Tariffs for the average heat requirement. Indeed, the maximum level of payment from the NI RHI Scheme for a 99kW<sup>25</sup> boiler was £58,000, compared with only £30,000 for the GB RHI Scheme.

2.27 The GB RHI Scheme also included other cost control measures to enable expenditure to remain within the available budget. In particular, Chapter 4 of the original consultation document for the GB RHI Scheme, in February 2010<sup>26</sup>, referred to a process of degression whereby the tariffs for new entrants to the Scheme would automatically be reduced in the periods between tariff reviews. Degression was formally introduced in the GB RHI Scheme from 2013, with tariffs for new entrants reduced depending on whether the projected level of expenditure reached certain thresholds. These thresholds were set for the overall Scheme, and for individual technologies and size bands, which meant that action would be taken at an early stage to control costs. Degression was never formally applied to the NI RHI Scheme.

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<sup>24</sup> The counterfactual fuel for the NI RHI Scheme was oil, which is more expensive than gas, which was the counterfactual under the GB RHI Scheme. Although evidence presented in the 2012 CEPA report suggests that the NI tariff should also have been lower because wood pellet prices were 0.63p/kWh lower than in England, it is not evident that this was reflected in the tariff calculations.

<sup>25</sup> Although the equivalent size band on the GB RHI Scheme had a higher upper limit of 200kW, the average size of accredited installations on the GB RHI Scheme is 117kW. Therefore 99kW, as the most prevalent boiler size on the NI RHI Scheme, was used as the basis for the comparison of payment levels.

<sup>26</sup> <http://excelscotland.co.uk/wp-content/uploads/2015/07/RHI.pdf>

## **Actions to Control Costs and Overcompensation**

- 2.28 Combined with an increase in applications in early 2015, the absence of tiering or degression on the NI RHI Scheme resulted in budgetary pressures, as well as having a serious detrimental effect on value for money. In response, tiered tariffs were introduced for new applicants only from 18 November 2015. However, there was a substantial spike in applications to the Scheme in advance of the implementation of the tiered tariff.
- 2.29 This exacerbated rather than ameliorated the budgetary pressures, which meant that it was necessary to suspend the Scheme to new entrants from February 2016. This resulted in a smaller, but still significant further spike in applications before the Scheme was suspended.
- 2.30 Although the NI RHI Scheme has been suspended to new entrants for over two years, Chart 2.1 shows that, per head of population, the total number of applications to the NI Scheme remains significantly higher than under the GB Scheme. Given that there is only funding available for new entrants to the GB Scheme until March 2021, this is expected to remain the case. In addition, the level of ambition in respect of the amount of renewable heat funded by the GB RHI Scheme is 21TWh by 2020<sup>27</sup>. This equates to approximately 600GWh for the NI Scheme, which is broadly equivalent to the amount of renewable heat projected for 2018-19.
- 2.31 Whilst the number of installations on the NI RHI Scheme is much lower than had been assumed in the 2012 CEPA report, the latter was based on an average level of annual heat generation of approximately 34MWh, compared with the actual average of 330MWh. This means that the projected amount of heat generation under the NI RHI Scheme in 2018-19 is in line with the CEPA projections<sup>28</sup>, albeit produced by a smaller number of installations.

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<sup>27</sup> Figure 7 of 2018 NAO report into GB RHI Scheme.

<sup>28</sup> Table B.2 of 2012 CEPA Addendum Report projects 581GWh of renewable heat under the NI RHI Scheme by 2018.

- 2.32 In spite of the measures previously taken to control costs in November 2015 and February 2016, it was projected that the financial commitments to the NI RHI Scheme participants would continue to be significantly in excess of the available budget if no further action was taken. It is on this basis that the 2017 Regulations<sup>29</sup> were developed, which extended the tiered tariff structure to all small and medium biomass boilers. The business case for the expenditure associated with the 2017 Regulations was approved by the Department of Finance (DoF) on 25 January 2017. State aid approval for the 2017 Regulations was confirmed on 31 March 2017<sup>30</sup>.
- 2.33 The intention was that the 2017 Regulations would last for one year only, during which time a comprehensive review would be conducted into the current tariff structure, to inform the development of a long-term approach for the Scheme. This would be followed by public consultation and then DoF, State aid and legislative approval to allow the revised tariff structure to be implemented from 1 April 2018. However, the development of the long-term approach has taken longer than originally envisaged, with the result that it was not possible to complete all the necessary stages of approval before the start of the 2018-19 financial year.
- 2.34 An additional complication was that, following the introduction of the 2017 Regulations, a challenge was made as to their legality. This Judicial Review was dismissed by Mr Justice Colton in December 2017<sup>31</sup>. However, the applicants to the Judicial Review have appealed this decision which is scheduled to be heard in February 2019. It is imperative that the Department continues to develop and implement a long-term tariff structure despite the uncertainty in respect of the outcome of this appeal.

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<sup>29</sup> [http://www.legislation.gov.uk/nisr/2017/32/pdfs/nisr\\_20170032\\_en.pdf](http://www.legislation.gov.uk/nisr/2017/32/pdfs/nisr_20170032_en.pdf)

<sup>30</sup> [http://ec.europa.eu/competition/state\\_aid/cases/268889/268889\\_1902876\\_36\\_2.pdf](http://ec.europa.eu/competition/state_aid/cases/268889/268889_1902876_36_2.pdf)

<sup>31</sup> <https://www.judiciary-ni.gov.uk/sites/judiciary/files/decisions/The%20Renewable%20Heat%20Association%20Northern%20Ireland%20and%20Another%27s%20Application.pdf>

## Republic of Ireland RHI Scheme

2.35 In January 2017 the Department of Communications, Climate Action & Environment (DCCAE) in RoI launched a public consultation on the design and implementation of an RHI. As with the original ambition for the UK, the RoI government has set a target to deliver 12% of heat by renewable sources by 2020 (compared with a baseline of 6.8% in 2016). In December 2017 DCCAE announced the details of how the Scheme would operate<sup>32</sup>, with capital grants provided for heat pumps and ongoing payments provided for biomass boilers.

2.36 Although there are many similarities in respect of how the ongoing payments will be made between the RoI and UK RHI Schemes, there are also some important differences. For example, the tariff on the RoI RHI Scheme is based on providing participants with an 8% rate of return over 15 years compared with a 12% rate of return over 20 years on the UK Schemes. This implies that for a net additional capital investment of £25,000 on a biomass boiler, a participant would be assumed to receive RHI payments of approximately £43,000 over the duration of the RoI Scheme compared with approximately £67,000 for the UK Schemes.

2.37 The economic analysis which informed the development of the RoI RHI Scheme estimates that 1,298GWh of renewable heat will be supported by 2020, which is broadly the same per head of population as the projected amount of renewable heat on the NI RHI Scheme<sup>33</sup>. Approximately 73% of the renewable heat on the RoI RHI Scheme is expected to be generated by biomass boilers. In addition, the average level of payment for a biomass boiler on the RoI RHI Scheme is projected to be less than 2p/kWh<sup>34</sup>. This appears to be based on the assumption that the average installation on the Scheme will have a significantly higher heat output than on the NI Scheme.

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<sup>32</sup> <https://www.dccae.gov.ie/documents/Scheme%20for%20Renewable%20Heat%20Scheme%20Overview.pdf>

<sup>33</sup> The objective for the NI RHI Scheme set out in Section 4 is to support at least 500GWh of renewable heat per year which is equivalent to approximately 270GWh per million population compared with 275GWh for the RoI RHI Scheme.

<sup>34</sup> Table 15-39

<https://www.dccae.gov.ie/documents/Economic%20analysis%20for%20the%20RHI%20in%20Ireland%20Combined.pdf>

2.38 In terms of cost controls, the RoI RHI Scheme will have an annual budget cap as well as tariff reviews on an ongoing basis. There will also be periodic reviews to ensure that projects already approved and in receipt of payments do not benefit from windfall gains as a result of significant changes in market conditions. In this context, whilst the projected cost of a 100kW biomass boiler of €625 per kW, assumed for the RoI RHI Scheme tariffs, is broadly in line with that assumed when setting the original tariff on the NI Scheme (£608 per kW), the actual experience locally has been that boilers are considerably less expensive.

## **Conclusions**

2.39 The intention of the RHI Scheme is to encourage an increase in the proportion of heat generated from renewable sources by providing ongoing compensation payments for the additional costs of renewable heat technologies. However, the level of compensation provided to participants at the outset of the NI RHI Scheme was too high. In addition, the lack of effective cost controls in the original design of the NI RHI Scheme, compared with the GB RHI Scheme, meant that action was required in 2015 when the level of payments began to escalate in excess of the available budget.

2.40 The scale of the deficiencies in the Scheme meant that further action was required in early 2016, with the suspension of the Scheme to new applicants. This was followed by the extension of the tiered tariff structure to all small and medium sized biomass boilers in 2017-18 and 2018-19. The net result has been to bring the Scheme back within budget, although there remain issues in respect of overcompensation as set out in more detail in Section 3.

## SECTION 3: NEED

### Introduction

3.1 This section sets out the need for a review of the current tariff structure for small and medium sized boilers under the NI Non-Domestic RHI Scheme. This is primarily due to the deficiencies in the original single tier tariff, as well as the impact of the interim measures introduced under the 2017 Regulations, extended under the 2018 Regional Rates and Energy Act. The section then presents the key events and issues in respect of the CHP technology, which gave rise to the need for the associated tariff to also be reviewed.

### Deficiencies in Original NI RHI Tariff for Biomass Boilers

3.2 The flaws in the single tier tariff structure for biomass boilers, which applied at the start of the NI RHI Scheme, have been well documented. For example, the June 2016 Northern Ireland Audit Office (NIAO) report on the 2015-16 DETI Resource Accounts<sup>35</sup> highlighted the extent to which participants could generate excess returns and that the level of committed expenditure on the NI RHI Scheme was expected to be significantly in excess of the available budget. These points were made again in the NIAO report on the 2016-17 DfE Resource Accounts<sup>36</sup>. The main failings of the single tier tariff fall under the following categories:

- (a) Overcompensation;
- (b) Unaffordable commitments; and
- (c) Perverse incentive to generate more heat than required.

### *Overcompensation*

3.3 As noted in Section 2, the actual heat load for medium sized biomass boilers on the NI RHI Scheme is more than four times higher than envisaged in the setting of the initial tariff. Hence, without appropriate action, the rate of return on such

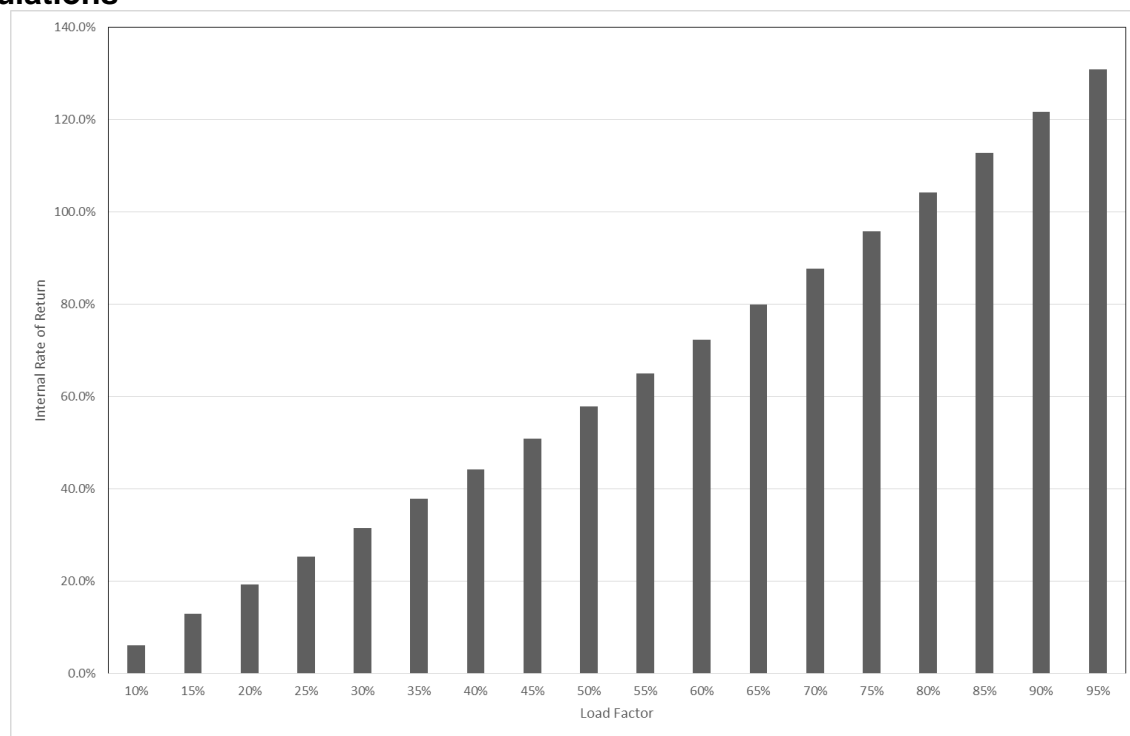
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<sup>35</sup> <https://www.niauditoffice.gov.uk/publication/renewable-heat-incentive-scheme>

<sup>36</sup> <https://www.niauditoffice.gov.uk/sites/niao/files/media-files/CAG%20Report%202016-17%20Final.pdf>

installations would be significantly greater than the target of 12% under a single tier tariff.

**Chart 3.1: Rate of Return for Typical 99kW Boiler by load factor under 2012 Regulations**



Source: RHI Taskforce Calculations

3.4 Chart 3.1 above is based on the capital and operating costs of boilers set out in the 2016 NIAO report. This shows that, under the previous single tier tariff structure, the rate of return for the typical 99kW boiler on the Scheme, with a 39% load factor, was over 40%, whilst boilers in operation for more than 80% of the time would generate a rate of return of over 100%. The findings from the subsequent Ricardo analysis (see Section 5) suggest that the NIAO report overstates the additional cost of renewable heat so that the actual rates of return experienced under the previous single tier tariff are even higher than presented in Chart 3.1.

3.5 The introduction of a tiered tariff structure in November 2015 was intended to bring the rate of return more into line with the original policy objective of 12% for new entrants to the Scheme. However, the spike in applications in advance of the change in tariff structure meant that a large proportion (83%) of boilers on the Scheme were still on the single tier tariff, which provided overcompensation.

### *Unaffordable commitments*

- 3.6 This further increased the level of future commitments under the Scheme in excess of the projected budget. In particular, the 2016 NIAO report included projections (Table 8) which suggested that the cost of the Scheme would be £140 million more than the available budget over the period 2016-17 to 2020-21.
- 3.7 Funding for the NI RHI Scheme is provided through Annually Managed Expenditure (AME) funding as a population adjusted share (2.86%<sup>37</sup>) of the budget for the GB RHI Scheme. This is separate from the Departmental Expenditure Limit (DEL) funding which is used for most of the public services provided by the NI block grant. However, the Statement of Funding Policy<sup>38</sup>, which sets out the funding arrangements for the devolved administrations, makes it clear (Paragraph 3.3) that:

*“Where a devolved administration wishes to offer more generous terms for an AME programme, then the excess over that implied by adopting broadly similar criteria to the relevant UK government department ....must be met from within their DEL budgets.”*

- 3.8 In practice, this means that total payments under the NI RHI Scheme in excess of 2.86% of the budget for the GB RHI Scheme must be met from the NI DEL (block grant) funding, with consequential impact on the resources available for hospitals, schools and other public services.

### *Perverse incentive*

- 3.9 In addition to giving rise to financial issues, the initial tariff structure has been associated with misaligned incentives and environmentally harmful behaviours on the part of some NI RHI Scheme participants.

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<sup>37</sup> Although the NI population is equivalent to 2.93% of the GB population (Para D.2 of SoFP) an additional VAT abatement factor adjustment of 0.975 is made by HMT in calculating the budget available for the NI Executive. In principle a further comparability factor adjustment of 15.3% (Table C.9 of SoFP) would be made to reflect the proportion of expenditure by DECC on services that are provided by the NI Executive, in line with the normal operation of the Barnett formula. This would reduce the NI consequential RHI budget to 0.44% of the projected spend on the GB RHI Scheme.

<sup>38</sup>

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/479717/statement\\_of\\_funding\\_2015\\_print.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/479717/statement_of_funding_2015_print.pdf)

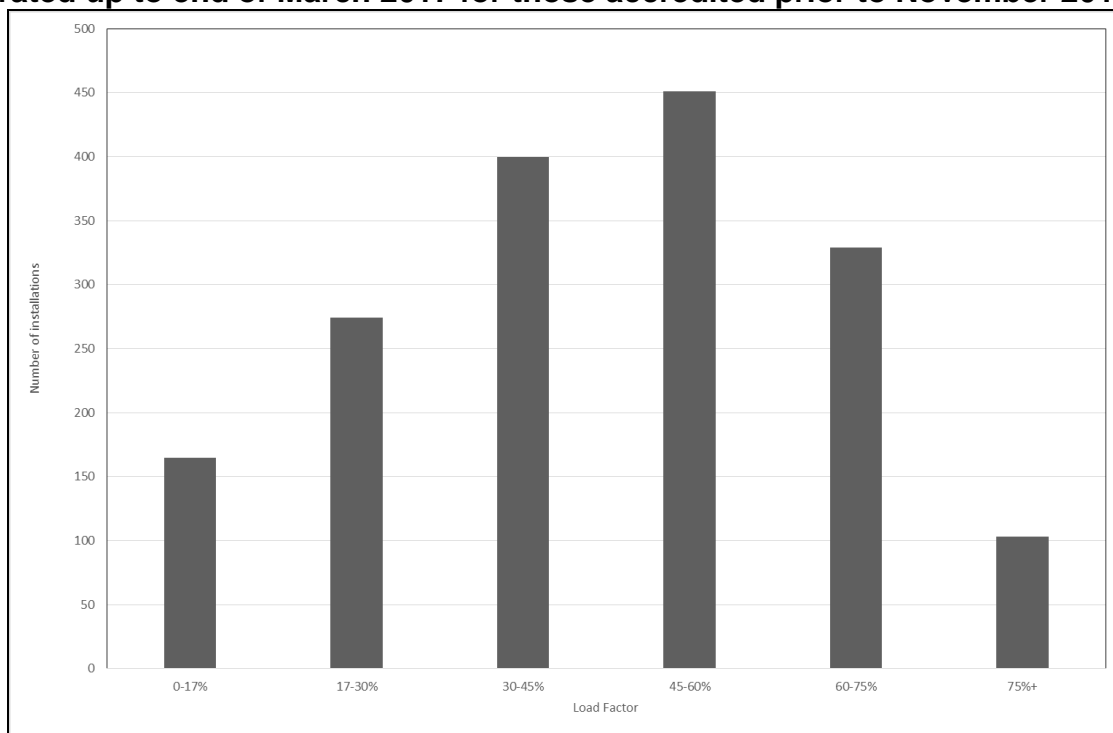


- 3.10 The initial proposed tariff in the 2011 CEPA report (1.3p/kWh) was lower than the variable cost of generating heat. However, following public consultation the subsequent 2012 CEPA addendum report recommended a tariff for medium biomass installations of 5.9p/kWh, which was higher than the variable cost of heat<sup>39</sup>. In fact, biomass fuel costs in NI were lower than projected by CEPA and fell over time. This can be seen in the June 2016 NIAO report where the variable cost of generating heat by a biomass boiler is estimated as 4.0p/kWh compared with a tariff of 6.4p/kWh at that time.
- 3.11 As a result of the variable cost of heat production being less than the tariff payable, per kWh, an incentive had been created for the production of unnecessary heat, or the production of heat for purposes not intended by the Scheme, in order to increase profit. This will clearly have had a negative effect on the Scheme's aim of decreasing carbon emissions.
- 3.12 Chart 3.3 below shows that, although the expectation was that the typical boiler on the Scheme would operate for 17% of the time, over 90% of those accredited onto the Scheme before the introduction of tiering were operating for a higher proportion of the maximum possible hours. In addition, over 25% of boilers were generating heat more than 60% of the time. Although boilers may have been generating heat in excess of the 17% assumed load factor for legitimate purposes, it was critical to remove the perverse incentive to generate more heat than required by reducing the tariff to below the marginal cost of producing heat.

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<sup>39</sup> Table A.25 of the 2012 CEPA report indicated that the price of biomass fuel was 4.39p/kWh. In the context that biomass boilers were assumed to operate at a fuel efficiency of 85% this implied a fuel cost of 5.16p/kWh. In addition, Table A.26 projected operating costs of £230 per year which equates to a further 0.30p/kWh. Combined, the 2012 CEPA report implied that biomass boilers would face a cost of 5.5p for each additional kWh of heat generated, but would receive 5.9p in RHI payments. Although this provided a clear incentive to generate as much heat as possible, this would have been tempered by the impact of excess usage on the lifespan and maintenance costs of the boiler.

**Chart 3.3: Number of Medium Biomass Boilers by Load Factor for heat generated up to end of March 2017 for those accredited prior to November 2015**



Source: RHI Taskforce Calculations, Ofgem

3.13 However, it was also important to ensure that participants receive sufficient compensation for the additional fixed capital cost of the investment in the biomass technology including a 12% rate of return<sup>40</sup>. It is for this reason that the tiered structure was adopted in the rest of the UK, and then NI, with the Tier 1 tariff covering both the fixed and variable costs of generating heat up to the Tier 1 threshold of 1,314 hours each year (equivalent to a 15% load factor).

3.14 At this point, it is assumed that the fixed costs for participants will have been paid for, with the Tier 2 tariff covering the additional variable costs of renewable heat. Although, it is only necessary for the Tier 2 tariff to be below the variable cost to address the perverse incentive issue, it needs to be equal to the differential between the variable cost of biomass and the variable cost of the fossil fuel alternative to reduce the scope for overcompensation.

<sup>40</sup> Some of the responses to the public consultation suggested that the tariff should separately include compensation for finance costs. However, consistent with the GB Scheme, it was always the intention that finance costs should be covered in the rate of return.

## Actions to Address Deficiencies in Tariff Structure

### *2015 and 2016 Regulations*

- 3.15 Although there were a number of deficiencies with the original tariff structure, the need for action was first identified in respect of affordability. In particular, during the first half of 2015 the projections of NI RHI payments began to exceed the expected available budget. In response, the Renewable Heat Incentive Schemes (Amendment) Regulations (Northern Ireland) 2015<sup>41</sup> ('the 2015 Regulations') introduced a tiered tariff structure for new entrants to the Scheme from 18 November 2015. An annual usage limit of 400,000 kWh was also introduced for new entrants as an additional cost control that had not been applied on the GB RHI Scheme. At the same time, the 2015 Regulations extended the scope of the medium biomass size band from 20-99kW to 20-199kW and included provision for specific tariffs for CHP plants.
- 3.16 The single tier tariff, previously applied to all heat generated, was used as the Tier 1 tariff, whilst the Tier 2 tariff was based on the equivalent GB tariff at the time the policy was being developed and advice from officials in CAFRE on the relative operating costs between biomass and LPG boilers, in reference to the poultry sector.
- 3.17 Although the intention of the 2015 Regulations was to control costs by restricting the amount of heat that would be subject to a high tariff each year, the extension of the medium biomass size band from 20-99kW to 20-199kW diluted the impact of tiering. For example, a 99kW boiler with a 300MWh heat annual load would have its 2018-19 payments reduced from £21,000 to £11,824 through the introduction of tiering. However, if a 199kW boiler was installed instead, then the payment for the same heat load would have been £18,920, i.e. a reduction of only 10% compared with over 40% if the size band had not been expanded. Approximately 67% of biomass applications accredited to the Scheme following the introduction of the 2015 Regulations were between 100-199kW in size.

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<sup>41</sup> [http://www.legislation.gov.uk/nisr/2015/371/pdfs/nisr\\_20150371\\_en.pdf](http://www.legislation.gov.uk/nisr/2015/371/pdfs/nisr_20150371_en.pdf)

- 3.18 In addition, the information available at that time, in the form of the 2013 CEPA report<sup>42</sup> (Table 6.1), suggested that 238GWh of renewable heat could be delivered per annum at the CHP tariff for new systems (3.5p/kWh) and 237GWh at the CHP tariff for system conversions (1.7p/kWh), which equates to £12 million per annum or £330 million over 20 years (current prices assuming 3% annual inflationary uplift). Although only two CHP plants applied to the Scheme before suspension, they have a combined heat output equivalent to over 350 typical 99kW boilers and could have potentially received £130 million in RHI payments.
- 3.19 Therefore, whilst the introduction of tiering was intended to control costs, the impact of the other measures in the 2015 Regulations acted to increase costs overall.
- 3.20 However, even before the 2015 Regulations took effect, there was a significant spike in the number of applications in advance of the introduction of tiering (see Chart 2.1), which resulted in an increase in committed expenditure. As a consequence, the decision was taken to suspend the Scheme to new applications on 29 February 2016 through the Renewable Heat Incentive Schemes<sup>43</sup> (Amendment) Regulations (Northern Ireland) 2016 ('the 2016 Regulations') by Suspension Notice.

#### *Interim Measures 2017-18 and 2018-19*

- 3.21 However, this action was also insufficient, with the lifetime cost of the NI RHI Scheme still expected to be more than double the available AME budget as set out in Chart 3.2 below. This shows that if the 2017 Regulations had not been put in place, it is estimated that payments of approximately £1.1 billion would have been made on the NI RHI Scheme from 2019-20 to the end of the Scheme, which represents a cost to the NI Executive block grant (DEL) of approximately £0.6 billion. In light of the financial challenges facing public services in NI over the coming years, it is clear that an additional spending pressure of this amount would have serious consequences for the delivery of

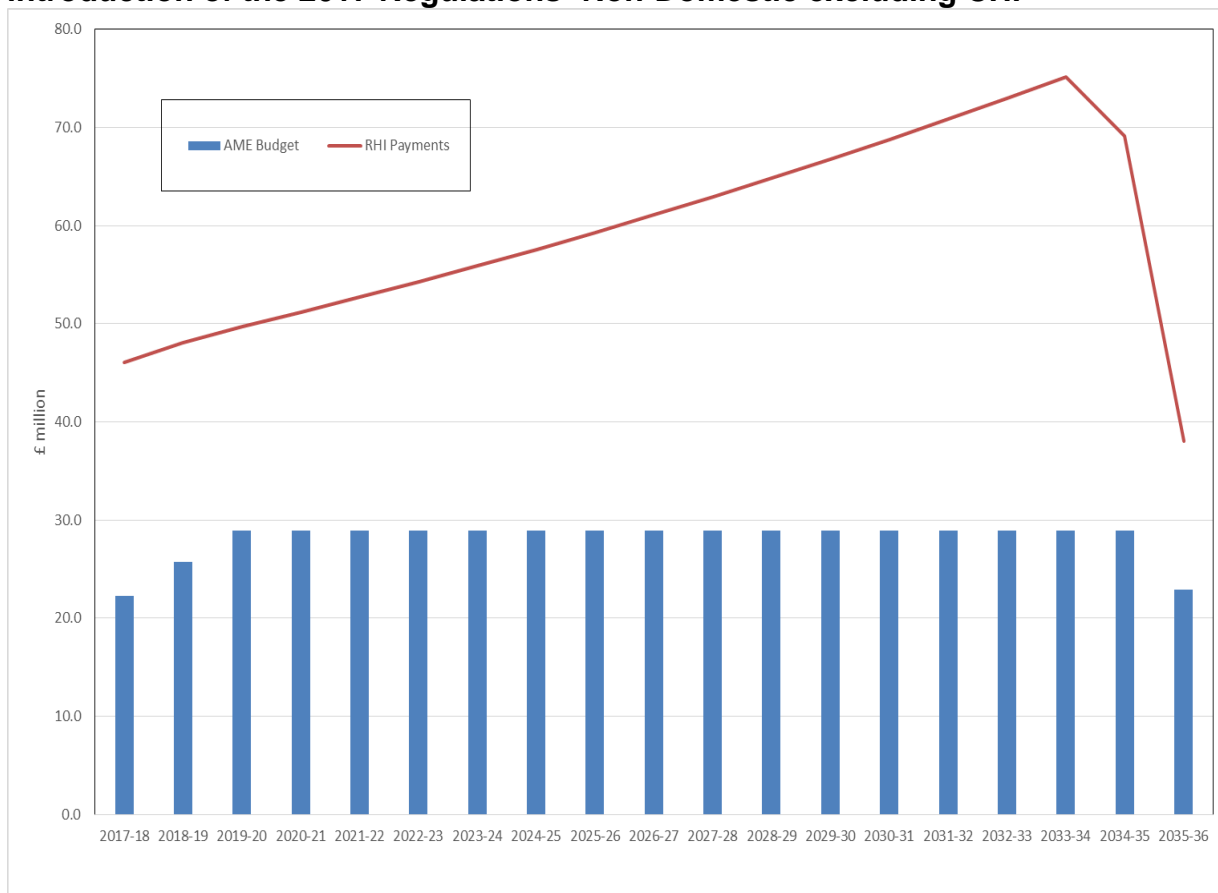
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<sup>42</sup> *Development of Phase II of the Northern Ireland Renewable heat Incentive*, Cambridge Economic Policy Associates Ltd and Ricardo-AEA (June 2013)

<sup>43</sup> [http://www.legislation.gov.uk/nisr/2016/47/pdfs/nisr\\_20160047\\_en.pdf](http://www.legislation.gov.uk/nisr/2016/47/pdfs/nisr_20160047_en.pdf)

key public services. It should be noted that this excludes overspend between 2016-17 and 2018-19 as well as the potential cost from CHP plants which would increase the cost to over £0.7 billion.

**Chart 3.2: Projected budget and expenditure under NI RHI Scheme before the introduction of the 2017 Regulations- Non-Domestic excluding CHP**



Source: RHI Taskforce Calculations

3.22 Whilst boilers may cease operation over the longer term, thereby reducing the number of installations on the Scheme, the level of overcompensation without the 2017 Regulations means that owners would have been financially incentivised to take every action possible to maintain their boilers or transfer ownership in the event that their core business stops trading. As there is now a greater awareness of the potential for excess profit to be made under the previous single tier tariff, the level of heat generated under the Scheme might actually increase if the Scheme reverted to the 2012 Regulations. Therefore the estimated level of overspend is considered to be conservative, rather than a worst case position.

- 3.23 In addition, throughout 2016 there was emerging evidence in respect of the 'Perverse Incentive' issue, although there was less appreciation of the potential for overcompensation. In this context, on 24 January 2017, the NI Assembly passed the 2017 Regulations to extend the tiered tariff structure and annual usage limit to all small and medium biomass boilers in 2017-18 i.e. not just to those who had applied to the Scheme after November 2015.
- 3.24 The 2017 Regulations were intended as an interim measure to provide an immediate response to address the serious financial issues with the Non-Domestic NI RHI Scheme. Although the Department was content on the basis of the evidence available at that time that the tiered tariff structure was fair and robust as an interim measure, it was recognised that it was based on analysis that should be updated.
- 3.25 In order to inform the development of the long-term tariff structure and the associated business case, the Department required external consultancy support. The proposed long-term tariff structure would then be subject to public consultation before business case, State aid and legislative approval was sought.
- 3.26 The original expectation was that this process could be completed by early 2018 which is why the 2017 Regulations remained in force only until 31 March 2018, due to a sunset clause in the legislation. However, the procurement of the external consultancy support proved more challenging than initially envisaged which had an impact on the anticipated timeframe.
- 3.27 In response to the delays in developing the long-term tariff structure, the provisions in the 2017 Regulations have been extended for a further one year only through the Northern Ireland (Regional Rates and Energy) Act 2018<sup>44</sup> which received Royal Assent on 28 March 2018. Business case approval was confirmed by DoF on 6 December 2017, whilst State aid approval for the

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<sup>44</sup> [http://www.legislation.gov.uk/ukpga/2018/6/pdfs/ukpga\\_20180006\\_en.pdf](http://www.legislation.gov.uk/ukpga/2018/6/pdfs/ukpga_20180006_en.pdf)

extension of the 2017 Regulations for a further year was confirmed by the European Commission on 16 February 2018<sup>45</sup>.

### **Impact of Interim Measures**

3.28 The extension of the tiered tariff structure and annual usage limit to all small and medium sized biomass boilers through the 2017 Regulations and the 2018 Act has addressed the three main deficiencies in the original tariff structure to different extents.

#### *Overcompensation*

3.29 Although the expected rate of return for installations on the NI RHI Scheme has been reduced, there remain significant issues in respect of overcompensation with concern that both the tariffs and annual usage limit under the tiered tariff structure are still too high. In terms of the former, the use of the previous single tier tariff as the Tier 1 tariff did not reflect the fact that the actual level of investment on boilers was significantly lower than first assumed.

3.30 Chart 3.4 below shows that 90% of boilers had lower capital costs than assumed when the tariff was first set, with an average cost for a 99kW boiler on the Scheme of £350 per kW compared with the £608 per kW that had been assumed. This means that whilst the current Tier 1 tariff includes approximately 5p/kWh (in 2018-19 prices) for additional capital costs, the actual capital cost of boilers on the Scheme implies that the additional capital cost element of the tariff should be around half this amount.

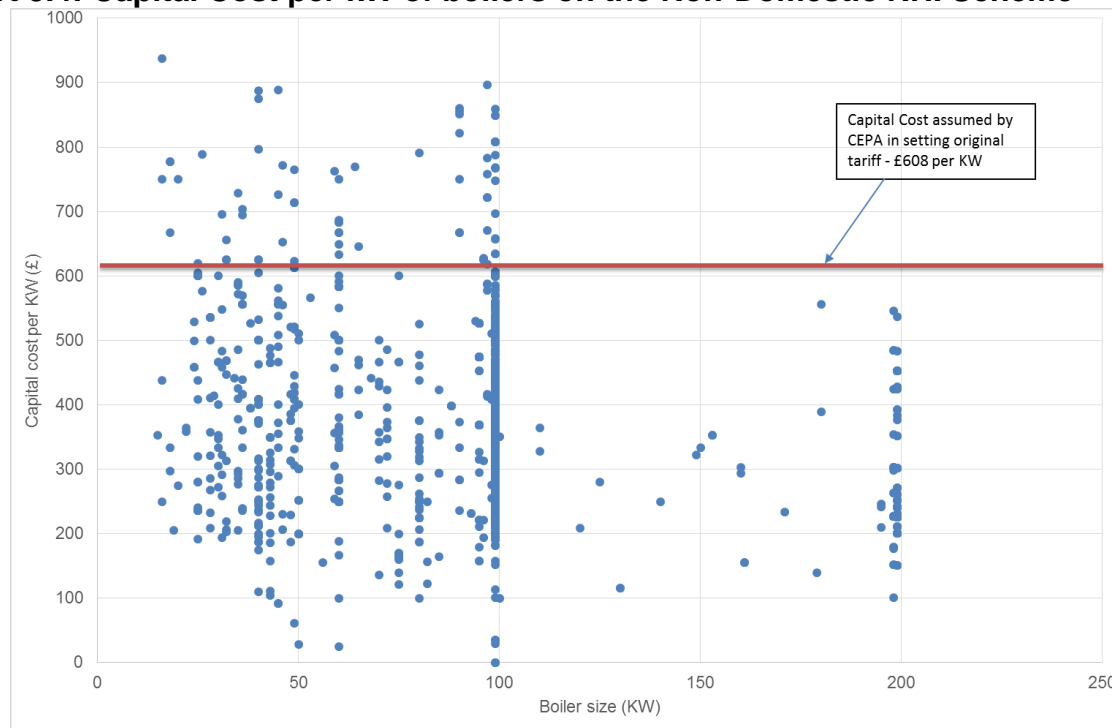
3.31 In addition, the CAFRE advice on which the Tier 2 tariff had been based had suggested a range 0.7-1.5p/kWh in respect of the additional variable costs of renewable heat, depending on biomass fuel type and boiler efficiency. Although the information on boiler efficiency provided in application forms to the Scheme

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<sup>45</sup> [http://ec.europa.eu/competition/state\\_aid/cases/272439/272439\\_1976953\\_79\\_2.pdf](http://ec.europa.eu/competition/state_aid/cases/272439/272439_1976953_79_2.pdf)

would have implied a Tier 2 tariff of at most 1.0p/kWh<sup>46</sup>, the upper limit of the range of 1.5p/kWh was chosen by the Department instead.

**Chart 3.4: Capital Cost per kW of boilers on the Non-Domestic RHI Scheme**



Source: Ofgem, Information provided in application forms

3.32 In respect of the annual usage limit, the evidence provided to CAFRE, when it was forming its advice to the Department, appears to have overstated the heat requirements of the poultry sector. This is in the context that heat requirements of the poultry sector may have been changing due to separate developments<sup>47</sup>.

3.33 The net result is that the expected rate of return under the current tiered tariff structure for the typical installation is significantly higher than both the 12%

<sup>46</sup> The CAFRE analysis was based on the experience of the poultry industry where biomass boilers were installed as part of a switch on the part of Moy Park producers from a Direct "wet" more humid, radiant heaters to an Indirect hot water heating system. Whilst this provided additional financial benefits, it also involved additional costs such as the electricity required for fans. However, these additional costs would apply regardless of whether the fuel type used was biomass or oil or LPG, in the context that Moy Park provides its producers with a fuel allowance which should have covered any additional fuel costs, suggesting that the Tier 2 tariff should have been set much closer to zero than was actually the case. There were also issues with the level of fuel efficiency assumed in respect of the 1.5p/kWh figure with the CAFRE advice based heavily on input from a poultry farmer, who subsequently became a Director of RHANI, whose evidence to the RHI Public Inquiry (WIT-217321 to 217324) implies that the Tier 2 tariff should have been set a 1p/kWh, even with the erroneous inclusion of additional costs relating to an Indirect hot water heating system.

[https://www.rhiinquiry.org/sites/rhi/files/media-files/WIT-217001toWIT-217500ThomasForgrave\\_Redacted-Part5.pdf](https://www.rhiinquiry.org/sites/rhi/files/media-files/WIT-217001toWIT-217500ThomasForgrave_Redacted-Part5.pdf)

<sup>47</sup> The annual usage limit also appears to have been based on the advice of a single individual, a Director of RHANI, who has indicated to the RHI Public Inquiry that a fair heat requirement is 0.5 tonnes of pellets per 1,000 birds. On the basis of an average flock size of 20,000 and 7 cycles per year, this implies an annual average heat requirement of approximately 300MWh rather than the 360-388MWh range he advised CAFRE (WIT-217326) and the 400MWh limit that was actually set. The required heat for the poultry sector is also confused by the switch from a Direct heating system to an Indirect hot water heating system. Whilst this may have increased the heat requirements of the poultry sector it is difficult to isolate its impact from the perverse incentive under the single tier tariff to generate more heat than required.



target and the 8-22% range previously referred to by the European Commission as being reasonable. This excludes previous excess payments under the original single tier tariff which would further increase the expected rate of return.

3.34 Therefore, whilst the measures taken by the Department to date have partly addressed the issue of overcompensation, there remains a pressing need for further action to be taken.

#### *Unaffordable commitments*

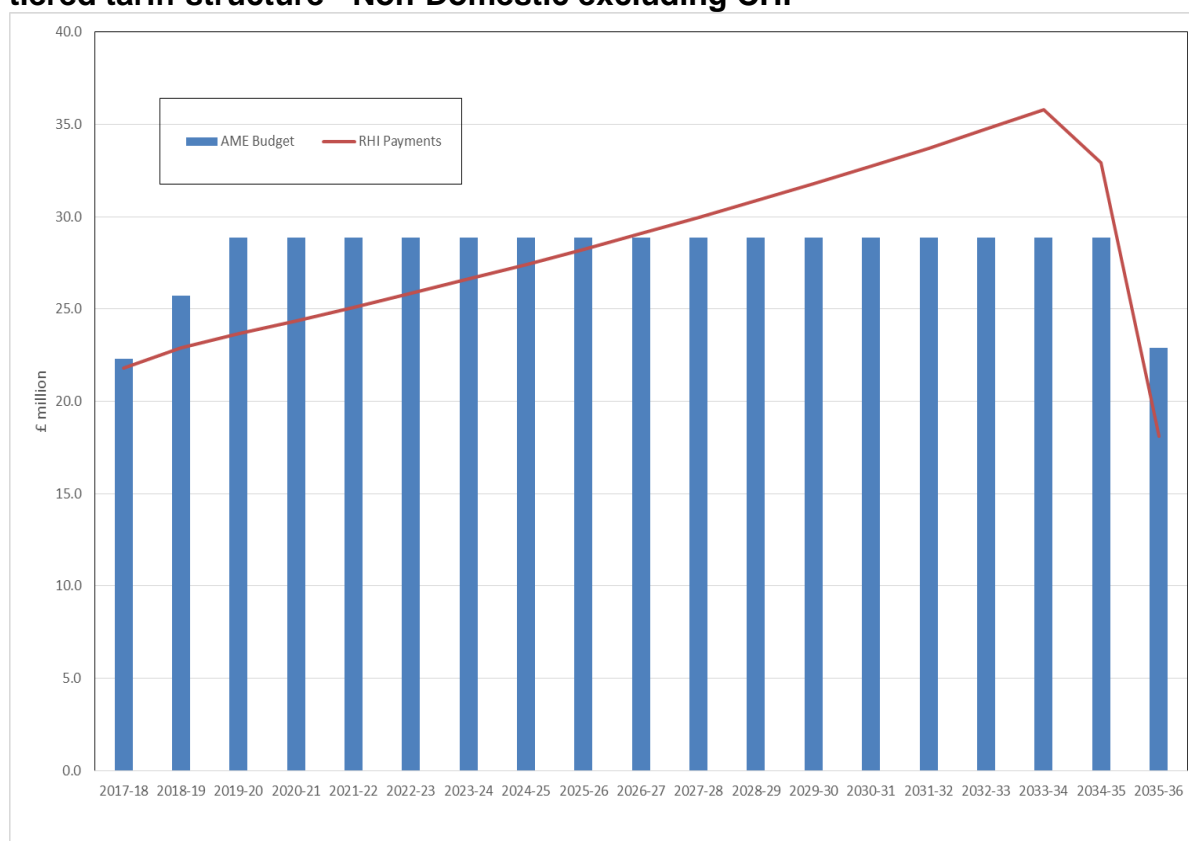
3.35 Although the 2015 and 2016 Regulations did not address the affordability issues with the NI RHI Scheme, the 2017 Regulations have reduced the level of projected expenditure by more than 50% due to a combination of the reduced rates of tariff payment to all participants and a decrease in the amount of excess heat generated. Projected expenditure under the NI RHI Scheme is broadly in line with the available budget for 2018-19. This is expected to remain the case for the medium term as the level of available funding will increase further in 2019-20 whilst payments on the NI Domestic RHI Scheme are expected to cease in 2023-24.

3.36 However, in the context that the available budget for the NI RHI Scheme is expected to remain constant in cash terms from 2019-20 until the mid-2030s<sup>48</sup>, the overall level of payment under the NI RHI Scheme based on the current tariff structure would be higher than the available budget by the late 2020s due to the provision in the 2012 Regulations for tariffs to be uplifted each year by RPI inflation- see Chart 3.5 below. The precise timing would depend on the actual rate of inflation as well as variations on the amount of heat generated on the Scheme.

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<sup>48</sup> Based on advice from HM Treasury provided by DoF officials.

**Chart 3.5: Projected budget and expenditure under NI RHI Scheme under a tiered tariff structure - Non-Domestic excluding CHP**



Source: RHI Taskforce Calculations

### *Perverse Incentive*

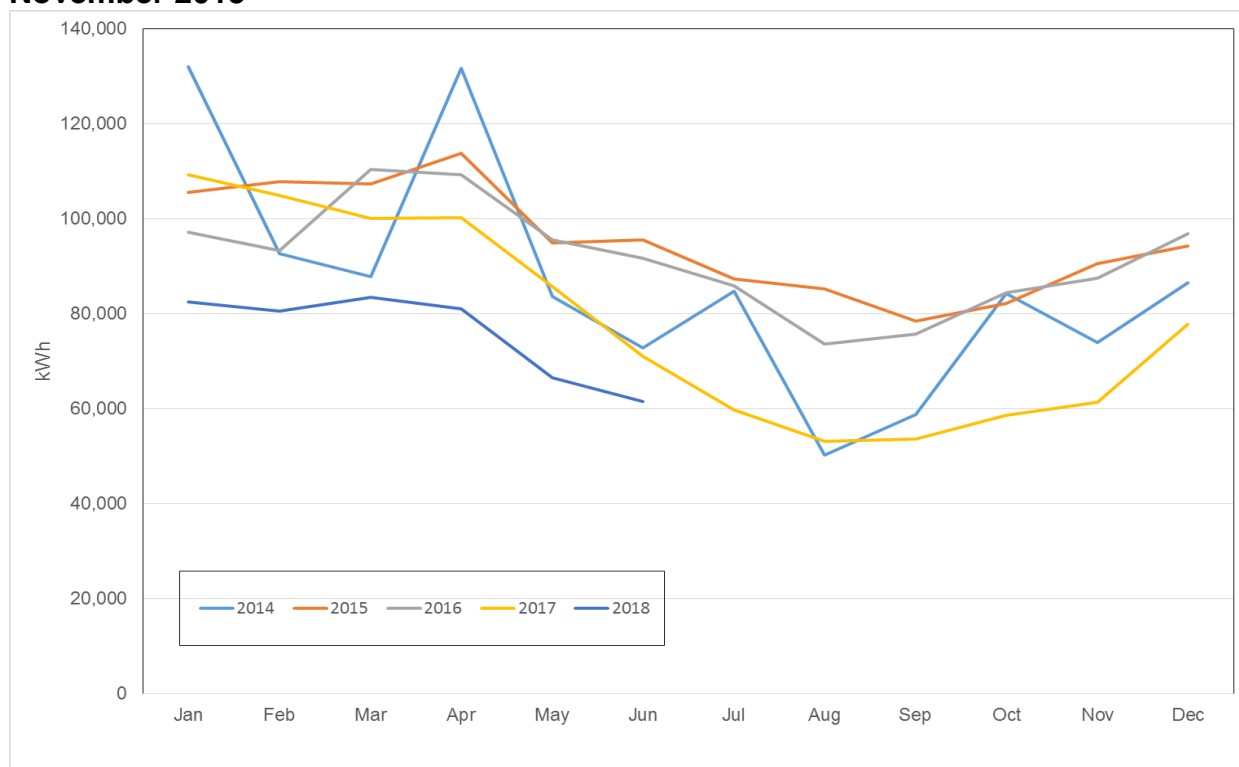
3.37 The introduction of a Tier 2 tariff lower than the marginal cost for the typical installation has reduced, but not removed, the potential for excess heat to be generated. This is because there remains the potential for participants who supply their own fuel to have very low marginal costs. However, the 400,000kWh annual usage limit means that there is an upper limit to the amount of excess heat generation that is paid for by the RHI.

3.38 In addition, in the context that one of the deficiencies in the Regulations for the Scheme is that participants are not required to meet minimum energy efficiency standards, the annual usage limit encourages improved energy efficiency measures to be installed.

3.39 As set out in Chart 3.6 below, the amount of heat generated on the Scheme by those installations previously on the single tier tariff has fallen significantly since

the start of 2017-18. The average load factor for small and medium sized boilers on the Scheme to date has fallen from 40.8% at the end of 2016-17 to 37.0%.

**Chart 3.6: Average Quarterly Meter Reading for installations accredited prior to November 2015**



Source: Ofgem, RHI Taskforce Calculations

## Need for Tariff Review

3.40 When introducing the 2017 Regulations to the NI Assembly on 16 January 2017, the then Minister for the Economy indicated that detailed consideration would be given to the options for the future operation of the Scheme<sup>49</sup>. In addition, when seeking State aid approval for the 2017 Regulations the UK Government committed to conducting a review of the NI RHI Scheme<sup>50</sup>.

3.41 Although the interim measures have made some progress in addressing the deficiencies with the original tariff structure for the NI RHI Scheme, it was recognised that further action was required. In particular, whilst the current tariff structure has brought the Scheme back within budget and largely removed the

<sup>49</sup> <http://data.niassembly.gov.uk/HansardXml/plenary-16-01-2017.pdf> (Page 49)

<sup>50</sup> (Paragraph 30) [http://ec.europa.eu/competition/state\\_aid/cases/268889/268889\\_1902876\\_36\\_2.pdf](http://ec.europa.eu/competition/state_aid/cases/268889/268889_1902876_36_2.pdf)

perverse incentive to generate more heat than required, the preliminary analysis by the RHI Taskforce suggested that there remained the potential for significant overcompensation.

3.42 In particular, analysis of the actual capital costs of boilers on the Scheme suggested that the main element of the Tier 1 tariff was substantially lower than assumed by CEPA in 2012. In addition, a review of the CAFRE analysis suggested that the Tier 2 tariff and the annual usage limit estimate were both overstated. Furthermore, the further reductions to the tariff levels on the GB RHI Scheme, also suggested that the current tariff structure in NI was too generous<sup>51</sup>.

### Combined Heat and Power Plants

3.43 CHP biomass plants differ from standard biomass boilers because they also produce electricity. The original 2012 Regulations did not include a specific tariff for CHP plants but instead included them as part of the biomass tariff which was limited in scale to 1MW. Subsequently, the 2013 CEPA report estimated the required tariffs for CHP plants at 3.5p/kWh for a new installation and 1.7p/kWh for sites where an existing conventional (fossil fuel) CHP was being converted to renewable CHP.

3.44 Proposals for specific CHP tariffs were included within the consultation on Phase II of the RHI with the view that “*DETI expects heat from renewable CHP sites to provide a significant contribution towards...the renewable heat target*” and that “*It is estimated that over 500GWh of heat per annum will be in place through CHP by 2020, over a third of the renewable heat target*”.

3.45 Although it is unclear whether business case approval was ever explicitly secured for the specific CHP tariffs, they were included in the 2015 Regulations for the Scheme. However, State aid approval was not sought. When the Department was seeking State aid approval for the 2017 Regulations for the

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<sup>51</sup> Small (<200kW) biomass boilers accredited onto the GB RHI Scheme between 1 July and 20 September 2015 (before the Tier 1 threshold was changed from 15% to 35%) will receive payments in 2018-19 based on a Tier 1 tariff of 2.79p/kWh and a Tier 2 tariff of 0.73p/kWh compared with 7.0p/kWh and 1.6p/kWh on the NI RHI Scheme.

Scheme a commitment was made to the European Commission that, “...no new CHP installations will be accredited under this category before 31 March 2018 and that the CHP tariffs will be notified to the Commission separately after a review by the Department of [sic] the Economy in Northern Ireland”.

3.46 Whilst two large new CHP plants applied for preliminary accreditation to the NI RHI Scheme in advance of its suspension in February 2016, it was not possible to proceed with consideration of the applications because of the lack of State aid approval. There was therefore a need to review the CHP tariff, so that a decision could be taken as to whether State aid approval should be sought for this technology.

### **Additionality/Displacement**

3.47 In light of the higher capital and operating costs associated with renewable heat technologies, a 2017 analysis commissioned by the Department for Business Energy & Industrial Strategy (BEIS) suggested that almost two thirds of participants on the GB RHI Scheme would not have switched from fossil fuel boilers in the absence of the RHI payments<sup>52</sup>.

3.48 In respect of the NI RHI Scheme, the lower than expected capital costs experienced by participants on the Scheme and the potentially greater than expected savings in respect of variable costs means that the lifetime cost of a biomass boiler is broadly similar to that of a fossil fuel boiler. However, in light of the innovative nature of the Scheme, participants may require a subsidy to encourage the take up of the renewable technology. Whilst the Department has no evidence in respect of biomass boilers being installed following the suspension of the NI RHI Scheme, it would be expected that this would be low as those interested in renewable heat technologies would already have applied and been accredited to the Scheme.

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<sup>52</sup> A synthesis evaluation of the GB Scheme reported that 63% of non-domestic applicants would not have installed a renewable heat technology without the RHI.  
[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/642103/RHI\\_evaluation\\_synthesis\\_-\\_2017.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/642103/RHI_evaluation_synthesis_-_2017.pdf)

- 3.49 At the same time, the level of tariff at the initiation of the Scheme appears to have been too high, which may have led some people to install renewable heat boilers when the difference in costs between the two fuel types would have been too large for their specific circumstances to justify the choice of renewable heat under an appropriately set tariff.
- 3.50 In addition, the intention of the NI RHI Scheme was to provide incentive to “replace” fossil fuel heating with a renewable heat alternative. However, following the introduction of the Scheme a number of applications were made in respect of new heat requirements. Whilst it is difficult to determine how much of the additional heat being produced was for entirely new requirements compared to business expansion of previous heat requirements, an increase in the overall amount of heat produced in NI was not a policy objective of the Scheme.
- 3.51 In respect of displacement, the available evidence would suggest that some participants have used the overcompensation from the NI RHI Scheme to cross-subsidise other parts of their wider business. Indeed, in her evidence to the RHI Public Inquiry on 21 September 2018, the former Chief Executive of Moy Park acknowledged that the company had appropriated some of the financial benefits from the RHI in the form of lower prices and/or fuel allowance paid to farmers for poultry. This would put Moy Park at a competitive advantage, potentially leading to the displacement of economic activity on the part of other firms. The need to avoid the potential for market distortion is another reason why it is necessary to revise the tariff structure.

### **Summary of need**

- 3.52 In summary, the 2017 Regulations were introduced to address the significant issues with the Non-Domestic NI RHI Scheme on an immediate basis, but with a sunset clause whereby they would cease to be applicable on 31 March 2018. The 2018 Regional Rates and Energy Act extended the application of the 2017 Regulations until 31 March 2019. The available evidence to date would suggest that the Regulations (extended by the Act) have had an impact on the

affordability of the Scheme but that further issues remain, particularly in respect of the potential for overcompensation.

3.53 In this context, there was a clear need to review the tariff structure currently in place for small and medium sized biomass boilers and to consider a range of alternative options. This relates not only to the tariff levels, but also other aspects of the tariff structure including the size bands, annual usage limits and annual inflationary uplift. Whilst similar issues may also apply to other technologies on the NI RHI Scheme, these account for a relatively small share of applications and total projected spend, which implies that the focus should be on small and medium sized biomass boilers at the current time. The one exception is CHP plants where a commitment has been made to the European Commission to review the tariff.

## SECTION 4- OBJECTIVES & CONSTRAINTS

### Introduction

- 4.1 The original objectives for the Non-Domestic NI RHI Scheme are set out in Table 4.1 below. These are taken from the 2012 business case which considered the options for a programme to support an increase in the deployment of renewable heat technologies. In terms of the interim targets for the Secondary Objectives, the 2012 business case states that they should only be taken as indicative.

**Table 4.1: Original Objectives for NI Non-Domestic RHI Scheme from 2012 Business Case**

<b>Primary Objective</b>		
<b>Area</b>	<b>Direction</b>	<b>Interim target for 2015</b>
Levels of renewable heat	Increase uptake of renewable heat to 10% of market share	Reach 4% market share
<b>Secondary Objectives</b>		
<b>Area</b>	<b>Direction</b>	<b>Interim target for 2013</b>
Carbon emissions	Reduce emissions against counterfactual	Emissions reduced by 30,000 tonnes
Oil imports	Reduce oil imports against counterfactual	Imports reduced by 40,000 barrels
Gas use	Minimal reduction against counterfactual	No reduction against current projections

Source: 2012 DETI Business Case

### Performance to date against Original Objectives

- 4.2 Whilst the primary objective of the NI RHI Scheme is to increase the share of total heat generation from renewable sources to 10% by 2020 (implies 1,670 GWh of renewable heat out of a total of 17TWh), the 2011 CEPA report indicates that 1,278 GWh (Table 7.2) or 7.65pp (Table 7.3) of the target would be achieved in the absence of the RHI, leaving 400GWh from the Scheme. In this context, the 2011 CEPA report (Table 7.2) also estimated that just under 600GWh of renewable heat could be generated under a NI RHI Scheme in 2020, which was subsequently increased to 870 GWh in the 2012 Addendum



## OFFICIAL- SENSITIVE

Report (Table B.2). This implied that the contribution of the NI RHI Scheme to the 10% target could be achieved with relative ease.

- 4.3 However, analysis set out in the subsequent 2013 CEPA Report on Phase II of the NI RHI Scheme significantly reduced the estimate of the level of renewable heat generated in the absence of the NI RHI Scheme. This meant that the amount of renewable heat required under the RHI increased to 1,000GWh in order to meet the 10% target (Page 10). The 2013 CEPA report concluded that this would be extremely difficult to achieve.
- 4.4 Based on the amount of heat being generated by the end of 2016-17, it is estimated that 700GWh of heat would have been generated under the NI Non-Domestic RHI Scheme each year if the 2017 Regulations had not been introduced. On the basis of the subsequent reduction in the average load factor due to the introduction of tiering, it is now projected that around 560 GWh will be generated by non-domestic RHI boilers in NI each year. Including domestic RHI boilers would increase this to 600GWh, whilst also adding the 2 large CHP plants would increase this to over 700GWh.
- 4.5 In comparison, the February 2018 NAO Report on the GB RHI Scheme (Figure 7) states that the current ambition is for 21TWh of renewable heat to be funded by the GB RHI Scheme by 2020. Adjusting for relative population size (2.93%) this equates to 615GWh for NI. Therefore, current heat generation levels would suggest that the amount of heat generated under the NI RHI Scheme will be broadly in line with the GB RHI Scheme.
- 4.6 More fundamentally, the operation of the NI RHI Scheme to date has shown the weaknesses in how the primary objective was defined. In the first instance, it was inappropriate for the Scheme to be assessed against the 10% target when it was originally expected to make only a minority contribution to its achievement.
- 4.7 Secondly the 10% target was based on the assumption that the overall amount of heat generated in NI would not change as a result of the Scheme. However,

the application forms to the Scheme would suggest that a large proportion of the heat paid for under the Scheme is not replacing that previously generated by a fossil fuel boiler. Whilst this may have been due to new economic activity that would have been undertaken in the absence of the RHI which is reasonable, there are three alternative scenarios where an increase in the amount of renewable heat would be more concerning:

- (a) an economic activity which did not previously require heat, such as a storage facility;
- (b) an existing economic activity in respect of which the amount of heat required has increased following the switch from fossil fuel to renewable heat; and
- (c) a new economic activity that would not be financially viable in the absence of an RHI Scheme providing overcompensation.

4.8 This implies that the Scheme has been associated with an increase in the amount of heat generated in NI, some of which is inconsistent with the Energy Directive which refers to energy savings, as well as an increase in renewable heat.

#### **Objectives for Long-Term Tariff Structure**

4.9 On this basis, it would be inappropriate for the primary objective of the Scheme to be set in terms of the direct achievement of the 10% renewable heat target. In respect of the secondary objectives, it is unclear how the specific impact of the NI RHI Scheme could ever have been measured accurately.

4.10 In light of the above, the key objectives of the long-term tariff structure for the NI Non-Domestic RHI Scheme are to ensure that:

- (a) it continues to make a contribution to the achievement of the 10% renewable heat target by supporting at least 500GWh of renewable heat generation each year until the end of the Scheme (measured by the level of heat paid for by the RHI each year);

- (b) the committed expenditure represents value for money and is affordable within the AME budget available from 2019-20 to the end of the Scheme (measured by the level of RHI payments each year compared with the available budget); and
- (c) the potential for participants to receive excess or insufficient levels of compensation is minimised (measured by the expected rate of return for the typical installation and the number of installations expected to achieve rates of return below 8% or above 22%) and that the perverse incentive to generate more heat than required for their normal business needs is reduced.

4.11 The level of renewable heat paid for by the NI RHI Scheme under objective (a) is lower than current levels to reflect uncertainty regarding the amount of heat generated by participants on the Scheme in future years.

## Constraints

4.12 A number of potential constraints have been identified as outlined below:

**Operational** – Any proposed approach must have the capability of being introduced without significant bureaucracy within the Department and without significant reporting and administrative changes to Ofgem and participants. Although changes in tariff rates can be implemented with relative ease by Ofgem, it is more difficult to make more significant changes to the tariff structure.

**Financial** – Any revised tariff structure must remain affordable within, or as near as possible to, the AME budget allocated from HM Treasury. Although the budget for the RHI will increase in 2019-20, HM Treasury have advised through DoF that no further increase in the budget should be assumed for subsequent years. This is in the context that the 2012 Regulations provide for an increase in the tariff rates each year in line with the rate of RPI inflation for the previous calendar year. HM Treasury have also stressed that this is a planning

assumption with funding for the NI RHI Scheme for 2020-21 onwards only to be confirmed as part of the 2019 Spending Review. The potential for the cost of the Scheme and/or available budget to be significantly different than projected is one of the key risks to the operation of the Scheme going forward- see Section 9.

**Timing** – Any proposal must be approved and ready to implement in advance of the start of the 2019-20 financial year. This includes approval of the business case by the DfE Accounting Officer and DoF, as well as State aid approval. However, the main uncertainty will be in respect of the process for securing legislative approval.

**Legal** – Any proposal must be legally defensible and capable of obtaining State aid approval.

**Policy** – Any proposal must be broadly consistent with the original policy objectives of the Scheme, i.e. to provide a fair and proportionate return for the additional capital investment in renewable heat technology.

## **Conclusions**

4.12 The performance of the NI Non-Domestic RHI Scheme has shown the need for a change in how the long-term objectives are defined. The revised objectives set out in this section will form the basis of the assessment of the options in Sections 7-9.

## SECTION 5: TARIFF REVIEW

### Introduction

5.1 Payments to Scheme participants under the NI Non-Domestic RHI Scheme are based on applying a tariff to the amount of heat generated (in kWh). The current tariffs for each technology and size band are set out in Table 5.1 below in respect of the 2018-19 financial year.

**Table 5.1: Tariffs for NI Non-Domestic Scheme (2018-19)**

Technology	Band	Size	Tier	Tariff (p/kWh)	No. of boilers applying to Scheme
Biomass	Small	0-19kW	Tier 1	7.3	12
			Tier 2	1.6	
	Medium <sup>1</sup>	20-199kW	Tier 1	7.0	2,065
			Tier 2	1.6	
	Large	200kW+	N/A	1.6	22
CHP				3.7	3
Heat Pumps	Small	0-19kW	N/A	9.7	14
	Medium	20-99kW	N/A	5.0	6
Solar				9.8	6

1. Original medium biomass size band was 20-99kW which increased to 20-199kW under 2015 Regulations

5.2 The tariffs were originally calculated by CEPA in a report for the Department in June 2011, which was revised in a February 2012 addendum following public consultation. These tariffs have subsequently been increased in line with RPI inflation each year.

5.3 Reflecting the fact that a significant proportion of the additional cost of renewable heat is fixed and does not increase in line with the amount of heat generated, a tiered tariff structure was introduced for new small and medium sized biomass boilers in November 2015.

5.4 The Tier 1 tariff was set at the level that had previously been calculated by CEPA in 2011/2012 for the single tier tariff, Tier 2 was set to be approximately

the same as the equivalent tariff under the GB Scheme of 1.5p/kWh<sup>53</sup>. Whilst the tariff levels were considered reasonable when applied to new Scheme entrants in November 2015, and extended to all small and medium sized biomass boilers from April 2017, an initial review of the most recent available evidence suggested that at least some elements of the actual additional costs faced by Scheme participants were significantly different from those assumed when first setting both the Tier 1 and Tier 2 tariffs.

### **Objectives of Tariff Review**

5.5 In this context, the energy consultancy Ricardo Energy & Environment was commissioned by the RHI Taskforce to undertake a comprehensive review of all the main elements of the tariff structure for small and medium sized (0-199kW) biomass boilers and CHP plants. The Terms of Reference for the Tariff Review also included an assessment of the current size bands (0-20kW and 20-199kW) for biomass boilers as well as the annual usage limit for small and medium sized boilers and the approach to the annual inflationary uplifts.

### **Approach Adopted by Ricardo**

5.6 In conducting the Tariff Review, Ricardo first critically examined the approach and evidence base adopted by CEPA (in 2011, 2012 and 2013). Ricardo then obtained a range of evidence including:

- (a) Data from ongoing inspections- as part of its complementary work inspecting installations for compliance with the NI RHI Scheme regulations, Ricardo collected information on the capital, fuel and maintenance costs of Scheme participants;
- (b) Data held by Department- this includes data per installation on capital costs (direct and indirect), boiler size, heat generated to date and payments to date;
- (c) Empirical research- including the latest market data on fuel costs as well as industry benchmarks on servicing/maintenance costs; and

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<sup>53</sup> Whilst this was the equivalent GB Tier 2 tariff when the policy was being developed in NI in the early summer of 2015, the GB Tier 2 tariff was subsequently reduced significantly by the autumn of 2015, which was not reflected in the NI Scheme.

- (d) Engagement with the technical expert providing advice to the developers of the two large CHP plants that had applied to the Scheme- in terms of the planned capital and operating costs for the two projects, as well as the expected levels of generation for both heat and electricity.

### **Ricardo Findings- Biomass**

- 5.7 The Final Report from Ricardo was received in May 2018<sup>54</sup> and includes a number of tariff scenarios based on variations from a Base Case scenario which reflects the assumed costs, savings and usage levels for a typical biomass boiler.
- 5.8 In the first instance however, following a review of capital costs which identified that there was a significant reduction in the capital cost per kW as biomass boiler size increases, Ricardo recommended that the current 20-199kW size band should be split between 20-99kW and 100-199kW. This returns the Scheme to the position before November 2015 where the upper limit of the medium size band was 99kW. This is in the context that it is unclear why the medium size band had been expanded previously, with the concern that new entrants to the Scheme were able to circumvent the tiered threshold by allowing them to oversize their boiler to increase the amount of heat generated at the higher Tier 1 tariff. Ricardo saw no particular reason to change the current 12% required rate of return used when calculating the tariff.
- 5.9 In terms of the tariff calculations, Table 5.2 below sets out the main assumptions proposed by Ricardo for the 20-99kW tariff<sup>55</sup> based on the latest available evidence, compared with the assumptions that had been made by CEPA in 2012. The reference boiler has been increased in size from 50kW to 99kW, reflecting the predominance of the latter boiler size on the Scheme. In addition, the capital cost per kW (Capex) has been reduced to reflect the actual investment expenditure incurred by NI RHI Scheme participants.

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<sup>54</sup> <https://www.economy-ni.gov.uk/sites/default/files/consultations/economy/9.NIRHI-Biomass-Tariff-Review-Final-Report-22-May-2018-FINAL-for-publication.pdf>

<sup>55</sup> Accounting for 92% of small and medium sized biomass boilers on the NI RHI Scheme.

**Table 5.2: Revised Main Assumptions for 20-99kW Biomass Tariff<sup>56</sup>**

	Biomass Boiler		Counterfactual boiler	
	2012 CEPA	2017 Ricardo	2012 CEPA	2017 Ricardo
Boiler size (kW)	50	99	50	99
Load factor	17%	15%	17%	15%
Capex (£/kW)	608	362	97	114
Opex (£/kW)	4.60	9.02	3.45	1.41
Assumed Fuel	Pellets	Pellets	Oil	Oil/LPG <sup>57</sup>
Fuel cost (p/kWh) <sup>58</sup>	4.39	3.26	4.86	4.14
Fuel efficiency	85%	92%	93%	92%
Upfront barrier cost (£)	5,364	987	0	0
Ongoing barrier costs (£)	828	619	0	0

Source: CEPA, Ricardo

5.10 In respect of ongoing operating costs, although the price of oil has fallen there had been a greater reduction in the price of biomass. This also reflects the use by Ricardo of actual NI prices, whilst CEPA had previously used projections for the rest of the UK. It is noteworthy that CEPA used UK wood pellet prices when setting the NI tariff even though the 2012 CEPA Addendum report (Table 3.3) showed that the price of wood pellets was 16% lower in NI<sup>59</sup>. Ricardo also reviewed the approach to barrier costs and concluded that these were overstated by CEPA.

5.11 A number of respondents to the public consultation suggested that the Ricardo analysis was flawed with the main issue being that it assumed that wood pellets cost £150 per tonne when the most recent data suggested that the price had risen to £175 per tonne. Although the price of biomass may have increased

<sup>56</sup> All monetary values are expressed in 2010 prices (CEPA) and 2016 prices (Ricardo)

<sup>57</sup> Ricardo identified that the counterfactual fuel for poultry farmers was mainly LPG compared with oil for other participants on the Scheme. However, it was not possible to identify which was the most prevalent. In the context that the price of LPG was not publicly available, with discounted LPG prices for poultry being offset by other elements of the payment system from Moy Park, the tariff was calculated on the price of oil only. As substitutes it was assumed that the price of LPG would not deviate significantly from the price of oil over the longer term.

<sup>58</sup> CEPA's modelling employed fuel price inflation over 20 years from 2012. The fuel prices in Table 5.2 were the assumed fuel prices for 2012 (in 2010 prices). However, the effective prices used in deriving the original tariff were 4.56p/kWh (Biomass) and 5.10p/kWh (Counterfactual) as noted by Ricardo in its Tariff Review

<sup>59</sup> Table 3.3 of the 2012 CEPA Addendum report presented analysis of the price of biomass in January 2012 which showed a price of 3.37p/kWh for wood pellets (small/medium commercial purchases) in NI compared with 4.00p/kWh for England.



since Ricardo conducted its analysis, based on the position in November 2017, this was also the case for oil prices. This means that the differential in prices between the two fuels is not expected to have fallen so that the Ricardo tariff calculations remain reasonable.

5.12 Table 5.3 below sets out the tariff structure for the Ricardo Base Case scenario (Scenario A) in respect of each size band and tier for small and medium sized biomass boilers. Compared with the current tariffs presented in Table 5.1, this represents a significant reduction and highlights the extent to which Scheme participants previously received excess payments, which will continue to a lesser extent up until the revised payment structure is implemented from April 2019. However, it is also important to highlight that Ricardo did not take account of previous and ongoing overcompensation when estimating the required tariff. If this had been the case it would be expected that Ricardo would have recommended that no further public subsidy was required, i.e. that the tariffs for the remainder of the NI RHI Scheme should be set at zero.

**Table 5.3: Tariff Review Base Case Scenario (2016 prices)**

p/kWh	0-20kW	20-99kW	100-199kW
Tier 1	7.0	2.2	1.1
Tier 2	1.7	-0.4	-0.7

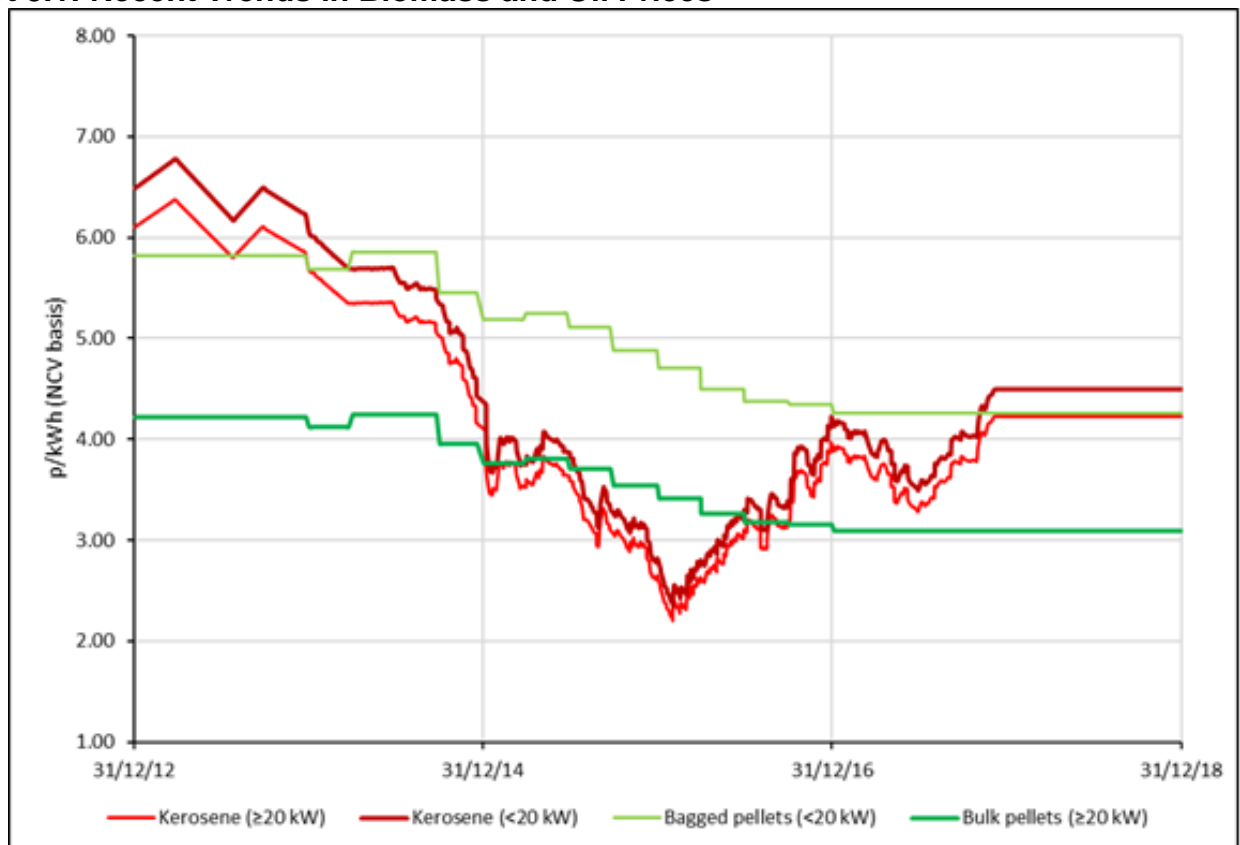
Source: Ricardo Tariff Review

5.13 Table 5.3 shows that the Base Case scenario has a negative Tier 2 tariff for the 20-99kW and 100-199kW size bands, reflecting the current market position where the price of biomass is below the price of oil, which is also taken as a proxy for the price of LPG. This means that whilst a 20-99kW boiler will receive 2.2 p per kWh for the first 1,314 hours of operation each year, the amount of RHI payment will be reduced by 0.4p per kWh thereafter. In order to avoid the need to recoup payments from Scheme participants, this would require a change in the payment profile. For example, payments could be made on an annual basis, in line with the Domestic Scheme, rather than the current quarterly payments. The alternative would be to set the Tier 1 threshold on a quarterly (329 hours a quarter) rather than annual basis (1,314 hours a year).

5.14 In respect of the current Tier 1 threshold of 1,314 annual hours (15% load factor), Ricardo was asked to consider whether NI should follow the approach for new entrants under the GB Scheme and extend the threshold to 3,066 hours (35% load factor). However, the associated reduction in the Tier1 tariff would disadvantage those with lower heat requirements, so Ricardo did not recommend a change to the current approach. If the Ricardo tariff calculations were calculated on the basis of 35% load factor for the typical installation, it is estimated that approximately two-fifths of participants would not achieve a 12% rate of return.

5.15 A negative value for the Tier 2 tariff also has implications for the 400,000kWh annual usage limit on the total amount of heat generated that is eligible for RHI payments. In particular, its continued application would mean that a higher rate of return would be achieved by firms generating more kWh of heat than the annual usage limit. Therefore, it would be inappropriate to proceed with both a negative Tier 2 tariff and an annual usage limit.

**Chart 5.1: Recent Trends in Biomass and Oil Prices**



Source: Ricardo Tariff Review

5.16 Whilst the results of sensitivity analysis are set out in more detail in Section 9, Chart 5.1 above shows the extent of volatility in the oil/biomass price differential over time, although in most cases the price of biomass is lower. This represents a significant risk to the Department with prices often changing materially over a relatively short period of time, compared with the time required to identify and confirm movements in trends and to implement revised tariffs. Therefore, Ricardo modelled an alternative approach (Scenario B) removing the additional cost of fuel from the tariff.

5.17 Table 5.4 below shows that the Base Case scenario excluding fuel costs would be of benefit to most Scheme participants, with the Tier 1 and Tier 2 tariffs both increasing for 20-199kW boilers compared with those set out in Table 5.3.

**Table 5.4: Tariff Review- Base Case Scenario excluding fuel costs (2016 prices)**

p/kWh	0-20kW	20-99kW	100-199kW
Tier 1	7.1	3.2	2.0
Tier 2	1.8	0.5	0.3

Source: Ricardo Tariff Review

5.18 Whilst the tariff structure in Table 5.4 represents a reduction on the current tariff levels, analysis by Ricardo on the implications for participants suggests that it would provide rates of return significantly above the 12% target for the typical installation.

5.19 Although it could be argued that a higher rate of return was justified by the transfer of risk to participants in respect of fuel prices, a further hybrid Scenario (Scenario Hy) was developed as a combination of Scenarios A and B, with the Tier 2 tariff set at zero pence per kWh for the 20-99kW and 100-199kW size bands, as set out in Table 5.5 below. The aim of this alternative was to address the issues with a negative Tier 2 tariff, whilst not also providing excess returns for Scheme participants.

**Table 5.5: Tariff Review- Hybrid Scenario (2016 prices)**

p/kWh	0-20kW	20-99kW	100-199kW
Tier 1	7.0	2.7	1.7
Tier 2	1.7	0.0	0.0

Source: Ricardo Tariff Review

5.20 Ricardo also conducted sensitivity analysis based on changing the assumptions in respect of capital costs, fuel costs, barrier costs and operating costs. This did not result in a significant change in the estimated tariff. Ricardo also examined each of the scenarios in respect of the projected cost and the number of installations expected to achieve a rate of return, lower, higher or within the 8-22% range referred to by the European Commission when providing the original State aid approval for the NI RHI Scheme.

### **Ricardo Findings- Combined Heat and Power (CHP)**

5.21 As there are only two CHP plants which have applied to the Scheme, Ricardo were able to liaise directly with the energy specialist who was advising both projects. This included obtaining information on the actual plans for each plant rather than having to rely on empirical research or assumptions. As with the biomass tariff structure, the latest available evidence would suggest that the previous CEPA analysis overstated the capital costs and the price of input fuel for CHP plants, as well as understating the expected load factor.

5.22 As a result, based on the evidence provided by the technical adviser to the proposed CHP plants, Ricardo have calculated that no public subsidy is required as the lifetime cost of the renewable heat technology is significantly lower than the fossil fuel alternative.

5.23 This main finding is caveated by the concerns raised by Ricardo that the capital cost provided by the technical adviser for the two projects is too low and that under alternative assumptions for capital cost, load factor and required rate of return there would be a need for public subsidy, albeit at a rate of tariff lower than set out in Table 5.1.

## **Conclusions**

5.24 The findings from the Ricardo Tariff Review have confirmed that the additional lifetime cost of generating heat by biomass and CHP technologies is currently lower than suggested in previous analysis by CEPA and CAFRE. As a result, the required level of tariff to provide a fair return on investment to NI RHI Scheme participants is lower than the current set of tariffs.

## SECTION 6: OPTIONS

### Introduction

- 6.1 Section 5 set out the details of the three main scenarios identified by Ricardo in respect of the tariff structure for small and medium sized biomass boilers. However, these scenarios are not the only options, with alternatives available, such as continuing with the current/previous tariff structures on the NI RHI Scheme or adopting the current/previous approach on the GB RHI Scheme. In addition, although the large majority of installations on the NI RHI Scheme are biomass boilers under 200kW in size, it is also necessary to consider the best approach for the other technologies on the Scheme, as well as the inflationary uplift applied to tariffs each year.

### Small and Medium Biomass Boilers

- 6.2 There are a wide range of potential options in respect of the tariff structure for small and medium sized biomass installations. These include variations in the size bands, the number of tiers, the rate of tariff under each tier, the threshold between each tier and the annual usage limit. Set out below are the main options that have been considered as part of this business case.

#### *Option A1: Do minimum/ cease payments*

- 6.3 The do minimum Option A1 is the default position if the Department does not secure the approval for the necessary legislation to implement a long-term tariff structure before the start of the 2019-20 financial year. This would involve no new legislation being put in place with the result that payments would cease for the almost 1,800 installations that applied to the Scheme before the tiered tariff was introduced in November 2015. However, under this option it might be considered unfair for those installations which applied to the Scheme after November 2015 to continue receiving payments. In this context, even under the do nothing option, some action would be expected to be necessary through an amendment to the legislation in order to cease payments for all boilers.

*Option A2: Extend 2017 Regulations*

- 6.4 Option A2 would involve the continued extension of the current 7.5/7.2 p/kWh Tier 1 tariff (all tariffs in this section are presented in 2019-20 prices<sup>60</sup>) for 0-19/20-199kW boilers for the first 1,314 hours of boiler operation (15% load factor) and a 1.7p/kWh Tier 2 tariff thereafter until the overall usage limit of 400,000kWh is reached. There would be no change in the 0-19kW and 20-199kW size bands.

*Option A3: Revert to Original Tariff Structure*

- 6.5 Reverting to the original tariff structure under Option A3 would mean that all heat generated would be subject to the Tier 1 tariff of 7.5/7.2p/kWh with no lower Tier 2 tariff or annual usage limit. This single tier tariff would apply to those installations which applied to the Scheme before November 2015 as well as those which had been subject to the tiered tariff structure since their accreditation date. The current 0-19kW and 20-199kW size bands would remain.

*Option A4(i): Tariff Review Base Case*

- 6.6 As set out in Section 5, as part of the Tariff Review, Ricardo presented a Base Case scenario based on the latest available evidence, including from the operation of the Scheme. In the first instance the existing 20-199kW size band would be split into 20-99kW and 100-199kW to reflect differences in the capital cost per kW of boilers.
- 6.7 In light of the actual average capital cost of boilers being lower than assumed when setting the original tariff, under Option A4(i), the updated calculations imply that the Tier 1 tariff should be revised to 7.4/2.3/1.2<sup>61</sup>p/kWh for the 0-19/20-99/100-200kW size bands, but should continue to be applied for the first 1,314 hours each year, consistent with the calculation of the tariff. As the price

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<sup>60</sup> Most options have been converted to 2019-20 prices based on applying the OBR's latest forecast of RPI inflation (3.4%) to the tariff for 2018-19 unless otherwise stated.

<sup>61</sup> The tariff scenarios in the Ricardo report are in 2016 prices. They have been uplifted to 2019-20 prices by applying the actual rates of RPI inflation applied for 2017-18 (2.5%) and 2018-19 (4.1%) as well as the OBR forecast for 2019-20 (3.4%). As the Ricardo estimated tariffs are based on an annual basis, a further 0.96 adjustment has been applied to reflect the quarterly nature of RHI payments.

of oil is currently significantly higher than the price of biomass fuel, the latest evidence suggests that the Tier 2 tariff should be negative for two of the size bands (1.8/-0.4/-0.7 p/kWh).

- 6.8 As this option involves a reduction in the current tariff rates, participants will have the ability to apply to withdraw from the Scheme in return for a one off payment in a voluntary buy-out- see Paras 6.1-6.31 below for further details.

*Option A4(ii): Tariff Review Base Case with zero Tier 2 tariff*

- 6.9 Although based on the Ricardo analysis of the additional costs and savings of generating heat from a biomass boiler, as opposed to the fossil fuel alternative, there is concern that participants may respond to the negative Tier 2 tariff under Option A4(i) by switching back to oil or LPG once the Tier 1 threshold has been reached. This would have potentially negative environmental consequences.

- 6.10 In this context, a variant option (Option A4(ii)) was developed based on the Tier 1 tariff required to deliver a 12% rate of return for the typical installation if the Tier 2 tariff is set at zero. The result is that the Tier 1 tariff for the 20-99kW size band falls from 2.3p/kWh to 1.7p/kWh whilst there is no change for the 100-199kW size band as its Tier 1 tariff was set at the Tier 1 threshold. There is no change to the tariff structure for the 0-19kW size band as the Ricardo Tariff Review did not estimate a negative Tier 2 tariff was required. This variant of Option A4 was developed following the completion of the Ricardo tariff review and the closure of the public consultation. This option also includes a voluntary buy-out element as set out below.

*Option A5: Tariff Review Base Case excluding fuel element*

- 6.11 Most of the elements of the tariff will not change significantly over time. This is either because the expenditure has already been incurred, as in the case of the capital cost of the boiler, or that costs would only be expected to increase moderately over time, such as maintenance costs.



6.12 The main exception is the fuel cost element, reflecting the difference in the prices of biomass and oil, with adjustment for fuel efficiency. As set out in Chart 5.1 above, the differential between the two prices has experienced significant volatility in recent years, primarily due to changes in the price of oil. Although the fuel cost element is a relatively small part of the overall tariff, it still represents a financial risk to the Department. In response, Option A5 is based on the Base Case scenario from the Tariff Review but with the fuel cost element excluded from the tariff calculations.

6.13 The result is that the tariff for most size bands increases to 7.5/3.4/2.1p/kWh in respect of Tier 1 and 1.9/0.5/0.3p/kWh for Tier 2. In order to seek to protect value for money for the taxpayer it will be important that the fuel cost element would not be reintroduced at a later stage if the price of biomass was higher than the price of oil. In respect of the potential for excess returns, particularly for those participants who produce their own biomass fuel, there is also a need to retain an annual usage limit.

6.14 In light of the evidence that the actual heat requirements for the poultry sector have been overstated, the annual usage limit has been reduced to 300,000KWh for this option. Although some respondents to the public consultation indicated that an annual usage limit discriminates against participants who have a genuine need for a high heat load, the Ricardo analysis shows that they do not face additional costs from generating more heat under a biomass boiler compared with the fossil fuel alternative. This implies that they would not be discriminated against by the annual usage limit. This option also includes a voluntary buy-out element as set out below.

#### *Option A6 Tariff Review- Hybrid*

6.15 Whilst removing the fuel duty element of the tariff reduces the risk to the Department in respect of future oil price volatility, it is also expected to increase the rate of return for the typical installation on the NI RHI Scheme above the target of 12%, as well as the 22% upper limit that had previously been specified by the European Commission when providing initial approval for the NI RHI Scheme.

6.16 In this context a hybrid option (Option A6) was developed which sets the Tier 2 tariff at zero for the 20-99kW and 100-199kW size bands with the Tier 1 tariff set at the mid-point between the Base Case scenarios, with and without the fuel cost element. This option is estimated to provide the typical installation with a 19% rate of return (excluding payments to date) and includes a voluntary buy-out element as set out below.

*Option A7: GB RHI Tariff Structure- Current*

6.17 In light of the similarities between the NI Non-Domestic RHI Scheme and that operating in the rest of the UK, Option A7 would apply the current tariff structure from the GB RHI Scheme. This is based on a Tier 1 tariff of 3.11<sup>62</sup>p/kWh being applied to all 0-200kW biomass boilers for the first 3,066 hours each year (35% load factor) and a Tier 2 tariff of 2.18p/kWh thereafter with no usage limit. This option would also include a voluntary buy-out element as set out below.

*Option A8: GB RHI Tariff Structure- Autumn 2015*

6.18 The alternative under Option A8 would be to apply the GB RHI tariff structure in place in the autumn of 2015, when most of the installations on the NI RHI Scheme applied. This option is again based on the same tariffs applying to all 0-199kW biomass boilers with a Tier 1 tariff of 4.67p/kWh being applied for the first 1,314 hours each year and a Tier 2 tariff of 1.24p/kWh tariff thereafter with no usage limit<sup>63</sup>. This option would also include a voluntary buy-out element as set out below.

*Option B: Compulsory Buy-Out*

6.19 The options set out above involve ongoing periodic payments being made to NI RHI Scheme participants based on the amount of heat generated by each installation in kWh each quarter. However, the original advice in the 2011

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<sup>62</sup> Rather than RPI inflation the tariffs on the current GB tariff structure (3.05/2.14p/kWh) have been uplifted by the OBR forecast for CPI inflation in 2018 (2.1%) to reflect the method for applying the inflationary uplift for new entrants to the GB RHI Scheme. The tariffs on the GB RHI Scheme are set to 2 decimal places compared with 1 decimal place on the NI RHI Scheme.

<sup>63</sup> The 2018-19 tariffs for applications to the GB RHI Scheme between 1 October 2015 and 1 January 2016 (4.52/1.20p/kWh) have been uplifted by the OBR forecast for RPI inflation in 2018 (3.4%).

CEPA report (Page 9) was that *“On a monetised cost-benefit basis, a Challenge Fund or other grant therefore appears more attractive than an RHI...”*

6.20 This is in the context that the NI Executive had flexibility over the form of public subsidy that would be provided under the Scheme. In particular, the HM Treasury written statement to the RHI Public Inquiry<sup>64</sup> (WIT-180027) indicates that *“As heat is a devolved policy area, the NIE had full autonomy over scheme design”* and *“The only specification by HMT...was that the allocation could only be used to support renewable heat projects...”*

6.21 In order to transform the NI RHI Scheme from its current ongoing quarterly payment basis to a grant basis, Option B would involve the cessation of ongoing tariff payments, with all participants provided with a one-off payment instead. This would be comprised of the projected additional lifetime costs of a biomass boiler, minus the amount of RHI payments received by the end of 2018-19. This option would have the following advantages:

- (a) *Less variability in rate of return between installations-* under an ongoing payment basis, whereby all installations of the same size band and technology receive the same tariff for each kWh of heat produced, there is significant variability in rates of return due to the differences in the purchase price of boilers<sup>65</sup> and load factors<sup>66</sup>. By setting the level of compensation for each installation based on its capital cost there is less scope for variation in the rates of return<sup>67</sup>;
- (b) *Takes account of previous overcompensation-* none of the options involving ongoing tariff payments takes account of previous RHI payments. In the context of the evidence of significant previous and current

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<sup>64</sup> [https://www.rhiinquiry.org/sites/rhi/files/media-files/WIT-180001toWIT-180120HerMajestysTreasury\\_Redacted.pdf](https://www.rhiinquiry.org/sites/rhi/files/media-files/WIT-180001toWIT-180120HerMajestysTreasury_Redacted.pdf)

<sup>65</sup> The 10<sup>th</sup> percentile Direct Capital Cost of 99kW boilers on the NI RHI Scheme is £24,760 compared with £47,590 for the 90<sup>th</sup> percentile.

<sup>66</sup> Participants operating their boiler with a load factor below the Tier 1 threshold would not be expected to achieve the target rate of return.

<sup>67</sup> However, there would still be scope for overcompensation if an installation has received more RHI payments by the end of 2018-19 than the additional lifetime cost of a biomass boiler.

overcompensation<sup>68</sup>, this suggests that even if the tariffs are set so that the typical installation will receive a 12% annual rate of return on payments received after 1 April 2019, the overall annual rate of return for its lifetime on the Scheme will be significantly higher (see Chart 8.3 below). By deducting previous RHI payments from the grant, Option B would return the overall rate of return for the lifetime of Scheme closer to the original objective of 12%<sup>69</sup>; and

- (c) *Aligns RHI Payments more closely with the actual profile of incurred costs-* the main additional cost in respect of renewable heat is the capital expenditure on a new boiler which participants tend to fund through a bank loan. Whilst the NI RHI Scheme currently provides payments over a 20 year period, it is often difficult for participants to secure loans for this length of time, with many only having a 3-5 year duration. If the tariff was set correctly for a 20 year period, this implies that participants would receive insufficient payments for the duration of their loan, followed by excess payments when the loan has been repaid, with overall, greater RHI payments being made than necessary<sup>70</sup>. A one-off payment over 1-3 years (in 2019-20 to 2022-23, following quarterly payments of 3-5 years (in 2013-14 to 2018-19) would bring the payments more closely in line with the profile of actual expenditure.

6.22 In terms of the level of the one-off payment, the Department now has the advantage of knowing how much Scheme participants paid for their boilers, as recorded in their application forms to the NI RHI Scheme, as well as the details of the RHI payments received to date. There are five main sub-options:

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<sup>68</sup> The Ricardo analysis implies that the typical installation (99kW boiler with 320MWh heat requirement) requires approximately £2,230 in annual support to compensate for the additional costs of a biomass boiler. This is significantly lower than the £23,040 that the typical installation would earn in RHI payments under the original tariff and £12,665 under the current tariff structure (2019-20 prices)

<sup>69</sup> It is not possible to reflect previous and ongoing overcompensation in the long-term tariff as this would be expected to result in a negative Tier 1 tariff.

<sup>70</sup> The total amount of payments for a £25,000 loan at a 12% interest rate over 20 years (£67k) is almost double that for the same loan and interest rate over 5 years (£35k) although the annual payments are lower (£3,300 vs £6,900).

## OFFICIAL- SENSITIVE

**Option B1:** sum of undiscounted annual payments required to provide a 5% rate of return on net additional capital investment in a biomass boiler over 10 years minus payments made to Scheme participants by end of 2018-19;

**Option B2 (unadjusted):** sum of undiscounted annual payments required to provide a 12% rate of return on net additional capital investment in a biomass boiler over 20 years minus payments made to Scheme participants by end of 2018-19;

**Option B2 (adjusted):** sum of annual payments required to provide a 12% rate of return on net additional capital investment in a biomass boiler over 20 years, with adjustment for early payment, minus capital element of payments made to Scheme participants by end of 2018-19;

**Option B3:** sum of undiscounted annual payments to provide an 8.5% rate of return on net additional capital investment in a biomass boiler over 15 years minus payments made to Scheme participants by end of 2018-19

**Option B4:** sum of undiscounted annual payments to provide a 12% rate of return on net additional capital investment in a biomass boiler over 20 years, plus hassle costs, minus payments made to Scheme participants by end of 2018-19

6.23 Option B1 seeks to provide participants with payment to take account of their finance costs, mainly in the form of bank loans. The RHANI response to the public consultation on the long-term payment options indicates that its members made loan agreements “...*at rates of between 4% and 5.5%...*”. However, the supporting analysis that RHANI provided, in the form of a financial analysis by the forensic accountants Harbinson Mulholland, refers to a bank loan rate of 3% with loans to be repaid over 5-10 years (Paragraphs 64-65). Therefore Option B1 is considered to be a conservative representation of the financing costs of boilers on the scheme.

- 6.24 Option B2 (unadjusted) reflects the format of the Compulsory Buy-Out presented in the Consultation Document on the future of the NI RHI Scheme, with the one-off payment equal to the 20 year sum of payments required to provide a 12% rate of return over 20 years, minus the total amount of RHI payments received by the end of 2018-19.
- 6.25 However, by receiving payment earlier than under an ongoing tariff payment, participants would be expected to achieve a significantly higher rate of return. In addition, the RHI tariff is intended to compensate participants not only for the additional capital costs of renewable heat, but also the additional operating costs. This suggests that the alternative would be for only the capital element of the previous RHI tariff payments to be deducted in calculating the one-off payment. These issues are addressed in Option B2 (adjusted) with further details presented in Annex A. This option would be more administratively difficult to implement, in part due to the need to reflect the different dates when boilers were installed as part of the discounting.
- 6.26 In this context, Option B3 would be easier to implement, but would still seek to address the issue of participants receiving payment at an earlier stage by deducting the social time preference interest rate (3.5%) from the rate of return<sup>71</sup>. It has also been suggested as part of the consultation that boilers will not be operated for the full 20 years. Whilst, the scale of overcompensation under options A2-A3 and A7-A8 means that participants would be expected to take all measures possible to maintain operation for the full 20 years, Option B3 also addresses this issue by setting the rate of return for a 15 year period only.
- 6.27 Data on the direct capital costs of each biomass boiler would be taken from application forms to the Scheme, but will need to be checked and validated by the Department. Whilst, details of the amount of indirect capital costs were also included in the application forms, as part of the Tariff Review, Ricardo raised concerns about this information given the extent of variation. Therefore, the median value of £21 per kW would be applied to each installation instead. The overall capital cost of a Biomass boiler will be capped at a £100,000 upper limit,

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<sup>71</sup> The value society attaches to present, as opposed to future, consumption. See Annex 6 of Green Book  
[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/685903/The\\_Green\\_Book.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/685903/The_Green_Book.pdf)

whilst the equivalent oil boiler cost would be based on the assumption from the Ricardo analysis i.e. £114 per kW for a medium sized boiler. Hassle costs would also be estimated on the same basis as in the Ricardo analysis<sup>72</sup>, applied to the average annual heat generation for each installation to date times 20 years.

6.28 The one-off payment will not be made in respect of those installations that have been rejected, removed or withdrawn from the Scheme. In addition, there will be installations that are expected to have received more RHI payments by the end of 2018-19 than the projected additional lifetime cost of their biomass boiler, with no one-off payment made under these circumstances.

6.29 In principle the one-off payment should also take account of the projected operating and fuel savings from operating a biomass boiler over a 20 year period. However, given that the price of biomass fuel is reasonably close to the price of oil/LPG and in light of the uncertainties regarding future fuel prices, these have not been included in the options set above, with the exception of hassle costs under Option B4. As a consequence, the actual rate of return may be lower/higher depending on the scale of the operating costs/savings-discussed further in Section 8.

6.30 In order to encourage the continued provision of renewable heat data, payment of £100 per confirmed quarterly meter reading is also proposed. This would not form part of the one-off payment and will only be paid on receipt of a quarterly meter reading for the remainder of the lifetime of the Scheme. The alternative would be to request meter readings on an annual or biannual basis with a higher level of payment per reading of £400 or £200 respectively.

#### *Voluntary Buy-Out*

6.31 Although the tariffs have been calculated on the basis of the typical boiler on the Scheme, this still means that boilers purchased at a low cost will receive excess returns. At the same time, those boilers purchased at a relatively high cost

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<sup>72</sup> Fixed ongoing barrier cost of £150 per annum and 0.36p for each kWh of heat generated.

and/or operated at load factors significantly below 15% may not achieve the 12% target rate of return. Whilst it is arguable that the Department should not provide additional support in such circumstances, as they relate primarily to the business decisions of Scheme participants, Options A4, A5, A6, A7 and A8, involving a reduction in the current tariffs, also include a voluntary buy-out element for those Scheme participants who wish to withdraw from the NI RHI Scheme, because their specific circumstances mean that renewable heat should not have been an appropriate option for them. In order to protect budget management, applications for voluntary buy-out would be on a 'first come first served' basis, with payment based on Option B2 (adjusted), with a £2 million limit each year for a period of 3 years- assume 80 applications per annum. The one exception is Option A4(ii) where £4 million per annum is proposed for the voluntary buy-out, as explained in Section 8.

*Summary*

6.32 Set out in Table 6.1 below is a summary of the options described above for ease of comparison



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**Table 6.1: Summary of Option for Small and Medium Biomass Boilers (2019-20 prices)**

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Option	Summary	Bands	Tier1 (p/kWh)	Tier 2 (p/kWh)	Tier 1 Threshold (hours)	Usage limit (kWh)	Voluntary Buy-out
Continuation with Scheme options							
A1	Do nothing- cease payments	0-19kW, 20-199kW	0.0	0.0	N/A	N/A	No
A2	Extend 2017 Regulations	0-19kW, 20-199kW	7.5/7.2	1.7/1.7	1,314	400,000	No
A3	Revert to 2012 Regulations (including post Nov 15 installations)	0-19kW, 20-199kW	7.5/7.2		None	None	No
A4(i)	Tariff Review- Base Case	0-19kW,20-99kW, 100-199kW	7.4/2.3/1.2	1.8/-0.4/-0.7	1,314	None	Yes
A4(ii)	Tariff Review- Base Case	0-19kW,20-99kW, 100-199kW	7.4/1.7/1.2	1.8/0.0/0.0	1,314	None	Yes
A5	Tariff Review- Base Case excluding fuel costs	0-19kW,20-99kW, 100-199kW	7.5/3.4/2.1	1.9/0.5/0.3	1,314	300,000	Yes
A6	Tariff Review- Hybrid	0-19kW,20-99kW, 100-199kW	7.4/2.9/1.8	1.8/0.0/0.0	1,314	None	Yes
A7	GB Tariff Structure- Current	0-199kW	3.11	2.18	3,066	None	Yes
A8	GB Tariff Structure- Oct 15	0-199kW	4.67	1.24	1,314	None	Yes
Compulsory Buy-Out options							
Option	Capital Cost		Rate of Return	Duration of return	Discounted/ Undiscounted	Net of payment to date	Hassle costs
B1	Direct costs from Application form plus Indirect Costs at £21 per kW		5%	10 years	Undiscounted	Yes	None
B2 (unadjusted)			12%	20 years	Undiscounted	Yes	None
B2 (adjusted)			12%	20 years	Discounted	Yes	None
B3			8.5%	15 years	Undiscounted	Yes	None
B4			12%	20 years	Undiscounted	Yes	Included

Source: RHI Taskforce calculations

### Combined Heat and Power Plants

6.33 The Ricardo Tariff Review found that no subsidy was required in respect of the two large CHP plants that had applied to the Scheme, on the basis of the information provided by the technical adviser to the project promoters. However, Ricardo were also of the view that the technical adviser was potentially being over optimistic in respect of the capital cost of the plant and the potential heat output.

6.34 This is in the context that the current tariff on the GB RHI Scheme for CHP plants is 4.42p/kWh (2018-19 prices), but with downward adjustments for those boilers with a high heat/power ratio to maintain consistency with the tariff for

large biomass boilers (3.05/2.14p/kwh). On this basis, there are three main options for consideration as part of this business case in respect of CHP plants.

*Option C1: No Tariff*

- 6.35 Option C1, based on no tariff, is in line with the main finding from the Ricardo Tariff Review with the available evidence suggesting that the two plants would generate a rate of return of around 30% from the use of a CHP plant, compared with the fossil fuel alternative, even without public subsidy.

*Option C2: Current NI Tariff*

- 6.36 Previous analysis undertaken by CEPA for the Department in 2013, suggested that a single tariff of 3.5p/kWh was required for CHP plants. Option C2 is based on this tariff uplifted for inflation.

*Option C3: Large Biomass Tariff*

- 6.37 The relatively small proportion of electricity to be produced as part of the two proposed large CHP plants may suggest that the primary reason why this technology was chosen by the applicants was because of the higher tariff that it attracted when compared with the alternative of a large biomass boiler. In order to correct for this potential perverse incentive, whilst still encouraging the development of the biomass sector, Option C3 involves applying the large biomass tariff (1.6p/kWh) to the CHP plants. This is in the context that the planning permission application in respect of one of the two plants indicates that a biomass installation will be used temporarily, before being replaced by a CHP plant<sup>73</sup>.

## **Other technologies**

- 6.38 In light of the relatively small number of other technologies (26 boilers) and large biomass installations (22) which applied to the NI RHI Scheme, the primary focus of this business case is on small and medium sized biomass boilers and CHP plants. Therefore, no options are included involving a revision

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<sup>73</sup>

[https://www.causewaycoastandglens.gov.uk/uploads/minutes/ITEM\\_5.5\\_Major\\_Item\\_E\\_LA01.2015.0377.F.pdf](https://www.causewaycoastandglens.gov.uk/uploads/minutes/ITEM_5.5_Major_Item_E_LA01.2015.0377.F.pdf) (Paragraph 4.2)

to the existing tariffs for the other technologies with the assumption that they will not change in real terms. The Department should review the tariff for these installations when the long-term tariff structure for small and medium sized biomass boilers has been bedded in.

### **Inflationary Uplifts**

6.39 All tariffs under the NI RHI Scheme have been uplifted by inflation each year as measured by the percentage change in the RPI at the December preceding the start of the financial year, compared with the previous December. However, the largest single cost in respect of the tariff is the capital cost of the biomass boiler, which has already been incurred and therefore, is not subject to increases in inflation.

6.40 This implies that the target 12% rate of return for the Scheme is on a real terms basis, although it has not been possible to confirm this. In the context of the excess level of demand for the GB RHI Scheme and the decision by the RoI government to adopt a lower rate of return target, it could be argued that a real terms rate of return of 12% is too high, with one option being to move to a 12% nominal terms rate of return.

6.41 Similarly, it is not evident that maintenance costs and barrier costs increase in line with RPI inflation, whilst trends in fuel prices over recent years have borne little, if any, resemblance to the general price inflation. In this context, the following options are considered as part of this business case, to be applied in conjunction with Options A2-A8.

#### *Option D1: No change*

6.42 Option D1 would involve continuing with the RPI inflationary uplift projected at around 3% per annum, which would increase tariffs by around 60% by 2035.

#### *Option D2: Use Consumer Prices Index*

6.43 Although the initial approach under the GB RHI Scheme was to increase tariffs each year in line with RPI inflation, new applicants on or after 1 April 2016 will

have their tariffs uplifted each year by the Consumer Prices Index. This is currently projected at around 2% per annum, which would increase the tariff by around 37% by 2035 under Option D2.

*Option D3: No inflationary uplift*

6.44 In light of the uncertainty regarding whether the rate of return target is on a real or nominal basis and whether it is set at too high a level, Option D3 involves no inflationary uplift being applied in future years, with the result that there is no change in tariff levels over time.

**Conclusion**

6.45 Whilst the nature of the NI RHI Scheme payment structure means that there are a large number of potential different combinations that could be applied, this section has set out the main options for consideration, as generally reflected in the public consultation document in respect of the Department's proposals for the long-term tariff structure, which was published in June 2018<sup>74</sup>. The costs and benefits of each of the options are considered in the subsequent sections.

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<sup>74</sup> [https://www.economy-ni.gov.uk/sites/default/files/consultations/economy/1.Consultation-document-The-Future-of-the-Northern-Ireland-Non-Domestic-Renewable-Heat-Incentive-Scheme\\_0.pdf](https://www.economy-ni.gov.uk/sites/default/files/consultations/economy/1.Consultation-document-The-Future-of-the-Northern-Ireland-Non-Domestic-Renewable-Heat-Incentive-Scheme_0.pdf)

## SECTION 7: MONETARY COSTS & BENEFITS

### Introduction

- 7.1 This section sets out the projected cost of the Non-Domestic NI RHI Scheme in 2019-20 and for the remainder of the Scheme for each option, compared with the available budget. This analysis includes not only small and medium sized biomass boilers but also other technologies and large biomass boilers.

### Budget

- 7.2 The UK Government provides funding to the NI Executive in respect of the NI RHI Scheme, calculated as a population based share of the budget for the parallel GB RHI Scheme, offset by a 2.5% VAT abatement factor. As part of the 2015 Spending Review<sup>75</sup> it was forecast that the budget for the GB RHI Scheme would increase from £900 million in 2018-19 to £1,010 million in 2019-20<sup>76</sup>. NI accounts for approximately 2.93% of the GB population which implies that it will receive 2.86%<sup>77</sup> of the GB RHI Scheme budget in 2019-20 or £28.9 million. This compares with the £22.3 million that was available for the NI RHI Scheme in 2017-18.
- 7.3 Although the regulations for the RHI Schemes in both NI and GB currently specify that tariffs will increase in line with inflation each year, the advice from HM Treasury, through DoF, is not to assume that there will be any increase in the NI RHI budget from 2019-20 onwards, as reflected in Table 7.1 below. This is in spite of the 2015 Spending Review document (Paragraph 1.204)<sup>78</sup> stating that the GB budget for the RHI Scheme would increase in 2020-21 to £1,150 million. If this was applied to NI, with the VAT abatement factor removed, the NI

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<sup>75</sup> [http://obr.uk/docs/dlm\\_uploads/Renewable-heat-incentive\\_November2015.pdf](http://obr.uk/docs/dlm_uploads/Renewable-heat-incentive_November2015.pdf)

<sup>76</sup> The Office for Budget Responsibility had previously forecast that UK RHI spending would increase to £1,470 million in 2018-19 which would have implied a budget for the NI Scheme of £42.0 million based on a 2.86% share.

<sup>77</sup> Population share (2.93%) times VAT Abatement Factor (97.5%)

<sup>78</sup>

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/479749/52229\\_Blue\\_Book\\_P\\_U1865\\_Web\\_Accessible.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/479749/52229_Blue_Book_P_U1865_Web_Accessible.pdf)

RHI budget for the remainder of the Scheme would be £5 million higher each year<sup>79</sup>.

**Table 7.1: Projected Budget for NI RHI Scheme**

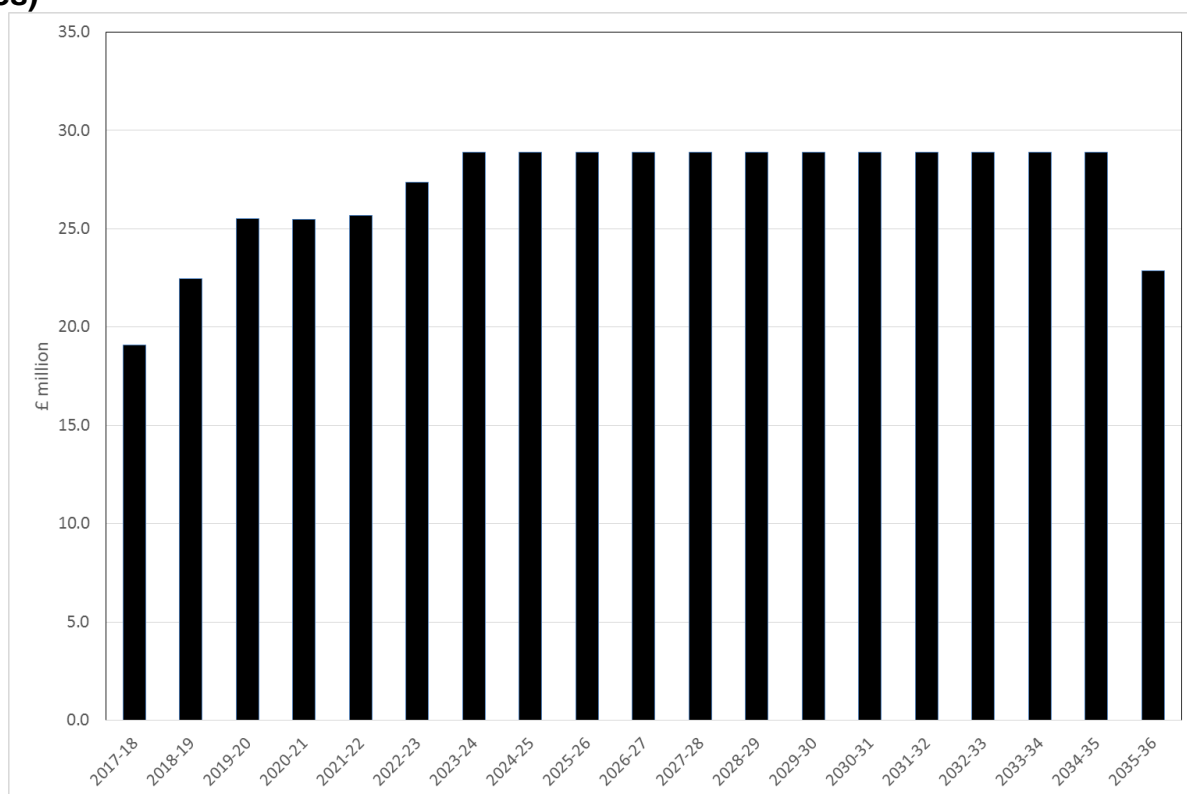
£million	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Budget for GB RHI Scheme	780	900	1,010	1,150	1,150	1,150
Implied NI RHI Budget	22.3	25.7	28.9	28.9	28.9	28.9
NI RHI Budget as a % of GB	2.86%	2.86%	2.86%	2.51%	2.51%	2.51%
NI Domestic RHI Payments	2.8	2.9	3.0	3.1	2.9	1.3
NI Non-Domestic RHI Budget	19.5	22.8	25.9	25.8	26.0	27.6

Source: RHI Taskforce Calculations

7.4 The funding made available by the Government is used for both the Non-Domestic and Domestic NI RHI Schemes, with the latter having a projected spend of £3.0 million in 2019-20. This leaves £25.9 million for the NI Non-Domestic RHI Scheme in 2019-20. Looking forward, the Domestic RHI Scheme provides payments for a 7 year period only, compared with 20 years for the Non-Domestic Scheme. This is reflected in the reduction in payments under the Domestic Scheme from 2021-22 onwards which are expected to cease completely in 2023-24.

7.5 This will mean that the funding available for the NI Non-Domestic RHI Scheme will continue to increase to £28.9 million by 2023-24. It is assumed that the funding available for NI will continue at this level until 2035-36, as shown in Chart 7.1 below. Overall there is projected to be approximately £470 million in funding available for the NI Non-Domestic RHI Scheme between 2019-20 and 2035-36.

<sup>79</sup> 2.93% of £1,150 million equates to £33.7million whilst 2.86% equates to £32.9 million.

**Chart 7.1: Projected Budget for the NI Non-Domestic RHI Scheme (current prices)**

Source: RHI Taskforce Calculations

## Projected Expenditure

7.6 The NI Non-Domestic RHI Scheme provides payments to offset the additional costs of renewable heat technologies for a range of size bands and technologies. Whilst the focus of this business case is on small and medium sized biomass boilers and CHP plants, there is a small amount of expenditure on heat pumps, solar and large biomass boilers.

### *Other Technologies*

7.7 Table 7.2 shows that there have only been 26 applications to the Scheme in respect of heat pumps and solar installations. These technologies account for 1% of the installations on the Scheme, in contrast to the 2011 CEPA report (Tables 7.7 and 7.8) which projected that they would account for the large majority. Only 14 of the heat pump and solar installations which applied to the Scheme have submitted meter readings to date. This compares with 15 large biomass boilers which account for almost all of the expenditure on the Scheme, outside of small and medium sized biomass boilers.

**Table 7.2: Projected RHI Payments in 2019-20 (Other technologies)**

	No. of applications to Scheme	No. of boilers that have received payment	Payment to Date (£million)	Average Load Factor	Projected Payment in 2019-20 (£million)
Large Solid Biomass Boiler	22	15	1.04	24.1%	0.51
Medium Ground Source Heat Pump	6	4	0.06	17.7%	0.02
Small Ground Source Heat Pump	13	8	0.08	35.7%	0.05
Small Solar Thermal	6	2	0.00	5.3%	0.00
Small Water Source Heat Pump	1	0	0.00	5.3%	0.00
Total	48	27	1.18	23.7%	0.58

Source: RHI Taskforce Calculations

7.8 In projecting the expected level of RHI payments for these renewable heat installations in 2019-20, it is assumed that all those which have not withdrawn or been removed from the Scheme to date will be submitting meter readings and receiving payments. It has also been assumed that those installations which have not submitted meter readings to date will have the load factors equal to the average for the installations of the same technology that have submitted meter readings to date.

7.9 The current RHI Tariffs have been uplifted by the projected rate of RPI inflation for 2019-20 (3.4%). These assumptions result in a projected level of payments of £0.6million in 2019-20, primarily in respect of large biomass boilers. To the end of the Scheme it is estimated that the other technologies will receive payments of approximately £13 million based on 3% inflation from 2020-21 onwards.

#### *Combined Heat and Power Plants*

7.10 There are only two CHP plants which have applied for preliminary accreditation to the Scheme. However, these are both very large, with a combined size of 15MW and projected load factors of 93.6%. Table 7.3 sets out the projected annual level of RHI payments for the two plants, based on the tariffs under each option uplifted by inflation.



**Table 7.3: Projected RHI Payments in 2019-20 (CHP Plants)**

Option	Tariff (p/kWh)	Projected Payment in 2019-20 (£million)
Option C1: No Tariff	0.0	0.0
Option C2: Current CHP Tariff	3.8	4.7
Option C3: Large Biomass Tariff	1.7	2.1

Source: RHI Taskforce Calculations

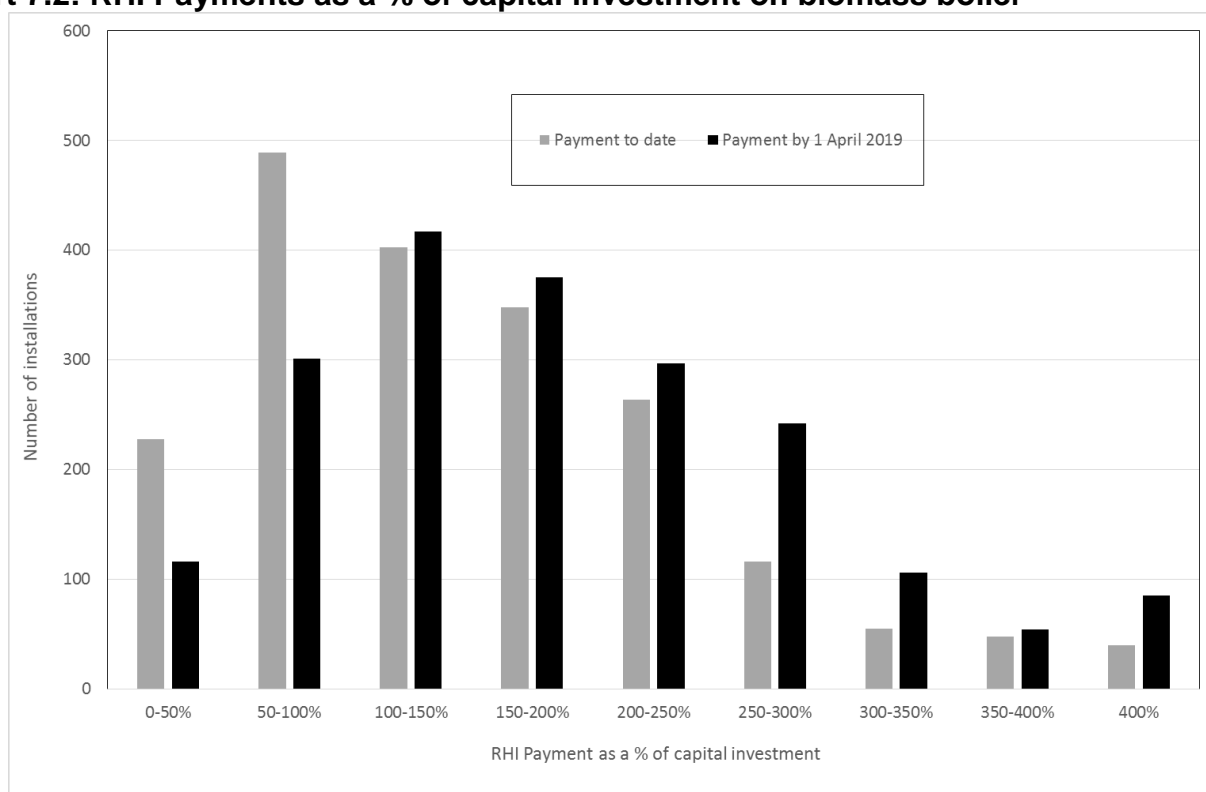
7.11 Table 7.3 shows that Option C1 of no tariff, reflecting the findings from the Ricardo Tariff Review, has the lowest cost, whilst application of the current tariff under Option C2 has the highest cost in 2019-20 of £4.7 million. Although this option would apply to only two plants, it would account for 18% of the total budget for the Non-Domestic RHI Scheme in NI.

7.12 Over a 20 year period, Option C2 would be expected to result in £127 million of payments to the Scheme participants (assuming RPI inflation of 3%), compared with £56 million under Option C3.

#### *Small and Medium Sized Biomass Installations*

7.13 The small and medium sized biomass boilers on the Scheme are estimated to have received payments of £77 million in respect of the heat generated by the end of 2016-17. Under the provisions within the 2017 Regulations it is projected that they will receive a further £43 million in 2017-18 and 2018-19 combined. This means that by the time the new tariff structure is implemented in 2019-20 they will have received approximately £120 million in RHI payments.

7.14 In comparison, the information provided in their application forms to the Scheme state that participants invested £73 million in their biomass boilers. In the context of the latest market data, suggesting that the ongoing operating costs of biomass boilers are lower than for the fossil fuel alternative, Chart 7.2 below shows that 79% of Scheme participants are expected to have received more RHI payments by the end of 2018-19 than their original capital investment in a biomass boiler. However, this does not include the 12% expected rate of return or the cost of a fossil fuel boiler which has been avoided.

**Chart 7.2: RHI Payments as a % of capital investment on biomass boiler**

Source: RHI Taskforce Calculations

7.15 In this context, the projected level of expenditure under each option has been calculated on broadly the same basis as the business case for the 2017 Regulations and the subsequent business case for the extension of those Regulations. In the first instance, the projected level of heat generated by each boiler in 2019-20 is estimated as the annual average of meter readings submitted to date. The one exception is reversion to the 2012 Regulations under Option A3 where the annual average level of heat generation to the end of 2016-17 is used instead, to take account of the impact of the 2017 Regulations on the level of heat generated. If a meter reading has not been submitted to date, a 15% load factor is assumed, except for Option A3 where a 25% load factor is assumed.

7.16 Installations which have been either rejected, removed or have withdrawn from the NI RHI Scheme are assumed to receive no further payment. On a prudent and conservative basis it is assumed that no further boilers are removed or withdrawn from the NI RHI Scheme due to the ongoing inspections process.

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Furthermore, it is assumed that the only impact on the level of heat generated is from the application of the annual usage limit.

7.17 Under Option A3, with no annual usage limit, and applying average annual usage to the end of 2016-17, it is assumed that the small and medium sized biomass boilers on the Scheme will generate 680GWh of heat in 2019-20. This falls to 620GWh based on average annual usage to date and 560GWh with a 400MWh annual usage limit, and 470GWh with a 300MWh annual usage limit.

**Table 7.4: Small and Medium Biomass Tariffs used for Cost Projections**

Option			2019-20 Prices			2018-19 Prices		
			Small	Medium	Large	Small	Medium	Large
A1	Do nothing- cease payments to all installations	Tier 1	0.0	0.0	0.0	0.0	0.0	0.0
		Tier 2	0.0	0.0	0.0	0.0	0.0	0.0
A2	Extend 2017 Regulations	Tier 1	7.5	7.2	7.2	7.3	7.0	7.0
		Tier 2	1.7	1.7	1.7	1.6	1.6	1.6
A3	Revert to 2012 Regulations (incl post Nov 15 installations)	Tier 1	7.5	7.2	7.2	7.3	7.0	7.0
		Tier 2	7.5	7.2	7.2	7.3	7.0	7.0
A4(i)	Tariff Review-Base Case	Tier 1	7.4	2.3	1.2	7.2	2.3	1.1
		Tier 2	1.8	-0.4	-0.7	1.7	-0.4	-0.7
A4(ii)	Tariff Review- Base Case with zero Tier 2 tariff	Tier 1	7.4	1.7	1.2	7.2	1.6	1.1
		Tier 2	1.8	0.0	0.0	1.7	0.0	0.0
A5	Tariff Review- Base Case excluding fuel costs	Tier 1	7.5	3.4	2.1	7.3	3.3	2.0
		Tier 2	1.9	0.5	0.3	1.8	0.5	0.3
A6	Tariff Review- hybrid	Tier 1	7.4	2.9	1.8	7.2	2.8	1.7
		Tier 2	1.8	0.0	0.0	1.7	0.0	0.0
A7	Adopt GB Tariff Structure- Current	Tier 1	3.11	3.11	3.11	3.05	3.05	3.05
		Tier 2	2.18	2.18	2.18	2.14	2.14	2.14
A8	Adopt GB Tariff Structure- Oct 15 uplifted by inflation	Tier 1	4.67	4.67	4.67	4.52	4.52	4.52
		Tier 2	1.24	1.24	1.24	1.20	1.20	1.20

Source: RHI Taskforce Calculations

7.18 The respective tariff(s) under each option are set out in Table 7.4 above. The tariffs have been split into three size bands of small (0-19kW), medium (20-99kW) and large (100-199kW) in line with the Tariff Review recommendations from Ricardo. The large biomass boilers under this analysis are distinct and separate from the large biomass boilers on the Scheme (200kW+), as

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discussed in Paragraph 7.7 above, with the specific terminology to be addressed in the NI RHI Scheme regulations.

7.19 Table 7.5 below sets out the estimated level of total payments to small and medium sized biomass boilers for each option involving ongoing payments. As with the business case for the 2017 Regulations, the option of reverting to the single tier tariff with no annual usage limit (Option A3) would have the highest cost of £49.5 million in 2019-20 with an average payment to participants of approximately £23,850. Extending the 2017 Regulations under Option A2 has the second highest cost of £23.1 million, followed by the GB Tariff Structures (Options A7/A8 £20.0/18.2million) highlighting the continued generosity of the NI RHI Scheme compared with GB.

**Table 7.5: Projected Level of Payment in 2019-20 by Option**

		Total (£ million)	Average (£)
A1	Do nothing- cease payments to all installations	0.0	0.0
A2	Extend 2017 Regulations	23.1	11,110
A3	Revert to 2012 Regulations (including post Nov 15 installations)	49.5	23,850
A4(i)	Tariff Review- Base Case	5.7*	1,770
A4(ii)	Tariff Review- Base Case with zero Tier 2 tariff	8.0**	1,920
A5	Tariff Review- Base Case excluding fuel costs	11.0*	4,310
A6	Tariff review- hybrid	8.7*	3,220
A7	Adopt GB Tariff Structure- Current	20.0*	8,660
A8	Adopt GB Tariff Structure- Oct 15	18.2*	7,780

\*Includes £2 million for voluntary buy-out

\*\*Includes £4 million for voluntary buy-out

7.20 However, depending on the approach adopted for CHP plants, each of the options (except for A3) would still allow the NI RHI Scheme to be within the AME budget in 2019-20. Apart from the cessation of payments under Option A1, the options based on the findings from the Ricardo Tariff Review result in the lowest cost and average level of payments, although current market

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conditions imply that they would still allow the typical boiler on the Scheme to achieve at least a 12% rate of return on the original capital investment.

7.21 Looking forward to the payments for the remainder of the Scheme, Table 7.6 is in line with expectations as the highest cost is in respect of the reversion to the 2012 Regulations under Option A3, which ranges from £800 million to £1,200 million, depending on the rate of inflation applied to the tariff structure. The options from the Ricardo Tariff Review (Options A4-A6) have the lowest projected costs ranging from £60 million to £200 million.

7.22 In terms of the options for the ongoing rate of inflationary uplift, Table 7.6 shows that the choice between RPI (c.3%) and CPI (c.2%) has less of an impact of £5-10 million in respect of the Ricardo Tariff Review options than for the reversion to the 2012 Regulations (£78 million) or continuation with the 2017 Regulations (£37 million).

**Table 7.6: Projected Level of Payment from 2019-20 to the end of the Scheme by Option.**

£ million		Rate of Inflation				NPC
		0%	2%	3%	5%	
A1	Do nothing- cease payments to all installations	0	0	0	0	0
A2	Extend 2017 Regulations	376	440	477	562	293
A3	Revert to 2012 Regulations (including post Nov 15 installations)	806	942	1,020	1,202	628
A4(i)	Tariff Review- Base Case	56	64	69	80	45
A4(ii)	Tariff Review- Base Case- with zero Tier 2 tariff	62	70	75	86	51
A5	Tariff Review- Base Case excluding fuel costs	137	159	171	200	108
A6	Tariff Review- hybrid	102	118	127	149	81
A7	Adopt GB Tariff Structure- Current	285	332	359	421	223
A8	Adopt GB Tariff Structure- Oct 15	249	290	313	368	195

Source: RHI Taskforce Calculations

- 7.23 The upfront cost of the voluntary buy-out applying for three years (£2million each year<sup>80</sup>), net of savings in subsequent years, has only a minor impact on the overall projected cost of the Scheme under Options A4, A5, A6, A7 and A8. It is assumed that the average net payment is £25,000 which would allow 80 installations to leave the Scheme each year, with the assumption that they would have an average load factor of 15%.
- 7.24 In light of the projected budget for the remainder of the Scheme being approximately £470 million, all the options apart from A2 and A3 provide scope for a new Scheme to be developed to promote the greater use of renewable heat, to reduce the level of carbon emissions. However, any new Scheme would need to be based on providing tariff based support over a shorter time period with the alternative being to provide an upfront capital grant only. Consideration of the specific options in respect of a new Scheme is outside the scope of this business case. Only under options A1, A4, A5, A6 and A8 would there be sufficient funding available in respect of the two CHP plants under Option C2.
- 7.25 Given the scale of the excess level of payments made to Scheme participants to date, the alternative approach would be to close the Scheme and make no further tariff payments. Scheme participants would be provided with a one-off payment instead. This is set out as Options B1, B2 (unadjusted), B2 (adjusted), B3 and B4 in Section 6.
- 7.26 Under Option B2 (unadjusted) the level of compensation for the additional cost of renewable heat is calculated as the sum of the annual payments required to provide a 12% rate of return over 20 years on the additional capital investment for each installation. For example, if a biomass boiler had been bought at £35,000 instead of an oil boiler at a cost of £10,000 then the payment for capital costs would be £66,940<sup>81</sup>. Adjustment is then required for the RHI payments that are expected to be received by the end of 2018-19 in estimating the projected net level of payment for each installation, excluding those that have

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<sup>80</sup> £4 million for Option A4(ii) with 160 participants to leave Scheme each year.

<sup>81</sup> £25,000 divided by annuity factor of 7.469 times 20 years.

been rejected, removed or withdrawn from the Scheme. In addition, there will be installations that are expected to have received more RHI payments by the end of 2018-19 than the payment for capital costs, with no payment made under these circumstances.

7.27 Whilst all of the Compulsory Buy-Out options are based on the annual payment required to deliver a rate of return over 15 or 20 years, only Option B2 (adjusted) directly takes account of the payment being received earlier than would be the case under the ongoing payment options. In light of the scale of the rates of return involved, discounting the sum of payments has a significant impact on the gross level of payment, from £66,940 in the example above, to £36,730 (see Annex A).

7.28 The Compulsory Buy-Out options are estimated to have a lower net cost than most of those involving ongoing tariff payments to Scheme participants, with a range of £7-72 million, as set out in Table 7.7. The extent of the range in cost is due to differences in the average level of payment as well as the number of installations which will receive no one-off payment. Table 7.7 does not include the costs of administering the Compulsory Buy-Out payment. However, this would be offset by the ongoing saving in respect of the management of the Scheme, including the reduced need for compliance and enforcement activities.

**Table 7.7: Projected Cost of Compulsory Buy-Out Options<sup>1</sup>**

	Number of Participants Receiving Payment	Average One-Off Payment (£k)	Total One-Off Payment (£m)	NPC (£m)
Option B1: (5% RoR over 10 years undiscounted)	400	17	7	16
Option B2 (unadjusted): (12% RoR over 20 years undiscounted)	1,160	36	42	49
Option B2 (adjusted): (12% RoR over 20 years discounted)	1,140	18	21	30
Option B3: (8.5% RoR over 15 years discounted)	740	22	16	26
Option B4: High Cost (12% RoR over 20 years + hassle costs)	1,680	43	72	78

Source: RHI Taskforce Calculations

<sup>1</sup> Does not include costs for other technologies as many of the application forms for large biomass boilers did not include details of their capital costs.

7.29 As the amount of payment under Options B2 (unadjusted) and B4 is higher than the expected annual budget for the NI RHI Scheme, it would be necessary to phase the one-off payments for each installation over 2-3 years. It should be noted that there is a slightly lower degree of confidence in respect of the estimated cost of Option B2 (adjusted) because it is more complex to calculate the one-off payment for each option, with the expectation that the actual cost will be lower than set out in Table 7.7.

7.30 One of the risks with the Compulsory Buy-Out options is that installation owners would potentially switch to a fossil fuel boiler, whilst those who continue using their biomass boilers would no longer submit the meter readings required to measure the contribution of the Scheme towards the renewable heat target. Whilst the relative operating costs of biomass and fossil fuel heat would suggest that owners should continue using the former, one option would be to provide an ongoing payment of £100 per quarterly meter reading submitted. This would add an additional cost of up to £0.8 million per annum, as reflected in the NPC calculations in Table 7.7.



## Conclusion

7.31 The analysis set out above shows that the large majority of the expenditure on the Non-Domestic NI RHI Scheme is in respect of small and medium sized biomass boilers. For this technology and size bands, the option chosen in respect of the long-term tariff structure will have a significant impact on the cost of the Scheme both in 2019-20 and for the remaining years of payment. At the extreme, reverting to the 2012 Regulations under Option A3 would be expected to cost more than £1billion between 2019-20 and 2036-37. This is more than double the level of available funding and would impose a significant cost on the NI Executive.

7.32 Apart from Option A1, all of the options would be expected to have a Net Present Cost. This is in part because no monetary value has been included for the impact on avoided carbon emissions or employment of the Scheme. In respect of the latter, this is because they are not considered to be significant, whilst the uncertainties in respect of the scale of carbon emissions means that the monetary impact could not be estimated with a reasonable degree of accuracy. However, both aspects are considered in non-monetary terms in Section 8.

7.33 The lowest cost option overall would be to cease payments (Option A1) to all installations. The lowest cost option involving ongoing RHI payments would be the Ricardo Base Case scenario (Option A4(i)) which has a projected NPC just below that for the Compulsory Buy-Out Option B2 (unadjusted), but higher than Option B2 (adjusted). However, if the decision was taken to continue with the ongoing payments on the Scheme the four options based on the findings from the Ricardo Tariff Review are all well within budget, with further savings to be made in switching from the RPI measure of inflation to the CPI measure.

## SECTION 8: NON-MONETARY COSTS & BENEFITS

### Introduction

8.1 In assessing the expected level of value for money for each option it is important to consider not only the monetary costs and benefits, as set out in the previous section, but also the non-monetary costs and benefits. The main non-monetary factors in respect of the NI Non-Domestic RHI Scheme are:

- **Environmental impact-** the extent to which each of the options will contribute to the environmental objectives of the Department;
- **Rate of return-** the extent to which each option provides boiler owners with a reasonable rate of return;
- **Economic impact-** although the NI RHI Scheme is primarily an environmental scheme, each of the options might have a different impact on the local economy;
- **Ease of implementation-** to assess the administrative impact on both the Department and Scheme participants; and
- **Reputation of Department-** the previous excessive payments to NI RHI Scheme participants have undermined the reputation of the Department, as well as the wider NI Civil Service, and it is essential that this is restored under the preferred option.

Set out below is an assessment of each of the options in respect of these criteria.

### Environmental Impact

8.2 At the outset of the NI RHI Scheme, the primary objective was to make a contribution to the achievement of the target that 10% of the heat generated in NI should come from renewable heat sources by 2020. It should be noted that it was never the intention that all of the target would be delivered through the RHI. In particular, the 10% target implied that approximately 1,700GWh of heat would be generated from renewable sources by 2020 whilst the 2012 CEPA report (Table B.2) estimated that only around 870GWh of heat would be generated under the RHI by that date.

- 8.3 This is in the context that the objective of increasing the generation of renewable heat was not an end in itself, but instead a mechanism to reduce the level of carbon emissions as the ultimate goal. Although significantly lower than fossil fuel boilers, renewable heat technologies still cause carbon emissions. Therefore, the installations on the NI RHI Scheme would only contribute to the reduction in carbon emissions if a fossil fuel boiler would have generated the same heat instead.
- 8.4 However, only one third of applications to the Scheme stated that the renewable heat installation was replacing a fossil fuel boiler. Although it may be that the renewable heat installation is being used for a new economic activity, instead of a fossil fuel boiler, there is no indication of the extent to which this is the case. This means that it is not possible to state what proportion of the boilers on the Scheme were contributing to a reduction in carbon emissions.
- 8.5 Furthermore, the setting of the original tariff for small and medium sized biomass boilers at a higher level than the marginal cost of generating the heat resulted in an incentive for Scheme participants to generate more heat than was required. Whilst this increased the amount of renewable heat generated, it would have gone against the ultimate objective of reducing the level of carbon emissions. Therefore, in assessing each of the options, it is not necessarily the case that the option with the highest level of renewable heat is best in respect of its environmental impact.
- 8.6 In this context, although the original business case for the NI RHI Scheme included the estimated value of carbon savings as part of the monetary assessment, the uncertainty in respect of the amount of heat that would be generated from fossil fuel alternative sources in the absence of the Scheme means that it has not been possible to update this analysis as part of this business case.
- 8.7 In estimating the projected cost of payments in Section 7, it is assumed that the main difference in the amount of heat generated by small and medium sized biomass boilers under the options involving ongoing payments being made to

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Scheme participants (Options A2-A8) was in respect of whether an annual usage limit was imposed.

- 8.8 It is recognised that changing the tariff rates may have an impact on the amount of renewable heat generated, over and above the effect of the annual usage limit. This is particularly the case for a reversion to the original tariffs under Option A3, the cessation of payments under Option A1 and the Compulsory Buy-Out Option B.
- 8.9 In terms of Option A3, information is available on the higher level of heat being generated by NI RHI Scheme boilers before the extension of a tiered tariff structure to all installations at the start of 2017-18. This includes the effects of the perverse incentive to generate more heat than required. It is not evident that other changes in tariff levels will have an additional impact when the perverse incentive has been removed and the level of heat being generated is at the level required to meet business needs. In particular, it is unclear why a Scheme participant would reduce the level of heat generated below that required for their wider business interests in response to a change in RHI tariff levels.
- 8.10 This is in the context that more heat may currently still be being generated by participants than would be the case in the absence of the RHI. This implies that whilst changes in the tariff levels may have an impact on the level of renewable heat produced, there will be less of an impact on the ultimate environmental objective in respect of the level of carbon emissions.
- 8.11 On this basis, Options A2 to A8, excluding Option A3, are judged to have broadly the same environmental impact whilst Options A1, Option A4(i) and Option B would have a slightly lower rating for this objective. Option A3 is considered to have the lowest environmental impact due to the inherent incentive to produce unnecessary heat in order to increase RHI payments and hence unnecessarily increase carbon emissions. Option A4(i) has a slightly lower environmental assessment than Option A4(ii) because of the risk that a negative Tier 2 tariff results in participants switching from biomass to fossil fuel.

8.12 In respect of the options (Options C1, C2 & C3) relating to the tariff levels for CHP Plants, the finding from the Ricardo Tariff Review that no subsidy is required for the use of the renewable heat technology, means that the level of renewable heat generated under each option is not expected to vary with the level of tariff.

### **Rate of return**

8.13 As with the GB Non-Domestic RHI Scheme, the payments under the NI Non-Domestic RHI Scheme are based on providing the typical or reference installation with a 12% rate of return on the original capital investment (net of the capital cost of an oil boiler) over a period of twenty years. This is a very generous rate of return given the historically low cost of capital currently faced by companies with a reasonable credit history.

8.14 In confirming State aid approval for the Scheme, the European Commission made reference to an 8-22% range of acceptable rates of return. This was adopted as the range of returns that the large majority of participants on the NI RHI Scheme should be expected to achieve. However, there are a significant minority of boilers with very low load factors or those which were purchased at very high prices. These boilers could achieve a rate of return lower than 8%, all other factors remaining equal. Alternatively, if the boiler was purchased at a price significantly lower than for the typical installation, then its rate of return could be higher than 22%.

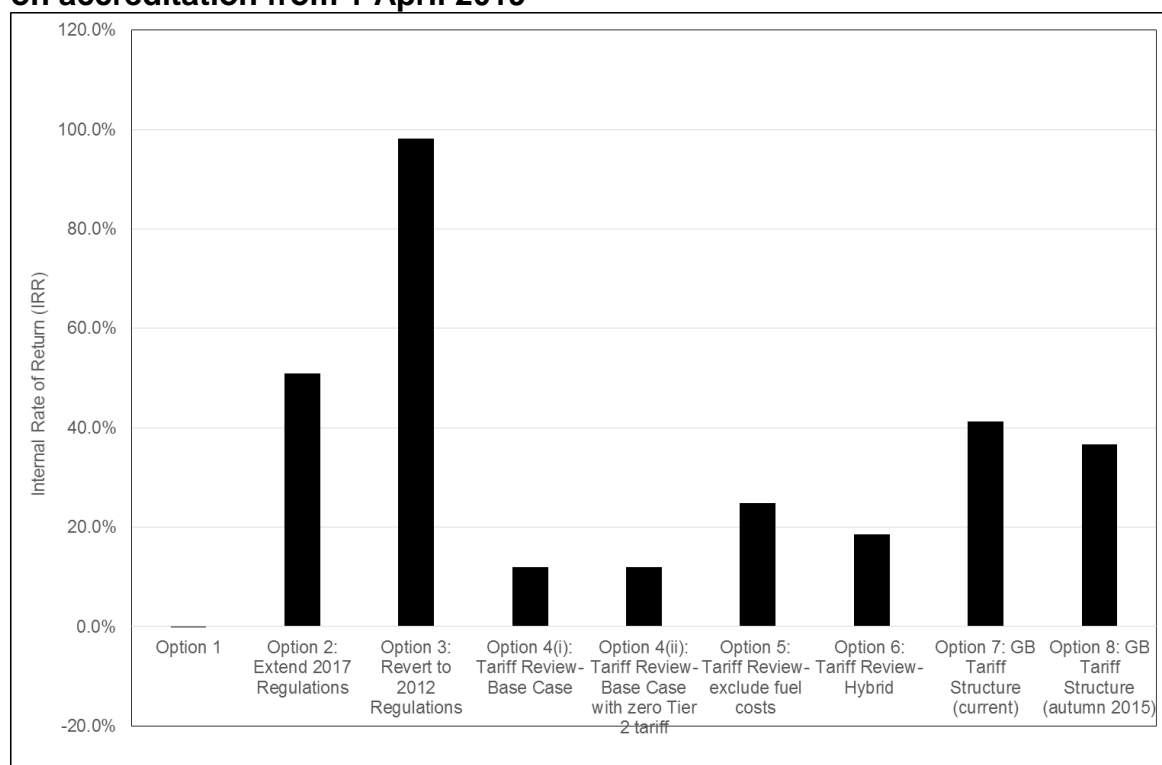
8.15 In these circumstances, it is not possible to set a tariff which means that all installations achieve at least an 8% rate of return without significantly increasing the number of boilers achieving a greater than 22% rate of return. Therefore a balance between the two constraints has to be struck, with the inclusion of a voluntary buy-out element for Options A4 to A8, providing the opportunity for those expected to achieve a low rate of return, to have this increased to 12%.

8.16 This is in the context that the analysis by Ricardo shows that over 80% of installations on the Scheme would achieve a rate of return greater than 12%,

when measured over a twenty year basis, based only on the RHI payments that they will have been received by the end of 2018-19. Therefore, on a strict value for money basis, only a limited number of installations should receive any RHI payments from 2019-20.

8.17 The Internal Rate of Return (IRR) for the typical installation for each option involving ongoing payments to Scheme participants, set out in Chart 8.1 below, has been calculated excluding the impact of payments and costs to date, as if the tariff was to apply for 20 years from 1 April 2019. This means that the IRR's in Chart 8.1, substantially underestimate the actual level of return for Scheme participants, as shown later in Chart 8.3.

**Chart 8.1 Estimated Internal Rate of Return for Typical Installation- based on accreditation from 1 April 2019**

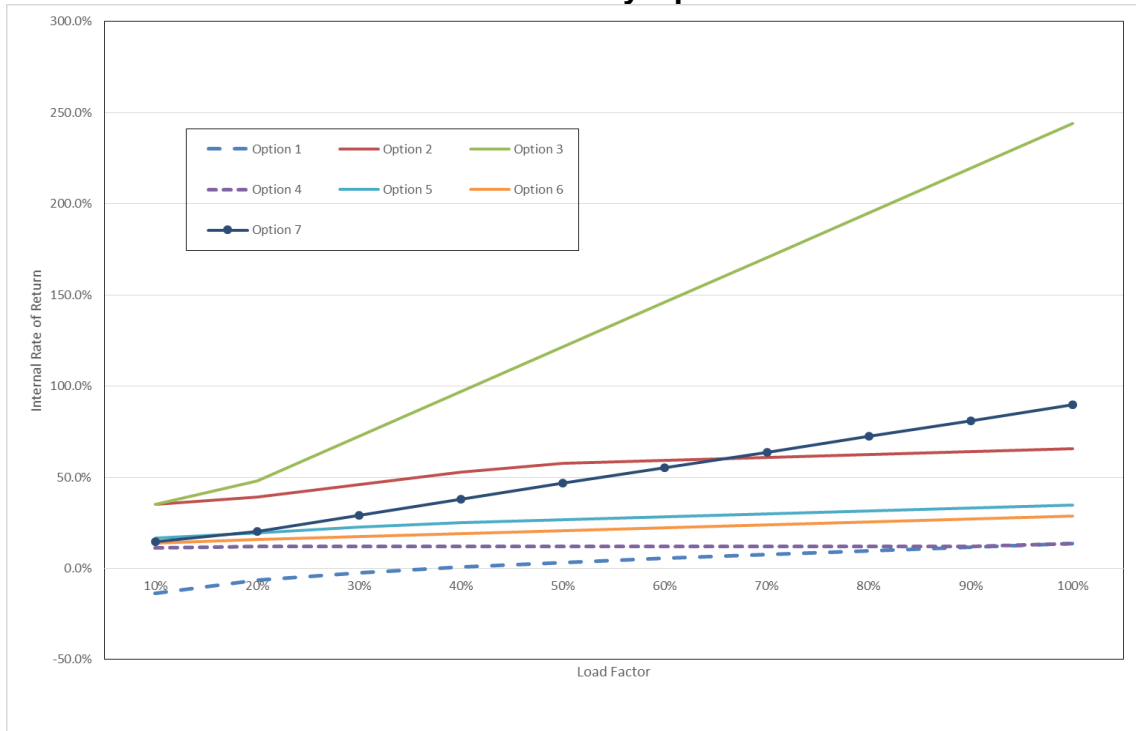


Source: RHI Taskforce Calculations

8.18 However the calculation of IRR's on this basis does allow a comparison to be made between the various options against the 12% target. The typical installation in this respect is taken as a 99kW boiler with an annual heat output of 320MWh (350MWh for Option A3), i.e. a load factor of 37%, with costs and savings in line with the values used by Ricardo in the Tariff Review.

- 8.19 As would be expected, Chart 8.1 shows that Option A4 is expected to deliver a 12% rate of return for the typical installation on the NI RHI Scheme. The cessation of payments under Option A1 would not provide any payment to the typical installation on the Scheme. However, the ongoing savings on fuel costs over 20 years would be expected to be roughly equal to the additional capital cost of a biomass boiler, resulting in a zero rate of return.
- 8.20 Based on the latest cost and performance data, the options involving the current/previous tariff structure on the NI RHI Scheme (Options A2 & A3) or the use of GB tariffs (Option A7 & A8) would all result in the typical installation on the Scheme achieving a rate of return far in excess of the upper limit of the acceptable range referred to by the European Commission when approving the Scheme.
- 8.21 Whilst the Base Case scenario from the Tariff Review excluding fuel costs (Option A5) performs slightly better, the rate of return for the typical installation of 25% is still high. This is in the context that whilst the European Commission referred to a range of 8-22% as being reasonable when providing the original State aid approval in 2012, in more recent discussions Commission officials have indicated that they would not accept a payment structure which delivered a rate of return higher than 12%. This means that the hybrid tariff Option A6 is also not acceptable because it delivers a 19% rate of return. This leaves only Option A4 as potentially being acceptable to the Commission.
- 8.22 Highlighting again the impact of a tiered tariff structure, Chart 8.2 below compares the IRR under each option by load factor. In particular, the absence of tiering under the 2012 Regulations means that the IRR increases with load factor under Option A3. Although the current tariff structure under the GB Scheme (Option A7) is tiered, the high level of the Tier 2 tariff means that participants would generate increased profit for every additional unit of heat produced.

**Chart 8.2: Estimated Internal Rate of Return by Option and Load Factor**

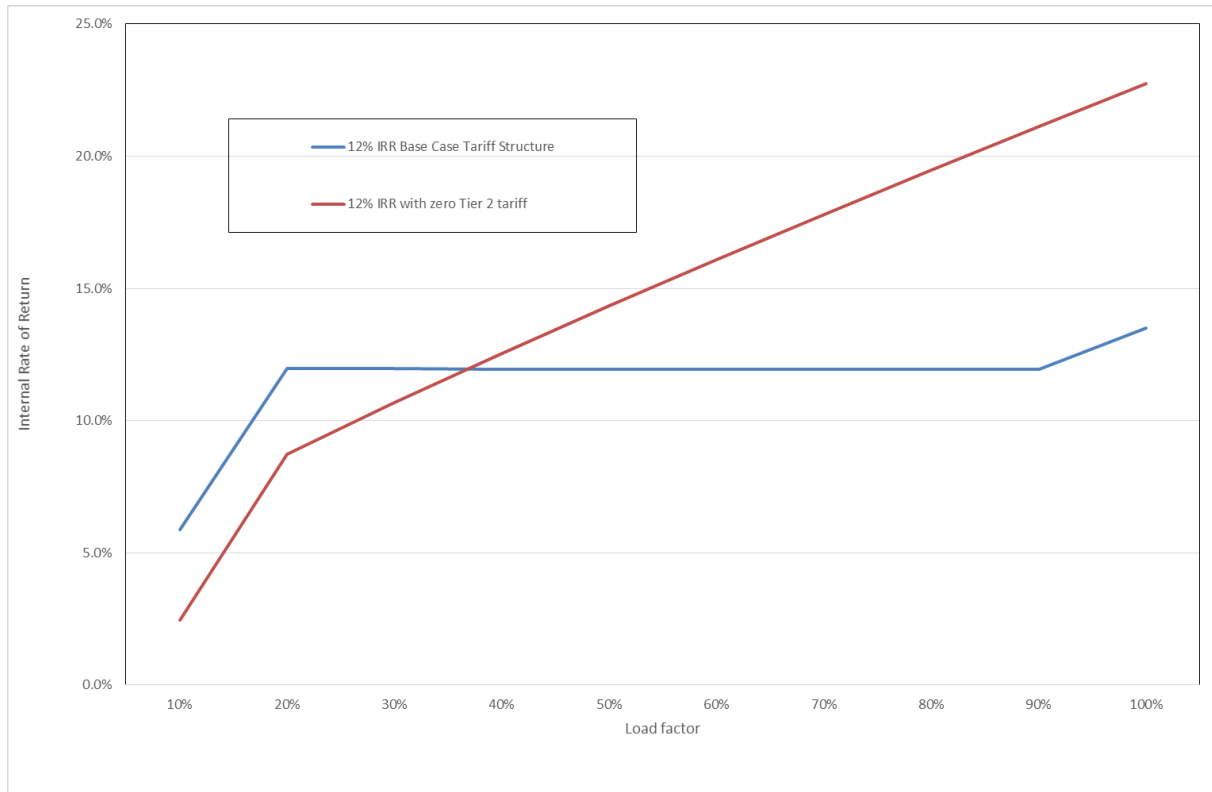


Source: RHI Taskforce Calculations

8.23 Focusing on the two variants of Option A4, Chart 8.3 below shows the impact of reducing the Tier 1 tariff in Option A4(ii) in order to compensate for increasing the Tier 2 tariff to zero. In particular, whilst Option A4(i) would be expected to provide a 12% rate of return for participants with a load factor of 15%, under Option A4(ii) only participants with the typical load factor would achieve the target rate of return. Participants with lower levels of heat generation would be expected to achieve lower rate of return whilst participants with higher load factors would be expected to achieve higher rates of return.



**Chart 8.3: Estimated Internal Rate of Return for Options A4(i) and A4(ii) by Load Factor**

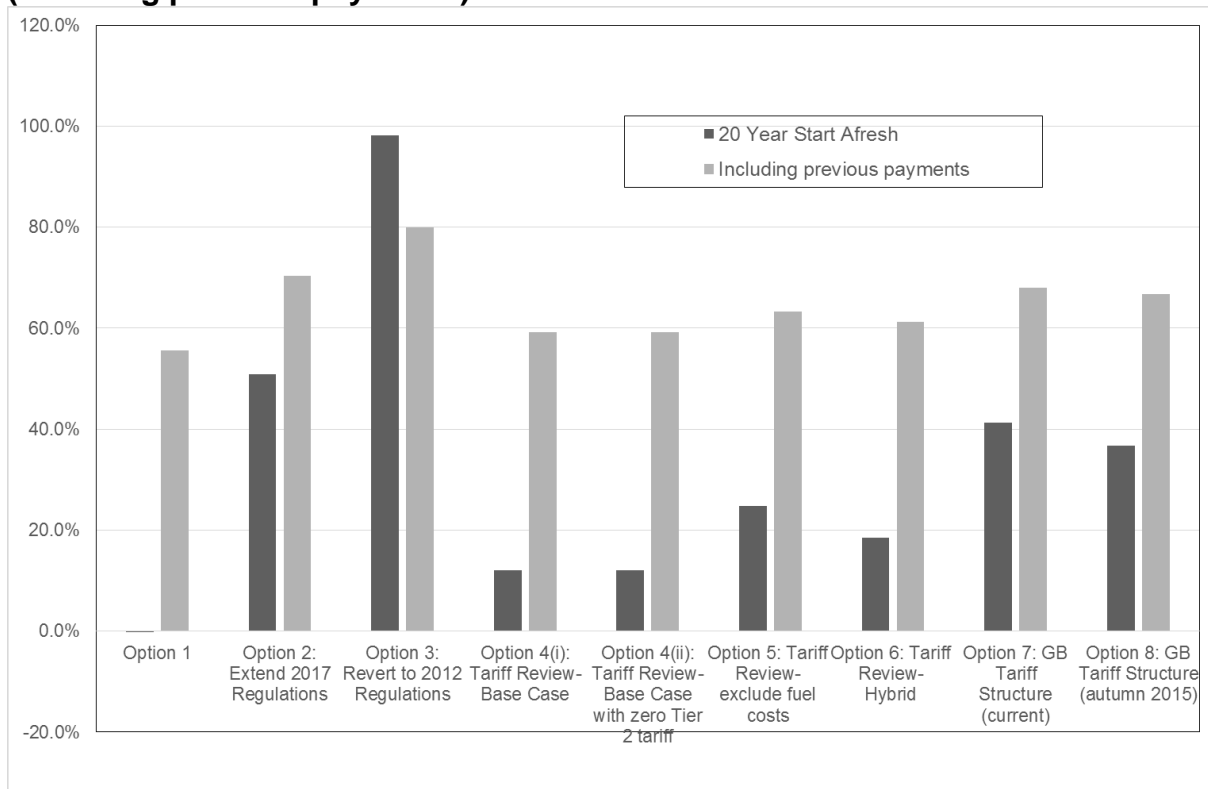


Source: RHI Taskforce calculations

8.24 The analysis set out above is based on the artificial assumption that the boiler is only installed and accredited from 1 April 2019. For comparison, Chart 8.4 includes the IRRs for each option based on the assumption that the boiler was installed and accredited on 1 April 2016, as a closer representation of the actual rates of return for the typical participant under each option.

8.25 The impact of the excess levels of compensation in 2016-17, and to a lesser extent in 2017-18 and 2018-19, can be seen in the IRR of over 50% being achieved, even if no further payments were received from 2019-20 under the option to cease payments (Option A1). The only option where the IRR falls is Option A3 because of the impact of the lower level of payments under the 2017 Regulations in 2017-18 and 2018-19. Taking previous payments into account, the only way to ensure that a typical installation would achieve a 12% rate of return over a 20 year period would be to set the Tier 1 tariff at -3p/kWh and the Tier 2 tariff at 0p/kWh for the remaining 17 years.

**Chart 8.4 Estimated Internal Rate of Return for Typical Installation- based on accreditation from 1 April 2019 (20 Year Start Afresh) and 1 April 2016 (including previous payments)**



Source: RHI Taskforce Calculations

8.26 The analysis set out above is based on the expected rate of return for the typical installation on the Scheme. Ricardo also examined the impact of each option on all installations in terms of whether they would be expected to achieve rates of return of lower than 8%, 8-22% and higher than 22% in line with the 8-22% range referred to by the European Commission when providing the initial approval of the NI RHI Scheme.

8.27 Table 8.1 below is based on the assumption that each installation is only accredited from 1 April 2019 for 20 years and shows that Option A4 performs best of the ongoing payment options in terms of the number of installations expected to achieve an 8-22% rate of return. Whilst 18% of installations would be expected to achieve a rate of return lower than 8%, around 240 installations could have their rates of return increased as part of the voluntary buy-out.

**Table 8.1: Number of Installations within Rate of Return bands by option-based on accreditation from 1 April 2019**

Option	Number of installations		
	IRR <8%	8-22% IRR	IRR >22%
Option 1: Do nothing- Cease Payments	1,213	665	153
Option 2: Extend 2017 Regulations	46	144	1,841
Option 3: Revert to 2012 Regulations	41	115	1875
Option 4(i): Tariff Review- Base Case	364	1,182	485
Option 5: Tariff Review- Base Case excluding fuel costs	165	490	1,376
Option 6: Tariff Review- Hybrid	227	780	1,024
Option 7: GB Tariff Structure (current)	149	295	1,587
Option 8: GB Tariff Structure (autumn 2015)	93	296	1,642

Source: Ricardo Tariff Review Report Tables 2.27 and 2.31

8.28 The Ricardo analysis did not consider Option A4(ii) where the Tier 1 tariff is set at the level required to provide a 12% rate of return if the Tier 2 tariff is set at zero. In line with Chart 8.4 above, this would be expected to reduce the number of boilers with a rate of return within the 8-22% range. However, the number of boilers involved is expected to be less than 100. In response, the budget for the voluntary buy-out for Option A4(ii) is increased from £2 million to £4 million per annum.

8.29 Table 8.1 does not include the impact of previous and ongoing overcompensation. If this was taken into account Table 8.2 below shows that even if no further payments were made from 1 April 2019 then 75% of small and medium sized boilers on the NI RHI Scheme would be expected to achieve a rate of more than 22% (83% more than 12%). The scale of previous and current levels of overcompensation on the NI RHI Scheme means that there is much less variation between the options with only a small proportion of installations expected to achieve a rate of return within the 8-22% range.

**Table 8.2: Number of Installations within Rate of Return bands by option-based on actual accreditation date.**

Option	Number of installations		
	IRR <8%	8-22% IRR	IRR >22%
Option 1: Do nothing- Cease Payments	297	215	1,519
Option 2: Extend 2017 Regulations	51	142	1,838
Option 3: Revert to 2012 Regulations	47	126	1,858
Option 4: Tariff Review- Base Case	148	250	1,633
Option 5: Tariff Review- Base Case excluding fuel costs	98	222	1,711
Option 6: Tariff Review- Hybrid	114	241	1,676
Option 7: GB Tariff Structure (current)	101	196	1,734
Option 8: GB Tariff Structure (autumn 2015)	78	198	1,755

Source: Ricardo Tariff Review Report Tables 2.26, 2.28 and 2.31

8.30 It is not possible to directly compare the expected rates of return between Options A and B as the latter will not include the ongoing operating savings/costs from the use of renewable heat. Chart 8.4 below shows the estimated IRR for a 99kW boiler with a £25,000 additional capital cost under the Compulsory Buy-Out options in respect of three heat output scenarios, 130MWh per annum, 330MWh per annum and 400MWh per annum.

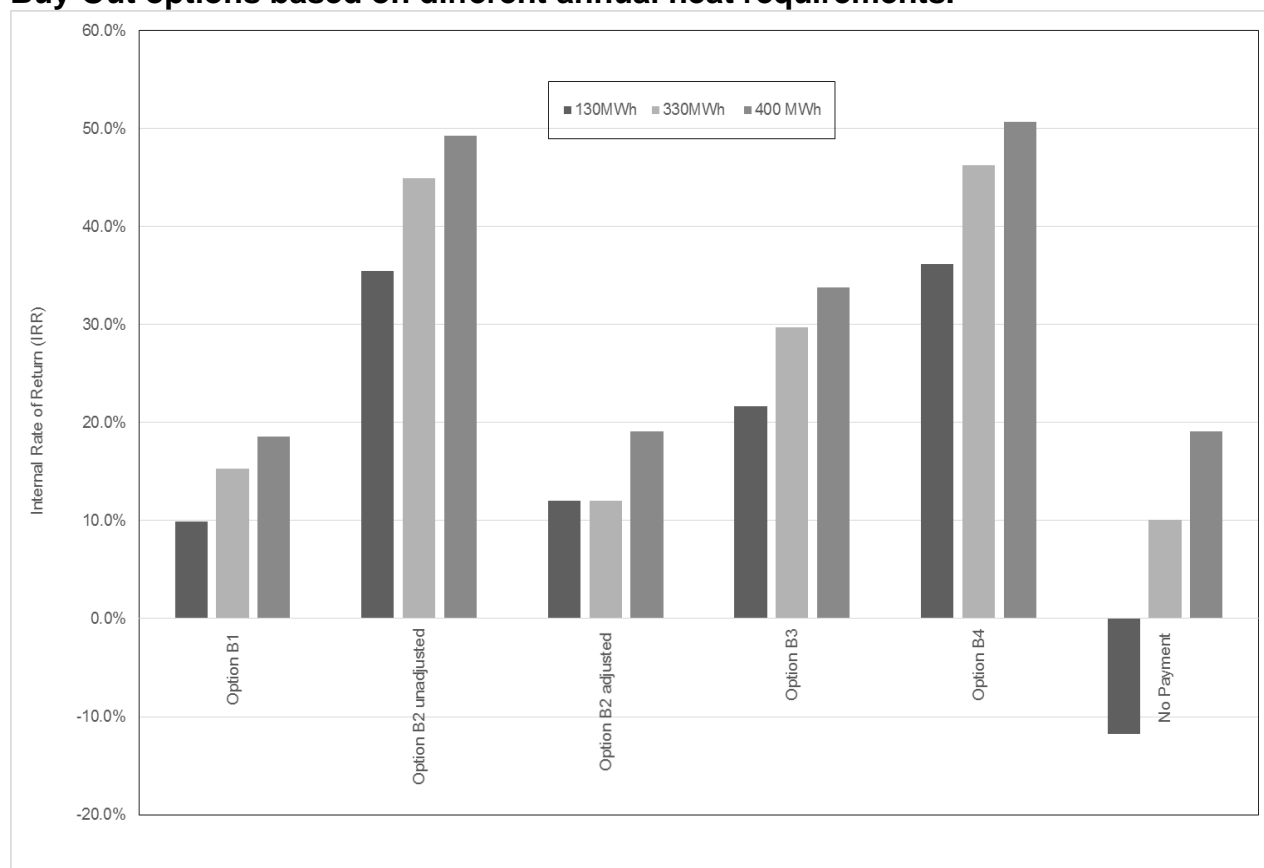
8.31 Whilst Option B2 (unadjusted) and Option B4 have lower projected IRR's than for the ongoing payment options set out in Chart 8.3 above, including the impact of payments received before the end of 2018-19, they are still much higher than the 12% target. Although Option B3 is slightly better because the rate of return is adjusted for early payment, it still provides too high a rate of return for installations with more than 130MWh per annum levels of heat generation. On the other hand, Option B1 provides too low a rate of return for installations with a low level of annual heat generation.

8.32 Option B2 (adjusted) is the best option in terms of delivering the target rate of return as it is designed to deliver a 12% IRR. However, this will not apply if more RHI payments will have been received for a boiler by the end of 2018-19 than the gross amount of payment required to deliver a 12% rate of return. This will be the case when participants have previously generated high levels of heat, with associated RHI payments, so that they would be expected to generate a greater than 12% rate of return even if they receive no further one-

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off or ongoing payments. In the assumption that there is no attempt to recoup previous payments, Chart 8.5 shows that the IRR under Option B2 (adjusted) defaults to the no payment IRR under the 400MWh scenario, which would increase further above 12% as the annual amount of heat produced increases and/or the net capital cost falls.

**Chart 8.5: Estimated Rate of Return for Typical Installation under Compulsory Buy-Out options based on different annual heat requirements.**



Source: RHI Taskforce calculations

8.33 In Table 7.7 it is estimated that approximately 1,140 installations will receive a one-off payment under Option B2 (adjusted). Taking account of those installations that will not receive a one-off payment because they have been rejected, removed or withdrawn from the Scheme implies that approximately 850 installations will not receive a one-off payment because their previous levels of RHI payments are too high. These installations will achieve an IRR in excess of 12% even if they receive no one-off payment. This will have the effect of increasing the overall rate of return on the Scheme to 19%.

- 8.34 In order to reduce the rate of return to 12% under Option B2 (adjusted) it would be necessary to recover £10 million from Scheme participants. This is on the basis of the capital costs of participants and capital element of the RHI payment.
- 8.35 It should be noted that the IRR calculations presented in respect of the Compulsory Buy-Out options do not include the costs/savings in respect of the operating costs of a biomass boiler whilst Option B2 (adjusted) only includes the capital element of the tariff. The exclusion of ongoing operating cost savings is the reason why 1,140 installations are expected to receive a one-off payment under Option B2 (adjusted) when the Ricardo analysis implies that only 350 installations are not expected to achieve a 12% rate of return, even if no further RHI payments were received from 2019-20 onwards.
- 8.36 Whilst Option B2 (adjusted) provides the typical installation with a 12% rate of return, excluding operating costs and the associated elements of the tariff, if it is assumed that the average operating cost saving is 0.4p/kWh from the use of biomass (in line with the Ricardo analysis), this would increase the rate of return to 27%. However, there is significant uncertainty in respect of the heat generation levels of boilers following the one-off payment, and hence whether the operating costs savings will materialize increasing the rate of return.
- 8.37 The alternative to Option B (adjusted) would be to use the Ricardo cash flow analysis, including both capital and operating costs as well as the associated RHI payments, to determine the one-off payment required to the 350 installations in 2019-20 to allow them to achieve a 12% rate of return, even if no further ongoing RHI payments are made. This would reduce the level of one-off payment from £21 million under Option B2 (adjusted) to £8 million. However, this would be offset to an extent by the additional costs of administering the one-off payment on this basis as participants would be expected to robustly challenge the application of the Ricardo analysis for the typical installation to their particular circumstances. In this context Option B2 (adjusted) remains the preferred Compulsory Buy-Out option.

8.38 In respect of CHP, the larger of the two proposed plants would be expected to achieve an IRR of 27% from the use of renewable heat in the absence of a public subsidy (Option C1), which would rise to 64% under the current NI tariff (Option C2) and 44% under the large biomass tariff (Option C3).

### **Economic impact**

8.39 The NI RHI is primarily an environmental scheme. However, in the process of installing and operating the renewable heat installations there was expected to be some economic impacts. In particular, the 2012 business case for the NI RHI Scheme highlighted that the primary employment benefits would be from the construction and installation of boilers, although this would be offset to the extent that this displaced activity in respect of oil boilers. Whilst these aspects were relevant when the Scheme was originally being considered they are not significant in respect of this business case, as most of the employment benefits will now have already been accrued.

8.40 This can be seen in the response to the public consultation from a boiler installer, Hegan Biomass Ltd, which indicated that the changes made to the Scheme had resulted in a reduction in the number of people it employed. However, any employment gains for boiler installers would be expected to be temporary and last only for as long as the Scheme was open to new participants. Therefore, the employment impact referred to by the company would have been primarily due to the suspension of the Scheme in February 2016 rather than changes in the payment structure that are being considered as part of this business case.

8.41 In terms of other economic impacts, although the tariff included compensation for the additional labour costs associated with renewable heat, it was not expected that the operation of a renewable heat boiler would require more staff. In addition, whilst the excess payments previously provided to participants may have been used as a subsidy for their wider business interests, this unintended benefit was not an objective of the Scheme. This is in the context that the funding used for the excess RHI payments could have been used for another

purpose by the NI Executive that would also have delivered positive economic benefits.

8.42 As part of its submission to the public consultation, RHANI provided the results of a survey it had commissioned from the economic consultancy Optimal Economics. The results of this survey appeared to be inconsistent as they implied that whilst the introduction of the Scheme resulted in the creation of 1,022 jobs (FTE), the employment loss from reducing the level of overcompensation through the 2017 Regulations was projected to be almost double. However, it is notable that whilst the Optimal Economics Report was finalised in May 2017, RHANI was not able to provide any supporting evidence in respect of the job losses that have actually occurred subsequently.

8.43 A number of participants on the Scheme stated that they were in financial distress due to the extension of a tiered tariff structure to all participants under the 2017 Regulations. In particular, reference was made to their original investment as well as ongoing finance and wood pellet costs. However, the scale of the original investment referred to by the participants appears to include wider investment in their business, such as poultry sheds, which the RHI was not intended to fund. In addition, the finance costs referred to imply that loans were taken out over a relatively short period of time and should therefore come to an end in the coming years whilst RHI payments would continue on. There is however a liquidity risk in respect of the Compulsory Buy-Out that some participants may continue to face loan repayments in 2019-20 and 2020-21 but will receive no RHI payments due to previous overcompensation.

8.44 Furthermore, whilst the cost of wood pellets was highlighted, there was no recognition of the cost of oil or LPG that had been avoided- it was never the intention that the NI RHI Scheme would provide participants with free fuel. On this basis, insufficient evidence was provided by participants to suggest that they were not continuing to achieve more than a reasonable rate of return from their investment in a biomass boiler.



- 8.45 Therefore, it is not possible to state that the previous excess payments to Scheme participants will have delivered a positive net impact for the economy as a whole, although it may have benefited the individual businesses. The corollary is that whilst amending the level of RHI tariffs to better reflect the additional costs of renewable heat may reduce the associated excess profits, and thus the benefit to individual Scheme participants, it is not expected to have a material impact on the wider NI economy. On this basis, there is assessed to be no significant difference between the options in respect of their economic impact.
- 8.46 Some of the respondents to the public consultation suggested that a reduction in tariffs would put participants at a competitive disadvantage compared to their counterparts in the rest of the UK and Europe. However, the previous and ongoing overcompensation to participants on the NI RHI Scheme means they are currently at an unfair competitive advantage rather than disadvantage. The objective of the long term payment structure is to ensure that the compensation provided for the additional costs of renewable heat ensures that participants are neither at an advantage or disadvantage compared with those not on the Scheme.
- 8.47 It was also suggested, as part of the public consultation, that owners of 99kW boilers would be at a competitive disadvantage compared with owners of 199kW boilers because more of the heat generated by the latter is subject to the higher Tier 1 tariff. In the context that participants should size their boilers to meet heat load requirements, rather than maximising the amount of RHI payments, the options based on the Ricardo analysis (A4-A6) take account of the lower capital cost per kW for larger boilers by applying reduced tariffs for boilers in the 100-199kW size band.
- 8.48 Respondents also suggested that there were additional benefits from RHI in respect of animal welfare. This reflects previous evidence of improved feed cost ratios in the poultry sector which would suggest that some participants are making significant financial savings from their use of biomass boilers<sup>82</sup>. These

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<sup>82</sup> <https://www.daera-ni.gov.uk/articles/heat-biomass>

financial benefits could be incorporated in the tariff calculations with a reduced level of payments. However, it is recognised that the benefits were primarily due to the move from a direct to an indirect hot water heating system which occurred at the same time as the installation of a biomass boiler for many participants. In the context that it would be inappropriate to include the additional costs of an indirect hot water heating system in the RHI tariff calculation, it would also be incorrect to incorporate the resulting financial benefits.

8.49 In respect of the two CHP plants some of the respondents to the public consultation suggested that they would provide a much needed expansion of wood pelleting capacity in NI. However, the RHI Scheme was intended to encourage a switch from fossil fuel to renewables rather than supporting economic activity that would not be viable in the absence of government support. This is in the context that no evidence was put forward that there was a shortage in wood pelleting capacity in NI and/or that this was having a negative impact on the local price of the fuel.

### **Ease of implementation**

8.50 Each of the options have been subject to public consultation followed by consideration and amendment as necessary. Legislative approval will be required prior to implementing any option. Ofgem have been able to implement previous changes to the payment structure including amended tariffs and the introduction of a tier with relative ease. Therefore, each of the options involved in the continued operation of the NI RHI Scheme are assessed as being broadly similar in terms of ease of implementation.

8.51 The one element that is expected to be more difficult to implement is the buyout, both voluntary and compulsory, in particular Option B2 (adjusted) which is more complex. In the first instance, further work will be required in respect of the specific terms to be set for the level of payment, with a particular need to avoid the potential for exploitation by Scheme participants. There will also be costs involved in designing the application process, assessing applications, queries and appeals, as well as the approach to the actual payment.

8.52 It would also be expected that Option A4(i) may be slightly more difficult to implement as the negative Tier 2 tariff implies that payment would need to change from a quarterly to an annual basis or that the Tier 1 threshold should change from an annual to a quarterly basis.

### **Reputation of Department**

8.53 The reputation of the Department for the Economy, the NI Executive and the NI Civil Service has been severely diminished by the previous mismanagement and exploitation of the NI RHI Scheme. This includes inadequate responses to allegations of fraud on the part of Scheme participants and insufficient weight given to value for money and affordability considerations. All are linked to the initial tariff structure for small and medium sized biomass boilers, with the single tier tariff resulting in the rate of payments being greater than the marginal cost of generating heat. This in turn created the perverse incentive to generate as much heat as possible regardless of the business requirements and/or the eligibility criteria for the Scheme.

8.54 In this context, the more the expected rate of return under each option deviates from a reasonable rate of return, for example one which is acceptable to the European Commission, the greater the potential for further reputational damage. This implies that Options B2 (adjusted), A4 and A6 are the best in this respect whilst Options A2 and A3 would be the worst.

### **Conclusion**

8.55 The suspension of the NI RHI Scheme coupled with the nature of the relationship between the amount of renewable heat generated and the level of carbon emissions avoided, means that there is expected to be little difference between the various options in respect of the environmental and economic impacts.

8.56 As summarised in Table 8.2 below, where a “high” assessment indicates that an option is expected to perform well against the criterion whilst “low” implies that it will perform poorly, the main areas of difference in the non-monetary

**OFFICIAL- SENSITIVE**

assessment of the options are in respect of the rate of return to Scheme participants and the reputation of the Department, where the Compulsory Buy Out Option (Option B2 (adjusted)) would be expected to represent the best approach, followed by implementation of the recommendations from the Tariff Review (Option A4, A5 & A6). The worst option would be to revert to previous single tier tariff (Option A3).

**Table 8.2: Summary of Assessment of Non-Monetary Costs and Benefits**

Option	Environmental	Rate of Return	Economic Impact	Ease of Implementation	Reputation of Department
<i>Biomass Options</i>					
A1	Low/Medium	Low/Medium	Low	High	Medium
A2	Medium	Low	Low	High	Low
A3	Low	Low	Low	High	Low
A4(i)	Low/Medium	Medium	Low	Medium/High	Medium
A4(ii)	Medium	Medium	Low	High	Medium
A5	Medium	Low/Medium	Low	High	Medium
A6	Medium	Low/Medium	Low	High	Medium
A7	Medium	Low	Low	High	Low/Medium
A8	Medium	Low	Low	High	Low/Medium
B1	Low/Medium	Medium	Low	Medium	Medium
B2 (unadj)	Low/Medium	Low	Low	Medium	Low/Medium
B2 (adj)	Low/Medium	High	Low	Low/Medium	Medium
B3	Low/Medium	Low/Medium	Low	Medium	Medium
B4	Low/Medium	Low	Low	Low/Medium	Low/Medium
<i>Combined Heat and Power Plant Options</i>					
C1	Medium	Medium	Low	High	Medium
C2	Medium	Low	Low	High	Low
C3	Medium	Low	Low	High	Low

Source: RHI Taskforce Assessment

8.57 There would be little difference in the non-monetary assessment between the options in respect of the CHP plants and the inflationary uplifts.

## SECTION 9: RISKS & SENSITIVITY ANALYSIS

### Introduction

9.1 There are four main risks in respect of the delivery of the monetary and non-monetary costs and benefits set out in the previous two sections:

- (a) **Budgetary**- that the actual level of payments to participants is significantly different from the projections in Section 7 due to the amount of heat generated on the Scheme being higher or lower than the projections;
- (b) **Financial Return**- that the actual rate of return to Scheme participants is different from the estimates in Section 8 due to variations in input costs;
- (c) **Implementation**- that it is not possible, or there are delays in putting the long-term payment structure in place due to difficulties in:
  - (i) securing legislative approval;
  - (ii) securing State aid approval; and
  - (iii) putting the necessary administrative arrangements in place.
- (d) **Legal challenge**- that there is a successful legal challenge to the legislation putting the chosen long term payment structure into effect.

9.2 Most of the risks are the same as those for the introduction and extension of the 2017 Regulations. In this context, each of them should be mitigated by the experience of the RHI Taskforce in operating the NI RHI Scheme since the start of 2017.

### Budgetary

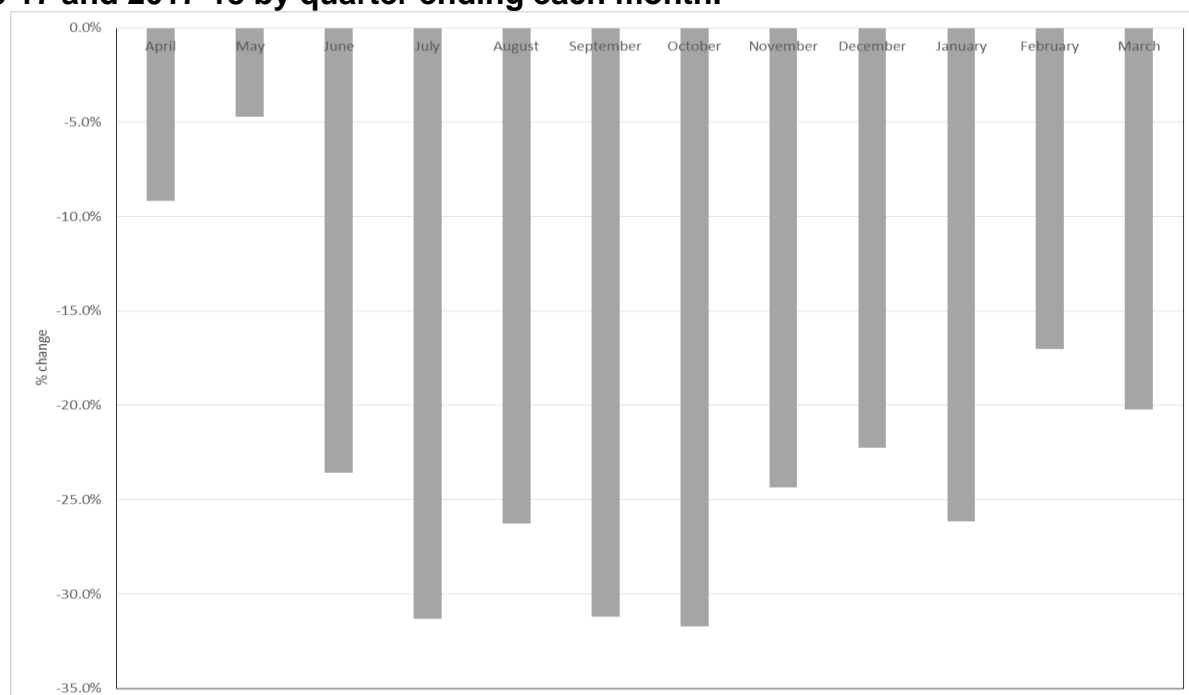
9.3 The total amount of payments under the NI RHI Scheme depends on the number of installations that are eligible for payment and the average level of heat generated per installation. In terms of the number of installations on the Scheme, the scope for ownership of boilers to be transferred implies that even if a business ceases operation or no longer requires a boiler, then RHI payments will still be made on the boiler if it is sold/transferred to another business, albeit with potentially different usage levels. In addition, the ongoing inspections process is focused on improving compliance rather than removing installations from the Scheme. It is on this basis that there is not expected to be a significant

change in the number of boilers receiving RHI payments, particularly in the short to medium term.

9.4 In respect of the average level of heat generated per boiler, Chart 3.6 above showed the impact of the extension of the tiered tariff structure to all small and medium sized biomass installation at the start of 2017-18, with a reduction in the average meter reading between April and December 2017 compared with the same period in 2016.

9.5 Chart 9.1 below considers the change in the amount of heat generated on the Scheme between 2016-17 and 2017-18 in greater detail by comparing the amount of heat generated in the quarter ending each month only for those installations which submitted meter readings in both 2016-17 and 2017-18. This is to enable a better like for like comparison.

**Chart 9.1: Percentage Change in Total Amount of Heat Generated between 2016-17 and 2017-18 by quarter ending each month.**



Source: Ofgem, RHI Taskforce calculations

9.6 In the early months of 2017-18 there was a relatively small reduction in the amount of heat generated, as part of the amount of heat in the meter readings related to 2016-17, before there was a change in tariffs. However, there was a

greater reduction in the 2017-18 meter readings during the summer compared with the same period in 2016-17.

- 9.7 This was possibly due to two main factors. In the first instance it could have been that excess heat was previously being generated by not reducing the amount of heat in the summer period to reflect rising temperatures. The second explanation is that, in the context that most boilers were accredited on the Scheme in October and November, a number of boilers were being turned off as they reached the annual usage limit. In the final months of 2017-18 Chart 9.1 shows that the reduction in the amount of heat generated fell, so that the average reduction in heat generated during the course of 2017-18 was 21.3%, on a like for like basis.
- 9.8 On this basis, the base case remains that the only impact on heat generation from the implementation of the long-term tariff structure in 2019-20 will be through the annual usage limit. The one exception is the reversion to the 2012 Regulations under Option A3, where it is assumed that the amount of heat generated will return to the higher levels experienced before the tiered tariff structure was extended to all small and medium sized biomass boilers. However, in order to test the robustness of the appraisal conclusions through the application of different assumptions, a sensitivity analysis has been undertaken. Table 9.1 below sets out the projected cost of the Scheme under 3 different scenarios:

**Scenario 1-** there is a 20% increase in the amount of heat generated in 2019-20 with no further attrition from the Scheme and 3% RPI inflation;

**Scenario 2-** there is 1% per annum attrition from the Scheme and 2% CPI inflation; and

**Scenario 3-** there is a 20% reduction in the amount of heat generated in 2019-20 followed by 1% per annum attrition up until 2030, followed by 5% per annum attrition to the end of the Scheme. Inflation is assumed to be 2% CPI inflation.

**Table 9.1: Sensitivity Analysis of Projected Level of Expenditure (to end of Scheme) by Option**

£ million		Scenario			
		Base Case	1	2	3
A1	Do nothing- cease payments to all installations	0	0	0	0
A2	Extend 2017 Regulations	477	497	400	350
A3	Revert to 2012 Regulations	1,020	1,224	856	650
A4(i)	Tariff Review- Base Case	69	60	59	62
A4(ii)	Tariff Review- Base Case with zero Tier 2 tariff	75	76	65	62
A5	Tariff Review- Base Case excluding fuel costs	171	175	145	132
A6	Tariff Review- Hybrid	127	129	108	100
A7	Adopt GB Tariff Structure- Current	359	420	302	236
A8	Adopt GB Tariff Structure- Oct 15	313	348	264	220

Source: RHI Taskforce Calculations

9.9 It can be seen that the relative ranking of the options does not change under each of the scenarios, with Option A3 having the highest level of projected expenditure followed by Option A2. In addition, under each of the scenarios it remains the case that only Option A3 is unaffordable whilst Option A2 is unaffordable under Scenario 1 (assuming no payments to CHP plants).

9.10 In terms of mitigation, it will be important for the Department to monitor meter readings on an ongoing basis to identify any significant changes from the base case projections. There are also risks in the actual rate of inflation being different from the OBR projections which will need to be monitored in terms of the latest HM Treasury forecasts and trends in the actual rates of inflation.

9.11 The actual levels of payment under the Compulsory Buy-Out options are all based on the amount of capital expenditure incurred by participants and the levels of payments received to date. As this information is already held by the Department, this implies that there is a lower risk in terms of future payment levels than under the ongoing payment options.



9.12 However, whilst the data that the Department has on capital costs is from the application forms to the Scheme, there will be a need to verify this information using actual invoices. Table 2.1 of the Ricardo report shows that the median cost of a 99kW biomass boiler on the Scheme is £35,873 as reported in application forms. As part of the inspections process Ricardo reviewed the invoices of installations and found that actual capital costs were 5% lower (£34,028) as reported in Table 2.2 of the Ricardo report.

9.13 In this context, Table 9.2 sets out the estimated total level of the one-off payments, under each of the Compulsory Buy-Out options, under the alternative scenarios that verified capital costs are 10% lower or higher than set out in application forms. This has a significant impact on the projected level of one-off payment, with a range of £14-29 million under Option B2 (adjusted).

**Table 9.2: Projected Cost of Compulsory Buy-Out Options<sup>1</sup>**

Total Payment (£m)	Base Case	10% lower capital costs	10% higher capital costs
Option B1: (5% RoR over 10 years undiscounted)	7	5	9
Option B2 (unadjusted): (12% RoR over 20 years undiscounted)	42	30	56
Option B2 (adjusted): (12% RoR over 20 years discounted)	21	14	29
Option B3: (8.5% RoR over 15 years discounted)	16	11	22
Option B4: High Cost (12% RoR over 20 years + hassle costs)	72	56	90

Source: RHI Taskforce Calculations

<sup>1</sup> Does not include costs for other technologies as many of the application forms for large biomass boilers did not include details of their capital costs.

9.14 Option B2 (adjusted) and Option B4 have additional risks compared with the other options. In respect of the latter, it is the only option which relies on assumptions regarding future heat generation levels in calculating the ongoing hassle costs, which are uncertain. For Option B2 (adjusted) the estimated costs set out in Table 7.7 and 9.2 are based on the simplifying assumption that each

of the boilers was installed in 2015-16 with payments received in 2016-17, 2017-18 and 2018-19. Although this will be the case for the majority of boilers there are some that will have been installed earlier. For these boilers, the cost of Option B2 (adjusted) would be expected to be lower as there will be additional payments in earlier years to be deducted.

9.15 In respect of CHP, as part of the Tariff Review Ricardo engaged with the technical expert advising the two projects which had applied for preliminary accreditation to the Scheme so that there is a high degree of confidence in the projected amount of heat that would be generated. In addition the high value for the planned load factor implies that there would be little scope to significantly increase the amount of heat generated. If instead the actual amount of heat generated was 25% lower, then the total amount of CHP payments would fall from £127 million to £95 million under Option C2.

9.16 The risks set out above all relate to the projected level of expenditure on the Scheme. However, there are also risks in respect of the projected budget from 2020-21 onwards. In particular, whilst HM Treasury have advised that a reasonable forecasting assumption is that the 2019-20 budget of £28.9 million (as confirmed in the 2015 Spending Review) is rolled forward to future years, with no uplift for inflation, it has also been highlighted that the actual budget allocations will only be confirmed as part of the 2019 Spending Review. This will be calculated as a population based share of the budget allocation for the GB RHI Scheme.

9.17 Whilst the expectation is that NI RHI Scheme budget will be in line with the forecasting assumption there is a risk that there is a material reduction in the budget and/or that expenditure under the RHI scheme is reclassified from AME to DEL. The worst case scenario is that no further budget is available from 2020-21 onwards. On this basis, only Option B1, B2 (adjusted) and B3 would be affordable as they would only involve expenditure in 2019-20, on the assumption that funding for the Domestic Scheme and other technologies could be managed within the DfE budget.

9.18 As the outcome of the 2019 Spending Review is only due to be confirmed in the autumn of 2019, there would be very little time available to respond to a substantial reduction in the NI RHI Scheme budget from 2020-21. In this context, it would be prudent for the legislation in respect of the future payment structure to include provision for an emergency application of the Compulsory Buy-Out Option B2 (adjusted) if there is a significant reduction in the available budget for the NI RHI Scheme.

## **Financial Return**

9.19 As set out in the previous section, only Option A4, of those options involving ongoing payments, would be expected to provide the typical installation on the Scheme with the target rate of return of 12%.

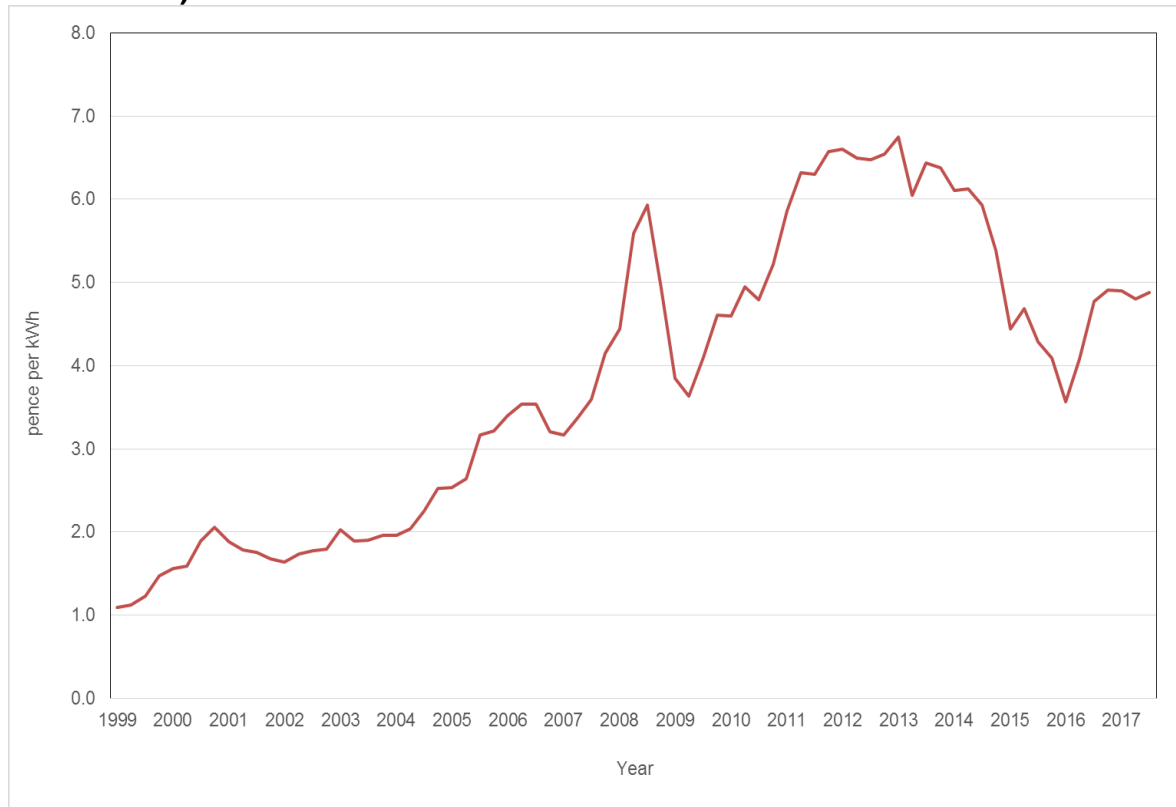
9.20 This analysis was based on the cost assumptions used by Ricardo in deriving the base case tariff scenario. In terms of the risk of subsequent changes in costs resulting in changes to the rate of return to Scheme participants, the capital costs have already been incurred whilst the barrier costs and maintenance costs are not expected to vary significantly over time. In contrast, fuel costs have been subject to significant volatility which is not expected to reduce for the remainder of the lifetime of the NI RHI Scheme. This means that future variations in the fuel price differential between biomass and oil is the main risk in respect of the rate of return on the NI RHI Scheme.

9.21 Chart 9.2 below shows that in the years before the introduction of the NI RHI Scheme, the price of oil was on a general upward trend, albeit with a temporary spike in 2008. In this context, it was reasonable to assume that the trend would continue when setting the original tariff<sup>83</sup>. However, this assumption proved to be incorrect, with the price of oil falling significantly between 2013 and 2016 before recovering slightly in 2017.

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<sup>83</sup> Table C.3 of 2011 CEPA report

**Chart 9.2: Price of Fuel Purchased by UK Manufacturing Industry (small consumers)**



Source: BEIS

9.22 The price of oil is set on a global basis and depends on a range of factors, such as global economic growth, the supply of alternative fuels, and the fiscal/political situation in oil producing countries. These factors often operate against each other with, for example, the desire of oil producing countries for a high price leading to increased shale output leading to a reduction in price.

9.23 In these circumstances, whilst Ricardo assumed that oil and biomass prices will remain at their current levels for the remainder of the lifetime of the NI RHI Scheme, there are a wide range of possibilities in respect of the future price of oil. Depending on the extent to which the price of biomass fuel also changes, a fall in the price of oil could lead to a reduction in the rate of return to Scheme participants, with pressure to increase the tariff. Alternatively, a rise in the price of oil could further increase the rate of return, requiring a reduction in the tariff.

9.24 Whilst the rate of return calculations for the typical installation set out in Section 8 are based on the operating costs assumed when calculating the base case tariff structure in the Tariff Review, it is important to consider what the rate of

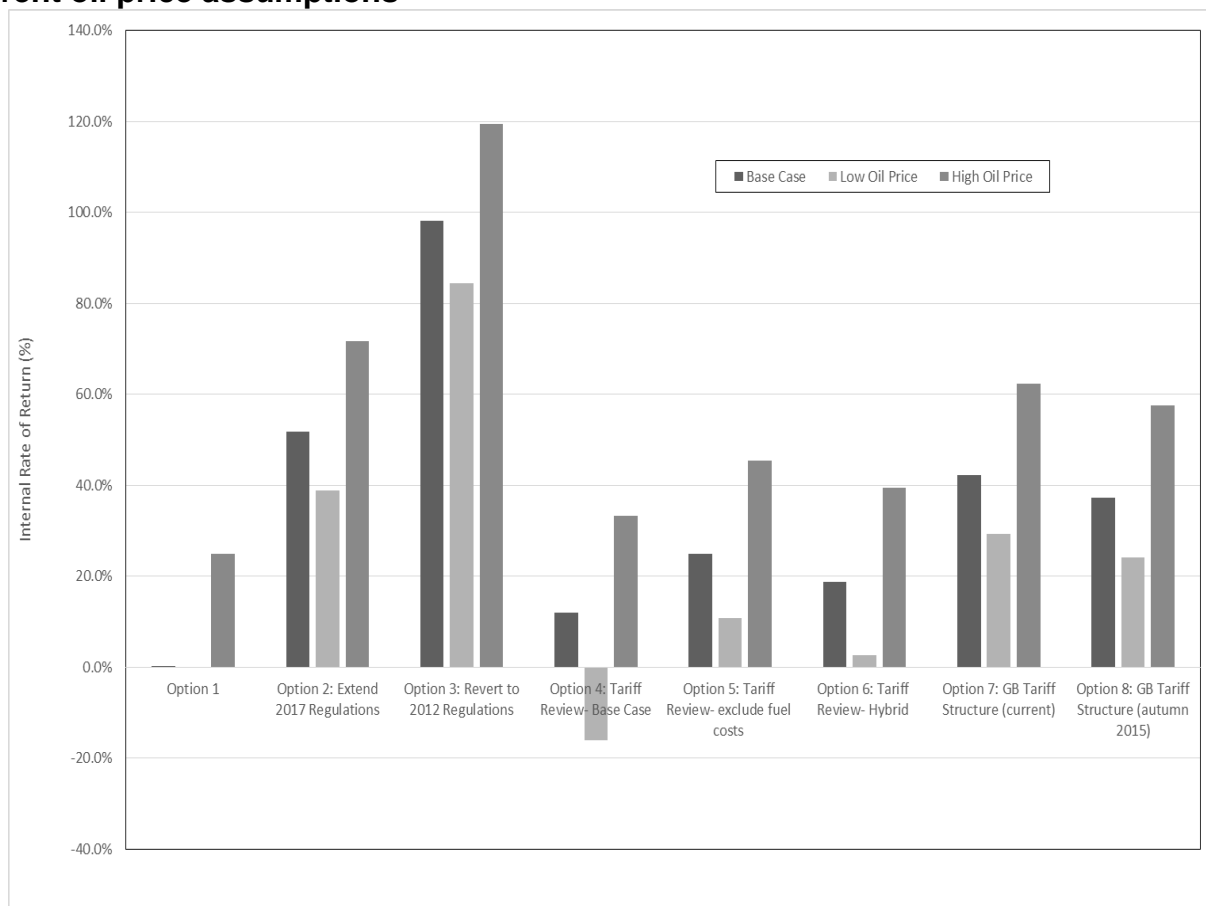
return would be if the actual fuel costs going forward were different, but not reflected in a revised tariff.

9.25 In this context, Chart 9.3 below compares the rate of return calculations set out in Section 8 with low and high oil price scenarios. Under the low oil price scenario, it is assumed that the price of oil falls to match the price of biomass over the 20 year period. Chart 9.3 shows that this results in a reduction in the projected rate of return for all of the options with only Option A5 within the 8-22% range. However, it should be noted that this does not include the impact of the overcompensation provided up until the end of 2018-19. If this was included then the projected rate of return under Option A5 would increase to 44%.

9.26 Under the high oil price assumption it is assumed that the price of oil, adjusted for fuel efficiency, increases by one third compared with the base case, but with no change in the price of biomass. This results in an increase in the projected rate of return under each of the options. In particular, even under Option A1 the projected rate of return for the typical installation is above the upper limit of the 8-22% range.

9.27 This highlights the significant impact that the assumed level of fuel costs can have on the financial return to Scheme participants. In terms of mitigation, it will be important that the Department actively monitors the price of biomass (through the ongoing inspections process) and the fossil fuel alternative (through NI Consumer Council data) on a regular basis, if the decision is taken to not proceed with a Compulsory Buy-Out. At the same time, the level of previous overcompensation implies that there is some flexibility in respect of the current fuel price advantage of biomass being eroded whilst under Options A5 and A6 there is less of a need to reduce tariffs further in response to a widening of the current fuel price differential.

**Chart 9.3: Projected Rate of Return by Ongoing Payment Option- Impact of different oil price assumptions**



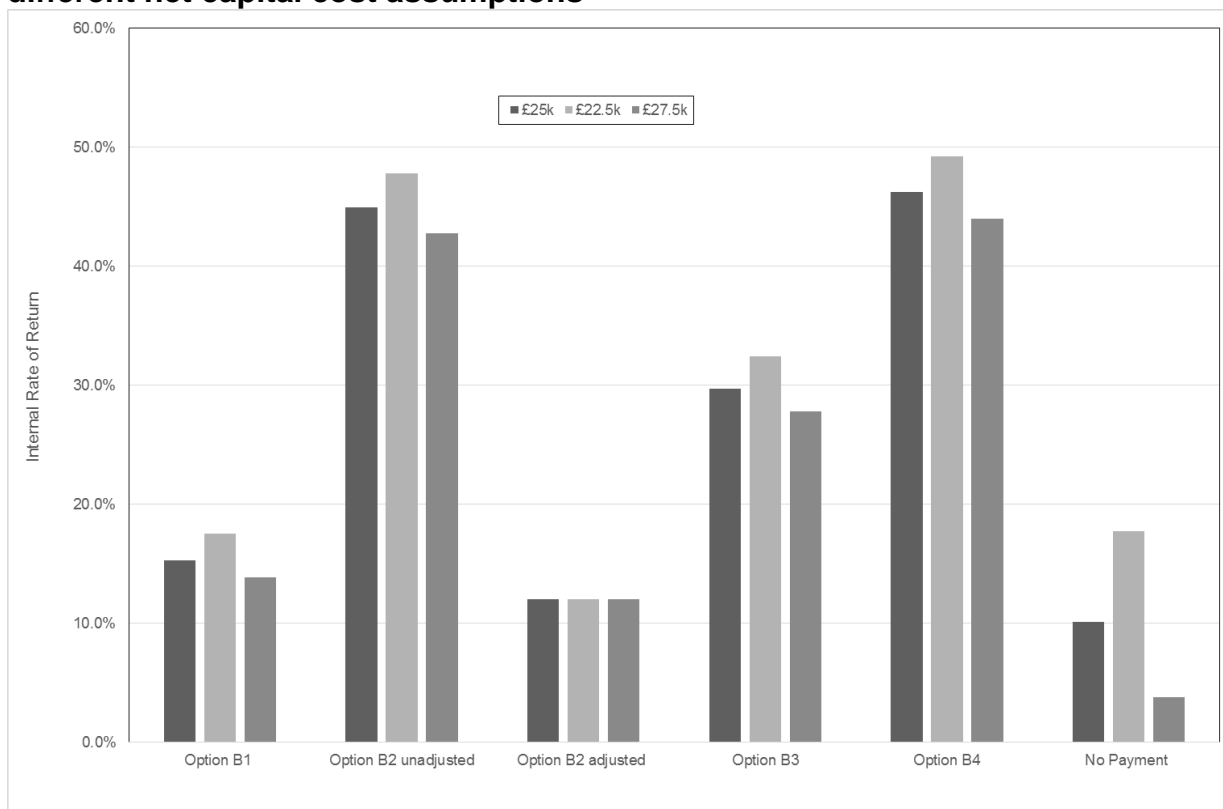
Source: RHI Taskforce Calculations

9.28 In light of the difficulties<sup>84</sup> experienced by the Department in previously making amendments to the tariff structure for the NI RHI Scheme it will be important that any future tariff changes are kept to the minimum necessary, are based on robust evidence and are implemented as quickly as possible. Should the monitoring activity identify that the difference between the price of oil and biomass has changed materially from that estimated by Ricardo (1.5p higher or lower, persisting for more than 1 year), those responsible for the management of the NI RHI Scheme should quickly commission advice either from Departmental economists or external consultants to formally review the price differential and the impact on the required level of tariff.

<sup>84</sup> These include the challenges involved when engaging with stakeholders with a financial interest in the Scheme both in the development of policy and assessing consultation responses. The potential for legal challenge has also resulted in an overly cautious and protracted approach.

- 9.29 It would be expected that such a formal review would not be required more often than once every three years for the remainder of the lifetime of the NI RHI Scheme. If the review identifies that a change in the tariff structure is necessary, it will be important that the necessary consultation is undertaken and approvals secured as quickly as possible. It is noteworthy that some respondents to the public consultation also highlighted the need for the Department to review the impact of fuel price fluctuations. This highlights the associated risk, in light of the asymmetrical level of market knowledge evident in the operation of the NIRHI Scheme to date, that a future review would be taken as an opportunity to press the case for an unwarranted increase in tariff levels.
- 9.30 As set out above, the main uncertainty in respect of the cost of the Compulsory Buy-Out options is in terms of the actual capital cost of the biomass boiler being significantly different from that set out in the application forms to the Scheme. The projected rates of return for each of the Compulsory Buy-Out options presented in Chart 8.4 was based on the cost of a typical biomass boiler being £25,000 higher than an oil boiler
- 9.31 Chart 9.4 also presents the projected IRR under a 330MWh heat requirement but with net capital costs 10% higher (£27,500) or lower (£22,500) than in Chart 8.4. There is no change in the projected IRR for Option B2 (adjusted) and only minor changes in respect of the other Compulsory Buy-Out options under these alternative scenarios.
- 9.32 It should be noted that the projected IRR calculation assumes that there is no difference in the ongoing operational costs between biomass and the fossil fuel alternative. This reflects the fact that the tariff is based on providing a 12% rate of return in terms of the additional capital investment only. In reality, participants may experience variations in their actual operating costs which may result in their actual rates of return deviating from 12%. However, there would be very little scope to amend the amount of the one-off payments once they have been made.

**Chart 9.4: Projected Rate of Return by Compulsory Buy-Out Option- Impact of different net capital cost assumptions**



Source: RHI Taskforce Calculations

9.33 In respect of CHP, even if the price of oil fell by one third it is still projected that the two projects would still achieve at least a 12% rate of return. As part of the Tariff Review, Ricardo conducted sensitivity analysis in respect of capital expenditure and total amount of heat generated. This concluded that only under extreme variations from the base case would a public subsidy be required.

## Implementation

### *Legislative Approval*

9.34 The long-term tariff structure will require legislative approval before it can be implemented from 1 April 2019. The ongoing uncertainty in respect of the future of the NI Executive means that that is expected that it will not be possible to secure legislative approval through the NI Assembly. However, the evidence of the extension of the 2017 Regulations has shown that it is still possible to secure legislative approval through Westminster.



9.35 Whether by way of the NI Assembly or Westminster, it would be expected that it will be easier to secure legislative approval for those options which have an evidence base which shows that they represent value for money to the tax payer, whilst still providing a reasonable rate of return for the Scheme participants. At the same time, it would be expected to be easier to secure approval of options based on an ongoing tariff payment basis than a Compulsory Buy-Out.

9.36 Whilst some respondents to the public consultation queried whether there was an existing legislative basis to introduce a compulsory buy-out, the development of the required legislation is not considered to be an unsurmountable barrier with legislative change required for the other options under consideration.

*State aid approval*

9.37 In addition to securing legislative approval, it will also be necessary to obtain State aid approval for the long-term tariff structure from the European Commission. Although approval of the extension of the 2017 Regulations into the 2018-19 financial year was a relatively simple process, the longer duration for the tariff structure to apply from 2019-20 would be expected to be subject to greater scrutiny.

9.38 Some respondents to the public consultation suggested that the European Commission would accept Option A3 as it had originally approved the single tier tariff under the 2012 Regulations. However, Commission officials have indicated that the approval of the 2012 Regulations by the Commission was on the basis of the evidence at that time which suggested that the typical installation would achieve a 12% rate of return. In the context that the Ricardo analysis suggests that the 2012 Regulations would deliver a 100% rate of return, it is not credible to suggest that this would be considered reasonable by the Commission. There are also risks in respect of the application of the GB tariff structures under Options A7 and A8, due to the stated differences between market conditions and the characteristics of participants on the NI and GB Schemes.

9.39 As part of early engagement on the long term payment structure for the NI RHI Scheme, European Commission officials made reference to a decision from 2017 in respect of a Spanish government scheme to promote the use of renewable energy. This scheme ("*regimen retributivo específico*" or specific remuneration scheme) supports electricity generation from renewable sources, cogeneration and waste. In calculating future payments on this scheme, the previous payments to installations under the scheme it replaced ("*regimen economico primado*" or premium economic scheme) are taken into account<sup>85</sup>.

9.40 This is in the context that payments under the scheme for existing facilities were based on the achievement of a 7.398% rate of return on investment. The Commission assessed that this rate of return was in line with the rates of return for renewable energy projects that it had recently approved, as set out in Table 9.3 below.

**Table 9.3: Rate of Return in cases referred to in European Commission Decision Text on Regimen Retributivo Especifico**

Commission Decision Text	Scheme	Rate of Return
SA.47205	<i>Complément de rémunération pour l'éolien terrestre à partir de 2017 (France)</i>	4.2-6.9%
SA.43756	<i>Support to electricity for renewable sources (Italy)</i>	5-9%
SA.36023	<i>Support scheme for electricity produced from renewable sources and efficient cogeneration (Estonia),</i>	8-12%
SA.43140	<i>Support to renewable energy and CHP (Latvia)</i>	9%
SA.43719	<i>Système d'aides aux cogénérations au gaz naturel à haute efficacité énergétique (France)</i>	7-8%

Source: European Commission

9.41 It is against this background that Commission officials subsequently indicated that they would not provide approval for any payment structure which results in a rate of return higher than 12%. This effectively rules out all of the ongoing tariff options that have been subject to public consultation with the exception of the two variants of Option A4.

9.42 The Spanish authorities introduced the scheme without prior notification to the Commission and therefore was providing illegal State aid for a period, unlike the NI RHI Scheme. One alternative would be to adopt the aspect of the Spanish

<sup>85</sup> As in the case of the Commission's approach (Paragraph 120) to the Spanish Governments scheme to support electricity generation from renewable energy sources.  
[http://ec.europa.eu/competition/state\\_aid/cases/258770/258770\\_1945237\\_333\\_2.pdf](http://ec.europa.eu/competition/state_aid/cases/258770/258770_1945237_333_2.pdf)

government scheme, referred to in paragraph 35(g) of the European Commission decision, that installations which attain the target rate of return before the end of their lifetime are not entitled to receive further compensation in respect of the capital investment and only receive payments in respect of the additional operating costs of a biomass boiler<sup>86</sup>.

9.43 In the case of the NI RHI Scheme this would involve the cessation of payments once a 12% rate of return was achieved, as the operating costs of a biomass boiler are lower than for the fossil fuel alternative. This also means that, unlike the Spanish government scheme, costs and savings would have to be considered for the project lifetime as the net operating cost savings from a biomass boiler would add to the rate of return, even if RHI payments are no longer being made.

9.44 The Ricardo analysis estimated that 83% (1,700) of installations on the NI RHI Scheme would have received sufficient RHI payments by the end of 2018-19 to achieve at least a 12% rate of return. These installations would receive no further payments from 2019-20 so that most participants on the Scheme would effectively be subject to the cessation of payments i.e. Option A1. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

9.45 This is in the context that the typical installation would be expected to achieve a lifetime rate of return of 56% if no further payments were received compared with 59% under Option A4(ii). Therefore adopting the Spanish government scheme approach is not expected to result in a significant improvement in value for money.

9.46 In addition, there would be expected to be significant administrative challenges in calculating the ongoing rate of return for the typical installation on the NI RHI Scheme. The only available information at individual installation level is the analysis conducted by Ricardo. However, these projections of the costs and

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<sup>86</sup> See paragraph 35(g) of Decision text.

savings over the lifetime of each project were intended to provide an indication of the impact of each option based on the aggregated position and not to determine whether payments should continue for each individual boiler.

9.47 [REDACTED]  
[REDACTED]  
[REDACTED] [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

9.48 This is in the context that the costs of the counterfactual fuel source are not observable for each installation whilst there would also be an incentive for participants to increase their biomass operating costs to defer the achievement of the 12% rate of return so that RHI payments can continue. [REDACTED]  
[REDACTED]  
[REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]  
[REDACTED]  
[REDACTED]

9.49 There is a further point. Support schemes of this nature that last for longer periods of time such as 20 years, are not designed to operate as the exceptional Spanish Scheme now operates. This is because they are designed to provide investors with a longer-term income stream in order to deliver up-front capital investment to help governments achieve climate change targets. Stopping payments early would not be consistent with this approach.

9.50 In summary, whilst the application of the approach in the Spanish government scheme has the potential to reduce the level of payments under the NI RHI, [REDACTED]  
[REDACTED] It could only be applied if clearly and explicitly required by the European Commission. Whilst European Commission officials previously referred to the Spanish government scheme in general terms, they have not made specific

reference to this aspect whilst the advice from Counsel is that the NI RHI Scheme is significantly different.

#### *Administrative Arrangements*

9.51 The NI RHI Scheme is administered by Ofgem on behalf of the Department. Any change in tariff structure must be able to be implemented on their IT and operational systems. As a result there are operational risks in taking forward any change to tariff structures. Although the risk is least under Option A3, the experience of the introduction of the 2017 Regulations would suggest that the other options could also be implemented with relative ease.

#### **Legal Challenge**

9.52 The 2017 Regulations were subject to a legal challenge by way of an application for judicial review of the legislation. The Department responded that it was within its rights to make amendments to the tariff structure when it is in the public interest. This was in the context that the tariff structure under the 2017 Regulations still provides those investing in renewable heat technologies with a generous rate of return. Although the Judicial Review was dismissed, it is now subject to an appeal, brought by the applicants.

9.53 In his Judgement (Para 216) dismissing the application for Judicial Review, Mr Justice Colton indicated that one of the applicants (an RHI Scheme participant) did enjoy a right to ongoing payments under the 2012 Regulations for the Scheme. [REDACTED]

9.54 However, Mr Justice Colton also indicated (Para 437) that *"In conducting the ultimate balancing test between the demands of the general interest of the public and the requirements of the individual's fundamental rights I am particularly influenced by my conclusion that the tariffs are being used to subsidise and support businesses rather than bridging the gap between the cost of converting heating systems which is their real purpose"*. [REDACTED]

[REDACTED]

9.55

[REDACTED]

#### **Additional risks raised in Public Consultation**

9.56 As part of the public consultation on the long term payment structure for the NI RHI Scheme a number of risks were identified by respondents in arguing that high tariff levels were justified.

9.57 In particular, it was suggested that the UK's departure from the European Union will lead to an increase in the price of biomass fuel. However, volatility in commodity prices and exchange rates is a normal risk of business which would also apply to the fossil fuel alternative. There is no indication that the Government intends to introduce import tariffs for biomass fuel, whilst the setting of the target rate of return for the Scheme (12%) significantly higher than the expected rate of return from a risk free investment means that participants would need to accept some form of risk.

9.58 Some respondents also highlighted the potential for the NI Executive to incur part of any fine falling to the UK Government for failing to meet its renewable heat targets. However, the relatively small scale of the NI heat market means that it will not have a significant impact on the achievement on the overall UK target. In the context that setting the tariff at a higher level would be expected to result in more unnecessary heat being generated the expected impact on the achievement of the UK target would not justify the substantial additional cost.

## Conclusions

9.59 Whilst there is a certain degree of risk associated with each of the options, there are none which would fundamentally alter the monetary and non-monetary assessments set out in Sections 7 and 8. At the same time, there is a higher risk in term of payments being greater than expected for the options involving higher levels of tariff. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]. A key issue is therefore the European Commission assessment of the proposed long term tariff structure.

## **SECTION 10: CONCLUSIONS AND NEXT STEPS**

### **Introduction**

- 10.1 The Northern Ireland Renewable Heat Incentive Scheme was intended to contribute to a reduction in the level of carbon emissions locally by increasing the share of heat generated from renewable sources. Government intervention, in the form of ongoing subsidy payments, was judged to be necessary because it was estimated that the lifetime cost of generating heat from a renewable heat installation was higher than for the fossil fuel alternative. In addition, due to the innovative and uncertain nature of renewable heat technologies, a 12% rate of return was applied to the additional capital costs to encourage a switch from fossil fuels.
- 10.2 However, the serious flaws in the original design of the payment structure for the NI RHI Scheme resulted in participants receiving substantial overcompensation which was exacerbated by a perverse incentive to generate more heat than required for normal business purposes. This led to a high number of applications which, combined with substantial overcompensation, meant that the projected level of payments under the NI RHI Scheme was significantly in excess of the expected available budget.
- 10.3 In response, a tiered tariff structure was introduced for new entrants to the NI RHI Scheme in November 2015, followed by the suspension of the Scheme to new entrants in February 2016. In April 2017 the tiered tariff structure was extended to also apply to those installations which had applied prior to November 2015.
- 10.4 Although the measures taken to date have addressed the potential for the NI RHI Scheme to overspend the available budget and largely removed the perverse incentive to generate more heat than required, participants are continuing to receive overcompensation under the current tiered tariff structure.



- 10.5 There was therefore a need to identify a long-term payment structure that could apply from the start of 2019-20 financial year to the end of the NI RHI Scheme which would address the issue of overcompensation. In order to inform the development of the best approach the energy consultancy Ricardo Energy & Environment reviewed the latest cost information and identified three alternative tariff structures.

### **Recommended Approach**

- 10.6 These (Options A4(i)-A6) have been assessed in this business case against the alternatives of ceasing payments (Option A1), and implementing the current/previous tariff structures on the GB (Options A7/A8) and NI (Options A2/A3) RHI Schemes.
- 10.7 The Ricardo analysis reflected and was based on the reference from the original State aid approval for the Scheme that a rate of return between 8% and 22% would be reasonable. This was also the assumption during most of the development of this business case. However, as part of the early State aid notification process, European Commission officials indicated that a payment structure which provided a rate of return higher than 12% would not be acceptable. In response, and reflecting the concerns at the presence of a negative Tier 2 tariff, a variant of Option A4 was developed as Option A4(ii) with the Tier 1 tariff calculated as the level required to deliver a 12% rate of return for the typical installation if the Tier 2 tariff was set at zero.
- 10.8 Commission officials have also indicated that they would have issues with a long term payment structure that did not take account of previous over compensation. Therefore, in addition to the nine options (Options A1-A8) based on ongoing payments to NI RHI Scheme participants, a number of Compulsory Buy-Out Options (Options B1-B4) have also been considered in respect of the small and medium sized biomass boilers that account for the large majority of installations on the NI RHI Scheme.

- 10.9 The extent of previous and ongoing overcompensation as well as the variations in circumstances between Scheme participants means that it is very difficult to identify an option which provides a fair, but not excessive, rate of return to all participants.
- 10.10 The Compulsory Buy-Out Option providing a 12% rate of return over 20 years, with adjustment for early payment (Option B2 (adjusted)) would be expected to be the best approach to addressing the issue of overcompensation. This is because it would provide the majority of boilers with a 12% rate of return, consistent with the key principles of the Scheme. This is in the context there is expected to be little difference between the options in respect of their economic and environmental impact. Under this option just over half of installations on the NI RHI Scheme would be expected to receive a one-off payment of approximately £18,000 on average, resulting in a total cost of £21 million in 2019-20 and up to £0.8 million per annum thereafter in payments for meter readings.
- 10.11 If this option was taken forward, the capital costs presented by participants in their application forms to the Scheme would need to be verified before the one-off payment could be made. In the context that the Ricardo report suggests that actual capital costs were 5% lower than set out in the application forms, if the actual capital costs of applicants were found to be 10% higher or lower than previously presented, it is estimated that the total cost in 2019-20 could be in the range £14-29 million.
- 10.12 It is recognised however that, in providing a one-off payment rather than applying an ongoing tariff, Option B2 (adjusted) represents a change from the original and current approach to compensating participants for the additional cost of renewable heat. In addition, the implicit assumption under pinning Option B2 (adjusted) is that participants will have appropriated all of the previous/ongoing over compensation which would then be available to offset a lower than required level of public subsidy in respect of future costs. This assumption may not hold in reality.

- 10.13 In this context, the Department may wish to proceed instead with an option based on ongoing tariff payments being made to participants. If this is the case, the evidence presented in this business case would suggest that the Tariff Review Base Case scenario with adjustment to ensure a 12% rate of return if the Tier 2 tariff is set at zero (Option A4(ii)) would represent the best option.
- 10.14 Although Option A6 would provide a rate of return for the typical installation within the 8-22% range previously referred to in the original State aid decision text, without the need for a negative Tier 2 tariff, the more recent position of the European Commission is that this option would not be acceptable because the rate of return is higher than 12%. In this context only the two variants of Option A4 would be expected to be acceptable to the Commission with a finely balanced choice between them.
- 10.15 Although the Base Case scenario without adjustment (Option A4(i)) represents the best option in principle, the practical implications of implementing a negative Tier 2 tariff, including the risk of switching back to fossil fuel, means that Option A4(ii) is preferred. However, it should be stressed that there is a narrow margin to this subjective judgement and that Option A4(i) would also be reasonable.
- 10.16 Option A4(ii) would be expected to cost £8.0 million in 2019-20, including £4 million for a Voluntary Buy-Out (based on similar terms to Option B2 (adjusted)) which would continue over a three year period. Although not relevant for the Compulsory Buy-Out option, if Option A4(ii) is instead chosen, based on ongoing payments to Scheme participants, then it is recommended that the measure of inflation is changed from RPI to CPI. This would result in a £70 million cost for the remainder of the lifetime of the scheme under Option A4(ii), compared with £75 million if the tariff was uplifted using the RPI instead.

[REDACTED]

[REDACTED]

[REDACTED]

10.17 However, Option A4(ii) may not in the end be acceptable to the European Commission because it does not take account of previous overcompensation. This also applies to the other options involving ongoing payments as the extent of previous and ongoing over compensation on the NI RHI Scheme implies that a negative Tier 1 tariff would be required.

10.18 If this were the case, it may be necessary to proceed with Option B2 (adjusted) instead. Whilst it could be argued that the practical difficulties associated with this option might justify a higher rate of return being used to calculate the one-off payment, this needs to be seen in the context that the 12% rate of return is very generous, compared with the 1.8% Return on Capital Employed (ROCE) in the NI agriculture sector,<sup>87</sup> the rates of interest on bank loans as well as the rates of return in renewable energy schemes recently approved by the European Commission (see Table 9.3 above). Increasing the rate of return to 16% would increase the level of one-off payments in 2019-20 to £26 million which would still be affordable, whilst the average rate of return would increase to 21%, as set out in Table 10.1 below.

**Table 10.1: Compulsory Buy Out (adjusted) option with different rates of return for typical installation**

Rate of Return for typical installation	Number of Participants Receiving One-Off Payment	Average One-Off Payment (£k)	Total One-Off Payment (£m)	Average Rate of Return
12%	1,140	18	21	19%
16%	1,240	21	26	21%
19%	1,310	24	31	24%
22%	1,360	27	36	26%
33%	1,520	41	62	36%
50%	1,710	71	122	52%

Source: RHI Taskforce calculations

10.19 The analysis produced by Ricardo concluded that no public subsidy was required in respect of the two very large CHP plants which had applied to the NI RHI Scheme. Whilst this business case includes other options, such as the use of the tariff for large biomass boilers, the recommendation is that no tariff is offered for CHP plants.

<sup>87</sup> <https://www.daera-ni.gov.uk/sites/default/files/publications/daera/Farm%20Incomes%20in%20Northern%20Ireland%20for%202016-17.pdf> (Table 16)

10.20 This business case has not considered any change to the tariffs for the other technologies on the NI RHI Scheme as well as large biomass boilers. These are expected to receive total RHI payments of approximately £0.6 million in 2019-20, with projected spend of £3.0 million for the Domestic Scheme.

### **Affordability**

10.21 As part of the 2015 Spending Review the NI Executive was allocated £28.9 million in AME funding for the NI RHI Scheme for 2019-20 as a population adjusted share of the funding for the GB RHI Scheme. The funding for the Scheme in future years will only be confirmed as part of the 2019 and subsequent Spending Reviews. However, the advice from HM Treasury is to assume that the 2019-20 budget will be rolled forward in cash terms to the end of the Scheme.

10.22 This implies that the total available budget for the Non-Domestic NI RHI Scheme will be approximately £470 from 2019-20 to the end of 2035-36. The recommended approaches (either Option B2 (adjusted) or Option A4) would allow expenditure under the NI RHI Scheme to remain within budget for the remainder of its lifetime. They would also provide scope for a new programme of support for renewable heat to be introduced.

10.23 The budget for the NI RHI Scheme is currently classified as Resource AME. Under Option B2 (adjusted) and the voluntary buy-out element of Option A4 the associated expenditure would be considered to be a capital grant and would need to be reclassified to Capital AME. Whilst HM Treasury have agreed in principle to the reclassification, the specific amounts involved would need to be requested each year with assurance provided that the expenditure is still supporting the use of renewable heat.

10.24 Furthermore, there is a risk that there is a significant reduction in the level of available funding for the 2020-21 financial year onwards announced in the 2019 Spending Review, expected in the autumn of next year. Whilst this is

less of an issue for Option B2 (adjusted) because the one-off payments would be made in 2019-20 there is a greater risk for Option A4. In this context, even if the decision is taken to proceed with Option A4 there might be value in including Option B2 (adjusted) in the legislation to be deployed depending on the outcome of the Spending Review.

## **Management Arrangements**

10.25 The RHI Taskforce was established in December 2016 to take forward all aspects of the NI RHI Scheme. Since that time it has developed and grown in response to emerging issues and demands. In particular, it currently has responsibility for Inspections & Compliance, Supporting the RHI Public Inquiry, Policy & Legislation, and management of the relationship with Ofgem as well as the Domestic Scheme. Ofgem fulfils a number of support functions including the administration of quarterly meter readings/payments and enforcement activity. Some of the current activities are temporary in nature with the aim that the RHI Taskforce will transform into a business as usual RHI Division at some point.

10.26 The future activities undertaken by the RHI Taskforce and RHI Division will vary depending on the option chosen in respect of the long term payment structure. For example, if the Compulsory Buy-Out approach is adopted then there will be significantly less need for future Inspections & Compliance activity, as well as ongoing payments to Scheme participants with consequential impacts on the role of, and payments to, Ofgem.

10.27 At the same time there will be a temporary increase in activity to manage the making of one-off payments under the Compulsory or Voluntary Buy-Outs with administrative staff potentially switching from Inspections & Enforcement. This would include the checking of boiler invoices<sup>88</sup>, confirmation of payments received by the end of 2019-20 and accreditation status of boilers as part of the calculation of the one-off payment for each boiler.

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<sup>88</sup> The information on capital costs provided in the application forms to the Scheme was meant to be based on invoiced costs. A review by Ricardo (Table 2.1 and 2.2 of Tariff Review Final Report) of 63 boilers found that actual costs were slightly (5-8%) lower than reported in application forms.

10.28 There will also be additional activity in respect of the Policy & Legislation function to secure the necessary approvals for the preferred option for the NI RHI Scheme payment structure in the first instance, as well as potentially developing a new Scheme. Set out in Table 10.2 below is a broad outline of the potential impact on the current functions of the RHI Taskforce of the two proposed approaches.

**Table 10.2: Non-Domestic RHI Functions**

<b>Function</b>	<b>Current Approach</b>	<b>Approach- Ongoing Payment</b>	<b>Approach- Compulsory Buy-Out</b>
Ongoing Payments-Biomass	Ofgem	Ofgem	No longer required
Ongoing Payments-other technologies	Ofgem	Ofgem	DfE
Inspections & Enforcement	Ofgem/DfE	Ofgem/DfE less resource	No longer required
Administration of One-Off Payment (2,000) under Compulsory Buy-Out	N/A	N/A	DfE- temporary 1-3 years depending on option
Administration of One-Off Payment (240/480) under Voluntary Buy-Out	N/A	DfE- temporary 3 years	N/A
Policy and Legislation	DfE	DfE-more resource to develop a new Scheme	DfE- more resource to develop a new Scheme
Support to Public Inquiry	Expected to end March 2019	Expected to end March 2019	Expected to end March 2019
Date for introduction of potential new RHI Scheme	N/A	2020-21	2020-21

10.29 In the meantime, the RHI Taskforce Project Board will continue to meet on a monthly basis to discuss progress on project milestones and emerging issues. This project will be actively monitored by the Project Board and Oversight Board with the Grade 3 Richard Rodgers responsible for ensuring the necessary policy, legislative and administrative arrangements are in place.

10.30 The resource implications in respect of the administration of the NI RHI Scheme will be set out in a separate business case. However, it is important

that the level of administration costs are a reasonable proportion of the total amount of expenditure on the Scheme. The impact of administration costs on the design of the NI RHI Scheme has been discussed at the RHI Inquiry with the suggestion that the comparators considered at that time provided a misleading indication. On this basis, it is recommended that administration costs are set to be at most 10% of the projected level of payments on the NI RHI Scheme, in line with the advice from the 2011 CEPA report (Paragraph 7.6.2). Whilst there may be a need for a higher level of administrative expenditure in the short term due to the commitment to inspect all installations the level of resources involved should be reviewed to consider whether it is commensurate with the level of RHI payments.

## **Monitoring**

- 10.31 The monitoring of the impact of the 2017 Regulations and 2018 Act to date has identified a reduction in heat production compared with the corresponding period in the preceding years. Although budgetary pressures will be of less significance under either of the two recommended options it will still be important for the Department to monitor the amount of heat generated. In particular, to examine the extent to which participants are still using their biomass boilers following the Compulsory Buy-Out. If Option A4 is chosen instead, the RHI Taskforce would need to monitor trends in the relative prices of biomass and oil, to identify whether tariffs should be amended.
- 10.32 On the basis that most of the one-off payments will be made by the end of October 2019, a post project evaluation will be undertaken by the end of 2019-20 in respect of Option B2 (adjusted). If Option A4 is chosen instead, an initial post project evaluation should be undertaken by the end of October 2021 followed by evaluations every five years until the cessation of payments. The evaluation will be undertaken by a Departmental official who is independent of the RHI Taskforce and the broader Non-Domestic RHI scheme.



## Next Steps

10.33 In summary, the main recommendations from this business case in respect of the long term payment structure for the NI RHI Scheme are as follows:

- (1) The overall objective of the Scheme should be amended to support the generation of at least 500GWh of renewable heat each year from renewable sources, rather than the original 10% of total heat target which is not currently measurable<sup>89</sup>;
- (2) The current size band (20-199kW) for medium sized biomass installations should be split between 20-99kW and 100-199kW to reflect the lower capital cost per kW of larger boilers;
- (3) The Tier 1 threshold should remain at 1,314 hours;
- (4) The Base Case tariff structure from the Ricardo Tariff Review with adjustment to ensure that a 12% rate of return is achieved if the Tier 2 tariff is set at zero (Option A4(ii)) should be applied from 2019-20 onwards;
- (5) Provision should be made for a Voluntary Buy-Out with payments based on Option B2(adjusted) on a first come first served basis and a maximum annual budget of £4 million (which could be reviewed if there is a high level of demand) for the years 2019-20 to 2021-22;
- (6) In light of the uncertainty in respect of the future budget for the Scheme, to be confirmed as part of the 2019 Spending Review, the legislation should include provision for a Compulsory Buy-Out to be implemented if there is a substantial reduction in the available funding;
- (7) The tariffs for small and medium sized biomass boilers should subsequently be uplifted by the rate of Consumer Price Index (CPI)

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<sup>89</sup> It is not possible to measure progress against the target because there is currently no mechanism in place to measure (a) the total amount of heat generated in NI and (b) the amount of renewable heat generated in NI that is not supported by the RHI- the GB target for renewable heat is based on 64% of the total renewable heat being generated outside of the RHI Scheme.

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Inflation each year based on the actual rate of CPI inflation in the December preceding the start of each financial year - subject to legal opinion on whether there are any implications for the implementation of Option A4(i);

- (8) The Department should monitor the relative price of biomass and fossil fuels on a regular basis;
- (9) If there is a significant and persistent change in relative fuel prices the Department should undertake a formal review of fuel prices and their impact on tariff levels;
- (10) No subsidy should be provided in respect of Combined Heat and Power plants;
- (11) The tariffs for the other technologies on the Scheme should be reviewed, when the long term tariff has bedded in, with changes made where necessary;
- (12) The Department should ensure that the resources devoted to the administration and management of the Scheme equate to no more than 10% of the payments to participants each year (whilst additional resources may be required in the short term in respect of the commitment to inspect all RHI installations the level of resources devoted to this activity should be commensurate with the level of RHI payments); and
- (13) A post-project evaluation should be completed by the end of October 2021.

10.34 If the European Commission does not consider that the preferred ongoing tariff approach is acceptable then recommendations (2) to (9) should be replaced with the following:

- (2A) The Compulsory Buy-Out Option B2 (adjusted) should be implemented with a one-off payment in 2019-20;

(3A) From 2019-20 onwards a payment of £100 per confirmed meter reading should be paid to allow for ongoing monitoring against the renewable heat target;

10.35 The Department had conducted a public consultation on the options considered as part of this business case. The assessment above has taken into consideration the points raised by respondents to the consultation.

10.36 Although Option B2 (adjusted) is considered to be the best option in terms of addressing the issue of overcompensation there may be practical difficulties with its implementation. On this basis it is recommended that the Department proceeds with Option A4(ii) as the preferred option. However, there is a key risk that this option may not be acceptable to the European Commission, in which case it might be necessary to revert to Option B2 (adjusted).

10.37 The recommendations set out in this business case will inform the decision by the RHI Taskforce Project Board on the most appropriate long-term payment structure for the NI RHI Scheme. Relevant approvals will then be sought through the Department and the Department of Finance, as required.

10.38 Any amendments to scheme regulations require approval from the European Commission in respect of State aid. Any State aid approval will need to be sought and obtained prior to 31 March 2019 when the current regulations become ineffective. The Department has a dedicated unit to manage this process.

10.39 Any amendments to scheme regulations also require approval from the NI Assembly. It is expected that the current political situation in Northern Ireland may cause some uncertainties or delay in this process. Under the normal process, approval to the regulations would be through the NI Assembly. Given the ongoing political uncertainty and collapse of the Assembly, an alternative option will be to secure legislative approval through Westminster.

10.40 This business case has not considered changes to the tariffs in respect of the other technologies on the Scheme, as well as the tariff for large biomass boilers. Although the amounts of expenditure involved are relatively small, it will still be important for the RHI Taskforce to conduct a review of the other tariffs on the Scheme once the long term tariff structure has bedded in.

**COMPULSORY BUY-OUT OPTION RATE OF RETURN ANALYSIS**

- A.1 The option set out in the Consultation Document in respect of a Compulsory Buy-Out is based on providing a one-off payment equal to the sum of annual payments required to deliver a 12% rate of return on the net capital investment over twenty years minus payments received to date. This is equivalent to Option B2 (unadjusted) in this business case.
- A.2 The example set out in Box 1 of the Consultation Document was based on a net capital cost of £25,000 which implies that the annual payment required to deliver a 12% rate of return over 20 years would be £3,347<sup>90</sup> per annum (times 20 years equals £66,939). Box 1 assumes that the boiler is 99kW in size and will have generated 130,000kWh in heat each year between Years 1 and 3 (assumed to be 2016-17 to 2018-19), equivalent to £25,350 in RHI payments (in 2016 prices) resulting a net one-off payment of £41,589 under Option B2.
- A.3 However, if this was set in the form of a cash-flow as set out in Table A1 below, the resulting Internal Rate of Return (IRR) is significantly higher than the target rate of 12%. This is because the one-off payment has not been discounted to take account of the payment being received earlier than if payments were made annually.

**Table A1: Cash flow and Rate of Return calculation for Option B2 (adjusted)**

£ million	Net Capital Investment	RHI Payments	One-Off Payment	Total
Year 0	-25,000	0	0	-25,000
Year 1	0	8,450	0	8,450
Year 2	0	8,450	0	8,450
Year 3	0	8,450	0	84,50
Year 4	0	0	41,589	41,589
Years 5-20	0	0	0	0
IRR				38.5%

- A.4 This means that a number of adjustments are required in respect of the one-off payment to bring the IRR back to the target rate of 12%. In the first instance, the annual payments required to deliver a 12% rate of return would need to be

<sup>90</sup> £25,000 divided by annuity factor of 7.469 calculated using the formula  $(1-(1+r)^{-n})/r$  where r is the rate of return and n is the number of years.

discounted using a 12% rate from the year that the payment is expected to be made as set out in Table A2 below. This shows that discounting the annual required payment, reduces the estimated one-off payment, before deductions for previous RHI payments, from £66,939 to £36,730.

**Table A2: Discounted Annual Payments required to deliver a 12% Rate of Return over 20 years for a net investment of £25,000**

	Annual Required Payment (undiscounted)	Discount Factor	Annual Required Payment (discounted)
Year 1	3,347	1.000	3,347
Year 2	3,347	1.000	3,347
Year 3	3,347	1.000	3,347
Year 4	3,347	1.000	3,347
Year 5	3,347	0.893	2,988
Year 6	3,347	0.797	2,668
Year 7	3,347	0.712	2,382
Year 8	3,347	0.636	2,127
Year 9	3,347	0.567	1,899
Year 10	3,347	0.507	1,696
Year 11	3,347	0.452	1,514
Year 12	3,347	0.404	1,352
Year 13	3,347	0.361	1,207
Year 14	3,347	0.322	1,078
Year 15	3,347	0.287	962
Year 16	3,347	0.257	859
Year 17	3,347	0.229	767
Year 18	3,347	0.205	685
Year 19	3,347	0.183	611
Year 20	3,347	0.163	546
Total	66,939		36,730

A.5 A discount rate of 12% is used in line with the target rate of return for the Scheme when it was first established. This is in the context that a 12% figure was set as the rate of return required to incentivise investment in renewable heat compared with the alternative investment opportunities available to participants. This in turn implies that the one-off payment under the Compulsory Buy Out could be invested in the alternative projects and achieve at least a 12% rate of return, in place of the annual return expected from the ongoing tariff payments.

- A.6 Second, the RHI payments need to be adjusted to remove the elements that are not related to providing the 12% return on the additional capital investment in a biomass boiler. Table 1 of the Consultation Document estimated that 4.5p/kWh, or 76.3%, of the original 5.9p/kWh tariff was in respect of the capital payments. This implies that approximately £19,340 of the RHI payments in the Box 1 example were in respect of the capital element of the tariff.
- A.7 A final adjustment is required to reflect actual RHI payments (capital element) in Years 1-3 being greater than the annual amount required to deliver a 12% rate of return over 20 years. If the total RHI tariff in Year 1 is 6.5p/kWh, then the capital element is 4.96p/kWh which implies £6,445 in annual RHI payments towards the capital return for a 130,000kWh heat output. This is £3,098 higher than the £3,347 required which needs to be uplifted by 12% per annum for the period of time between the RHI annual payment and the one-off payment. This implies that the deduction from the one-off payment to reflect RHI payments received in Year 1 would be £3,347 plus £3,098 times  $1.12^3 = £7,699$ . This increases the total amount deducted from the one-off payment to reflect previous RHI payments from £19,340 to £21,750.
- A.8 The net result is that the one-off payment, minus the impact of RHI payments received to date falls from £41,589 under Option B2 to £14,981. Table A3 below shows that the adjusted approach to calculating the one-off payment results in an IRR of 12.0%.

**Table A3: Cash flow and Rate of Return calculation for Option B2 (adjusted)**

£ million	Net Capital Investment	RHI Payments (capital element)	One-off payment	Total
Year 0	-25,000	0	0	-25,000
Year 1	0	6,445	0	6,445
Year 2	0	6,445	0	6,445
Year 3	0	6,445	0	6,445
Year 4	0	0	14,981	14,981
Year 5-20	0	0	0	0
IRR				12.00%

A.9 Set out in Table A4 is a comparison of the estimated IRR for a 99kW boiler under the different options set out in the main body of the business case. In particular, Option B2 (adjusted) reflects the adjustments set out above. In addition, the alternative option of calculating the one-off payment with a 12% rate of return over three years is also presented.

A.10 Whilst the assumption in Box1 of the Consultation Document was that the boiler would generate only 130,000kWh per annum, the alternative scenario is also presented of a boiler generating 350,000kWh per annum. Whilst this scenario increases the level of RHI payments in Year 1 under the 2012 Regulations, it has no impact on the payments for Years 2 and 3 as the 2017 Regulations mean that the capital element of the tariff is only paid for the first 1,314 hours of operation.

**Table A4: Estimated IRR by Option for biomass boiler with a £25,000 net cost**

Option	Annual heat generated	
	130,000kWh	350,000kWh
Option B1- 5% rate of return over 10 years undiscounted	9.9%	16.2%
Option B2 (unadjusted)- 12% rate of return over 20 years undiscounted	35.5%	46.1%
Option B2 (adjusted)- 12% rate of return over 20 years discounted	12.0%	12.6%
Option B3- 8.5% rate of return over 15 years undiscounted	21.7%	30.8%
12% rate of return over 3 years	8.6%	14.3%
No one-off payment	-11.8%	12.6%

A.11 Whilst Option B2 (adjusted) is designed to result in a 12% IRR, in respect of the 350,000kWh scenario the level of payments received to date is greater than the one-off payment required with the result that it defaults to the no payment option IRR. The options based on a 5% rate of return over 10 years under Option B1 or providing a 12% rate of return over 3 years only are both within the range specified by the European Commission. However they both would represent a break from the principle of providing a 12% rate of return over 20 years.