ofgem e-serve

Making a positive difference
for energy consumers

Summary of Consultation Responses:
Published: 1 December 2016

Responses received to the Ofgem e-serve consultation on operational approach under Non-Domestic RHI in respect of installations generating heat using ground source heat pumps and recovered heat

Consultation opened: 26 January 2016
Consultation closed: 23 February 2016

Our questions for respondents
Question 1: Do you agree with our proposal to adopt a new approach to recovered heat?
Question 2: Thinking about your installations and designs, do you foresee any difficulties in distinguishing the heat drawn from the ground from the recovered heat that has not circulated the ground? (Metering could be used in addition to an appropriate calculation.)
Question 3: Do you foresee any other consequences/impacts were we to adopt the proposed approach?

RESPONSES.

Response	Respondent
1	Confidential
2	EDF energy
3	ICAX
4	GEA
5	Green Engineering UK
6	Geoscart
7	Chair of the CIBSE CHP-District Heating Group
8	Kensa Group
9	GeoScience Ltd
10	Calibrate Energy Engineering
11	E.ON-1
12	E.ON-2

Stakeholder responses

RESPONSE 1
Confidential
Question 1. Confidential
Question 2. Confidential
Question 3. Confidential

RESPONSE 2
EDF energy
Question 1. EDF Energy is supportive of Ofgem's proposal to adopt a new approach to recovered heat so that it will no longer be required to be stored in the ground prior to circulating a ground source heat pump in order to be eligible for Non-Domestic RHI support payments.
EDF Energy is proactive in promoting renewable heat as a heat source and we therefore consider that recovered heat should be used when it is available. We believe that the proposed approach will give more flexibility for the design of new projects for GSHP. This in turn will increase the range of opportunities for the ground source heat pump project developments.
Question 2. EDF Energy does not foresee any difficulties in distinguishing the heat drawn from the ground from the recovered heat that has not circulated the ground, providing there is a sufficient metering arrangement on site. It is therefore important that metering arrangements continue to be reviewed on a case-by-case basis when an RHI application is made. We do not foresee any other impacts or consequences should the proposed approach be adopted.
Question 3. n/a.

RESPONSE 3
ICAX
Question 1. Yes, this will allow the design of ground source heat pumps installations to be more efficient and lead to lower carbon emissions.
On a point of detail in "Scenario 2 – Recovered heat added to heat pump return" under "Key Points" it is stated "Recovered heat is added to the return line and then circulated the ground". From the context and the illustration it appears that this should read "Recovered heat is added to the return line and then circulates the heat pump."
Question 2. We believe there are practical solutions to distinguish the heat drawn from the ground from the recovered heat that has not circulated in the ground.
Question 3. We think all consequences will be positive in terms of saving carbon emissions.

RESPONSE 4
GEA
Question 1. See below
Question 2. See below
Question 3. See below

It is positive to see that The RHI is under review to make it easier for application for RHI on heat pumps using heat recovery as the source, as we see a large potential for heat recovery from chiller and refrigeration plant across UK.
The current rule that 3/5 of the heat needs to be recovered from ground source water (or similar) makes it not only more complicated but inefficient for processes where they have a large amount of waste heat from refrigeration systems. The users who choose to recover heat from their refrigeration plant and at the same time having 3/5 of the energy coming from ground source water have a less efficient plant but a shorter payback (because of RHI)? This makes no sense!
DECC will achieve more low carbon heating for the same amount of money by creating a tariff for waste heat recovery, without the demand of there being 3/5 of the heat source coming from ground source water.

It is clear that heat from a non-renewable fuel source should not be used where heat via heat recovery or a heat pump is possible, yet the current scheme is missing out on a vast amount of renewable heat recovered from the refrigeration process.
We believe heat recovered from a refrigeration plant in this way should be accepted for RHI approval under the new scheme as the traditional and current practice is truly inefficient and enormously detrimental to the environment. Producing heat via a "add on heat pump"

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working in conjunction with a refrigeration system is far more efficient and beneficial to the environment than those currently allowed under the scheme, yet are not applicable for RHI.

Almost all products go through a process of heating up and cooling down. Today all the cooling is produced by refrigeration plant and the heating by oil or gas boilers. By extracting the waste heat from the refrigeration process and boost it up to useful temperatures via a heat pump we could reduce the oil and gas usage in the food industry by 70 – 90%

RESPONSE 5
Green Engineering UK
Question 1. Greengineering Ltd specialise in innovative methods of recovering and utilising waste thermal energy within industry. We believe that all thermal energy should be harvested, whether from ground/water or from waste sources. Many businesses in the UK are expelling waste heat in one department and warming another with imported natural gas.
The Digest of UK Energy Consumption (2011) states that the UK industrial heat energy use is ca. 291 TWh/yr. In 2014 DECC commissioned a report on waste heat recovery from experts within the industry and Imperial College. The analysis identifies a technical potential of 11 TWh/yr from heat sources, based on projects that are projected to save 2.2 MtCO2/yr.
If we are to lower the energy consumption of Industry and assist with reducing climate impact, we must harness energy from any source. The majority of the waste heat from a business process is regarded as low grade. This potential resource is often wasted, usually expelled into the atmosphere. We should be harnessing this valuable commodity and rewarding those companies who are prepared to invest in the infrastructure to do so. We all want to lower energy use and CO2, however many companies lack the space for a ground array or can manage the logistics required for installation.
Of course there must be safeguards, the source of the thermal energy should be proven to be from an existing process and normally wasted into the atmosphere. Heat Pumps are good for the environment, lets encourage their use not penalise it.
Question 2. Yes – I can foresee issues.
Our solutions can work with ground installations, waste heat only or a combination of both. However in some cases the thermal energy from the waste source could be too high for a heat pump and would require tempering. This could be achieved by combining with lower grade sources (such as from ground or water), but metering would present difficulties.
Question 3. If the measures are adopted then the targets for GSHP technology will probably not be achieved. It is another hurdle for the renewable industry and a reason to buy a traditional Gas Boiler.

RESPONSE 6
Geoscart
Question 1. Yes. We agree that adopting a new approach to recovered energy (the term "energy" should be used rather than "heat") would support the opportunity for "best practice in system design", and ultimately increase uptake of GSHP systems.
Question 2. We do not foresee difficulties in making distinctions between all sources of thermal energy supply and delivery into a "system" – indeed it should be considered best practice to know this information. We do not use Class II meters currently gather all of this information, and therefore if Class II meters were required we would face cost / disruption.
Question 3.
a. Quarterly calculation of the 3/5th rule is not the most appropriate for technical performance as proportions will vary seasonally (winter potentially being less than 3/5 and summer being greater) however appreciate this needs to be linked to the quarterly payment mechanism.
b. "Recovered heat" sources may need to be defined and categorised to prevent potential abuse in system design and operation. Naturally occurring recovered heat – such as a geo-solar inter-seasonal storage scheme - making best technical and commercial use of both naturally occurring heat sources should be fully supported with RHI i.e. without restriction

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on measuring / heat source balance. This could be classified as "heat from processes other than the generation of heat"
Heat recovered from mechanical processes such as space cooling or process cooling could be operated to "create artificial levels of heat for the purpose of recovery" and as such should regulated.
c. We do not see the adoption of any change as a driver for improved GSHP efficiencies, or that current efficiencies are adversely affected by the method of collection of recovered heat. We consider the adoption of this change to promote best practice in system design and the recovery of heat (from any source) which would have otherwise been wasted. This increased flexibility in design leading to increasing uptake in GSHP systems.

RESPONSE 7
Chair of the CIBSE CHP-District Heating Group
Question 1. IF DATA CETRE COOLING IS ELIGIBLE THEN THE ANSWER IS YES
Question 2. IF THE LONDON UNDERGROUND IS INCLUDED I THINK YOU SHOULD STIPULATE HEAT METERING ON THE SOURCE LOOP OF THE HEAT PUMP
TO DETERMINE HEAT RECOVERED AND SHOULD NOT ALLOW A CALCULATION AS THIS WILL LEAD TO SIGNIFICANT OVERSTIMATES
Question 3. NO, I THINK IT ALL SOUNDS LIKE A GOOD MOVE TO ME

RESPONSE 8
KensaGroup
Question 1. Subject to OFGEM's decisions on the details that are not included in the Consultation, the GSHPA agree. We believe that the proposal is in line with the revised Legislation, which we understand has been changed by DECC so that it reflects the European Commission's opinion that all heat generated will count towards the UK's RED2020 targets.
Question 2. Subject to OFGEM's decisions on the details that are not included in the Consultation, in principle, we do not. However, until real, practical Case Studies are commissioned and then approved by OFGEM, so that the markets understand what is and is not eligible, there will be no certainty for clients to place orders. There are plenty of uncertainties on the five scenario's portrayed, for example: -

1. Scenario's 3, 4 and 5 show that the flow into the heat pump from the ground arrays has a pipe that links across to the flow from the heat pump into the ground arrays. This is not a particularly common way of hydraulically linking ground source heat pumps to ground arrays.
2. Scenario 5 states that "Recovered heat does not always circulate the ground first" and yet further on it then states the opposite "if the recovered heat does not circulate the ground first it may not be included in the renewable proportion of heat"

However, the GSHPA do understand that the Consultation is a high level document that should be replaced with much more detailed Guidance in due course. Whilst the GSHPA believe that the intent is for OFGEM to allow recovered heat to circulate directly through the heat pump, without going through the ground arrays first, provided that the 3/5 (i.e. 60%) rule and all other eligibility requirements are met, it would be immensely helpful if OFGEM could produce a much greater range of eligible scenarios, together with detailed schematic diagrams, which should also show the precise recommended positions for meters.
Question 3. Yes. DECC's concern was only around "simultaneous" heating which is accurately reflected in Annex C of DECC's Consultation Response to "Improving Support Increasing Uptake":-
We will therefore be requiring that all heat pumps that are capable of simultaneous heating and cooling install meters to measure heat drawn from the ground loop in addition to heat output from the heat pump system.
OFGEM's Consultation takes a contrary view to DECC's stated policy intent:-
We also understand that non-simultaneous heat pump installations may also make use of recovered heat and, were the proposal to be accepted, we will be asking that these quantities are reported as part of quarterly periodic data submissions.

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The only way to "report" these quantities of heat would be via a heat meter on the ground arrays on any application where there is any cooling – which is not commercially viable. In other words, where DECC concerns centred on "simultaneous", it seems that OFGEM are concerned about "all" reversible systems, because the term "recovered" means:-
In line with RHI Regulation 8(3)(b) and 8(3)(c), recovered heat is taken to mean heat from space cooling or process cooling, or heat from processes other than the generation of heat.
If OFGEM carries out their proposal then wherever there is any element of cooling – even the smallest amount of solar gain into a building which is put into the ground for a few hours and then recovered - the 3/5 rule and a meter on the ground arrays, and the extra reporting for 20 years, will be required.
The complications, risk and extra capital cost will therefore render most straightforward cooling applications unviable.
OFGEM's proposal would therefore significantly increase the carbon emissions from buildings. The GSHPA expect that DECC will express a similar view to the GSHPA on this aspect of OFGEM's consultation, which is that it does not chime with DECC's policy intent.
The GSHPA looks forwards to OFGEM confirming that it will review this aspect of their proposal, and ensure that it chimes precisely with DECC's policy intent, and that meters will only be required for simultaneous heating and cooling.

RESPONSE 9
GeoScience Ltd
Question 1. Given the requirement for a binary answer - then Yes.
With reservations.
The most widespread use of recovered heat by a GSHP system is in their application as a means of delivering efficient space heating and cooling to buildings. The (unique) attraction of GSHPs is that they offer storage of the rejected heat on a time shifted basis, either daily, seasonally or longer term. As with other heat pumps (ASHPs) they also offer the possibility of simultaneous heating and cooling. Given that this is, and will be, the most common use of recovered heat by GSHPs, I have concerns as to whether OFGEM has adequately addressed all variants of GSHPs that can deliver this benefit, which also results in the most beneficial use of ground arrays. There are a variety of heat pump configurations that are capable of delivering these heating and cooling solutions, and I have concerns as to whether they are all addressed by OFGEM. The perverse affect of encouraging the installation of heating only systems, with separate chillers or ASHPs for cooling, in order to maximise RHI payments - should be avoided.
As I understand it, the approach being envisaged here is to (also) allow for the possible inclusion of waste heat recovery in GSHP systems.
Whilst I understand the reasons for ineligibility for RHI of your System 1, I am not clear as to your reasoning for System 2. Recovered heat is injected into the return to the heat pump load side and immediately reappears on the load side flow, having passed through the condenser of the heat pump. The heat pump may or my not raise the temperature of this heat - depending on the load side demand. This heat does not "circulate on the ground".
In all of your other cases the heat enters the heat pump source side, either circulating around the ground or not. If you are able to award RHI on the basis of the 3/5 formula then fine. It will be down to the GSHP designer to ensure that the partitioning of the "recovered" heat and raw (renewable) ground derived heat - maximises the potential RHI benefit.
Question 2. No - in that I believe that it will be possible to meter and design to meet your requirements.
Bear in mind the following:
In your spreadsheet, I point out the following:
Line two "B= total heat supplied to the heat pump as measured by the heat meter on the output of the heat pump." No - the heat meter will read the total heat supplied "to" the heat pump on its input side + the electrical input to the heat pump. (Strictly speaking - the heat meter will measure the total heat output "from" the heat pump)
As long as I measure, at the point of injection, any "recovered heat" that is either injected into the source side of the heat pump directly, or via the ground loop, and I subtract the

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electrical energy from the total heat measured at the output of the heat pump, I will be able to distinguish between "renewable" heat and "recovered" heat. There are issues here for the designer to address in considering whether retaining some of the recovered heat in the ground is more or less beneficial than passing directly to the heat pump. For system 2, I will need to measure the "recovered heat" being injected into the load side return flow.
Question 3. Given my comment regarding the spreadsheet - you may need to give consideration to requiring the electrical consumption of the heat pump to assist in the identification of renewable heat vs recovered heat.
Alternatively, for all systems other than 1 and 2, you could require metering of the heat input into the source side of the heat pump, which introduces all of the issues surrounding the accurate metering of low temperature, low delta-T flows. You then subtract the metered "recovered" heat at its point of injection into the system.

RESPONSE 10
Calibrate Energy Engineering
Question 1. It is common sense to allow a Heat pump to be as efficient as possible. There will need to be a higher capital cost for this assumed efficiency so there should also be the relevant tariff benefit.
Question 2. Either a design calculation or metering would suffice, it's a straight forward calculation. Ultimately we would prefer a design calculation versus metering as it's just another cost and component for ongoing maintenance, however if metering is required Scenario 5 is the best of the options.
Question 3. it will increase the uptake of the technology, in that the ongoing costs will be minimised both for electrical input and ongoing maintenance - a Heat pump system running with a higher brine input temperature is always going to last longer than the alternative – in my estimation it will increase the lifespan by up to 25%.

RESPONSE 11
E.ON-1
Question 1. Yes. Currently, the unit needs to be run for a certain period of time before sufficient heat has built up in the ground in order for the heat to then be extracted for use in site processes. This proposal will shorten the amount of time it takes for the required amount of heat to be built up by allowing recovered heat to be used without first having to be stored in the ground. This means that the overall process will become more efficient, resulting in lower costs.
Question 2. No. An additional heat meter would be required to measure the heat available from the ground storage in addition to the heat meter across the unit. The unit would provide heat for both the heating/cooling circuit and the heat store which would equal 100% of output.
The metering on the heating/cooling circuit would equal x% whilst the meter on the heat store pipe would equal y%. The unit output (100%) would then equal x% + y%.
Question 3. No, we do not foresee any other major consequences or impacts should the proposed approach be adopted. There would be a cost for the additional metering but it is expected that this would be minimal and would be built into future supplier costs.

RESPONSE 12
E.ON-2
Question 1. Yes, the proposal would allow us to utilise waste heat in a more efficient way which in turn would reduce energy consumption and carbon emissions.
Question 2. No, we agree that metering should be used to determine if the 3/5th rule has been met, despite the initial cost of making this change.
Question 3.

i) Quarterly calculation of the 3/5th rule does not support installations where recovered heat is subject to seasonal variation, such as refrigeration. In such instances, during a single quarter the 3/5th rule may not be met due to an excess of waste heat, however over an annual period the 3/5th rule could be met. Failure to allow for seasonal variations could mean that such systems could not be operated in the most efficient way.

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ii) Whilst metering is the most accurate way to determine if the 3/5th rule has been met, the initial cost of such changes to the system may outweigh the potential for any efficiency savings and therefore deter participants from engaging.

iii) Additional metering requirements for non-simultaneous installations will increase upfront and ongoing maintenance/verification costs.

iv) Changes to the RHI Register should be released and tested in timeframe aligned to the rollout of any accepted changes to prevent delays in payments and unnecessary administration.

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