Department of Energy & Climate Change

Non-Domestic Renewable Heat Incentive

Improving Support, Increasing Uptake

4 December 2013

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Non-Domestic Renewable Heat Incentive

Improving support, increasing uptake.

A Government Response to consultations on:

- ‘Expanding the Non-Domestic Scheme’ September 2012
- ‘Air-water Heat Pumps and Energy From Waste’ September 2012
- ‘Early Tariff Review’ May 2013

Calls for Evidence on:

- Bio-propane
- Large biomass
- Ground Source Heat Pumps
- Landfill Gas

Ministerial Foreword

I am pleased to say that 2013 has been one of the most successful years ever for Britain's renewable energy drive. We have seen big leaps forward in actual deployment, in newly announced projects and in delivering a robust package of support for industry.

Investment in renewables is reaching record levels, large numbers of new green jobs are being created and we are building new renewable heat markets that are helping the UK to compete in the global race for green growth. Importantly we are also seeing a step change in positive consumer and industry attitudes towards renewables. I have recently spoken of my vision of an energy sector of the "Big 60,000" that rise to challenge the "Big 6" energy companies. A vision where companies, communities, public sector and third sector organisations grab the opportunity to generate their own energy and start to export it at scale. I want to see renewable heat at the heart of this.

One of our recent success stories is Rainbarrow Farm in Dorset, which saw the country's first full-scale anaerobic digester and biomethane-to-grid plant open in November 2012. It is providing renewable gas direct to the local community in Poundbury near Dorchester, which will spread through the distribution network to around 4,000 homes in the winter and 56,000 homes in the summer. It is the first plant in the UK to inject renewable gas directly into the local distribution network.

As we continue to break new ground through implementation of the RHI we are able to gather more evidence, market intelligence and deployment data to help improve the effectiveness of the scheme. It is vital that we continue to make improvements to drive uptake even further. This can be achieved through getting the level of support right so that the market can invest with confidence, cost reductions can be achieved and the market can grow sustainably.

The changes set out in this document are designed to stimulate significant additional growth in the deployment of renewable heating systems in the coming years in a range of technologies and applications right across the country.

We have designed the RHI to drive a step change in the way we produce heat and pave the way for mass deployment of a host of renewable heating technologies beyond 2020. This is a challenging goal, but we have already taken the initial steps to get there and achieved a 7% increase in energy from renewable heat sources in 2012 compared to the previous year.

We have also seen significant deployment of renewable heat in households through the Renewable Heat Premium Payment (RHPP) scheme, which has provided support for 17,000 domestic installations, and I announced details of the RHI for the domestic market in July this year. I intend this to be open to applications in spring next year and we are on track to deliver that. With support available for home owners, social housing, businesses, schools, hospitals and other public sector organisations, we can expect to see a ramping-up in renewable heat deployment during the second half of the decade.

Next year, as we review the non-domestic RHI, we will look to improve the potential of the scheme even more, as we evaluate opportunities to develop the renewable heat market further through the non-domestic RHI.

The Government's commitment to cost effective renewable energy as part of a diverse, low-carbon and secure energy mix, is as strong as ever. Renewable energy helps provide energy security, meet our decarbonisation objectives and brings green growth to all parts of the UK. The Coalition Government is committed to ensuring that the nation maximises the opportunity that cost effective renewable energy presents – not just jobs and investment now but providing clean energy that will underpin our long term economic prosperity.

Gregory Barker

Minister of State, Department of Energy and Climate Change

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Summary of Policy Decisions

1. The Renewable Heat Incentive (RHI) is the Government's principal mechanism for driving a significant increase in the deployment of renewable heat. It is designed to help businesses, communities, the public sector and householders overcome the cost difference between renewable and conventional heating systems. The incentive has a significant role to play in ensuring the UK meets its share of the EU's renewable energy targets – 15% of our energy coming from renewable sources by 2020 – and forms part of our Carbon Plan ("The Carbon Plan: Delivering our Low Carbon Future")[1].
2. We have seen strong uptake in certain renewable heat technologies and a 7% rise in renewable heat in 2012. However we have not so far seen the levels of uptake that were anticipated when the scheme was launched. Whilst applications of biomass installations smaller than 1MWth have exceeded our expectations, uptake for the other technologies offered support has been lower than was originally anticipated. Based on current applications we estimate the total heat generated in 2013/14 will be about 1.2 TWh. This is just over a third of what was originally expected.
3. This document sets out our decisions in relation to the non-domestic proposals that we consulted on in September 2012 and May 2013. The final policy decisions reflect input from the consultations and calls for evidence and are designed to stimulate significant additional growth in the deployment of renewable heating technologies in the coming years (alongside the domestic scheme announced in July this year).
4. We are also setting out how we are adapting our approach to budget management to reflect these policy decisions (as we indicated was planned in the May 2013 consultation), as well as providing an update on the issue of increasing certainty for projects with long lead times (which was not concluded following the July 2012 consultation 'Providing Certainty, Improving Performance'), and an update on the approach we will be taking to the planned review in 2014.
5. We estimate that with the policy changes set out the scheme could incentivise around 5,000 installations and support 6.4TWh of renewable heat by the end of 2015/16 (in addition to what is already in the scheme). This will help to sustain and build the supply-chains needed to deliver our aspirations for renewable heat to 2020 and beyond. Our policy changes will provide a good platform for further growth in the renewable heating sector in the next spending review period and ensure that the RHI can make progress towards the original objectives[2] of:
   - Facilitating the heat sector's contribution to the 2020 renewable energy target;
   - Delivering significant reductions in carbon emissions from fossil fuels used for heating;
   - Delivering a step-change in the uptake of renewable heat technologies, helping to increase renewable heat from its current level of around 2% to 12%;
   - Incentivising uptake across a range of technologies and sectors, minimising the costs to society and avoiding the creation of perverse incentives.
6. The accompanying Impact Assessment estimates the monetised costs of these changes to be £471m for installations up to the end of 2015/16. The non-monetised benefits include

[1] https://www.gov.uk/government/publications/the-carbon-plan-reducing-greenhouse-gas-emissions--2

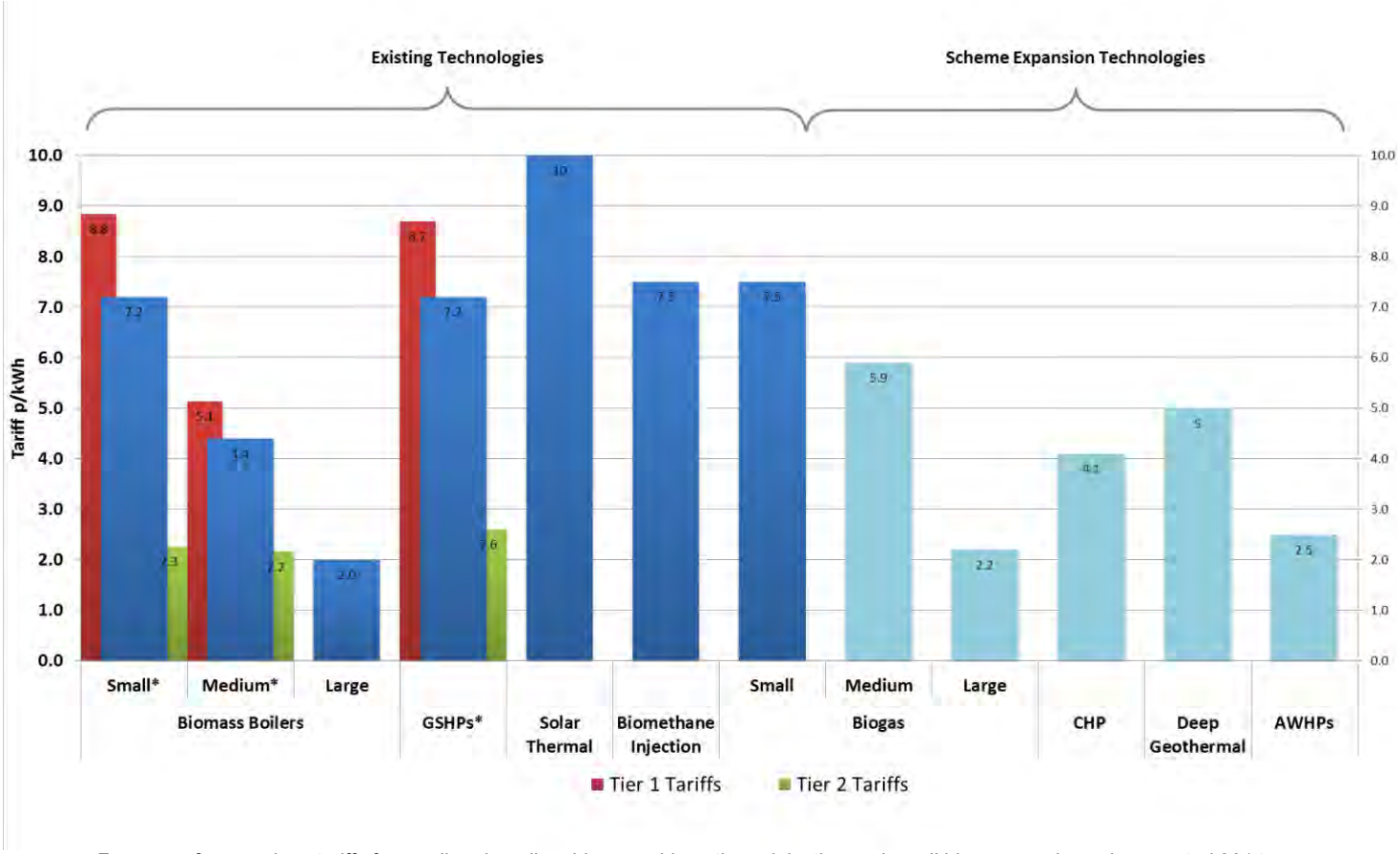
[2] http://www.legislation.gov.uk/ukia/2011/514/pdfs/ukia_20110514_en.pdf

greater diversification of the fuel mix, improved UK competitiveness in green technologies, innovation benefits and reduced technology costs due to learning from greater deployment.

Expanding the Non-Domestic Scheme

7. 102 respondents contributed to the consultation "Expanding the Non-domestic Scheme". Mixed levels of support were received for the proposals it contained, which included support for biomass and bioliquid CHP, large scale biogas combustion, deep geothermal, biomass direct air and heating only air-to-air heat pumps. We will be introducing support for biomass CHP (4.1p/kWh), biogas >200kW (5.9 p/kWh and 2.2pkWh depending on size) and deep geothermal (5.0p/kWh). However, we do not intend to proceed at this time with support for heating only air-to-air heat pumps or biomass direct air as the consultation did not enable the development of appropriate deliverable policy. In addition, we will not be introducing a tariff for bioliquid CHP.

Figure 1: *Non-domestic RHI Tariffs from Spring 2014 (p/kWh)*



For ease of comparison tariffs for small and medium biomass, biomethane injection and small biogas are shown in expected 2014 levels. This means that these tariffs have been inflated using an estimate of the annual RPI uplift (of 2.8%). The actual RPI uplift that will apply from 1 April 2014 may be different and will be confirmed prior to that date. These tariffs may be subject to degression on 1 April if deployment exceeds expected levels.

** The tariffs for these technologies are tiered. The untiered tariff level has been shown in this chart for comparison against other technologies.*

Biogas Combustion over 200 kW

8. Biogas was highlighted as important for industrial heat in the "UK Bioenergy Strategy"[3] and "The Future of Heating: Meeting the Challenge"[4]. It can also help to support the market for anaerobic digestion – a key plank of the UK's Waste Strategy[5].

[3] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48337/5142-bioenergy-strategy-.pdf

9. We will introduce banded tariff support, an approach that is consistent with the Renewables Obligation (RO) and Feed in Tariffs, with the aim of using limited resource efficiently. We are engaging with the European Commission about the approach to setting the tariffs for this technology since it differs from that taken for other technologies. Subject to State Aid approval, tariffs will be set at 5.9p/kWh for installations with a thermal capacity of between 200 to 600kWth and 2.2p/kWh for those greater than 600kWth.
10. Biogas systems will not be subject to a CHP quality assurance requirement, because this introduces requirements that we believe would be too onerous and costly and would introduce an additional administrative burden on support for electricity generation.
11. The budget management quarterly tariff triggers for the three biogas combustion tariffs combined (the current less than 200kWth tariff for small biogas, as well as the medium and large biogas tariffs set out here) will be £5.5m in January 2015 and £9.8m in January 2016.

Biomass and Bioliquid Combined Heat and Power (CHP)

12. CHP is the most energy efficient way to use fuels to generate heat and power – the "UK Bioenergy Strategy"[3], "The Carbon Plan: Delivering our Low Carbon Future" [1] and "The Future of Heating: Meeting the Challenge"[4] all highlight its key role for heat networks and some industrial processes. We will introduce a specific tariff for biomass CHP of 4.1p/kWh of eligible heat produced.
13. We will not introduce a tariff for bioliquid CHP at this stage, given uncertainty around whether providing RHI support for use in CHP plants might lead to competition for limited quantities of available bioenergy that might be better used for transport. However, we will be assessing the case for the inclusion of bioliquid in the non-domestic RHI as part of the 2014 review of the scheme (including the issue of the impact on availability of biofuels for transport).
14. Currently CHP installations are able to claim the RHI tariff applicable to the heat technology they use, provided they are not also claiming additional support under the RO (the 'ROC uplift'). The ROC uplift is due to end in 2015, as confirmed in the recent RO banding review. Biomass CHP installers will be able to claim the RO on their electricity generation and the RHI on the eligible heat use provided they have not received the ROC uplift under the RO.
15. Under the Government's new support mechanism, Contracts for Difference (CfD), the strike price for biomass CHP is set to be equivalent to the RO support for dedicated biomass power only (i.e. without the ½ ROC uplift). The intention is for participants to be able to apply for the RHI as well as CfD support. The finalised strike prices will be confirmed in the Electricity Market Reform Final Delivery Plan which is scheduled for publication by the end of December.
16. Receipt of the CHP RHI tariff will be conditional upon the installation being CHPQA certified. A biomass installation not seeking CHPQA will remain eligible for the corresponding biomass tariff dependent upon the capacity. Installations over 1MWth capacity. Will receive the revised 2.0p/kWh tariff. CHPQA certified conversions of fossil fuel systems to biomass will be eligible for the CHP tariff from the date of this publication provided that the CHP conversion is commissioned after this date. Table 1 summarises the available RHI tariffs and eligibility for CHP.

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[4] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/190149/16_04-DECC-The_Future_of_Heating_Accessible-10.pdf

[5] https://www.gov.uk/government/policies/reducing-and-managing-waste

Table 1: *CHP tariffs in 2014/15 and availability*

Technology	Size	Heat only tariff (p/kWh)	CHP tariff (p/kWh)	CHPQA certification required for CHP tariff?	Compatible with RO	Registration on RO required?	Compatibility with ½ ROC uplift
Biogas	<200kW	7.5	Receives heat only tariff	n/a	Yes	No	Incompatible
	200kW-600kW	5.9	Receives heat only tariff				
	>600kW	2.2	Receives heat only tariff				
Biomass	<200kW	Tier 1: 8.8 Tier 2: 2.3	4.1	Yes	Yes	No	Incompatible
	200kW-1MW	Tier 1: 5.1 Tier 2: 2.2					
	>1MW	2.0					

17. The budget management quarterly tariff triggers for biomass CHP will be £29.6m in January 2015 and £68.0m in January 2016.

Deep Geothermal Heat

18. Deep geothermal is a key renewable source of energy for heat networks (as cited in "The Future of Heating: Meeting the Challenge"[4]). We currently support this technology under the large GSHP tariff which, to date, has not stimulated uptake. In addition, the changes to the GSHP tariff set out below will not provide appropriate support for deep geothermal as the current banded tariff will be replaced with a single tariff which is tiered.

19. We will introduce a new tariff for deep geothermal heat at 5p/kWh. Deep geothermal heat will be defined as heat coming from a drilling depth of a minimum of 500m; this depth may be reviewed in the future if new evidence arises.

20. The budget management quarterly tariff triggers for deep geothermal will be £5.5m in January 2015 and £9.8m in January 2016.

Heating-only air to air heat pumps (AAHPs)

21. Although these technologies do produce renewable heat, we will not be introducing support for them at this time. This is primarily because of the risk of incentivising the installation of separate heating and cooling AAHPs in order to claim the RHI, rather than a reversible AAHP, which is likely to be more energy efficient. We intend to revisit the potential for reversible AAHPs to make a cost-effective contribution to the renewable energy targets as part of the 2014 review process.

Biomass Direct Air Heating

22. We will not be introducing support for biomass direct air heating at this time as we have not yet been able to develop an accurate and viable methodology for determining payments based on eligible heat use. We will keep this under review pending further discussion with industry on how payments for the heat produced could be made in the absence of accurate metering.

Energy Efficiency

23. Energy efficiency is at the heart of the Government's approach to tackling dangerous climate change and ensuring safe, secure and affordable energy supplies. The potential social, economic and environmental benefits of increasing the UK's energy efficiency are significant and Government plans over time to unlock this potential through existing policies, such as the RHI. However, we will not be introducing explicit energy efficiency criteria for non-domestic RHI applicants at this time. The mixed views from consultation respondents made it clear that more work needs to be done to establish a range of effective but not unduly burdensome energy efficiency measures that could be introduced into the scheme.

Air to Water Heat Pumps and Energy from Waste

24. In total 56 respondents contributed to the consultation on 'Air to Water Heat Pumps and Energy from Waste' with the vast majority in favour of the proposals set out. We will be introducing support set at 2.5p/kWh for AWHP and 2.0p/kWh for the biogenic proportion of energy from waste (commercial and industrial).

AWHP

25. Heat pumps have an important role to play in helping to achieve the longer-term carbon budgets as the grid decarbonises. Support is now needed to incentivise renewable heating over non-renewable counterfactuals in the short-term (e.g. oil or liquefied petroleum gas) but more importantly for the longer-term to build supply-chain capacity, stimulate innovation and performance improvement and drive forward longer-term cost-reductions. The Government's 2013 policy document "The Future of Heat: Meeting the Challenge"[4] envisages that heat pumps will play a key role in transforming space heating to lower carbon energy.
26. We will introduce a single tariff of 2.5p/kWh for AWHP designed to achieve a minimum seasonal performance factor of at least 2.5.
27. The budget management quarterly tariff triggers for AWHP will be £23.7m in January 2015 and £39.3m in January 2016.

Energy from Waste

28. Creating and supporting markets for commercial and industrial waste energy recovery is essential for achieving the landfill directive targets and optimising resource efficiency across the economy.
29. Currently the RHI pays a tariff for the proportion of heat generated from the biomass in municipal solid waste (MSW), which has a biogenic content of 50% or higher. However, the biodegradable content of commercial and industrial wastes provides another renewable fuel source. We therefore intend to extend support to include energy from commercial and industrial wastes provided there is a minimum of 10% biogenic content in the waste. Support will be available at the tariff rates offered for biomass according to the percentage of biogenic content. The biomass CHP tariff announced in this consultation will not be available for energy from waste CHP owing to the lower costs of feedstock.

Calls for Evidence

30. We received eleven responses to the four calls for evidence. The evidence gathered has been used to inform the Early Tariff Review consultation and/or has otherwise informed the early thinking on the scope of the planned 2014 review of the non-domestic scheme.

Early Tariff Review - May 2013

31. In February of this year, we published our response to the July 2012 consultation, "Providing Certainty, Improving Performance"[6], on budget management and scheme improvements. This set out our approach to scheme reviews, including indicative criteria for completing an early review of tariffs, which we confirmed had been met. In May, we published a consultation on proposed increases to the current tariff levels for GSHP, biomass over 1MWth and solar thermal, updated proposed tariff levels for AWHP and biomass direct air, and proposed an update to the way in which we calculate the "value for money cap" which affects the tariff levels offered for the more expensive technologies. 72 stakeholders responded to this consultation. Respondents were generally in favour of the tariff increases and changes to tariff setting proposed. We will introduce all of the tariff increases capped at 10.0p/kWh of renewable heat.

Value for Money Cap and Tariff Rate of Return

32. When the non-domestic scheme was launched in November 2011, tariffs were capped at a level we considered reflected the support provided to offshore wind, which was judged to be the marginal technology that could be deployed to meet the 2020 renewables target. Therefore, in principle, paying more than this level was considered not to achieve good value for money in terms of contributing to meeting the 2020 renewable targets, which is the principal objective of the RHI, as funds could otherwise have been used to deploy cheaper renewable energy.

33. We consulted on updating the value for money cap applied to RHI tariffs to a range of between 10.0p/kWh and 11.3p/kWh (in 14/15 prices). To date, the cap has only affected the solar thermal tariff. The assessment set out in the Early Tariff Review consultation identified that under our new proposals the non-domestic GSHP tariff and solar thermal tariffs (in both the domestic and non-domestic schemes) would be affected.

34. The responses to the proposed range for the value for money cap demonstrated wide support for an increase to the value for money cap. However, having further reviewed our proposed approach we will not include the value of indirect support to offshore wind reflected in the upper end of the range (11.3p/kWh). There are a range of supports that would need to be accounted for – not just the EU ETS and Carbon Price Support as set out in the consultation – some of which could have negative impacts on the value for money cap. However, it is not possible to value the impact of all indirect support. As such, the current approach continues to be the best way to ensure good value for money in comparison to other technologies contributing to the Renewable Energy Directive (RED) target. Therefore, from Spring 2014 tariffs across the RHI will be capped at 10.0p/kWh of renewable heat (and continue to be adjusted by RPI annually).

35. We also invited views on the RHI rate of return. We continue to aim to incentivise up to the 50th percentile of the heat potential of each technology and to provide a pre-tax internal rate of return[7] on financial costs of 12%. This is done on the basis of the best available evidence, and subject to the value for money cap. We consider that this approach assists us in ensuring that the scheme does not give rise to overcompensation in the aggregate, in accordance with State Aid rules. The majority of consultation responses supported our

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[6] https://www.gov.uk/government/consultations/renewable-heat-incentive-providing-certainty-and-improving-performance

[7] The Internal Rate of Return (IRR) is a common way of appraising an investment. It refers to the discount rate that makes the net present value of all cash flows from a particular project equal to zero. In the case of RHI tariffs this means we set the tariff such that, when applying a discount rate of 12% to all financial flows (both benefits and costs) the NPV of the project is equal to zero.

approach of setting the internal rate of return at 12% and therefore we do not plan to amend this value.

Biomass Tariffs

36. The largest proportion of installation types accredited to receive the RHI is small biomass, with medium biomass being the second largest. The medium biomass tariff has already been subject to a tariff reduction as a result of the RHI budget management policy (degression). The Early Tariff Review consultation did not propose a change to these tariffs.
37. Large Biomass (greater than 1MWth) is a cost-effective renewable heating technology and using biomass for industrial processes and heating is identified as a priority pathway for biomass in the bio-energy strategy[3]. With appropriate sustainability and air quality requirements, large biomass can bring significant benefits, particularly in decarbonising industrial processes (as highlighted in "The Future of Heating: Meeting the Challenge"[4], "The Carbon Plan: Delivering our Low Carbon Future"[1] and the "UK Bioenergy Strategy"[3]).
38. To date deployment of large biomass has been below expectations and therefore we will go ahead with the proposed tariff increase to 2.0p/kWh.
39. The budget management quarterly tariff triggers for large biomass over 1MWth will be £20.8m in January 2015 and £37.2m in January 2016.

Ground Source Heat Pump Tariffs

40. As with AWHPs, GSHPs are expected to contribute significantly to the Government's long term aim of increasing energy efficiency and low carbon energy use.
41. We will be replacing the current banded GSHP tariffs with a single tariff of 7.2p/kWh, which will be tiered. The tier 1 tariff of 8.7p/kWh will be paid on the initial heat[8] generated for an eligible purpose and the tier 2 tariff of 2.6p/kWh will be paid on the remaining eligible heat generated. This is equivalent to a tariff of 10.0p/kWh renewable heat assuming an SPF of 3.6.
42. The budget management quarterly tariff triggers for GSHPs will be set at £15.6m in January 2015 and £35.0m in January 2016.

Solar Thermal

43. Solar thermal collectors are an important technology for enhancing the efficiency of systems when used in combination with other renewable heating technologies.
44. We will be raising the solar thermal tariff to 10.0p/kWh, in line with the updated approach to the value for money cap. We will be retaining the current 20 year tariff period.
45. The budget management quarterly tariff triggers for solar thermal will £5.5m in January 2015 and £9.8m in April 2016. More details on the adjustments to the budget management approach are set out below.

Eligibility Dates

46. The tariffs that will be available under the non-domestic RHI in Spring 2014 are summarised in Figure 1 Summary of Government. These are subject to State Aids and Parliamentary approval.

[8] The 'initial heat' is the amount of heat, in kWh, that would be generated by the installation if running at full capacity for 15% of the year (1314 hours).

47. The eligibility date for new technologies and new technology specific tariffs will be the same as the publication date of this document. This will affect air to water pumps (AWHP), biomass combined heat and power (CHP), deep geothermal and biogas combustion over 200kWth. New forms of waste, including those from the commercial and industrial sectors, will be eligible for use in RHI accredited energy from waste plants from Spring 2014.

48. Any applications with a date of accreditation of 21 January 2013 or later will benefit from the tariff increases brought forward as a result of the Early Tariff Review consultation. The increase will be applied once the new tariffs come into effect, but not backdated, and will apply to ground source heat pumps (GSHP), solar thermal and biomass over 1MWth.

49. Deep geothermal and biomass CHP installations are currently eligible for the large GSHP and large biomass tariffs respectively. Biomass CHP installations over 1MWth accredited between 21 January 2013 and the time that the new regulations come into force will receive the increased large biomass tariff of 2.0p/kWh. Those commissioned after the date this document is published and accredited after the regulations come into force will receive the new CHP specific tariff of 4.1p/kWh.

50. All deep geothermal installations accredited up until the date that the new regulations come into force will receive the current large GSHP tariff of 3.5p/kWh. Deep geothermal installations commissioned after the publication of this document and accredited after the regulations come into force in Spring 2014 will receive the new technology specific tariff of 5.0p/kWh. A summary of tariff changes and eligibility dates is set out in Annex A.

RHI Non-domestic Budget Management Policy

51. The long-term budget mechanism for the non-domestic RHI was announced in February 2013 and implemented in regulations in April 2013. It is designed to ensure the RHI remains financially sustainable and provides value for money to the taxpayer. Under this mechanism we reduce the tariffs paid to new RHI recipients if uptake of the scheme is higher than trigger levels set out in advance in legislation, based on forecast deployment for each technology. Since implementation, we have made three quarterly degression assessments, one of which resulted in the medium biomass tariff being reduced by 5%[9]. The outcome of the most recent assessment was published at the end of November. We will publish the fourth quarterly announcement by 1 March 2014.

52. In the May 2013 tariff review consultation we set out that the budget management policy would need to be developed in light of any tariff changes or scheme extensions and to reflect the outcome of the spending review for 2015/16, which has since confirmed an RHI budget in 2015/16 of up to £430m. Having reviewed the budget management mechanism to ensure it remains fit for purpose, we will make some changes to the policy from Spring 2014 to:

    - base the deployment levels set out in the degression mechanism on refreshed market intelligence rather than the expectations that were modelled prior to the scheme's introduction;
    - reduce the tolerance in the technology trigger for biomass under 1MWth and bio-methane injection by reducing the amount that these triggers are scaled above expected levels of deployment. They will change from being 150% of expected deployment to 120% of expected deployment. This will reduce the risk of unsustainable growth and dominance of the budget by a small number of technologies;

[9] https://www.gov.uk/government/statistical-data-sets/rhi-mechanism-for-budget-management-estimated-commitments

- set the triggers for technologies we expect to deploy in relatively lower volumes (solar thermal, deep geothermal and all biogas) at 2.5% of the overall budget, rather than the current 5%.

53. As an indicative example, the tariff triggers which would be applicable at an April 2014 assessment are set out in
54. Table 2 below. The combined effect of these changes is that all technologies supported under the scheme will have significant room for sustainable growth from current levels over the remainder of this spending review period, even though some technology triggers will be lower than those set out in the current regulations.

Table 2: *Indicative example - April 2014 scaled triggers*

Technology	April 2014 tariff trigger*
Small Biomass (< 200kWth)	£49.9m
Medium Biomass (200kWth – 1MWth)	£46.1m
Biomethane (all scales)**	£44.4m
Large Biomass (> 1MWth)	£14.1m
Small GSHP (< 100kWth)	£8.8m
Large GSHP (> 100kWth)	
Solar Thermal* (< 200kWth)	£3.1m

**These numbers may be refined before implementation and will apply subject to Parliamentary timetabling and approval.*

***Biogas combustion will no longer be included in the biomethane tariff trigger from Spring 2014 onwards and will have a separate trigger.*

Reducing uncertainty for projects with long-lead times

55. The Government recognises that certain features of the RHI create a level of uncertainty, particularly for projects with long lead times, which is hampering investment and potentially leading to missed opportunities to incentivise value for money renewable heat generation. To meet our legal obligations and long-term aspirations, it is essential that we capture these opportunities. We therefore intend to introduce a form of tariff guarantee for the largest installations (for example, those over 1MW), initially available for plant due to be commissioned by 31 March 2016. Subject to further policy development in 2014, State Aid and Parliamentary approval, we will aim for this measure to be in place from April 2015 to March 2016 and thereafter factored into the next spending review discussions on the RHI so that it can be available from Spring 2016 for plant due to commission by 31 March 2020.

Biomass Sustainability Update

56. Our response to "Providing Certainty, Improving Performance"[6] set out Government's intention that from 1 April 2014, RHI recipients would be required to demonstrate they had met the greenhouse gas lifecycle emissions savings target to be eligible for RHI payments. Compliance with land criteria would be enforced no sooner than April 2014 and no later than April 2015. Based on feedback from stakeholders about industry readiness, we will postpone implementing mandatory compliance with GHG lifecycle emissions savings to Autumn 2014, so that industry and participants can monitor their processes in light of the sustainability criteria and build the audit trail necessary to demonstrate compliance. We intend for the Biomass Suppliers List to be open for applications from suppliers of biomass in Spring 2014.

57. We have amended RHI policy so that sustainability standards are not grandfathered. This is being done in order to simplify the running of the scheme and ensure we are able to retain flexibility for the future, should new evidence regarding sustainability come to light. To provide certainty for investors, we intend to align any future reviews of the RHI sustainability criteria with periodic reviews of the RHI scheme.

58. Subject to the availability of Parliamentary time, we intend to implement land-use sustainability criteria by 1 April 2015.

Public Grants

59. The RHI currently prevents applicants that have benefitted from a public grant for the installation of a renewable heat system from accessing the scheme. The exception is plant completed and first commissioned between 15 July 2009, when the RHI was first announced, and the introduction of the scheme on 28 November 2011. In these cases the grant must be repaid to the granting authority before RHI payments can be made. After two years of the non-domestic RHI we think a more flexible approach to the interaction between public grants and the RHI could encourage more renewable heat installations to come forward.

60. Pending further work alongside the 2014 review to look at the interaction between public grants and the non-domestic RHI, we intend to introduce some additional flexibility next year. We will take forward regulatory amendments to extend the eligibility window for repayment of grants and to allow some grant recipients who are unable to pay back their grants to access the RHI via reduced tariff payments.

Next Steps

61. Subject to State Aid approval, our aim is to lay the amending regulations needed to implement the changes set out in this document formally in Parliament in early 2014. We expect that these changes will come into force by Spring 2014.

Introduction

62. The UK's National Renewable Energy Action Plan progress report 2013 will be published at the end of this year and will provide a summary of our overall progress towards our legal obligations to achieve 20% renewable energy by 2020.

63. In 2012 around 15.2TWh energy was generated from all renewable heat sources, an increase of 7% on the previous year. The sector is continuing to see some growth, following a decline that started more than 10 years ago as a result of tighter emission controls which discouraged on-site burning of biomass, especially wood waste. Since their 'low point' in 2005 bioenergy use has more than doubled to 13.9TWh; the increase between 2011 and 2012 was 4%. Our analysis suggests that by 2014/15 there is expected to be more than 19TWh of renewable heat with the changes set out here adding around 6.4TWh in 2015/16. This is expected to rise more quickly during the latter part of the decade and will continue to play a key part in the UK reaching its 2020 targets.

64. In November 2011, we launched the first phase of the RHI scheme by offering support for key renewable heating technologies including biomass, GSHP, solar thermal and biomethane injection in the non-domestic sector. Since then the application rate has been relatively steady, with applications received from a range of sectors including industry, small businesses, supermarkets and schools, and across a range of technologies.[10] As of 30 October 2013 we have registered 3,554 applications to the scheme, with 2,657 installations accredited representing 547 MW of installed capacity. Of these installations, 497 GWh of heat has been generated for the 1,776 installations that have received payment. This encompasses a range of renewable heat technologies, as shown in Figure 2 overleaf.

65. While growth has been steady, scheme participation has not achieved the levels that were expected when the scheme was launched for some technologies. The changes set out here are intended to boost deployment and the contribution of the RHI to the 2020 renewables target and the longer term objective of decarbonisation. This document details the Government response to 3 consultations:

    i. Air-Water Heat Pumps and Energy from Waste, September 2012[11];

    ii. Expanding the Non-domestic Scheme, September 2012[12];

    iii. Non-domestic Scheme Early Tariff Review, May 2013[13].

[10] http://www.decc.gov.uk/en/content/cms/statistics/rhi/rhi.aspx

[11] https://www.gov.uk/government/consultations/renewable-heat-incentive-air-to-water-heat-pumps-and-energy-from-waste--2

[12] https://www.gov.uk/government/consultations/renewable-heat-incentive-expanding-the-non-domestic-scheme

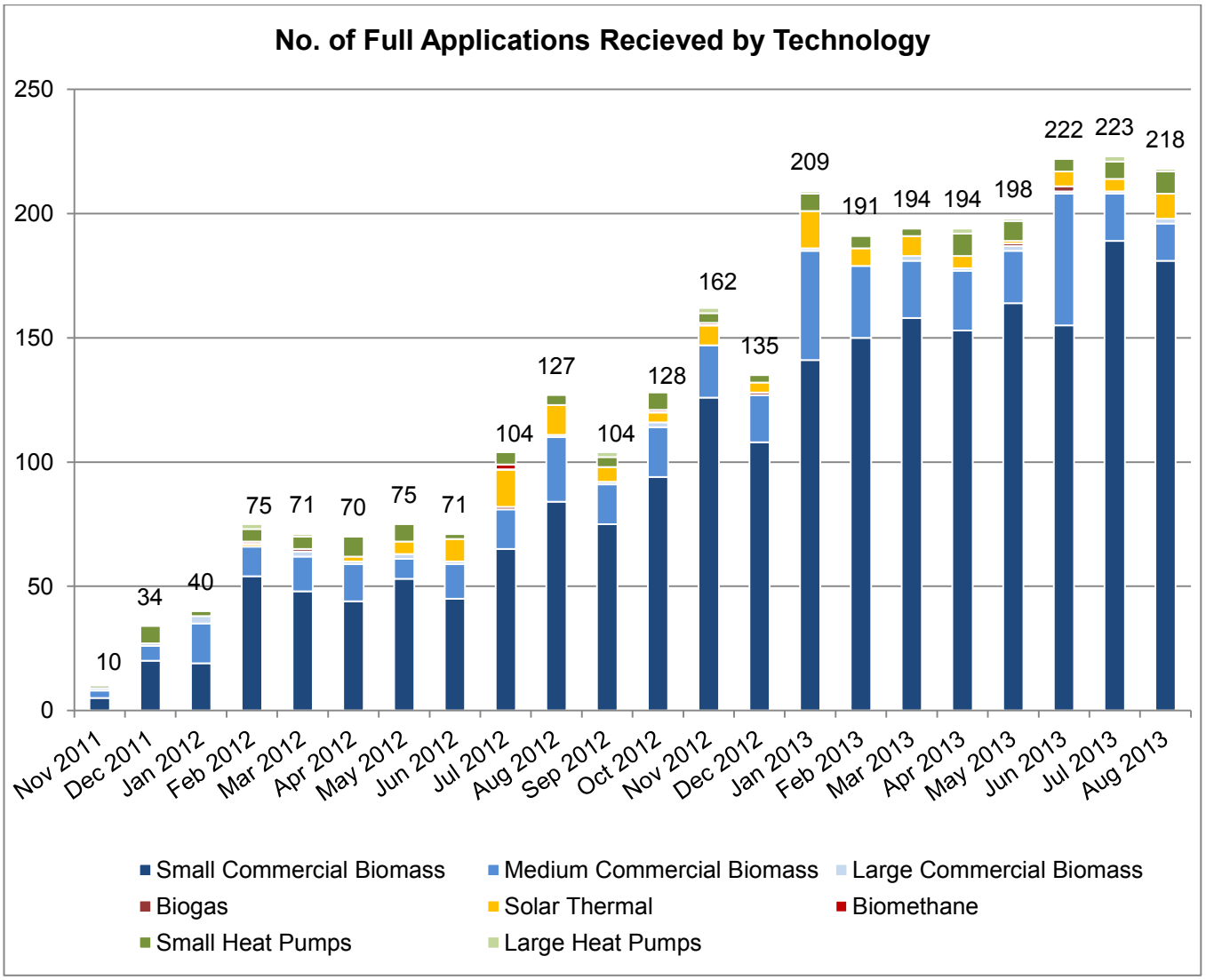
[13] https://www.gov.uk/government/consultations/non-domestic-rhi-early-tariff-review

66. In September 2012 we also issued four calls for evidence:

- Bio-propane
- Large biomass
- GSHP
- Landfill Gas

67. The evidence gathered in response to the GSHP and large biomass calls for evidence was incorporated into the proposals we set out in the Early Tariff Review consultation. Our consideration of the evidence provided in response to the Biopropane and Landfill Gas calls for evidence is set out in this document.

Figure 2: *Full applications to the non-domestic RHI*



Overview of the Consultations

September 2012 Consultations: i) Expanding the Non-Domestic Scheme; ii) Air to Water Heat Pumps and Energy from Waste

68. In September 201 2 we consulted on proposals to expand the non-domestic scheme to include additional technologies for which policy could not be finalised in time to be included in the initial phase of the scheme or there was not sufficient evidence to support tariff setting. The tariffs that were proposed are set out in Table 3 below.

Table 3: *Proposed tariffs in September 2012 consultations*

Technology		Proposed tariff (p/kWh)
Heating only AAHP		0.97
AWHP		1.7
Biomass Direct Air Heating	<1MW	2.1
	>1MW	1
Biogas Combustion	200-500kW	5.9
	>500kW	2.2
CHP: Biomass, bioliquid		4.1
Deep Geothermal		5.0
Energy from Commercial/Industrial waste		1.0

Non-Domestic RHI Early Tariff Review (May 2013)

69. In order to learn more about the main drivers of the tariffs, DECC commissioned a study[14] in August 2012 on the costs and performance of renewable heat technologies. Following the completion of this work and in light of scheme performance to date and strong stakeholder feedback we announced our intention to carry out a review of the evidence base used to set existing tariffs in the non-domestic RHI on 21 January 2013.

70. Our review of non-domestic scheme costs and performance concluded that higher tariffs were needed for some of the technologies already supported in the scheme. In response, DECC consulted on proposals to revise the non-domestic RHI tariffs on 31 May 2013.

71. Table 4 shows the current support and the changes that we proposed through the tariff review consultation.

72. The tariff review consultation also presented updated indicative tariffs for AWHP and biomass direct air heaters since we had new evidence to inform tariff setting on these technologies. The proposed tariffs were all subject to the value for money cap.

[14] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/204275/Research_on_the_costs_and_performance_of_heating_and_cooling_technologies__Sweett_Group_.pdf

Table 4: *Existing support and proposed new tariffs from consultation*

Technology		Current tariffs (p/kWh)[15]	Reviewed tariffs (p/kWh) (proposed for 2014/15)
Biomass Boilers	**Small** (up to 200kWth)	Tier 1: 8.6, Tier 2: 2.2	**NO CHANGE**
	Medium (200kWth to 1MWth)	Tier 1: 5.0, Tier 2: 2.1	
	Large (1MWth and above)	1.0	**2.0**
GSHPs	**Small** (up to 100kWth)	4.8	**7.2-8.2**[16]
	Large (100kWth and above)	3.5	
Solar Thermal	(up to 200kWth)	9.2	**10-11.3**

Table 5: *Proposed new tariffs for extension technologies updated in tariff review consultation*

Technology		Tariff proposed in September 2012 (p/kWh)	Reviewed tariffs proposed for 2014/15 (p/kWh
AWHP		1.7	**2.5**
Biomass Direct Air Heating	**Small and medium** (<1MW)	2.1	**2.5**
	Large (>1MW)	1.0	**2.0**

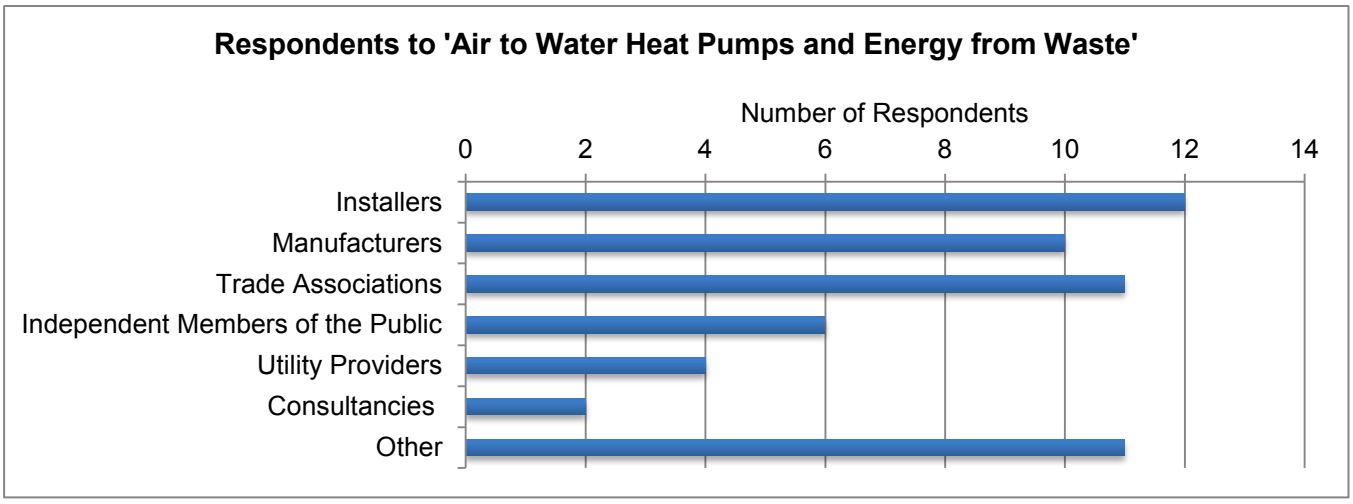
Consultation respondents

73. All consultations received responses from across the renewable heat supply-chain, although there tended to be a greater number of responses received from installers and trade associations.

Air to Water Heat Pumps and Energy from Waste

74. A total of 56 respondents contributed to the first of the three consultations, entitled “Air to Water Heat Pumps and Energy from Waste”, by answering one or more questions. The breakdown of respondents is shown below.

Figure 3: *Respondents to ‘Air to Water Heat Pumps and Energy from Waste’*



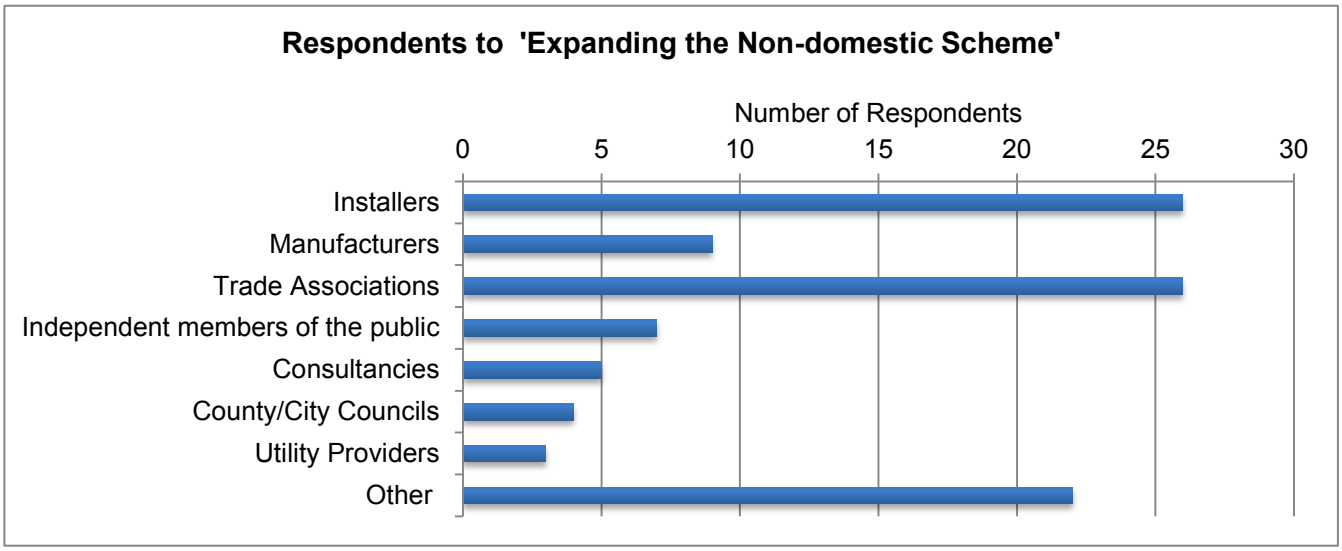
[15] For comparison purposes please note that these tariffs will be updated in 2014/15 for any RPI increase from the previous year. https://www.gov.uk/government/consultations/non-domestic-rhi-early-tariff-review

[16] Equivalent to 10.0p/kWh - 11.3p/kWh of renewable heat

Expanding the Non-Domestic Scheme

75. 102 respondents contributed to the second of the three consultations, entitled "Expanding the Non-domestic Scheme", by answering one or more questions. The breakdown of respondents is shown below.

Figure 4: *Respondents to 'Expanding the Non-domestic Scheme'*



76. At the events held across the country in Autumn 2012 as part of the consultation, the issues most raised by participants were:

- How support for CHP installations would work, particularly the interaction with support from the RO. There were mixed views on whether a CHPQA was required;
- Strong support for inclusion of AWHP;
- The proposals on energy efficiency were unpopular, with attendees suggesting that we need to concentrate on securing higher levels of deployment of renewable heat, rather than giving applicants further barriers in the form of energy efficiency requirements;
- Suggestions on how to measure the heat output of biomass direct air systems. There were strong views that we should not move away from paying the RHI on the basis of metered (rather than deemed) heat as this would open the RHI up to significant risks of fraud and gaming.

Non-Domestic Scheme Early Tariff Review

77. A total of 72 respondents contributed to the last of the three consultations, entitled 'Non-Domestic Scheme Early Tariff Review', by answering one or more questions. The distribution of respondents is shown in Figure 5 overleaf.

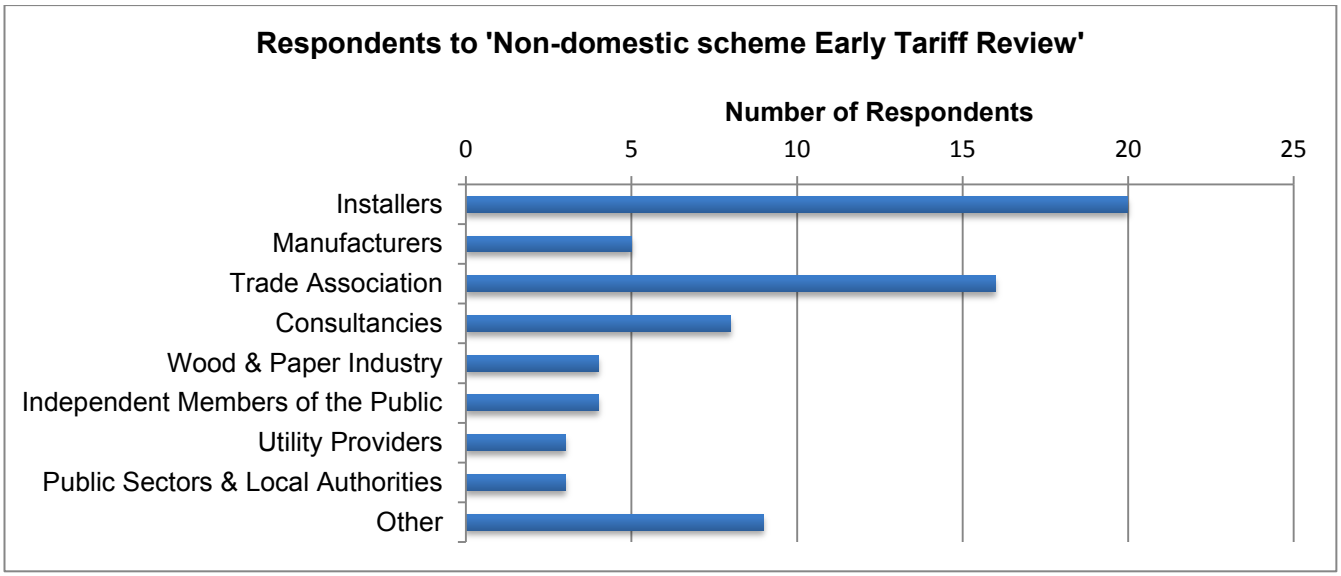
78. During the consultation period we conducted ten bilateral meetings with stakeholder groups, we also attended three stakeholder events and held a web chat to aid discussion and policy development. The main areas of discussion during these sessions were:

- A consensus that the large biomass tariff should be increased;
- The seasonal performance factor that should be used for GSHPs to convert the capped tariff paid for renewable heat to the tariff paid to GSHPs for all heat;

- The approach taken to tiering the GSHP tariff;
- Interaction between the tariff consultation and budget management policy, and in particular concern about the impact of the medium biomass degression (which had just been announced on 1 June) on the market.

79. The accompanying impact assessment[17] aims to quantify the impact of the changes set out in this policy document and responses to the consultation. It sets out the underpinning evidence base, uncertainty and analytical approach and presents our evaluation of the likely impact of our proposals, including monetised costs and benefits, deployment potential, cost effectiveness and net-present value.

Figure 5: *Respondents to 'Non-Domestic Scheme Early Tariff Review'*



[17] https://www.gov.uk/government/consultations/renewable-heat-incentive-expanding-the-non-domestic-scheme

Expanding the Non-Domestic Scheme

80. On 20 September 2012 we launched two consultations and four calls for evidence detailing or relating to proposals to extend the non-domestic RHI. The technologies in the consultations fell into three main categories:

    - Those we had previously considered introducing support through the RHI but had been unable to include in the initial tranche when the RHI launched in November 2011. The reasons we had been unable to introduce support for these technologies varied significantly, from metering challenges to lack of evidence and fundamental consideration of the suitability for subsidy for a particular technology;
    - Technologies that were not included in the original RHI proposals but for which there could now be a case for inclusion;
    - Technologies that were supported under the RHI but for which the tariff levels did not reflect their particular costs and performance.

81. This section details our final decisions, subject to Parliamentary and State Aid approval, on the technologies where specific tariff proposals were put forward.

Eligibility Date

82. The eligibility date for the new tariffs that are set out in this section will be the date of this publication (i.e. for the tariffs for biogas combustion over 200kWth, CHP, deep geothermal heat, and AWHP). This means that the owners of installations commissioned after the date of this publication will be able to apply for the new RHI tariffs once they are available in Spring 2014. The owners of installations commissioned prior to the date of this publication will not be eligible for these tariffs.

83. This approach will provide good value for money, ensuring support for new installations that have been brought forward in response to the new tariffs.

84. We have considered other eligibility dates, the first of which is the date the regulations come into force in Spring 2014. We ruled out this date on the basis that it could trigger a market hiatus whilst energy consumers delay commissioning projects in order to be eligible for the RHI. We have also ruled out both July 2009, the eligibility date for existing non-domestic RHI support, and September 2012, the date the consultation was launched. Neither of these dates offers value for money to the taxpayer as we would be paying for installations which were not incentivised by confirmed RHI support. We expect we would also encounter difficulties obtaining State Aid clearance if adopting these eligibility dates, as it would be challenging to demonstrate any incentive effect for these installations.

Biogas combustion over 200kWth

85. The RHI currently supports biogas combustion from gas produced from solid biomass, solid waste and liquid waste. By biogas combustion we mean the creation of biogas and its subsequent use on site either for heating only or for CHP. Typical examples include space heating or drying applications in buildings nearby to the biogas production plant. Support has been limited to plants with an installed thermal capacity of less than 200kWth due to limited data on the costs of larger plants. The further upgrade of biogas into biomethane and its injection into the gas grid is supported at all scales in the RHI but is unaffected by the decisions on biogas combustion over 200kWth.

86. Eligible methods of creating biogas are anaerobic digestion (AD) and advanced conversion technologies (ACTs), although we expect the majority of biogas combustion in the RHI to come from AD. AD plays an important role in the "UK Bioenergy Strategy"[3] as a means of dealing with organic waste and avoiding the greenhouse gas (GHG) emissions that are associated with its disposal to landfill though more efficient capture and treatment. It can be used to generate electricity, heat or transport fuels (or combinations of each). Typical feedstocks are "wet" wastes such as food waste, farm wastes (manures and slurries), sewage sludge and purpose-grown crops such as maize and silage. The process involves the breakdown of organic material by micro-organisms in the absence of oxygen. This results in a reduction in the quantity of organic material and the production of biogas, consisting mainly of methane and carbon dioxide. The biogas can be used in a boiler or CHP engine to generate renewable heat. It also produces a nutrient-rich digestate that can be used as a fertiliser.

87. The main types of ACT treat "dry" wastes at high temperatures with little or no oxygen present. Gasification produces a gas which is a mixture of carbon monoxide, hydrogen, carbon dioxide and methane. Pyrolysis produces a solid char and either a gas or oil (or both). The outputs of both technologies can be burned in a boiler or CHP engine to generate heat.

88. We are not making changes to existing biogas combustion support for plants which are under 200kWth capacity. Rather, the key issue under consideration is the introduction of support to biogas combustion plants over 200kWth.

What we proposed

89. We proposed to introduce support under the RHI for biogas combustion over 200kWth in order to recognise the valuable contribution that this technology could make to the production of renewable heat, waste management and reduction of GHG emissions.

90. Our evidence suggested that savings on gate fees[18] totalled more than the cost of setting up a biogas plant, meaning no support was necessary. However, deployment rates suggest that gate fee savings alone are not sufficient to stimulate investment. In addition, with the FiTs and the RO supporting biogas for electricity generation over 200kW, the current limit in the RHI of 200kWth means the incentive for heat generation is inconsistent with electricity generation.

91. We signalled our intention to update our evidence base and cost assumptions to produce tariffs using the standard RHI tariff setting methodology. However, to provide a point of reference the consultation provided some indicative tariffs linked to the existing support

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[18] Gate fee – This is a charge levied on a given quantity of waste that is collected or received at a waste processing facility. In the case of the RHI this facility could be an energy from waste or anaerobic digestion plant.

under FiTs and the RO, but with built-in reductions to reflect the differences between heat and electricity. The proposed tariffs were 5.9p/kWh for medium installations (200 – 500kWth) and 2.2p/kWh for large installations (>500kWth).

92. We sought views on the indicative tariffs and asked for evidence-based suggestions on alternative bandings, given that the bandings we proposed were based on FiTs bandings rather than heat-specific applications of biogas technology.

93. We also proposed to maintain the current interpretation of the heat capacity limit for biogas CHP systems, which included the thermal jacket from which the heat was produced, rather than just the heat exchanger. We explained how the introduction of a medium installation tariff would permit those CHP installations - in particular, those whose thermal jackets pushed them above the current 200kWth capacity limit – to claim the RHI. We sought views on our suggested position that there would be no need to adjust the current interpretation of capacity.

What respondents said

94. 46 of 49 (94%) respondents supported the introduction of support for biogas installations over 200kWth, with some suggesting that tariffs should be paid retrospectively upon inclusion of this technology within the RHI. There were suggestions that biogas should be subject to minimum environmental standards such as those in place for biomethane. Some respondents went further to suggest that the RHI should support biomethane only, as they thought it was the cleaner, more efficient technology.

95. Of the 24 respondents who shared views on tariff bandings, the majority expressed support for DECC's proposals. Some raised the concern that having multiple tariff bands might distort the market. Of those respondents that expressed a view on the tariff banding cut-off points, most were broadly supportive of the proposals. Some highlighted that the proposed bands, which simply reflect the FiTs bandings, did not take into account the fact that thermal capacity was higher than electrical capacity.

96. On the question of indicative tariffs 15 of 23 respondents (65%) agreed with the proposals. In particular, there was general support for the medium tariff, but there were several calls for the large tariff to be higher (at least 3.0p/kWh, with another suggestion of 4.1p/kWh).

97. Respondents in support of the proposed tariffs felt that another band was required for 500kWth to 1MWth systems, as they felt that the proposed tariff levels were too low to incentivise this scale of technology.

98. Some stakeholders expressed concern that electricity producing biogas plants would already be considered to be commissioned as CHP engines because they were used to provide heat to processes involved in the biogas production.

99. On the question of whether we should continue to base the capacity limit for biogas CHP installations on the total installed peak output capacity, including the thermal jacket and heat exchangers, 13 of 21 respondents (62%) agreed with our proposal: agreeing that the current approach was the correct way to set the capacity limit of an installation as this is how the useable heat can best be identified. Those who disagreed (38%) suggested that the heat recovery systems in such installations also needed to be taken into account and that perhaps a requirement for all available heat to be utilised should be in place, using category 1 meters.

Government consideration

100. Biogas combustion can make a significant contribution to meeting our renewables targets. Biogas offers a sustainable solution to waste management, using waste that would otherwise go to landfill, thereby making GHG savings as well as providing a renewable source of heat.

101. The current limit of 200kWth capacity for RHI support for biogas combustion excludes the majority of pipeline biogas projects and a large proportion of renewable potential of this technology. These plants range from medium sized AD plants on farms, likely to be only slightly above the current capacity limit, to multi MW plants on industrial sites such as whisky distilleries and cheese processing plants.

102. It is not always practical for a biogas project to be upgraded for biomethane injection because of additional costs and lack of access to a grid injection point. We do not want to exclude from support those projects that make use of available waste feedstock to meet a local heat requirement and will not therefore be limiting support in this way.

103. We are in discussion with the European Commission about the approach being taken to setting the biogas tariffs since, as we don't have a supply curve for this technology, they have been calculated differently from other RHI tariffs due to the limited evidence for this technology. **We intend to introduce support for biogas combustion over the current 200kWth capacity limit provided that State Aid approval is obtained.**

Tariffs and bandings

104. The majority of biogas projects at the medium and large scales will be combined heat and power systems and claiming support for electricity generation under the FiT, RO or CfD mechanisms. The current disparity between support for electricity and heat means it is often not economic for installations to capture and use the heat from these systems and make the most efficient use of the energy produced. It is important that the level of RHI support accurately reflects the costs of this technology and is compatible with existing support under FiTs and the RO in order to lead to efficient outcomes where owners of biogas technologies produce heat or electricity depending on when it is efficient to do so.

105. The approach of basing RHI tariffs and size bands on the support available under FiTs, and adjusted for the differences in opportunity costs, ensures that funding is used efficiently across electricity and heat production and that there is no incentive to inefficiently alter the ratio between heat and electricity generation. The tariffs consulted on represent the subsidy value placed on a unit of biogas produced energy under FiTs.

106. Further to the consultation, we sought more detailed costs from biogas projects of various sizes. This information confirmed the view that heat producing biogas plants were likely to be CHP and also that a tariff was required. Based on the costs of these plants, and taking into account support already received under FiTs, we concluded that the proposed tariffs were the right level to make the capture and delivery of heat from biogas viable. **We therefore wish to introduce support at the tariff levels proposed in the consultation of 5.9p/kWh for medium installations and 2.2p/kWh for large installations, subject to State Aid approval.**

107. The size bandings for RHI tariff support that we proposed were that the large tariff threshold be set at 500kWth in line with FiTs. While the principal of linking the tariff bands to FiTs gained support, we recognise the argument that because of the differences between heat and electricity generation, electrical capacity does not convert directly to thermal capacity.

108. Our current interpretation of thermal capacity is the total installed peak heat output capacity, which includes the thermal jacket. We believe that this is the correct one, but we

recognise that this means that thermal capacity will be higher than the electrical capacity for CHP systems.

109. A cut off point for medium and large installations of 500kWth as consulted on would therefore not be equivalent to the FiTs bandings. A CHP biogas combustion plant built to an electrical capacity of, say, 499kW in line with the FiTs bandings would likely have a thermal capacity of over 500kWth.

110. **To reflect this we will set the band for the tariff for medium sized installations at 200 – 599kWth, with large installations being defined as those 600kWth and over in order to align better with the FiTs bandings.** We will not raise the cut off point for smaller biogas plants to 300kWth as suggested by some respondents, because our analysis of costs for real life projects suggests that the tariff of 5.9p/kWh was sufficient to incentivise those projects just above the current 200kWth threshold.

Eligibility

111. There are around 70 electricity producing AD plants that are not currently making use of the heat produced from the electricity generating process. This heat could potentially be put to use if the RHI were available.

112. The RHI is intended to incentivise new sources of renewable heat, it therefore has an existing requirement that installations must be new and commissioned after the eligibility date in order to be eligible for the RHI. For CHP systems that were previously producing electricity we do not require that the whole installation be new, instead we only require that the installation was commissioned as CHP after the eligibility date. In practice, this means that the installation must have had a heat exchanger added to an electricity-only plant in order to be considered new. We will not be changing this approach since we do not believe that it is good value for money to offer a tariff for the capture and transportation of heat from a pre-existing CHP plant. Allowing existing CHP biogas plants to access the RHI could present the risk of overcompensating participants who make only small adjustments to capture the heat.

113. Therefore we will require plants to be commissioned as CHP after the eligibility date. This will be 15th July 2009 for installations below 200kWth and the date of this publication for installations 200kWth and above. We will continue to require that heat only biogas plants are new and commissioned after the eligibility date of the date of this publication in order to be eligible for the RHI.

Biogas CHP QA Requirement

What we proposed

114. The EU's Cogeneration Directive, since superseded by the Energy Efficiency Directive (EED)[19], requires that support given to CHP for electrical output must be subject to certain levels of quality assurance procedures (see the CHPQA section of biomass CHP section below for more detail). No such requirement currently applies to biogas installations receiving RHI because the tariff is not specific to CHP and supports heat rather than electricity.

115. However, recognising that CHPQA standards ensure that CHP systems are of good quality and as energy efficient as possible, we sought views on the possible introduction of a CHPQA requirement for biogas CHP installations.

What respondents said

116. A small majority of respondents (18 of 29, or 62%) supported requiring CHPQA accreditation in order to receive RHI support, as this would help to ensure efficiency in the installation of this technology. Those not in favour of this proposal cited the administrative costs of proceeding through the CHPQA process as potentially prohibitive for installations under 1MWth, and the apparent policy disconnect of introducing an additional obstacle to deployment of renewable heat at a time when increased uptake is required.

Government consideration

117. On balance, and given the range of views expressed through the consultation, we consider that while introducing a CHPQA requirement would ensure that CHP systems are of a good quality we do not want to introduce onerous requirements, particularly given that the tariff is the same for heat only installations as it is for CHP.

118. Although CHPQA ensures a level of efficiency, heat generation is more efficient than electricity generation in biogas systems. Adding in a requirement for CHPQA in order to receive the RHI could have the opposite impact of dis-incentivising the more efficient use of energy that CHP systems offer. **Therefore we will not introduce a requirement that biogas combustion installations are CHPQA accredited in order to receive the RHI.**

[19] http://ec.europa.eu/energy/efficiency/eed/eed_en.htm

Biomass and Bioliquid Combined Heat and Power

119. Biogas, biomass or geothermal CHP installations are already eligible for the RHI. CHP installations do not currently have a specific RHI tariff, but the installation is able to claim the tariff applicable to the heat technology it uses, subject to banding and sizing limitations of that technology. The RO can also be claimed in respect of the electricity generation of such installations.

120. For biomass, eligibility is subject to the condition that plants have not been accredited as a dedicated biomass CHP generation stations under the RO, which entitles them to an additional ½ Renewables Obligation Certificate CHP uplift ('the CHP uplift'). The CHP uplift is paid in addition to the ROCs paid for electricity generated and for 2013/14 ½ a ROC is valued at around 2.3p/kWh of electricity produced. However, this uplift will not be available to new plants from April 2015, and consequently CHP plants are already beginning to look to the RHI as an alternative.

121. The inclusion of bioliquid CHP under the RHI had not previously been proposed. However bioliquid CHP produces the most total energy per unit of input fuel leading to high levels of efficiency and carbon savings. CHP plants can also offer a use for bioliquids that are not suitable for the transport sector and the potential to innovate to produce more advanced biofuels that will be important to help decarbonise the transport sector in the future.

What we proposed

122. We recognised that the current RHI arrangements do not offer sufficient long term CHP support for certain technologies. Evidence suggested that the large biomass tariff of 1p/kWh was too low for biomass CHP; and there was no support for bioliquids. We also recognised the significant extra costs associated with building a CHP plant compared to electricity or heat only installations.

123. Consequently we proposed a tariff of 4.1p/kWh for new biomass and bioliquid CHP installations entering the scheme. Our proposals to extend the biogas capacity limit beyond 200kWth should be sufficient to incentivise deployment of larger biogas CHP installations.

124. We made clear that support for bioliquids would be dependent on introducing mechanisms to limit the use of bioliquids in the RHI so as to avoid diverting significant volumes of bioliquids from the transport sector, which has a priority call on their use. These mechanisms are also intended to limit emissions caused by Indirect Land Use Change where existing food crops are displaced by the production of crops for fuel.

125. We proposed that eligibility would be linked to the mandatory sustainability criteria regarding the sourcing of bioliquids which are already applied under the RO by introducing a requirement that bioliquid CHP are accredited on the RO scheme. An alternative of a lower tariff was also suggested.

126. Finally, we set out our preference that all new biomass and bioliquid CHP installations entering the RHI would need to undergo the CHP Quality Assurance process (CHPQA). This is a requirement of the EED[19] (which replaces the Cogeneration Directive cited in the consultation) when specific support is provided for CHP on the electrical output.

What respondents said

127. 53 out of 56 respondents (95%) agreed that a dedicated biomass CHP tariff should be introduced, pointing out the need for increased support for CHP once the entitlement to the CHP uplift ceases in 2015. Of those who did not support a biomass CHP tariff, concerns

were raised that the CO_2 emitted during the transportation process when importing fuels into the UK might offset any emissions saved through the use of biomass in heating.

128. 35 out of 41 respondents (85%) supported our proposed biomass CHP tariff of 4.1p/kWh. Support was mainly based on the view that the proposed RHI tariff would offer a similar level of support as currently provided under the RO. Those who did not agree with the proposed biomass CHP tariff either had reservations about including such a technology in the RHI, or felt that a higher tariff of 5.0p/kWh or 5.5p/kWh should be offered.

129. 20 out of 25 respondents (80%) stated that a bioliquid CHP tariff should be provided under the RHI and that 4.1p/kWh was suitable. Some respondents felt that providing an RHI tariff would offer a welcome means of strengthening the bioliquid fuel supply-chain and could increase the technical potential for transport biofuels.

130. Those respondents who did not support a tariff for bioliquid CHP suggested that the technology was only 20% as efficient as biomass CHP. Others feared that UK food production would be at risk if the production of bio-crops for the purposes of creating bioliquids sharply increased.

131. 12 out of 18 respondents (67%) agreed with our proposal to limit the quantity of bioliquid eligible for RHI tariff support. It was felt that doing so would reduce the chance of UK 'cash-crop' production and would help to protect food production.

132. 15 respondents provided views on whether an enforced link to the RO or a low tariff would be the best mechanism for limiting the quantity of bioliquid eligible for RHI tariff support. Neither method gained a strong majority of support, but there was a slight weighting towards using low tariffs to provide a limit. This was largely down to the view that such a method would allow the market to operate more naturally.

133. Those who did not support a limit on the quantity of bioliquid eligible for RHI tariff support felt that it would hold back the production of biofuels, and consequently have a negative impact on the growth of the country's green transport infrastructure.

Government consideration

Biomass CHP

134. Where there is a demand for both heat and electricity, CHP systems offer the most energy efficient use of fuel. CHP is identified in the "UK Bioenergy Strategy"[3] as a low-risk energy deployment pathway for biomass use to 2030, enabling biomass to contribute to both renewable electricity and renewable heat targets.

135. We believe it is important to give clarity and certainty to industry about how CHP will be supported owing to the CHP uplift ceasing in April 2015 and the complexity of CHP systems meaning they often have long lead in times from investment decisions to commissioning. In addition, the RHI could provide a better targeted support mechanism for the heat from CHP systems than the RO as the RHI pays on eligible heat use.

136. Biomass CHP is already eligible for the RHI under the standard biomass tariff. However since CHP has specific associated costs and risks the biomass tariff is not sufficient to incentivise CHP heat production. The tariff proposed was based on input data from evidence gathering carried out in conjunction with the RO banding review and using the standard RHI tariff setting methodology.

137. The small and medium biomass tariffs do not provide an appropriate mechanism for smaller CHP installations since the tariffs are tiered, with support reducing after initial heat generated. For CHP, which typically have high heat loads, tiering in this manner could incentivise a lower than optimum use of heat.

138. Many respondents to the consultation made clear that additional support under the RHI is necessary to incentivise biomass, especially when the ½ ROC uplift ceases to be available. The proposed tariff of 4.1p/kWh, which was based on standard RHI tariff setting methodology, received widespread support. **We will therefore introduce a tariff of 4.1p/kWh for CHPQA certified biomass CHP.**

139. The biomass CHP tariff was not proposed for, and will not apply to, Energy from Waste CHP plants. Energy from Waste CHP is dealt with in the Energy from Waste section below.

Bioliquid CHP

140. Bioliquids are not currently supported in the RHI but are supported for electricity generation under the RO. CHP is a more efficient use of bioliquids than electricity only, delivering increased greenhouse gas savings over use in electricity generation. Additionally, CHP plants can use advanced bioliquids with very high greenhouse gas savings and low sustainability risks. However, the Government's position is that any support for bioliquids should not divert feedstocks suitable for use in transport from that sector and should ensure any fuel is sustainable and does not have any adverse land use impacts.

141. The RO introduced a supplier cap for bioliquids following analysis of the availability of sustainable bioliquids not suitable for use in transport. The supplier cap reflects the high level of uncertainty over the availability of bioliquids which do not have applications as transport fuels.

142. While the cap represents a cautious approach under the RO, the increase in support for bioliquids that the proposed CHP tariff represents means there is no guarantee that significant amounts of additional feedstocks will not be diverted from transport.

143. The Government believes that bioliquid CHP can provide an efficient use of non-transport bioliquids and should be supported within the limits of sustainable supply. However, the Renewable Energy Directive, which outlines mandatory sustainability criteria for bioliquids, limits our ability to ring-fence only those bioliquids which we would want to support.

144. With the RO CHP uplift ceasing, without RHI support, from April 2015, there will be no Government incentive for the use of CHP bioliquid over electricity only. However, the ROC uplift is still available for new CHP plants up to 31 March 2015. **Therefore we will not be introducing support for bioliquid CHP in the RHI at this time.**

145. However, we continue to believe that sustainable non-transport bioliquids can make a valuable contribution to the renewable energy targets through CHP. We also see potential for bioliquids produced from waste residues that would otherwise go to landfill to be used for heating-only applications as a potential sustainable source of renewable heat.

146. **We are therefore planning, as part of the scheduled 2014 non-domestic RHI review, a project to assess the case for the inclusion of certain bioliquids in the RHI**. A key challenge of this project will be to develop a method of distinguishing sustainable, non-transport feedstocks which we would want to see being used for generating heat, from those which should be prioritised for use in transport.

147. The consultation on the draft Electricity Market Reform Delivery plan, published in July 2013, did not set a strike price for bioliquids at that time. The finalised strike prices will be confirmed in the Electricity Market Reform Final Delivery Plan which is scheduled for publication by the end of December.

Eligibility

RO/RHI Interaction

148. While the RO CHP uplift remains available until 1 April 2015, new dedicated biomass CHP installations will be eligible to make a one-off choice about whether to (i) receive the RO (1.5 ROCs per MWh electricity generated) on their electricity generation plus the RHI CHP tariff for their renewable heat generation, or (ii) the RO amount (1.5 ROCs per MWh electricity) plus the 0.5 ROC CHP Uplift if accredited under the RO as a biomass CHP.

149. The RHI is intended to incentivise new deployment of renewable heat technologies and so installations will not be able to "switch" from receiving the 0.5 ROC CHP uplift to the RHI CHP tariff.

150. **Participants will therefore be able to claim the RO on their electricity generation and the RHI on the eligible heat use provided they have not received the ½ ROC uplift under the RO.**

151. Under the Government's new support mechanism, CfD, the strike price for biomass CHP is set to be equivalent to the RO support for dedicated biomass power only (i.e. without the CHP uplift). The intention is for participants to be able to apply for the RHI as well as CfD support. The finalised strike prices will be confirmed in the Electricity Market Reform Final Delivery Plan which is scheduled for publication by the end of December.

CHP Quality Assurance

152. The EU's EED[19] requires that any support given to CHP must be subject to certain levels of quality assurance procedures for electrical output. The UK has a CHP Quality Assurance programme (CHPQA) which assesses the quality of CHP schemes and their efficiency. In order to receive CHP support for electrical output in the RO we require that systems are certified as "good quality CHP" in the CHPQA.

153. As the RHI in itself requires an eligible heat use, being certified as "good quality" by the CHPQA process is less significant for the RHI and the EED[19] requirements are only applicable to support on electrical output. The RHI only pays on renewable heat produced via the CHP engine and overall efficiency increases with greater heat outputs. However the CHPQA scheme is valuable as a means of ensuring the plants are not biomass plants which generate a small amount of electricity in order to claim the greater CHP tariff. This is important given the tariff is specific to CHP rather than heat only installations, and provides consistency with the RO.

154. **We therefore will make certification on the CHPQA scheme mandatory for eligibility for the CHP biomass tariff, but plants will not be required to fully qualify as Good Quality CHP on the CHPQA scheme.**

155. The CHPQA scheme has its own methodology of determining "qualifying heat output" (QHO) in a CHP system. This is based on a CHPQA scheme boundary which may include heat only boilers in addition to the CHP engine. **The CHP tariff will be eligible only for heat produced via the engine/turbine and therefore the QHO as determined by CHPQA will not be considered eligible CHP generated heat for the purposes of the RHI. Instead we will require that heat generated from the CHP engine/turbine is separately metered.**

156. Any other heat provided directly by biomass boilers within the scheme boundary may be eligible for the standard biomass tariff if it meets all other eligibility requirements and so participants would have to accredit this boiler separately as a biomass boiler in order to receive RHI payments.

Conversion from fossil fuel systems

157. We also want to encourage conversions of existing fossil fuel CHP to renewable systems. Replacing a fossil fuel boiler with a biomass boiler in a CHP system has additional costs over simply installing a new heat only boiler. **Where conversions of fossil fuel systems to biomass are in line with CHPQA requirements plants will be eligible for the CHP tariff provided they meet all other eligibility requirements.**

158. We recognise that renewable CHP systems may have some fossil fuel boilers feeding the CHP engine in addition to biomass boilers. Since we want to encourage the use of renewable CHP where possible, **where fossil fuel boilers feed the CHP engine in addition to renewable boilers this will not preclude a CHP system from being eligible for the RHI, although the RHI will only be payable on renewable CHP heat. The renewable proportion of the heat generated by the turbine will be determined by the energy content of the fuel input.**

Eligibility date

159. The eligibility date for new support brought forward as a result of the September consultation "Expanding the Non-domestic Scheme" is the date of this publication. For biomass CHP, this means that the plant must have been commissioned after this date in order to be eligible for the new CHP tariff.

Commissioning date

160. The commissioning date for a CHP plant is the date that it was commissioned[20] as CHP. This means that if a plant was previously generating electricity only and subsequently commissioned as a CHP plant after the eligibility date, it will be eligible for the CHP tariff provided it meets all other eligibility criteria.

161. Similarly, if a plant was previously generating heat only and a CHP engine was subsequently commissioned after the eligibility date, it will also be eligible for the CHP tariff provided it meets all other eligibility criteria.

[20] Commissioned means the completion of procedures and tests (that represent usual industry standards at the time) necessary to show that the installation is capable of operating and delivering heat to the premises or process for which it was installed

Deep Geothermal Heat

162. Deep geothermal heat, as a technology, is currently recognised and supported by the RHI under the same tariff as GSHPs. This is due to the lack of data available on deep geothermal heat extraction at the time the scheme was launched, with GSHPs providing the most relevant alternative basis with which to provide some level of appropriate tariff support.

163. However, true deep geothermal heat extraction takes place deeper underground than GSHPs installed with a borehole loop and typically operates at higher load factors. These differences necessitate different approaches and tariffs for each technology.

What we proposed

164. We identified in the consultation that there were higher costs associated with drilling to depths of at least 500 metres compared with the assumptions used to set the GSHP tariff. Given this, we estimated that the current GSHP tariff would not bring forward any new geothermal heat generating systems by 2020, and this pointed to the need for a separate tariff.

165. We sought views on whether there should be a separate tariff to incentivise deep geothermal heat and asked whether a tariff of 5.0p/kWh would be suitable. We also asked respondents if a drilling depth of at least 500 metres was a suitable definition of deep geothermal drilling.

What respondents said

166. 25 out of 28 respondents (89%) agreed that there should be a separate tariff for deep geothermal heat. Those respondents who disagreed suggested that there was at the time not enough data on the technology to make an informed decision on the issue. A lack of suitable drilling sites in the UK was also cited as a reason not to support a separate tariff for this technology.

167. A small number of respondents commented on the proposed tariffs, with 7 out of 10 respondents (70%) agreeing that 5.0p/kWh would be sufficient to incentivise the deployment of deep geothermal heat. Those who did not agree with the proposed tariffs felt that it would need to be either higher or lower.

168. 6 out of 10 (60%) respondents agreed that a minimum drilling depth of 500 metres was an appropriate definition of deep geothermal. Those who disagreed suggested this was an arbitrary number, as drilling depth would be site specific and vary widely. Some suggested drilling depths of 400 meters and 1000 meters, whilst others suggested it should be defined by the temperature of the heat that can be extracted from the ground.

Government consideration

169. Deep geothermal heat is a technology distinct from GSHPs, obtaining heat generated in the earth rather than solar heat stored in the Earth's surface. The cost basis is also unique to this technology, as the investment is highly front loaded with large amounts of planning and survey work to find the correct geology for the borehole. Projects can have lead in times of up to 3 years from the date the initial costs are incurred. However, once the initial costs are incurred, geothermal installations can have low operating costs and long lifetimes.

170. Geothermal installations also tend to have high load factors, typically higher, and sometimes significantly higher, than 55%. The tariff review consultation proposed adjusting the GSHP tariff, making the support more generous and also introducing a tiered payment

structure such that the tariff reduces over a 15% load factor. These adjustments were made following updates to the cost data and input assumptions for GSHPs.

171. In our consultation in September 2012 we highlighted the problem with linking deep geothermal to the GSHP tariff as it had been insufficient to incentivise uptake. Following the 'Early Tariff Review' the tariff for GSHP has increased. However, as the new higher GSHP tariff will be tiered it will remain unsuitable for deep geothermal installations due to the expected high load factors. **Therefore we will introduce a separate bespoke tariff for deep geothermal heat.**

172. The tariff of 5.0p/kWh proposed in the consultation was based on all the available evidence available on geothermal at this stage. The tariff received support from respondents and no specific alternative tariff was suggested. **We therefore intend to set the tariff for deep geothermal at 5.0p/kWh**

173. We have given consideration to the suggestion that we use the temperature of the heat that can be extracted from the ground as proof that an installation is Deep Geothermal. However, depth is a generally accepted method of defining deep geothermal and there is a lack of evidence demonstrating the benefits of using the temperature of the heat, we will therefore use depth as a defining factor for eligibility for this tariff.

174. The information we have suggests that it is extremely unlikely a GSHP will have a borehole of 500m or deeper. In addition heat gathered above 500m would not have a high enough energy content to run as a Deep Geothermal system.

175. Although alternative depths were suggested, they were not supported by additional evidence and there was not any emerging pattern in the alternative suggestions. Consequently, we believe this drilling depth requirement will clearly differentiate deep geothermal systems from GSHPs, **we intend to retain our proposed definition for deep geothermal heat as coming from a drilling depth of a minimum of 500m.** This depth maybe reviewed in the future if new evidence emerges.

Air to Air Heat Pumps

176. AAHPs typically come in two commercial forms; heating and cooling systems, and systems that provide heating only. They produce warm air which is circulated by fans to heat a building. The nature of AAHP design and functionality means that a system can usually be reversed to allow the heat pump to provide a cooling function, thus allowing space heating and cooling depending upon the time of year or the specific requirements of a building. Reversible AAHPs are competitive against the fossil fuel market, dominating the medium and small commercial cooling market with AAHPs preferred to fossil fuel chillers as the more economic option. Heating only AAHPs are less commonly produced and installed; such systems are often seen as needlessly limiting the full functionality and potential of AAHP technology.

What we proposed

177. Given the strength of the reversible AAHP market without any Government intervention, we asked whether this technology was sufficiently strong already that no RHI support is required. We therefore did not propose any support for this technology, and sought views on this position.

178. However we recognised that heating only AAHPs might require support to promote deployment. This was largely due to the fact that they were still an emerging technology and that there may be circumstances where a heating only AAHP was an appropriate renewable technology. We noted the risk however that given the costs for heating only and reversible systems are the same, the introduction of support could create a subsidy driven market. Under normal market circumstances an organisation is unlikely to choose to install a heating only system when a system with the additional flexibility of cooling is available at the same price. The consultation also acknowledged that there were compliance risks, such as modification to provide cooling after they had been installed.

179. We therefore sought views and evidence on whether we should introduce RHI support for heating only AAHPs. We highlighted that if we were to introduce support for this technology, we would need to establish a methodology for determining payments since no standard exists for metering heat delivered by air. We therefore sought input on methodologies which could be used to determine payments.

What respondents said

180. 31 of 40 respondents who answered the question (78%) agreed that reversible AAHPs should not be included in the scheme due to the stable and growing market that currently exists, indicating that no incentive was required to promote reversible AAHP deployment.

181. Respondents were split on the question of whether to introduce support for heating only AAHPs in the scheme, with 22 (52%) in favour and 20 against. The reasons for reservations were varied, but the main concern appeared to be that supporting heating only AAHPs might create an artificial market, with negative impacts for the existing reversible AAHP market which would not benefit from RHI subsidy.

182. There were additional concerns over the renewable credentials of heating only AAHPs. It was suggested that poor SPF performance of heating-only AAHPs, due to large amounts of electricity required for the compression phase of the heat pump cycle, might cancel out any potential carbon reduction benefits of the technology.

183. Of those who favoured the introduction of support for heating only AAHPs, a range of tariffs were suggested from 0.97 to 3.0p/kWh. Views were also split on the best method of calculating the tariff payment, with some suggesting metering and/or a system of input/output calculations based on electrical consumption and system efficiencies. Others

argued in favour of using a deemed approach. No respondent was able to provide evidence of a commercially viable means of achieving accurate and consistent metering data.

Government consideration

184. We recognise the valuable contribution that AAHP can make to decarbonising commercial heating and to our national renewables targets. Indeed, the strength of the market for devices capable of providing both heating and cooling is large and growing with approximately 220,000 AAHP terminals (both domestic and non-domestic) being sold in 2011, worth an estimated £600 million in first point sales. Discussions with the industry have indicated that the growing market is reflected in the cost of the technology and prices are decreasing.

185. We recognise that there remains a lack of awareness in the market place and that a strong market does not necessarily indicate that the market is mature. There may therefore be potential for further growth of this technology. But it is not clear that any additional heat provided by a tariff would represent good value for money for the taxpayer given the large number of installations that would be eligible for a tariff that would have been purchased without RHI support. Consultation responses demonstrated that there still exists a barrier in relation to how to determine payments in a way which is consistent with the policy of paying the non-domestic RHI on metered heat.

186. Given the difficulties of finding a practical methodology to determine payments, the potential for large rents, concerns around value for money and the evidence that AAHP are already able to compete with traditional fossil fuel heating technologies**, we do not intend to introduce support for reversible AAHPs at this time.** We will be conducting further work and gathering more evidence on reversible AAHPs through the 2014 review.

187. The market size for heating only AAHP systems is much smaller and there is therefore a greater potential for RHI to make a contribution to the growth of this technology. This potential must be weighed against the risks of creating an entirely subsidy driven market and the risk of incentivising heating only systems alongside a separate cooling system when a reversible system would lead to a more efficient outcome. Heating only AAHPs are identical to reversible heat pumps in terms of hardware, the only difference being software which limits their functionality. The vast majority of the non-domestic AAHP market is for space heating, typically in commercial buildings such as offices. In these circumstances there are no advantages to installing a heating only AAHP over a reversible AAHP (such as reduced costs or significantly improved heating performance). There is no clear reason why an individual would install a heating only AAHP over a reversible device, other than if a subsidy was available.

188. Reversible AAHPs are an efficient way of meeting a building's cooling need; we do not want to create a situation where individuals choose a heating only AAHP over a reversible device in order to receive the RHI and install a separate cooling system. While the consultation feedback was split on the question of whether or not to introduce support, we believe that introducing support for heating only systems and not reversible systems would lead to perverse incentives and an unsustainable market. **We therefore do not intend to introduce support for heating only AAHPs at this time.**

189. Regardless of RHI support, AAHPs will continue to play an important role in driving the uptake of renewables in the UK and we see the technology as playing a part in helping us meet our 2020 EU targets.

Biomass Direct Air Heating

190. Biomass direct air heaters produce heat through the combustion of solid biomass material to heat air directly, chiefly using waste wood. Uses for the heated air can include space heating and grain drying. Direct air heating systems are often simpler and cheaper than equivalent biomass boiler installations because they do not use boilers or require an additional wet heating system.

What we proposed

191. We noted that large scale co-firing operations exist where biomass is used alongside traditional fossil fuels. While we accepted the carbon savings and renewable contribution of the use of biomass in these applications, we noted that additional capital expenditure is rarely required and that biomass is already an economically viable option. We therefore asked in our consultation of September 2012 about support for the introduction of biomass direct air heating into the RHI, with only those biomass direct air heaters specifically designed and installed to use only biomass being eligible for the scheme.

192. Biomass direct air heaters had not previously been included in support for biomass under the RHI because of difficulties with determining payments. For other technologies in the non-domestic RHI where heat is delivered via liquid or steam, there are clear metering rules and standards set out in the Measuring Instruments Directive. However there is no accepted standard for metering the flow and temperature of air. The consultation sought opinions on the options for determining payments, with three key suggestions of metering, deeming and using fuel input as a proxy.

193. We proposed a tariff of 2.1p/kWh, with installations over 1MWth receiving no more than the large biomass tariff. However, in the non-domestic Early Tariff Review consultation we revised this proposed tariff to 2.5p/kWh below 1MWth, and 2.0p/kWh above, based on an assessment of a range of updated model outputs, industry views and market intelligence and relativities to other tariffs, in particular the revised proposed tariff for large biomass.

What respondents said

194. There were 51 responses to the question of whether the RHI should support biomass direct air heating for biomass only systems, of which 41 agreed that it should (80%). Those that were against its inclusion cited the quantity of carbon emissions resulting from biomass combustion and difficulties in assuring a sustainable fuel supply-chain. Concerns were raised around the potential for this relatively simple method of heating purely to receive the financial benefits offered by the RHI.

195. On the tariff, 21 of 27 respondents (78%) agreed that the tariff of 2.1p/kWh for small and medium sized heaters was appropriate, though some stressed that 2.1p/kWh was the lowest the tariff should be set and others suggested that it was too low.

196. Views on a large tariff of 1.0p/kWh were split, with 19 in favour and 14 against. There was a wide range of opinions expressed, though it was emphasised that the tariff for large systems should not be higher than that offered for large biomass (with some respondents also stating that the 1p/kWh for large biomass was too low).

197. Finally, 40 respondents answered the question on how payments could be determined for this technology, with problems outlined for all approaches of determining payment; deeming, metering and measuring fuel input, including fraud risk and the difficulties in a practical solution.

198. Deeming received some support from respondents as a means of encouraging energy efficiency although it was recognised that with the wide range of uses it would be difficult to

establish deeming methodologies. Fuel input also received some support, although there were issues raised around administering a scheme based on fuel input and concerns that there would be incentives to use fuel inefficiently.

Government consideration

199. Biomass Direct Air systems offer a range of heating opportunities, such as space heating for large, open, industrial spaces and other industrial processes such as grain drying and wood chip processing. It offers a renewable alternative to fossil fuels in situations where other renewable technologies would not be appropriate.

200. Biomass direct air systems are typically cheaper than biomass boilers because they do not require a wet heating system to distribute the heat. The low cost of this technology means it has high value for money for the tax payer per kWh of renewable heat produced.

201. Payments for all other technologies in the non-domestic RHI, apart from biomethane injection[21], are based on metered heat used for eligible purposes. However, there are significant difficulties inherent in seeking to introduce standards to measure the renewable heat output of hot air. In particular, in order to ensure a certain level of accuracy, we require the meters used to measure the delivered heat for RHI technologies to be at least the class II standard as set by the Measuring Instruments Directive. However, the metering of heat delivered by air is not covered in the Measuring Instruments Directive.

202. We considered other options of determining payments, through either a deeming methodology or on the basis of fuel input. Before introducing a methodology for determining payments we would need to be confident that this would be accurate, consistent, commercially viable and testable against standards. Industry have been unable to demonstrate as yet that such a methodology exists and so **we will not be introducing support for biomass direct air heating systems in this spending review period**.

203. Discussions with industry indicate there may be a way forward for metering these systems. We welcome further discussions with industry on how metering can be implemented for this technology and on weather a suitable solution can be demonstrated.

[21] This is paid on the energy content of the fuel injected into the grid.

Energy Efficiency

204. Energy efficiency measures were not introduced in the non-domestic RHI when the first phase of the scheme was launched in November 2011. At the time, it was felt that many non-domestic installations should have a vested interest in achieving energy efficiency to reduce operational costs and that requiring specific energy efficiency measures might pose a barrier to uptake and unnecessarily delay the launch of the scheme.

205. However, energy efficiency is at the heart of the Government's approach to tackling dangerous climate change and ensuring safe, secure and affordable energy supplies. The potential social, economic and environmental benefits of increasing the UK's energy efficiency are significant and Government plans to unlock this potential through existing policies, such as the RHI.

What we proposed

206. We outlined proposals for three main users of heat:

- Users of process heat;
- District heating networks (DHNs) and;
- Commercial and public space and water heating.

Users of process heat

207. We consider that users of process heat are already committed to achieving energy efficiency, as for most process heat users, the generation of heat is a key part of their operations and one of the largest costs to their business. Organisations using process heat systems are likely to be already subscribing to increased energy efficiency through their involvement in existing Government schemes such as the Climate Change Agreement or the EU Emissions Trading System (EU ETS). Therefore, we did not propose to introduce any additional energy efficiency measures for process heating systems at the time of consultation.

District heating networks

208. The non-domestic RHI can be claimed in cases where heat is supplied from one renewable heat installation to multiple domestic dwellings or to a single domestic dwelling which partly pays business rates.

209. For small scale heating networks, which we defined as consisting of five dwellings or less where recipients of the heat are more likely to have a stake in the heating installation, we proposed the introduction of energy efficiency requirements akin to those proposed for the domestic RHI. We sought views on the requirement for the building to have undergone a Green Deal assessment and to have installed those 'green tick' measures eligible for full Green Deal funding.

210. We recognised that a different approach was required for larger scale district heating networks (DHNs) where the owner of the installation is likely to be a third party and the number of households benefitting from the renewable heat installation could be in the hundreds. We sought views on whether energy efficiency requirements were appropriate in this situation where large DHNs are often much more energy efficient overall when compared to individual dwellings using individual boilers and one household could prevent renewable heat being made available to many others. Should energy efficiency requirements be set for large-scale DHNs, we suggested the introduction of a sliding scale determining the proportion of households that would have to meet energy efficiency

standards proposed under the domestic RHI, based on the size of the district heating network.

Commercial space and water heating

211. We proposed that, should energy efficiency requirements be set for commercial, industrial, public and community space/water heating, various methodologies should be eligible to demonstrate compliance. We noted that Energy Performance Certificates (EPC), Building Research Establishment Environmental Assessment Model (BREEAM) and Display Energy Certificates (DEC) could all provide the necessary standards by which to measure energy efficiency, and asked whether such requirements were likely to act as too significant a barrier to uptake and whether any other methodologies should be included. We also sought views on the corresponding minimum compliance standards to gain eligibility for the RHI. Allowing such flexibility would help to reduce the risk of energy efficiency requirements acting as a barrier to RHI support.

What respondents said

212. The responses received were very mixed on the question of whether energy efficiency requirements were desirable, particularly given the barrier to renewable heat deployment that they might represent. Equally, opinion was mixed on how such energy efficiency requirements should be implemented.

Users of process heat

213. 53 of 65 respondents (82%) agreed that we should not include energy efficiency requirements for process heating installations. This mirrored our view that this sector of industry already has a vested interest in achieving energy efficiency to limit operational costs.

District Heating Networks

214. 31 of 55 respondents (56%) agreed that small-scale DHNs should be expected to meet 'green tick' compliance, agreeing that they should be subject to the same requirements as individual domestic RHI dwellings but acknowledging that this could act as a barrier to the development of DHNs. Those who disagreed felt that DHNs were already at a disadvantage as the additional costs of connecting infrastructure were not reflected in the RHI tariffs and that such requirements would act as a significant barrier to DHN deployment. Others commented that DHNs were not comparable to domestic dwellings and that a different approach was required.

215. Only 30 out of 61 respondents (49%) were in favour of energy efficiency requirements for large-scale DHNs. Those against said the requirements for large-scale DHNs would act as a significant barrier to deployment, as the party responsible would have a difficult and unrealistic task of ensuring the compliance of all the individual DHN dwellings. Others noted that the social housing sector, where large DHNs have the potential to deploy, is already subject to statutory obligations to improve the thermal efficiency of its housing stock. Opinion was also fairly evenly split on whether or not a sliding scale determining the proportion of households in a network that would have to meet energy efficiency standards proposed under the domestic RHI should be introduced.

Commercial space and water heating

216. 39 of 53 respondents (74%) agreed that a range of methodologies should be available to demonstrate energy efficiency standards in space and water heating installations. It was suggested that allowing multiple methodologies would make the scheme more accessible to prospective applicants. Paasivhaus SAP calculations, LEEDS, ISO 14,000 & ISO 50,000, SBEM and building regulations were suggested as alternative methodologies.

217. However, 30 respondents provided views as to why energy efficiency requirements would act as a significant barrier to space and water heating deployment. The primary concern was that developers would be more likely to stick with fossil fuel alternatives if additional barriers were introduced to the scheme. It was also suggested that a great deal of rural and listed properties would be excluded from the RHI, unable to overcome the potential financial and planning barriers associated with meeting energy efficiency requirements.

Government consideration

218. We consider that the September consultation marked the start of discussion of how energy efficiency considerations might be incorporated into the non-domestic RHI scheme. Energy efficiency is a clear priority for the Government. The need to drive forward efficient use of energy is a key part of maintaining affordable and sustainable energy supplies.

219. The responses to the inclusion of energy efficiency to this scheme were varied. However, the underlying message was that respondents understood the need for energy efficiency but felt that it was too soon to require this within the RHI scheme as it would prove to be an additional barrier to deployment within the three sectors identified.

220. It should be noted that the energy efficiency requirement for the domestic scheme has also changed since the consultation proposals. To be eligible for the domestic RHI, all applicants will need to provide evidence that they have identified, through a Green Deal Assessment (GDA), which energy efficiency measures would be cost-effective for their property and have, at a minimum, installed loft insulation and cavity wall insulation where these measures are recommended as suitable and cost-effective for the property by the GDA, with an updated EPC as proof (or provide valid evidence proving why installation was not feasible).

221. Due to the wide variety of views expressed by respondents it is difficult to establish a clear indication of which proposals would be effective if implemented. In addition, the non-domestic market is so wide and varied that it is not possible to apply a single measure of energy efficiency that will cover all areas. **We have concluded that more work needs to be done to establish a range of effective but not unduly burdensome energy efficiency measures that could be introduced into the scheme; therefore we do not plan to implement any energy efficiency measures at this time.**

222. However, we consider there is scope to introduce energy efficiency measures into the scheme in the near future. DECC's Energy Efficiency Deployment Office is conducting a survey of energy efficiency in non-domestic buildings. We expect that some of the results from this survey will be available over the course of 2014. These results may inform which sectors could be targeted and what measures could be introduced without introducing significant barriers to the generation of renewable heat under the scheme. We will consider the issue of energy efficiency and performance of installations further in the 2014 Review of the non-domestic RHI.

223. The EU EED[19] also includes some reference to district heating (and cooling) networks. Article 8 (on energy audits) states that "Member States may require that an assessment of the technical and economic feasibility of connection to an existing or planned district heating or cooling network shall be part of the energy audit".

224. As highlighted in DECC's 11 July – 3 October 2013 consultation on the Energy Savings Opportunity Scheme (ESOS)[22], which aims to transpose Article 8 into UK law, the UK Government's overall approach is not to 'gold-plate' implementation of EU Directives.

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[22] https://www.gov.uk/government/consultations/energy-savings-opportunity-scheme

225. Requiring energy audits to include assessments on district heating and cooling would go beyond the minimum requirements of the Directive. DECC will consider its position in light of responses to the ESOS consultation. One option would be to encourage enterprises undertaking audits to consider district heating and cooling options as appropriate as part of voluntary good practice guidance.

226. DECC will also be shortly consulting on articles 9 & 11 of the EU EED[19] on heat metering. In doing so, Government will look to consider any synergies with the existing UK policy landscape, including, in particular, heat metering installed as part of the RHI.

Air to Water Heat Pumps

227. Heat pumps have an important role to play in helping to achieve longer-term carbon budgets as the grid decarbonises. AWHPs can be a viable option when GSHPs are not and are cheaper and easier to install than GSHPs.

What we proposed

228. AWHPs were initially excluded from the RHI because insufficient evidence on costs had meant it was not possible to set an appropriate tariff level. However, by the September 2012 consultation we considered we had sufficient evidence to identify support levels for this technology.

229. In the September 2012 consultation we proposed a tariff of 1.7p/kWh and a 'one size fits all' approach where all sizes of AWHP would receive same tariff. However in the Early Tariff Review consultation we updated this proposed tariff to 2.5p/kWh. This was following a review of the updated evidence base alongside industry views on tariffs gathered as part of consultation.

What respondents said

230. 41 of 45 respondents (91%) agreed that a tariff for AWHPs should be introduced to help remove cost and other non-financial barriers preventing up-take.

231. Half of the 40 responses supported the proposed one size fits all approach and a tariff of 1.7p/kWh. Those who disagreed suggested that the tariff should be higher, with a range of tariffs between 1.9 and 2.9p/kWh suggested.

232. Those respondents in agreement with the principle of a 'one size fits all' tariff commented that adopting this approach would promote the installation of correctly sized systems and would help to simplify the RHI. Some respondents also commented that a one size fits all approach was appropriate as there were only marginal cost variations, on a £/kW capacity basis, between smaller and larger systems. Those who disagreed commented that the proposed tariff was not high enough to incentivise the uptake of AWHPs and the tariff should be banded based on the size of the installation.

Government consideration

233. AWHPs have an important role to play as we decarbonise heating, particularly in the retrofit market. While costs are low in relation to some renewable technologies, this technology is not yet at the point where it can compete effectively with traditional fossil fuel heating technologies without subsidy. Respondents were strongly supportive of our proposals to introduce support for AWHPs in the RHI pointing out that in many situations, AWHPs are the only viable renewable technology and that without support for AWHPs fossil fuel is the most attractive option. **We therefore intend to introduce support for this technology.**

234. Since the September 2012 consultation was launched we carried out a review of the performance and cost assumptions used to propose the tariff for this technology, producing new model outputs. The proposal in the tariff review consultation of 2.5p/kWh was in the middle of the range of tariffs suggested by respondents to the September 2012 consultationand reflects new model outputs, market intelligence and relativities to other tariffs.

235. We have now finished analysing the consultation responses from the May consultation, and **we intend to introduce support for this technology at the tariff level of 2.5p/kWh**.

This is marginally above the centre of the range of tariff levels provided by consultation respondents in response to the original proposal of 1.7p/kWh.

236. Whilst opinion was split in consultation responses on whether support should be banded by size, our evidence base suggests that there are no significant economies of scale for this technology. In addition, we recognise respondents' calls to keep the RHI as simple as possible and so we do not want to introduce banding for a technology where our evidence base suggests that it is not necessary. The higher tariff will also address the concerns of respondents who supported banding because they felt that smaller systems would require a higher tariff. On this basis, **we intend to introduce support for AWHPs on a one size fits all tariff.**

237. Exhaust air heat pumps are another type of heat pump available, these are designed to run on waste heat rather than renewable energy sources. The primary focus of the RHI is to incentivise generation of renewable heat and not to support energy recovery; therefore these devices will be excluded from support.

238. Provided AWHP units are designed to use only ambient sources of heat (i.e. air which has not been heated due to human action) they will be eligible for the RHI (subject to meeting all other eligibility criteria), even if there is an non-ambient element to their heat source. This is because we recognise that it will be difficult in many commercial uses of AWHPs to place a unit in a position where there is no risk of non-ambient heat being drawn upon by the heat pump and believe that this is a good compromise.

239. **We will therefore exclude from support heat pumps designed to run on waste/exhaust air heat. Other AWHPs that meet all other eligibility criteria will be eligible for support, even if they make use of some waste heat.**

Seasonal Performance Factor (SPF) Requirements for Heat Pumps (Air and Ground Source)

240. The ratio of heat output by a heat pump to the electricity used gives the coefficient of performance (COP) of a heat pump. The COP is determined by laboratory testing at defined source and heat flow temperatures. The Seasonal Performance Factor (SPF) is the value of this ratio for a heat pump averaged over the whole year, reflecting the efficiency that a heat pump achieves when it is installed. A higher SPF means a more efficient heat pump system which will deliver more heat for every unit of electricity used, also making it cheaper to run and delivering greater carbon savings. The RHI currently has a requirement for heat pumps to meet a minimum COP of 2.9 as a proxy for the SPF.

241. At the time of publication of the 'Expanding the Non-domestic Scheme' consultation, our policy on SPF requirements for heat pumps was not finalised as we were awaiting the European Commission announcement on the Renewable Energy Directive (RED) specifying how much of the energy generated by heat pumps should be considered renewable, and therefore what a minimum SPF requirement should be. However, using the latest available data at the time we expected this SPF to be around 2.5.

What we proposed

242. We proposed to follow the European Commission's guidance on a minimum SPF requirement for heat pumps of 2.5. But we made clear that we were expecting an update to the guidance in early 2013 and that we intended to review that update to inform our decision as to whether our efficiency requirements for heat pumps should be revised. We proposed that any changes made to heat pump efficiency guidance should be based on the European Commission guidance.

243. We also asked how minimum SPF requirements for heat pumps should be demonstrated in the RHI application process, should a minimum SPF be set.

What respondents said

244. 26 of 30 respondents (87%) supported our proposal to base any changes to heat pump SPF requirements on European Commission guidance. This strong level of support appears to largely be due to the simplification that such measures would bring, allowing manufacturers to adhere to fewer testing standards.

245. Those who did not support our proposal were generally concerned with the accuracy of EU data and its relevance to the UK.

246. 22 respondents suggested ways for minimum SPF requirements to be demonstrated in the RHI application process. Some respondents suggested that manufacturers should include SPF data with their products for installers to include when applying to the RHI; others suggested that lab tests (supported by some additional field testing) should provide manufacturers with lab based proxy SPF data. CIBSE TM41 'Degree Days: Application and Theory' and BS EN 14825 were suggested as other suitable methods to calculate SPF performance upon application to the RHI scheme.

247. It was felt by some respondents that annual or periodic system SPF performance reviews were required to ensure that installations were performing as indicated at the time of application.

Government consideration

248. The European Commission has since published guidance as part of the Renewable Energy Directive on how to calculate SPF for different heat pump technologies and

applications, taking into account differences in climate conditions. The guidance also confirmed a minimum SPF of 2.5 for heat pumps.

249. In light of this and of the responses to the consultation we have decided that the existing COP requirement is insufficient to provide certainty that a heat pump is performing to an acceptable standard. **We will therefore require a design SPF of 2.5 as the minimum for an installed heat pump to be able to claim the non-domestic RHI**. Heat Pump applicants will be required to demonstrate that their system has been designed to achieve this standard. Annex C provides further detail on what will be expected of applicants.

250. Clearly we would welcome the installation of far more efficient heat pumps, as heat pumps with an SPF of 4 or more are possible. Therefore we see 2.5 as a minimum rather than a target and, if evidence suggests it is appropriate, we may consider raising the bar in future to drive forward performance.

251. Whilst the existing COP requirement is insufficient on its own, it is nonetheless a useful backstop and an easy test to be conducted at application stage. Particularly for systems for which it is difficult to specify design SPF. **We will therefore retain the requirement of a minimum COP of 2.9 and apply it to all heat pumps in the scheme.**

252. In order that we can assess whether the SPF design criteria used as an eligibility requirement are delivering in situ performance we require additional data to be collected. **We are therefore introducing mandatory electricity consumption measurement and reporting requirements for all heat pumps.** In combination with the existing requirement to meter the heat produced, this will allow us to calculate the SPF of heat pumps in the scheme. Annex C provides further detail on what will be required to be metered. In addition to providing certainty of performance, the data gained by this requirement will also be valuable when generally assessing heat pump performance in the UK.

253. **The metering and monitoring will not affect payments, even if it does show that individual systems are failing to meet a measured SPF of 2.5.** We consider this to be important from an investment perspective- if an applicant can demonstrate their heat pump system has been designed to meet an SPF of 2.5, they do not need to be concerned that RHI income will be affected by factors out of their control, such as a particularly cold winter.

Energy from Waste (EfW)

254. EfW has the advantage of using biomass at the end of its useful life, both producing renewable energy and preventing damaging methane gas emissions produced when the biodegradable proportion of this waste decays in landfill. The Government review of waste policy in England[23] set out Government's commitment to increasing the generation of renewable energy, both heat and power, from waste.

255. The main input fuels for incineration are currently waste collected by local authorities (typically referred to as Municipal Solid Waste), commercial and industrial waste.

What we proposed

256. The RHI currently pays a tariff for the proportion of heat generated from the biomass in municipal solid waste (MSW) which typically has a biogenic content of 50% or higher, with a corresponding proportion of the corresponding biomass tariff being paid out.

257. In the consultation we proposed to extend this support to the biomass proportion of commercial and industrial wastes to be consistent with the support provided under the RO. Commercial and industrial waste with a biomass content of at least 10% would be eligible for support, with the corresponding biomass tariff being paid out on the biomass proportion of the waste.

258. Because the costs of generating heat using this fuel type are significantly lower than biomass CHP we made clear that the CHP tariff proposed in the consultation would not apply to energy from waste CHP.

What respondents said

259. The majority of respondents supported the inclusion of commercial and industrial waste feedstocks in the RHI with 30 of 35 respondents (86%) in agreement. Some respondents suggested that all waste types, regardless of origin, should be treated as a resource and used in a beneficial way to avoid waste heading to landfill. Others suggested that only high biomass content wastes should be included in any expansion of RHI.

260. No respondents disagreed with the suggestion that support for waste under the RHI should take a consistent approach to the RO and adopt the same waste eligibility criteria. Some respondents commented that the RO is widely understood by the non-domestic sector and consistency and simplicity would help to ensure the success of the RHI.

Government consideration

261. The combustion of residual waste offers a better option than sending waste directly to landfill in terms of environmental impact and GHG emissions. The Government review of waste policy[5] in England's commitment to increasing renewable energy from waste includes commercial and industrial waste as well as MSW. Commercial and industrial waste, like MSW, would otherwise go to landfill, producing methane emissions from the biodegradable content.

262. For MSW, there is sufficient evidence from analysis of waste for us to make an assumption as to the biomass proportion. Provided that participants can demonstrate that the proportion of biomass in the MSW is unlikely to be below 50% we are able to assume that the biomass proportion of the waste is 50% and ensure that the non-renewable portion of the waste receives no subsidy.

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[23] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69401/pb13540-waste-policy-review110614.pdf

263. The biodegradable content of commercial and industrial wastes provides another renewable fuel source not currently supported in the RHI. The exclusion of these waste streams from the RHI has restricted deployment for EfW plants since waste contracts mean it is rarely viable to run a plant purely on MSW.

264. The RO extends support to all renewable wastes, i.e. commercial and industrial waste, where not more than 90 per cent of the waste is, or is derived from, fossil fuels in addition to MSW. Furthermore, if the fossil fuel contamination is under 10 per cent, they are eligible for the dedicated biomass support band.

265. We wish to align the RHI with the RO and not present additional barriers to participants already complying with the requirements of the RO. **We will therefore extend support in the RHI to energy from commercial and industrial wastes where not more than 90% of the waste is, or is derived, from fossil fuel** (i.e. waste has a biomass content of at least 10%). Commercial and industrial waste is heterogeneous in comparison to MSW and participants will be required to demonstrate to Ofgem the biogenic content of the fuel.

266. Participants will receive support only on the biomass proportion of their waste and will therefore have to demonstrate what proportion of the waste is biomass.

267. Participants using municipal solid waste (MSW) will continue to be able to use the existing mechanism of demonstrating the proportion of biomass is 50%, that is producing data published by a relevant authority demonstrating that the proportion of municipal waste is unlikely to exceed 50% fossil fuel; and evidence that the waste has not been subject before use to a process which is likely to have materially increased that proportion.

268. When this mechanism is used, the biomass proportion of the MSW is assumed to be 50% and the payment deemed on that basis. Additionally, participants using mixed waste streams which include MSW alongside other waste streams will be able to use this deeming mechanism on the MSW proportion of the waste.

269. For waste streams other than MSW (i.e. commercial and industrial wastes) the participant will be required to demonstrate directly to Ofgem that the proportion of biomass in their waste is at least 10%.

270. Similarly to the RO, if the fossil fuel contamination is less than 10% (i.e. biomass content of 90% or more), then installations may be eligible for support as a solid biomass installation, subject to meeting the eligibility requirements for that technology.

Tariff

271. There is limited evidence available on the particular costs of heat from the combustion of renewable waste and so we have been unable to model a separate tariff for energy from waste. However, we are aware that facilities using unprocessed waste materials are generally able to charge the waste producer a gate fee. Producers may also use processed waste such as Solid Recovered Fuel, which has a higher energy content than unprocessed waste resulting in greater efficiencies. Producers may have to pay for this feedstock but the cost is likely to be lower than the cost of solid biomass.

272. However, the lower cost of feedstocks for EfW relative to biomass combustion is offset by the additional cost of meeting more stringent environmental regulation in the form of the Waste Incineration Directive[24].

273. **We will therefore continue applying the standard solid biomass tariff, now 2.0p/kWh for large biomass, to the biogenic content of energy from waste. (See the**

[24] http://europa.eu/legislation_summaries/environment/waste_management/l28072_en.htm

Early Tariff Review section below for more detail on the rationale for increasing the large biomass tariff).

EfW CHP

274. The proposed tariff of 4.1p/kWh for biomass CHP was not proposed to apply to EfW CHP. Instead it was proposed that the large biomass tariff would continue to apply to EfW CHP plants. No respondent suggested that the dedicated CHP tariff was necessary, although some feedback was received that the current level of support for large biomass of 1.0p/kWh was too low. We therefore believe that the revised tariff for large biomass of 2.0p/kWh will be sufficient to incentivise heat from EfW CHP plants. **Therefore EfW CHP plants will only be eligible for the heat only biomass tariff (2.0p/kWh for large biomass) and so it will not be necessary for plants to be certified on CHPQA in order to be eligible.**

275. Energy from waste CHP is supported in the RO, with CHP being a precondition of support. The RO support is therefore designed to compensate fully for the costs of energy from waste CHP stations **so energy from waste applications accredited on the RO will not be eligible for RHI support**.

276. Interaction with eligibility for CfD will be confirmed in the Electricity Market Reform Delivery Plan which is scheduled for publication by the end of December.

Other Minor Regulatory Changes

277. In addition to the major changes to the scheme we are also implementing other smaller changes to improve the performance of the scheme.

What we proposed

278. In the consultation we proposed to address two regulatory issues, these were;

- **Ineligible forms of biomass:** we proposed working with Ofgem to properly define 'solid biomass' to provide greater clarity regarding biomass eligibility.
- **Power to amend conditions of accreditation:** we intend to allow amendments to conditions of accreditation once participation has commenced. This will provide a consistent approach with that which is taken with the preliminary accreditation that enables Ofgem to make amendments throughout the tariff lifetime.

279. As the issues were related primarily to the administration of the scheme, we did not ask any specific questions about them in the consultation.

Government consideration

280. Given that no significant concerns were raised over these proposals in any of the consultation responses or at any of the events, we will move forward with these amendments, working closely with Ofgem to ensure that any changes achieve the intended outcomes.

281. In addition to the minor changes we consulted on we will also be making a number of other regulatory amendments to improve the scheme. These include:

- **Retail Price Index (RPI) uplift:** We intend to change the methodology for applying the RPI uplift to ensure lower tariff technologies are not disadvantaged through rounding when adjusting for annual inflationary increases of the RPI.
- **New Microgeneration Certification Scheme (MCS):** We will update the relevant testing standard for MCS such that sub 45kWth installations benefit from the most recent changes to the industry standards.
- **Clarification of 'properly insulated' for underground pipes:** With support from industry we will clarify the definition of 'properly insulated' for underground pipes as the current standard is not able to be effectively applied to underground pipes.

282. We are also making two further minor changes to the regulations this autumn:

- **Air Quality emissions testing:** We are addressing an issue in the air quality emission regulations which requires standards to be applied to all biomass boilers where it is not possible to apply these standards to most boilers under 500kWth. We expect this issue will be resolved by December 2013 subject to parliamentary process.
- **Budget management:** we are also intending to amend the regulations to correct a small discrepancy with the operation of the budget management mechanism. This will ensure that the correct level of reduction can be applied where a reduction to tariffs is triggered in consecutive quarters.

Early Tariff Review

Approach to Reviewing Tariffs

283. The technical annex[25] to the May 2013 consultation set out in detail the rationale and approach taken to updating the tariffs available under the non-domestic scheme. It explained that the original 2011 tariffs were calculated on the basis of the best available data at the time (the AEA reports from 2009 and 2010) and how we had used new sources of data and expert judgement to arrive at the tariffs consulted on.

284. The four key sources of data used to inform the proposed tariffs were:

- Original AEA data[26]
- Sweett data commissioned in August 2012[27]
- Stakeholder evidence gathered through consultations, ongoing engagement and market intelligence
- Scheme data published by Ofgem[28]

285. The new approach remained consistent with that previously taken in terms of seeking to incentivise up to the 50th percentile of the heat potential of each technology, including a 12% internal rate of return. This approach was a key part of the scheme's original State Aid approval and remains core to the policy decisions set out here.

286. The consultation set out a range of criteria for use in making final decisions on tariffs:

- The level of forecast deployment
- The range of modelling outputs
- Industry views
- Recommendations made by DECC engineering specialists
- The nature of each technology and any specific risks of over- or under-deployment
- The relativities between tariffs for comparable technologies
- The role each technology has to play in meeting DECC's medium and long-term objectives.

[25] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/208546/RHI_tariff_review_consultation_Technical_annex_MAY_2013_-_FINAL_DRAFT_corrected_v1__P_.pdf

[26] 2009 report: http://www.rhincentive.co.uk/library/regulation/0907Heat_Supply_Curve.pdf, 2010 report: http://www.nera.com/67_5554.htm

[27] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/204275/Research_on_the_costs_and_performance_of_heating_and_cooling_technologies__Sweett_Group_.pdf

[28] https://rhi.ofgem.gov.uk/Public/ExternalReports.aspx?id=1

What we proposed

287. We asked respondents whether they agreed that we should continue to aim to incentivise the 50th percentile of heat potential with a 12% internal rate of return (IRR) on the financial costs of replacing a fossil fuel technology with a renewable heating technology. We sought views on our new range of evidence and asked whether there were any other material factors we should be considering when making judgements about tariff levels.

288. We provided an update on the value for money cap applied to the scheme when it was launched in November 2011. The value for money cap is set at the level of support provided to offshore wind, as this is judged to be the marginal technology that could be deployed to meet the 2020 renewables target. In 2014/15 prices we suggested this should be 10.0p/KWh (compared to 8.5p/kWh in 2011). We also identified that indirect support provided to electricity producers could be taken into account in calculating the value for money cap – specifically the carbon price floor and the EU ETS. We suggested that if these factors were taken into account (in addition to adjustments by the RPI), the cap could be considered to be 11.3p/kWh in 2014/15 prices. We consulted on these two different approaches to estimating the value for money cap for the RHI tariffs.

289. To date, the cap has only affected the level of the solar thermal tariff. In light of our new evidence, the cap would affect both the solar thermal and GSHP tariffs. We therefore consulted on a tariff range for these technologies of between 10.0p/kWh and 11.3p/KWh renewable heat (equivalent to 7.2 and 8.2p/kWh total heat from a GSHP assuming a seasonal performance factor of 3.6).

What respondents said

290. 87% of respondents (34 out of 39) supported updating the value for money cap applied to RHI tariffs. Respondents also generally recognised the need for a value for money cap, although the increase of tariffs that would result from a new, higher, cap was welcomed. Of the 5 respondents that disagreed there was a mixture of opinions. Some felt there should not be a cap, voicing concerns that it restricted the scope of the RHI. Others suggested that an increase in the cap would result in tariffs being set too high, thus jeopardising the affordability and value for money of the scheme as a whole.

291. In converting the renewable heat value for money cap into a capped tariff for the total heat provided by a GSHP, 59% of respondents (17 out of 21) disagreed with our proposal to use an assumed average seasonal performance factor of 3.6. Alternative suggestions ranged from 1.2 to 4.1.

292. Responses indicated that there were concerns about using an assumed average SPF because SPF levels will vary depending upon the type of installation, e.g. there will be distinct differences between open and closed looped installations, and heating and cooling systems are likely to be more efficient than heating only systems. 5 respondents suggested that an accurate evidence base for GSHP performance could be gathered by mandatory metering of electricity use, in addition to the existing requirement to meter the heat generated.

293. 67% of respondents (29 out of 43) agreed with our proposal that a 12% internal rate of return is adequate to stimulate investment in renewable heat. However, there were 11 respondents who believed 12% should be the minimum, with 5 respondents suggesting a rate of 15% would be needed to ‘kick start’ the renewables sector, for example, because investors could see the risk of technical failure as quite high in renewable heating technologies.

294. 77% of respondents (23 out of 30) supported our new evidence criteria. It was suggested that some criteria should be weighted differently to others; our medium to long-term objectives should be prioritised over short-term goals. However, it was also suggested that we omit long-term goals altogether, as there was concern from some respondents that this criteria would lead to us favouring some technologies over others due to the projected forecasts of future energy mixes. In addition to this, it was suggested that the over-deployment risk should be removed, as we are currently unlikely to come close to the required levels of deployment to trigger consideration of this criteria.

295. 40 respondents made a range of suggestions of other material factors that we should consider when making judgements about tariff levels. The main emerging themes included £/ton of CO2 abated, air quality costs, availability of finance, the economic value of the diversification of the UK's energy supply, political and financial risk, impact on employment, recognition of innovation and pre-accreditation.

Government Consideration

296. The Government is determined to drive forward the deployment of renewable heat in a way which is cost-effective and achieves value for money. The application of a value for money cap based upon an assessment of the marginal cost of meeting the renewable energy target is a crucial mechanism for achieving this. We therefore will continue to apply the value for money cap when setting the levels of support available under the renewable heat incentive.

297. We have reviewed stakeholder views on the proposals to change the approach to the cap and the support expressed. No new evidence emerged through the consultation to justify departing from our proposal to increase the cap. On the contrary, stakeholders from the ground-source heat pump sector strongly supported the evidence we presented for a tariff level at the higher end of the 10.0p/kWh – 11.3p/kWh range. They believed this would be needed to kick-start the industry and to drive cost reductions over the longer term.

298. We have further reviewed our approach to setting the value for money cap. Whilst we were able to quantify and include the impact of the non-financial support gained by offshore wind as a result of EU ETS and Carbon Price Support, we did not account for other forms of indirect support. There is in fact a wide range of indirect support, such as levies on energy prices and variable VAT rates, and these supports could have both positive and negative impacts on the value for money cap. It is not possible to value the impact of all indirect support. For this reason, the current approach of focussing on the equivalent financial support provided continues to be the best way to ensure good value for money in the RHI tariffs in comparison to other renewables. **We will therefore apply a value for money cap of 10.0p/kWh for renewable heat for RHI tariffs from Spring 2014.**

299. Given the consultation responses are content that 12% is within the range of suitable IRRs, it is also consistent with our State Aid approval. **We will therefore retain an internal rate of return of 12% when developing tariffs.**

300. When the RHI was introduced, tariffs were based on the best available data at the time however DECC now has a wider evidence base. Four key data sources are:

- the original AEA data[26];
- the new data set from Sweett commissioned in August 2012[27];
- actual scheme deployment data; and,
- the data collected from stakeholder engagement.

301. We are now using this broader range of evidence to set tariff levels, rather than having to rely solely on modelling outputs. The aim of the tariffs set in the scheme remains the same as before, that is, to incentivise up to the 50th percentile of the heat potential for each technology, whilst providing a rate of return of 12% to the reference installation.

302. To make judgements about the appropriate tariffs levels, the following considerations have been taken into account (further detail of this can be found in the Impact Assessment published in parallel with this document):

- The level of forecast deployment
- The range of modelling outputs
- Industry views
- Recommendations made by DECC engineering specialists
- The nature of each technology and any specific risks of over- or under-deployment
- The relativities between tariffs for comparable technologies

303. Some of the suggestions made by respondents are already considered when we set tariffs, for example the cost of meeting the air quality emissions limits was considered in the original RHI tariffs and value for money. Other suggestions that those listed above have been considered on a tariff by tariff basis in the following sections.

304. Following the consultation we held further dialogue with an industry trade association to gather further evidence on the typical average SPF for GSHPs. In light of this we received further evidence that supported our proposal of an average SPF 3.6. Even though the proposed SPF may be viewed as high for some GSHPs available now it may be considered low in the future. We believe that we will be enabling more efficient systems to be supported by the RHI therefore **we will use the assumed SPF of 3.6 as an appropriate average SPF on which to base the calculation of the GSHP tariff**.

Small and Medium Biomass

305. Biomass boilers generate heat through burning organic matter, primarily wood. The heat is usually used to produce hot water or steam, the latter being more suitable for industrial applications.

306. Small and medium biomass boilers (0 to 199kWth and 200kWth to 1MWth respectively) are the highest deploying technologies in the RHI and represent 96%[29] of committed spend as of October 2013. Deployment for both boiler sizes continues to exceed our deployment estimates.

What we proposed

307. We proposed that the small and medium biomass tariffs should not be adjusted, as deployment is strong and the current tariffs are within the range of new model outputs. We forecast expenditure on small and medium biomass to be 126% and 169% of their anticipated levels of deployment respectively, as of 30th April 2013.

308. We noted that measures to enforce biomass sustainability and air quality were due to come into force over the next year. The introduction of these measures had been the Government's published intention since the scheme was launched in 2011. As previously stated, this would mean that the industry would face higher costs, but these were already factored into modelled tariff levels.

What respondents said

309. 88% of respondents (29 out of 33) agreed with our proposal to keep the small biomass tariff the same. Of the four respondents who did not agree, two provided suggestions as to why the small biomass tariff should change. It was suggested that biomass has been over-incentivised thus far, to a point where it had led to poor investment decisions based also upon additional assumptions that planning permission was easier to obtain than for other technologies. It was also suggested that a district heating uplift was required.

310. 72% of respondents (23 out of 32) agreed with our proposal to keep the medium biomass tariff the same. There were a range of reasons cited by those who disagreed with our proposal; some felt that the tariff should be increased to take into account air quality measures, others argued that a different banding structure should be used, the reversal of degression was called for and, finally, it was claimed that biomass has been over-incentivised thus far, which was suggested to have resulted in poor investment decisions.

311. 82% of respondents (23 out of 28) stated that our current approach to banding and tiering tariffs might be incentivising the installation of inefficient systems. Examples of this were provided, including instances where 999kWth systems were installed when 1.5 to 3MWth systems should have been fitted, instances of multiple 199kWth systems being installed rather than a single larger system; and where undersized systems were installed with buffer tanks to provide optimum financial returns.

312. Ways of combatting inefficient system sizing were suggested as follows: more stringent monitoring of applications to deter inefficient sizing; the introduction of a sliding scale of tariffs; tiering based upon heat output rather than load factor and counting capacity cumulatively across a single site.

313. Of the respondents who did not feel that our approach to tariff banding and tiering might be incentivising the installation of inefficient systems, it was suggested that poorly specified

[29] https://www.gov.uk/government/statistical-data-sets/rhi-mechanism-for-budget-management-estimated-commitments

installation parts were the cause of some inefficiencies, and that any removal of banding would result in the installation of bigger systems and waste of heat. Again, a number of respondents suggested that the tariffs need to be increased to reflect the recent introduction of the air quality emission levels.

Government Consideration

314. As outlined above, our proposal not to review the tariffs for both small and medium biomass was supported by a large proportion of respondents. Since the consultation deployment levels have continued to be high, with small biomass forecast expenditure at 173% of anticipated levels and medium at 151% as of 31 October 2013. This degree of support and continued high deployment reinforces our decision not to review these tariffs based on the current high uptake of these technologies.

315. We note that some respondents raised concerns that these sizes of biomass boilers are over incentivised due to the significant uptake that has been witnessed in the early stages of the non-domestic RHI scheme. Although these technologies are currently deploying up to their triggers, we have reassessed the market potential of what they can deliver and concluded that triggers should increase from current levels. See the section of this document on budget management for further information.

316. Government is also concerned about the potential for incorrect sizing of biomass boilers to benefit from the higher tariffs. Further work will be undertaken in the 2014 review, looking into this issue to better understand the scale and how it can best be addressed. We recommend consumers take steps to ensure that their biomass boiler is correctly sized. The Carbon Trust provides a tool[30] to help assess biomass heating system sizing and integration.

[30] http://www.carbontrust.com/resources/tools/biomass-decision-support-tool

Large Biomass (>1MW)

317. This installation type and size can either deliver space heating or industrial process heat, and therefore has a large technical potential for deployment. The use of biomass to provide heat for buildings or industrial process heating has been highlighted in the "UK Bioenergy Strategy"[3] as a low risk priority energy deployment pathway. In addition, given the scale and relative simplicity of the technology it has amongst the lowest average costs per unit of renewable heat of all the RHI supported technologies.

What we proposed

318. In 2011, prior to the introduction of the RHI, we had indicated our intention to introduce a tariff of 2.7p/kWh for large biomass. This was intended to incentivise 100% of the technical potential of the technology in contrast to the 50% used for all other technologies. We were ultimately unable to adopt this different approach for large biomass due to a requirement to use the methodology approved for all other technologies which avoids systematic overcompensation in order to gain European State Aid approval. A tariff for large biomass of 1.0p/kWh, set to incentivise 50% of the supply curve, has therefore been available since the start of the RHI in November 2011. However, uptake of this technology has not been close to achieving deployment consistent with incentivising 50% of the technical potential, with only 23% of the expected expenditure forecast for the 12 month period from 30th April 2013.

319. We also issued a call for evidence on the costs of large biomass alongside our September consultation. Of the four responses we received, three gave examples of projects which had gone ahead but not achieved the target internal rate of return of 12%, projects that were not viable against the fossil fuel counterfactual and evidence of cost estimates of large biomass being higher than the assumptions on which the 1p/kWh tariff is based. Taking into account market feedback, relativities to other tariffs and modelled output we proposed a tariff of 2p/kWh in the tariff review consultation.

320. The model outputs showed a high degree of variance and are based on a limited quantity of data. We therefore considered that evidence of the low uptake and the evidence from industry to be stronger indicators of an appropriate tariff level. There is a low risk to budget management associated with this proposal, and it still represents very good value for money as one of the lowest proposed tariffs in the scheme. An increased uptake of large biomass installations would lead to significant deployment of cost effective renewable heat.

What respondents said

321. 76% of respondents (35 out of 46) supported our rationale for a 2.0p/kWh tariff. It was highlighted that this would provide a more attractive rate of return to investors than currently, with evidence that some installation projects would likely proceed under this tariff where they would otherwise have remained dormant.

322. However, some respondents expressed their support with caveats. For example, that this tariff would only be appropriate if: a CHP tariff was set at 4.1p/kWh, the large biomass band was split further, a district heating networks uplift was introduced at the same time, enhanced preliminary accreditation was introduced, or that the tariff was paid subject to sustainability criteria.

323. Of the respondents who disagreed with our proposal, it was suggested that a higher tariff would be required to drive the uptake of large biomass, with suggestions of a tariff of at least 3p/kWh.

324. We invited respondents to comment on wider factors that we should consider. Concerns were raised over the effect on the wood fuel supply, as it was suggested that the proposed

tariff would divert supplies away from existing biomass installations. Respondents were concerned that the proposed tariff would provide disproportionately high returns to the largest installations, with respondents suggesting that an additional band should be introduced for installations over approximately 5MWth where it would be more suitable to retain the current large biomass tariff of 1.0p/kWh.

325. Another concern was that those on-grid installation opportunities might require higher tariffs. One respondent suggested that the low levels of deployment that were currently being experienced may simply be due to the drawbacks of large biomass as a technology, when compared to other alternatives.

Government Consideration

326. Currently we do not have enough evidence to suggest that it would be suitable to introduce an additional band in the larger biomass systems. Even after increasing the large biomass tariff to 2.0p/kWh this is still the cheapest level of support provided through the RHI and so represents very good value for money, relative to other renewable technologies.

327. At this stage a district heating uplift is not something that has been considered. We would need to consider the impact on other areas of the RHI and gather additional evidence on district heating system costs before options can be assessed. In “The Future of Heating: Meeting the Challenge”[4] published earlier this year we committed to consider further how heat networks can be better supported as part of the next RHI policy review in 2014.

328. In terms of the impact of existing large biomass systems, we would expect the proposed change in tariffs to have a negligible effect on the average price of biomass, given that use in the RHI is a relatively small part of the overall biomass market.

329. Following the consultation and the support for the increase in tariff (76% of respondents agreeing) **we will increase the large biomass tariff to 2.0p/kWh. This will come into force in Spring 2014 and will have an eligibility date of 21 January 2013.**

Ground Source Heat Pumps

330. GSHPs can perform at relatively large scale to provide space and hot water heating in a variety of different building categories and can make a material contribution to our 2020 renewable energy target.

331. The long term strategic value of heat pumps was highlighted in the Government's framework for low carbon heat[4]. In particular, they can play a part in the Government's long term aim to increase energy efficiency and the deployment of low carbon energy.

What we proposed

332. At the time of consultation GSHP deployment was low; with the forecast expenditure on 30 April 2013 for small and large GSHPs at 1% and 10% of what was anticipated at launch respectively. Given this very low level of deployment, we identified a substantial increase was likely to be required to incentivise up to 50% of the heat potential of this technology.

333. Taking into account the range of evidence, we assessed that a 9.0p/kWh tariff would be appropriate to incentivise up to 50% of the heat potential of GSHPs.

334. We also clarified that we intended to enable the tariff to be paid on the full amount of the heat generated by GSHPs. A tariff of 9.0p/kWh would be equivalent to 12.5p/kWh of renewable heat, beyond the value for money cap[31]. We therefore consulted on supporting GSHPs up to the cap i.e. 10.0p/kWh to 11.3p/kWh of renewable heat (equivalent to 7.2 - 8.2p/kWh on all heat output).

335. We proposed a single unbanded GSHP tariff, a change from the existing 'two band' approach, since model outputs implied that the tariffs would be relative close to one another. To avoid incentivising overproduction of heat, we proposed that the single tariff needed to be tiered. We requested that respondents provide suggestions as to the best way to tier the single tariff.

What respondents said

336. 60% of respondents (21 out of 35) supported our rationale for proposing a GSHP tariff of between 7.2 and 8.2p/kWh, with some saying it should be at the minimum of the range and others saying should be the maximum. There were a variety of reasons why some respondents were against the proposal. Some felt that the proposed tariff range was not enough to act as an incentive to the deployment of GSHPs. Others questioned whether the proposed tariff range provided good value for money to the taxpayer, or whether GSHPs should be supported under the RHI at all.

337. 66% of respondents (16 out of 24) were unable to provide a quantitative response when asked how much more deployment they thought a tariff of 8.2p/kWh would create, compared to a tariff of 7.2p/kWh. 29% of respondents (7 out of 24) suggested that the higher tariff would indeed result in greater levels of deployment, with figures of between 10% and 30% positive growth suggested.

338. Respondents also stated that it was difficult to comment on the difference in the potential for GSHP cost reductions comparing a tariff of 8.2p/kWh with a tariff of 7.2p/kWh, with 84% of respondents to this question (16 out of 19) unable to provide views. Those who provided views (16% of respondents, 3 out of 19) suggested that there would be increased potential for GSHP cost reduction if the higher end of the tariff range were paid; potential cost reductions of between 10% and 30% were suggested by some installers.

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[31] Assuming a seasonal performance factor of 3.6

339. 44% of respondents (11 out of 25) did not agree that GSHP tariffs should be 3 or 4 times higher than a tariff for AWHP. Alternative suggestions of 2 and 2.5 times higher were provided, as well as a suggestion that AWHP tariffs should be set at 60% of GSHP tariffs. 36% of respondents (9 out of 25) agreed with our proposal, as it was felt by some that this higher level of support was required to make GSHPs a viable option. 20% of respondents (5 out of 25) did not provide a response that either supported or disagreed with the proposal.

340. 66% of respondents (16 out of 24) agreed with our proposed tiering methodology for GSHPs, saying that it should help prevent gaming and reduce the incentive to overproduce heat. 21% of respondents (5 out of 24) disagreed, with some suggesting that it would lead to heat pump oversizing, add unnecessary complexity and would not result in adequate capital expenditure compensation.

341. Suggestions for what the minimum reasonable usage should be, ranged from 15 to 30%. Various suggestions on how the tier 2 tariffs should be set were also received, these included the tariff being relative to the net cost of renewable heat and the price of electricity divided by the assumed average SPF of the heat pump.

Government Consideration

342. The key purpose of the RHI is to help achieve our 2020 renewable target set by the EU Renewable Energy Directive. Therefore, when setting tariffs we need to consider all other technologies that can contribute towards this target. We do not believe that it represents good value for money to provide an incentive higher than the marginal technology, which is offshore wind, so the value for money cap will continue to stand at 10.0p/kWh (for reasons set out in paragraphs 32 to 35).

343. In line with the majority of support which is in favour of an increased tariff, **we will be increasing the GSHP tariff to 7.2p/kWh in untiered terms.**

344. Tiering the GSHP tariff will reduce the risk of gaming and any incentive to overproduce heat, as was recognised by the majority of respondents. **We will therefore introduce a tiered approach for the GSHP tariff.**

345. The tariff will be split into a higher 'tier 1' tariff, applicable for a set limited number of hours of heat pump use before a lower 'tier 2' tariff will be applied. Having considered the evidence presented, we will proceed using 15% as the initial heat[32] for which the tier 1 tariff will be payable. This has the further benefit of being consistent with the methodology used in the tiering of the small and medium biomass tariffs, allowing investors and energy consumers to more easily compare these two key heating technologies.

346. Setting initial heat as 15% equates to 1,314 hours so the tier 1 tariff will apply for the eligible heat generated by the GSHP and used for eligible purposes for the first 1,314 hours of full heating capacity use in a 12 month period. All further eligible heat will receive the lower tier 2 tariff.

347. It is therefore important to define the full heating capacity of a GSHP so that the extent to which the tier 1 payment (otherwise known as the 'initial heat') applies can be easily determined by Ofgem. For a heating only heat pump, this is relatively straightforward as the initial heat can be calculated by multiplying the capacity of the heat pump (in kW) by 1,314 to give the initial heat in kWh. However, as GSHPs can be sized to provide both heating

[32] The 'initial heat' is the amount of heat, in kWh, that would be generated by the installation if running at full capacity for 15% of the year (1314 hours).

and cooling, resulting in an increased full rated output, in these systems the initial heat must be based upon the heating component alone.

348. We will therefore define initial heat in a heating and cooling GSHP as the amount of space heating that would be provided by the heating system if it were operated at full rated output for 1,314 hours, assuming it had been sized in accordance with an approved heating system design method for space heating alone.

349. Applicants for heating and cooling GSHP will therefore be required to provide information which will provide reassurance that the heating requirement alone has been determined correctly. We are finalising the exact information which will be required, but it is likely to include:

- A heat loss calculation for the building, stating the method and calculator used
- Confirmation that the method used complies with BS EN 12831
- The internal and external temperatures used to represent the design day in the calculation
- How the above were used to determine the heat demand in kW under design conditions
- The heat output capacity of the heat generator(s)

350. We plan to continue working with industry and Ofgem on the final details of this approach.

351. We have aimed to set the tier 2 tariff at a level that would remove any incentive to overproduce but would encourage the continued use of the renewable heat source. The tier 2 tariff is therefore set at a level where the cost of the electricity consumed by a GSHP would exceed the RHI payment for the heat produced. To achieve this, the tier 2 payment is set at 85% of the cost of the electricity associated with the generation of the next unit of heat, using an SPF of 3.6. This results in a tier 2 tariff of 2.6p/kWh (based on 2014 price). This approach reflects the possibility of increasing performance and decreasing electricity prices.

352. Tier 1 is calculated to ensure that, on average, the tier 1 and tier 2 payments are equal to those received if the tariff was untiered, assuming a 20% load factor. Therefore tier 1 is calculated on the basis of the tier 2 tariff of 2.6p/kWh, and the number of hours on which it is paid (1,314 hours) and the untiered tariff of 7.2p/kWh. This results in a tier 1 tariff of 8.7p/kWh.

353. **We will therefore be proceeding to introduce a tiered GSHP tariff with the tier 1 set at 8.7p/kWh and the tier 2 tariff set at 2.6p/kWh**.

Renewable safeguards – eligible sources of heat for GSHPs

354. GSHPs are a complex technology with a unique ability to store heat for future use which would otherwise have been wasted. We recognise that this is one of the key benefits of this technology in a commercial setting. In the Early Tariff Review consultation we said that we did not wish to discourage low carbon and cost effective applications of renewable technologies even if not all of the heat generated could be counted towards the renewables target.

355. We stated our intention to replace the ‘naturally occurring’ heat source requirement in the existing regulations to simplify GSHP support (i.e. a factor would not be applied to payments by Ofgem to reflect any non-renewable component). However, we also highlighted the concern that, without appropriate safeguards being in place, there was a

risk that this could be abused to gain RHI payments for systems which generate only non-renewable heat and committed to working with industry to develop appropriate safeguards and eligibility criteria.

356. We have developed, in conjunction with the industry, a set of eligibility requirements and monitoring conditions to ensure the RHI makes GSHPs an attractive option in the non-domestic sector, whilst also providing value for money for taxpayers.

Eligible Heat Sources for recharging the ground

357. The efficiency of GSHP systems can be significantly increased by recharging the ground with heat from external sources. This external heat can theoretically come from a wide range of sources, some of which we consider compatible with RHI support and some we do not:

I. **Solar collectors**. Heat can be gathered and stored in the ground from a wide range of solar sources from panels to car parks. This is a renewable source of energy and using GSHP technology to store this heat so it can be used when needed can provide significant carbon savings. **Therefore this form of recharge will be fully compatible with the RHI**, but no energy subsidy other than the GSHP tariff will be payable on that heat e.g. in the example of solar thermal panels storing heat in the ground it would not be possible to claim the solar thermal tariff on the heat generated.

II. **Waste heat from space cooling and process cooling**. Many buildings in the non-domestic sector are likely to have a cooling demand and will typically use 'chillers' which dump waste heat into the atmosphere. Reusing this heat or storing it in the ground clearly provides carbon savings. This is likely to be by far the most common source of non-ambient heat on this list. **This waste heat source will be compatible with RHI support.** However, to ensure the RHI is not supporting purely energy recovering systems, GSHPs which perform simultaneous heating and cooling will be subject to the principles outlined below in paragraphs 359 to 361.

III. **Waste heat from industrial processes**. Where there is waste heat from industrial processes which would otherwise be dumped into the atmosphere, it is beneficial to store and reuse the heat. It will **therefore be treated in the same manner as waste heat from cooling and be compatible with the RHI.**

IV. **Direct Heat from Combined Heat and Power Systems (fossil fuel or renewable)**. We have recently been made aware of proposals to use GHSPs in conjunction with Combined Heat and Power systems (primarily gas CHP) in order to increase total system efficiencies. We recognise there may be benefits to using these two technologies in this manner, but concerns over the interaction with the Combined Heat and Power Quality Assurance scheme (CHPQA) means we are unable to make this use of GSHPs eligible with RHI support immediately. However, we want to give this further consideration and will work with industry to gather the evidence needed with a view to making a final decision as part of the 2014 review.

V. **Heat from fossil fuel or renewable boilers**. We want to avoid a situation where heat is generated only to be stored in the ground and **therefore if heat from these sources is used to recharge a GSHP system it will render the GSHP ineligible for RHI support**.

358. These arrangements will apply to all new ground source heat pumps accredited after the new regulations come into force.

Renewable Heat vs. Energy Recovery

359. This issue only applies to GSHP systems that are capable of simultaneous cooling and heating, where waste heat from cooling is used to heat another part of the system. This waste heat could be used directly for heat (never going into the ground loop) or could be drawn into the ground loop and stored in the ground (subject to losses) and used at a later date. When the waste heat is used directly for heating, this is effectively a form of energy recovery and, whilst it reduces carbon emissions and is therefore beneficial, it cannot be considered fully 'renewable'. We recognise that this ability to reuse waste heat simultaneously is one of the key benefits of this technology to the commercial sector and that some RHI support of this activity is necessary to incentivise this form of heat pump. However, the RHI is not intended to support devices which are purely energy recovery systems and the Government will monitor the situation to ensure that this is not the case.

360. DECC engineers have worked with the GSHP industry to develop a clear dividing line beyond which we consider simultaneous GSHP systems to be primarily energy recovery systems rather than renewable heating systems. In summary, **providing the heat drawn from the ground loop is at least 3/5 (three fifths) of the total heat produced by the heat pump, we are satisfied that a system should be considered renewable for the purposes of the RHI.** Please see Annex C for the derivation of the dividing line.

361. **We will not be introducing any eligibility requirements relating to the dividing line at this moment in time**. However, we will monitor the situation and, to provide reassurance that this limit is not regularly breached, we will be requiring GSHP RHI participants with simultaneous systems to install additional meters. Full details of the meters which will be required can be found in Annex C, but, in summary, the heat drawn from the ground loop will need to be metered in addition to the total heat output from the heat pump. In many cases, total heat output from the heat pump will be metered anyway for RHI payment purposes, so the only additional metering in such cases would be that of the heat drawn from the ground loop. We will monitor the evidence produced by these meters so that, if necessary, further action can be taken in future in the form of a cap based on the dividing line described above. This would limit RHI payments on the total heat produced by a heat pump to 5/3 of the heat taken from the ground. As an example of how this would work, if 30,000 kWh were drawn from the ground loop, payments would be made at the relevant tariff level, for up to 50,000kWh of heat output, provided that it was used for eligible purposes.

Solar Thermal

362. Solar thermal technologies collect heat from the sun onto a collector which transfers the heat energy into a working liquid. This liquid can then be used directly to provide hot water within a building, or an exchanger can transfer the heat from the working liquid to the water.

What we proposed

363. Solar thermal currently receives the maximum tariff available; set at the current level of the value for money cap. Our updated evidence suggests a tariff between 24.2 and 27.8p/kWh would be needed to incentivise 50% of the supply curve at a 12% internal rate of return. However, this is higher than the cap, so the solar thermal tariff is 9.2p/kWh in 2013. Deployment levels for this technology have therefore been understandably low.

364. However, any increases to the value for money cap, as detailed earlier in this document, may mean that there is a case for increasing the tariff for solar thermal. For this reason we discussed the possibility of raising the solar thermal tariff to between 10.0p/kWh and 11.3p/kWh. Although this is likely to be below the level required to incentivise 50% of the supply curve, industry have presented evidence of potential for cost reductions for this technology, which implies that installation costs could come down over time.

365. In addition to this, we sought stakeholder views on the benefits of reducing the tariff payment period from 20 years to 7 years, as an additional means to address the issue of high installation costs.

What respondents said

366. 76% of respondents (16 out of 21) supported our proposal to increase the solar thermal tariff to between 10.0p/kWh and 11.3p/kWh. However, it was also suggested that a limited increased tariff of 14.3p/kWh should be provided initially to 'kick start' the market. It was suggested that the solar thermal market experiences difficulties given the level of subsidy available for renewable electricity and that this could be a key reason why such a level of incentive could be required. Of the respondents who did not support our proposal to increase solar thermal tariffs, it was suggested that solar electricity (solar photovoltaic, or PV) was a preferential technology, offering a more efficient use of roof space. Others called for a reduction to the budget allowed for solar thermal in favour of other technologies, such as biomass.

367. 61% of respondents (11 out of 18) agreed that our proposed increase to the solar thermal tariff would bring projects forward that would otherwise not have received investment. Some installers and Local Authorities had examples of how increased tariffs would allow some potential projects to be commissioned and progressed where current tariff levels had proven to be insufficient.

368. The respondents who did not agree suggested that further increases in the tariff would be required to make a real difference to the commercial attractiveness of solar thermal projects. It was also suggested that the domestic RHI scheme might act as a catalyst to increase the commercial uptake of the technology, as was the case with solar PV as a result of FiTs.

369. A small number of respondents 36% (5 out of 14) of respondents felt that the proposed increase to the solar thermal tariff would stimulate cost reductions for the technology. Some of those who did not support this suggestion felt that prices would actually rise, to capitalise on the increase to RHI tariff levels. Other respondents suggested that the volumes associated with the non-domestic sector were too small to have any real impact on the

market, suggesting that the domestic RHI scheme had a better chance of impacting upon the costs of solar thermal technologies.

370. 21 respondents provided suggestions as to the opportunities and risks associated with reducing the solar thermal tariff payment period from 20 years to 7 years. The main opportunity was highlighted as being able to generate more interest in solar thermal installations, which would help develop the market. It was also suggested that a 7 year tariff payment period would be more appropriate, as there were no on-going fuel costs for solar thermal installations.

371. With regards to potential risks, it was suggested that those involved in other technologies might perceive treating solar thermal differently to the other technologies as being unfair. It was also highlighted that a 7 year tariff payment period would require an increase to the solar thermal budget allocation in the earlier years of the scheme, which was seen by some as interference with the natural competitiveness of the renewables market. In addition to this, it was suggested that installations might be decommissioned after 7 years, only to be replaced with a new installation for the sole purpose of receiving RHI tariffs for a further 7 years.

Government Consideration

372. The majority of respondents were in favour of the increased tariff for solar thermal and **we will therefore implement an increased tariff to 10.0p/kWh reflecting the value for money cap.**

373. Taking into consideration the responses received we will not, at this time, introduce a reduced tariff duration for solar thermal. This would be a step change from our current approach to tariff support in the non-domestic sector and the impact of such a change would need to be carefully considered in respect of other technologies given that changing the tariff length could be seen as favouring one technology over another, something the RHI is designed not to do.

Eligibility date

What we proposed

374. When we announced the possibility of an early review of tariffs on 21 January 2013 we stated our intention that any RHI installation with an accreditation date of 21 January 2013 or afterwards would benefit from any increase in tariff once they come into effect. This was to ensure we stimulated uptake in certain technologies at the earliest possible opportunity. We proposed that any installations accredited to the scheme prior to this date would be subject to the tariff in place at the time. Given that investment decisions are usually made on commercial viability it would not be good use of taxpayers' money to increase tariffs for installations which were commercially viable under existing tariffs.

375. We asked if respondents agreed with our intention that any changes to tariffs following this consultation should only affect those installations accredited from 21 January 2013.

What respondents said

376. 65% of respondents (32 out of 49) supported our decision to only apply new increased tariffs to installations accredited on or after 21 January, as the decision to move forward with a project prior to this date would have already been made.

377. Of those that disagreed with this proposal, 12 out of 49 (almost half) felt that new tariffs should only apply to applications made either on the date the consultation was published or on the date the Government response was published. The remaining 5 respondents that did not support our proposal felt that the tariffs should be applied to any installation installed since July 2009 as with the original tariffs, particularly for the large biomass tariff.

Government consideration

378. **Given the support from respondents and our original intention, we will proceed with our proposed eligibility date of 21 January for those tariffs changed as part of the tariff review.** We feel that this offers the best value for money and continues to support increased uptake of new renewable heat sources across the UK.

379. Installations planned prior to this date would not have been anticipating an increase in tariffs. Offering a higher tariff would therefore represent poor value for money as they were incentivised to produce renewable heat at the lower tariff.

Budget Management

Budget management and scheme performance so far

380. In April 2013, DECC implemented a budget management mechanism to control spending under the non-domestic RHI scheme, and to provide certainty to applicants, until the end of the current spending review period, March 2015. This system is based on 'degression' or gradual reductions of tariffs. Since then we have published the results of three rounds of quarterly forecasts[9] which show how scheme expenditure compares to degression triggers set out in legislation, and several monthly updates of scheme performance. A fourth announcement is due by 1 March 2014.

381. The assessments and updates have shown that the non-domestic scheme continues to grow, but that the growth is based primarily on the deployment of two technologies: small and medium biomass boilers, which have exceeded expectations at the scheme's inception. Other technologies have shown relatively slow growth (hence the tariff uplifts set out in this document). Table 6 below shows the forecast expenditure versus expectations as set out in regulations as of 31 October.

Table 6: *Forecast expenditure versus expectations at 31 October 2013 for currently supported RHI technologies*

Technology	Expected deployment for 31 October	Actual forecast expenditure on 31 October	Forecast expenditure as % of expected
Small Biomass (< 200kWth)	£18.7	£32.3	173%
Medium Biomass (200kWth - 1MWth)	£17.6	£26.5	151%
Large Biomass (> 1MWth)	£32.0	£8.6	27%
Small GSHP (< 100kWth)	£43.6	£0.5	1%
Large GSHP (> 100kWth)	£7.2	£0.5	7%
Solar thermal (< 200kWth)	£7.2	£0.1	1%
Biomethane (all scales) & biogas (< 200kWth)	£24.2	£1.9	8%

Key features of degression

382. The RHI is funded directly from general taxation and had been assigned annual budget limits by the Treasury through until 2014/15. These allowed for £251m expenditure in 2013/14 and £424m expenditure in 2014/15. On 26 June this year a budget limit of £430m was confirmed for 2015/16. These budgets are fixed so Government needs to ensure that the scheme stays within these limits and achieves good value for money to the taxpayer. At the same time, those who are considering installing renewable heat need as much certainty as possible about the support that is likely to be available to them.

383. Degression works by gradually lowering tariffs paid to new applicants if deployment exceeds expected levels, set out in advance in the Regulations. These levels, or triggers, are expenditure thresholds and are currently based on modelled forecasts dating from the scheme's launch in November 2011. The key features of the current policy are summarised below.

Total trigger

384. The total trigger is a trigger related to overall deployment. This is essentially the sum of all individual technologies' expected levels of deployment. When overall deployment reaches this trigger, those tariffs which are deploying above their expected levels are reduced by 5%.

Tariff triggers

385. The mechanism is designed to allow some flexibility for deployment to differ from expected levels. It does this by setting a separate degression trigger for each tariff higher than expected levels of deployment. These are currently set at 150% of expected deployment for most technologies. This aspect of the policy is intended to ensure that if some technologies are deploying at lower levels than expected, there is flexibility for others to deploy at a higher level, thus allowing for more heat to be delivered than would be possible if triggers were set at expected levels alone. It also recognises the fact that deployment projections are modelled outputs.

386. Whether any degression occurs as a result of the tariff triggers being hit is also linked to the total trigger, as overall non domestic deployment must reach 50% of the total trigger for the tariff triggers to result in a tariff reduction.

Technologies with low forecast deployment

387. Where our modelled uptake forecasts for particular technologies are very low, or zero, the tariff triggers have been set at 5% of the value of the total trigger to ensure that there is plenty of scope for deployment of these technologies, whilst maintaining assurance over the RHI budget. This only currently applies to the large GSHP (combined with deep geothermal) and solar thermal tariffs.

What happens when a trigger is reached

388. Once accredited into the scheme the tariff for an installation cannot be reduced. Therefore when a degression occurs, reduced tariffs apply only to new applicants to the scheme. If tariff triggers are reached, tariffs are reduced by 5% initially, with reductions of up to 20% possible if the rate of uptake does not slow down and continues to increase. This approach of starting with a relatively small reduction and then, if needed, increasing the levels of reduction over time is designed to ensure that the market is not negatively impacted by over correction of tariff levels.

389. The full set of rules on which the system is based, including for repeated degressions and additional capacity, is set out in the response to the consultation "Providing Certainty, Improving Performance"[6].

390. We have recently laid amending regulations before Parliament to correct a discrepancy between our published policy intent and the original regulations. This minor amendment has had no impact on previous degression announcements, and so has not impacted on available tariff levels. It relates to the rules which govern the percentage reduction applied where tariff reductions are triggered in consecutive quarters. We intend for the amendment to be in place as soon as possible, subject to the Parliamentary timetable. We expect this

to be by the end of December 2013. This will ensure that there is no difference between the policy intention and application.

Developments and changes

391. We have learnt from the operation of degression since its introduction and have engaged with stakeholders on improvements. In May's Early Tariff Review consultation we stated that to ensure that the scheme as a whole remained affordable we would need to review and update triggers in light of scheme extensions, the tariff review, the introduction of the domestic RHI scheme and the 2015/16 spending review settlement.

392. Since we carried out the tariff review consultation, we have updated our deployment estimates to determine the potential for deployment of all RHI technologies until 2015/16. These estimates have been derived from data gathered from the industry and investors. They show that the spending envelope in 2015/16 of £430m should be sufficient to accommodate the likely potential of the market for each RHI technology. Likely deployment levels for each technology differ from initial modelled expectations, in some cases quite significantly. Please see the impact assessment that accompanies this publication for further detail.

393. We have therefore concluded that we should retain as much of the existing degression mechanism as possible, given that the objectives for the mechanism remain the same: to manage the budget sustainably and achieve value for money whilst ensuring technology diversity and flexibility around deployment estimates. We have, however, identified three areas which need to be adjusted to ensure that the mechanism continues to function as intended, and these are set out below.

Basis of triggers

394. We will set triggers on the basis of our updated deployment estimates. This will ensure that triggers reflect the current state of the market as far as possible and allow for sustainable growth in renewable heat. For example, where deployment for certain technologies has been low to date, as in the case of GSHPs and large biomass, the new triggers will reflect the likely state of those markets from Spring 2014 onwards. So although those triggers will be lower than they would have been under the current system they still allow for significant growth in these markets compared to current deployment. Conversely, for small and medium biomass, the expected deployment level will increase, which reflects a reassessment of the technical potential of these technologies, evidenced by the strong deployment of these technologies to date.

395. There will be one trigger for GSHP, now that all installation sizes will receive the same tariff. The small biogas tariff will be removed from the biomethane trigger and treated in the same way as other very low deploying technologies (with one trigger for all sizes of biogas installations). The updated expected deployment levels for January 2015 and 2016, which are the basis of the new triggers, are set out in Table 7 below, alongside levels currently set out in legislation for comparison where relevant.

Table 7: *Previous expected expenditure levels and updated Market Intelligence (MI)*

Status	Technology	Current January 2015 expected expenditure *	Updated January 2015 central MI scenario	January 2016 central MI scenario
No change in tariff	Small Biomass (< 200kWth)	£29.4m	£63.1m	£98.7m
	Medium Biomass (200kWth – 1MWth)	£28.8m	£54.2m	£78.8m
	Biomethane (all scales)	£61m	£46.4m	£95.5m
Tariff review technologies	Large Biomass (> 1MWth)	£57.9m	£12.0m	£21.4m
	Small GSHP (< 100kWth)	£94m	£10.0m	£23.3m
	Large GSHP (>100kWth)	**£14.6m		
	Solar Thermal (< 200kWth)	**£14.6m	£1.2m	£2.1m
New technologies and tariffs	Biogas (all scales combined)	N/A	£0.8m	£1.2m
	CHP Biomass	N/A	£17.6m	£45.3m
	Deep Geothermal**	N/A	£0.7m	£0.8m
	AWHP	N/A	£14.8m	£26.2m

** As set out in regulations based on projections of deployment at scheme launch*

*** These triggers were set at this level in regulations due to the approach to setting triggers for low deploying technologies set out above, however our modelled expected deployment was significantly lower.*

Approach to scaling triggers

396. In general we think it essential to retain the approach of scaling up tariff triggers as set out in paragraph 385 to build in flexibility of deployment levels between technologies. This will apply to the majority of technologies (other than for those technologies with low estimated deployment which already have additional flexibility). This will continue to ensure that if a deployment scenario emerges that differs from our forecast data, but does not threaten the overall budget then the mechanism does not reduce tariffs too soon.

397. Estimates of deployment for new tariffs and technologies in the scheme (e.g. CHP and AWHP) are less certain than those for established technologies (e.g. small and medium biomass) as we cannot be sure exactly what impact the new support will have on the market. There is also similar uncertainty in our estimates for tariff review technologies which are being increased where deployment was previously lower than anticipated (GSHPs and large biomass). To account for this uncertainty, and ensure that the markets for these technologies can grow and develop to their full potential, we will retain 50% scaling for these technologies (with a different approach being taken for technologies with low forecast deployment, see below).

398. Small and medium biomass and biomethane are currently included in the scheme and have had more stable market conditions since the scheme's launch two years ago. This is reflected in the deployment for small and medium biomass, which is the strongest in the scheme, and our deployment estimates for biomethane injection, which are of a similar magnitude. Given this relative stability, we are able to be more certain about the likely deployment levels of these technologies at current tariffs. We will therefore reduce the scaling of these technology triggers to 20%. This approach will ensure that the scheme remains affordable and that we are able to afford to support other technologies as they

come forward into the RHI. At the end of 2015/16 we expect this group of technologies to account for over half of the forecast expenditure.

399. All triggers are set on the basis of our central market intelligence scenario, other than those technologies where deployment is expected to be relatively low (solar thermal, deep geothermal and biogas). However, to reduce the risk of slight variations from the central scenario resulting in unnecessary tariff reductions soon after new tariffs are implemented, we will set initial triggers slightly higher than central market intelligence in some cases, and bring them back into line with the central market intelligence scenarios by April 2015. This will apply to GSHP, ASHP, large biomass, CHP and biomethane. These are the technologies which are either new, have updated tariffs, or have reduced triggers relative to current levels set out in legislation. This approach is not required for small and medium biomass as their triggers will increase.

400. Table 8 below sets out the impacts of these changes on the scaled triggers at the point at which triggers are likely to change in April 2014, subject to parliamentary timetabling and approval.

Budget available for technologies with very low forecast deployment

401. There are now five tariffs for which our deployment estimates are relatively low: solar thermal, deep geothermal and all three biogas combustion bands. We will therefore continue with the present approach of assigning a fixed percentage of the budget to each of these technologies which will give sufficient room for growth in the market and act as a backstop should deployment go well beyond expected levels.

402. We will however reduce the percentage of budget assigned from 5% to 2.5% as our deployment estimates show that this should be sufficient to accommodate much more than the likely growth in the market.

403. We will assign one single trigger, set at 2.5% of the budget, to all three of the biogas combustion tariff bands. Our expectations for the level of deployment for each biogas tariff are small, we expect total expenditure of around £1m in 2015/16, and combining the tariffs avoids excessive levels of granularity in the mechanism and reduces the risk of premature degression. Table 8 below sets out the relevant tariff trigger at April 2014 and Table 9 shows the levels that that triggers will be set at in regulations for January 2015 and January 2016.

Table 8: *Impacts on scaled triggers*

Status	Technology	Current April 2014 scaled trigger	Updated April 2014 scaled trigger	Difference	Scaling
No change in tariff	Small Biomass (< 200kWth)	£34m	£49.9m	£15.9m	20%
	Medium Biomass (200kWth–1MWth)	£32.7m	£46.1m	£13.4m	
	Biomethane (all scales)	£55.5m	£44.4m	-£11.1m	
Tariff review technologies	Large Biomass (> 1MWth)	£61.8m	£14.1m	-£47.7m	50%
	Small GSHP (< 100kWth)	£89.5m	£8.8m	-£90.3m	50%
	Large GSHP (>100kWth)	£9.6m			
	Solar Thermal* (< 200kWth)	£9.6m	£3.1m	-£6.5m	N/A
New technologies and tariffs	Biogas* (all scales combined)	N/A	£3.1m	N/A	N/A
	CHP Biomass	N/A	£25.5m	N/A	50%
	Deep Geothermal*	N/A	£3.1m	N/A	N/A
	AWHP	N/A	£15.6m	N/A	50%

**these technologies do not have scaled triggers as they are assigned a fixed percentage of the overall budget.*

404. Please note that these figures will be subject to finalisation and it is possible that there may be some variance between the figures in Table 8 and Table 9 and the figures included in the regulations. As regulations are intended to be laid by Spring 2014 the triggers in Table 8 for April 30 2014 will apply subject to Parliamentary timetabling and approval.

Table 9*: The central MI scenario and tariff triggers, the latter will be set out in regulations for January 2015 and January 2016*

Technology	Jan-2015		Jan-2016	
	Central MI Scenario	Tariff trigger	Central MI Scenario	Tariff trigger
Small Biomass (< 200kWth)	£63.1m	£75.9m	£98.7m	£118.5m
Medium Biomass (200kWth – 1MWth)	£54.2m	£65.1m	£78.8m	£94.5m
Biomethane (all scales)	£46.4m	£60.4m	£95.5m	£114.6m
Large Biomass (> 1MWth)	£12.0m	£20.8m	£21.4m	£37.2m
Small GSHP (< 100kWth)	£10.0m	£15.6m	£23.3m	£35.0m
Large GSHP(>100kWth)				
Solar thermal	£1.2m	£5.5m	£2.1m	£9.8m
Biogas (all sizes)	£0.8m	£5.5m	£1.2m	£9.8m
CHP Biomass	£17.6m	£29.6m	£45.3m	£68.0m
Deep geothermal	£0.7m	£5.5m	£0.8m	£9.8m
AWHP	£14.8m	£23.7m	£26.2m	£39.3m

The degression forecasting methodology

405. As part of the review of the budget management policy, we have examined the existing approach to how we determine whether a tariff reduction is needed. This was to ensure that the methodology used for estimating scheme expenditure is as accurate as possible; which is particularly important as we look to add new technologies to the scheme. We have also benefitted from the mechanism being in operation for several months, which in turn has helped us to identify where improvements can be made.

406. We believe that the current methodology continues to offer broadly the right approach. The existing methodology, set out in regulations, estimates committed expenditure for the non-domestic scheme over the following 12 months. It does this by determining heat loads[33] (load factors) for all systems which have applied to join the scheme as well as those accredited or registered by Ofgem. The estimates of expenditure are increasing in their levels of accuracy as we start to receive more actual meter readings from RHI recipients. We will continue to count all applications which are accredited and registered to the scheme, as well as applications for preliminary accreditations.

407. The challenge for us is to ensure that the way that we calculate heat loads for those plants yet to provide meter readings is as accurate as possible. For plants smaller than 1MWth we will continue to do this by using average heat loads for each technology and heat use where we have sufficient data to do so (sufficient in this case means 20 meter readings for a heat use), or an average from the overall scheme where there is insufficient data.

Changes to the current methodology

408. We currently count plants towards our estimates using the application date. We intend to change this so that we only count plants towards estimates using the date when we realistically expect them to start to have budgetary impacts, which will not always be the application date. We will therefore estimate the cost of preliminary accreditation and biomethane registrations starting from the estimated commissioning date provided by the applicant.

409. Currently, for medium and large biomass plants producing heat to enable a process, we use the 'estimated hours of operation per week for eligible purposes', which is provided at application. For medium biomass process heat we intend to change this approach and instead use the method used for other technologies currently in the scheme, which is to use average heat loads from similar RHI accredited installations that have provided metering data.

410. For large biomass plants, and all other plants that are more than 1MWth in size, we propose to ask new plant owners applying to the scheme to provide us with their 'estimated annual eligible heat generation' as part of the application process. We will then use this to calculate their heat load until plant metering data is provided. For larger plants we expect capacities and types and hours of use to vary considerably, and applying an average load factor to such plants would be inappropriate. This approach will apply to the following technologies which are 1MWth and above in size only: deep geothermal; large biomass; large heat pumps; CHP; and large biogas >600kWth.

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[33] The term heat load refers to the fraction of heat generated in a period of time compared to the maximum an installation could have produced if run continuously at maximum capacity. For example, a 100kWth system could produce in 1 day (24*100) 2400kWh of heat, however in reality the meter reading for a day's heating might only be 600kWh, therefore we could calculate the heat load as (600/2400) 0.25 or 25%. We would calculate the estimated spend over the next 12 months for this plant based on an assumed 25% heat load, or 0.25 x plant capacity x number hours in a year x tariff = £/per year.

411. We currently only determine flow rates for biomethane plants that are already injecting into the grid, that is those participants who have received a periodic support payment. We intend to change this so that, prior to receipt of past flow rate readings, we will base any estimates on expected flow rates provided as part of the application. We will not use average flow rates from across all biomethane plants. By 'expected flow rate' we mean the amount of gas the owner of the installation expects to inject into the grid within the next 12 months (from the application date).

412. In addition, we intend to amend the regulations to make it absolutely clear that certain applications will no longer be included in our assessment of expenditure. These are applications where we have confirmation from the applicant that they no longer wish to pursue their application.

When new triggers and methodology will be applied

413. The changes to budget management set out in this document will come into force when the amended regulations come into force, expected to be Spring 2014.

Biomass Sustainability Update

414. Since 2005 bioenergy use for renewable heat has more than doubled to 13.9TWh (in 2012); the increase between 2011 and 2012 was 4%. We expect bioenergy to receive significant amounts of support under the RHI via the range of tariffs for: biomass combustion; biogas and biomethane; and biomass CHP[34].

415. For the RHI to deliver the full range of potential benefits, it is essential that the bioenergy it incentivises is sustainable in terms of GHG savings and broader land-use impacts. That is why we have always intended to introduce appropriate sustainability criteria into the scheme, as set out in the original November 2011 policy document[35].

What we said in "Providing certainty, improving performance"

416. In the February 2013 Government Response to "Providing certainty, improving performance,"[6] we stated our intention for the UK to be at the forefront of the EU in ensuring biomass supplies are sustainable. We are determined to achieve real and significant GHG emissions savings from the growth in bioenergy we wish to see. We announced plans to introduce sustainability requirements into regulations by the end of the year, ahead of an April commencement date. The RHI sustainability standard will consist of two criteria i) a GHG lifecycle emissions target and ii) land criteria.

417. We announced that the biomass sustainability standards would apply to installations of all sizes which use biomass as a feedstock, unless that biomass was classed as a waste. This included biomass installations and biogas/biomethane installations which produce the biogas using biomass which is not waste. The use of animal manure and animal slurry were to be exempt from the sustainability standards.

418. We stated that, from 1 April 2014, RHI recipients would be required to demonstrate they had met the GHG lifecycle emissions savings to be eligible for RHI payments. Compliance with land criteria would be enforced no sooner than April 2014 and no later than April 2015, in line with the RO timetable.

419. As we are intending to link eligibility for RHI support with meeting the sustainability criteria, we stated that the criteria would need to be notified to the European Commission as a technical standard.

420. We announced plans for two methods of compliance with the sustainability criteria: either by reporting to Ofgem or by sourcing fuel from an approved suppliers list. We believed that this would allow sufficient flexibility for scheme participants to demonstrate compliance, though typically we would expect larger installations to choose to demonstrate though reporting and smaller installations to buy their fuel from an approved supplier.

421. RHI recipients choosing the reporting option would be required to report on a per consignment basis; individual installations would be required to declare on a quarterly basis that their fuel complies with the sustainability criteria and produce and submit an annual

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[34] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/255182/UK_Renewable_Energy_Roadmap_-_5_November_-_FINAL_DOCUMENT_FOR_PUBLICATIO___.pdf

[35] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48041/1387-renewable-heat-incentive.pdf

report to Ofgem. The quarterly declaration was intended to remind suppliers of their responsibilities and to ensure that they are following the appropriate procedures throughout the year.

422. We announced that owners of heat installations of less than 1 MWth capacity would be allowed to source woody biomass feedstocks for their boiler from their own estate and this would be deemed sustainable. The approved supplier scheme would offer a simple process whereby these installations register their details with the scheme as a self-supplier, and provide accompanying evidence of the estate's capacity to supply woody biomass.

423. We announced our expectation for the approved supplier list to be in place by the year end. Once established, the approved supplier list was to be managed and monitored by an approval body which was to be appointed later this year. Biomass suppliers who wanted to access the expanding RHI market would need to put themselves forward to the list manager for approval. Part of the list manager's role would be to ensure that the suppliers are selling biomass that meets both the GHG emissions target and the land criteria.

424. We also announced our policy position on grandfathering of sustainability criteria, which for existing RHI accredited installations was to grandfather from the date at which the criteria are first introduced into the RHI. For new biomass heat installations, grandfathering of the criteria would be applied at the point of accreditation, meaning that if biomass sustainability criteria change in future, the changed criteria would only apply to installations which were accredited after the point at which the new criteria came into force.

Latest Developments

Grandfathering

425. As stated in the Government Response to "Providing Certainty, Improving Performance"[6], the Government retains the flexibility to update biomass sustainability criteria should EU legislation make it necessary or, should new evidence suggest the initial sustainability criteria in place do not provide sufficient assurance that GHG savings are being generated.

426. The RHI policy on grandfathering announced in the February Government Response was intended to reduce uncertainty for investors, as we recognise that unmanageable risks to long-term contracts can present a deterrent to investment. However, in developing policy in relation to the Biomass Suppliers List, we have taken a decision to update our approach for heat. Grandfathering the criteria as initially proposed may create a situation where several sets of criteria are in force at any time. We are concerned that this is likely to lead to overly-burdensome administrative complexity for the RHI scheme administrator, the Manager of the Biomass Suppliers List, and suppliers of biomass, with the potential to discourage new suppliers from entering the market and add to the cost of biomass fuel.

427. In addition, academic and other research into the complex field of biomass sustainability is ongoing. In taking policy decisions on biomass, in line with the principles set out in the Bioenergy Strategy, we therefore seek to balance flexibility and investor certainty. The number and nature of the supply chains that are developing for biomass together with shorter contracting lengths compared to electricity indicates that, with sufficient notice, the heating sector could adapt more readily to changes if new evidence regarding sustainability, e.g. on carbon stocks or the wider environment, comes to light.

428. A significant number of large biomass projects are expected to be CHP, and thus come under the RO rules rather than the RHI criteria. The projects within the remit of the RHI sustainability criteria will in general be smaller projects and in many cases will be most

likely to be purchasing fuel through the Biomass Suppliers List. Supporting a dynamic and agile biomass supply chain is an important aim of the RHI.

429. Therefore, in order to simplify the running of the scheme, and ensure Government is able to set the current criteria in line with the information available in today's market while retaining flexibility for the future, we have amended RHI policy so that sustainability standards are not grandfathered. We now intend that any updated criteria should apply to all existing and new applicants to the non-domestic RHI, from the date the amended legislation comes into force.

430. We recognise the need for clear, early notice of potential changes to sustainability criteria to reduce uncertainty. Our market intelligence indicates that the biomass supply chain for heat, unlike that for electricity, is agile enough to respond to new sustainability criteria if given a suitable period in which to prepare. We will therefore align reviews of the RHI sustainability criteria with periodic reviews of the RHI scheme (which take place every three years), and we do not anticipate reviewing the criteria sooner than the planned 2017 review of the RHI (with a view to legislating for any new criteria during 2018, subject to EU legislation.)

431. At this stage, we would expect any updates to the criteria to be incremental. For example, if the EU is able to define the term "highly biodiverse grassland" we may wish to consider updating the land criteria, and we will consider the potential impact of any change in sustainability criteria on all consumers and formally consult on proposed changes in advance of the legislative changes. Industry will therefore have an estimated 12-18 months' notice of any likely new criteria, and if appropriate we will announce at the time a further notice period before the new criteria come into force (depending on the scale of changes proposed).

347. The policy set out above assumes that no EU legislation will be brought in to enforce sustainability standards across member states. It remains our expectation that the biomass sustainability criteria for the RHI will not be reviewed before 2017, in line with periodic reviews of the RHI, unless the UK Government is specifically required to make changes by European legislation.

432. This update on the RHI does not change the policy for sustainability criteria under the RO as set out in the "Government Response to the consultation on proposals to enhance the sustainability criteria for the use of biomass feedstocks under the Renewables Obligation (RO)"[36] published on 22 August 2013. This document set out that the UK will not make further unilateral changes in the methodology underpinning the RO GHG targets or to other aspects of the RO sustainability criteria before 1 April 2027. New investment in electricity infrastructure is reliant on the establishment of long term feedstock supply contracts. Without confidence as to the future standards that companies will need to aim for, such investment might not take place.

433. Biomass CHP installers will be able to claim the RO on their electricity generation and the RHI on the eligible heat use provided they have not received the ROC uplift under the RO. As set out in the February 2013 Government Response[6], a CHP station receiving ROCs under the RO, and therefore demonstrating compliance with the RO sustainability criteria, will not be required to demonstrate compliance with the RHI sustainability criteria (for clarity, this includes the period prior to April 2015, during which the RO criteria will be implemented on a reporting basis only). This is in order to prevent additional burdens and

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https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/231102/RO_Biomass_Sustainability_consultation_-_Government_Response_22_August_2013.pdf

duplicate reporting. We expect to follow this approach for Contracts for Difference (CfDs), the Government's new support mechanism for renewable electricity.

Implementation timelines for biomass sustainability criteria

434. DECC recognises stakeholder concerns about the readiness of industry to demonstrate compliance with mandatory standard GHG lifecycle emissions savings, if they were implemented from April 2014. We will therefore postpone implementing mandatory compliance with GHG lifecycle emissions savings to Autumn 2014. This is so that biomass suppliers and self-reporting non-domestic participants can monitor their processes in light of the sustainability criteria and build the audit trail necessary to demonstrate compliance. DECC will work with the manager of the Biomass Suppliers List to ensure that the evidence requirements for demonstrating compliance will be available by Spring 2014. This postponement will not affect the opening of the domestic RHI scheme, the implementation of the other changes to the scheme as set out in this document, or participants' ability to claim RHI for either the domestic or non-domestic schemes.

435. Work is ongoing to develop land criteria which are consistent with those used within the RO. Subject to the availability of Parliamentary time, we intend to implement land-use sustainability criteria by 1 April 2015. These would consist of wood fuel land criteria and land criteria consisting of general restrictions on the use of biomass sourced from land with high biodiversity or high carbon stock value such as primary forest, peat or wetland.

436. Prior to 1 April 2015, there will be no requirement to report against land criteria and compliance with RHI standards will be judged solely on whether the participant has met the minimum GHG lifecycle emissions standards.

437. RHI participants and suppliers of biomass will be notified of the details and requirements for land criteria well in advance of 1 April 2015, so as to provide adequate time in which to prepare for the new standards.

438. Both options for demonstrating compliance will be open for all participants on the non-domestic scheme and any single participant will be allowed to use either method for each consignment of biomass or biogas used. A definition of 'consignment' can be found in the Ofgem non-domestic scheme guidance.

Biomass Suppliers List

439. We have continued developing our proposals for an approved supplier list. In order to make the scope and purpose of the list clearer, we will henceforth be referring to the Biomass Suppliers List, rather than an 'approved supplier list'.

440. The procurement process for securing a contracted organisation to act as the list manager is now underway, and we expect the contract to be signed in early 2014. We intend for the Biomass Suppliers List to be open for applications from suppliers of solid biomass in Spring 2014. We expect a detailed operating model for the Biomass Suppliers List to be finalised in the New Year and for the application requirements to be made available to biomass suppliers in Spring 2014. For more detail on the overall cost and benefits of the Biomass Suppliers List, please see Annex 1 of the accompanying Impact Assessment.

441. As of Autumn 2014, suppliers on the Biomass Suppliers List will need to ensure that the RHI-compliant fuel they sell meets the legislated GHG emissions standards. In order to register on the list, suppliers will need to demonstrate that the calculation of GHG emissions for each consignment of fuel delivered to a participant follows the calculation methodology set out by the manager of the Biomass Suppliers List, and that, where different types of fuel are sold, they clearly differentiate between fuel which meets the

criteria and any fuel which does not. The GHG calculation is expected to take into account where possible the emissions produced in cultivation, processing and transporting biofuels as part of the supply-chain and in transporting the fuel from the supplier to the participant.

442. Upon the introduction of mandatory compliance with land criteria, the Government intends for all registered suppliers and new applicants to the list to be audited against the requirements for demonstrating compliance. As stated above, these requirements will be published well in advance of the mandatory compliance date, in order to allow suppliers to prepare.

443. DECC recognises the need for any administrative requirements placed on businesses not to present a barrier for growth and will work with the list manager to ensure that any calculation methodology proposed is sensitive to the type and size of organisation applying.

444. It is DECC's intention that all suppliers registering on the Biomass Suppliers List will agree to desk-based and onsite audits, both at the point of registration and on an ongoing basis to ensure continued compliance with the legislated sustainability criteria. Failure, or inability, to demonstrate compliance with the criteria, may result in a supplier losing their place on the list. We intend for further details of the compliance and audit regime for biomass suppliers to be available before the list opens for applications in 2014.

445. It is DECC's intention for the RHI scheme administrator to accept proof of purchase of RHI-compliant fuel from a registered supplier as evidence of an RHI participant's compliance with the sustainability criteria. This evidence requirement will come into force in Autumn 2014, when compliance with the criteria becomes mandatory. Before this date, there will be no obligation to purchase from a registered supplier although participants will be encouraged to source biomass from a registered supplier if possible, in order to ensure a smooth transition when compliance becomes mandatory.

Clarifying rules and reporting following the Government response on sustainability requirements for the Renewables Obligation

446. In February, we set out that participants would have the option of demonstrating they meet the sustainability criteria through either self-reporting or through an approved supplier list (the Biomass Suppliers List). We also confirmed that participants could, if they wished, source part of their fuel from the list and self-report on the sustainability of the remainder.

447. Following decisions made in the Government's response to the consultation on sustainability criteria for the RO, we will require that, where participants demonstrate compliance through self-reporting, installations over 1MWth use the actual value method of reporting, as set out in Annex 1 of the European Commission 2010 Report on sustainability criteria for biomass and biogas.[37] The Government's free online solid biomass & biogas carbon calculator tool uses this actual value method.

448. Installations below 1MWth in size will be allowed to use the default value method, using the high level default values provided in Annex 2 of the 2010 report for the whole feedstock lifecycle in combination with the installations thermal efficiency.

449. For installations over 1MWth, which will have to use the actual value method of reporting, we will take a consistent approach with that decided in the RO that actual rather than standard inputs must be used for: (a) fertiliser use, (b) type and amount of energy used in processing and (c) transport distances. For other factors in the lifecycle emission calculation, standard input values may be used.

[37] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52010DC0011:EN:HTML:NOT

450. The government's response to the consultation on sustainability criteria for the RO[36]confirmed that binding agents up to 2% by weight of the solid biomass material for binding or other performance purposes will be deemed sustainable without requiring a separate sustainability report for the additive. We will also be adopting this policy for the RHI.

451. Reporting on sustainability criteria is by consignment, the RO response[36] gave guidance on characteristics we would expect to be the same in a single consignment. These are:

- Feedstock type – i.e. the final fuel is the same material, or where it is different materials these have similar sustainability characteristics (e.g. pellets sourced from 80% forest management residues and 20% sawmill residues)
- Country of origin – i.e. same country of origin (e.g. UK, France, Canada)
- Fuel classification – i.e. waste, product, co-product, processing residue etc.
- Whether or not it meets the land criteria
- Whether or not it meets the GHG criteria

452. We stated in the February response[6] that the GHG limit for solid biomass and biogas/biomethane would be 125.28kg CO_2 equivalent per MWh of heat generated, representing a 60% saving against the EU fossil heat average. This remains unchanged, but for clarity and consistency with the units used in the European Commission report on sustainability and with the RO, this equates to 34.8g CO_2 equivalent per MJ of heat generated.

Public Grants

453. The RHI scheme does not currently accept applications from those who have benefited from a public grant for their renewable heating system. The exception is for plants completed and commissioned between 15 July 2009 when the RHI scheme was first announced and 27 November 2011 when the scheme was introduced. In these cases the grant must be repaid to the granting authority before RHI payments can be made.

454. Now that the non-domestic RHI has been in operation for nearly two years, DECC has looked at the interaction between public grants and the RHI and in response to stakeholder representation. We have concluded that a more flexible approach to the interaction between public grants and the RHI could encourage more renewable heat installations to come forward.

455. When determining what amendments are required to the scheme, DECC will seek to ensure value for money for the taxpayer, avoid overcompensation and achieve consistency with State Aid law. At the same time, we recognise that allowing recipients of public grants to be eligible for the scheme may assist those who struggle to access capital finance, such as community groups and schools.

456. Pending further work alongside the 2014 review to look in more detail at the interaction between public grants and the non-domestic RHI, we intend to introduce more flexibility next year by:

I. **Extending the eligibility window for the repayment of grants.** The window within which public grants can be repaid will be extended from 15 July 2009 until the non-domestic RHI closes to applications in 2020. This will ensure that those installations commissioned after 27 November 2011 will be able eligible for RHI tariffs if they re-pay their grants.

II. **Reducing RHI tariff payments by the grant amount.** Where it is not possible to repay a grant either because the granting authority no longer exists or because the granting authority will not accept the repayment of the grant, applicants that wish to also benefit from the RHI will be eligible to do so but with a reduced RHI tariff. The tariff will be reduced by the grant amount spread proportionally over 20 years.

457. These changes will require an amendment to the existing RHI regulations, which we aim to make alongside the other changes outlined in this Government Response in Spring 2014.

Future Planned Policy Changes

Tariff certainty for installations with long lead in times

458. At present, applications to the non-domestic RHI are only accepted once the renewable heat technology has been commissioned. The degression mechanism used to manage budgets in the RHI reduces tariffs as certain levels of deployment are reached, which means that tariff rates can reduce between an investment decision being made and the project claiming the RHI. The RHI is funded directly from Government spending and is assigned annual budgets by the Treasury at each spending review. This means that budgets from March 2016 onwards will be agreed during the 2015 spending review. This uncertainty of the future tariff and budget can affect those involved in projects with long lead-in times.

459. In the July 2012 consultation, "Providing Certainty, Improving Performance," we sought views on a policy option that might reduce tariff uncertainty, that is to allow applications for an enhanced form of preliminary accreditation (EPA). EPA would be available to a wider range of technologies than preliminary accreditation is currently[38] and would enable applicants involved in larger projects to apply earlier in the development of their project, for example at financial close. Their tariff would be fixed as the tariff at that date although they would not receive any payments until the project was generating heat. The guarantee would be time limited and restricted to certain sizes of installation.

460. In the response to the consultation we confirmed that there remained significant challenges to overcome with the design of the policy and therefore that we were not able to implement a tariff guarantee at that time. We committed to continue to work on measures to improve certainty and to engage further with industry stakeholders as we worked on measures to improve certainty in the non-domestic RHI.

461. Since the publication of that Government response we have engaged with stakeholders to develop our evidence base. The evidence we have collected supports the view that uncertainty of tariffs due to degression, and uncertainty as to whether there will be RHI budget available for new installations beyond 2015-16, will result in substantially lower deployment of larger renewable heat projects with longer lead-in times. These larger projects can generate significantly more renewable heat towards our 2020 ambitions.

462. We will therefore aim to introduce a tariff guarantee for the largest installations (e.g. those over 1MW) from Spring 2015, subject to successful demonstration that a tariff guarantee is affordable and good value for money, and securing State Aid and Parliamentary approval. This would be available for plants to due to commission by 31 March 2016 and is intended to also be available from Spring 2016 for plants due to commission by 31 March 2020. We are considering the detail of the policy to ensure that we do not offer tariff guarantees to speculative applications and to ensure that the tariff guarantee offers good value for money for the tax payer. For example, we may start to count down the 20 year tariff payment period from the award of the tariff guarantee or offer

[38] Preliminary accreditation (as currently operated for medium and large biomass, deep geothermal and biomethane) allows applicants to apply in advance of installations and provides assurance that a project will be eligible if completed as specified. It provides no assurance about the level of tariff that will apply and does not apply to heat pumps (even when they are large)

a lower tariff. As budgets for the RHI have not been set out beyond March 2016, any tariff guarantees that are offered will be funded from the current budget assigned to the RHI. We may consult on this and will provide further detail of the tariff guarantee during Spring.

Non-domestic RHI Review 2014

463. The Government Response to the consultation "Providing Certainty, Improving Performance"[6], published in February 2013, announced that we intend, as proposed, to commence a review of the non-domestic RHI scheme and its tariffs in 2014 and 2017. We are currently working to define the scope of the review and would welcome views from all stakeholders involved in the non-domestic RHI.

464. It is our intention that the 2014 Review will align closely to the Government's other plans and activities and be conducted in a way that minimises market uncertainty. We are proposing that the overarching objective of the review will be to 'improve the potential of the non-domestic RHI' by focussing primarily on making improvements to the scheme.

465. It is also our intention to avoid making changes to the new tariffs set out here and not to open up fundamental questions regarding the tariff setting methodology.

466. Our current thinking is that the review will cover three themes:

- **Developing the market**: Evaluating the case for government support for other renewable heat technologies, including whether they are suitable for RHI support.
- **Improving performance and efficiency**: Looking for ways to monitor and meter the performance of non-domestic installations with a view to making them more energy efficient over time.
- **Simplifying the regulatory burden**: Where possible, working with Ofgem to streamline the application and accreditation processes.

467. In order to shape the structure and content of the review, we are conducting an information gathering exercise in Autumn - Winter 2013 that will include a review of the evidence base on individual issues and engagement with industry stakeholders and colleagues across government.

Calls for Evidence

468. In addition to the two non-domestic consultations in September 2012 we launched a series of calls for evidence on specific technologies to increase our evidence base and understanding of the benefits of these heat sources. The calls for evidence were:

- Landfill Gas
- Biopropane
- The assumptions used to set the tariffs for GSHPs; and,
- Large Biomass.

469. In total we received 11 responses to these calls for evidence. Following the calls for evidence we used the information as follows.

Ground Source Heat Pumps & Large Biomass Boilers

470. The evidence gathered through the GSHP and large biomass call for evidence was incorporated into the evidence review of the costs and performance of renewable heat technologies[27]. This prompted the "Early Tariff Review" consultation and the subsequent tariff changes detailed above.

Biopropane and Landfill Gas

471. The evidence gathered through these calls for evidence has been built into our evidence base. On biopropane, we think that further work is required to fully assess the case for its inclusion in the non-domestic RHI. Consequently, biopropane has been suggested as a possible candidate for the 2014 Review.

472. In light of the low number of responses received on landfill gas, and given that landfill gas availability is likely to decline in future, and that tariffs exist for some products of landfill such as biogas combustion and biomethane injection, we do not believe this needs pursuing further.

Annex A: Eligibility tables

Tariff Review Technologies

Tariff / Technology	Commissioning Date (or date of commissioning as CHP if conversion)	Size	Tariff available on heat produced up until Spring 2014 (p/kWh)	Tariff available on heat produced post Spring 2014 (p/kWh)[39]
Large biomass	Pre 21 January 2013	>1MW	**1.0**	**1.0**
	Post 21 January 2013	>1MW	**1.0**	**2.0**
Solar thermal	Pre 21 January 2013	<200kW	**9.2**	**9.2**
	Post 21 January 2013	<200kW	**9.2**	**10.0**
GSHP	Pre 21 January 2013	<100kW	**4.8**	**4.8**
		>100kW	**3.5**	**3.5**
	Post 21 January 2013	<100kW	**4.8**	**7.2**
		>100kW	**3.5**	**7.2**

[39] Current tariffs will be uprated for RPI from April 2014. New tariffs are already shown in 2014/15 prices

Scheme Expansion Technologies

Tariff/Technology	Commissioning Date (or date of commissioning as CHP if conversion)	Tariff available on heat produced up until Spring 2014 (p/kWh)	Tariff available on heat produced post Spring 2014 (p/kWh)[39]
Biomass CHP	Pre 21 January 2013	1.0	1.0
	Between 21 January 2013 and the date of this publication	1.0	2.0
	Post the date of this publication	1.0	4.1
AWHP	Pre 21 January 2013	-	-
	Between 21 January 2013 and the date of this publication	-	-
	Post the date of this publication	-	2.5
Deep Geothermal	Pre 21 January 2013	3.5	3.5
	Between 21 January 2013 and the date of this publication	3.5	3.5
	Post the date of this publication	3.5	5.0
Medium biogas	Pre 21 January 2013	-	-
	Between 21 January 2013 and the date of this publication	-	-
	Post the date of this publication	-	5.9
Large Biogas	Pre 21 January 2013	-	-
	Between 21 January 2013 and the date of this publication	-	-
	Post the date of this publication	-	2.2
Municipal solid waste	Pre 21 January 2013	1.0	1.0
	Between 21 January 2013 and the date of this publication	1.0	2.0
	Post the date of this publication	1.0	2.0
Commercial and industrial waste	Pre 21 January 2013	-	-
	Between 21 January 2013 and the date of this publication	-	-
	Post the date of this publication	-	2.0

Annex B: List of Consultation Respondents

Expanding the Non-Domestic Scheme

AB Sugar
Accord Air Systems
Advanced Plasma Power
Anaerobic Digestion and Biogas Association
Association for the Conservation of Energy
Barnett Engineering
British Ceramic Confederation
British Gas
British Property Federation
British Telecommunications
Buccleuch BioEnergy
Building & Engineering Services Association
Calor Gas
Carillion Energy Services
Centre for Alternative Technologies
Clifford Jones Timber
Coal Products
Combined Heat & Power Association
Confor
Corgi Energy
Country Land & Business Association
Daikin Air conditioners
Dalkia
Dee Associates
E.ON UK
Edge Renewables
Electrical Contractors' Association
ENER-G Natural Power
Energy Advisory Associates
Energy Agency
Energy Services and Technology Association
Envergent Technologies
Environmental Services Association
Estover Energy
FARM2000/Teisen Products
Fichtner Consulting Engineers
Ford and Etal Estates
Forth Energy
GAIA Heat
Glass and Glazing Federation
Goldmine BD
Green Pathways
Greenfields Consulting
Ground Source Heat Pump Association
GT Energy
Heat Pump Association
Herefordshire Council
Highgate Climate Action Network
Ignis Biomass
Interseasonal Collection & Exchange (ICAX)
J F Temple & Son
John Cantor Heat Pumps
LowC Communities
Malaby Biogas
Maltsters' Association of Great Britain
Mark Group
Micropower Council
Mineral Products Association
MITIE Asset Management
Mitsubishi Electric
National Farmers' Union
National Inspection Council for Electrical Installation Contracting
Newcastle City Council
Nottinghamshire County Council

Nottinghamshire Eco Fuels
O-Gen UK
Ore Valley Housing Association
Oxford Brookes University
Ranelagh International
Regen SW
Renewable Energy Association
Renewable Energy Systems
Renewable Heat Services
RWE Npower Renewables
Saint-Gobain
Scotch Whisky Association
Scottish & Southern Energy/Scotia Gas Networks
Scottish Water
South East Wood Fuels
Standardkessel Baumgarte UK
Tamar Energy
The UK District Energy Association
The Whitehouse Consultancy
The Wood Heating Company
UK Energy Research Centre
UK Green Building Council
UK Renewable Fuels
Wall-Lag
Westminster City Council
Woodsure
Zero Carbon Future/Fair Energy

Plus seven respondents / individual members of the public not associated with a particular organisation

Air to Water Heat Pumps & Energy from Waste

Biocentre Technology
Border Eco Design
British Gas
Building & Engineering Services Association
Calor Gas
Carillion
Chartered Institution of Wastes Management
Cheltenham Lido
Coal Products
Combined Heat & Power Association
Cumbria Software Systems
Daikin Airconditioners
Ecofitter
Ecotec Services
EDF Energy
Electrical Contractors' Association
Energos
Environmental Services Association
Fichtner Consulting Engineers
Global Energy Systems & Technology
Graphite Resources
Ground Source Heat Pump Association
Heat Pump Association
Heat Therm
Historic Houses Association
Ignis Biomass
Interseasonal Collection & Exchange (ICAX)
Kensa Engineering
LoBils
London Borough of Islington
Micropower Council
Mitsubishi Electric
Myriad CEG
National Inspection Council for Electrical Installation Contracting
Norfolk Against Incineration and Landfill (NAIL2)
Panasonic UK
Renewable Energy Association
Renewable Heat Services
Roderick James Architects
Scottish & Southern Energy
Scottish Renewables
Singleton Birch
Space Air Solutions
Space Airconditioning
United Kingdom Without Incineration Network
Vaillant Group
Wealden District Council
White and White

Plus six respondents / individual members of the public not associated with a particular organisation

Early Tariff Review

200 Aldersgate
British Gas
BSW Timber
Buccleuch BioEnergy Ltd
Calor Gas Ltd
Carillion
Certsure
Chemical Industries Association
CHPA
CO2Sense CIC
Cofely District Energy
Confederation of Paper Industries
Confor
CPL Renewables
Dalkia
E.ON
Earthtest Energy
EDF Energy
Electrical Contractors Association (ECA)
Energy Agency
Energy UK
ESI Ltd
Farm Energy Centre
Finn Geotherm UK Ltd
Forever Fuels
Forth Energy
Geothermal Supplies
GI Energy
GlaxoSmithKline
Glenavon Growers
Ground Source Heat Pump Association
Hampshire County Council
Heat Pump Association
Helius Energy
Helix Agencies
Hill of Banchory ESCo Limited
Hoval
HWE Energy
Hyber
ICAX
Ice Energy
ISO Energy
John Gordon & Son Ltd
Kensa Engineering
Mawera UK Ltd
Micropower Council
Mitsubishi Electric
National Services Scotland (Health Facilities Scotland)
Navitron Ltd
Northamptonshire County Council
Nottinghamshire Eco Fuels
PDM Group
Pontrilas Sawmills
Ranheat Engineering Ltd
Renewable Energy Association
Riverside Sawmill Ltd
Rural Energy (Myriad CEG Ltd)
Saffery Champness
Scotch Whisky Association
Scottish Land & Estates
Scottish Renewables
Sembcorp Utilities (UK) Ltd
Synergy Boreholes and Systems Ltd
The Wood Panel Industries Federation
Topling Ltd
UK Hydrogen and Fuel Cell Association
UK Pellet Council

Plus five respondents/ individual members of the public not associated with a particular organisation

Annex C - Technical issues related to heat pumps

Improving heat pump efficiencies

We intend that heat pumps accredited for the RHI should be designed and installed so as to operate with an SPF, termed here the *design SPF*, of at least 2.5, in accordance with the minimum standard set by the RED. Prospective participants in the RHI will be asked to provide evidence at application to confirm that the design SPF is greater than or equal to 2.5, according to industry-accepted standards, in order for their installation to be eligible for RHI support.

The manner by which SPF can be evidenced could vary depending upon the type of heat demand that the heat pump is designed to meet; this would affect the particular standard used to calculate SPF. We are still determining the final details of the design SPF to be provided at accreditation; however, for space heating-focused systems, it is likely that the EN 14825 standard may be the most appropriate approach, whilst for hot water, it is likely that an approach could be based on EN 16147.

In addition, as discussed in paragraph 250, all new applicants to the scheme will be asked to meter electricity consumption by the heat pump in order to determine the SPF of the heat pump in operation. If the SPF of the heat pump drops below 2.5 Ofgem will alert RHI participants to the system's performance and recommend that they take action, empowering them to improve system efficiency.

The SPF of a given system will depend on the components of the system that are included in the heat and electricity measurements. We appreciate that the RHI has recently significantly reduced metering complexity and therefore we do not intend to request that additional heat meters be installed to determine SPF for specified system components. We will simply request that electricity metering is conducted so as to calculate an SPF in a manner approved by Ofgem, and that the SPF system boundary and method employed for electricity calculation be evidenced to Ofgem at the time of application. Further detail will be provided in Ofgem guidance. In practice, this will mean that SPFs calculated for different heat pumps will incorporate varying sets of components but we do not intend to base payment on this figure and therefore do not believe that this potential inconsistency in the gathered data poses a barrier to this approach.

Renewable Energy vs. Heat Recovery

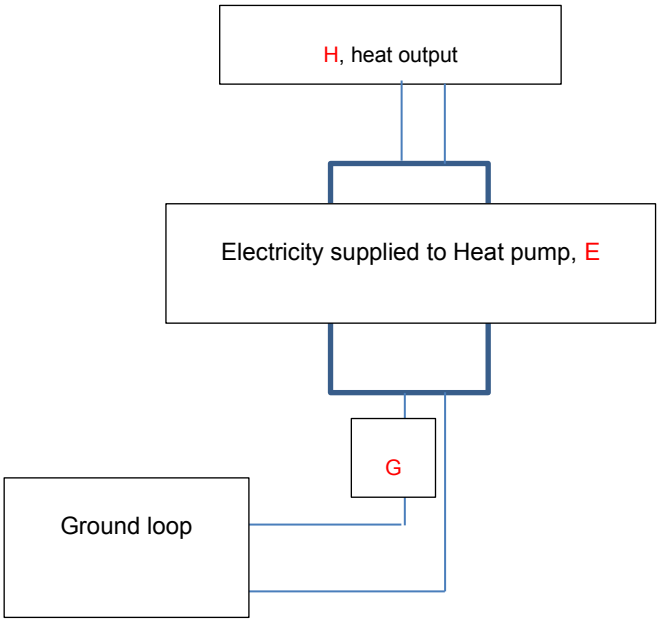
Earlier in this document (under Renewable Heat vs. Energy Recovery) a situation is described where a heat pump is capable of simultaneous heating and cooling, where this could mean that a significant proportion of heat demand is met through heat recovery from cooling. Such heat is not considered to be renewable. However, given that the heat recovered may represent the most efficient use of that heat and may be a low carbon heating approach, we do not wish to exclude such systems from the RHI. Instead, we plan to incentivise them through the scheme whilst monitoring the proportion of heat that is derived from a renewable source.

Working with industry, DECC engineers have developed a rule that we believe marks a clear dividing line between a system that is predominantly sourcing heat through energy recovery and a system that is predominantly generating renewable heat. The rule is that:

$$\frac{\text{Total heat extracted from the ground}}{\text{Total heat generated by the heat pump}} \geq \frac{3}{5}$$

We will therefore be requiring that all heat pumps that are capable of simultaneous heating and cooling install meters to measure heat drawn from the ground loop in addition to heat output from the heat pump system.

The inequality, on which this reasoning is based, is derived by initially considering a heating only ground source heat pump:



The above diagram includes a number of energy flows which are defined as follows:

$H = output\ of\ heat\ pump$

$E = electricity\ consumption\ of\ heat\ pump$

$G = heat\ drawn\ from\ ground\ loop$

SPF is defined as the ratio of heat output to electricity consumption by the above heat pump, $SPF = \frac{H}{E}$.

In addition, the relationship between electricity, total heat output and heat from the ground can be expressed as: $H = E + G$ or rearranging: $E = H - G$

Therefore, the above SPF formula can be rearranged as,

$SPF = \frac{H}{H-G}$.

The Renewable Energy Directive states that, in order to be considered renewable, heat pumps should have a minimum SPF of 2.5. Therefore, inputting this to the above equation,

$\frac{H}{H-G} \geq \frac{5}{2}$.

If the above equation is rearranged then this leaves the following:

$\frac{5}{2}G \geq \frac{5}{2}H - H$

or $\frac{5}{2}G \geq \frac{3}{2}H$

Therefore $G \geq \frac{3}{5}H$

To summarise, this means that at least 3/5 of the total heat output needs to be sourced from the ground loop in order for the system to meet the European definition of renewable. We will extend this requirement to systems that are capable of simultaneous heating and cooling, specifying that at least 3/5 of the total heat pump output needs to be drawn from the ground loop.

As discussed earlier in this document we do not intend to cap based on this payment or exclude systems that draw less heat from the ground. Instead, all ground source heat pumps that are capable of simultaneous heating and cooling will need to monitor heat drawn from the ground loop and submit the meter readings to Ofgem so that Ofgem can confirm that heat pumps are drawing at least this proportion of heat from a renewable source.

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