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Non-Domestic Renewable Heat Incentive

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- Why incentivise renewable heat?
- The UK experience of RHI
- The complexity conundrum
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What is the RHI?

- A world-first financial incentive to promote the generation of renewable heat
- £860m Scheme (first four years)
- Launched in 2011
- Funded through taxation, not a levy
- Payments made quarterly over 20 year period on basis of metered heat generation (p/kWh) (Non-domestic)
- Payments made quarterly over 7 years (Domestic)
- 2013: domestics launched
- Estimated 1m participants by 2020 (original estimate…)

Why do we need it?

47% of UK energy use is for heating and the UK spends around £32bn on heat across our economy

Around 1/3 of UK's carbon emissions come from energy used to produce heat

Under EU Renewable Energy Directive 2009 we have a binding commitment to increase renewable energy use to 15% by 2020

Contribute to 2020 targets – 12% of total heat demand in 2020 to come from renewables

Incentivise roll out of renewable heat systems

Prepare for mass rollout in 2020s

Build sustainable supply chains	Improve performance	Reduce costs	Reduce barriers to uptake

Ofgem administers a number of environmental schemes

- Energy Companies Obligation (ECO)
- Domestic Renewable Heat Incentive (RHI)
- Non-Domestic Renewable Heat Incentive (RHI)
- Climate Change Levy (CCL) exemption
- Feed-in-Tariff (FIT) scheme
- Renewable Energy Guarantees of Origin (REGO)
- Renewables Obligation (RO)
- Non Fossil Fuel Obligation (NFFO) / Scottish Renewable Obligation (SRO)
- Electricity rebate programmes

Ofgem has a restricted role in RHI

DECC

- Develop overarching policy framework and supporting legislation
- Set tariffs for different technologies
- Specify detailed eligibility criteria and scheme rules in RHI Regulations

Ofgem

- Formally administer the scheme on behalf of Government and in line with the RHI Regulations
- Accredit installations to the scheme
- Provide guidance and support to participants
- Make payments to participants
- Ensure compliance with scheme rules

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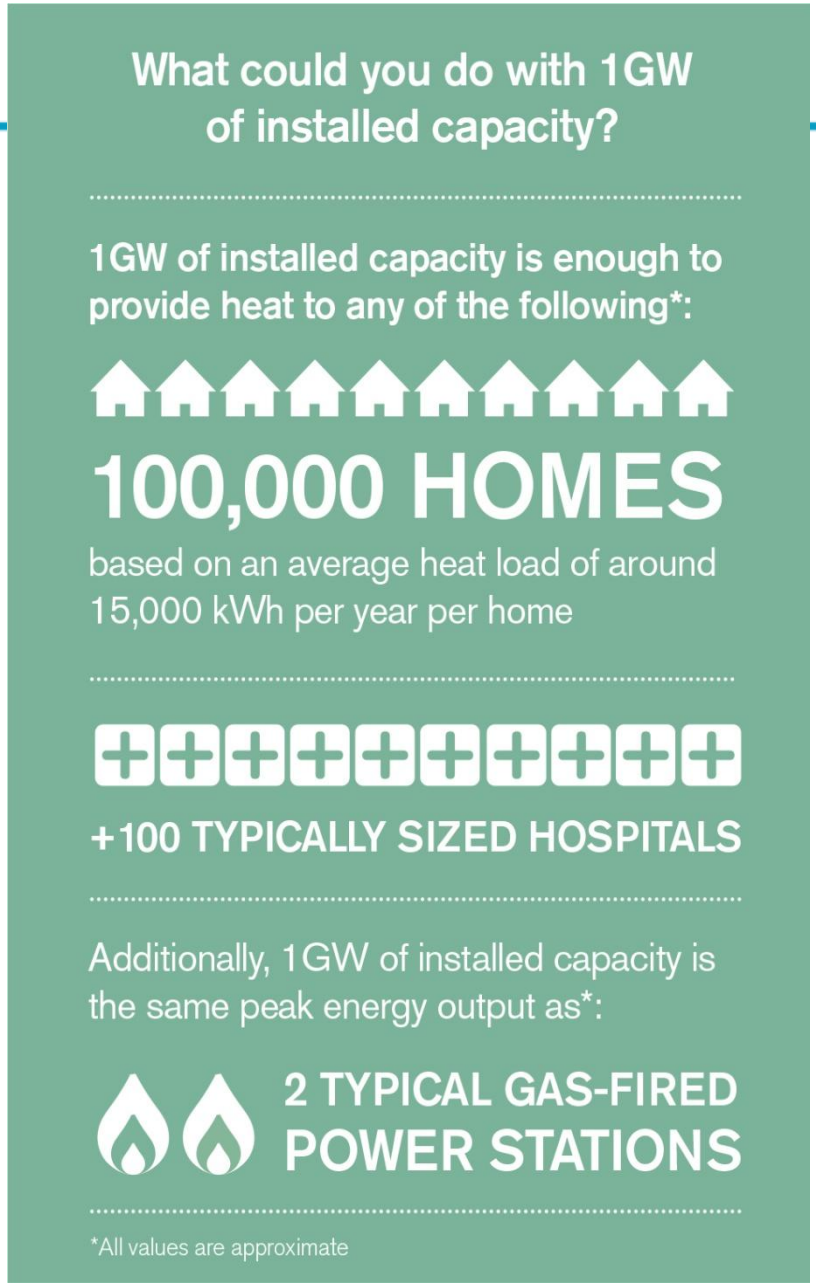
Celebrating 1 GW

- In October we reached a major milestone
- 1 GW of renewable capacity had been installed under the non-domestic RHI
- By the end of November, 1926 GW hours of renewable heat had been generated



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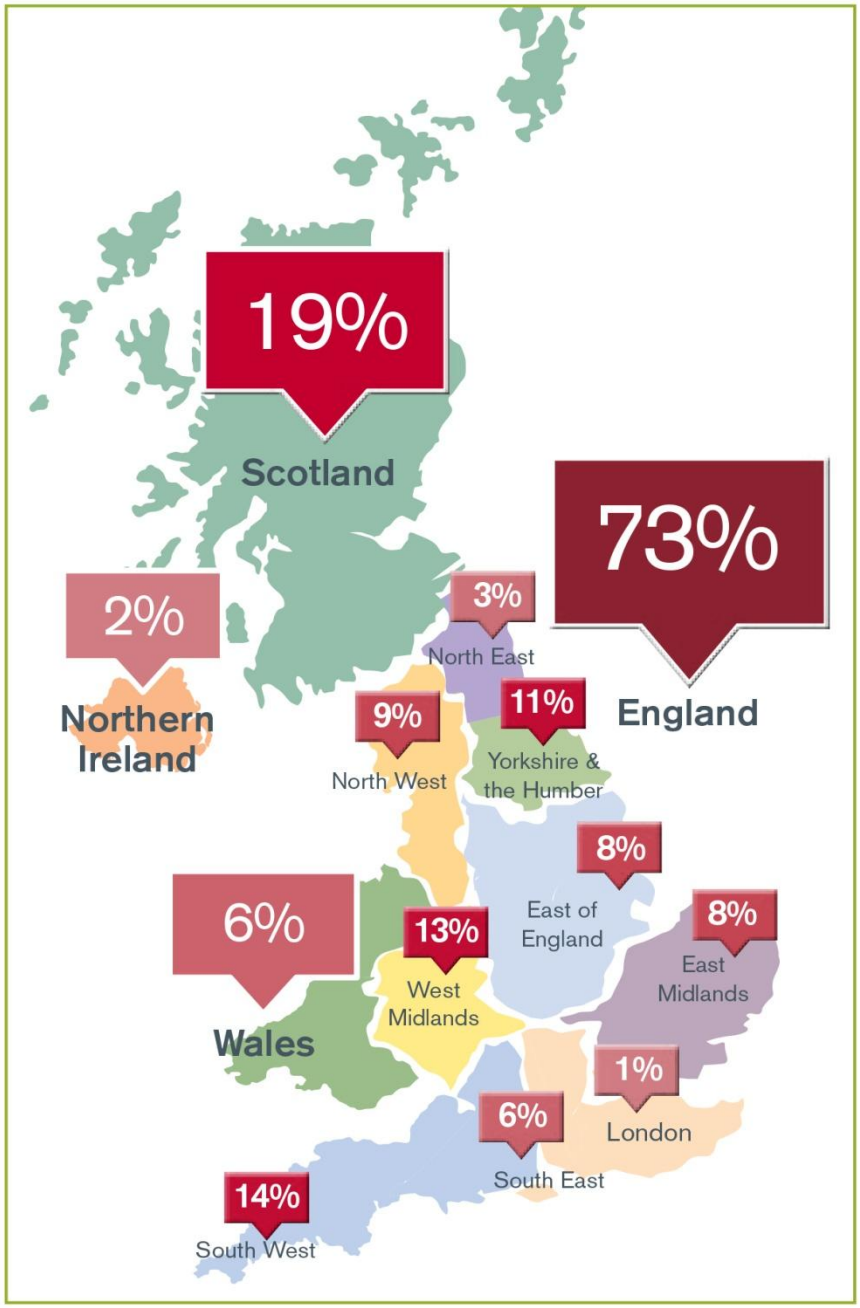
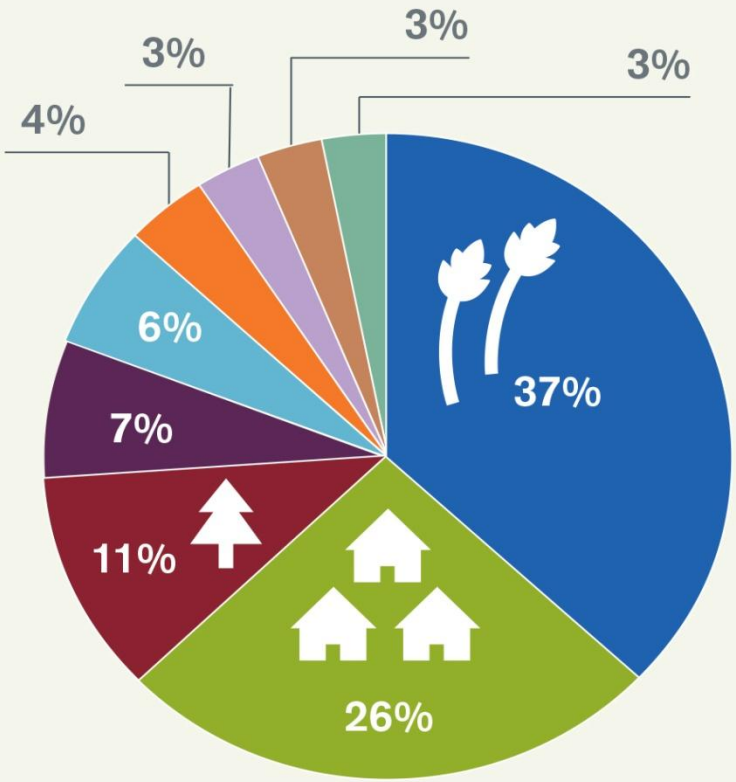
Scotland and the green fringes of the south west and west midlands have seen greater uptake of the RHI



Some sectors have embraced RHI



Breakdown of accredited installed capacity by industrial sectors

- Crop and animal production and related service activities
- Accommodation
- Manufacture of wood and of products of wood and cork
- Education
- Retail trade
- Manufacture of food products
- Forestry and logging
- Sport activities
- Business support activities

Figure 3: Breakdown of accredited installed capacity by industrial sectors

Some technologies are more popular

Technology	% of accredited installed capacity
Solid biomass	98.7%
Ground source heat pumps	0.8%
Solar thermal	0.2%
Water source heat pumps	0.2%
Biogas	0.1%
Biomethane	3 registered producers (5 more in process of registration)

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Tariffs in pence per kW hour

Technology	2013 Tier 1	2013 Tier 2	Today Tier 1	Today Tier 2	Comment
Biomass below 200kW	8.3	2.1	6.8	1.8	Multiple degressions
Biomass 200 -1000kW	5.1	2.1	5.1	2.2	One degression
Biomass over 1MW	1		2		Reversal of state aid ruling
Biomass CHP	Not available		8.7	2.6	More encouragement for CHP
Water and Ground Source Heat Pumps	4.7 (small)	3.4 (large)	8.7	2.6	Comprehensive re-alignment of HP tariffs
Air Source Heat Pumps	Not available		2.5		Introduced last year
Solar thermal	8.9		10		
Biomethane	7.1		6.8		One degression (so far)

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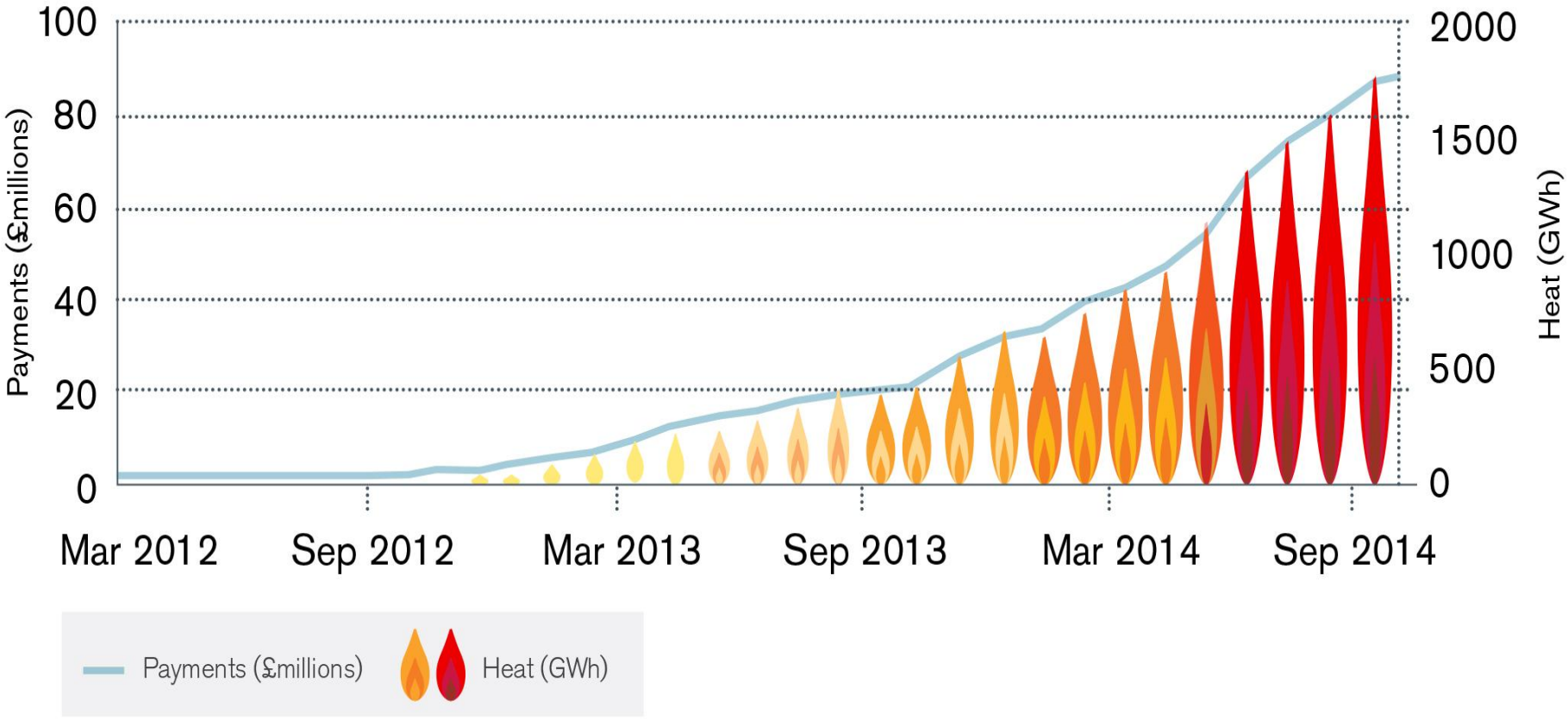
Over £90m paid to generators to date

Figure 5: Cumulative payments made to RHI participants to date against eligible heat generated



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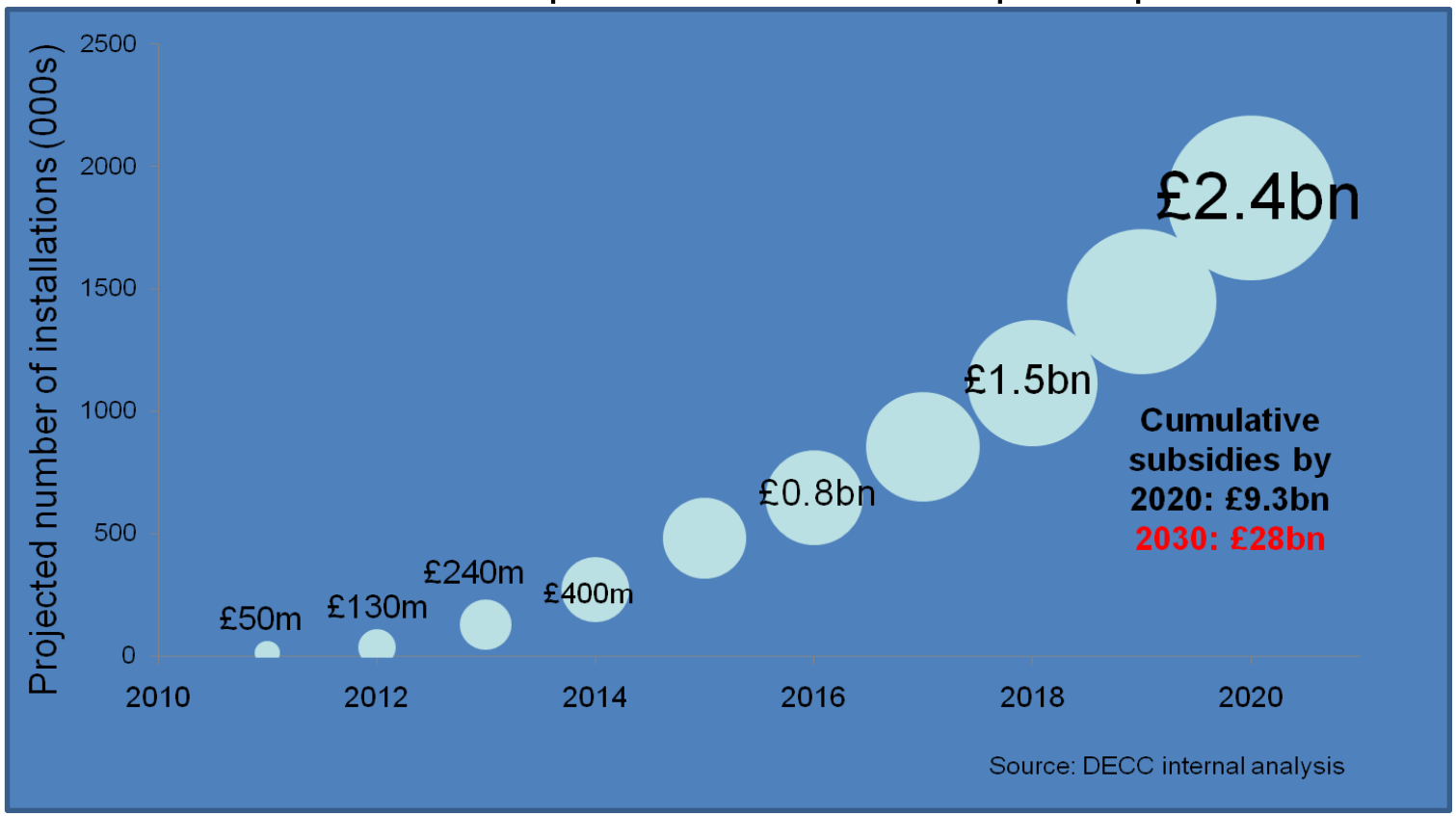
Somewhat behind original projections...

How much will be paid in subsidies to participants?



Achieving objectives

- Have we achieved the level of heat generation anticipated?
- Are we building towards mass roll out?

- Factors which have impacted:
  - Take up has been slower than anticipated
  - Some technologies have been disproportionately popular so mass roll out of others may be unlikely
  - Accreditation takes longer than predicted
  - Six sets of regulations in the last 3 ½ years
  - Industry competence is not a requirement above 45kW

Take up

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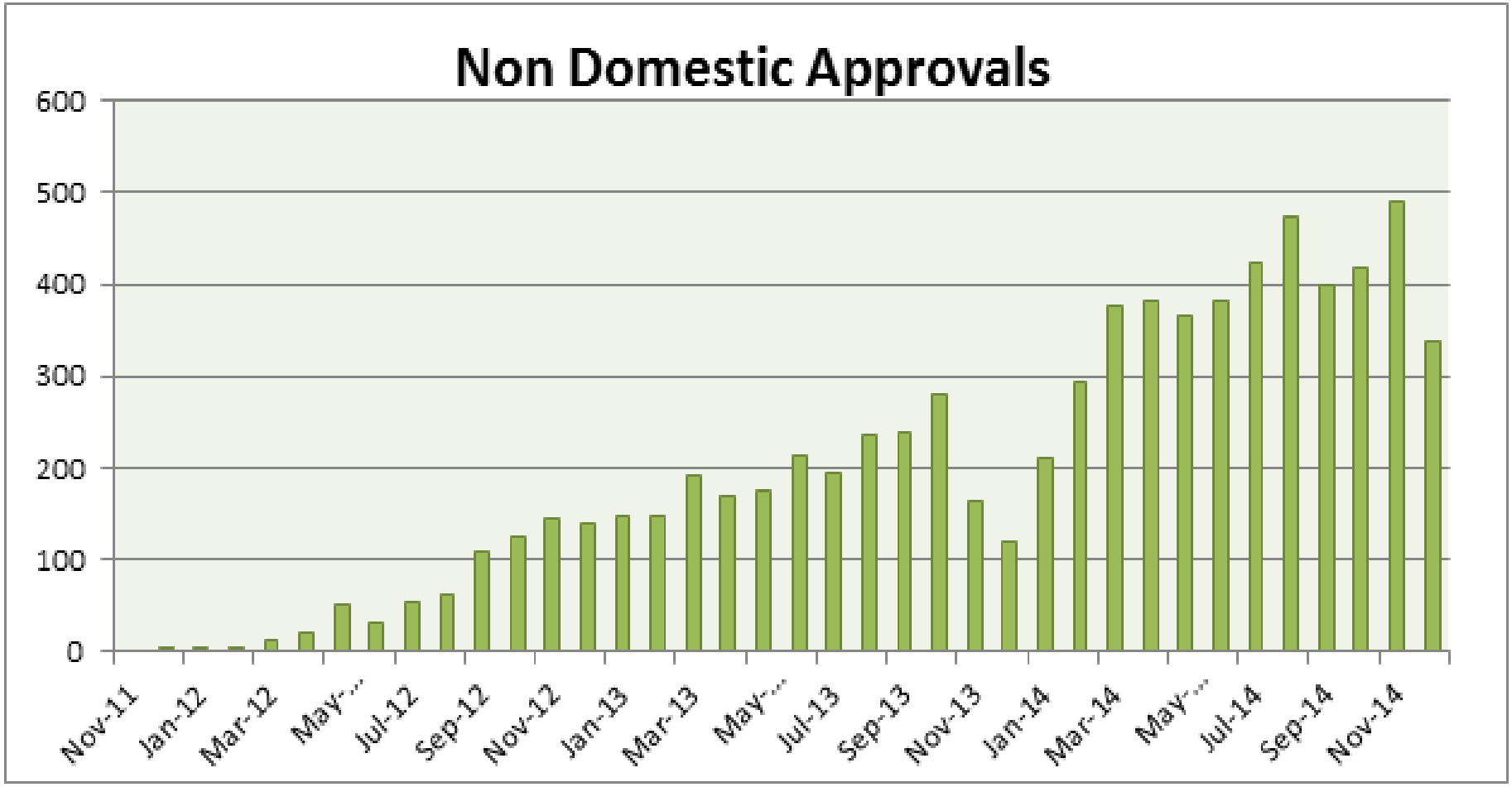
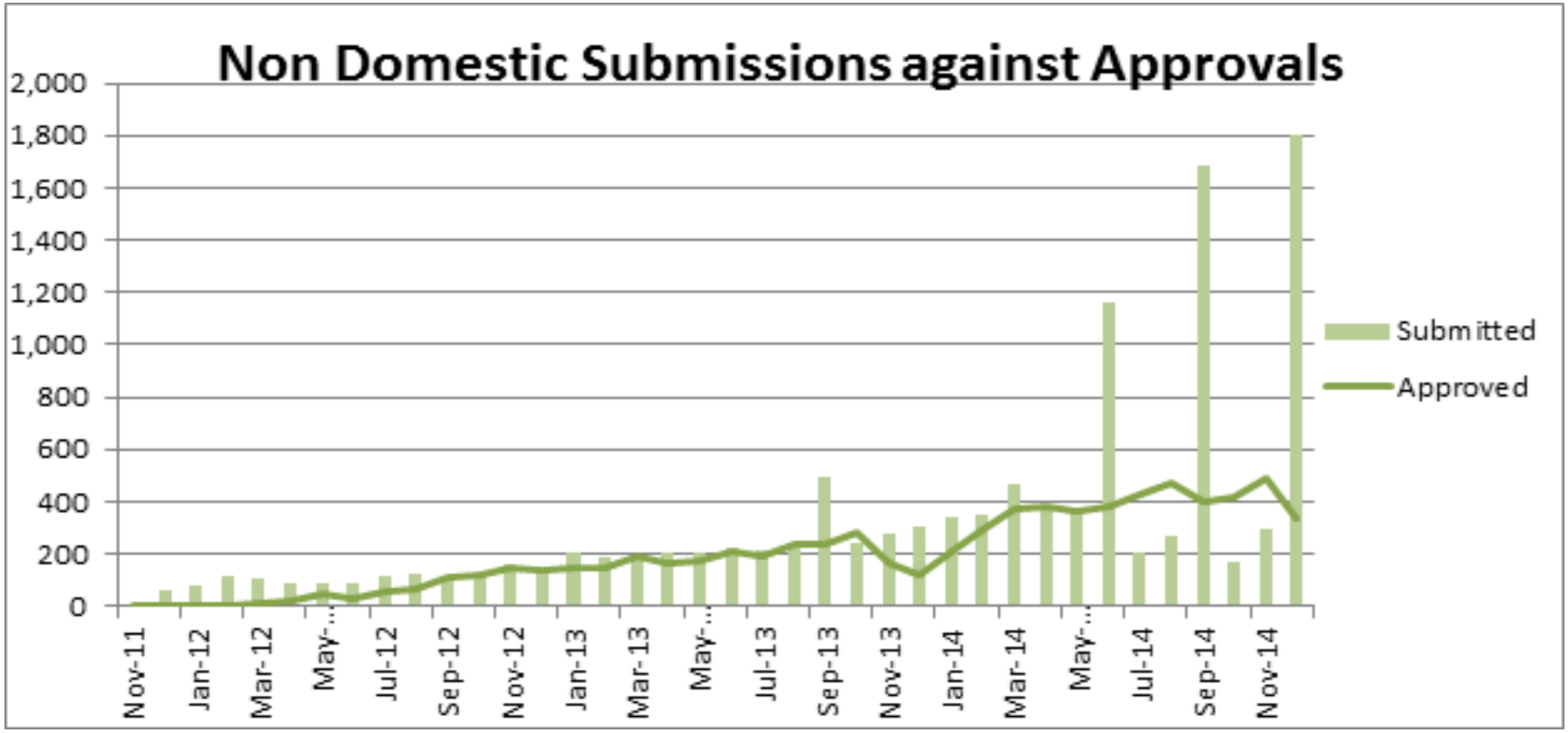
Developing the Regulations



The effect of rate reductions



Accreditation

- Accreditations have taken longer than anticipated because:
  - Many clients are unfamiliar with their heating systems
  - The industry is relatively young and inexperienced in renewable installation
  - As demand for installations grows – new firms enter the market
  - The scheme is complex
  - Degression has produced significant pressure to install to deadlines
  - Installers preoccupied with new installations can be disinclined to spend time helping applicants through the process
  - This has raised the cost of administration of the RHI

Between announcement and launch

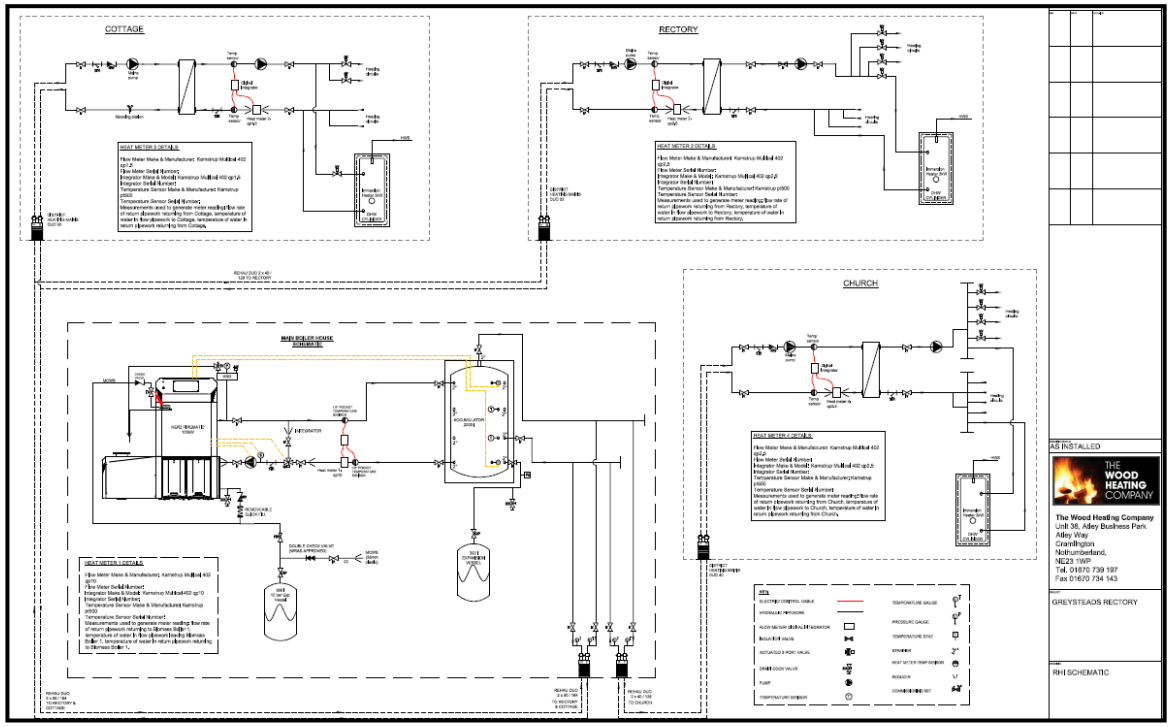
- The RHI was announced in June 2009
- The scheme was launched in November 2011
- All renewable heat technologies installed between these dates were eligible provided they met the eligibility criteria
- But the eligibility criteria were not published until 2011
- Because the scheme was announced two years before the detailed regulations were available, many installations took place in ignorance of the precise requirements
- This meant a great deal more effort was required to accredit them

Scheme complexity

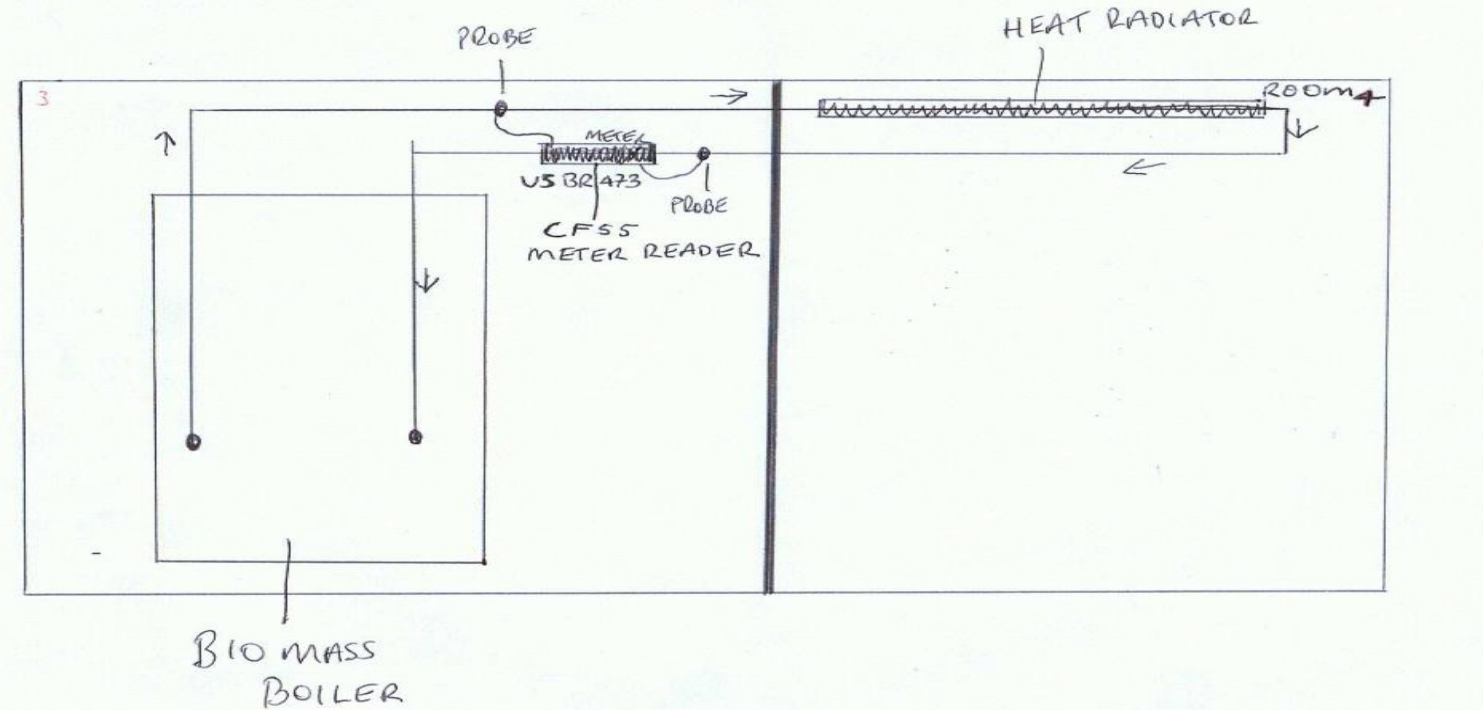
- There are many eligibility requirements
- Heat generation:
  - Installed/first commissioned after 15 July 2009
  - Equipment new at time of installation
  - Grants not received for purchase/installation of equipment
  - Medium of heat transfer must be liquid or steam
- Heat use:
  - Space heating, hot water, carrying out a process
  - In a building
  - Or commercial drying or cleaning outside a building
  - No single domestics on non-domestic scheme
- Also ongoing requirements relating to provision of periodic data, compliance with site inspections etc.

Schematics

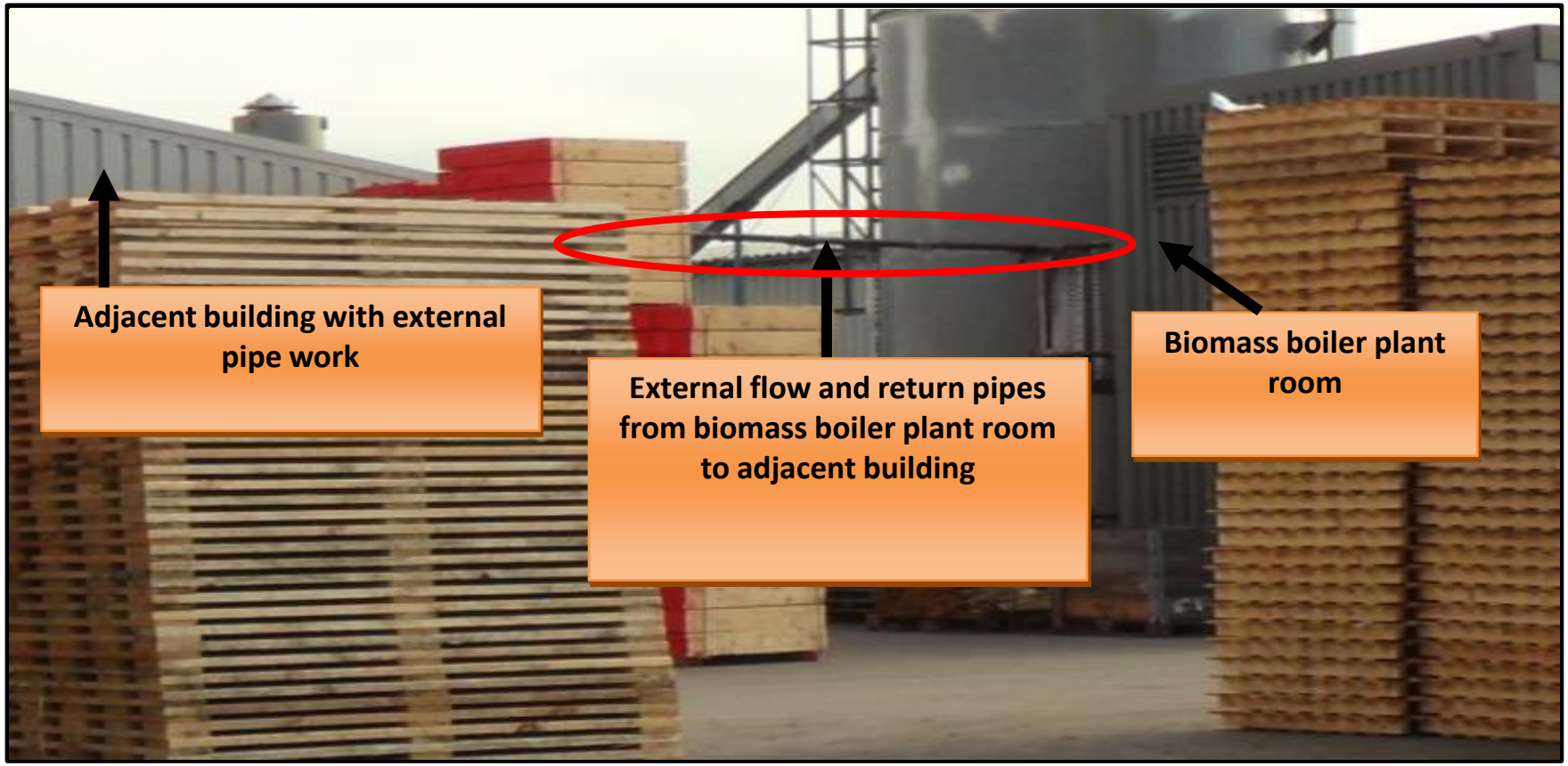
Many systems include auxiliary ‘decentralised’ heating plant and a combination of ‘eligible’ and ‘ineligible’ heat uses
Many schematics were produced long before the RHI was thought of and not amended since construction



Schematics
do they show the full installation?



Real life can be different



Beware of unintended consequences

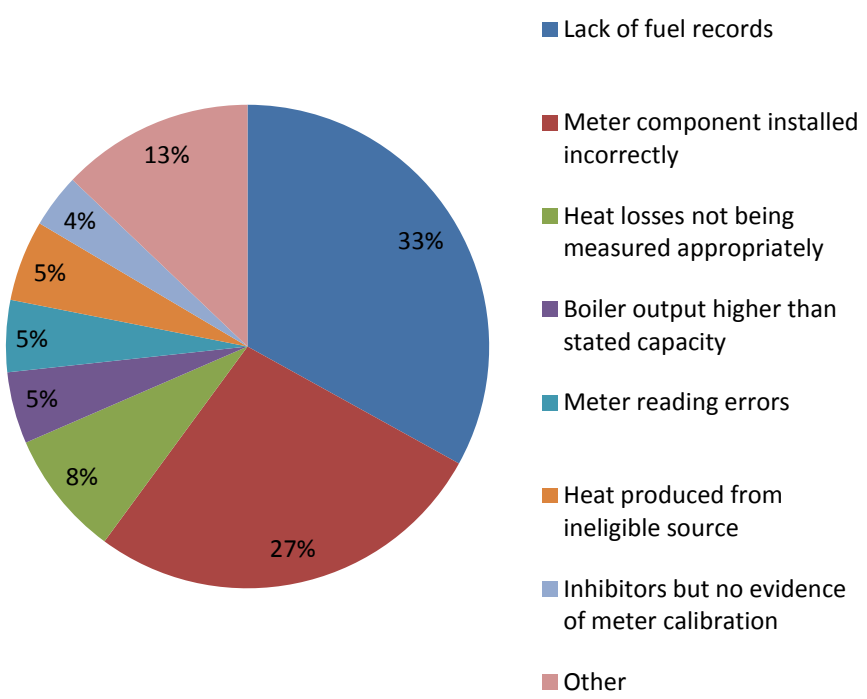
Metering changes implemented to simplify and cut costs

1. Redundant meters no longer required.
2. Heat loss from external pipework will be disregarded in certain circumstances.
3. Heat loss calculations (HLCs) will be accepted in place of additional meters in certain circumstances.

Non compliant installations

- Significant non compliance rate across all installations
- Most frequently related to lack of fuel records and metering issues
- Fewer metering issues for installations commissioned post RHI go-live indicating that metering competence is improving
- Implementing actions to raise awareness and improve industry competence

Figure 1: Frequency of non compliances



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Case study - church

A challenge facing Ofgem is the technical understanding of participants. In many cases participants have very little understanding of renewable heating technologies, heat metering or their existing heating system

Temperature sensor connection

Heat meter calculator

Temperature sensor connection point

Flow meter

Heat meter calculator

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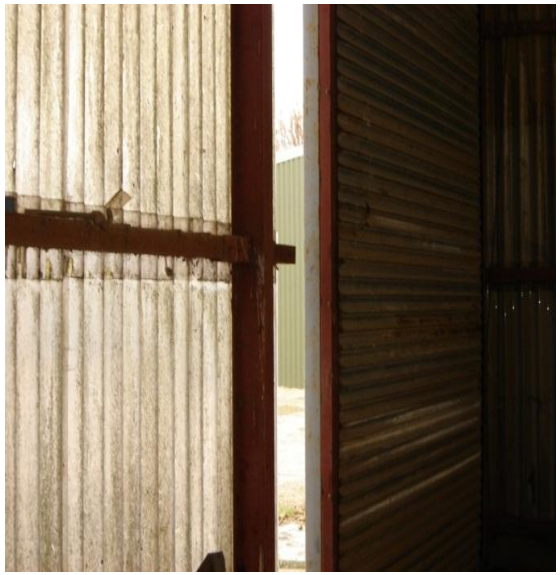
Case study
wholly enclosed buildings

Potato grading shed being heated

Gap in wall
1.5m high



Undisclosed fan coil units

Bio fuels sustainability

- Due to come into force this Autumn for both domestic and non-domestic RHI
- Applies to all new and existing participants generating heat from biomass or biogas and to those producing biomethane for injection
- Will only apply from the date the regulations come into force
- Fuel being sustainable is based on lifecycle greenhouse gas (GHG) emissions and land criteria
- Most participants will have to buy their fuel from a supplier on a Government approved list
- Will require participants to burn only the fuels on their emissions cert, and to ensure that it is no wetter than allowed

Keeping fuels dry

Conclusions

- Renewable heat can become popular, even without much marketing
- Guard against complexity – It increases costs and difficulty for applicants
- Make sure the requirements are proportionate to the size and scale of the technologies
- Make sure the industry knows how to install compliant systems – competence affects client satisfaction and scheme costs
- Think about the customer journey at the outset – domestic RHI has done this very effectively
- Energy efficiency is key to scheme reputation

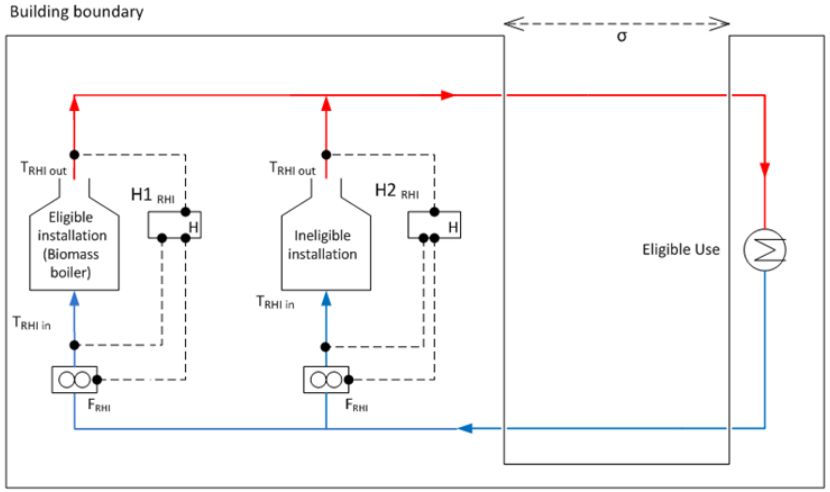
Goodbye from me

Edmund Ward, head of technical non-domestic RHI, will be the main point of contact from now on edmund.ward@ofgem.gov.uk

Where it can get complicated

- Some property types thought of as domestic may not have a domestic EPC

Multiple



Payment formula:

Tariff x Eligible use x Eligible generation / Total generation

= Tariff x (H1 + H2 – HLC) x (H1/(H1+H2))

- This has 4 quantities.
- The external pipework has losses that must be **deducted** so it counts as an ineligible use.
- They have measured eligible generation, ineligible generation and ineligible use.
- The ineligible heat use doesn't need a meter since it is 'measured' with a HLC.

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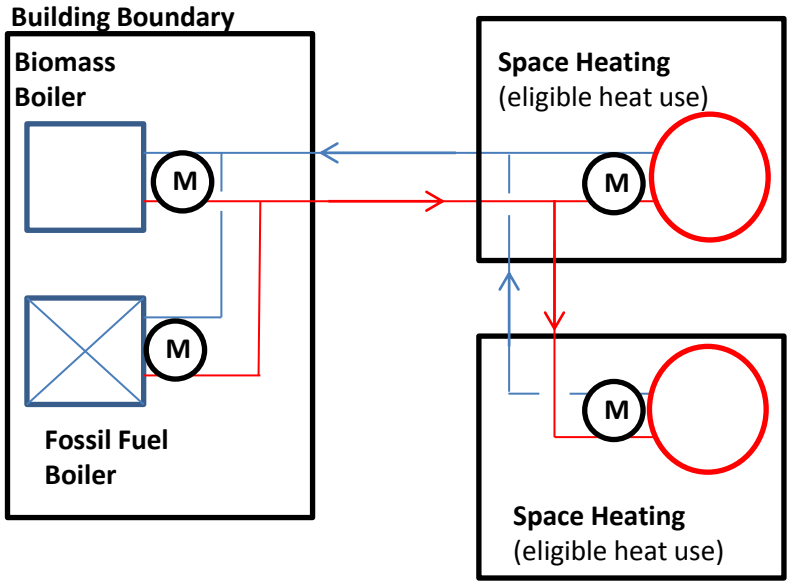
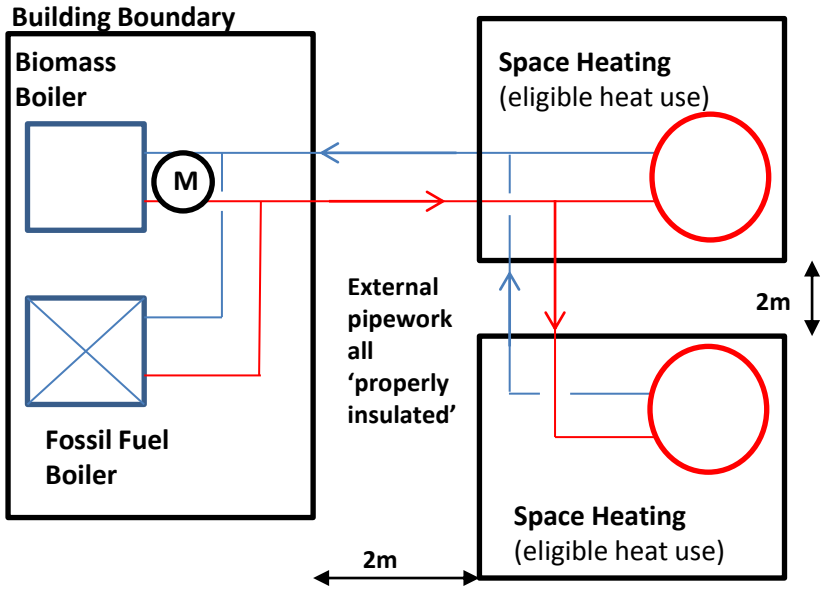
Disregarding heat loss from properly insulated external pipework The existing regulations require any heat loss from external pipework to be metered and subtracted from the RHI payment.

As shown in this example, if all external pipework is 'properly insulated' and no individual length of external pipework >10m the associated heat loss can be disregarded.

Now: 4 meters required



24th Sept: 1 meter required



Heat loss can be disregarded in certain circumstances

An applicant will be able to disregard heat loss from external pipework where:

A. The external pipework is 'properly insulated'; AND
(Definition of 'properly insulated': pipework is insulated to the heat loss rates as listed in BS5422 & are calculated in accordance with BS EN ISO 12241)

B. One of the following apply:

(i) All individual lengths of external 'properly insulated' pipework are 10m or less in length; or

(ii) Where there are one or more individual pipe lengths > 10m, the average annual heat loss from all such piping is <3% of the projected annual heat output of the plant;

If (ii) applies evidence in the form of a heat loss calculation would have to be submitted as evidence during the application process.

Calculations can sometimes be accepted in place of additional meters

- HLCs will be accepted in place of meters in certain circumstances where:
  - One or more individual lengths of external pipework are ‘properly insulated’ but are > 10m and the average annual heat loss from all such piping is > 3% of the projected annual heat output of the plant;
  - Due to physical constraints, reasons of safety or environmental conditions it is not practical to install a meter;
  - A heat meter would provide less accurate results than a heat loss calculation;
  - The cost of installing a heat meter would be disproportionate (> 5%) when compared to the total installation cost of the plant;
  - Ofgem’s administrative costs (£100) for processing metering data from a heat meter would be greater than the value of the heat losses that payments would be being made on

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Regulatory Changes

- September 2013 changes included **air quality requirements** and changes to **metering arrangements**, including heat loss calculations

- Completing a **Heat Loss Assessment** requires the applicant to provide detailed information relating to pipe lengths and insulation properties.

Question 1: 'Properly Insulated' External pipework *(Refer to IT Question HH122)*

If the installation has external pipework it must be 'properly insulated' (ie meets British Standards BS 5422 & BS EN ISO 12241) for you to disregard any associated heat loss. To find out if your pipework complies with these standards please insert answers to the questions below. Note, any grey cells are not required and should be omitted.

If you have pipework with different levels of insulation, different diameters, or a mixture of buried and above-ground lengths, please complete Question 1 for each individual pipe length and then copy each set of answers to the 'Additional Pipework Information' worksheet. Then follow the relevant option below:

1) If all of the pipework is 'properly insulated' and all individual lengths <10 m, you should complete only Question 2(A)(a).
2) If all of the pipework is 'properly insulated' and any individual lengths >10 m, you should complete Question 2(A) and any further required sections.
3) If all of the pipework is 'non properly insulated' you should complete Question 3 (A) (b,c or d).
4) If you have a combination of 'properly insulated' and 'non properly insulated' pipework you should complete Questions 2(A) and 3(A).

a	Is pipe length above ground or buried? *(NB where a single pipe length is both buried and above ground please select buried from the drop-down menu).*	Above Ground	
b	Pipe material:	Metal	
c	Average temperature of fluid running through the pipes (deg C):	≤ 95ºC	
d	Pipe diameter (mm), excluding any insulation:	56	This is the diameter of the pipe carrying the liquid, not the outside diameter of the insulation.
e	Is the pipe diameter entered above the nominal or outside measurement?	Nominal	'nominal' = diameter on the inside of the pipe 'outside' = diameter on the outside of the pipe
f	Use the manufacturer heat loss declaration instead of specifying insulation properties?	No	To use this option, you should have appropriate reference data available, such as the technical data sheet for your insulated pipework.
g	The heat loss rate for the pipework (W/m) defined in the manufacturer declaration:		Must be in units of W/m length of pipe.
h	Insulation thickness (mm):	60	From the outside of the pipe carrying the liquid, to the edge of the insulated pipe
i	Thermal conductivity of the insulation (W/m per deg K):	0.04	Must be in units of W/m K ['Watt per metre per Kelvin']
j	What is the surface finish of the insulation?	High emissivity	A polished, shiny or white surface has low emissivity; otherwise select high emissivity.
k	Using the above evidence that you have provided the adjacent cell should provide you with an answer as to whether Ofgem will/ won't accept your insulation as being 'properly insulated'.	PASS Select from drop down menu.	**Please now copy the answers to Questions 1(a-k) to the 'Additional Pipework Information' worksheet and complete this step for all pipe lengths.**

Distribution System Details

Pipe Sections	Units	Total		
Section Name	-	-	*Example*	Length Y
Flow or Return?	-	-	*Flow*	Flow
Length	m	45	*1000*	45
Pre-insulated or Buried Pipework?	-	-	*No*	No
Not Pre-insulated				
Nominal Diameter	mm	-	*40*	40
Outside Diameter	mm	-	-	-
Insulation Type	-	-	*85% Magnesia*	Calcium Silicate
Insulation Thickness	mm	-	*25*	25
User defined insulation thickness	mm	-	-	-
Surface Emissivity	-	-	*Medium*	High
External Condition	-	-	*Exposed*	Sheltered
No. Valves	-	0	*1*	0
Valves Insulated?	-	-	*No*	-
No. Flanges	-	1	*1*	1
Flanges Insulated?	-	-	*No*	Yes
Pre-insulated or Buried				
Ext. Heat Loss Rate	W/mK	-	-	-
Based on *ground* or *air temperature*?			-	-

Fluid Temperature

Month	Units	Total		
January	ºC	-	*80*	70
February	ºC	-	*80*	70
March	ºC	-	*80*	70
April	ºC	-	*80*	70
May	ºC	-	*80*	70
June	ºC	-	*80*	70
July	ºC	-	*80*	70
August	ºC	-	*80*	70
September	ºC	-	*80*	70
October	ºC	-	*80*	70
November	ºC	-	*80*	70
December	ºC	-	*80*	70

Grants

- EU has strict regulations on state aids
- UK has implemented this by saying that you must not have received a grant from public funds for a plant receiving the RHI
- This has caused some difficulties and a change has been made
- There will no longer be a restriction on who can pay back their grant to become eligible – before it was only for those commissioned between 15th July 2009 and 28th November 2011
- Grant can be repaid by deducting from payments every quarter in certain scenarios

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Case study - wholly enclosed buildings

Roller shutter door

Plastic drapes to minimise heat loss

Cases of good and bad practice observed. Similar installation audited on the same day for a warehouse application had a motion sensor fitted.

Should doors that are open most of the time but can be closed be allowed under the RHI?