



# Renewable Heat Incentive: New Technologies Evidence Gathering – Summary Paper

## Background

The key driver of both the non-domestic and domestic RHI schemes<sup>1</sup> is to help the UK meet its 2020 renewable energy target set out in the EU Renewable Energy Directive (2009/28/EC)<sup>2</sup> (RED). As part of on-going work on developing the market for non-domestic renewable heat, it is important to consider the role that technologies which are not currently part of the RHI could play in helping us reach the 2020 target.

In July 2013, we published the document “*New technologies: process towards eligibility*” which set out the criteria we need to consider in assessing the case for extending RHI support to any new technologies in the RHI.

We identified a number of potential non-domestic heating technologies which would benefit from external evidence gathering. These technologies are typically ones which are post innovation-stage, and have existing markets to some degree. They are also sectors where the evidence gathering exercise was thought to benefit from external expertise for reasons including the complexity of the supply chain or specialisation of the engineering knowledge.

We commissioned a suite of evidence gathering on potential new non-domestic RHI technologies in six areas:

- Bioliquids for heat;
- Biopropane;
- Reversible Air to Air Heat Pumps (RAAHP);
- Gas Driven Heat Pumps (GDHP);
- Direct Applications of renewable heat to industrial processes;
- Heat Networks (not further addressed here as the research is ongoing)

The projects were tendered separately in order to encourage tenders by consultancies with the required expertise in the individual technology. The suite of work also included a contract on coordination and consistency to provide an independent view ensuring that technologies were considered on an equal footing and evidence was collected and presented in a consistent manner.

The overall purpose of this suite of work was to provide robust data on cost, performance, and potential heat deployment of the technologies. This information can help to identify whether market failures exist, to compare the case for support of different technologies on a common footing, and to identify barriers that might prevent the technology from being practicably included in the Non-Domestic RHI. The conclusions of these reports and the next steps are summarised below.

<sup>1</sup> <https://www.gov.uk/government/policies/increasing-the-use-of-low-carbon-technologies/supporting-pages/renewable-heat-incentive-rhi>

<sup>2</sup> <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0016:0062:EN:PDF>

For any other potential technologies not included in the scope of these research reports, we are also releasing a document entitled “*New technologies: Further information on the process towards eligibility*”, to give stakeholders further guidance on the evidence we would need to consider to assess the case for supporting other technologies which are currently ineligible for the RHI.

## Evidence Gathering Outcomes

### Reversible Air to Air Heat Pumps (RAAHP)

Presently, there is no apparent failure in the RAAHP market and existing non-domestic RAAHP installations number at approximately 2.8 million.

Support under the RHI could result in substantial costs paying for heat from systems that would have been generated anyway, and could also to incentivising of additional cooling, and the associated carbon emissions.

There is no established reliable methodology available to cost-effectively monitor the amount of renewable heat generated by RAAHPs.

**Next Steps:** We will not be pursuing introducing this technology into the RHI. While we recognise that this technology can provide a renewable source of heat, we do not consider support in the RHI to be appropriate due to existence of a current market and inability to meter the heat delivered effectively the and so will not carry out any further work on this technology.

### Gas Driven Heat Pumps (GDHP)

The report suggests a window of opportunity for GDHPs to contribute to renewable targets prior to the electricity grid being decarbonised at which point electric heat pumps will be a better option.

GDHPs are currently not an industrial scale market in Europe and RHI Support would give industry the confidence to invest in developing the supply chain, and in R&D, which will lead to efficiency increases and cost-reduction, setting the GDHP industry on course to being a sustainable industry.

There are also arguments from stakeholders that GDHPs should be treated in a similar manner to electric heat pumps with regards to RHI support to create a level playing field.

A lower proportion of the heating output of GDHPs compared with electrically driven heat pumps can be counted towards our renewable targets due to lower seasonal performance factors.

However, GDHPs do produce renewable heat output and even low efficiency GDHPs outperform gas condensing boilers in terms of carbon emissions and there may be potential for GDHPs where the strength of the electricity grid means there are high costs associated with strengthening the electricity grid to accommodate electric systems.

We therefore think there may be potential for this technology in the RHI, but we need to establish whether a tariff sufficient to incentivise this technology would offer good value for money.

**Next steps:** We will carry out further work internally to assess the value for money case of introducing RHI support for GDHPs. We recognise that the RHI could be a suitable mechanism for supporting this technology but we need to establish whether introducing support offers good value for money in terms of renewable heat produced and compatibility with the wider objective of decarbonisation.

## Bioliquids

The estimated renewable heat output from the four priority feedstocks identified in the report is from 0.4 to 1.6 TWh per annum.

The report proposed a decision making framework for identifying feedstocks most applicable to heating (rather than transport) was developed and included a detailed set of assessment criteria relating to both heat and transport suitability. This framework was presented to stakeholders and Department for Transport.

The majority of the potential feedstocks identified may already be used to some extent for heating, electricity generation, or as transport fuels. The extent to which additional renewable content would be generated is not completely clear and varies by feedstock.

There remain significant policy complexities to introducing support for bioliquids in the RHI. Bioliquids differ from other technologies in the RHI and so there are policy complexities involved in introducing support. These include defining the feedstocks with sufficient clarity for regulations, identifying the suitable recipient and establishing an appropriate tariff setting methodology given that unlike other technologies in the RHI support would not be to incentivise the installation of a renewable heating

installation to replace a fossil fuel alternative.

These policy complexities, coupled with legal uncertainty about our ability to nominate specific bioliquids feedstocks for support due to provisions on sustainability criteria for bioliquids in the RED, mean that attempting to introduce support is likely to be resource intensive with uncertainty of successful delivery of support for bioliquids in the RHI.

**Next steps:** We are not prioritising work on bioliquids as part of the 2015 Spending Review. We recognise that bioliquids do offer a source of renewable energy and some potential towards our 2020 renewable energy targets. There are however significant complexities in delivering support in the RHI. Resolving these issues would be resource intensive without any guarantee of success and given the current relatively small size of renewable energy potential we have decided to not prioritise work on this technology. We are however not ruling out potential support in the future and so bioliquids will continue to be kept under consideration.

## Biopropane

In the timeframe considered biopropane is not likely to be produced in the UK, and any support may not incentivise new production as in plants able to come online by 2020/21, biopropane is a small component in larger biodiesel plants.

The only viable opportunity for biopropane in the UK in the near future is through imports. The report concluded that without some form of Government incentive to import the biopropane to the UK, it is likely it would be sold and consumed in the local market.

Biopropane, which is produced by the purification of off-gases of other processes, differs from other technologies in the RHI and as such would require different implementation, with its own tariff setting methodology and a different eligibility structure as the tariff would not be payable to the owner of a renewable heating system.

**Next steps:** We will not be pursuing introducing this technology into the RHI. Biopropane does offer a renewable fuel source which could contribute to the UK's energy targets, however, while introducing support could encourage some imports, it is unlikely to bring about any new production in the UK in the lifetime of the RHI. We do not think that there is a case to commit resource to developing a support structure for biopropane.

## Direct Applications

The fuel consumption for direct heat applications has been researched and established or estimated for the eight largest heat consuming industrial sectors. The research identified a wide range of direct heat-consuming processes in industry. Using renewable heat in industry is essential for long term decarbonisation.

The research identified significant opportunity to use or increase use of renewable and low carbon fuels in these processes. Fuels examined include Hydrogen, Syngas (from waste or biomass), and solid Biomass. The report identifies that these fuels would in most cases need subsidy to be cost competitive with natural gas or coal use.

The report also identifies an approach to determining the amount of heat consumed in an industrial Direct Application. Though developing a suitable metering method to

enable incentive payments to be determined will be a challenge, this is a technical issue which the team expects can be overcome through further work.

Developing tariffs for each technology and sector and identifying the best means of support will also be challenging. This will require further work by the team to consider a suitable support mechanism and appropriate levels of support across a diverse range of technologies and sectors.

**Next steps:** The report highlighted both opportunities and barriers for the use of renewable heat in industry in direct applications. We will continue work in this area, including identifying the best means of support.

## For more information

For further information on the technologies covered by the reports, the full reports and summary positions are available on our [website](#) or contact us at [rhi@decc.gsi.gov.uk](mailto:rhi@decc.gsi.gov.uk)

For any other technologies not covered by these reports which stakeholders would like to be considered for the RHI, the updated evidence document will enable stakeholders to consider the evidence needs for us to be able assess the case for inclusion of their technology and provide a framework on which to gather evidence as to the suitability of their technology for the RHI. If compelling evidence is presented, we will consider the case bearing in mind the particular benefits and challenges of the given technology.