WHA response to Consultation on proposed reforms to the existing Domestic and Non-Domestic Renewable Heat Incentive schemes

The Wood Heat Association (WHA) is pleased to submit this response to the above consultation. The WHA is the UK trade association for the modern wood heating and related biomass heating industry including wood fuel suppliers, biomass boiler and stove installers and distributors, and anyone involved in the supply chain. The WHA is a fully owned subsidiary of the Renewable Energy Association. Members range in size from major multinationals to sole traders.

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Answers to Consultation Questions

General comments

We support and welcome the Consultation on the Renewable Heat Incentive to improve value-for-money, increase access, and provide overall scheme improvements. However, we are very concerned with the proposed change to the RHI support for biomass, as part of the refocusing of the scheme, which will have a detrimental effect on the biomass heat industry the Government has helped build over the past five years.

We disagree with the proposed changes to the domestic biomass support in form of the heat demand limits, which will make biomass boilers for larger properties unaffordable, without making systems for smaller properties more affordable. The biomass tariff has been degressed 57% since the launch of the domestic scheme, and is now insufficient to drive reasonable growth in the industry. The rapid degressions has also lead to significantly different rates of return (RoR) between the technologies, with the RoR for biomass boilers being as low as -0.5% compared to 12.5% for air-source heat pumps. This is an unlevel playing field, where consumers will be forced to choose the renewable heating system based on government payback rather than the appropriate technology for their property. The domestic biomass tariff should therefore be reset to its 31 June 2015 level (i.e. 8.93p/kWth) to offer a decent rate of return. Furthermore, we want to stress the necessity of sufficient consumer protection when implementing third party ownership.

Although we agree with the proposed changes to create one tariff band for biomass in the non-domestic RHI, we very much disagree with the proposed tariff level. We appreciate that DECC wants to drive uptake of larger biomass heat (+1MW), as this generally needs lower support levels, however, we do not believe this has to be

instead of supporting medium and small biomass, which is still very cost-effective compared to other RHI technologies.

We are concerned that the Government is assuming fuel scarcity is an issue for biomass heat, and therefore wants to limit the general uptake of the technology. This is an unfounded concern as there are substantial amount of sustainable biomass available from UK, EU and international sources, and evidence show that the uptake of biomass heat supports increased growth in forests and biomass cultivation.

We believe DECC is taking a great risk by betting so heavily on the significant uptake of large scale biomass in energy intensive industries and for industrial heat and processes. These industries and heat loads have been incredibly difficult to unlock with paybacks of 2-3 year often being necessary to be attractive to these industries. The energy intensive industries are most often connected to the gas grid using 100% gas rather than DECC's assumption of 50% oil/50% gas, and would therefore need a higher tariff than proposed. By not including direct air heating, even fewer industries will be able to use biomass. It is therefore unlikely that 60 large biomass plants will be deployed by 2020/21 and doubtful that DECC will achieve their renewable heat aims by focusing solely on large scale biomass.

Medium and small biomass has delivered 81% of all biomass heat generated and 68% of all heat generated in the RHI, and have been shown to work and be deliverable. The current proposal will jeopardize the considerable efforts the Government has put into supporting training, skills, development of industry standards, and quality of installations, and will have a very harmful effect on the biomass heating industry.

We therefore propose that the Government enable a tariff reform that will support both the large biomass market and the cost-effective medium/small market. Having a credible tariff for medium and small scale biomass, as well as for large biomass, has the benefits of being very affordable, deliverable, supporting nationwide economic and sustainable growth, helping the uptake of local and community based district heating schemes, and spreading the risk of insufficient uptake of the large industrial biomass projects.

Please note that the main focus of this response will be on wood and biomass heat, for further information we refer to the response of our parent association, the Renewable Energy Association.

Degression and trigger setting

1. **Do you agree with the proposed policy approach for degression and trigger setting? Yes / No. Please provide evidence to support your answer.**

We are extremely concerned with the proposed indicative annual deployment levels suggested in the table under section 2.26. Deployment levels of 1000 biomass boilers for the domestic market and 65 biomass systems for the non-domestic market are nowhere near sufficient to maintain a competitive market, supply chain to service existing boilers, and achieve cost reductions. We believe this will lead to significant contraction in the market, companies exiting the industry, and loss of supply chains – all of which Government policy has helped to grow and mature over the last five years.

We refer to the Renewable Energy Associations' response for further details on this matter.

Budget control

2. **A budget cap introducing the ability to close the scheme to new deployment is necessary to ensure we can protect the budget. Do you agree that:**
    a. **The budget cap should be kept as a final backstop with minimal notice periods for the implementation of closure? Yes / No. Please expand.**
    b. **The budget cap should only be deemed likely to be hit, and closure only be deployed when we assess that it is likely RHI commitments from plants commissioned or plants in the immediate pipeline on the verge of commissioning would consume available budgets? Yes / No. Please expand.**
    c. **That a 21 day notice period will allow only those plants on the verge of commissioning to proceed? Yes / No. Please expand.**

We refer to the Renewable Energy Association's response for further details on this matter.

3.
    a. **Do you agree with the proposal from 2017/18 onwards for discretion to close the Non-Domestic scheme only, noting that this would mean that that scheme could be closed before it was assessed that 100% of overall budget was committed? Yes / No. Please expand.**
    b. **Do you have any suggestions as to how best to manage any additional uncertainty from this proposal?**

We refer to the Renewable Energy Association's response for further details on this matter.

4.
    a. **Are there any other features of the budget cap policy that could be improved?**
    b. **Do you have any suggestions of how these improvements could be delivered?**

We refer to the Renewable Energy Association's response for further details on this matter.

Other cross cutting issues

5. **Can you provide any compelling evidence as to why RPI would be a more appropriate measure of inflation than CPI for all technologies across the RHI?**

We refer to the Renewable Energy Association's response for further details on this matter.

Non-Domestic RHI: Additional capacity

6. **Do you agree simplifying the rules for additional capacity as proposed will help achieve better value for money? Yes / No.**

   Please provide any evidence which demonstrates the possible impacts of making this change.

We refer to the Renewable Energy Association's response for further details on this matter.

Non-Domestic RHI: Eligible Heat Uses

7.

   a. **Are there any potential heat uses which the Government should consider not supporting for new applicants to the scheme? Yes / No.**

   b. **If yes, please describe these heat uses and provide any evidence in support of your answer.**

Force drying of wood chip is an important part of the supply chain process, which enables fuel suppliers to respond to growing demand. However, we are concerned that certain systems dry fuel, perhaps to increase RHI income rather than need for dry chip. A potential solution could be to set a minimum efficiency for such drying systems, which is enforced by a simple desk-top audit comparing the amount of wet chip purchased and the amount of dry chip sold by the operator by reviewing their chip purchase and chip sales invoices. This will give the amount of water removed and therefore the amount of heat required to remove that water. The RHI payment can then be limited to this figure, regardless of how much heat has actually been used. This rewards installers of efficient, more expensive drying systems and does not over-pay those who have installed cheaper, less efficient drying systems. Alternatively, RHI can be paid only if a minimum efficiency is achieved.

Non-Domestic RHI: Planning Permission

8.

   a. **Will the requirement to obtain and maintain appropriate permissions for new plant in order to be eligible for and continue to receive RHI support pose any barriers to deployment under the scheme? Yes / No. Please expand.**

   b. **Are there particular permissions which it may be difficult or impossible to obtain ahead of applying to the scheme? Yes / No. Please expand.**

In some cases, it will significantly extend installation lead times especially as in many

cases planning permission is not required, as the installation of the technology is included under permitted development rights. Even when planning permission is required as a formality and unlikely to be a problem, there is a minimum 8 week delay, which is often extended by authorities with little knowledge of renewable heating technologies. Adding this to the RHI requirements just adds additional 'red tape' with little benefit.

Ground source heat pump systems with shared ground loops

9. **Do you think that an owner of a shared loop system should be able to apply to the Domestic RHI? Yes / No.**

   Please provide evidence to support your response and how this would encourage greater deployment, drive down installation costs and improve performance of GSHP.

We do not see why this should be treated differently from other district heating systems.

10. **Do you think that an owner of a shared loop system should be able to apply to the Non-Domestic RHI with deemed heat demand? Yes / No.**

    Please provide evidence to support your response and how this would encourage greater deployment, drive down installation costs and improve performance of GSHP.

We would be concerned that deemed heat demand would create less incentive to achieve high efficiency and potentially leave consumers vulnerable if their systems do not work.

11. **Do you agree that:**

    a. **If shared loop systems become eligible on the Domestic RHI, they should receive the same tariff as individual GSHP systems under the Domestic RHI? Yes / No.**

    b. **If shared loop systems remain eligible on the Non-Domestic RHI but with deemed heat demand, they should receive the same tariff as individual GSHP systems under the Non-Domestic RHI? Yes / No.**

    c. **The heat demand limit proposed for individual GSHP systems on the Domestic RHI should be applied (25,000kWh/yr per household on the shared ground loop)? Yes/No.**

    Please provide any evidence you may have as to typical differences in costs to support your position.

See response to question 9.

12.

    a. **Do you think that the proposals relating to shared ground loops result in an increased risk of overcompensation? Yes/No.**

    b. **How could we develop our policy to best mitigate these risks?**

c. **Do you think that new-build properties should be treated differently to avoid overcompensation? Yes/No.**

d. **Do you think the number of dwellings is one of the risk factors which may contribute towards overcompensation? Yes/No.**

e. **Do you think there should be a specific limit to the number of dwellings? Yes/No.**

Please provide any evidence to support each of your responses.

13.

a. **Do you agree that these proposals should apply to social and private landlords only? Yes/No.**

b. **Do you think private homeowners who are collaborating together should be able to apply? Yes/No.**

We do not see why this system should be treated any different from other district heating schemes, such as those supported by geothermal or biomass.

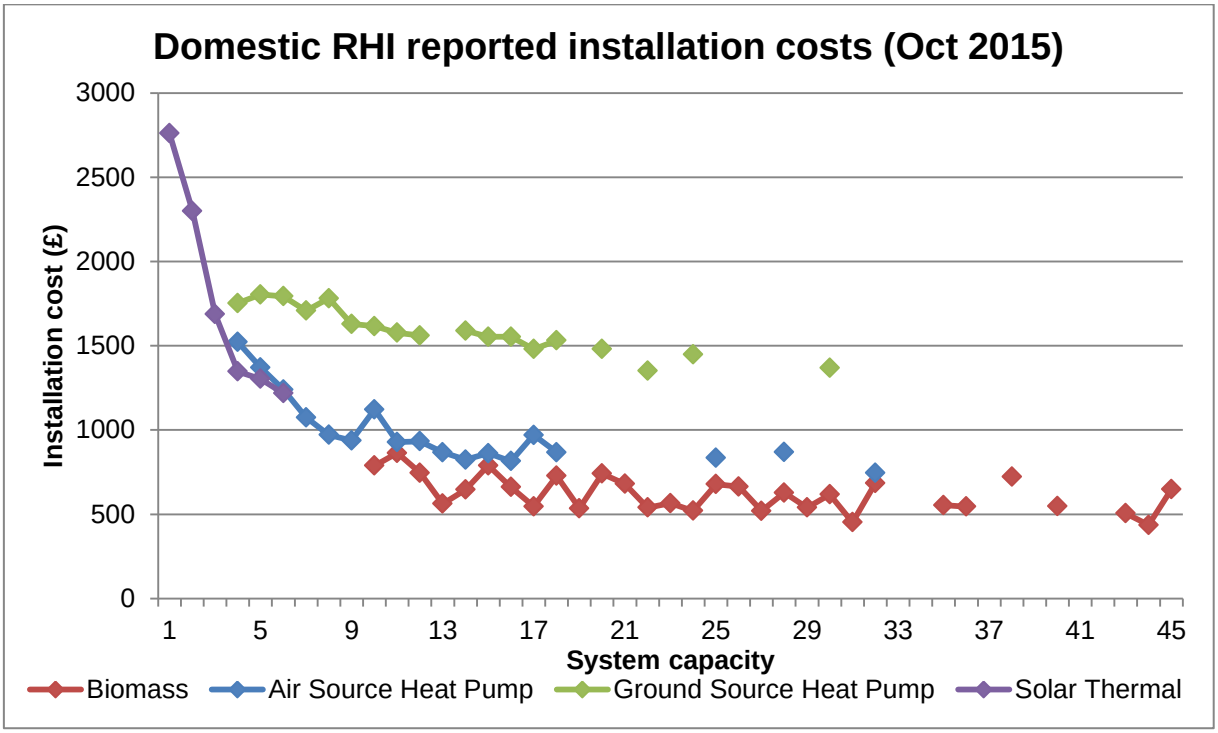
14. Do you agree that if deeming is introduced to the Non-Domestic RHI scheme for this type of project, metering and monitoring service packages should be mandatory to allow performance data to be reviewed by Government/user/owner? Yes / No.

Please provide evidence to support your response. If you do not support this proposal we seek recommendations of how to establish the performance of heat pumps supported.

Introducing new degression triggers and cap policy and introducing heat demand limits across main RHI technologies

15. Do you agree that the proposal to introduce heat demand limits will contribute to achieving the aims of the reform of the RHI? Yes / No. Please expand.

Introducing heat demand limits will cut costs, but we are concerned that they will have some unintended consequences, such as significantly reducing the economic incentive for certain technologies, in particular ground source heat pumps and biomass boilers.



Larger domestic biomass systems provide some economic of scale (see figure above), although not excessively, but the domestic RHI pays the same tariff per kWth irrespective of size of the system. However, smaller systems will need a higher tariff to be viable, and heat demand caps therefore increases the necessary tariff level to incentivise renewable heating systems.

Biomass boilers offer heating in off-gas-grid domestic properties, which cannot be serviced by low temperature technologies. Off-gas-grid properties are more energy inefficient than the average household, and therefore have a higher heat demand than the average UK property. Introducing a heat demand limit will make installation of low carbon heating homes financially unfeasible.

The heat demand limit will stop deployment of GSHP at the larger scale where they have been successfully deployed. Rather than making the system more attractive at the smaller scale, the heat demand limits will merely make larger scale installations unattractive. Considering that DECC want to support deployment and supply chain developments to achieve long term cost reduction, it is less beneficial to limit the sectors where deployment has been successful.

The heat demand limits will prevent installations in the largest, most polluting properties, and will not impact the subsidy paid per kWh of renewable heat.

If concerned about over-rewarding larger properties, DECC could alternatively introduce tiered tariffs, which would be easily understood by consumers.

16.

a. What are your views on the limits of: 20,000kWh for AWHP; 25,000kWh for GSHP and biomass?

b. What would be the merits of higher/lower limits? Please expand.

Setting the heat demand cap at such a low level will penalise domestic properties with legitimately higher heat uses. Should DECC persist with the heat demand limits, we would recommend a limit of 20,000kWh for ASHPs, 30,000 for biomass boilers, and no limit for GSHPs.

17. In light of the issues raised in para 5.20, do you have any alternative proposals to heat demand limits which would achieve the same aims and which would be simple for potential applicants to understand, deliverable and applicable across the GB-wide scheme? Please expand.

We would recommend that the heat demand limits be replaced with a tiered tariff, as used in the non-domestic RHI. This is easy to understand and simple to implement. The other option would be to introduce required metering above the proposed caps, to ensure that the properties were only paid for actual heat use, and limiting potential overpayment.

Making it easier for less able to pay households to benefit from the RHI (assignment of rights)

18. Do you have alternative proposals, beyond those summarised above, for further changes which may help increase deployment among those less able to pay? Please expand.

As we highlighted in our response to DECC's call for evidence on third party ownership, we recommend:

- The installations should be metered to ensure that the third party organisation is only paid if the system is working. Although required metering will carry an added cost, it is not very high and the potential drawbacks of malfunctioning systems and cold houses will be much greater.
- Ofgem must have the names and contact details of the homeowner registered on its system in addition to the third party organisation. The homeowner must be able to communicate directly with Ofgem if they need to.
- Ofgem must be able to stop payments if a home-owner reports that the system is malfunctioning, while the situation is investigated.
- Third party financiers should be required to be a member of a TSI-approved Consumer Code and be required to comply with the Code at all times.
- Third party financiers should be required to comply with any and all of their obligations under the Consumer Credit Act.
- Restrict financing models to a 7-year period to reflect the 7-year period of RHI

payments.

- Third party financiers must be MCS certified.

We strongly stress the need for these measures to ensure that the consumer is protected and receives adequate heating, which ultimately is the goal of the RHI.

Heat pump tariffs and performance

19.

a. Do you agree with reviewing the tariffs available:

i. Within the range of 7.42 -10.0p/kWh for AWHP? Yes/No.

Over the past year, Ofgem has received 6,274 applications for ASHP installations (March 2015-February 2016). Arguably, this is less than DECC expected in terms of yearly deployment of this technology, but it is significantly more than the other available technologies supported in the Domestic RHI.

It is worth underlining that the RHI is aimed at retrofitting off-gas-grid properties, and the tariff designed to match these homes. However, off-gas-grid homes are often less energy efficient than on-gas-grid properties and require higher heat loads. ASHPs are therefore not suited for all properties, as they cannot deliver the high heat load required. ASHP would, in many cases, be the perfect fit for energy efficient new build properties. It would therefore be unrealistic to expect about 14,000 ASHP to deploy yearly.

We understand that the government is attempting to increase support for longer term decarbonisation of the UK's energy infrastructure, however we do not believe that this approach is the most effective way of achieving this. Finding a way to target payments which incentivises housing developers to install heat pumps from the outset in new-build properties more suited to the technologies would be a much more effective way to achieve this.

In the consultation document, 'value for money' is cited as an aim of the reform. By increasing the tariff offered to ASHP installations, the government will get less renewable heat per pound spent. As illustrated in chart B11 in the impact assessment ASHP would then offer a Rate of Return up to 12.5% compared to the 3-4.5% return offered to GSHP and the -0.5-1.5% return to biomass boilers. This would create a significant imbalance in the rate of returns offered in the domestic RHI scheme, which would foster choosing renewable heat systems based on best government payback rather than which technology is the best fit for their home. A level playing field is essential between the technologies to mitigate the risk of not achieving planned RH targets, increasing the ASHP tariff would not achieve this.

We have not seen any evidence that suggest that the capital expenditure of ASHP has increased since the launch of the domestic RHI, and we therefore do not see any need to increase the tariff if DECC still wants to ensure Value for Money.

ii. Up to a maximum of 19.51p/kWh for GSHP? Yes/No.

b. How would an increase to current tariffs impact deployment? Please

provide evidence to support your response

Deployment would most likely increase slightly for ASHP, as the financial returns would be significantly above the domestic RHI's aim of 7.5%. However, as stated above, unlike the general housing stock, off-gas-grid properties often need a higher heat load and high temperature heating than can be offered by ASHPs. For this niche market, other technologies such as biomass boilers would be more appropriate.

20.

a. **Do you agree further Government and industry action is required to drive up the performance of heat pumps and tackle underperforming installations on the RHI? Yes/No.**

We note that there have been concerns with the efficiency levels reported in the Detailed analysis of data from heat pumps installed via the Renewable Heat Premium Payment Scheme. We would highlight that the industry is already responding to these concerns as technology evolves and improves. We agree that further action from Government would also help to ensure the high quality installation of heat pumps.

b. **How can the RHI best be developed to tackle this and drive up deployment?**

21. **In your recent experience, what are the main financial barriers to the deployment of heat pumps in the domestic sector? In particular, what are the main reasons why the current tariffs have not achieved higher deployment levels? Please provide any supporting evidence.**

The lack of upfront payment poses a financial barrier for the deployment of heat pumps in general.

22. **In your recent experience, what are the main non-financial barriers to the deployment of heat pumps in the domestic sector and how can they best be overcome? Please consider how they compare to the financial barriers in terms of impact on uptake and provide any supporting evidence.**

23. **Is there a way to link payments to actual performance which balances consumer confidence with incentives for higher performing systems? Yes/No. Please provide evidence to support your response.**

Metering would be an effective method of ensuring higher efficiency.

24.

a. **Performance monitoring can play a key role in driving up heat pump performance. What can we do to make the RHI's metering and monitoring service package more attractive? Please provide evidence to support your response.**

b. **Are there alternatives to incentivise the monitoring of heat pump performance? Please provide evidence to support your response**

Support for biomass

Biomass heating has been a huge success for the Government, with the development of a wide supply chain and creation of a maturing market which has developed extensive skills and knowledge amongst installers. It also supports thousands of jobs, attracts millions in investment, and has increased the available domestic fuel supply.

Biomass boilers offer the most cost-effective low-carbon heating option in the domestic RHI to the niche market of off-gas-grid buildings. They provide sustainable heating in domestic off-gas-grid properties, with high temperature heating which is more likely to work in older houses. Biomass systems have been most effective at replacing oil boilers among the supported technologies under the Domestic RHI, with 58% of biomass boilers replacing an oil boiler compared to 27% of heat pumps and 23% of solar thermal installs.

Not all properties can install heat pumps, which are well suited for very well insulated homes and new builds, but are not suitable for all homes (and neither is biomass). For heat pumps to work well, substantial improvements to the property would be needed to upgrade the thermal efficiency. Without these provisions, energy bills could increase, as the low grade heat isn't sufficient to heat the house, and direct electric heating will have to make up the rest. Furthermore, the many 'hassle factors' of installing heat pumps in oil heated homes limit their deployability, as radiators need replacing, garden dug up, floorboards ripped up to install underfloor heating, etc. Biomass boilers are the best fit for some homes, as it works with their existing central heating systems; they do not need to replace radiators, or install underfloor heating.

Over the past year, the biomass tariff has been reduced from 12.2p/kWh to 5.14p/kWh, a 58% reduction. The deployment is currently a fifth of what it was a year ago, with less than a hundred new applications being received per month by Ofgem. The rate of return listed in the impact assessment is between -0.5% - 1.5%, making it financially unattractive.

We understand and recognise that the government wants to increase the deployment of heat pumps to prepare the market for mass roll out beyond 2020, especially in the on-gas-grid markets. This is a completely legitimate purpose and aim of the scheme. We do, however, believe a more balanced approach is needed to mitigate the risk of not achieving planned RH targets, as there is now clearly an unlevel playing field between the technologies. The biomass tariff therefore needs to be increased to its 31 June 2015 level (i.e. 8.93p/kWth) to offer a decent rate of return, so consumers can choose the right renewable heating for them, rather than deciding based on best government payback. This is the last quarter the sector saw reasonable deployment levels of 1,229 new biomass applications (compared to 1,417 ASHP applications in Q2 2015). However, one member has also suggested that the biomass tariff at the July 2015 level (i.e. 7.14p/kWth) was effective in generating interest in new installations.

Support for solar thermal

25. Do you agree that we should withdraw support for new solar thermal systems in the Domestic RHI from 2017? Yes/No. Please provide evidence to support your response.

We do not agree that DECC should withdraw support for solar thermal, which is an important part of the low-carbon heating sector and has great potential. This is particularly true when combined with heat pumps, or part of district heating. Solar thermal is to date forecasted to use a very small amount of the RHI budget compared to other technologies with just £0.74million for domestic and £0.2million in non-domestic. Removing support under the RHI at this time would be particularly harmful due to the delay and uncertainty in delivering zero-carbon homes, solar thermal is a key way of delivering low carbon heat for new-build properties and for retrofits. Although some owners of solar thermal systems claim they would have done it without support from the RHI it will still be an important driver and it leaves a very small market available to installers, it is important that this market is maintained.

Solar thermal has been negatively affected by policy uncertainty and changes made since 2010. These have slowed deployment and therefore reduced the ability of the industry to drive cost reductions. The RHPP offered an upfront grant for Solar thermal, however, when compared to the tariff for Solar PV which was offered for 20 years did little to drive the market. Now the FiT for Solar PV has been reduced significantly, there is a more level the playing field for the two technologies. We believe that removing the RHI for Solar thermal will once again limit its ability to compete in the market against Solar PV.

It could be argued that Solar thermal would be better supported by an upfront subsidy as Solar thermal does not require ongoing fuel payments and therefore the majority of the costs over the lifetime are on installation. Although we recognise this is not within the scope of the current consultation, if there was a way to frontload any support given through the RHI, this would allow more solar thermal to be installed and go some way to help drive cost reductions, resulting in better value for money.

Although take up has been low, it has potential to form a very useful part of a combined system (e.g. taking domestic hot water up to safe temperature levels in a GSHP system rather than having to use an electrical boost). It would have benefitted from the Zero Carbon homes policy which has now been removed as solar thermal can be deployed onsite and would help to produce low-carbon heating. With deployment at current levels, it has very little impact on the overall RHI budget, yet by remaining an option in the RHI it will incentivise innovation and result in further take-up of the lowest carbon heating source. If installation levels do pick up, then the degression mechanism can easily be used to bring deployment levels under control.

Removing Solar Thermal will have a number of negative impacts:

- Data provided by Innovas for the REA shows that nearly 9000 people and 375 companies involved in the supply chain for solar thermal in the UK in 2014/2015. Removing solar thermal from the RHI puts these jobs at risk.
- Removing solar thermal from the RHI, removes a technology that could play a role in decarbonising heat, which is important for the government to meet 2020 targets.
- Loss of investor confidence as investors see another example of a renewable

technology having support cut unexpectedly.

- Reduced options for low-carbon heat generation in urban areas. Solar thermal can be used in any area providing there is a suitable rooftop and can have benefits for reducing fuel-poverty and can easily be installed during refurbishments or general maintenance.
- It gives a negative view to the public and media about the technology and much work will need to be done by the industry to prove once again that it is a viable technology.

Biogas derived from crops

26.

a. **Do you agree that limiting the use of some feedstocks will deliver more cost-effective carbon abatement? Yes/No. Please provide evidence to support your answer.**

b. **Apart from wastes and residues, are there other feedstocks which should not be subject to payment restrictions? Yes/No. Please provide evidence to support your answer.**

27. **Do you prefer option 1 or 2 as a method of limiting payments in respect of biogas / biomethane derived from crops? Option 1 / Option 2. Please provide your reasons and include any evidence.**

28.

a. **Do you agree that from spring 2017 the tariffs for new biomethane installations are likely to require resetting to bring forward new deployment? Yes / No. Please provide evidence to support your answer.**

b. **Do you agree this should not include resetting the tariffs for biogas? Yes / No. Please provide evidence to support your answer.**

29.

a. **Do you agree that adding capacity to existing biogas and biomethane installations could result in payments which are not targeted towards the most cost effective biogas and biomethane production? Yes/No. Please provide evidence to support your answer.**

b. **If yes, how can the risks be mitigated?**

30.

a. **Do you agree with proposals to increase auditing requirements? Yes / No. Please expand.**

b. **Do you think there are any wastes which should not be subject to unlimited payments? Yes/No**

c. **Is there additional evidence that could be used to demonstrate that a generator intends to use waste? Yes / No. Please expand.**

Eligible heat uses

31. **Do you agree with the proposal to remove support for heat used to dry digestate for new installations? Yes / No. Please provide evidence to support your answer.**

32. **Are there other uses of biogas heat which you do not consider a good use of the RHI payment? Yes / No. Please provide evidence to support your answer.**

Non-domestic RHI: Heat Pumps

33.

a. **Do you agree that the current tariff levels for heat pumps in the non-domestic sector strike the right balance between value for money for the tax payer and providing sufficient returns to drive deployment? Yes / No.**

b. **If no, how could they be adjusted to strike this balance appropriately? Please provide evidence in support of your answer.**

34. In your recent experience, what are the main financial barriers to the deployment of heat pumps in the non-domestic sector? In particular, what are the main reasons why the current tariffs have not achieved higher deployment levels? Please provide any supporting evidence.

We are concerned that the Government is over-optimistic in its projections of non-domestic heat pump deployment. In the past year (March 2015-February 2016) Ofgem has received 431 applications from non-domestic heat pump installations. In 2020/21 the government expects 3,200 new installations per year, a sevenfold increase, without proposing higher tariff rates. We do not believe the tariffs should be increased, but would point out that the deployment assumptions for heat pumps are brave and overly optimistic.

35. In your recent experience, what are the main non-financial barriers to the deployment of heat pumps in the non-domestic sector and how can they best be overcome? Please consider how they compare to the financial barriers in terms of impact on uptake and provide any supporting evidence.

We are concerned with the statement in section 7.8, which indicates that reduced support levels will increase deployment of G/WSHP, as though biomass and heat pumps were directly competing with each other. Biomass and G/WSHP are very different technologies, which have different requirements to work well, e.g. G/WSHP need access to drilling, open land or water sources and more energy efficient properties, and biomass heating needs space for delivery and storage of pellets, and can deliver the higher heat loads needed in less efficient properties. There is very little overlap between where the technologies can be installed. We would be worried if part of the rational of reducing biomass tariffs was to drive heat pump deployment, as this would only result in fewer biomass installations rather than higher heat pump deployment and, most likely, less overall renewable heat delivered.

Properties and processes that are suitable for heating via biomass and heat pumps tend to largely be discreet. Due to the fact it is a combustion technology, biomass is efficient and economical, comparable to heating oil or LPG, in providing essential comfort heating (space and water heating) to properties that require high flow temperatures. This is why the vast majority of biomass systems for comfort heating have been installed in off-gas-grid areas, into older, relatively poorly insulated properties with existing traditional radiator heating distribution systems. Due firstly to

the relatively poor insulation, often in properties that do not even have cavity walls, and secondly because the existing radiators are not particularly efficient, these properties require flow temperatures generally in the region of at least 70˚C. Heat pumps are unsuitable for these sorts of properties, because their efficiency decreases exponentially as the flow temperature required increases. This is the reason why the efficiency of heat pumps, expressed as Coefficient of Performance (COP), is generally expressed by the manufacturers at 35˚ flow temperature (at either 0˚C or 7˚C outside temperature). A 35˚C flow temperature is only going to be adequate to heat a very well insulated property with modern, highly efficient heating distribution, such as underfloor heating or specifically designed low surface temperature radiators. This does not apply to the vast majority of the housing stock in the UK, and certainly not the majority of properties in rural, off gas-grid properties.

When heat pumps are required to supply higher temperatures their efficiency drops off dramatically, ultimately because the delta T between the heat source (air, ground or water) is so much greater and the compressor has to work much harder to produce the heat required. Once the heat pump is required to produce the high temperatures needed in existing off grid rural properties, the efficiency of the heat pump will approach a COP of 1:1, i.e. it will be working pretty much as an electric boiler does, and costing a similar amount to run, without delivering renewable heating. Therefore, in modern, well-insulated buildings, heat pumps are generally ideal, and in older housing stock, with existing heating distribution systems (and the space), biomass is a much more suitable alternative.

Outside of comfort heating, heat used for industrial purposes tends to require large volumes of hot water which, due to the high temperatures, biomass tends to be much better suited for. The exception to this is swimming pools, which tend to be heated to below 30˚C, and therefore are ideal for heating by heat pumps.

In most cases, when installers are considering which type of heating system is the best fit for the property, their starting point is to investigate the flow temperatures that will be required to adequately heat the property, and therefore which technology is the best fit for the project. Their starting point should never be "which technology is going to generate the largest RHI payments" as this will incentivise miss-selling and ultimately result in dissatisfied customers with inappropriate heating systems.

36.

a. **Do you agree we should amend the scheme rules to allow heating and cooling AWHPs (paying on the renewable heat generated only)? Yes / No. Please expand.**

b. **What other scheme rules could be eased which would drive deployment? Please provide supporting information.**

37.

a. **Do you agree further Government and industry action is required to drive up the performance of heat pumps and tackle underperforming installations on the RHI? Yes / No.**

b. **How can the RHI best be developed to tackle this issue and drive**

deployment?

38.

a. **Do you agree the proposals set out in this document will be sufficient to drive an increase in deployment of efficient heat pump systems in the non-domestic sector in this Parliament? Yes / No.**

b. **If no, what else do you believe Government should be doing consistent with its overarching objectives for RHI reform and energy policy?**

Non-domestic RHI: Biomass

39.

a. Do you agree that the proposed single biomass boiler tariff should be tiered? Yes / No.

Yes. We agree that the biomass tariff should be tiered and that the three biomass tariff bands should be merged, as these have created scheme inefficiencies and false incentives. Banding the biomass tariffs have led to a disproportional number of 190-199kW and 950-999kW installations, to receive the higher tariff of the lower band (see charts below).

Figure 5: Capacity distribution of installations: 0-199kW

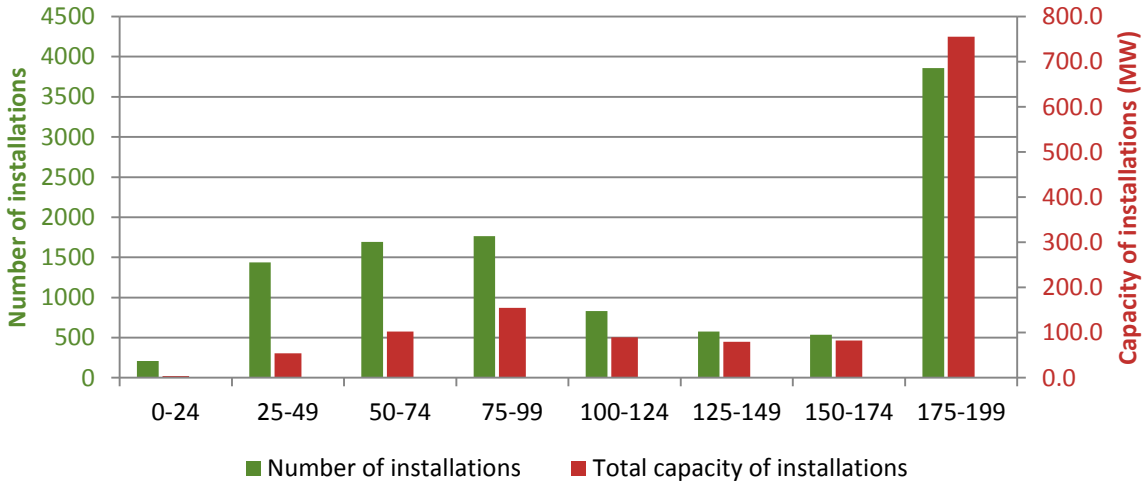
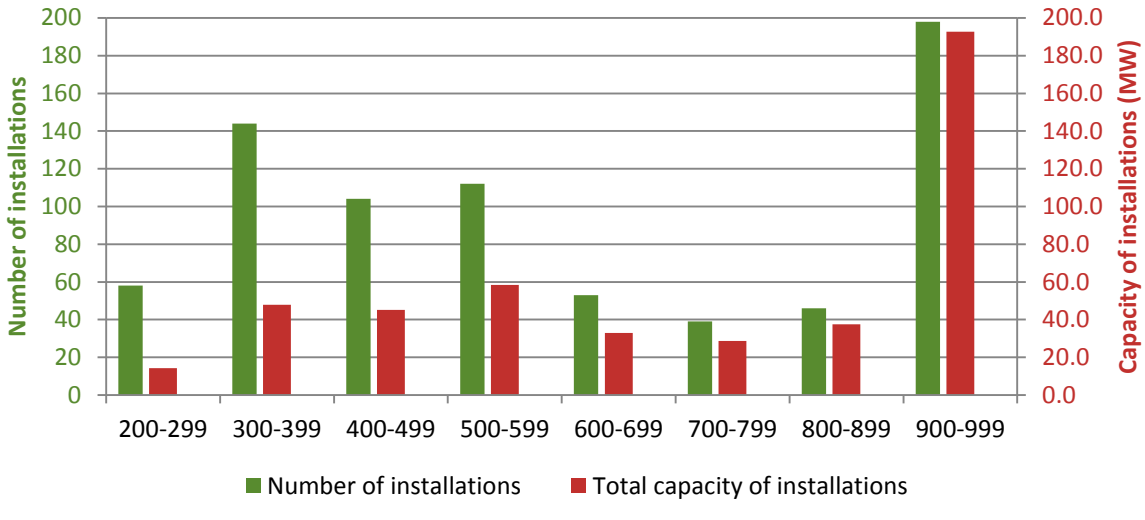


Figure 6: Capacity distribution of installations: 200-999kW



Note: Based on Ofgem data from FOI released 28.9.2015.

We agree that a tiered tariff, like the biomethane tariff, would be more efficient, as it reduces incentive to over- and undersize installations for maximum financial benefit.

It is also easy for Ofgem to administer, and increases the incentive to size the installation for maximum efficiency.

However, we do not support the tiering structure proposed in the consultation. A three-tier tariff structure which applies to projects of all sizes, and the Tier 1 tariff is paid for the first X MWth, after which the project receives the Tier 2 tariff, followed by the Tier 3 after Y MWth. X is assumed to be the same for projects of all sizes - improving the incentive to size installations optimally for operational needs. This tariff structure has been effective for the biomethane sector, it has been easy to understand by industry and to operate for Ofgem.

b. What is the appropriate tiering threshold at which participants should move from the Tier 1 to Tier 2 tariff? Please express your answer as a percentage, where 100% equals a system running constantly at full capacity.

We disagree that the tiering should be based on percentage of full system capacity; it should rather be based on kWth to ensure that the tariff supports all sizes of biomass boilers as seen with the biomethane tariff structure. We would also recommend having three tiers, as having only two tiers will create too big of a cliff edge. The tariff structure could look like this:

	Tariff (p/kWth)
Tier 1 (On the first 1,000 MWth of eligible heat)	4.0
Tier 2 (Next 2,500 MWth of eligible heat)	3.3
Tier 3 (Remaining MWth of eligible heat)	2.5

There would be one band for all biomass installations with three tiers, and the tiering would be calculated on an annual basis. The tariff structure has here been applied to four different potential systems:

	Example 1	**Example 2**	**Example 3**	**Example 4**
System capacity kW	500	2,000	4,000	4,000
Load factor	20%	20%	20%	35%
Hours in operation pa	1,752	1,752	1,752	3,066
MWh pa	876	3,504	7,008	12,264
MWh pa @tier 1	876	1,000	1,000	1,000
MWh pa @tier 1	-	2,500	2,500	2,500
MWh pa @tier 3	-	4	3,508	8,764
Average tariff (p/kWth)	4.0	3.5	3.0	2.8

The tariff levels are merely illustrative as we have not consulted our members on these particular tariffs.

We are aware of other suggestions for similar tariff structures where the tiering would be based on a lifetime basis. With this suggestion, the system would get tier 1 for the first X MWth in its lifetime, followed by tier 2 for Z MWth, and tier 3 for Y MWth. A small system would take several years on tier 1 before having generated all X MWth and proceed to tier 2, where a large system could potentially only receive tier 1 for less

than a year before proceeding to tier 2 and later tier 3. This proposal has previously been put to DECC. The benefits of such proposal would be that the RHI income received by the customer would be frontloaded. We understand that DECC are limited by the annual budget in 2020/21 and frontloading the payments would limit the number of systems and installations that the budget could support, compared to more evenly spread payments.

40.

a. Do you agree that the appropriate tariff level for Tier 1 support for biomass boilers is in the range of 2.03 - 2.90p/kWh? Yes / No.

No. We do not agree that the appropriate tariff level for a tier 1 should be in the range of 2.03 – 2.90p/kWh, as this represents a significant tariff reduction for biomass systems below 1MW. We are also very concerned that increasing the tiering structure to 30% rather than 15% will only provide support for high heat load uses. Given that a significant amount of heat in the UK is for space and hot water heating and tends to be seasonal this will make biomass heating unviable for the biggest potential use. This includes the targeted large biomass systems intended for district heating usage where heat demand is seasonal.

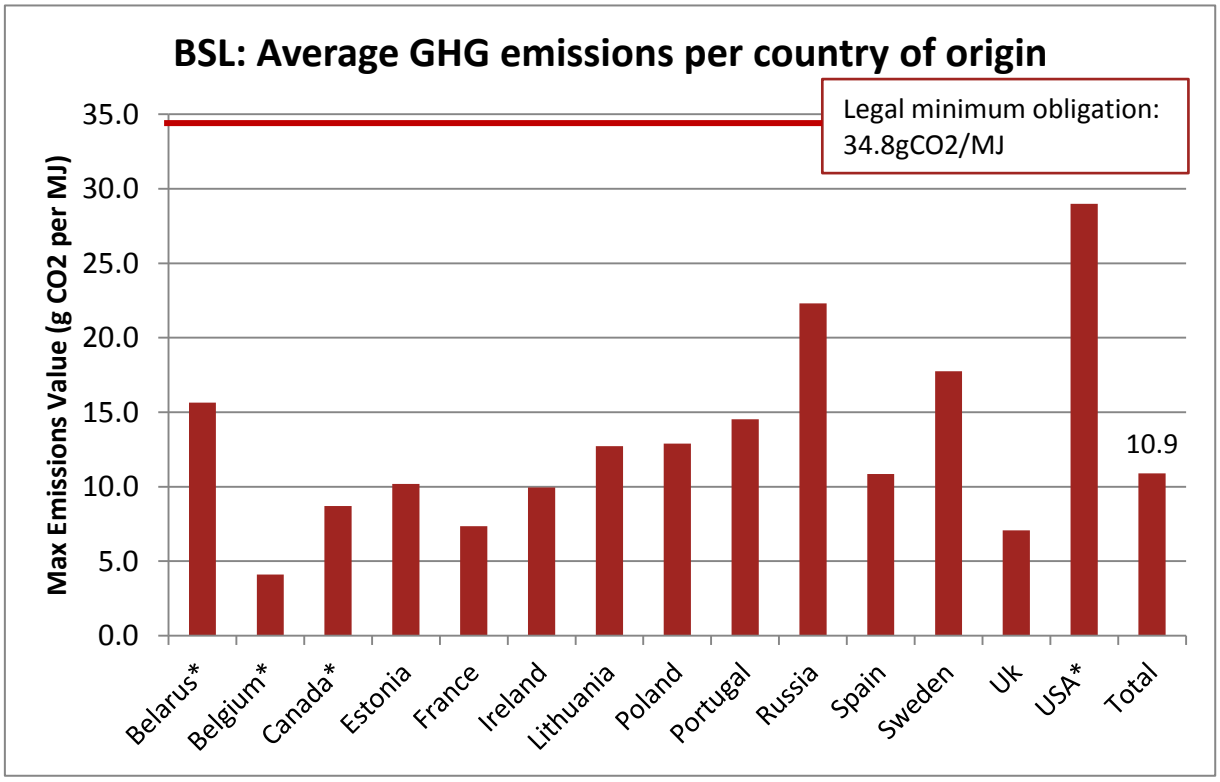
Biomass is sustainable and an available resource

We are very concerned that the consultation document refers multiple times to biomass as 'a scarce resource', followed by proposals to limit the increase of biomass heating under the RHI. We do not believe there are grounds for concern and, below, will refer to several reports and statistics illustrating the forests supplying wood fuel are growing in the UK and EU. There is similarly an untapped potential for the growth of sustainable non-woody biomass such as energy crops. Biomass fuels are one of the few sources of energy where demand will actually stimulate availability.

The government's own UK Bioenergy Strategy state that "*although highly uncertain, our analysis indicates that sustainably-sourced bioenergy could contribute by 2020 around 8-11% to the UK's total primary energy demand and around 12% by 2050 (within a wide range of 8%-21%)*".

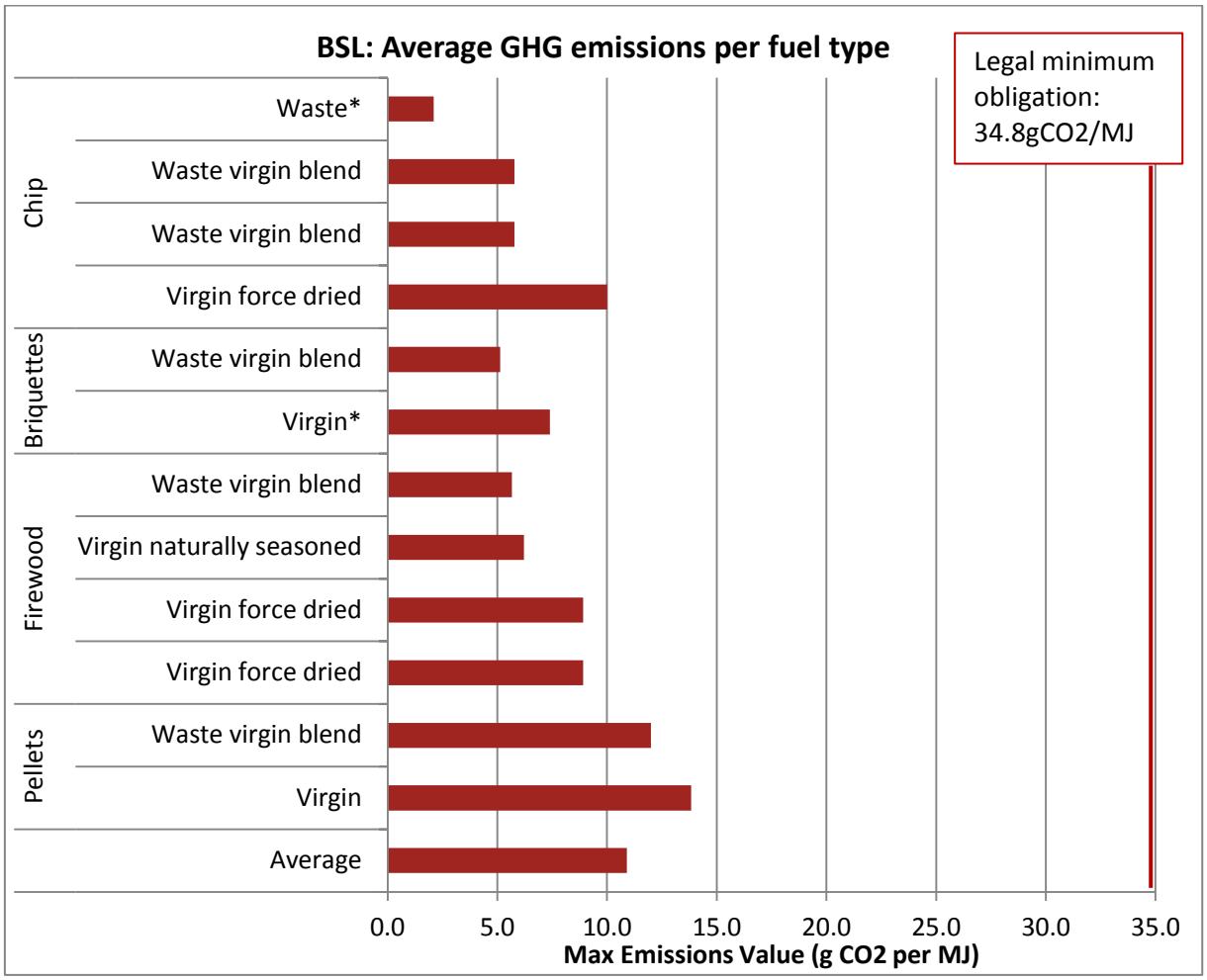
We have mainly focused on UK and EU forestry as these would be the main sources for the biomass heat fuel. North America, South America, East and Southeast Asia, Africa, and Australia are not considered to be suppliers for UK biomass heating. This is also illustrated by the fuels registered on the Biomass Suppliers List, where 75% of fuels originate from EU countries accompanied by the Russian fuel making up 23% of registered fuels. It is worth noting that these numbers only refer to listed fuels and not the actual volume in which each of these fuel were used. Despite making up 23% of BSL listed fuels, the Russian fuels could account for less than 5% of the total volume used by consumers.
It is also worth noting that the average Biomass Suppliers List fuel has a maximum emissions value of just 10.9gCO2/MJ compared to the 34.8gCO2/MJ minimum requirement. This constitutes 87.47% GHG saving compared to the EU fossil heat average. The average UK BSL fuel has a maximum emissions value of just 7.1gCO2/MJ, which constitutes a -91.88% GHG saving. The figures do not weigh the

fuels by the volume in which they used, and it is therefore likely that the average GHG saving is even higher.



Note: Based on Ofgem data from FOI released 1.4.2016. * denotes less than 5 fuels are registered on the Biomass Suppliers List from this country.

As data from the Biomass Suppliers List (illustrated in the two charts) shows, the biomass heat industry has demonstrated that it sustainable and delivers significant GHG emission savings.



Note: Based on Ofgem data from FOI released 1.4.2016. * denotes less than 10 fuels are registered on the Biomass Suppliers List from this country. The average does not weigh the fuels by the volume in which they used.

UK Forestry:

The annual increment of volume of wood in England's forests is around 7.4million cubic meters of timber. Over the next 20 years the average annual coniferous increment is forecast to reduce to 2.5 million cubic metres in the period 2032-36. The woodland area in the UK has, since the 1900s, continuously increased every decade, with UK woodland area increasing from 4.7% in 1905 to 13.0% in 2015[1]. This is at a time when the use of biomass fuel has increased. DECC commissioned the "UK and Global bioenergy resources and prices"-report in 2011 from AEA, Oxford Economics, Forest Research, and the Biomass Energy Centre, which shows that by 2020, the UK could have access to about 1,800 Petra joule of bioenergy supply; equivalent to 20% of current primary energy demand in the UK. Over the next 20 years the average annual hardwood increment is forecast to increase to a maximum of 5.0 million cubic metres and then fall back to 4.7 million cubic metres in the period 2032-36.[2] The market for hardwood in the UK is mainly aimed at woodfuel, which is the only

[1] Forestry Commission, Woodland Area, http://www.forestry.gov.uk/website/forstats2015.nsf/0/4E46614169475C868025735D00353CC8?open&RestrictToCategory=1

[2] Forestry Commission, Woodlands indicator 3: Annual increment of volume of wood in England's forests (p. 45): http://www.forestry.gov.uk/pdf/FC-England-Indicators-Report-20152.pdf/$FILE/FC-England-Indicators-Report-20152.pdf

significant market for hardwood roundwood[3]. Without an active demand for hardwood for woodfuel, there would be little demand for this, eliminating the economic incentive to grow and supply UK grown roundwood.

DECC's analysis in the UK Bioenergy Strategy suggests "*a reasonable level of domestic feedstock that is now available for the production of energy in excess of 75TWh of bioenergy. There is potential for this to rise by at least 20% to around 90TWh by 2020 with further growth potential leading up to 2030 (our low estimate assumes 110TWh)*. […] *Supplies from UK forests are also expected to increase. Around 10 Million green tonnes of wood each year is currently harvested in the UK from woodlands and forests. Harvested timber supplies a range of markets including sawmills, panel board producers and energy generation. In recent years significant progress has been made in developing the woodfuel supply chains (in 2007 around 0.5 Million tonnes of wood were delivered to energy markets, increasing to 1.5 Million tonnes in 2010)*"[4]

The Forestry Commission's 50 year forecast of timber availability does not suggest any concern with biomass availability[5,6], but this does not include the positive impact of demand for biomass fuel. With increased demand for biomass, previous undermanaged forests would be brought into management and thereby increase its availability[7]. It is a common misconception that the increased use of biomass will lead to reduced use of wood in panel board and construction, but Forestry Commission statistics show that the as softwood deliveries to energy markets have increased, deliveries to sawmills have increased and deliveries to panel board mills have remained broadly stable between 2005 and 2014[8]. Increased demand for biomass fuel creates an economic signal to the forestry market that devalued residue and by-products have an economic value, thereby supporting increased forestry growth.

Defra has in a forestry policy statement[9] outlined how the Government intends to work with the forestry sector to bring more woodland into active management,

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[3] Forestry Statistics 2015 - UK-Grown Timber, Deliveries of UK-grown roundwood, http://www.forestry.gov.uk/website/forstats2015.nsf/0/187E23791CE53F068025735200491AFF?open&RestrictToCategory=1

[4] UK Bioenergy Strategy, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48337/5142-bioenergy-strategy-.pdf

[5] Forestry Commission, hardwood availability forecast http://www.forestry.gov.uk/pdf/50_YEAR_FORECAST_OF_HARDWOOD_AVAILABILITY.pdf/$FILE/50_YEAR_FORECAST_OF_HARDWOOD_AVAILABILITY.pdf

[6] Forestry Commission, Softwood availability forecast http://www.forestry.gov.uk/pdf/50_YEAR_FORECAST_OF_SOFTWOOD_AVAILABILITY.pdf/$FILE/50_YEAR_FORECAST_OF_SOFTWOOD_AVAILABILITY.pdf

[7] Forestry Commission, Millions of tonnes of wood being wasted every year http://www.telegraph.co.uk/news/earth/earthnews/8603921/Millions-of-tonnes-of-wood-being-wasted-every-year.html

[8] Forestry Commission, Forestry Statistics 2015 - UK-Grown Timber, Deliveries of UK-grown roundwood, http://www.forestry.gov.uk/website/forstats2015.nsf/LUContents/824A4E0E2DDEDC858025731B00541EFF

[9] Government Forestry and Woodlands Policy Statement, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/221023/pb13871-forestry-policy-statement.pdf

including the development of the woodfuel market. The policy clearly outlines how the use of woodfuel is seen as a positive factor for UK's forestry sector and will enable more undermanaged woodland to be brought into management. By thinning trees in dense woods to produce the fuel, it opens up the forest, which encourages more wood land growth, rather than less, and benefits woodland biodiversity, wildlife, and local economies. A lack of active management means that sunlight can often no longer reach the woodland floor. Rarely grazed by livestock, woodlands are often overgrown with brambles and suffering from high levels of nutrient pollution, which encourage plants like nettles instead of our specialist woodland flora[10].

The strict UK Forest Management criterion (i.e. land-use criteria) protects against unsustainable practices and reduces risks of unsustainable forest management. In life-cycle analysis, the average UK fuel registered on the Biomass Suppliers List by far exceeds the Government's 60% minimum GHG saving criterion, as it has a max emissions value of just 7.1gCO_2/MJ, representing a 91.88% GHG saving compared to the EU fossil heat average. This is excluding the thousand self-suppliers who are assessed to have an even lower GHG footprint due to the low transport distance. Including imported fuels, the average fuel registered on the Biomass Suppliers List has a max emissions value of just 10.9gCO_2/MJ, representing 87.47% GHG saving.

UK Energy Crops:
There is an enormous potential for further developing UK produced biomass. The NFU suggest that the UK should be aiming to produce 10 million tonnes of indigenous biomass. This should be made up from 4 million tonnes of straw, 3.5 million tonnes of perennial energy crops such as short rotation coppice (SRC) and miscanthus (grown on 350,000 hectares of farmland) and 2.5 million tonnes from enhanced woodland management (particularly bringing unmanaged woodland back into management). The Energy Technology Institute suggest that domestic sources of biomass could provide 6% of UK's energy by 2050 and could reduce the cost of meeting the UK's 2050 carbon targets by more than 1% of GDP[11]. Furthermore to this point, several reports and academics have found significant land available for the production of perennial energy crops. Lovett, A. et al. (2014)[12] conclude that there is a large area of potentially available land for planting of perennial energy crops in Great Britain, even after making allowance for food production - at around 3.5 Mha, towards the top of the range cited in the 2012 Bioenergy Strategy. Aylott et al (2010)[13] suggest that 7.5 million tons of biomass (from short-rotation coppice) is realistically available from 0.8 million ha of poorer land in England.

The straw and woodland resource are already there waiting to be exploited. Currently perennial crops have an area of around 10,000 – 15,000 hectares so a significant increase in planting will need to be stimulated for this potential to be realised. SRC and miscanthus can be grown on marginal agricultural land so shouldn't compete with food production.

[10] Forestry Recommissioned, Bringing England's woodlands back to life, http://www.plantlife.org.uk/uploads/documents/WR_web.pdf
[11] Bioenergy, Enabling UK biomass http://www.eti.co.uk/bioenergy-enabling-uk-biomass/
[12] Lovett, A. et al. (2014) Global Change Biology - Bioenergy 6, 99–107, https://ueaeprints.uea.ac.uk/48133/1/gcbb12147.pdf
[13] Aylott et al (2010) Biofuels 1(5), 719–727, http://www.tandfonline.com/doi/abs/10.4155/bfs.10.30

There are fringe benefits of producing biomass in the UK. Trees and perennial energy crops can assist with water quality improvements and are part of a toolkit of measures assisting in flood mitigation. When planted appropriately trees and perennial energy crops are a very effective and low cost way of helping the UK meet the Water Framework Directive objectives and reducing the economic impact of floods[14]. Haughton et al. (2015)[15] found that biomass crops could enhance biodiversity in agricultural landscapes, supporting wider sustainability goals

Willows grown as SRC can provide early sources of pollen and nectar for pollinating insects in late winter early spring. This could be exploited to help rebuild pollinator populations and potentially could lead to higher yields of insect pollinated food crops. Home-grown biomass production would also facilitate rural regeneration by creating jobs and rural wealth creation opportunities.

EU Forestry:
Of the area in the EU, 41%, 178 million ha, is covered with forests and other woodland, with about 75 % of that area potentially available for wood supply[16]. The European Commission's 'Study on the Wood Raw Material Supply and Demand for the EU Wood-processing Industries' state:

- "In all the analysed products and product groups, the production in Europe is either declining or relatively stable. However, in sawmilling and especially pellet production, there are high hopes among the producers that future demand will be increasing. However, the low price of sawn wood in comparison with the relatively high price of logs keeps sawmilling's competitiveness at a low level, although the increasing demand for the by-products of sawmilling partly compensates."
- "Between 2000 and 2010, wood raw material use in the EU-27 bio-energy sector grew (ca. +82 million m3 RWE) more than double in comparison to the growth of both pulp and paper and of wood products. Following this significant growth, the wood raw material use of the bio-energy sector approached the wood raw material use of the wood product sector."
- "The sawmills are in a key position in this because sawlogs are the most valuable parts of the trees and hence the most interesting one from the wood sellers' point of view. To get the market of wood raw material running, it is therefore extremely important that the sawmills are profitable and act as drivers for the wood market. This brings also pulpwood as well as energy wood to the market and other forms of woodworking industries, pulp and paper industries as well as power plants can benefit from this as well as from the industrial residues. This trickle-down effect is often referred to as a "cascade"."

[14] Forest Research, Woodland for Water: Woodland measures for meeting Water Framework Directive objectives, http://www.forestry.gov.uk/pdf/FRMG004_Woodland4Water.pdf/$FILE/FRMG004_Woodland4Water.pdf

[15] Haughton, A.J., Bohan, D.A., Clark, S.J., Mallott, M.D., Mallott, V., Sage, R. and Karp, A., 2015. Dedicated biomass crops can enhance biodiversity in the arable landscape. GCB Bioenergy, http://onlinelibrary.wiley.com/doi/10.1111/gcbb.12312/full

[16] Study on the Wood Raw Material Supply and Demand for the EU Wood-processing Industries, http://ec.europa.eu/DocsRoom/documents/11920

We would also like to point to the 'State of Europe's Forests 2015 Report'[17] from Forest Europe which concludes:

- Between 2005 and 2015 the average annual sequestration of carbon in forest biomass, soil and forest products reached about 720 million tonnes, which corresponds to about 9% of the net greenhouse gas emissions for the European region
- Despite the fact that the European forest sector was affected by the recent global economic recession, it seems now on a steady path of recovery. Europe still remains one of the world's biggest producers of equivalent roundwood and has moved from being a net importer of primary wood and paper products to a net exporter. In particular as reported in the document, information on total roundwood production was provided by 38 countries, representing 60% of the forests in the Forest Europe area.
- Sustainable forest management in Europe is directly contingent on sustainable markets for forest products and vice versa. The consumption of roundwood and all of its products and by-products is a factor in the sustainable development of the forest sector. Profitability in most forests is dependent upon sales of roundwood, and, to a growing extent, sales of forest residues for energy. The revenue from sales of wood supports most activities and treatments in forests. The price of saw logs is particularly important for the profitability of forest operations, thus the demand for solid wood products plays a crucial role for the mobilisation of pulpwood and forest residues. In this context it is worth noting that the recognition of the environmental benefits of the use of wood in construction is slowly increasing throughout Europe. This could result in far greater consumption in the future.
- *Wood consumption in Europe remains well below forest growth. Thus, harvests fall short of annual growth by approximately 36%.*

<u>Biomass is a strategic and not a transitional technology</u>

According to DECC's Bioenergy Strategy, "excluding biomass from the energy mix would significantly increase the cost of decarbonising our energy system – an increase estimated by recent analysis at £44 billion". Biomass heating has a large strategic potential for decarbonising our heat use, but it is not going to support the entire heating demand – far from it. Biomass heating is ideal for the off-gas-grid heating needs in schools, agriculture, offices, hospitals, and various other buildings with high heat load need, either in form of dedicated heating, CHP, or district heating.

Biomass heating has a long term strategic role to play in decarbonising the existing building stock, where 80% of current building stock is predicted to still exist in 2050. There is therefore a massive need for retrofitting of high-carbon, fossil-fuel-based heating, where there are few alternatives other than biomass to adequately meet the heat load needed. We understand the intention to support the overall electrification of heating via heat pumps, as supported by renewable power technologies and nuclear energy. This strategy has its merits, but it does ignore the diversity of heating need in very distinct, and different non-domestic sector.

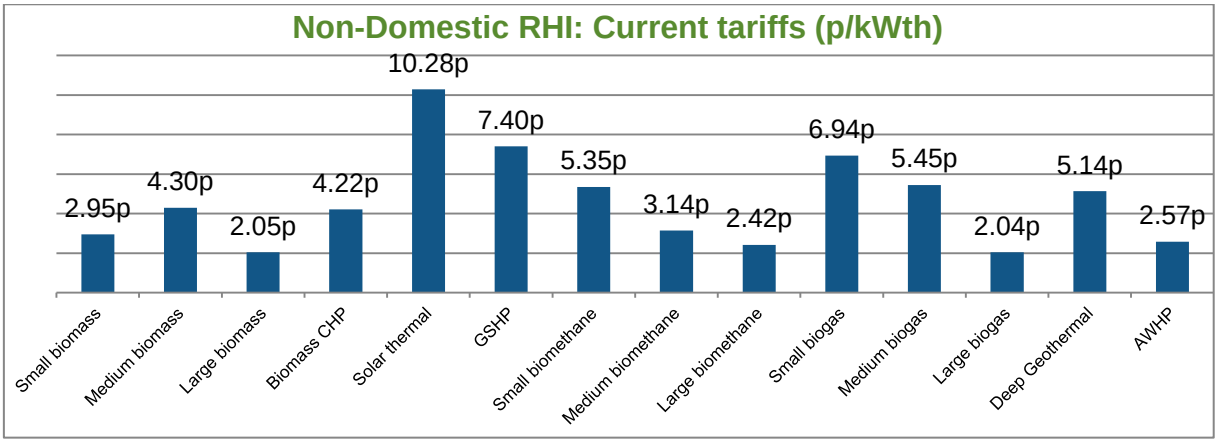
We would also propose to consider the international experience of decarbonising heat, where biomass has significantly led the replacement of fossil fuels. In Europe,

[17] FOREST EUROPE, 2015: State of Europe's Forests 2015, http://www.foresteurope.org/fullsoef2015

biomass had provided 89% [Eurostat] of all European renewable heat production, despite having a higher energy efficient building stock than the UK. This is not to imply that 90% of UK heating should be delivered from biomass, but merely to underline that international experience shows that biomass heating has so far been the preferred low-carbon, renewable heating option. In the UK, biomass is, as mentioned before, the most suitable for the off-gas-grid, rural, low density 'niche' market – the very same market the RHI is aimed at.

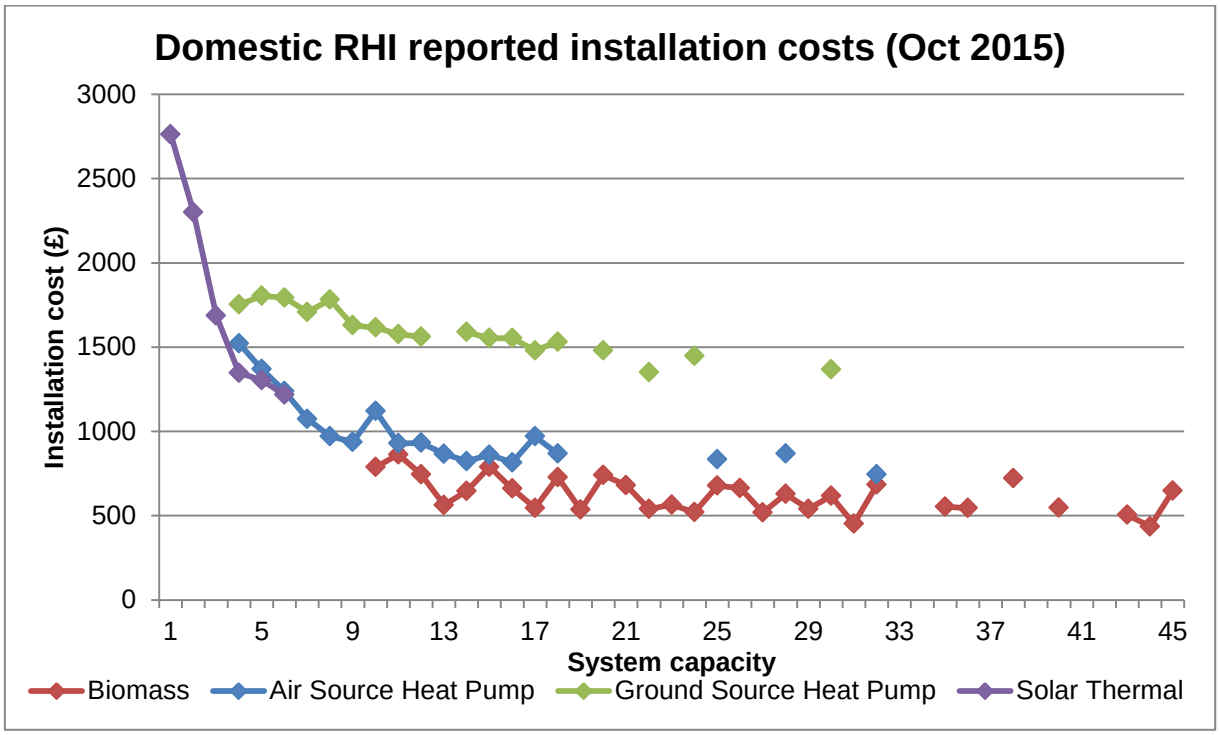
Biomass is cost-effective to support

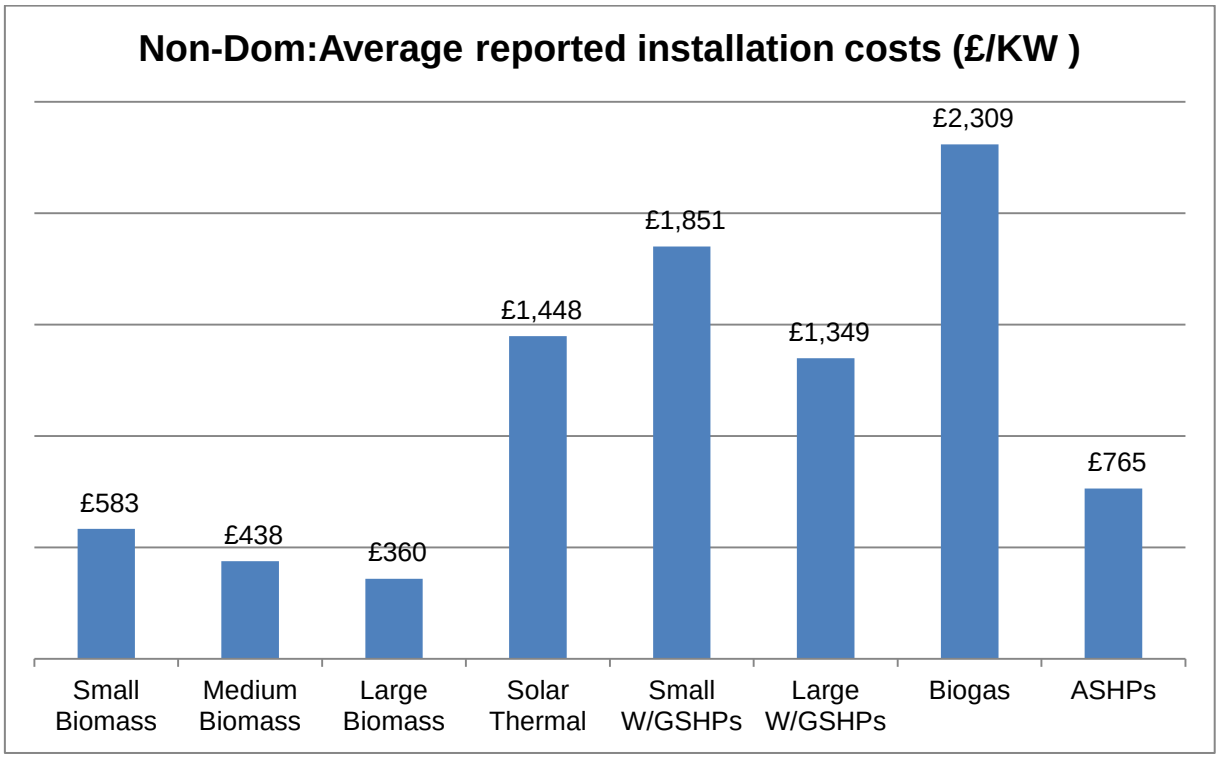
The consultation document questions the cost effectiveness of biomass heating below 1MW, which is surprising considering that the medium biomass tariff (the only market currently showing growth) is lower than many other supported technologies.



Before the 25% degression was applied to the small biomass market 1st July 2015 and deployment levels for this band were still relatively high, the tariff was at a weighted average of just 4.8p/kWth.

Looking at the cost of installation data released with the consultation, it is clear that biomass is the cheapest low-carbon renewable heating option both in the domestic and non-domestic RHI:





We understand why DECC wants to encourage large scale biomass (+1MW) projects as they provide the lowest cost per KW. As reported in DECC's Non-domestic RHI reported installation costs (Oct 2015) spreadsheet, the average reported installation cost for large biomass was merely £360 per KW capacity. However, this should not mean that the government cannot also support medium and small biomass which have the second and third lowest installation cost, and therefore are the second and third cheapest renewable heating technology in the RHI. By focusing solely on large scale biomass and proposing a tariff that would make sub-1MW project

economically unviable, the Government is losing out on very low cost renewable heating that would help to meet 2020 targets.

Large scale biomass may not deliver at the level expected

We understand why DECC want to support the best possible value for money from the RHI budget in term of large biomass and support this. Nevertheless, we are concerned that the proposal is insufficient to deliver the amount of heat predicted (i.e. 8.30TWh by 2020/21).

During the past 5 years of support under the non-domestic RHI, 31 plants have been accredited and further 10 have submitted a full application. In the same period, there have been 12,995 small and medium biomass boilers. In the estimation of indicative deployment by 2021 (section 2.26), DECC expects 60 large biomass plants and 5 biomass CHP plants to be deployed annually. This represents a significant increase in deployment, based on the assumption that longer term certainty for the scheme, tariff guarantees, and a potential tariff increase will be sufficient to drive this change. We very much support these proposals and believe it will unlock a market that has been unable to access the RHI because of uncertainty. Biomass heat above 1MW will also be the lowest cost renewable heat technology available in the RHI.

The growth in large biomass is predicated on conversions of a 'typical' large scale plant of 4MW capacity, currently using 50/50 oil and gas. We do not believe that sufficient number of such plants exist to achieve these targets. Most of the current large scale biomass systems have been installed in industries that have a close wood residue supply, such as sawmills and chip-board manufacturers – and the viable projects have already been done. Existing large-scale heating plants are simply not built using oil at this scale as this would be uneconomic, and they would almost invariably be connected to the gas grid if at all possible.

The promotion of large scale biomass is also vulnerable from a raw material supply perspective. Large systems to date have mostly been fed by local timber residues from forestry or sawmills, which are difficult to transport over long distances, hence this policy is further restricted to certain areas of the UK. However, medium and small scale biomass are usually fed by wood pellets, which can be supplied from far greater distances and which benefit from the strong world market and growing production. There are about 30mT of pellets traded and 42mT of production capacity in the world today, and scope for this to grow strongly and sustainably for many years to come.

It is believed that larger-scale biomass fired heat might be used in energy intensive industries, as stated in the consultation document. This policy aim also drives the change of tiering from the current 15% to the proposed 35%. However, the large heat loads that are suitable for RHI biomass are nearly always on the gas grid, which would require a higher tariff to compete with gas compared to the model in the Impact Assessment of a 4MW plant using 50% gas and 50% oil. There are large heat loads in energy intensive industry which is suitable for biomass, but there are significant barriers, such as a shortage of investment capital and a requirement for a higher rate of return than the RHI can offer.

It is worth assessing the potential for large scale biomass within the eight heat intensive sectors participating in DECC's "Industrial Decarbonisation and Energy Efficiency Roadmaps" (i.e. Iron and Steel, Chemicals, Oil Refining, Food and Drink,

Cement, Pulp and Paper, Glass, and Ceramics). Biomass boilers are not suitable for a number of the heat loads in certain sectors such as iron and steel, cement, glass and ceramics sectors, as these use heat from furnaces and kilns. This market could be unlocked by considering to allow the direct application of renewable heat (also referred to as 'direct air') as outlined in DECC's RHI Evidence Report: Direct Application of Renewable Heat as part of the evidence gathering on potential renewable heating technologies. Without direct air, uptake in these industries is highly unlikely. The oil refineries would be unlikely to use biomass boilers as they would use the gas by-products from the refining processes. The industries that require steam or hot water heat loads (i.e. chemicals, food and drink and the pulp and paper) and therefore are suitable for biomass boiler deployment are most often connected to the gas grid, because of the lower energy cost. The comparison for large biomass should therefore not be the plant using 50% gas and 50% oil, but instead 100% natural gas. The 50/50 example is not representative of typical heat loads, and by using this would underestimate the tariff level necessary.

As outlined in the Industrial Decarbonisation and Energy Efficiency Roadmaps, there are several barriers to deployment of large biomass in the chemicals, food and drink and the pulp and paper industries. Two key barriers are the requirement for quicker returns on investments and a shortage of investment capital. However, as demonstrated in the Industrial Roadmaps Work and in the Carbon Trust's efforts over the past years, a full return on investments is required within 2-3 years, significantly shorter than the paybacks provided by the RHI. We are not suggesting that the 12.5% IRR of the non-domestic RHI should be changed, but it does not match the requirements of the eight heat intensive sectors participating in the Industrial Decarbonisation and Energy Efficiency Roadmaps with greatest potential for biomass boilers. The RHI might not be the appropriate policy tool to unlock this particular market, and this should be reflected in the forecasted deployment estimates.

Similarly, there is a high degree of competition for investment capital between projects in chemicals companies; the food and drink sector has a shorter investment cycle, as supermarkets hesitant to sign contracts longer than 12 months, and margins in are currently low; and investment funds are few in the pulp and paper sector, as they have been facing declining volumes.

Biomass CHP plants also require support from the Contract for Difference scheme. Under current proposals, these will get 12-18 months of new investment after the second CfD auction, as tariff guarantees are not available at the first auction. We do not expect any further investments from March 2019 to March 2021 because there won't be enough time to complete projects before the spending review period ends. Furthermore, with the proposed CHP tiering payback could more than double. Evidence from one member suggests that for CHP plants with 5MWth steam boiler peak capacity (0.2 MWe peak power capacity) the estimated payback would double from 8 to 17 years, and for CHP plants with 7MWth steam boiler peak capacity (1.9 MWe peak power capacity) the estimated payback would increase from 4 to 12 years.

We therefore believe it is highly unlikely that 60 large biomass plants and 5 biomass CHP will be deployed annually by 2021, and it will therefore also be unlikely that these alone will deliver 8.30TWh by 2021. Large biomass is expected to deliver 60% of all new renewable heat delivered by 2017-2021. The unlikelihood of this being

delivered alone by large biomass and CHP makes it highly unlikely and that the RHI will deliver 23.7TWh, as estimated in the Impact Assessment. Instead we would point to the small and medium biomass market which has delivered cost-effective renewable heat over the past 5 years to deliver the majority of the generated biomass heat. These markets have shown great potential and growth, and it would be unfortunate to close these markets and only gamble on the success of CHP and large biomass.

Small and medium biomass heat market

The support required by the sub-1MW is higher than the large biomass tariff, but this does not mean it provides less value-for-money, as in general, it is still very cost-effective compared to the other renewable technologies supported under the RHI, and will mitigate the risk of non-delivery by large biomass and heat pumps.

There are for instance many opportunities to improve and heat local authority housing. With significant insulation and cladding together with new heating and hot water systems, most of these schemes need boilers ranging from 200-500kW. Anything larger than that and the schemes often become too complex or expensive to link up.

Recent figures for the financial year of 2014/2015 show 5,650 people are employed directly or indirectly by 246 companies through the biomass boiler industry in the UK (i.e. in installation and maintenance, manufacturing, and design and development). Many of these companies have established themselves mainly in the small to medium biomass market and have strategically procured and trained staff to accommodate the growth in this industry based on predictions such as those in the Government's NREAP. Similarly, biomass fuel producers, an industry with over 6100 jobs and 340 companies, will have also expanded their operations in-line with demand caused by growth seen in the small and medium biomass sector.

The current proposals are likely to cause the collapse of the whole small and medium biomass installation supply chain, and much of the fuel supply, with significant reduction of jobs created over the past five years. This would result in the industry shrinking into one of mainly service; maintenance and fuel supply of existing boiler instillations. Many professionals who have attained expertise in the instillation sector will be left with obsolete skills as these cuts will cause their redundancy by curtailing demand. Even the fuel supply industry will face adversity as investments have been made to accommodate the anticipated increasing demand. This will represent the loss of five years' worth of government effort and investment that have helped built a mature and stable industry. DECC has spent considerable efforts supporting training, skills, development of industry standards, and quality of installations, which will all be lost if these proposals are enacted. This does not include the substantial private investment that has gone into the sector to develop these areas. We therefore strongly urge the Government to rethink its proposal to reduce the biomass support to the proposed levels of 2.03-2.9p/kWth.

b. Within the range 2.03 – 2.90p/kWh what is the appropriate Tier 1 level of support for biomass boilers?

We do not agree that 2.03-2.9p/KWh is appropriate for Tier 1, as this would make

medium and small biomass economically unviable. For further detail, see answer to question 40a.

41.

a. **Do you agree that the appropriate tariff level for Tier 2 support for biomass boilers is in the range 1.80 – 2.03p/kWh? Yes / No.**

b. **What is the appropriate level of Tier 2 support for biomass boilers, within the range 1.80 – 2.03 p/kWh?**

Please provide any available evidence in support of your response.

See answer to question 40a.

Should DECC still pursue a single biomass boiler tariff below 3p/kWh then we advise against tiering, as this distorts the market away from large industrial users of heat. With a tariff below 3p/kWth tiering is not necessary, as because the RHI payments would be below the marginal cost of generation. This would provide a simpler policy.

Non-domestic RHI: Biomass Combined Heat and Power

42.

a. **Do you agree we should maintain a 4.17/kwh CHP biomass tariff (please consider the below question on tiering when providing your responses)? Yes / No.**

b. **Are there any types of plants (e.g. heat-led, power-led plants, plants of certain capacities) that may be overcompensated through the receipt of the 4.17p/kWh tariff? Yes / No.**

Please provide any evidence you may have to support your answer.

43.

a. **Do you agree with the introduction of tiering for all new biomass CHP participants? Yes / No.**

b. **Do you agree with the proposed tier threshold of a 35% load factor? Yes / No.**

c. **What is the appropriate level of the tier 2 tariff, within the range 1.8 – 2.03p/kWh?**

Please provide any available evidence in support of your responses. In particular, this should indicate why the arrangements for CHP should be set differently to those proposed for biomass heating-only systems (where we are proposing that Tier 1 could be set at a level equivalent to a 35% load factor and Tier 2 would be set between 1.8 – 2.03p/kWh).

We understand that DECC intends to introduce a minimum 20% electrical efficiency for biomass CHP plants through CHPQA in line with the fossil fuel CHP criteria. The CHPQA is based around power generation led schemes such as gas turbines and engines. In these schemes the power generation is the main requirement, with heat being secondary. As such it is usual for the Power Efficiency to be greater than a 20% threshold simply because power generation is the principal use of the fuel input not, because the power generation is necessarily efficient. For biomass CHP plants the main requirement is heat generation, usually for process use. The power efficiency is therefore often lower than 20% as it is not the main purpose of the plant.

Furthermore, there is also need for clarification on the link between tariff guarantees and CHPQA. From our understanding of the consultation proposal, it might be possible to get a tariff guarantee, as pre-CHPQA is not available.

We are concerned that implementing a tiered tariff for CHP will remove the incentive to site CHP plants where there is a valid, and stable, heat use and reduce their efficiency. We therefore advise against tiering for biomass CHP. For very large CHP projects, heat users will be sequentially added to a district heating network over many years. To ensure there remains an incentive to continue adding projects so that maximum renewable heat can be generated, the RHI must not be tiered for CHP.

Non-domestic RHI: Other technologies

44. **Do you agree with our proposal to retain the existing tariff level for deep geothermal plant? Yes / No. Please provide evidence to support your response.**

45. **Do you agree that we should withdraw support for new solar thermal systems in the Non-Domestic RHI from 2017? Yes/No. Please provide evidence to support your response.**

Please see our response to question 25.

Non-domestic RHI: Tariff guarantees

46.

a. **Our policy on tariff guarantees is that they should only be available to projects with long-lead times and which involve high capital expenditure. Do you agree installed capacity is a reasonable proxy measure for these criteria? Yes / No.**

b. **If No, what alternative proxy would you suggest?**

Yes, we agree.

c. **Do you agree with the suggested capacity limits for eligibility for tariff guarantees as set out in paragraph 11.15? Yes / No.**

d. **If No, what capacity limits would you suggest? Please provide evidence in support of your answer.**

We agree with the proposal, as biomass CHP, deep geothermal, biomethane (all larger in the nature of the projects), 2MWth+ Biomass and 600kWth+ Biogas installations have longer lead times from planning to construction to commissioning.

Tariff uncertainty is one of the biggest constraints on larger renewable heat projects. Some projects have lead times of several years, and the risk of the given tariff being reduced several times or not existing at the commissioning date constitutes a significant barrier to these projects.

Considering the increased value-for-money and cost-efficiency of larger projects, given that they receive a lower tariff, it is vital to ensure the right regulatory framework and support for these large scale projects.

We agree with most of the proposed boundaries. Biomass CHP, deep geothermal and biomethane all tend to be larger projects, as they often first become financially viable at scale. Biomass installations over 2MWth and biogas installations over 600kWth face the same issues as the three aforementioned technologies in terms of long lead times and would benefit from the certainty tariff guarantees would provide. There is also an argument for extending guarantees to biogas CHP 200-599kWth, as these projects can still take 20-30 months from early work to commissioning. We believe tariff guarantees have potential to unlock previously unobtainable markets.

As mentioned in our answer to question 2b, we would be concerned the budget cap will lead to an increased use of tariff guarantees for all projects which tariff guarantees were available to. As recognised in the consultation document, there is a risk with all tariff guarantees and similar policies (pre-accreditation in the Feed-in Tariff scheme) that the criteria for obtaining a guarantee are not sufficiently strict, and budget is therefore locked away for a project that will never commission. We are therefore concerned about how this would impact the budget cap, as many unviable projects with tariff guarantees that will never commission, would trigger the budget cap, and close the RHI for new applications, despite having unspent budget.

One suggestion to mitigate this risk is to make tariff guarantee unavailable before the point where concern raises about overspending the budget and closure of the RHI. Much less damage will be done by a premature closure of the tariff guarantee

scheme than by a premature closure of the RHI.

47.

a. **Please provide your views on the application process outlined in paragraphs 11.27 – 11.56, specifically:**

   i. **Can this process work for industry (i.e. does it fit with business planning and management of projects)?**

   ii. **What modifications could be made to improve it?**

b. **We propose to award the tariff guarantee at stage two of the application process, as described in paragraphs 11.33 – 11.36, but are interested in stakeholder views and evidence which may support the awarding of a tariff guarantee at stage one instead.**

48. It will be critical to the success of the tariff guarantee scheme that plant owners are able to provide accurate maximum plant capacities and reliable expected annual eligible heat output or injection rates.

a. **We therefore invite stakeholder views on the approach described at paragraphs 11.48 – 11.49 which proposes limiting the level of RHI payment based on the declared maximum capacity of plants.**

b. **We also invite views on the proposals to require applicants to provide separate evidence that substantiates heat loads; as well as alternative approaches to this issue.**

49. We require a high degree of certainty that a tariff guarantee for large Ground and Water Source Heat Pumps can operate within the proposed framework.

a. **We welcome evidence of whether the requirement to reach financial close as it is currently proposed can work for Ground and Water Source Heat Pumps.**

b. **Please suggest any alternative approaches to financial close, or minor modifications to the application process to improve its operation with regard to large heat pumps. Any approach would need to provide DECC with sufficient assurance that large Ground and Water Source Heat Pump projects will go ahead and commission.**

50.

a. **Do you agree with the suggested capacity limits for Air to Water Heat Pumps and to Ground and Water Source Heat Pumps who wish to apply for preliminary accreditation? Yes / <u>No</u>.**

b. **If No, what capacity limits would you suggest? Please provide evidence in support of your answer.**

c. **Please provide any evidence and reasoning to support the extension of tariff guarantees to Air to Water heat pumps, and suggest what capacity limit should apply, if any.**

The motivation for introducing tariff guarantee is as stated in the consultation document to overcome the uncertainty the degression mechanism creates for large projects with long lead times. Introducing tariff guarantees also brings some risks as highlighted by the questions above, namely locking in budget for projects that will never commission and triggering degressions for new projects. These are considerable risks, causing the government to introduce barriers and qualifying criteria to obtain the guarantees.

We would be concerned that the limit might be too low for heat pumps, which could lead to unspent budget, but do recognise that lead times can be very long for smaller projects considering the complexity of grid connections for certain properties.

51. **Tariff Guarantees would provide larger plant with certainty of the tariff they will receive ahead of their commissioning, provided they meet eligibility criteria including demonstration that financial close has been reached on the project. Do you agree that a plant granted a tariff guarantee should be protected from any scheme closure if the budget cap (described in Chapter 3) is subsequently assessed as likely to be hit, meaning that it will still be able to commission and be accredited or registered onto the scheme? Yes / No.**

    When considering your response it is important to recognise that a plant granted a tariff guarantee (but not yet accredited/registered) will be counted towards our assessment of estimated spend and whether budget management trigger levels have been met and/or the budget cap is likely to be hit; and that this approach to counting tariff guarantee plant will therefore affect when budget management triggers are met and any scheme closure is triggered.

This is a concern that has been raised by members of the REA, as explained in our answer to question 4. In particular, this may become an issue if some of the projects that have obtained tariff guarantees do not go ahead and reach completion for whatever reason. The cap would end up being hit and/or degression triggered because of speculative projects.

This can be addressed by having a mechanism in place within the scheme to account for projects that have dropped out and reallocate their associated spent back to the scheme spent. There could be a mechanism in place whereby Ofgem must to be informed by developers if they are unable to complete a project after they have been awarded tariff guarantees.

52. **Do you have any thoughts as to how to minimise the above risk of counting committed spend from plant awarded a tariff guarantee and the potential this has to result in premature scheme closure?**

Conclusion

53. Does your interest in the RHI relate to the operation of the scheme in a particular geographical area?

a. England

b. Wales

c. Scotland

d. GB-wide

54. We are interested in stakeholders' experience of our regular RHI deployment statistics publications.

a. Do you use these statistics? Yes / No.

b. If yes, for what purpose?

Deployment monitoring and degression forecast.

c. Is there any information within the statistics that you find especially useful? Yes / No. Please expand.

We have in the past used information from every single tab in the monthly deployment statistics, and find them all necessary and useful.

d. Is there any information not provided in the statistics that you would find useful? Yes / No. Please expand.

There is currently no information on bioenergy sustainability in the statistics. We would find this very useful, if it were to be included.

55. Do you have any further comments or suggestions on the proposals included in this consultation, or on the RHI in general?

In table C6 (Profile of renewable heat generation under the central scenario) in the impact assessment, DECC states that 31.14TWh of baseline renewable heat is expected to be delivered outside of the RHI in 2016-2021. This is sourced from the Domestic Wood Survey carried out during 2015, which assesses the level of domestic wood heat generated in the UK. However, we are sceptical about the validity of this assessment.

The 31.14TWh is evidently mainly, if not entirely, assumed to be wood heating through biomass boilers, wood stoves, and open fires etc., which are not eligible for RHI support. However, prior to the RHI, sales of biomass boilers were minimal, and the volumes since the introduction of the RHI demonstrate that this part of the market is a tiny fraction of the total assumed market, even under strong stimulus. If assuming that the vast majority of the baseline heating is from wood stoves and open fires, it is still highly unlikely that this amount of stoves and open fire are delivering 31.14TWh of

heating (three times as much as 5 years of RHI support has generated). If the wood heat is being used for space heating with no wet system, it will only do a part of the heat load of the house, i.e. not the water heating or heating or other rooms in the house. Stove heating and open fire are most often used for recreational, occasional heating a few times a week rather than the main heating source. The Domestic Wood Survey indicate that respondents used only 25% less fuel in summer than in winter on their open fires, and 46% less in their closed stoves. In total, people used over 40% of their wood fuel in summer. This seems very unlikely considering the vast temperature difference between summer and winter, and the significant different heating needs between the two seasons. It also suggests open fires consumed over 2.5 tonnes of seasoned logs per year and closed stoves nearly 2 tonnes, which again seems extraordinarily high considering that they only provide heating for one or few rooms and not hot water heating. We therefore doubt the validity of Domestic Wood Survey and whether domestic stove heating really represents 5% of *all* UK heating.

The existing RHI scheme is reported to deliver 10.53TWh in 2016/17 from installations installed prior to 1 April 2016, and of that 7.63TWh is reported to be delivered by biomass. However, from March 2015 to February 2016 the RHI scheme only delivered 4.83TWh (4.26TWh from the non-domestic scheme and 0.57TWh from the domestic scheme) according to the RHI monthly deployment data published by DECC. We are therefore very concerned that DECC is considerably overestimating the performance of the existing installations, their contribution towards the EU 2020 renewables targets, and the deployment needed to meet these targets.