



Department
of Energy &
Climate Change

Domestic Renewable Heat Incentive

The first step to transforming the way we heat our homes

12th July 2013

Department of Energy and Climate Change
3 Whitehall Place
London
SW1A 2AW

Telephone: 0300 068 4000
Website: www.gov.uk/decc

© Crown copyright 2013

Copyright in the typographical arrangement and design rests with the Crown.

This publication (excluding logos) may be re-used free of charge in any format or medium provided that it is re-used accurately and not used in a misleading context. The material must be acknowledged as crown copyright and the title of the publication specified.

This document can also be found on DECC's website

Published by the Department of Energy and Climate Change.

Ministerial Foreword

Today most buildings in the UK burn fossil fuels for space and water heating. By 2030, we know that we may need up to 8.6 million building-level low carbon heating systems taking the place of our fossil fuel boilers. This scale of challenge demands a new approach, and the Renewable Heat Incentive (RHI) is the first of its kind in the world. I am proud that the Coalition is breaking new ground globally in this field.



The innovative nature of the domestic RHI means that it has been a challenging and time-intensive policy to develop. We have carefully considered the huge amount of valuable evidence we have received from stakeholders, and listened to the wide range of views expressed through the consultation process. Given the current economic climate and the need to deliver value for money through Government expenditure, it was particularly important for us to get it right. We have sought to develop a scheme that is sustainable and delivers renewable heat in the most cost-effective way, learning from past experience.

Building on the success of the Renewable Heat Premium Payment Scheme, and the non-domestic RHI, I am now confident that we have a domestic RHI policy that will drive further demand for renewable heat. The uptake of microgeneration technologies under the Feed-In Tariffs scheme has shown that renewable technologies can move from niche to mass market in just a few years, and with the support of the domestic RHI, I hope that renewable heating technologies will see such success.

Renewable energy and energy efficiency go hand in hand, which is why it is so important that the RHI works alongside the Green Deal. Renewable heating technologies work best in an energy efficient home, and reducing the size of the heating demand from each house means we can support more households through the RHI. Together, the RHI and Green Deal should offer those off the gas grid in particular a way to a warmer, cheaper, lower carbon home.

A handwritten signature in black ink, appearing to read 'Greg Barker'. The signature is stylized and fluid, with a long horizontal stroke at the end.

Greg Barker
Minister of State, Department of Energy and Climate Change

Contents

Ministerial Foreword	3
Executive Summary	7
Chapter 1: Introduction	9
A scheme targeted at off-gas grid.....	9
Chapter 2: Scheme overview	11
How the scheme works	11
Who is eligible?	11
Owner-occupier	12
Private landlord	12
Registered Social Housing Providers	12
Self-builder	12
Third party owner of the heating system.....	12
Legacy installations	13
Ineligible applicants	13
Renewable heat technologies.....	13
Eligible technologies.....	13
Microgeneration Certification Scheme	14
Eligible products list.....	14
Other eligibility requirements	15
Energy efficiency	15
Being ‘meter-ready’	15
How the payments work	16
Metering for payment.....	17
Receiving payments	17

Financing a renewable heating system	18
Maintaining a renewable heating system	18
Chapter 3: The technologies	19
Heat pumps	19
What is a heat pump?	19
Tariffs and payment	19
Minimum efficiency	20
Metering and Monitoring Service Packages	20
Backup, supplementary or hybrid heating systems	21
Biomass heating systems	21
What is a biomass heating system?	21
Tariffs and payment	22
Metering and Monitoring Service Packages	22
Back-up, supplementary and hybrid heating systems	22
Other requirements	23
Solar thermal	24
What is a solar thermal system?	24
Tariffs and payment	25
Back up and supplementary heating systems	25
Chapter 4: Implementation of the scheme.....	26
How to apply	26
When legacy applicants can apply	26
Ongoing requirements and auditing	27
Metered systems	28
Where to get further information	28

Chapter 5: Ensuring consumers are protected.....	29
Consumer protection schemes.....	29
MCS.....	29
Renewable Energy Consumer Code.....	29
Making a complaint.....	29
The Ofgem complaints process.....	30
Chapter 6: Making changes to the scheme and tariffs.....	31
Budget management.....	31
How degression works.....	31
Reviewing the scheme.....	32
Evaluation.....	32
How new technologies/products will be added to the RHI.....	33

Executive Summary

This document sets out the final policy for the domestic Renewable Heat Incentive (RHI), subject to State Aid and Parliamentary approval.

The domestic RHI is a financial support scheme for renewable heat, targeted at, but not limited to, off gas grid households. The support will be paid at a set rate per unit of renewable heat produced (kilowatt hour or kWh), for seven years, to the owner of the heating system. The scheme will support air source heat pumps (ASHP), biomass systems, ground source heat pumps (GSHP) and solar thermal technologies. The support rates vary depending on the technology installed:

	ASHP	Biomass	GSHP	Solar Thermal
Tariff (p/kWh renewable heat)	7.3	12.2	18.8	19.2 ¹

All installations must be certified under the Microgeneration Certification Scheme and meet relevant required standards for each technology, including limits on harmful emissions for biomass systems – see Chapter 3 for further details on each technology.

The scheme will cover single domestic dwellings and will be open to owner-occupiers, private landlords, Registered Providers of Social Housing, third party owners of heating systems and self-builders. It will not be open to new build properties other than self-build. In addition, the scheme will be open to anyone in these groups who installed an eligible technology since 15th July 2009, provided they meet the criteria within this document. Chapter 2 covers eligible applicants in more detail.

Renewable heating systems work more efficiently in a well-insulated home. Therefore, we are requiring all applicants to complete a Green Deal Assessment before applying and to ensure that they have met minimum energy efficiency requirements of loft and cavity insulation where required by the Assessment – see Chapter 2.

The renewable heat generated will be estimated in most cases for payment purposes. For biomass and heat pumps, it will be based on an estimated figure of heat demand from an Energy Performance Certificate. For heat pumps, this will be combined with an estimate of the heat pump's efficiency to determine the renewable proportion of the heat. For solar thermal systems, the payments will be based on the estimate of system performance completed as part of an MCS installation. Those applying for a space heating system who have a back up heating system, such as an oil boiler, or people applying for a second home, will need to install metering equipment on which the RHI payments can be based.

¹ This tariff is capped by reference to the level of support offered to offshore wind. The tariff will be at least 19.2p, and possibly up to 21.7p, depending on the decision on the appropriate level of the vfm cap following the outcome of the non-domestic tariff review consultation. The announcement on the final tariff will be made in the Autumn.

To help improve performance of renewable heating systems, there will be an extra incentive for applicants who install metering and monitoring service packages, of £230 per year for heat pumps and £200 per year for biomass boilers. These are described more fully in Chapter 3.

We intend that the scheme will open for applications in Spring 2014. It will be administered by Ofgem. Guidance will be available before the launch of the scheme on how to apply and the information that will need to be provided. The opening date for legacy applications – that is, people who installed a renewable heating system before the launch of the scheme – will be phased over time.

To control the costs of the policy, we intend to introduce a system of degression, which is reductions in tariffs over time as threshold spend figures (known as triggers) are reached. We will be announcing further details on cost control policy in the Autumn, including whether we introduce an overall cap.

Chapter 1: Introduction

1. Almost all of the heat we use for heating our homes and hot water today comes from burning fossil fuels. Only a very small proportion of households use renewable heating. This means that domestic heating accounts for around 28% of UK energy demand.
2. By 2050, emissions from heating in homes will need to reduce to almost zero to meet our goal of reducing emissions across the economy by 80%. To achieve this we need to prepare now for mass rollout of low-carbon heating in the 2020s. In the shorter-term, domestic heating also needs to make a contribution towards the UK's 2020 target of 15% of energy from renewable sources.
3. With this in mind, the Government set up the Renewable Heat Incentive (RHI), a financial incentive scheme to encourage uptake of renewable heating among householders, communities and businesses. In 2011 the non-domestic RHI opened for applications, and we intend to launch the domestic RHI in Spring 2014. This document sets out the final policy for the domestic RHI, subject to State Aid and Parliamentary approval.
4. We consulted on proposals for a domestic RHI in September 2012. We have carefully considered the responses to the consultation, our experiences from the Renewable Heat Premium Payment (RHPP) and non-domestic RHI schemes, and the results from the evidence gathering exercise that happened alongside the consultation, to arrive at the final policy. A full summary of consultation responses, and the rationale for our final policy choices, has been published alongside this document.

A scheme targeted at off-gas grid

5. We don't need everyone to switch to renewable heating straight away – the change needs to happen over several decades. It makes sense to start with those who will benefit the most from switching, and where it's cheapest. For most people in Great Britain, gas heating is a relatively cheap and convenient option. However, there are about 4 million households that use non-mains gas heating fuels, such as oil, LPG and electricity.
6. It costs more to heat these homes, and they emit more carbon. Switching to renewable heating could help many of them to save money on fuel bills and reduce emissions. We expect that most people taking part in the RHI at first will be off the gas grid – although it will be available for all households.
7. Off-gas grid households are evenly split between urban and rural areas. However, the two populations are very different, particularly in the type of fuel they use and homes they live in. Over 90% of those not using gas in urban areas heat their homes using electricity. These urban households are less likely to have outdoor space, and many live in high rise flats.² These high density urban areas are likely to be better suited to heat networks, which

² Off-grid energy: An OFT market study, OFT 2011

can provide individually controlled and metered heat as reliably as gas boilers. Heat networks powered from renewable sources are already eligible for the non-domestic RHI. In contrast, rural off-gas grid consumers mainly use heating oil, and tend to live in older, larger, solid walled properties that are not energy efficient.³ In relatively sparsely populated rural areas, heat networks will not be economical, and so individual or shared low carbon heating systems such as renewable heating systems are likely to be the best alternative to fossil fuels.

8. Heating an off-grid home is much more expensive than a home using mains gas. In 2011, the average cost of heating a three bedroom house was almost 50% higher for oil and over 100% higher for LPG, in comparison to gas.² We also know from recent research⁴ commissioned by DECC that off-grid homeowners are more likely to be positive about renewable heating technologies than those using mains gas. They also have much lower 'barrier costs' than on-grid homeowners – that is, the subsidy required to persuade them to switch from their current heating system to a renewable system is much lower.
9. The Impact Assessment published alongside this document suggests that we might support around 750,000 renewable heating systems by 2020 through the domestic RHI, predominantly installed off the gas grid.

³ Off-gas consumers: Information on households without mains gas heating, Consumer Focus, 2011

⁴ Homeowners' willingness to take up more efficient heating systems, Ipsos Mori and the Energy Saving Trust, March 2013

Chapter 2: Scheme overview

How the scheme works

10. The financial support through the RHI will be paid at a set rate per unit of renewable heat generated (kilowatt hour or kWh), for seven years. The support rates vary depending on the technology installed, as set out in Chapter 3. We expect the scheme to be open until March 2021.
11. The support is set at a level designed to compensate for the difference between the cost of installing and operating renewable heating systems and fossil fuel systems, including non-financial costs such as disruption, on the basis of 20 years of heat produced. The fossil fuel costs used for this purpose are those faced by households off the gas grid.

Who is eligible?

12. The domestic RHI scheme will give financial support for an eligible renewable heating system that heats a single domestic property in Great Britain. The property can be on or off the gas grid. Payments will go to the owner of the heating system.
13. A system that heats more than one dwelling (including multiple flats in a single building) may be able to apply to the non-domestic RHI scheme. Details of the non-domestic scheme can be found using the following link: <http://www.ofgem.gov.uk/e-serve/RHI/Pages/RHI.aspx>
14. The following groups will be able to apply to the domestic RHI scheme provided they meet all the eligibility criteria, and will all receive the same tariff:
 - Owner-occupiers
 - Private landlords
 - Registered Providers of Social Housing
 - Self-builders
 - Third-party owners of a heating system and;

- Owners of systems installed between 15th July 2009 and the launch of the scheme in any of the above groups (known as legacy applicants).⁵

Owner-occupier

15. People who own and occupy their home will be able to apply.
16. Applications can also be made for a second home. A second home is one which is not a person's main residence (for example, a holiday home or an unoccupied rental property). Applicants for second homes will have to install metering equipment which will measure the amount of heat used. RHI payments will be based on the meter reading, but only up to the deemed amount applicable to the property. For an explanation of deeming, see the section on 'How the payments work' later in this chapter.
17. Properties used mainly for business purposes, such as holiday lets, cannot apply to the domestic scheme, but may be eligible for the non-domestic scheme (although see below regarding private landlords). However, those who work from home will be eligible provided the property meets the scheme definition of a domestic property.

Private landlord

18. A private landlord will be able to apply for a property or properties that they own (provided they own the heating system). The landlord will receive the RHI payments. We would expect them to get any necessary permissions from their tenant(s), both in relation to installation of the system and in order to enable compliance with ongoing scheme requirements such as maintenance and possible site visits.

Registered Providers of Social Housing

19. Registered Providers of Social Housing will be able to apply for a property or properties that they own, and will receive the RHI payments. We would expect them to get any necessary permissions from their tenant(s), both in relation to installation of the system and in order to enable compliance with ongoing scheme requirements such as maintenance and possible site visits.

Self-builder

20. Self-builders who have built or commissioned a home for their own use, either by building the home on their own or working with builders, will be able to apply.
21. Self-build homes with a shared heating network will not be eligible for the domestic RHI scheme. They may be able to apply through the non-domestic RHI instead which provides tariffs for two or more dwellings who share a renewable heat technology, that is to say, a mini-district heat network. Details of the non-domestic scheme can be found using the following link: <http://www.ofgem.gov.uk/e-serve/RHI/Pages/RHI.aspx>

Third party owner of the heating system

22. In most cases, the owner of the system will also be the owner of the property. In some instances, the owner of the heating system could be different to the owner of the property,

⁵ As evidenced by the commissioning date on the MCS certificate. The commissioning date must be on or after 15th July 2009. MCS certificates must be generated within 10 working days of the commissioning date, according to the rules governing the MCS database.

for example if the heating system is leased. This arrangement will be permitted under the scheme, provided the other eligibility criteria are met, and in this case the RHI payment will go to the heating system owner. We would expect the applicant to get any necessary permissions from the property owner and any tenant(s), both in relation to installation of the system and in order to enable compliance with ongoing scheme requirements such as maintenance and possible site visits.

Legacy installations

23. Owners of renewable heating systems installed between 15th July 2009 and the scheme launch (legacy applicants) will be able to apply to the scheme providing they meet all of the eligibility requirements. The only exceptions to the eligibility criteria are as follows:

- The installation will need to meet the Microgeneration Certification Scheme (MCS) standards that applied at the time of installation, rather than the current standards.
- Installations will not need to meet the air quality requirements that will apply from the launch of the scheme for new applicants

24. For more information on how the application process will work for legacy applicants please see Chapter 4. Details of how any previous funding will be taken into account are given later in this Chapter.

Ineligible applicants

25. New build properties will not be eligible for the scheme. This means properties in which the renewable heating system was installed before it was inhabited for the first time. This includes applications from house builders and housing developers, as well as anyone who owns a new build property, including legacy applicants. The only exception is self-build homes.

26. Housing developers may be eligible for the existing non-domestic RHI. This scheme offers tariffs for two or more properties that are connected to a district heat network. Details of the non-domestic scheme can be found at the following link: <http://www.ofgem.gov.uk/e-serve/RHI/Pages/RHI.aspx>

27. For Local Authorities who use Arm's Length Managed Organisations (ALMOs) to manage their properties, the application must come from the owner of the heating system.

28. People will not be able to claim for more than one space heating renewable heating system in the same property. However, installations of solar thermal and another eligible technology will be permitted. This is explained in Chapter 3.

Renewable heat technologies

Eligible technologies

29. The following technologies will be eligible:

- Air to water heat pumps

- Biomass-only boilers and biomass pellet stoves with back boilers
- Ground (and water) source heat pumps
- Flat plate and evacuated tube solar thermal panels

30. The installation must be certified under the MCS or equivalent scheme at the time of installation,⁶ and installed by an installer certified under MCS or equivalent scheme.

31. Chapter 3 contains further information on the requirements that are specific to each technology.

Microgeneration Certification Scheme

32. We require that heating systems and those installing them are appropriately certified. We will recognise certification schemes that meet standards such as European standard EN 45011 (which sets out general requirements for bodies operating third party certification schemes) or ISO/IEC 17065 that has replaced EN 45011. The Microgeneration Certification Scheme meets this requirement and other requirements such as having consumer protection measures. References in this document to 'MCS and equivalent schemes' should be read in this context.

33. MCS is an independent, industry-led certification scheme accredited by the United Kingdom Accreditation Service (UKAS).

34. MCS certification bodies assess microgeneration products and installation businesses against consistent, robust standards. By providing assurances as to the quality, durability and energy generation performance of microgeneration products and guarantees to consumers on the quality of their microgeneration installations, MCS aims to protect consumers in this emerging market.

35. Members of the MCS are also expected to comply with the standards set out by the Renewable Energy Association's (REA) Renewable Energy Consumer Code (RECC) which is currently the only scheme backed by the Trading Standards Institute (formerly a role performed by the Office of Fair Trading) for the microgeneration sector.

36. More information can be found on the MCS website, www.microgenerationcertification.org and RECC website <http://www.recc.org.uk/>.

Eligible products list

37. We are working with Ofgem and MCS to develop an online list of products that are eligible for the domestic RHI, that applicants and installers can access.

⁶ In accordance with the MCS standards that applied at the time of installation

Other eligibility requirements

38. The requirements listed below apply to all technologies. Depending on the type of system installed, additional criteria may apply - see the relevant parts of Chapter 3.

Energy efficiency

39. Renewable heating systems work best in a well-insulated home. The Green Deal lets homes and businesses pay for energy efficiency improvements, like insulation or a new heating system, through savings on their fuel bills. Repayments taken through the electricity bill will be no more than what a typical household should save in energy costs.

40. More information about the Green Deal can be found using the following link:
<https://www.gov.uk/green-deal-energy-saving-measures/how-the-green-deal-works>

41. Before applying for RHI support, all applicants, including legacy applicants, will need to ensure that:

- a. a Green Deal Assessment (GDA) has been carried out to find out which energy efficiency measures are cost-effective for the property;
- b. loft insulation (to 250mm) and cavity wall insulation have been installed where these measures are recommended by the GDA; and
- c. where the GDA shows the required loft and cavity wall insulation is yet to be installed, an updated Energy Performance Certificate (EPC) is obtained following installation, as proof of installation (or valid evidence is provided proving why installation was not feasible)

42. The only exception is for self-builders, whose properties will already be energy efficient since they are built to current building regulation standards. However, they will need an EPC in order for Ofgem to be able to calculate their payments.

Being 'meter-ready'

43. Selected installations will have DECC's own metering equipment fitted so that we can check the assumptions we made about fuel bill savings and renewable energy generation from installations. For applicants, this means that they need to agree as part of the application process to having metering equipment fitted if the installation is chosen as part of DECC's metering programme.

44. To minimise the burden on applicants, we are working with MCS to make it an MCS Installation Standard requirement that all new systems installed in the domestic RHI are 'meter-ready' where possible.⁷ This will not apply to legacy installations. Making an installation 'meter-ready' will include:

⁷ This is likely to be similar to the requirements in the RHPP Installer Checklist <http://www.energysavingtrust.org.uk/Media/Generating-energy/PDFs/RHPP2-Installer-checklist-with-trained-installers-PDF>

- Leaving sufficient space for heat meters to be fitted in defined locations
- Installing isolation valves to avoid the need to drain systems when fitting heat meters
- Leaving the pipework accessible (i.e. not boxed in) to enable meters to be fitted
- Providing information about the installation (this will to help DECC to select appropriate sites for RHI metering)

45. Making an installation meter-ready will enable metering equipment to be fitted at a later date with relative ease. We do not intend to make the data we collect available for householders and installers to view in the same way a Metering and Monitoring Service Package does (see Chapter 3 for further details on Metering and Monitoring). Instead, we intend to publish anonymised outputs once at least a year's worth of data has been collected, checked and analysed.

How the payments work

46. The RHI support will be paid on each kWh of renewable heat the installation generates, for seven years. To work out how much heat is generated, we will be using a 'deeming' calculation that estimates the property's expected annual heat usage. Multiplying the deemed figure by the technology's tariff rate will determine the annual payments. The tariff rates for each technology are in Chapter 3.

Example of payment calculation – *for illustrative purposes only, not intended to be representative*

Estimated heat use:	15,000kWh
Chosen technology:	Biomass
Tariff:	12.2p/kWh
Total annual RHI entitlement = tariff x kWh renewable heat:	£1830

47. The deeming calculation for **biomass and heat pumps** will be the estimated heat use (in kWh) of a property after the installation of the required energy efficiency measures. Where an applicant already has these installed, the figure will be taken from the Energy Performance Certificate (EPC) done as part of the Green Deal Assessment.⁸ Where the Assessment identifies that the measures still need to be put in place, the figure will be taken from the updated EPC completed after their installation.

⁸ As self-build applicants are not required to have a Green Deal Assessment, the figure will be taken from the EPC required on completion of the property.

48. If the heating system is a heat pump, the heat use figure will be combined with the heat pump's expected efficiency to estimate how much renewable heat should be generated. More detail on how this is calculated is set out in Chapter 3.
49. The deeming figure for **solar thermal** will be the estimated contribution of the solar thermal system to the property's hot water demand (in kWh) that is calculated as part of the MCS installation process and shown on the MCS certificate.

Metering for payment

50. For biomass and heat pumps, payments will be based on metered renewable heat usage rather than deemed usage in two situations:
- If the renewable heating system is installed alongside another fossil fuel or renewable space heating system (this includes hybrid systems)
 - For second homes
51. In both cases, metering equipment will need to be installed in line with the requirements described in *'Metering for Payment Technical Supplement'*⁹. Payments will be capped at the level of the estimated renewable heat use from the deeming calculation, to avoid over-use of heating.

Receiving payments

52. Participants will receive RHI payments quarterly in arrears for seven years. Tariffs will change annually in line with the Retail Price Index (RPI). Increases or decreases will take effect in the first payment period following 1 April each year, in line with RPI changes in the prior financial year (1st April – 31st March).
53. If the applicant has previously received public funding for the heating system, such as the Renewable Heat Premium Payment, this must be declared as part of the application process. This will then be deducted from RHI payments under the scheme. Initially, a deduction equal to one twenty-eighth of the value of the prior public funding received will be made from each quarterly payment. However, where tariffs are altered in line with RPI, the quarterly deduction will also change by the same proportion, so that the overall value of the deduction remains constant.
54. We also intend to take into account other forms of subsidy – for example, support from energy companies. In some cases, where subsidy has been provided in the past, RHI payments may be reduced or these installations may be ineligible. This is aimed at ensuring applicants do not receive a double subsidy to install renewable heat. We will confirm details closer to the launch of the scheme.

⁹ Available on <https://www.gov.uk/government/consultations/renewable-heat-incentive-proposals-for-a-domestic-scheme>

Financing a renewable heating system

55. The RHI will be paid over seven years, so the upfront costs of the heating system will need to be funded by the applicant. We expect that participants will use a range of different funding sources, including savings, extensions of mortgages and loans which could be repaid using the RHI income.
56. For some householders the Green Deal could provide a way to part-finance a renewable heating system. The Green Deal lets people pay for energy-efficiency improvements, including renewable heating systems, through savings on their energy bills. The amount of Green Deal finance offered towards the cost of a renewable heating system will depend on the expected fuel bill savings from the measures installed in the particular property. People will be able to use Green Deal finance and claim the RHI.
57. There may also be companies who will offer a leasing arrangement or install a renewable heating system at no or reduced upfront cost. Depending on the exact arrangement with the company, either they or the property owner may be eligible to claim the RHI. Further details on eligibility can be found earlier in this Chapter.

Maintaining a renewable heating system

58. It is important that renewable heating systems are regularly maintained to ensure they are working well. Applicants will need to confirm that their system is operating correctly as part of the application process, and if they are accredited on to the scheme will need to confirm annually that their system is being maintained according to the manufacturer's instructions. For legacy applicants in particular, whose systems may have been installed several years ago, the period before the launch of the scheme provides an opportunity to have a system 'health-check' from a qualified installer. This should spot and rectify any issues - such as over-use of electric supplementary heating, equipment turning on and off too frequently, inadequately sized radiators or poor heating controls – that may mean a system is costing more to run than it should do.
59. Payment uplifts for Metering and Monitoring Service Packages are also available for legacy and new applicants (see Chapter 3 for further details) – these are a good way to check a system is working properly.

Chapter 3: The technologies

Heat pumps

What is a heat pump?

60. Heat pumps transfer heat from the outside environment to the inside of a house. There are two different types that are eligible for the domestic RHI:

- **Ground or water source heat pumps** extract heat from the ground or water. This heat can then be used to provide space heating and/or hot water in a home.
- **Air to water heat pumps** absorb heat from the outside air. This heat can then be used to provide space heating and/or hot water in a home.

61. Only heat pumps that run on electricity will be eligible. Any cooling from heat pumps is not eligible.

Tariffs and payment

62. There are different tariff levels for the different types of heat pump:

- The tariff for ground or water source heat pumps is **18.8p/kWh** of renewable heat
- The tariff for air source heat pumps is **7.3p/kWh** of renewable heat

63. Not all of the heat generated by heat pumps that run on electricity is renewable. RHI payments for heat pumps will only be made on the renewable portion of their heat output. This is the energy that comes from the ground, water or air, net of the electricity used to run.

64. The amount of renewable heat generated by a heat pump depends on its efficiency – that is, how much electricity it uses to operate per unit of heat it generates. The technical term for heat pump efficiency averaged over a whole year is Seasonal Performance Factor (SPF) which is normally between around 2.5 and 4. The SPF relates to how much heat the system generates per unit of electricity it uses – for example, a heat pump with an SPF of 3 generates three kWhs of heat for every kWh of electricity it uses. The eligible heat for the purposes of RHI payment will be worked out using the following formula:

$$\text{Eligible heat demand} = \text{Total heat demand} \times (1 - 1/\text{SPF})$$

This means that if the heat pump has an SPF of 3, two-thirds of the heat output will be renewable and therefore eligible for RHI payments.

65. For heat pumps installed after the scheme launches, the performance of the system will need to be estimated by an MCS installer. The rating will be recorded by the installer and given to the owner of the system as part of the installation process. We are working with MCS to develop how to do this. It will be based on the star rating system in a document

called the Heat Emitter Guide, designed to be used when installing heat pump systems through MCS – this can be found on the MCS website:

[http://www.microgenerationcertification.org/images/MIS_3005_Supplementary_Information_2 - Heat Emitter Guide v2.0.pdf](http://www.microgenerationcertification.org/images/MIS_3005_Supplementary_Information_2_-_Heat_Emitter_Guide_v2.0.pdf).

66. Heat pumps installed before the launch of the scheme will be given a default SPF of 2.5. Applicants can arrange a full assessment by an MCS installer to demonstrate a higher rating if they wish.

Worked example of payments for heat pumps – for illustrative purposes only

Total annual heating demand = 15,000kWh

Example 1: ASHP rated at 3* in the Heat Emitter Guide = SPF 2.7

Eligible heat demand = 15,000kWh x (1-1/2.7) = 9,444kWh

Total annual RHI payments = 9,444kWh x 7.3p/kWh = **£689**

Example 2: ASHP rated at 5* in the Heat Emitter Guide = SPF 3.4

Eligible heat demand = 15,000kWh x (1-1/3.4) = 10,588kWh

Total annual RHI payments = 10,588kWh x 7.3p/kWh = **£773**

Minimum efficiency

67. Only heat pumps with an SPF of 2.5 and above are considered renewable under the EU Renewable Energy Directive¹⁰, and only those that are considered renewable will be eligible for the RHI. This will be based on the estimation of efficiency described above, where applicable.

Metering and Monitoring Service Packages

68. We will offer householders installing heat pumps an optional additional payment of £230 per year for purchasing a Metering and Monitoring Service Package from their installer that meets our requirements. These packages are similar to a service contract. An installer will fit an advanced set of meters to the new heating system so that the householder and installer will be able to view measured data from their system over the internet.

69. We have introduced this measure to encourage the householder to take out these packages which we believe will give them peace of mind that their installation is working as expected; enable the installer to continually improve performance where possible; and also to diagnose common problems if they occur. The payment has been designed to reimburse the householder for the cost of the package over the seven years of RHI payments. It will stop if the service contract ends before the end of the seven years.

¹⁰ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:062:0027:01:EN:HTML>

70. We encourage applicants to take advantage of this offer. Data we have collected in the past has shown that it is often possible to reduce the energy consumption of installations using a package like this. Payments for Metering and Monitoring Service Packages will be available on a first come, first served basis to 2,500 applicants in the first year of the scheme, across biomass and heat pump systems. We will review the payment level as part of the 2015 policy review.

71. A full list of requirements for Metering and Monitoring Service Packages for all technologies is available in '*Metering and Monitoring Service Packages Technical Supplement*'¹¹. The data collected by Metering and Monitoring Service Packages may be required to be submitted to DECC, Ofgem or a nominated third party in a standardised format on request, to help evaluate the effectiveness of the RHI scheme.

Backup, supplementary or hybrid heating systems

72. Where a heat pump is installed alongside another space heating system, such as an existing oil boiler or another renewable technology, a meter will need to be installed for the heat pump. This includes hybrid systems. The metering needs to be arranged by the applicant and installed in line with the requirements set out in '*Metering for Payment Technical Supplement*'¹². Payments will be based on the metered readings (see section on Metered systems in Chapter 4), and the payment amount will be capped at the level of expected renewable heat use from the deeming calculation.

73. If a heat pump is used together with a solar thermal system to heat hot water, two claims can be made for the RHI – one for the heat pump and one for the solar thermal system. Provided the heat pump isn't bivalent or installed in a second home, each system will receive its full deemed amount and no metering will be needed.

Biomass heating systems

What is a biomass heating system?

74. Biomass heating systems burn fuel such as wood pellets, chips or logs to provide central heating and hot water in a home.

75. Subject to the air quality and fuel sustainability criteria set out below, the eligible types of biomass technologies are :

- Biomass-only boilers (covering all solid biomass, including logs and chips)
- Biomass pellet stoves with back boilers

¹¹ Available on <https://www.gov.uk/government/consultations/renewable-heat-incentive-proposals-for-a-domestic-scheme>

¹² Available on <https://www.gov.uk/government/consultations/renewable-heat-incentive-proposals-for-a-domestic-scheme>

76. Condensing biomass boilers will not initially be eligible for the domestic RHI. However, we await the result of tests on such boilers being undertaken on behalf of the Department for Environment, Food and Rural Affairs (Defra). We will make a further announcement on this once we have discussed with Defra their analysis of those results.

Tariffs and payment

77. The tariff for biomass heating systems is **12.2p/kWh** of renewable heat. All of the heat output of biomass systems is considered renewable under the Renewable Energy Directive, so payments are based on the estimated heat use from the EPC.

Metering and Monitoring Service Packages

78. We will offer householders installing biomass-only boilers (but not pellet stoves with back boilers¹³) an optional additional payment of £200 per year for purchasing a Metering and Monitoring Service Package from their installer that meets our requirements. These packages are similar to a service contract. The installer will fit an advanced set of meters to the new heating system so that the householder and installer will be able to view measured data from their system over the internet (for example efficiency in the case of biomass).

79. We have introduced this measure to encourage the householder to take out these packages which we believe will give them peace of mind that their installation is working as expected; enable the installer to continually improve performance where possible; and also to diagnose common problems if they occur. The payment has been designed to reimburse the householder for the cost of the package over the seven years of RHI payments. It will stop if the service contract ends before the end of the seven years.

80. We encourage applicants to take advantage of this offer. Data we have collected in the past has shown that it is often possible to reduce the energy consumption of installations using a package like the one we have specified. Payments for Metering and Monitoring Service Packages will be available on a first come, first served basis to 2,500 applicants in the first year of the scheme, across biomass and heat pump systems. We will review the payment level as part of the 2015 policy review.

81. A full list of requirements for Metering and Monitoring Service Packages for all technologies is available in '*Metering and Monitoring Service Packages Technical Supplement*'¹⁴. The data collected by Metering and Monitoring Service Packages may be required to be submitted to DECC, Ofgem or a nominated third party in a standardised format on request, to help evaluate the effectiveness of the RHI scheme.

Back-up, supplementary and hybrid heating systems

82. Where a biomass system is installed alongside another space heating system, such as an existing oil boiler or another renewable technology, a meter will need to be installed for the biomass system. This includes hybrid systems. The metering needs to be arranged by the applicant and installed in line with the requirements set out in '*Metering for Payment*

¹³ As the radiant heat from these systems would be impractical to measure in many cases, the data would be less meaningful.

¹⁴ Available on <https://www.gov.uk/government/consultations/renewable-heat-incentive-proposals-for-a-domestic-scheme>

*Technical Supplement*¹⁴. The payment amount will be capped at the level of expected heat use from the deeming calculation.

83. If a biomass system is used together with solar thermal to heat hot water, the RHI can be claimed twice – once on the biomass system and once for the solar thermal system. Provided the biomass system isn't bivalent or installed in a second home, each system will receive its full deemed amount and no metering will be needed.

Other requirements

Air quality

84. New installations of biomass systems will need to meet air quality standards in relation to particulate matter (PM) and oxides of nitrogen (NO_x). Legacy installations, installed between 15th July 2009 and the launch of the scheme, will not need to meet this requirement.
85. Systems must not exceed the maximum permitted emissions limits of 30 grams per gigajoule (g/GJ) net thermal input for PM and 150 g/GJ for NO_x.
86. Once accredited on the RHI scheme, systems will be grandfathered. This means they will not be expected to meet any possible future changes to the emissions limits under RHI regulations, although they will still need to comply with any changes that may be required by future EU or global legislation or commitments.
87. These limits do not replace national air quality and planning legislation. RHI participants will continue to need to comply with that legislation.

Fuel sustainability

88. To be eligible for and continue to receive RHI support for a biomass system, fuel needs to be sourced from a supplier registered on an approved supplier list. Such a list will be set up ahead of the launch of the scheme and will be the same one that is being established for the non-domestic RHI scheme
89. RHI recipients will have to make an annual declaration that they are using only approved fuel from an approved supplier, and keep receipts as evidence for future audits.
90. To be included on the list, we intend that fuel suppliers will have to meet two criteria from April 2014:
- i. Supply fuel which complies with the greenhouse gas (GHG) lifecycle emissions target of achieving 60% GHG savings against the EU fossil fuel heat average, assuming a boiler efficiency of 70%
 - ii. Report their performance against the relevant land criteria from the following list (although compliance with the criteria will not initially be required):
 - a. For wood-fuel: the UK public procurement policy on wood and wood products (<http://www.cpet.org.uk/uk-government-timber-procurement-policy/>), or its equivalent

- b. For perennial energy crops planted under the Energy Crops Scheme for England (<http://www.naturalengland.org.uk/ourwork/farming/funding/ecs/>), or its equivalent: the sustainability requirements set by that scheme or its equivalent. This scheme may be coming to a close, so we may need to revisit this area to ensure there is no gap in sustainability requirements. In doing so, we will seek to take an approach that is consistent with the non-domestic RHI scheme.
- c. For other types of solid biomass: the sustainability criteria set under the Renewable Energy Directive (<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0016:0062:EN:PDF>)

In line with the non-domestic RHI scheme, our intention is to make compliance with the land criteria mandatory from April 2015, subject to EU and international legislation.

91. Further information about the criteria can be found in the Government Response to the July 2012 non-domestic RHI scheme consultation entitled 'Providing Certainty, improving performance'. A link to the response is available here: <https://www.gov.uk/government/consultations/renewable-heat-incentive-providing-certainty-and-improving-performance>.
92. Work is ongoing to develop an approved supplier list and we expect it to be in place before the launch of the domestic RHI scheme. Further details will be published closer to the launch of the scheme. With a view to minimising administrative burdens, we intend that woody biomass feedstocks (which includes perennial energy crops as well as wood) grown on the same estate as an eligible biomass system will be automatically treated as meeting the sustainability criteria provided they do not also supply to other biomass heat installations. Our aim is that people in this situation register their details as a self-supplier and provide accompanying evidence. We will also look at introducing a proportionate approach for suppliers who only supply to their local area (local suppliers).

Solar thermal

What is a solar thermal system?

93. Solar thermal systems use solar panels, called collectors, usually fitted to a roof. Unlike biomass and heat pumps, solar thermal panels usually only heat hot water, and don't provide room heating. The panels collect heat from the sun and use it to heat up water which is stored in a hot water cylinder.
94. There are two types of solar water heating panels that are eligible for the RHI, both which can be fixed on the roof tiles or integrated into the roof:

- evacuated tubes
- flat plate collectors.

95. Only domestic hot water generated by solar thermal systems will be eligible.

Tariffs and payment

96. The tariff for solar thermal heating systems is at least **19.2p/kWh**¹⁵ of renewable heat. All of the heat output generated by solar thermal systems is considered renewable.

Back up and supplementary heating systems

97. Unlike heat pumps and biomass, solar thermal will almost always act as a complementary system to other heating systems – either fossil fuel or renewable. This is because a solar thermal system will not normally be able to provide 100% of a property's heating demand.

98. RHI payments will therefore be made only on the solar thermal system's deemed contribution to the hot water demand. No metering will be required for the solar thermal system.

99. If solar thermal is used together with a biomass boiler or a heat pump, two claims can be made for the RHI – one for the solar thermal system and one for the space heating system. Provided the space heating system isn't bivalent or installed in a second home, each system will receive its full deemed amount.

¹⁵ This tariff is capped by reference to the level of support offered to offshore wind. The tariff will be at least 19.2p, and possibly up to 21.7p, depending on the decision on the appropriate level of the vfm cap following the outcome of the non-domestic tariff review consultation. The announcement on the final tariff will be made in the Autumn.

Chapter 4: Implementation of the scheme

How to apply

100. We intend that the scheme will open to applications from Spring 2014. We will make an announcement on the exact date closer to the planned launch of the scheme. Ofgem will be responsible for administering the scheme when it launches.
101. The main way to make an application will be through the Ofgem website and we encourage applicants to do so wherever possible. By maximising the proportion of electronic applications we aim to make processing times as short as possible and reduce the administration costs of the scheme. However, we will ensure that there are alternative ways of applying so that the scheme is accessible to all.
102. The application will cover a number of areas that will allow Ofgem to check the system meets all the eligibility criteria for the scheme. Some supporting information will be needed alongside the application. We will aim to keep the number of extra documents required to a minimum to make the application process as simple as possible and minimise processing times and administration costs.
103. While applications are being processed, Ofgem may contact applicants to clarify certain points and/or request further information. Once Ofgem is satisfied that the system meets all the criteria of the scheme it will contact applicants to let them know their application has been successful. From that point on the applicant will be eligible to receive payments (see Chapter 2).

When legacy applicants can apply

104. All renewable heating systems installed between 15th July 2009¹⁶ and the launch of the scheme will be able to apply to the scheme, provided they meet the eligibility criteria. These are referred to as legacy installations.
105. To manage the potentially large volume of legacy applications and avoid a backlog we are working with Ofgem to develop an approach to phasing legacy applications over a period of time after the launch of the scheme: that is, staggering the dates when legacy applicants can first apply to the scheme.
106. We will confirm our approach to phasing closer to launch of the scheme, but our intention at this stage is that owners of eligible legacy installations that have not received funding through RHPP will be able to apply first. RHPP participants are likely to be in the next

¹⁶ As evidenced by the commissioning date on the MCS certificate. The commissioning date must be on or after 15th July 2009. MCS certificates must be generated within 10 working days of the commissioning date, according to the rules governing the MCS database.

phase, and may be staggered on the basis of when funding was received. We intend that there will be a cut-off date for applications to be made.

107. More information on the launch date for the scheme and phasing of legacy applications, will be announced closer to the planned launch of the scheme.

Ongoing requirements and auditing

108. All scheme participants will be required to regularly confirm their ongoing eligibility to receive payments under the scheme. This means completing an annual declaration which will include confirmation that:

- the system is still in use and meets the requirements of the scheme,
- the system is in working order and being maintained in line with manufacturer's instructions, and;
- the current recipient is still entitled to the payments in relation to this system.

If the declaration is not completed, or the participant no longer meets the scheme requirements, then the participant is no longer eligible and payments will stop.

109. Participants will also need to let Ofgem know of any changes in circumstances that affect their eligibility to receive payments. For example, if the owner of the system changes because the property is sold, Ofgem must be informed so that the payments can be transferred to the new owner.

110. Participants on the scheme may be selected for one or more of the following checks:

- Ofgem will select a sample of applications for a more detailed review. This could be either while they are initially processing the application or a spot check after the application has been accepted onto the scheme. Those selected for checking should make every effort to supply the additional information Ofgem request. This could include allowing Ofgem to visit the property to inspect the renewable heating system.
- The MCS and its certifying bodies also conduct surveillance to make sure installation companies are carrying out works to a high enough quality. Site visits help to ensure that only high quality installers are able to fit systems under the scheme. We don't expect these to take long and only a small proportion of installations are selected for inspection. If chosen, the RHI recipient will be asked to agree to MCS or the certifying body visiting their property to check the quality of the installation.

111. Furthermore, there is an audit regime in place to ensure that all Green Deal Assessor organisations and their Advisors are complying fully with the Green Deal framework and that the Green Deal Advice Reports (GDARs) they create meet the required standards. The audit of the Reports ensures they have been completed accurately and assessments and recommendations made in line with standard procedures.

112. Finally, some installations will be selected for metering to provide DECC with valuable information about the performance of the technology. Installation of metering equipment is also a relatively short process. If chosen, the RHI recipient will be asked to agree to an appointed installer visiting the property in order to fit the metering equipment.
113. Refusal to agree to any of these requests may delay or prevent acceptance onto the scheme, or mean the RHI recipient is not meeting the ongoing requirements of the scheme and will no longer receive payments. In certain circumstances – for example if misleading information has been supplied in an application – then accreditation may be withdrawn and payments already received may need to be paid back.

Metered systems

114. For systems where payments are based on metered heat use (see Chapter 2), the RHI recipient will need to give readings to Ofgem. Ofgem will use the meter readings to calculate the amount of renewable heat generated and the payment. The payment will be capped at the level of the estimated renewable heat usage from the deeming calculation (see Chapter 2).
115. Participants who have taken up a Metering and Monitoring Service Package (see Chapter 3) will need to notify Ofgem on a regular basis that the monitoring system is still functional and in use to continue to qualify for the additional payments. The data collected by Metering and Monitoring Service Packages may be required to be submitted to DECC, Ofgem or a nominated third party on request, to inform our understanding of in-situ performance of heat pumps and biomass boilers.

Where to get further information

116. Information on the scheme's requirements is available on DECC's website www.gov.uk/decc. Anyone interested in applying can contact the Energy Saving Advice Service (ESAS) in England and Wales on 0300 123 1234, and Home Energy Scotland in Scotland on 0808 808 2282 in Scotland for further advice. Ofgem will publish detailed guidance on how to apply before the launch of the scheme, which will be available on their website ofgem.gov.uk.

Chapter 5: Ensuring consumers are protected

Consumer protection schemes

117. Certification of both products and installers in line with the Microgeneration Certification Scheme (MCS) or equivalent scheme is a condition of the RHI scheme. This ensures that people who buy renewable heating systems are covered by consumer protection schemes governing the products and their performance, as well as the quality of the installation and service they receive from the installer. Consumer protection is provided jointly by:

- the MCS product and installer standards; and
- the Renewable Energy Consumer Code.

MCS

118. The MCS is described in Chapter 2. MCS standards are intended to certify that an installer can install to a defined quality, using MCS-certified products that have met rigorous testing standards. The standards therefore provide protection relating to technical aspects of the installation. Any business that signs a contract with a domestic consumer must be MCS certified. Guidance for consumers is provided at the following link: <http://www.microgenerationcertification.org/consumers/consumers>

Renewable Energy Consumer Code

119. MCS certified installers must also be members of the Renewable Energy Consumer Code which sets out standards that installers must meet in contracting with domestic consumers. The Code is backed by the Trading Standards Institute under its Consumer Codes Approval Scheme. The Code covers advertising and promotion, behaviour of sales staff, proposals, estimates and quotes, terms of business, cancellation rights, deposits and prepayments, guarantees, maintenance and service agreements and service and repair. Guidance for consumers is provided at the following link: <http://www.recc.org.uk/consumers>

Making a complaint

120. We hope that renewable heat installations supplied and installed under MCS will be free from problems. Occasionally, however, things do go wrong. The MCS Licensee and Certification Bodies work closely with the Renewable Energy Consumer Code to address consumers' complaints, and the process for complaints is available at the following link: <http://www.recc.org.uk/consumers/how-to-complain>.

The Ofgem complaints process

121. If an RHI applicant is unhappy with the way that Ofgem has dealt with them, there will be a complaints handling and review process. Ofgem will publish details on this closer to the time of launch.

Chapter 6: Making changes to the scheme and tariffs

Budget management

122. The RHI is funded directly from Government spending and has been given annual budgets, to cover both the non-domestic and the domestic scheme, for the years 2011-12 to 2014-15 (the current Spending Review period). An annual budget for 2015-16 has recently been agreed. Annual budgets are not flexible, so spending less than the budget in one year does not mean that we can spend more in future years. We need to ensure that the scheme stays within budget and that it is value for money to the taxpayer. At the same time those who are considering installing renewable heat need to know what support is likely to be available to them.
123. The main method of controlling the budget for the domestic RHI will be degression (lowering) of the tariffs paid to new applicants as more renewable heating systems are installed. Tariffs will be reduced as spend on the domestic scheme reaches certain “triggers” (expressed as an amount of budget). This is the same method that is used for the non-domestic RHI scheme.
124. To provide extra budgetary control, we have considered combining degression with a cap i.e. a level of budget at which the scheme could be suspended to new applicants until the following financial year if the budget was at risk. A cap provides additional ability to ensure that the scheme does not go over budget, but the risk of the scheme being stopped could discourage people from choosing renewable heat. We will continue to consider this and may introduce a cap if we conclude that we require additional ability to control costs. We intend to announce further details on the cost control policy for the domestic RHI in the Autumn.

How degression works

125. Tariff announcements will take place periodically, with advance notice of any reduction of tariffs. Applicants who are accredited onto the scheme after the notice period ends will receive the new tariffs. Those who have already been accredited on to the scheme will continue to receive the previous tariffs.
126. The decision on whether to reduce tariffs will be based on the previous period’s applications to the domestic scheme. It will not be affected by applications to the non-domestic RHI. Legacy applications will not count towards the decision on whether to reduce tariffs in financial year 2014-15. Updates of progress towards the triggers will be published on the DECC section of the gov.uk website.

127. Degression triggers will be set for each tariff in the scheme until the end of 2015-16. Degression triggers for 2016-17 onwards will be set out once the Spending Review for that period has concluded. If a tariff trigger was hit, that tariff would be reduced by a set percentage. We are working on the detail of degression triggers and the frequency and size of reductions when a trigger is hit. We anticipate making this information available for 2014-15 and 2015-16 in the Autumn.

Reviewing the scheme

128. The domestic RHI is a new and innovative scheme. We plan to regularly review it to check it is working well and to make any changes needed to improve it or reflect changes in the market. These planned reviews will take place in 2015 and 2017, with the aim of bringing in any changes in 2016 and 2018 respectively. It is possible we may do a tariff review sooner, if this was necessary.

129. We haven't decided on the scope of the reviews yet, but it is likely that we will look at issues such as:

- Tariff levels for technologies and different groups of applicant;
- At the first planned review, the accuracy of the estimated heat usage figures, and whether all systems should have payments determined according to metered renewable heat generation, rather than deemed heat use;
- Eligibility of technologies, including whether currently eligible technologies have seen good uptake and reductions in costs and should continue to receive support, and new potential eligible technologies;
- Increasing the energy efficiency requirements for example to include all Green Deal green tick measures;
- Raising the minimum performance standard for heat pumps.

Evaluation

130. To feed into reviews, evaluation of the scheme will be carried out in line with HM Treasury guidance on evaluation. The evaluation will focus on how the scheme is working in practice; whether it is meeting its objectives; why it is (or isn't) delivering as expected; and whether it provides value for money. The evaluation will be designed to provide evidence that can be used to improve the scheme in the future

131. Where necessary, the evaluation will need to carry out research with people who have been involved in the scheme, as well as those who haven't, to understand how it has worked and the impact it has had.

How new technologies/products will be added to the RHI

New products (within eligible technology types)

132. If new products within the eligible technology types become available and are certified by MCS or an equivalent scheme, they will be eligible for support provided they meet the other eligibility criteria of the scheme (such as air quality).

New technologies

133. In the future, new technology types may come on to the market that would benefit from RHI support. DECC will decide on the eligibility of new technologies by gathering and analysing evidence to check whether it meets our criteria for support. If we decide that the technology does meet our criteria, and it is affordable, we will then need to go through a process involving public consultation and legislation to make the technology part of the scheme.

134. The introduction of support for new technologies will normally only be done as part of the regular scheme reviews described above. Further details on the criteria and process for new technologies to become eligible is set out in '*Renewable Heat Incentive – New Technologies: process towards eligibility*' which has been published alongside this document.

© Crown copyright 2013
Department of Energy & Climate Change
3 Whitehall Place
London SW1A 2AW
www.gov.uk/decc

URN 13D/181