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Subject: FW: NIRHI Audit
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[RHI Site Audits - Audit Report - Template.docx](#)

Trevor/Elaine

Template for site audits undertaken by Deloitte/AEA.

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RHI Audit Report

Site: <Site Name>
 Reference No: <Ref No>
 Date: <Date>
 Technology:

Executive Summary

A site audit was carried out by AEA on <Date> at the Renewable Heat scheme installed at <Site Name>, in <Location>, RHI Reference No <Ref No>.

The Renewable Heat Installation comprises <provide summary of key features of renewable heat installation>

<Provide summary of observations from Section 5.2, focussing on issues deemed to be non-compliances. Include reference to the severity of these issues>

Observations (including non-compliances) are summarised within the following table. **Observations are highlighted within the body of the report for emphasis.**

Summary of Auditor's Observations (including Non-compliances)

No	Auditors Observations	Does observation constitute non-compliance? [Yes/No]	What remedial work is recommended to rectify this issue?	Reference to Ofgem Guidance (volume and section)
1				
2				
3				
4				
5				

<Comment on the level of error associated with the heat meter readings>

Document Control

Date	Description	Name	Signature
<Date>	Issue 1 report raised	<Author Name>	
<Date>	Issue 1 reviewed and approved for release to Ofgem	<Reviewer Name>	<Reviewer Signature>

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1 Audit Planning and Preparation

1.1 INSTALLATION DETAILS

[To be completed by Audit Administrator prior to Audit Visit]

RHI no.	Installation Name	Location	Authorised signatory
			<addressee of audit letter>

Technology Type	Installation Capacity [kW _{th}]	Audit Scale [Small/Medium/Large]	Metering Classification [Simple/Complex]

1.2 AUDIT PLANNING

[To be completed by Audit Administrator prior to Audit Visit]

Auditor 1 (Name)	Auditor 2 (Name) [Optional]	Date Site Notified	Date of Site Visit

Have Ofgem Audit team advised specific issues to be addressed during the audit? If so detail these below

--

2 Audit Commencement

2.1 SITE PERSONNEL PRESENT DURING VISIT

[To be completed by Auditor upon Commencement of Audit Visit]

	Name	Position	Tel No [Optional]	E-Mail [Optional]
1				
2				
3				

The authorised signatory (<Name of Authorised Signatory>) **was/was not** present during the audit visit.
<see section 1.1 for details of authorised signatory>

3 Paper-Based Investigation

Instructions to Auditors

The following checks are completed by the auditor referring to documentary evidence either provided within the audit pack from Ofgem or on-site during the audit visit.

Auditors are to review documentation in audit pack provided by Ofgem and use this to provide a response to the following checks. Any checks that cannot be closed out in advance of the audit visit should be covered with site personnel during the audit visit. Section 4 then covers physical inspections undertaken as part of a 'Plant Walkdown'.

Checks in Section 3.1 must be performed for all installations. Checks in Section 3.2 should only be performed for the applicable technology type (see Section 1.1)

3.1 ALL TECHNOLOGY CHECKS

3.1.1 Plant Overview

Review overall installation configuration referring to plant equipment schedules, schematics and heat output data provided to Ofgem. From this review, focus on the following points

Ref	Check	Comments
3.1.1.1	Confirm stated plant heat capacity	
3.1.1.2	Confirm scheme compliant with any non-standard conditions relevant to their accreditation	
3.1.1.3	Check for presence of heat rejection facility	
3.1.1.4	Where heat rejection facility has been identified , confirm purpose of heat rejection facility with site staff	
3.1.1.5	Using installation schematic, confirm metering is configured in such a way to allow discrimination between heat from eligible and ineligible installations as well as heat supplied to eligible and ineligible uses	
3.1.1.6	Where plant has claimed to be removed , compare new schematic with original schematic to verify location of removed plant. Note location for purposes of plant walk-down	
3.1.1.7	Check whether reported heat output levels vary according to changes in demand (e.g. fall in summer due to less space heat demand)	
3.1.1.8	Check that scheme is technically capable of delivering metered heat output	
3.1.1.9	Where appropriate, confirm through documentation that the building(s) where heat is used are not single domestic	
Notes		

3.1.2 Input Fuel

Review installation's fuel input records.

Ref	Check	Comments
3.1.2.1	Where relevant, check fuel purchase records to confirm fuel type matches that claimed in scheme description	
Notes		

3.1.3 Metering Inspection

Review metering schedule together with data sheets for metering equipment.

Heat Meters – Compliance with MID Class 2

Confirm that all heat metering instrumentation complies with MID Class 2 (or equivalent) accuracy requirements.

Meter Tag	Description	Item Type			Make and Model	Serial Number	Confirm compliance with MID Class 2 [Use ✓]
		Packaged Heat Meter	Heat Meter, Separate Components				
			Flow Meter	Calculator			
Notes (Detail documentation reviewed to confirm compliance with MID Class 2)							

Steam Meters

Meter Tag	Description	Confirm all components present				Flow Meter Make and Model	Flow Meter Serial Number	Confirm compliance with Industry Best Practice [Use ✓]
		Flow Meter	Pressure Sensor	Temperature Sensor	Calculator			
Notes (Detail documentation reviewed, evidence of compliance with best practice)								

Ref	Check	Comments
3.1.3.1	Check Evidence of heat transfer fluid composition measurements/sampling performed during commissioning or purchase invoices	
3.1.3.2	Is there evidence of the use of frost/corrosion inhibitors in the heat transfer fluid that might affect the heat capacity of the fluid? If so, verify what measures have been adopted to ensure metering is appropriate to this.	
3.1.3.3	Where composition of heat transfer fluid may change over time, check for evidence of procedures to monitor and/or control the liquid being used or re-calibrate the meters where necessary	
3.1.3.4	If independent metering report available Review metering report and check against audit pack data	
3.1.3.5	Review error checking procedures and processes	
3.1.3.6	For Fully Accredited Schemes. Take set of monthly data reported to Ofgem and trace back through operator's own records to confirm that data originated from plant.	
3.1.3.7	For Fully Accredited Schemes. Check that RHI payments from Ofgem correspond to reported heat output in conjunction with appropriate tariffs for scheme.	
Notes		

3.1.4 Maintenance and Calibration

Discuss with site personnel measures that they have adopted to ensure that the installation has been, and continues to be suitably maintained. Check meters calibration procedure, schedule and certificates

Ref	Check	Comments
3.1.4.1	Check operator has a maintenance regime in place to ensure meters are routinely calibrated.	
Notes		

3.2 TECHNOLOGY SPECIFIC CHECKS

The following checks should be performed for each applicable technology type.

3.2.1 Biogas

Ref	Category	Check	Comments
3.2.1.1	Plant Overview	Check manufacturer's data sheet to confirm capacity of individual units and ensure that overall capacity is $\leq 199\text{kW}_{\text{th}}$	
3.2.1.2	Input Fuel	Verify that the procedures outlined within the Fuel Measurement and Sampling Questionnaire are being followed	

Notes

3.2.2 Biomass Fuel Input checks

Ref	Check	Comments
3.2.2.1	Where use of fossil fuels is identified, confirm that their use is limited to permitted ancillary purposes	
3.2.2.2	Check how the quantity of and energy content of the fuels used is recorded	
3.2.2.3	Check periodic data submitted to Ofgem for a given period and trace back through site's own records to confirm data originates from plant	
3.2.2.4	Verify methods used for determining the proportion of fossil fuel used for ancillary purposes relative to total energy input.	
3.2.2.5	For installations with an installed capacity $\geq 1\text{MW}_{\text{th}}$ Verify methods used for determining the level of fossil derived contamination in biomass	
3.2.2.6	For installations with and installed capacity $\leq 45\text{kW}_{\text{th}}$ confirm that fuel supply is "100% biomass by energy content" by viewing fuel supply contract or letter from supplier	
3.2.2.7	Verify that the procedures outlined within the Fuel Measurement and Sampling Questionnaire are being followed	

Notes

3.2.4 Biomethane

Ref	Category	Check	Comments
3.2.4.1	Plant Overview	Inspect the role of applicant in the injection of biomethane into the distribution network to confirm that they are the 'producer' as defined in legislation /guidance	
3.2.4.2	Plant Overview	Inspect meters / measurement devices and data calculated on IT system to confirm this matches data stated to Ofgem	
3.2.4.3	Plant Overview	Inspect meters / measurement devices and comparison to schematics provided. To confirm compliance with the following requirements: <ul style="list-style-type: none"> • Metering in place to measure energy content of gas entering the gas network • Metering in place to measure energy content of propane used to upgrade biogas (inc. measurement of propane CV) • Metering in place to record heat supplied to a biogas production plant/processes As per the fuel measurement processes agreement agreed between the participant and Ofgem	
3.2.4.4	Plant Overview	Review schematic to confirm process/technology utilised for biogas production is eligible and as stated in the application for registration	
3.2.4.5	Plant Overview	Review energy measurements provided to Ofgem for one reporting period and explore with site staff how figures were derived	
3.2.4.6	Input Fuel	For installations producing biomethane from AD Inspect fuel receipt records to confirm the fuel source is one of the following: <ul style="list-style-type: none"> -Solid biomass -Solid waste -Liquid waste 	
3.2.4.7	Input Fuel	For gasification/pyrolysis plant using feedstocks contaminated with fossil fuels Inspect fuel measurement and sampling <i>equipment</i> to confirm this allows for agreed FMS procedures to be followed.	
3.2.4.8	Input Fuel	For gasification/pyrolysis plant using feedstocks contaminated with fossil fuels Inspect fuel measurement and sampling <i>procedures</i> to confirm that these follow provisions agreed with Ofgem	
3.2.4.9	Maintenance and Calibration	Verify maintenance / calibration records to confirm that meters and measurement devices have been: <ul style="list-style-type: none"> -Calibrated -Maintained and periodically checked for errors -Continuously operating 	
Notes			

3.2.5 Combined Heat and Power

Ensure checks for corresponding fuel type are also completed:

- **Biogas** see section 3.2.1
- **Biomass** see section 3.2.2
- **Biomass (MSW)** see section 3.2.3

Ref	Category	Check	Comments
3.2.5.1	Plant Overview	Confirm source of energy is one of the following: geothermal, biogas, solid biomass or biomass contained within municipal waste	
3.2.5.2	Plant Overview	Inspect CHP unit heat exchangers to confirm thermal rating of each heat source (e.g. jacket oil cooler, exhaust heat exchanger).	
3.2.5.3	Plant Overview	Review commissioning documentation to confirm system commissioned as CHP on or after 15th July 2009	
Notes			

3.2.6 District Heating

Where metering does not account for heat distribution losses (i.e. metering at generator end of distribution network), operators will be expected to use Ofgem heat loss calculator tool to determine extent of heat loss.

Review heat loss calculator with applicant to confirm that it has been completed accurately. Note any potential discrepancies.

Notes

3.2.7 Geothermal

Ref	Category	Check	Comments
3.2.7.1	Plant Overview	Inspect geological report showing the area has a suitable hydrothermal or hot dry rock resource.	
3.2.7.2	Plant Overview	Verify documentation relating to depth of drilling conducted for any injection and extraction boreholes.	
Notes			

3.2.8 Heat Pumps

Ref	Category	Check	Comments
3.2.8.1	Plant Overview	Check that only heat sources for the heat pump are naturally occurring heat as specified in regulation 8	
3.2.8.2	Generating Plant Inspection	Check manufacturer's data sheet to confirm CoP at design conditions stated within application	
3.2.8.3	Generating Plant Inspection	For installation capacities of between 75kW_{th} and 125kW_{th} Check manufacturer's data sheet to confirm individual unit capacities at Design Conditions stated	
3.2.8.4	Generating Plant Inspection	For installation capacities of between 75kW_{th} and 125kW_{th} sum individual unit capacities at Design Conditions stated to confirm total capacity	
3.2.8.5	Plant Overview	Where heat pump is reversible check metering arrangement to confirm only heat energy is metered	
Notes			

4 Plant Walkdown

Instructions to Auditors

The following checks are completed by the auditor through a physical inspection of the installation during the audit visit.

Checks in Section 4.1 must be performed for all installations. Checks in Section 4.2 should only be performed for the applicable technology type (see Section 1.1)

4.1 ALL TECHNOLOGY CHECKS

4.1.1 Generating Plant Inspection

Perform inspection of heat generating plant. Focus on the following points.

Ref	Check	Comments
4.1.1.1	Inspect installation to confirm that number of plant items match those given in scheme description	
4.1.1.2	Check plant nameplates to corroborate rating. <u>Take Photographic Evidence</u>	
4.1.1.3	Where installation consists of multiple component plant. Verify that component plants are of the same make and model, or if not, the same technology	
4.1.1.4	Where applicant has claimed that plant has been removed, confirm plant is no longer present <u>Take Photographic Evidence</u>	
4.1.1.5	Where applicant has claimed that plant has been added, confirm presence of new plant. <u>Take Photographic Evidence. Cross check plant serial numbers</u>	
4.1.1.6	Confirm all generating plant connected to system as described on system schematic	
4.1.1.7	Confirm all generating plant referenced as per schematic	

Notes

4.1.2 Plant Overview

Perform walkdown of the distribution system connecting heat generating plant (eligible and ineligible) to heat users (eligible and ineligible)

Ref	Check	Comments
4.1.2.1	Confirm that capacity of generating plant is suitable for the identified heat loads	
4.1.2.2	Confirm that plant has been suitably installed and commissioned	
4.1.2.3	Inspect equipment to confirm installation has been suitably maintained	
4.1.2.4	Confirm plant items match technology type given in scheme description	
4.1.2.5	Confirm heat delivered only as liquid (e.g. water or heat transfer oil) or steam. Direct hot air heating is not eligible	
4.1.2.6	Confirm claimed eligible heat is used for an eligible purpose (i.e. space, water or process heating)	
4.1.2.7	Confirm that building(s) in which eligible heat uses occur meet the RHI definition of a building e.g. fully enclosed and permanent. Take photographs of relevant areas where this is not the case.	
4.1.2.8	Confirm all heat loads connected to system as described on system schematic	
4.1.2.9	Check Pipework connections between all plants and heat loads	
4.1.2.10	Confirm heat users referenced as per schematic	
4.1.2.11	Check for presence of heat rejection facility	
Notes		

4.1.3 Metering Inspection

Review installed meter instrumentation.

Ref	Check	Comments
4.1.3.1	Confirm meter readings are commensurate with data submitted to Ofgem	
4.1.3.2	Confirm all metering equipment installed as described on system schematic. Take photographic evidence of meter nameplates	
4.1.3.3	Confirm all generating plant referenced as per schematic	
4.1.3.4	Confirm location of metering components as per system schematic	
4.1.3.5	Verify meter unit serial numbers against documentation	
4.1.3.6	Check metering report against situation on site	
4.1.3.7	Check meters are capable of continuous operation and operating at the time of the visit	
4.1.3.8	Check for evidence of tampering or modification of the meter since installation or last calibration	
Notes		

4.2 TECHNOLOGY SPECIFIC CHECKS

4.2.1 Biogas

Ref	Category	Check	Comments
4.2.1.1	Generating Plant Inspection	Check nameplates of individual units and ensure that overall capacity is $\leq 199\text{kW}_{\text{th}}$	
4.2.1.2	Generating Plant Inspection	For Pyrolysis/Gasification plants check syngas cooling/cleaning equipment to confirm no heat is generated from solid biomass	
4.2.1.3	Generating Plant Inspection	For Anaerobic Digestion plants inspect plant to confirm technology definition is met (the bacterial fermentation of biomass in the absence of oxygen).	
4.2.1.4	Generating Plant Inspection	For Gasification or Pyrolysis Plants Verify unit operation to show absence of oxygen (pyrolysis) or substoichiometric conditions (gasification) present.	
4.2.1.5	Generating Plant Inspection	For Gasification or Pyrolysis Plants Verify production of syngas from the unit	
4.2.1.6	Generating Plant Inspection	For Gasification or Pyrolysis Plants Verify production of char as an indicator of incomplete combustion	
4.2.1.7	Generating Plant Inspection	Inspect biogas source to confirm it is not from a landfill	
4.2.1.8	Generating Plant Inspection	Confirm heat generating plant is specifically configured to operate on biogas and has no connection to gas mains	
4.2.1.9	Plant Overview	Verify that the procedures outlined within the FMS Questionnaire are being followed	
Notes			

4.2.2 Biomass

Ref	Category	Check	Comments
4.2.2.1	Plant Overview	Confirm plant is utilising <i>solid</i> biomass as a fuel	
4.2.2.2	Generating Plant Inspection	Confirm boiler installed matches that identified in the scheme description	
4.2.2.3	Generating Plant Inspection	Check fuel feed system for capability to use fuels other than those declared in scheme description	
4.2.2.5	Generating Plant Inspection	Check for indications of the use of alternative fuels that have not previously been declared	
4.2.2.6	Generating Plant Inspection	Check that use of fuels mirrors that given in the FMS questionnaire	
4.2.2.7	Plant Overview	Check fuel processing facilities to confirm no ability for fossil-derived material to be added to biomass	
4.2.2.8	Input Fuel	Verify that the procedures outlined within the FMS Questionnaire are being followed	
Notes			

4.2.3 Biomass within Municipal Solid Waste

Ref	Category	Check	Comments
4.2.3.1	Generating Plant Inspection	Check that use of fuels mirrors that given in the FMS questionnaire	
4.2.3.2	Plant Overview	Check fuel processing facilities to confirm no ability for fossil-derived material to be added to biomass	
4.2.3.3	Input Fuel	Verify that the procedures outlined within the FMS Questionnaire are being followed	
Notes			

4.2.4 Biomethane

Ref	Category	Check	Comments
4.2.4.1	Plant Overview	<p>For installations producing biomethane from AD</p> <p>Inspect facility including storage / delivery areas to confirm the fuel source is one of the following:</p> <ul style="list-style-type: none"> -Solid biomass -Solid waste -Liquid waste -Not liquid waste 	
4.2.4.2	Plant Overview	Confirm feedstock and process / technology utilised for biogas production is eligible and as stated in the application for registration.	
4.2.4.3	Plant Overview	<p>Inspect meters / measurement devices and confirm compliance with the following requirements:</p> <ul style="list-style-type: none"> • Metering in place to measure energy content of gas entering the gas network • Metering in place to measure energy content of propane used to upgrade biogas (inc. measurement of propane CV) • Metering in place to record heat supplied to a biogas production plant/processes <p>As per the fuel measurement processes agreement agreed between the participant and Ofgem</p>	
4.2.4.4	Metering Inspection	Inspect meters and measurement devices to confirm that they are continuously operating	
Notes			

4.2.5 CHP

NB: Auditor should ensure that they also complete checks for corresponding fuel type

Ref	Category	Check	Comments
4.2.5.1	Plant Overview	Confirm source of energy is one of the following: geothermal, biogas, solid biomass or biomass contained within municipal waste	
4.2.5.2	Generating Plant Inspection	Inspect CHP unit heat exchangers to confirm these match capacities discovered during desk-based investigation (see Section 3.2.5)	
Notes			

4.2.6 Heat Pump

Ref	Category	Check	Comments
4.2.6.1	Generating Plant Inspection	Check heat pump nameplate to confirm it matches with manufacturers data identifying CoP	
4.2.6.2	Plant Overview	Where technically feasible, inspect ground loop / water loop or water extraction and rejection points and consider whether there is scope for any waste heat or effluent produced to come into contact with the heat pump installation.	
4.2.6.3	Plant Overview	For water-source HPs confirm water source is either surface water or ground water	
4.2.6.4	Generating Plant Inspection	For installation capacities of between 75kW_{th} and 125kW_{th} check heat pump nameplates confirm individual unit capacities and total capacity	
4.2.6.5	Generating Plant Inspection	For multiple heat pump units check that all units are interconnected	
4.2.6.6	Plant Overview	For multiple heat pump units check borehole manifold to confirm all units share the same source	
4.2.6.7	Plant Overview	For multiple heat pump units check units all serve the same heating system	
Notes			

4.2.7 Solar

Ref	Category	Check	Comments
4.2.7.1	Plant Overview	Inspect panels to confirm they use either liquid-filled flat plate or evacuated tube collectors	
4.2.7.2	Plant Overview	Where hybrid PV/solar thermal panels Check to confirm thermal collector is either liquid-filled flat plate or evacuated tube type	
Notes			

5 Audit visit close-out checklist

To be completed by Auditor prior to completing audit visit

	Check	Completed
1	Desk-based investigation generic checks completed (Section 3.1)	✓/x
2	Desk-based Technology specific checks completed for all relevant technology types (Section 3.2)	
3	Walkdown generic checks completed (Section 4.1)	
4	Walkdown Technology-specific checks completed for all relevant technology types (Section 4.2)	
5	Specific concerns raised by Ofgem have been addressed in investigations (See Section 1.2)	
6	<p>Auditor has all photographic evidence required. Should include:</p> <ul style="list-style-type: none"> • Relevant areas where buildings do not meet RHI definition (i.e. fully enclosed and permanent) • Nameplates of heat generating plant • Nameplates of metering equipment • Any potential non-compliances that might need to be communicated to Ofgem 	