Title: Final Impact Assessment for Budget Management in the non-domestic Renewable Heat Incentive scheme	Impact Assessment (IA)
	Date: 26/02/2013
IA No: DECC0093	**Stage: Final**
	Source of intervention: Domestic
Lead department or agency: Department of Energy and Climate Change (DECC)	**Type of measure:** Secondary legislation
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Summary: Intervention and Options | **RPC: n/a**

Cost of Preferred (or more likely) Option				
Total Net Present Value	**Business Net Present Value**	**Net cost to business per year**	**In scope of One-In, One-Out?**	**Measure qualifies as**
Marginal	£m	£m	No	N/A

What is the problem under consideration? Why is government intervention necessary?

The Renewable Heat Incentive (RHI) is an inflation-linked subsidy to owners of renewable heat installations. It is linked to the amount of renewable heat produced. Currently, if RHI expenditure exceeds a pre-determined level in 2012/13 the scheme is temporarily suspended until the next financial year. This form of cap can have a detrimental impact on investor confidence and lead to the creation of a stop-start market. Government intervention is needed to ensure the RHI budget can be sufficiently managed should forecast spending exceed expectations while also providing enough transparency to support investor confidence and ensure value for money for the tax-payer.

What are the policy objectives and the intended effects?

- To ensure any budget management approach adequately controls the RHI budget;
- To ensure value for money and reduce uncertainty in the market;
- To introduce a simple and transparent budget management approach;
- To help the Government meet its 2020 renewables target and longer term heat strategy objectives by supporting a range of renewable heating technologies;

The intended effects are to reduce uncertainty and support a smooth increase in the deployment of renewable heat installations. It is also to ensure the minimal payment of economic rents.

What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)

The range of policy options considered for managing the RHI budget were set out in the July consultation and included:

- Degression;
- Enhanced Preliminary Accreditation;
- Quota system;

DECC intends to implement a system of degression. The key decision is whether to manage the RHI budget through a preset link between expenditure and tariff levels or whether to suspend the scheme each year if a particular level of spending is reached. Of the options considered degression will help reduce market uncertainty and ensure value for money.

Will the policy be reviewed? It will be reviewed. **If applicable, set review date:** 2014

Does implementation go beyond minimum EU requirements?			**N/A**		
Are any of these organisations in scope? If Micros not exempted set out reason in Evidence Base.	**Micro** **Yes**	**< 20** **Yes**	**Small** **Yes**	**Medium** **Yes**	**Large** **Yes**
What is the CO2 equivalent change in greenhouse gas emissions? (Million tonnes CO2 equivalent)			**Traded:** **Reduction**	**Non-traded:** **Reduction**	

I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.

Signed by the responsible Minister: .... Date: ....

Summary: Analysis & Evidence — Policy Option 1

Description: degression – committed non-domestic RHI expenditure for the next 12 months will be reviewed on a quarterly basis. If this committed expenditure exceeds certain trigger levels of expenditure, tariffs for new installations will be degressed on a periodic basis (every quarter) until committed expenditure falls to acceptable levels.

FULL ECONOMIC ASSESSMENT

Price Base Year 2012	PV Base Year 2010	Time Period Years 20	Net Benefit (Present Value (PV)) (£m)		
			Low: Negligible	**High:** Large	**Best Estimate:** Marginal

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	Negligible		Negligible	**Negligible**
High	Low		Low	**Low**
Best Estimate	Low		Low	**Low**

Description and scale of key monetised costs by 'main affected groups'

- Not quantified (see Evidence section);

Other key non-monetised costs by 'main affected groups'

- The threat of a degression could cause investors to delay their investment in renewable heating technologies due to the risk of receiving a lower tariff. This would undermine efforts to meet 2020 renewables target;
- Potential anticipation of degression could cause a spike in demand which would limit the ability of this mechanism to control budgets and mean demand may not respond to degression in the way predicted;
- Potential for premature degression if there is a "one off" spike in deployment in one particular quarter (which is reversed in the following quarter);
- "Menu" cost to investors from potentially frequent tariff degressions;

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	Negligible		Negligible	**Negligible**
High	Low		High	**High**
Best Estimate	Low		Positive	**Positive**

Description and scale of key monetised benefits by 'main affected groups'

- Not quantified (see Evidence section).

Other key non-monetised benefits by 'main affected groups'

- Demand-based system that enables subsidy to be amended as the technology matures ensuring value for money to the tax-payer;
- Helps support deployment of renewable heat installations and efforts to meet the 2020 renewables target. It also avoids disruption to scheme and demand;
- System relatively transparent and conducive to growing investment in renewable heat technology;
- Assists in managing the RHI budget;
- More market certainty than the 'do nothing option' of suspending the scheme until the next financial year as investor's are more certain of receiving RHI subsidy on a particular date;

Key assumptions/sensitivities/risks — **Discount rate (%)** 3.5%

- Demand is relatively responsive to degressions in tariffs (relatively frequent degressions at lower rates of reduction helps minimise risk);
- Triggers do not become self-fulfilling resulting in either under deployment or spikes in deployment due to the expectation of an impending degression;

BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Equivalent Annual) £m:			In scope of OIOO?	Measure qualifies as
Costs: n/a	**Benefits:** n/a	**Net:** n/a	No	N/A

Evidence Base (for summary sheets)

Glossary of terms

Committed expenditure – the level of non-domestic RHI expenditure DECC is committed to spending at any one point in time, based on applications received and approved.

Degression – the reduction of RHI tariffs for new RHI applicants accredited after degression is implemented, once a particular ‘trigger’ level of expenditure is reached.

Stand-by mechanism for budget management – the current system for managing the RHI budget in place until 31 March 2013. Effectively the scheme is suspended if a particular trigger level of spending is reached.

Lead-in times – the time taken from when the initial investment in a technology is made, to when the technology becomes operational and is producing renewable heat.

“Legacy” spending – RHI expenditure on existing installations. For example, expenditure in say 2013/14 will include expenditure on installations that have been claiming the RHI prior to 2013/14 as well as expenditure on installations that will begin claiming the RHI in 2013/14. “Legacy” spending refers to expenditure on installations already claiming the RHI (in the example above, installations that have been claiming the RHI prior to 2013/14).

Scaling – increasing the forecast level of expenditure by a particular percentage.

Tariff – the level of RHI subsidy (pence per kilowatt hour) that is paid to each eligible technology size.

Tariff trigger – applicable to most technology tariffs is a 50% uplift on the forecast level of non-domestic RHI expenditure for those tariffs. This forecast is the one used when the RHI scheme was launched in 2011 (and set out in the July 2012 consultation Budget Management Impact Assessment).

Total trigger – the total level of committed RHI expenditure forecast when the RHI scheme was launched (which was used to set the RHI budget). When the scheme was launched, this was broadly equal to the level of expenditure that was estimated to be needed to meet heat’s share of the 2020 renewables target.

Summary of preferred policy option (see Figures 4 and 5)

- A degression mechanism based on **committed RHI expenditure** will be implemented from April 2013;
- Total committed non-domestic RHI expenditure and committed expenditure for each tariff will be reviewed on a **quarterly basis.** Total committed RHI expenditure will be compared to the total trigger while committed RHI expenditure for each tariff will be compared to an individual technology tariff trigger;
- Degression will be triggered in the event of **either**: (1) total committed overall expenditure exceeding the **total trigger** or (2) committed expenditure for **any one tariff** exceeding an individual tariff trigger.

Summary of what has changed since the Consultation Impact Assessment in July 2012

- Enhanced Preliminary Accreditation (EPA) – where potential owners of renewable heat installation have a tariff “guaranteed” at a pre-determined level prior to the renewable heat installation being operational – this will **not** be implemented as part of this policy (see page 4);
- Differential treatment between cost-effective and less cost-effective technologies will **not** be implemented as part of this policy (see pages 10-12);
- We will not proceed with scaling above the overall cost of deployment in order to set the total trigger (see pages 10-12);
- The total, and individual tariff, levels of spending remains the same as set out in the July 2012 Impact Assessment (except for adjustments to assumed inflation rates and to better reflect process and space heating contributions);

Introduction

This Impact Assessment (IA) sets out the estimated costs and benefits of the Government's intended policy on non-domestic RHI budget management. This policy is set out in detail in the Government response to the consultation. The IA does not consider the costs and benefits of alternative policy options which were set out in the consultation IA on 'The Renewable Heat Incentive: Providing certainty, improving performance: Longer term budget management'.[1]

One of those policy options – enhanced preliminary accreditation (EPA) – will not be part of this policy. The majority of responses to the consultation were in favour of enhanced preliminary accreditation and some evidence was provided of the need for a tariff guarantee to drive deployment in the context of degression. It was, however, clearly challenging to provide evidence for this when degression is not yet in place. At this time there remain challenges to overcome with the design of the policy. For example the necessary measures to avoid gaming and speculative applications could result in significantly increasing the delivery costs of the scheme and questions remain as to whether such costs are worth the benefits the policy will bring.

While we do not propose to bring forward EPA at this time we recognise that there are arguments for the introduction of measures to improve certainty, even though these can be difficult to evidence. We therefore intend to monitor deployment in light of the introduction of degression and other planned improvements to the scheme. We will also continue to work on measures to improve certainty. This could include: resolving the remaining issues associated with enhanced preliminary accreditation, improvements to the existing form of preliminary accreditation; action as part of any future tariff reviews and/or considering what can be agreed as part of the RHI spending review package. We will continue to work with industry stakeholders through 2013 to improve our evidence base as we develop these options.

Background

The Renewable Heat Incentive (RHI) is a 20 year inflation-linked subsidy to owners of renewable heat installations based on the amount of renewable heat produced. It was introduced in November 2011 for the non-domestic sector. We have recently been consulting on its introduction to the domestic sector.

The current market for renewable heat is gradually expanding but these technologies still find it difficult to compete on cost with conventional heating options such as gas, oil and electricity. In addition to cost differences, there are a number of non-financial barriers to the uptake of renewable heat. The following describes the rationale for subsidising renewable heating:

- the negative carbon externality associated with the conventional heating of buildings. Renewable heat technologies enable buildings to be heated using significantly less fossil fuels thereby reducing greenhouse gas emissions;
- the UK operates under the EU's Renewable Energy Directive (RED) which sets out a legally binding target for the UK of 15% of energy coming from renewable sources by 2020. Although the infraction penalty for not meeting this target is not currently monetised, it is described as being commensurate with the costs of meeting the target;[2]
- driving innovation and cost reductions in renewable heat technologies is also a key rationale to support the longer term sustainable heating of buildings;
- renewable technologies add a further non-monetised benefit through diversifying the UK's energy demand, reducing the exposure of the UK to the price of oil and gas through further diversification of energy supply;

The Renewable Energy Strategy (published in 2009[3]) found that, on analysis of opportunities across electricity, transport and heat, a suitable contribution from the heat sector was 12% of heat being delivered from renewable sources by 2020. Renewable heat is also a key part of DECC's Carbon Plan[4]

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[1] http://www.decc.gov.uk/en/content/cms/consultations/rhi_cert_perf/rhi_cert_perf.aspx

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

[3] http://www.decc.gov.uk/assets/decc/what%20we%20do/uk%20energy%20supply/energy%20mix/renewable%20energy/renewable%20energy%20strategy/1_20090717120647_e_@@_theukrenewableenergystrategy2009.pdf

[4] http://www.decc.gov.uk/en/content/cms/tackling/carbon_plan/carbon_plan.aspx

and longer-term Heat Strategy,[5] which set out the important role of renewable heat in contributing to the long-term de-carbonisation of energy supply.

When the RHI was introduced, tariffs were based on the best available data at the time. However, it is possible that as more data becomes available, and / or there are cost reductions experienced in certain technologies, tariffs may end up being too high for future installations. Offering investors an excessive rate of return would mean the scheme would not deliver at least cost and hence would pose budgetary risks.

The budget for the RHI for the next two years is given in the table below. The RHI is funded directly from Government spending and has been assigned annual (nominal) budgets for this SR period. The annual budgets are not flexible and therefore any under spend in one year cannot be carried forward to future years.

Figure 1: Allocated RHI budget (nominal prices)

Financial year	Spending Envelope £m
2013/14	251
2014/15	424

If forecast levels of non-domestic deployment turn out to be higher than expected, an appropriate budget management approach needs to be in place to manage the public sector cost implications and ensure value for money to the tax-payer.

In addition, uncertainty in the level and sustainability of the non-domestic RHI could be undermining (or could undermine) investor confidence in renewable heat and therefore the Government's ability to meet its renewables target. Therefore, as well as the twin objectives of ensuring value for money and budgetary control, any budget management approach must also be balanced against the need to ensure certainty and transparency in the payment of the RHI.

Problem under consideration

As the Government has a limited budget for the RHI, the problem under consideration is how to best manage the non-domestic RHI budget and meet the objectives of: budgetary control; value for money; reduced investor uncertainty; and ensuring the policy is relatively simple to implement and administer. The preferred approach is through a preset link between expenditure and tariff changes. This is preferential to maintaining the current mechanism of budgetary control which involves suspending the scheme to new entrants if a particular level of spending is reached (i.e. a cap).

Rationale for intervention

The overarching aim of the RHI is to incentivise the cost effective installation and generation of renewable heat to contribute to the heat proportion of the renewables target whilst ensuring the foundations are set to deliver the Heat Strategy and meet future carbon reduction targets.

While these objectives (and those listed in the Background section) are all desirable, there is a limited budget available to support renewable heat deployment. The current mechanism for ensuring budgetary control for the non-domestic RHI applies until 31 March 2013 and effectively involves the suspension of the scheme once a particular level of spending is reached. However, it is recognised that this is a blunt instrument relative to alternative options and may add to an increase in uncertainty in the market. It may also represent lower value for money than other options if it results in a higher level of inefficiency – through the payment of excessive economic rents – than alternative options.

[5] http://www.decc.gov.uk/assets/decc/11/meeting-energy-demand/heat/4805-future-heating-strategic-framework.pdf

Policy objectives

The proposed budget management approach has the following key policy objectives:

- to put in place a transparent system that is capable of managing the RHI budget, should demand (and therefore spending) exceed forecasts;
- ensures value for money;
- avoids suspensions of the scheme;
- reduces uncertainty in the market; and
- is relatively straightforward to administer and implement;

The 'do nothing' option

It is essential when analysing the impact of a policy option to consider the impact of no change. In the context of the non-domestic RHI, a 'do nothing' approach to budget management would effectively involve having a budgetary control system similar to the stand-by mechanism for budget management (SBM).[6] The SBM covers 2012/13 and has a preset link between non-domestic RHI expenditure and scheme suspension i.e. once a particular level of expenditure is reached the scheme is temporarily suspended for new entrants for the remainder of the financial year. A review of the RHI is currently scheduled for 2014 and 2017 which would enable tariffs to be amended in the event of the scheme being suspended. While this form of budget management ensures RHI expenditure does not exceed the budget available, and is relatively straightforward to administer and implement, it has the following weaknesses:

1. It creates uncertainty for investors and particularly for investors in large renewable heat projects with long lead-in times; and
2. It does not represent as good value for money as other options given significant spending on one particular technology could, in theory, lead to the scheme being temporarily suspended to the disadvantage of other (potentially more cost effective) technologies which are deploying in smaller numbers;

In respect of 1, if investors are uncertain about whether they will be eligible to receive the RHI, they may be deterred from investing in a renewable heating technology (or at least delay their investment decision). Conversely, they may apply before they are ready in order to secure funding before the scheme is suspended, which may artificially result in the cap being hit. In respect of 2, it is important to firstly understand how RHI tariffs are calculated. RHI tariffs are calculated in the following way:

- Estimate the additional cost of installing and running a renewable heating system. This is used to calculate the cost per unit of heat produced for renewable technologies less the cost of the conventional technology alternative. Added to this cost are the additional barrier costs. Calculations are made using costs, use and performance data for each technology in each category of building (broken down by commercial, industrial, counterfactual fuel and location).
- Estimate the heat demand of each building category, the number of such buildings and the proportion of them suitable for each renewable technology.
- From these figures, a "supply curve" is produced for each technology which estimates the amount of renewable heat potentially fundable at each tariff level.
- From these curves we are able to identify the tariff required to potentially incentivise the targeted percentage of the potential installations. This targeted percentage is the 50% point on the supply curve (**unless** the tariff reaches the level consistent with the marginal cost of meeting the renewables target);[7]

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[6] http://www.decc.gov.uk/en/content/cms/consultations/rhi_cost/rhi_cost.aspx

[7] RHI tariffs are capped at 8.3p per kilowatt hour (2010 prices for offshore wind). Capped tariffs are currently being reviewed and DECC will report on this issue in due course.

If demand for a particular technology significantly exceeds expectations, this could be due to our cost assumptions being incorrect (as a result of the technology maturing allowing capital costs to fall, changes in supply and/or changes in operating costs for example). If costs are lower than expected, demand will be higher all else being equal. In such a scenario, it is possible that demand could be higher for a small number of technologies which could cause a ‘trigger’ level of spend to be reached causing the RHI to be suspended. Such a system makes no allowance for certain technologies having matured faster than others and instead the RHI in its entirety is suspended for the remainder of that financial year.

This type of demand response would be an indication that the tariff rates were too high, implying potential excessive economic rents and deployment in the short term at the expense of more sustainable deployment over the medium-to-long term given budgets. The uncertainty and stop-start impact on the market this could have would not be supportive of generating sustainable growth in renewable heat deployment. From a public sector financing perspective, it would also mean lower value for money and potentially a reduced ability to manage the RHI budget year to year.

Proposed 'do something' option - degression system

<u>Summary of how the degression mechanism will work</u>

- A diagram explaining how the proposed degression mechanism will work is set out below.

- When the non-domestic RHI scheme was launched in 2011, there was a total level of non-domestic RHI expenditure forecast up to 2020. This included estimates of expenditure required to support both existing applications and new installation as they came on line. This RHI expenditure was linked directly to an increase in renewable heat deployment. This level of deployment was broadly equal to **heat's share of the 2020 renewables target** and used to set the RHI budget.

- **The proportion of this total level of expenditure which is estimated as committed spending (i.e. on existing applications) is the 'total trigger'** (see below). If expenditure exceeds this level of spending then there may be a level of deployment that is in excess of what is needed to meet heat's share of the 2020 renewables target.

- The total level of non-domestic RHI expenditure consists of expenditure on different eligible renewable heating technologies. This spending represents the tariff for the relevant technology multiplied by the expected amount of renewable heat produced, as modelled when the scheme was launched in 2011. The levels of expenditure for most tariffs have been increased by 50% (rationale given below). **The level of expenditures for tariffs following this 50% increase are defined as the 'tariff triggers'. Two technologies have their triggers set in a different way: solar thermal and large ground source heat pumps, where triggers are set at 5% of the value of the total trigger.**

- The proposed degression mechanism will then work as follows:

- On a **quarterly** basis, both total estimated committed non-domestic RHI expenditure for the following 12 months and estimated committed non-domestic RHI expenditure for each tariff for the following 12 months will be compared against the total trigger and tariff trigger levels of spend respectively. The following decision rules are then applied:

- **Step 1:** at each degression point, compare total committed non-domestic RHI expenditure for following 12 months with the total trigger of non-domestic RHI expenditure. If total committed non-domestic RHI expenditure at any degression point is less than 50% of this total trigger no degression will occur. If it is greater than 50% proceed to Step 2. If it is 100% or more proceed to Step 3.

- **Step 2:** as the 50% total trigger is 'hit', compare committed non-domestic RHI expenditure for each tariff with each tariff trigger. If committed non-domestic RHI expenditure at any degression point exceeds the individual tariff triggers **then degress by 5%**. For future degressions where tariff triggers continue to be hit see **Step 4.**

- **Step 3;** If total committed non-domestic RHI expenditure at any degression point exceeds the total trigger (i.e. is equal to or more than 100%) then for each technology deploying 'above' its forecast level of deployment **degress by 5%** (or as set out under step 4), or if deploying above the tariff trigger **degress by 10%**.

- **Step 4**: For future degressions where total committed non-domestic RHI expenditure at any degression point continues to be greater than 50% of the total trigger, then each technology deploying 'above' its tariff trigger may be degressed further. However, this is dependent on the rate of continued growth against the rate that the total trigger level increases (this is explained in Figure 4). A degression may be up to 20% of the existing tariff.

- **Step 5:** Now continue to the next degression point and repeat the process.

Description of do something option (degression)

This policy option involves reducing the tariff(s) paid to new applicants **if** committed forecast RHI expenditure exceeds particular trigger levels. Assessment of deployment against triggers will occur every three months, with degression occurring if triggers are hit.

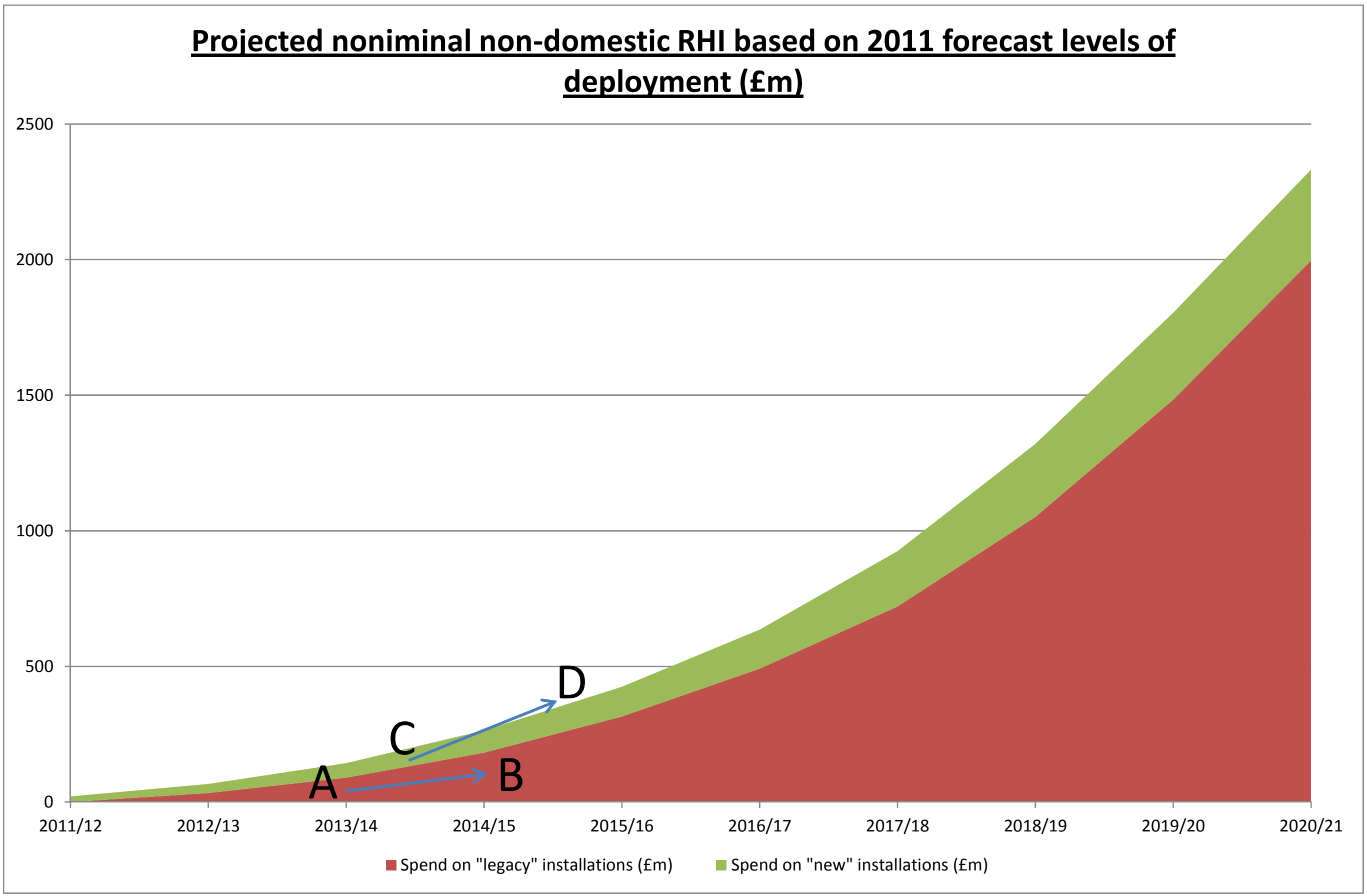
At any degression point, if estimated committed non-domestic RHI expenditure for the following 12 months is above a key trigger level of expenditure, tariffs would be reduced by a pre-set percentage. This would be repeated the following quarter if the reduction was not sufficient to bring expenditure back within estimated levels, as set out at Figure 4. **Please note, all trigger points are given in Annex B. At each of the dates given, if committed expenditure for the following 12 months is equal to, or is greater than, the numbers in Annex B, then there will normally be a degression; the exception being where growth following an earlier degression has slowed so as to indicate that degression has had an impact on deployment rates.**

The degression mechanism and proposed triggers are illustrated in the diagram below. The diagram illustrates the original projected levels of RHI expenditure when the scheme was launched. However, the total level of expenditure is split between spending on "legacy" installations and spending on "new" installations. Spending on "legacy" installations represents all the RHI that is projected to be spent on installations already claiming the RHI. For example, in 2014/15, the projected level of "legacy" expenditure is equal to around £182m (this is the red area in the chart below). This is projected spending in 2014/15 on all installations that began claiming the RHI before the 1 April 2014 (i.e. April 2012-March 2013). However, during the course of 2014/15, new installations will also begin claiming the RHI. The projected level of expenditure on "new" installations during 2014/15 is around £80m (this is the green area in the chart below). The combined total (£264m) is the projected level of RHI expenditure in 2014/15.

Therefore, it is important that any trigger ensures there is sufficient budget to cover the cost of meeting all "legacy" commitments and "new" installations that are projected to come on stream that year. As the preferred policy compares committed expenditure at each degression point over 12 months, it only takes into account spending on existing (or "legacy") installations. It does not take into account spending on "new" installations. Therefore, the triggers at any degression point are effectively the "legacy component" of the budget.

For example, if we are at point A in April 2014, and our forecast level of committed expenditure is equal to point B (say around £190m), then as this is within the "legacy" component of the budget there would be no degression. At point A, there is sufficient budget to meet commitments from existing installations and fund "new" installations over the coming 12 months. However, in the example below, if we are at point C in say October 2014 and committed RHI expenditure for the following 12 months exceeds the legacy line so we are projected to be at point D, there will be a degression. This is because existing commitments would exceed the level of budget available for meeting those "legacy" installations meaning there is insufficient budget to fund "new" installations over the 12 months.

Figure 2: Forecast non-domestic RHI expenditure from scheme launch in 2011



The following scenarios provide some further examples of how the degression mechanism will work:

- Scenario 1: in April 2014 total committed non-domestic RHI expenditure is equal to £190m and all expenditures for each tariff are less than their tariff triggers
- Scenario 2: in July 2014 total committed non-domestic RHI expenditure is equal to £250m and all expenditures for each tariff are greater than their tariff triggers
- Scenario 3: in October 2014 total committed non-domestic RHI expenditure is £250m while small and medium biomass are deploying above their tariff triggers

In order to assess how the degression mechanism will work we need to use the trigger points set out in Annex B.

- In Scenario 1, it is April 2014 and total committed non-domestic RHI expenditure is equal to £190m. From Annex B, the total trigger in April 2014 is £192.8m which is greater than committed expenditure. In addition, all expenditures for each tariff are less than their tariff triggers so there is no degression in any tariff.
- In Scenario 2, total committed non-domestic RHI expenditure is £250m. In Annex B, the total trigger in July 2014 is £226.1m. As the total trigger has been exceeded and expenditure on each tariff is greater than each of the tariff triggers, there is a 10% degression in all tariffs (5% from the total trigger being hit and 5% from the tariff triggers being hit).
- In Scenario 3, total committed non-domestic RHI expenditure is equal to £250m. In Annex B, the total trigger in October 2014 is £259.5m so the total trigger has not been 'hit'. However, small and medium biomass are both deploying at rates greater than their individual tariff triggers. In this instance, only small and medium biomass receives a degression equal to 5%.

Of course there are obvious limitations with modelling, not least that all forecasts will be based on a number of assumptions. In particular, if the degression of tariffs comes at the expense of deployment such that the 2020 renewables target is put at risk and spending is reduced well below budget, this could suggest the proposed rates of degression were too strong. Therefore, it is important that we review the mechanism at future points.

There are also several important details of the policy which require further explanation including:

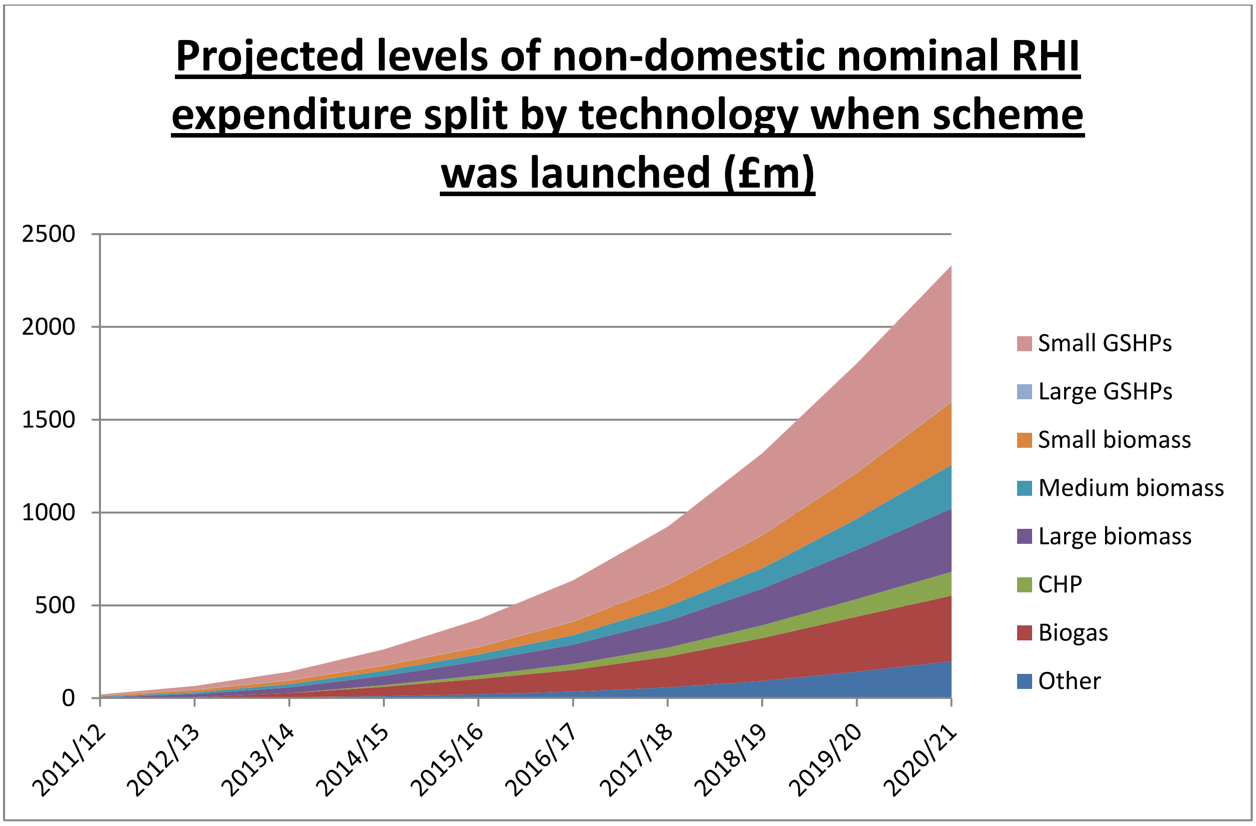
- What baseline to use to compare committed expenditure against?
- Whether all technologies should be treated the same?
- How frequent should degressions be?
- What should be the rate of degression?
- How much flexibility should there be?
- How will degression work in practice?

<u>What baseline to use to compare committed expenditure against?</u>

As the overarching objective of the RHI is the cost effective deployment of renewable heating technologies so as to enable heat to meet its share of the 2020 renewables target, it is proposed that the most appropriate baseline to use is the total level of expenditure set out in the July 2012 IA (derived from the original 2011 IA as per Figure 2). This forecast is consistent with a significant renewable heat contribution towards meeting the 2020 renewables target. It was also the basis for estimating the RHI budget for the current spending review period.

The projections cover time after the current spending review. The RHI scheme budget is agreed to 31 March 2015. Future budgets will be set as part of wider resource allocation processes. However, the underlying principles around degression are expected to remain the same. The individual technology contributions as shown in Figure 3 and all triggers are given in Annex B (for individual tariff triggers, they are the forecasts given below scaled by 150%, or for solar thermal and large ground source heat pumps set a 5% of the value of the total trigger)

Figure 3: Forecast non-domestic RHI expenditure



Note: CHP = combined heat and power, GSHP = Ground source heat pumps, Other = other technologies that were included in the 2011 IA and projected to contribute towards the 2020 renewables target

Whether all technologies should be treated the same?

Given uncertainties with forecasting deployment and spending up to 2020, particularly in a relatively new market such as renewable heat, it is proposed that individual tariff triggers for most technologies are scaled at 150% of their expected level of expenditure up to 2020. To be consistent with the total trigger, these individual tariff triggers will be the underlying levels of expenditure underpinning the total trigger. They therefore represent the forecasts made when the scheme was launched. The triggers for solar thermal and large ground source heat pumps set a 5% of the value of the total trigger**.**

To reflect the possibility that deployment may be different from our original modelling, the scaling to 150% helps provide flexibility and supports the growth of the renewable heat industry. It also maintains a link to value for money while supporting diversity by preventing one dominant technology. By identifying the level of scaling for tariff triggers we have made a judgement that 150% will provide the balance between enabling flexibility and maintaining a link to value for money.

The 2011 projections do not anticipate any deployment in solar thermal panels because the tariff was capped at a level equivalent to the Renewables Obligation subsidy for offshore wind and modelling therefore did not show sufficient incentive to bring forwards deployment. The projections for large commercial ground source heat pumps were also very low. These technologies were included in the RHI because it was judged that there is value in incentivising their deployment, therefore it would be illogical to put in place a trigger that would reduce tariffs as soon as there is any deployment in the case of solar thermal, or once a very low level of deployment has been reached in the case of large heat pumps. We will therefore have no tariff trigger that is less than 5% of the total trigger. We will consider whether these triggers should be amended as part of the planned 2014 review.

Scaling tariffs as set out above allows for the fact that the eventual mix of technologies / tariffs in the future is likely to be different to a modelled scenario made several years earlier. This helps avoid degressing one tariff where overall deployment is low and therefore under deploying, whilst also maintaining the link to value for money for tariffs and avoiding over-compensation. If the level of scaling were too high, then there would be an increased risk of one technology dominating the RHI budget and the link to value for money would be reduced. If the triggers are scaled less, the possibility of the RHI failing to deliver the 2020 renewables target is increased.

How frequent should degressions be?

The consultation proposed quarterly degression evaluations and reductions if triggers are hit and we are proposing to take this approach forwards. More frequent smaller degressions reduce the risk of over correction and, when combined with the capacity for reductions to be increased if demand does not reduce sufficiently, ensure that the RHI budget can be managed effectively. Fixed dates for quarterly assessments enable stakeholders to easily recognise when reductions might occur.

Announcements will be based on regular deployment data provided by the Office for Gas and Electricity Markets (Ofgem). The process will include a period of assessment of this data by DECC to determine if any triggers have been hit and what levels of tariff reduction, if any, need to be made. There will be a one month notice period issued prior to any tariff reduction coming into effect. The process is illustrated in Annex A. Degressions occurring as a result of the overall trigger being hit will be made every quarter regardless of how individual technologies are deploying.

It is proposed that DECC will make an announcement on degression on the following dates, with any reductions in tariffs coming into effect a month later.

Dates DECC will make a degression announcement	Date revised tariffs come into effect
1 June	1 July
1 September	1 October
1 December	1 January
1 March	1 April

:

What should be the rate of degression?

The rates of degression need to be large enough to (a) ensure the RHI budget can be managed year to year and (b) maintain a steady growth in deployment up to 2020 thus minimising excessive payment of economic rents. The rate of degression should not be so large that the demand response from a degression is so significant that there is a detrimental impact on the supply chain. Therefore, to help balance the need to manage the RHI budget with the need to avoid significant disruption to market development, it is important that the mechanism itself is established up front. This will help to mitigate the possibility that the supply chain will surge forward detrimentally.

The sensitivity analysis set out later in this IA 'stress tests' the proposed degression rates to ensure the proposed rates are sufficient. For example, we have analysed the impact of reducing the capital costs of most eligible RHI technologies by 50% and combined this with higher fossil fuel prices – which makes renewable heating technologies more attractive relative to conventional gas boilers – and a reduced supply constraint that limits suppliers from meeting larger increases in short term demand. This scenario modelling broadly indicates that under these scenarios the proposed degression levels and frequencies of degression would be sufficient to ensure spending stays within the total trigger level of expenditure.

How much flexibility should there be?

There are a various features of the proposed degression mechanism that ensure the policy is flexible. For example, the scaling of individual tariff triggers is, in part, a reflection of the uncertainty in our forecasts of what the mix of technologies will be in the future. There are also several other features of the proposed mechanism that enable increased flexibility including:

- **Exempting technologies from a degression if deployment is significantly low:** as a key rationale for the RHI is to ensure the 2020 renewables target is met in a cost effective manner, degressing tariffs in a world of low deployment undermines this policy. Therefore, if total committed expenditure is less than 50% of the total trigger there will be no degression irrespective of whether individual tariff triggers are hit or not, or whether some technologies are deploying at higher than projected levels;

  Having two triggers: there will be triggers for each tariff and an overall total trigger for the total non-domestic RHI expenditure. Triggers represent cumulative nominal RHI expenditure. The total trigger would be based on the "legacy" component of the RHI budget which, when the scheme was launched, was equal to the assumed cost of the overall deployment curve required to meet the 2020 renewables targets and used as a basis for setting the RHI budget. The triggers for each tariff are also based on the underlying contributions of each tariff to this total trigger, scaled to a 150% or set at a value of 5% of the total trigger.

How will degression work in practice?

DECC will set out in advance the quarterly triggers in each year initially up until the end of 2014/15 (see Annex B). The decision rules for degression are set out in greater detail in the two following diagrams.

Figure 4: Decision rules for degression policy in quarter 1

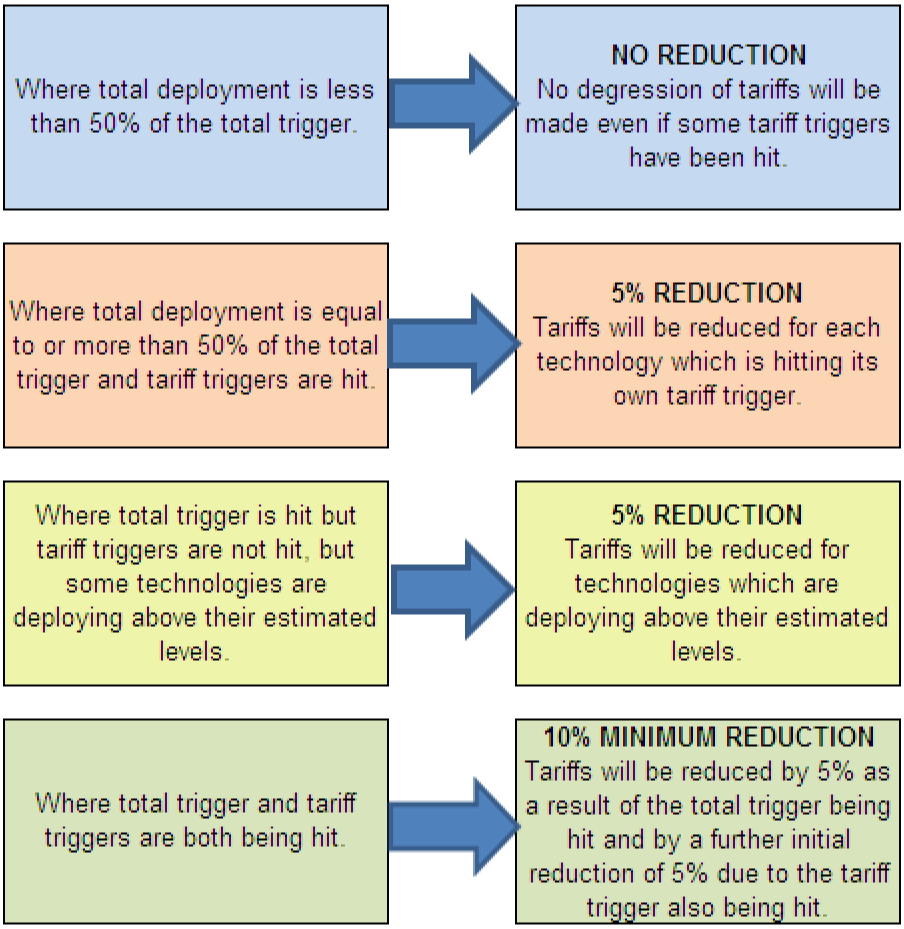
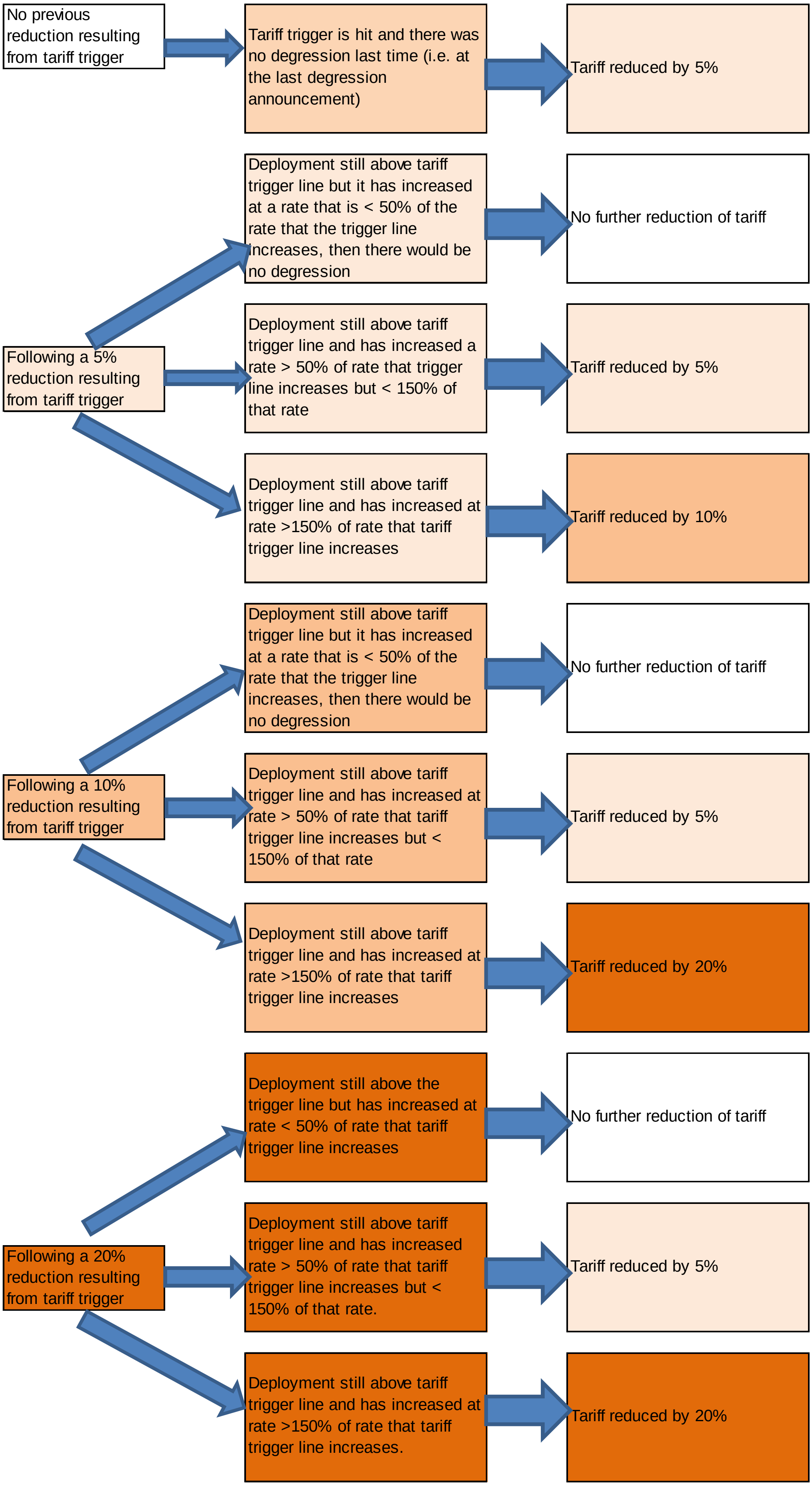


Figure 5: Decision rules for degression policy where by a tariff trigger has been hit in the previous quarter



Monetised and non-monetised costs and benefits of each option

In order to assess the impact of the proposed policy option we have set out all the potential benefits and costs in qualitative form. A qualitative approach is required because of the range of possible scenarios that could result if actual deployment turns out to be significantly different from forecast deployment. We have undertaken extensive sensitivity analysis to illustrate the potential impact of a degression system and assessed how this policy option **compares with the do nothing option** against the key policy objectives. This is summarised in the table below.

Figure 6: Summary of potential impact of preferred policy option

	Better value for money	Avoids suspensions of the scheme	Guarantees budgetary control	Reduces uncertainty	Straightforward to implement and administer
Do nothing: Stand-by Budget Management	No	No	Yes	No	Yes
Policy option 2: degression	Yes	Yes	No	Yes	No

The alternative to degression is annual spending caps that extend the current stand-by budget mechanism; the scheme would be suspended until the next financial year if committed expenditure were to rise above pre-set levels. This has the advantage of ensuring greater budgetary control at the expense of potential investment disruption, whilst degression involves less investment disruption but gives less certainty on budgetary control.

The preferred approach is to implement a preset link between tariff levels of spending (degression) rather than through a system that could lead to investment disruption. Therefore, greater risk on budgetary control is traded off against the additional benefits of value for money and avoidance of scheme suspension.

Policy Option 1: Do nothing

This option is the counterfactual that the “do something” option will be compared against. There are broadly two options for the counterfactual; either we assume that the SBM mechanism is extended or we assume it lapses and there is no formal budget management mechanism in place. We have assumed the former because given a limited budget (see Figure 1), there ideally needs to be some form of budget management system in place to ensure spending remains in this budget. However, we recognise the possibility of there being no formal budget management approach, and that if this were the case, it is assumed DECC would still need to react to any potential overspend in a potentially crude manner i.e. through scheme suspension. Our estimates for spending indicate that a suspension in the absence of any formal budget mechanism is unlikely to be needed, at least in the short term. If the counterfactual scenario did not assume any form of scheme suspension, we would effectively be assuming there was an unlimited budget for the RHI which is clearly unrealistic.

Policy Option 2: Degression of tariffs

Benefits

Better value for money

There are broadly two ways of defining value for money (vfm):

- Ensuring we get the maximum level of benefit per £1 spent (which should mean benefits outweigh costs); or
- Achieving a given level of benefit (or target) at least cost;

RHI expenditure tends to be negative Net Present Value (NPV) for the benefits we can quantify. Negative NPV investment means the costs outweigh the monetised benefits. Therefore, if the focus of the RHI is to meet the 2020 renewables target, then vfm should be about achieving this target at least cost. This means any expenditure – and therefore deployment – above what is required to meet this target would not represent vfm.

However, there are three complications to this interpretation:

1. Forecast levels of expenditure as per Figure 2 and deployment are not necessarily based on an optimised level of deployment that will deliver at least cost;

2. A secondary objective of the RHI is to prepare for the mass roll out of renewable heat technologies needed to support future heat demand; and

3. There are potential non-monetised benefits associated with supporting renewable heat technologies which should form part of the vfm analysis, particularly associated with innovation leading to future cost reductions.

A benefit of degression, over the SBM, is that it enables tariffs to be adjusted as technology and customer attitudes change. It,therefore, reduces the risk of excessive unsustainable deployment – in which tariffs are higher than necessary to meet the 2020 renewables target (meaning some RHI subsidy may not represent value for money) - and helps ensure a smooth trajectory of deployment to 2020. Higher than expected expenditure on a particular technology also indicates that tariffs may be too high resulting in the payment of economic rents to producers. Degression enables subsidy to be amended to avoid producers receiving an excessive rate of return.

The scenario modelling, set out later in the IA, analyses the potential impact of adjusting some key assumptions determining the uptake and level of RHI expenditure. Varying these assumptions so that renewable heating technologies are commercially more attractive, can cause expenditure and deployment to rise above the level required to meet the 2020 renewables target. As discussed above, this would mean expenditure does not necessarily represent value for money as it would not be achieving a target at least cost. However, the proposed budget management mechanism appears effective at managing RHI expenditure so a smooth trajectory of deployment to 2020 is achieved.

Reducing uncertainty

One of the potential drawbacks with degression is that the triggers could impact on investor confidence. For example, the existence of triggers and the threat of degression itself could lead to potential investors withdrawing from the market. The mere possibility of this may have a self-fulfilling impact by causing potential investors to shy away from any investment. This would undermine efforts aimed at meeting the 2020 renewables target.

However, there could also be the opposite impact given our counterfactual scenario is the potential suspension of the scheme once a particular level of expenditure is reached. The introduction of degression may actually increase confidence in the market by giving greater certainty and clarity to potential investors on the tariff they could receive (rather than the possibility of the RHI scheme being temporarily suspended). This is because the decision to invest in a technology will be determined by the expected return of that investment. Part of that return is the expected subsidy income stream. However, the risk associated with any uncertainty on the value of the subsidy will be factored into any investment decision.

The key question is whether the introduction of a degression system will lead to an increase or decrease in uncertainty. It could be argued that degression will increase uncertainty as potential investors will be unsure whether they would receive a tariff that is less than the prevailing rate; this is particularly true for technologies with long lead-in times such as renewable Combined Heat and Power (CHP) plants or deep geothermal sites. An investor will, therefore, have to form a judgement on the expected value of a future tariff which will be a function of the probability of the current tariff being reduced before they are eligible to receive the RHI. This means the perceived RHI tariff is less than the current one. This expected tariff could mean certain investments will not go ahead.

If the alternative to degression is the suspension of the RHI scheme, then investors may perceive a degression system as a more suitable instrument to managing the RHI budget. For example, if expenditure exceeds a particular trigger with the SBM, the RHI scheme is suspended for the remainder of the financial year). Therefore, for projects with long lead in times, they will need to form a judgement about the expected value of any future subsidy income stream on the basis that they may not be able to claim the RHI until several months in the future.The suspension of the scheme could have a detrimental impact on the market by undermining the confidence of investors in the supply chain, and in the technologies for end use, by creating a stop-start market.

Thus, the key issue is whether a system of degression based on preset rules linking expenditure and tariff levels provides greater certainty to investors than a scheme which could be suspended should a particular level of spending be reached. Responses to the consultation suggest broad support for a system of degression. This suggests respondents prefer such a form of budget management relative to the risk of the scheme being suspended. This could indicate that implementing a system of degression could actually reduce uncertainty in the market. Hence, provided clear rules are set out in advance, degression has the potential to be transparent for investors as it provides clarity to industry about how DECC monitors expenditure and at what level expenditure would 'trigger' a degression and by how much.

Costs

Lack of certainty on managing the RHI budget

Although degression lowers RHI expenditure relative to a world with no budget management mechanism in place, this policy option does **not** guarantee that the RHI budget will not be exceeded in the event of (significantly) higher than expected deployment (unlike the SBM which enables the scheme to be suspended). For example, if demand is relatively price insensitive to changes in tariff levels, then degression may only have a limited impact in lowering future spending. The existence of an external shock for example, this could be a substantial increase in fossil fuel prices or large change in the costs of renewable heat technologies,or changes in consumer demand, could cause a spike in uptake for renewable heat technologies. The size of the shock could mean that demand becomes relatively price insensitive to degression changes, which would limit the effectiveness of this measure in helping meet the RHI budget. The analysis of such scenarios (set out in the sensitivity section of the IA) suggests the proposed policy is forecast to bring spending into line should particular scenarios happen. The sensitivity analysis also assesses the types of scenarios where this might not happen.

The benefit of the SBM approach is it provides the most certainty on budgetary control. In effect, the level of committed RHI expenditure would be allowed to rise overtime until a particular 'trigger' level of spending is reached. At this point the scheme would no longer be open for new RHI applicants for that financial year. It therefore has the advantage of being transparent and relatively straightforward to administer as it would simply involve monitoring expenditure until a 'trigger' point is reached.

Difficult to implement

A key objective of the policy is to implement a simple and transparent budget management approach. Arguably the SBM, which simply tracks total spending versus a pre-determined quota level of expenditure, has the advantage of being a simpler scheme to implement compared to degression. This is partly because degression aims to meet the additional policy objectives of ensuring value for money and reducing uncertainty in the market. However, we have sought to minimise this complexity through the use of transparent diagrams and clearly set out trigger levels of expenditure in Annex B. Annex B illustrates the levels of committed expenditure at each degression point that can ultimately cause a degression. Investors are able to track these trigger levels and committed expenditure overtime which helps reduce uncertainty and any perceived complexity with the policy.

Potential risk of "over degression"

If there was a particular month where demand "spiked" causing forecast spending to be higher than baseline forecasts, there is a risk that tariffs could be degressed unnecessarily, if demand was to then fall significantly afterwards. Reducing tariffs unnecessarily would undermine the ability of renewable heat to meet the 2020 renewable target and mean important benefits were being foregone.

Thus, deciding the appropriate frequency of any degression - as well as the rates which should be applied - involves a trade-off between ensuring there will be enough degressions in a year at a sufficient level to reduce spending sufficiently, bagainst ensuring there is sufficient time between degressions where new deployment can grow and respond to the change in incentive. As we do not know the future relationship between tariff changes and take-up the degression rates chosen aim to balance the need for budget control with this risk.

Administrative costs

An additional cost associated with this measure is the potential administrative costs to DECC and Ofgem in operating this policy. Although monitoring levels of RHI committed expenditure would happen under a 'do nothing' option, there would be an additional cost in administering the scheme through systems changes, particularly if there are frequent degressions. The potentially large number of small degressions in a 'high' deployment scenario could also impose a potential "menu cost" on industry (the cost to industry of having to regularly re-assess the business case of an investment in light of changing tariffs).

Whilst these costs are partly implementation costs to Government, they should be compared against the 'do nothing' option. If degression was required, it would be because forecast expenditure is likely to exceed the budget available. Therefore, in the absence of degression, there would still be a cost in monitoring expenditure against budget and implementing a potential suspension of the scheme should spending reach the budget available.

When compared to the existing stand-by mechanism, degression does result in additional costs to DECC and Ofgem. However, these are within DECC tolerances enabling us to implement our preferred policy which removes the need to suspend the scheme, and avoid the uncertainty which a suspension would create for industry. Suspension represents a relatively simple approach to budget control for both DECC and Ofgem; Ofgem only needs to monitor deployment levels in order to determine if the stand-by mechanism has been activated. If activated, this need to monitor is temporarily stopped until the next financial year and hence Ofgem's costs are lowered due to the fact that the scheme is frozen and thus there is no longer a need to accept and process any new applications. The reporting requirements for the stand-by mechanism do not add additional costs as they fall within normal reporting requirements.

For DECC, degression will necessitate quarterly assessments of monthly data to determine if degression is activated. It is not considered that this adds additional costs as similar analysis is required under the existing stand-by mechanism.

Administrative burden to scheme administrators

The forecasting of expenditure will be a relatively simple routine, using data already collected via Ofgem:

a. Low Deployment: Assessment of cost: Negligible

b. High Deployment: Assessment of cost: Negligible

c. Excessive Deployment: Assessment of cost: Negligible

In the case that degression is triggered, there will be higher administrative costs associated with continued monitoring of deployment levels, processing applications, amendments to IT systems to implement degression, audit checks and general consumer queries regarding quarterly degressions.

Under degression, Ofgem will continue to accept and process applications, and provide regular reports on deployment. They will also need to amend their IT systems each time there is a degression. The estimated costs for this are £12,000 per change. However, under a low scenario, we estimate no or very few numbers of degressions occurring and the IT cost is therefore minimised. Clearly these costs increase under a medium and high scenario. The worst case scenario is that there are around 4 degressions in the first year, meaning a total cost of £48K in IT changes. If we also degress to the same extent in the following year then IT costs increase to just under a maximum of £100K in 2 yrs.

Ofgem also expects some increased costs may result from the need to conduct additional audit checks to confirm eligibility and prevent possible fraud on installations commissioned around a degression. It is estimated that up to 25% of installations may be audited. Projected costs for this are £150K over 3 years and these costs are mitigated, to some extent, by the fact that Ofgem already carries out site visits and has processes in place to conduct these. We have examined whether a lighter touch and lower cost approach to carrying out checks might be feasible but the requirement for audit checks are based on Ofgem's experiences of the Feed-in tariff scheme.

These costs will be reviewed as deployment levels rise and the scheme beds in, to ensure that they continue to represent the most cost effective response, and in any case one year after their implementation (and/or the first deployment in the case of degression).

The proposed introduction of degression may lead to temporary surges in applications as participants rush to beat the deadline for reduction in tariff rates. This would place a strain on Ofgem in processing accreditations, particularly if there is a long notice period. However, o reduce this risk we have kept the notice period short (one month).

Administrative burden on suppliers (the supply chain)

Degression could cause higher administrative burdens on suppliers of renewable heat. In order to assess the risks of degression being triggered, suppliers will need to be aware of and interpret DECC/Ofgem expenditure forecasts. Suppliers have indicated to DECC that they will be monitoring rates of deployment where possible as a matter of course, so the additional burden is considered minimal, but again varies with deployment:

a. Low Deployment:

Where deployment is not considered likely to trigger degression, it is expected that suppliers would face negligible monitoring burden. Assessment of cost: Negligible

b. High Deployment:

Where deployment risks triggering degression, it is expected that suppliers will face a low level of administrative burden. It is considered that suppliers need only ensure they are aware of developments in deployment (which will be regularly published) and use this to inform decisions on investment. Assessment of cost: Very Low

c. Excessive Deployment:

Where degression is triggered and a hiatus in the market for renewable heat exists, this is expected to result in some form of administrative cost to suppliers. However, as before, this may be lower than in the counterfactual case whereby the scheme was suspended later. Assessment of cost: Very Low

Sensitivity analysis

Are the proposed degression levels appropriate?

This section contains analysis on the potential impact of different scenarios which alter key assumptions relating to the demand and supply of renewable heat technologies. The key assumptions varied are:

- Capital costs: the capital cost of a renewable heating technology is a key determinant of demand. A cheaper upfront capital cost will increase the demand for this technology all else being equal, as it will be more attractive to purchase relative to a conventional heating system;
- Fossil fuel prices: more expensive fossil fuel prices raise the cost of the assumed counterfactual technology, which increases the attractiveness of a renewable heating technology all else being equal; and
- Supply side constraint: the central projections of RHI expenditure and deployment assume suppliers are, in the short term, constrained by their ability to meet future increases in demand thus limiting the level of RHI expenditure. If this assumption is relaxed, demand will be higher if previously constrained (all else being equal) as consumers are able to claim RHI faster than otherwise would be the case;

Given the infancy of the renewable heat market, we do not yet have a firm view as to which of the above assumptions are most likely to be incorrect. However, large reductions in capital costs are arguably unlikely given demand would need to be sufficiently high to allow suppliers to realise cost reductions. This may be less true of technologies where there is potential for low cost imports. To analyse the potential impact of large reductions in costs in a technology that could deploy quickly we have carried out a sensitivity test on Air Source Heat Pumps (ASHPs).

The following analysis 'stress tests' the proposed policy by assessing the potential impact of varying these assumptions to see how forecast RHI expenditure might change overtime and whether the policy objectives are achieved.

A key point to note is that our modelling assumes any degression happens at the start of the financial year. Therefore, modelling the proposed levels of degression described previously would overstate the 'effective' level of degression experienced in a financial year given degression points happen at different points during the year. To account for this, we have calculated a weighted average of the proposed degression mechanism during a financial year and used this in our modelling. For example, in the table below, our index for a tariff at the start of the financial year is 1. This falls to 0.9 in July following a 10% degression, to 0.77 following a 15% degression and to 0.57 in January following a 25% degression (if required a further degression of 25% is possible in April but this has not been included in this analysis as it would take effect in the following financial year).

Therefore, over the course of the financial year there is a maximum 43% reduction in the tariff. However, this does not translate into a 43% reduction in RHI expenditure, all else being equal, given some of the reductions happened at different points during the year. We have, therefore, estimated a weighted average which effectively places a 3/12 weighting on a tariff being equal to 1 during the period April, May and June, a 3/12 weighting on a tariff being equal to 0.9 for the period July to September, a 3/12 weighting on tariff equal to 0.77 for the period October to December etc. This weighted average means our assumed level of degression over a financial year is 12% rather than 43% (in nominal terms). The same methodology has been adopted for the analysis around individual tariff triggers. We have done this for all the degression analysis.

Figure 7: Levels of degression if total and tariff triggers are hit

	Month	Index of tariff	Level of degression if total trigger and tariff trigger 'hit'	Index of tariff	Level of degression if tariff trigger 'hit' only
	April	1.00	0%	1.00	0%
	May	1.00		1.00	
	June	1.00		1.00	
Degression point	July	0.90	10%	0.95	5%
	August	0.90		0.95	
	September	0.90		0.95	
Degression point	October	0.77	15%	0.86	10%
	November	0.77		0.86	
	December	0.77		0.86	
Degression point	January	0.57	25%	0.68	20%
	February	0.57		0.68	
	March	0.57		0.68	
Total reduction in tariff		43%		32%	
Average reduction in tariff over year (weighted average)		12%		8%	

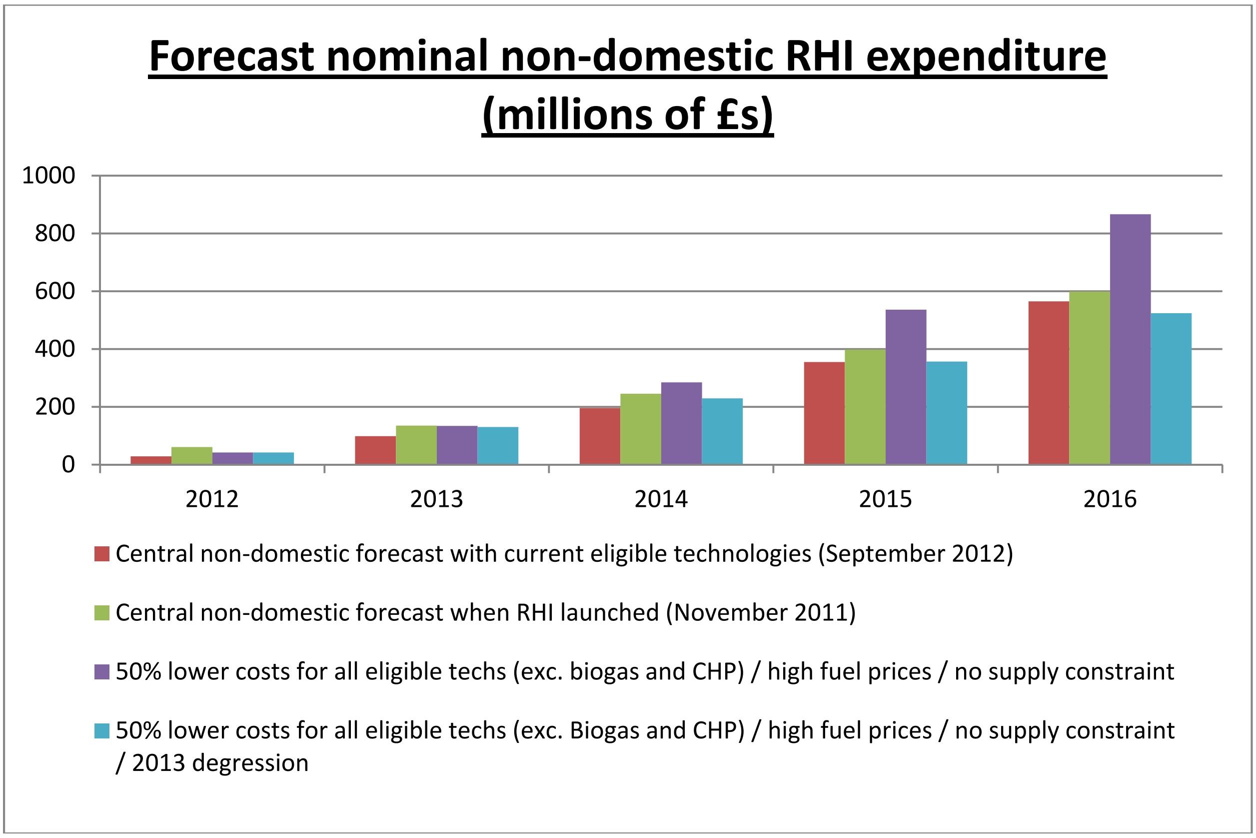
Modelling future uptake and RHI expenditure is subject to a large number of unknowns such as consumer preferences, capital costs, fuel prices and supplier responses. This is particularly true of a market in its infancy such as the renewable heat market. As a result, a large number of assumptions need to be made, meaning all modelling projections should be viewed with caution and seen as an illustrative level of uptake and spending.

The following chart illustrates projected nominal expenditure under four different scenarios. The 'Central non-domestic forecast' is DECC's latest forecast of future non-domestic RHI expenditure for technologies currently eligible for the RHI. The 'Central non-domestic forecast when RHI launched' is the original forecasts made when the scheme was launched. It was set at a level that was consistent with heat meeting its share of the renewables target (this forecast has been adjusted slightly to reflect changes in inflation forecasts, process and space heating uses and the "legacy" issue described in

Annex B of the 2012 budget management consultation IA[8]). This forecast level of expenditure also represents our key trigger level of spend.

The scenario '50% lower costs for all eligible technologies (excluding biogas and CHP) / high fuel prices / no supply constraint' illustrates the cumulative impact of reducing capital costs for all eligible RHI technologies by 50% other than for biogas and CHP in 2012, and being in a world of high fuel prices and no supplier constraint. As we would expect, with this scenario, spending increases significantly over time and in 2014 is projected to exceed the forecast total trigger. As a result, a degression equal to what would happen under the preferred policy is also modelled. This is the fourth scenario. The degression is modelled in 2013 and as the chart demonstrates, the effect is to reduce expenditure in 2013/14 and 2014/15 so that it falls back within budget.

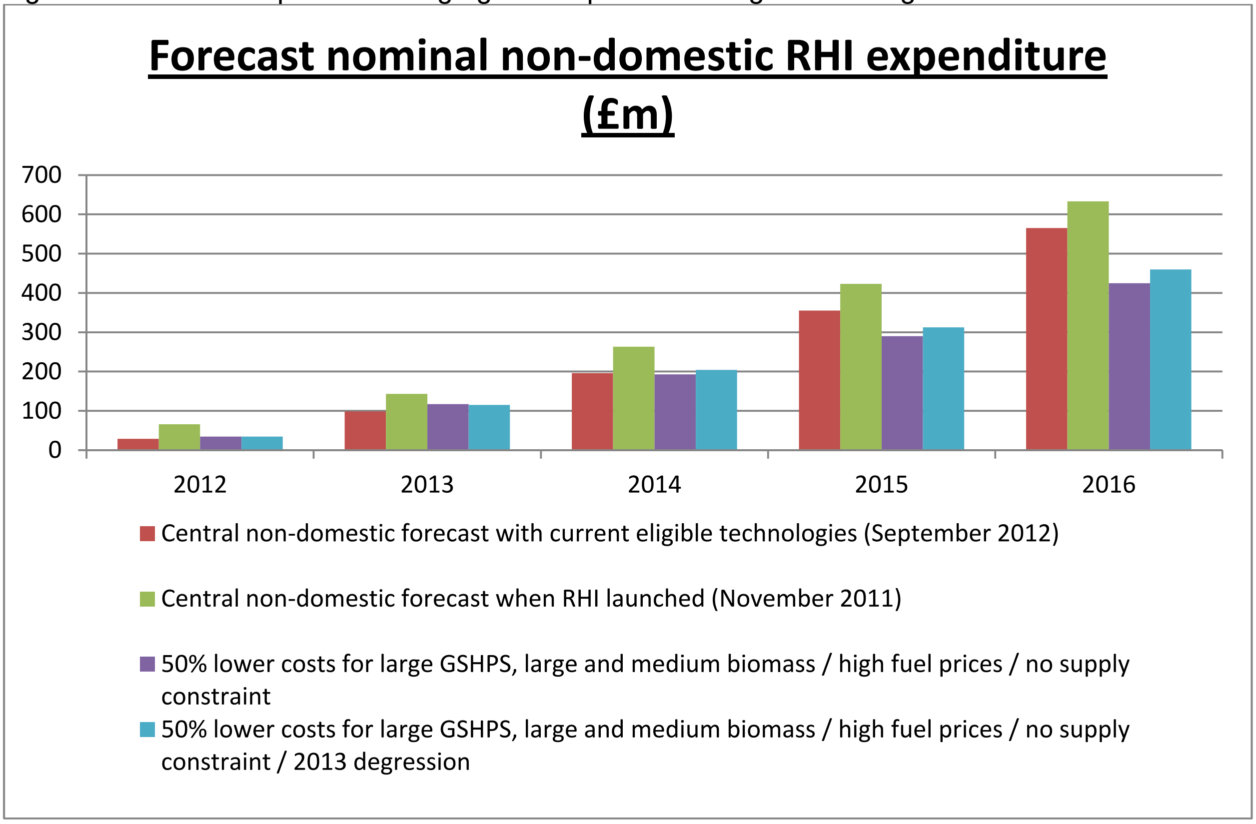
Figure 8: Potential impact of changing assumptions for all technologies



The following chart is the same as the preceding chart but the cost reductions are only applied to large and medium biomass and large GSHPs. Under this scenario, expenditure does not reach the overall trigger (in fact it falls). This is because despite the increased commercial attractiveness of large biomass and large GSHPs, as their tariffs are relatively low compared to other technologies, consumers may be substituting away from more expensive technologies into these 'cheaper' technologies thus delivering a net subsidy saving. However, in this scenario, although the overall trigger is not 'hit', the individual triggers for large biomass and large GSHPs are. This results in a degression for these particular technologiesThis causes an increase in RHI expenditure as consumers substitute back away from this cost-effective technology into less cost-effective ones. Although this means an increase in expenditure, as set out previously, one objective of the RHI is to support a range of technologies in order to help meet future heat demand e.g. innovation leading to future cost reductions. Supporting a range of technologies and avoiding one technology from dominating is a crucial part of DECC's Carbon Plan and longer-term Heat Strategy (which set out the important role of renewable heat in contributing to the long-term de-carbonisation of energy supply).

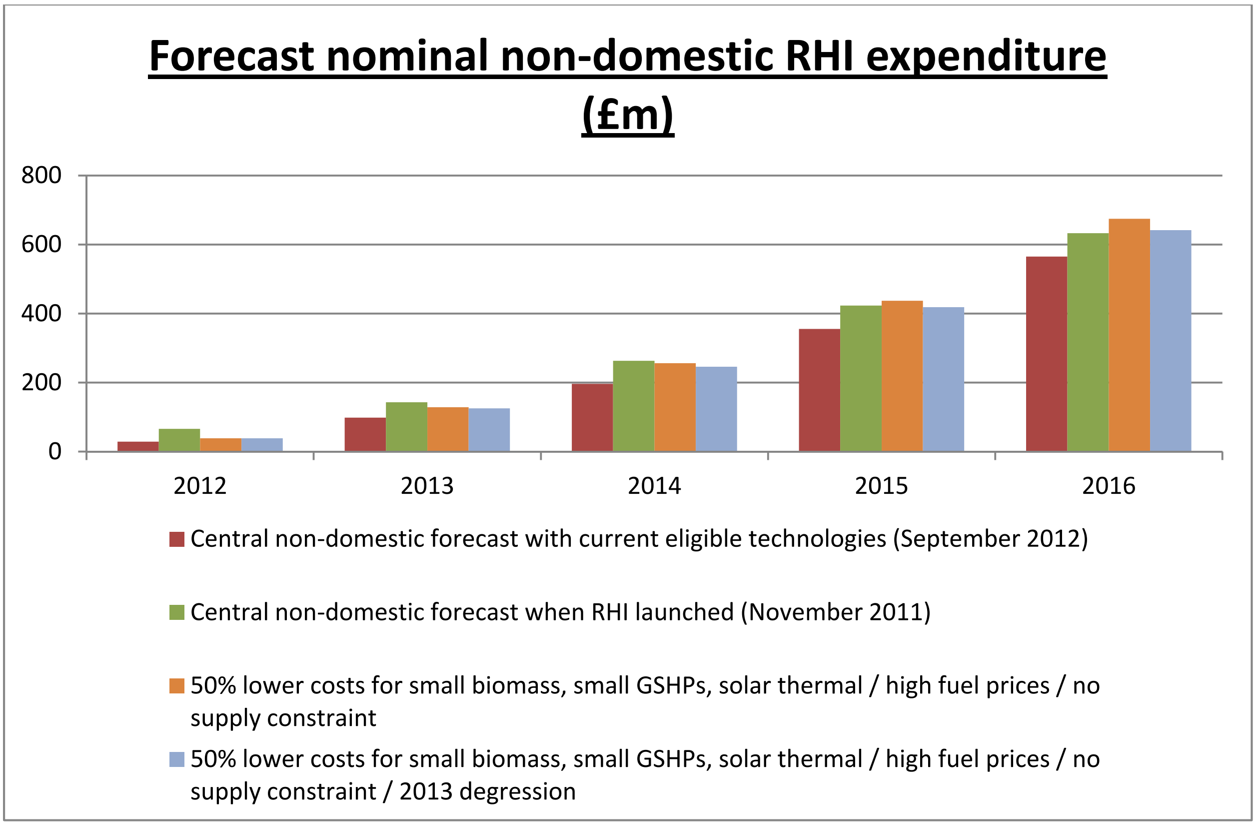
[8] http://www.decc.gov.uk/en/content/cms/consultations/rhi_cert_perf/rhi_cert_perf.aspx

Figure 9: Potential impact of changing assumptions for large technologies



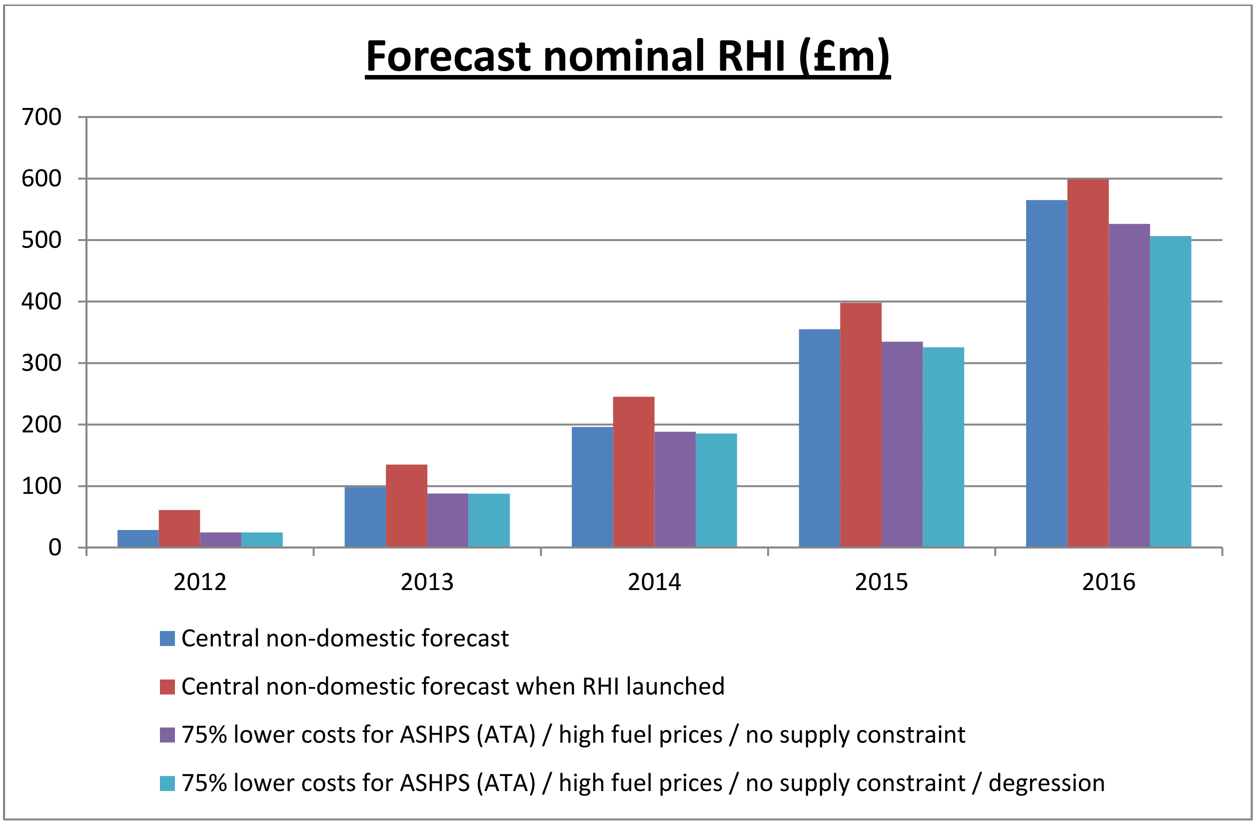
The chart below is similar to the preceding chart but applies the cost reductions to the remaining non-domestic eligible technologies (small biomass, small GSHPs and solar thermal). In this scenario, in 2014, projected non-domestic RHI expenditure is not forecast to exceed the total trigger level of spend. However, the individual tariff trigger for small biomass is 'hit' and there is a degression in this tariff in 2013/14. The effect is to reduce expenditure in 2013/14 and 2014/15.

Figure 2: Potential impact of changing assumptions for small technologies



The following chart is also similar to the preceding charts but focuses on air-to-air heat pumps. Please note that these technologies are not currently eligible for the RHI and no decision has been made as to whether they will become eligible. We have, however, analysed the potential impact of this technology as they are considered a technology that could deploy rapidly. Therefore, if they did become eligible for the RHI they may cause a significant increase in expenditure. We have modelled the potential growth by assuming a 75% fall in capital costs for this technology. However, the net impact of this assumption is to reduce forecast expenditure as this technology is relatively cost-effective compared to other technologies. The growth in demand causes a net reduction in total RHI expenditure.

Figure 3: Potential impact of changing assumptions on Air to Air Heat Pumps



In order to complete the sensitivity analysis, we have also undertaken an extreme stress test to understand when the degression mechanism is likely to break down. This has been done by relaxing the assumptions around the replacement rate of conventional gas boilers. The RHI model assumes an average annual rate of 6.7% for replacement of existing heating systems. This assumption reflects the fact that heating equipment is replaced, on average, every 15 years (100/15=6.7). Of this 6.7% replacement rate, we limit the level of uptake of renewable heating technologies. The existence of the constraint reflects the potential information failure and initial lack of awareness when a policy is first implemented. However, over time, as people become more aware about the policy and the potential benefits on offer, this constraint becomes less prevalent. This restriction is gradually reduced over time. falling to zero by 2018. The central assumptions for this uptake constraint are illustrated in the table below. We have analysed the impact of altering this uptake constraint to help determine:

- The potential behavioural impact of people bringing forward their investment in a renewable heating technology rather than waiting for their existing heating system to come to an end (such a behavioural argument may be less applicable in the non-domestic sector); and
- The potential for there to be a higher than expected response to the RHI due to higher than expected awareness of the policy;

We have modelled the following impacts by analysing the following scenarios:

Figure 4: Demand uptake restrictions

Scenario	2012	2013	2014	2015	2016	2017	2018
Central	20%	33%	47%	60%	73%	87%	100%
High	20%	40%	55%	75%	85%	100%	100%
High 2	20%	50%	65%	80%	95%	100%	100%
No limit	100%	100%	100%	100%	100%	100%	100%

Effectively the three scenarios (other than the Central scenario) gradually reduce the demand constraint imposed on the model on the proportion of existing heating systems replaced. In short, all scenarios other than the 'Central' and 'No limit' scenarios fully relax the constraint one year earlier than the central scenario. This means a 'looser' constraint in all years leading up to 2017. For illustrative purposes we also test a 'No limit' scenario which removes the constraint entirely for all years.

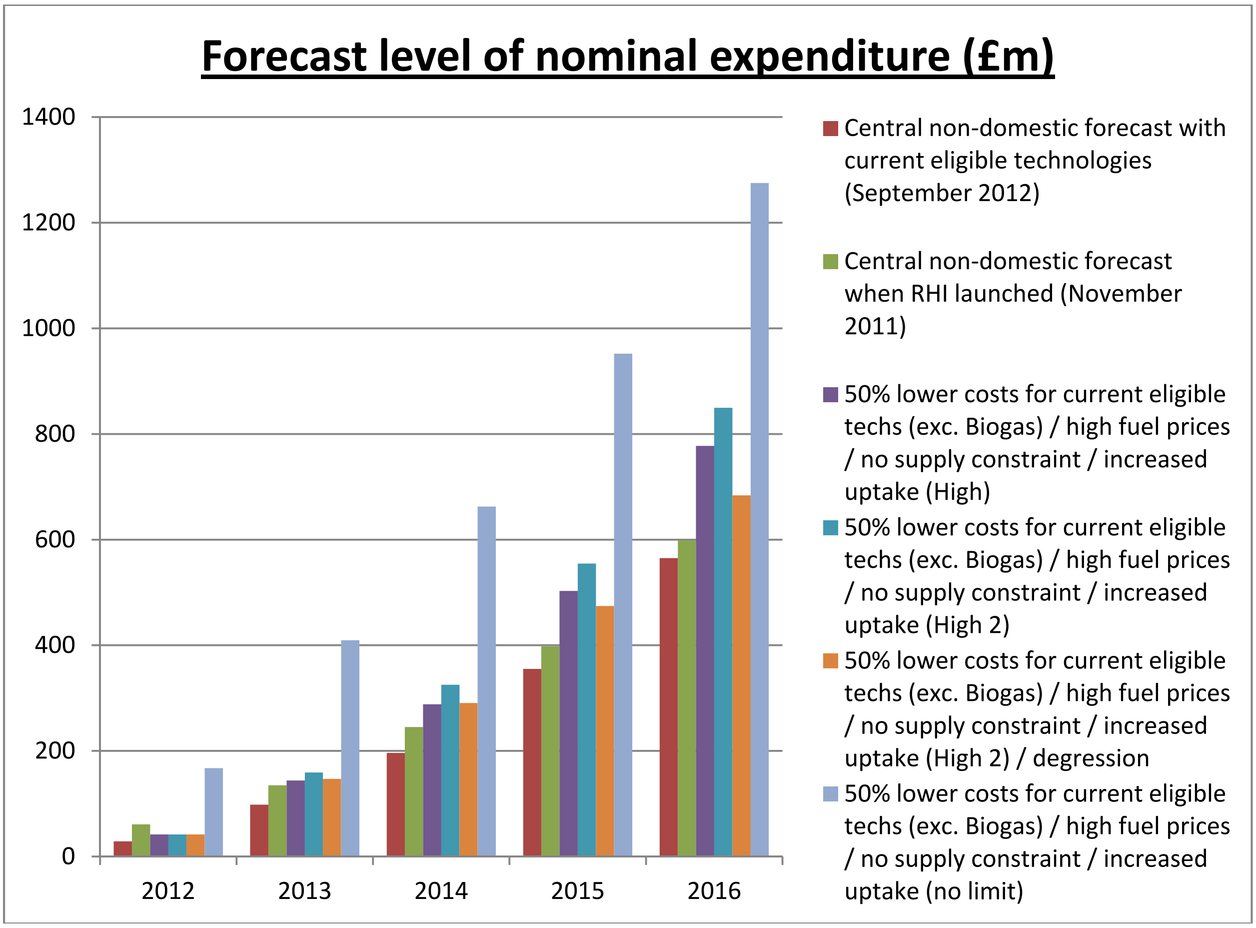
The chart below illustrates the potential impact of the above scenarios. We have combined the above scenarios with the following assumptions to try and capture a 'worst case' scenario:

- A 50% reduction in capital costs for all currently eligible RHI technologies (excluding biogas and CHP);
- High fuel prices; and
- No supply side constraint.

As expected, the impact of relaxing the demand constraint and bringing forward future investment is to increase forecast RHI expenditure. As we would expect, the 'No limit' assumptions have the effect of increasing forecast expenditure by over 3 times the central total trigger level of expenditure. The 'High' and 'High 2' scenarios also lead to an increase in RHI expenditure which would trigger a degression. We have, therefore, modelled the impact of the proposed degression triggers on RHI expenditure. In particular, we have modelled the potential impact of a maximum degression in 2013 on the 'High 2' scenario. The effect is to reduce forecast RHI expenditure to a level slightly above the total trigger level of spend in 2013. This suggests the following scenario defines one critical point at which the proposed degression mechanisms could be insufficient:

- A 50% reduction in costs in all eligible renewable heating technologies (excluding biogas and CHP);
- High fuel prices;
- No supply side constraint; and
- A scenario where the restriction on uptake of those replacing renewable heating systems is 17 percentage points above our Central scenario in 2013;

Figure 5: Impact of changing demand uptake constraint



The sensitivity analysis suggests that whilst there will always be a risk that total expenditure could exceed our forecast projections of spend, the scenarios we have modelled give us a reasonable level of confidence that the proposed policy is able to meet the policy objectives set out. The key point at which the degression mechanism breaks down is if the assumed demand uptake is around twice that currently assumed in 2013.

Rationale and evidence that justify the level of analysis used in the IA

We have taken a qualitative approach as the policies considered in this IA are focussed on designing an appropriate framework for budget management in the non-domestic RHI and ensuring value for money. Estimating potential monetised impacts was not possible given the wide range of possible outcomes and responses. However, the sensitivity analysis demonstrates the potential impact of this policy option on uncertainty and the level of risk of over spending in any one year.

Risks and assumptions

The key risk is the assumption that demand responds in a way we expect following degression enabling the budget to be managed. It also assumes that 'trigger' levels for degression do not become self-fulfilling resulting in either under deployment or spikes in deployment due to the expectation of an impending degression.

Summary

The crux of the issue is whether it is better to exercise budget management through a preset link between uptake and tariff adjustment, or through a system of quotas that lead to temporary suspensions of the scheme and / or adjusted tariffs in response to a suspension. The degression policy option is considered the preferred option as it means an improvement in value for money and the potential investment disruption associated with the SBM would undermine efforts to meet the 2020 renewables target.

Under a "low" deployment scenario the impact of degression would be minimal. DECC would continue to monitor forecast non-domestic RHI expenditure but would not degress tariffs in response. Potential investors would also be confident in the tariff rate not being degressed. Under a 'high' deployment scenario, tariffs would be degressed resulting in a lower level of public expenditure and improved value for money (due to reduced rents). Potential investors would also be aware of lower tariff rates and would reduce deployment in response. Under a 'central' deployment scenario, tariffs would not be degressed but expenditure would be closely monitored by business and Government and there would be a perceived high probability of a degression. This could negatively impact on investment but arguably less so than if there was a risk that the scheme could be suspended.

Taking into account the cited modelling limitations, our sensitivity testing shows that the levels of reductions set out have the potential to keep the non-domestic RHI within overall budget against large reductions in capital costs, coupled high fuel prices, no supply constraint and some relaxation in the demand constraint we impose in the early years of the scheme. Our sensitivity analysis attempts to analyse the potential impact of significantly relaxing many of the key assumptions and constraints that might cause excessive deployment. For example, we modelled a 1 year capital cost reduction of 50%. However, there are a large number of plausible drivers of excessive deployment, particularly around consumer and investor behaviour, which are impossible to fully capture in modelling. As such, any trigger based degression mechanism comes with a degree of risk which results from the inherent trade-off between investor confidence and expenditure control.

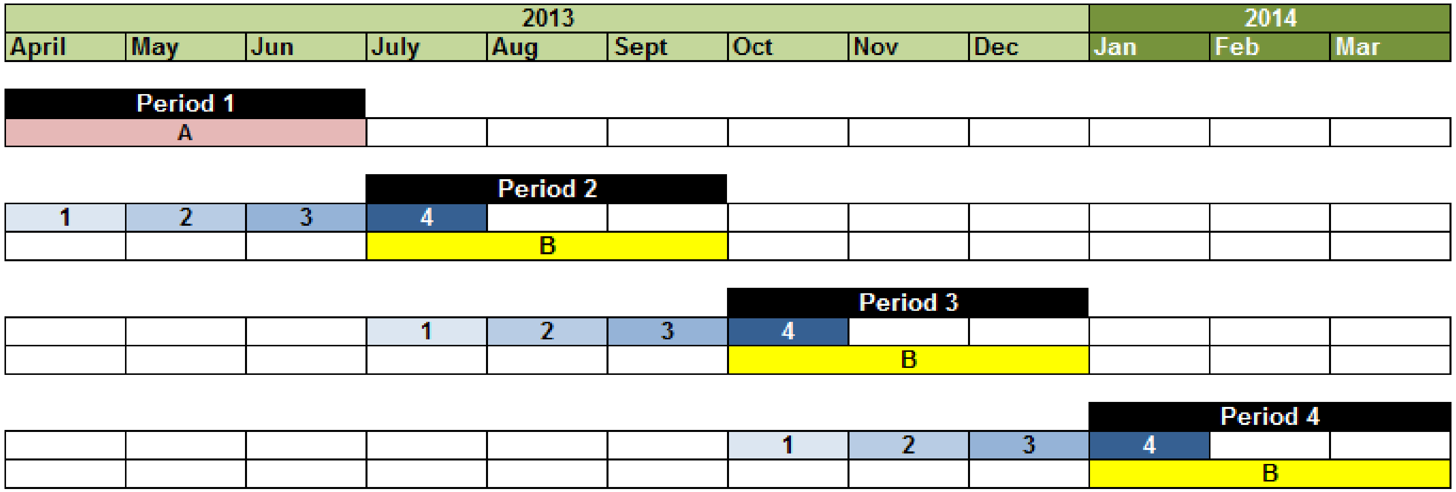
The Net Present Value (NPV) of this policy is the costs and benefits multiplied by the probability of it occurring. Under a "low" deployment scenario the impact would be small, with "central" or "high" levels of deployment the impact is more significant. The assumptions which would make the NPV negative include higher administrative costs (which have been assessed as relatively small); whilst impacts making the NPV positive include the benefits of higher deployment (lower CO_2 emissions), potential innovation, a greater ability to meet the 2020 renewables target, a reduction in market uncertainty and improved value for money as tariffs can be amended as the technologies mature. As the overall impact on deployment is likely to be marginal we have assessed the NPV as marginal (though positive). However, this does not take into account the potential improvement in value for money as this policy option enables tariffs to be amended as the technology matures.

Wider Impacts

The wider impacts of the preferred policy option should be compared against the counterfactual of the SBM being in place. The RHI is a voluntary scheme and, therefore, is not seen as producing any impact on business. The policy options considered in this IA are not considered to have any impact on competition, rural issues or diversity.

Annex A - Degression process diagram

DEGRESSION MODEL: how DECC will determine whether degression has been activated



Key:

A	**Amended regulations bring degression into force**	It is planned that the Renewable Heat Incentive Scheme (Amendment) Regulations 2013, which provide for degression, are approved by Parliament in period 1 in 2013. Tariffs available during this period will not be affected by degression.
1	**Assessment date**	This will be the last day of a 3 month period i.e 30 April, 31 July & 31 October 2013 and 31 January 2014. DECC will analyse the data on deployment levels provided to it by Ofgem as these dates.
2	**DECC analysis of data**	During this period, DECC will fully analyse the data provided by Ofgem to determine whether degression of tariffs is required.
3	**Tariff change notice issued**	DECC will publish a tariff change notice on the 1st day of the month setting out revised tariff rates if, following its analysis of the deployment data, degression has been activated i.e. on 1 June, 1 September & 1 December 2013 and 1 March 2014
4	**Reduced tariff implemented**	Any tariffs reduced through degression will come into effect on the 1st of the month i.e 1 July & 1 October 2013 and 1 January & 1 April 2014
B	**Amended tariffs**	Reduced tariffs will apply to installations which are accredited and biomethane producers who are registered during July-September 2013 for period 2; October-December 2013 period 3; January-March 2014 for period 4.

Annex B – Total and individual tariff triggers (£m). These triggers are based on the forecast from when the non-domestic RHI scheme was launched (November 2011). At any "trigger point", committed RHI expenditure must not equal or exceed these triggers otherwise a degression may be required

Trigger point (end of the month)	Total	50% total trigger	Biogas	Large commercial biomass	Medium commercia l biomass	Small commercial biomass	Large commercial heat pumps	Small commercial heat pumps	Solar thermal
April 2013	£ 97.2 million	£ 48.6 million	£ 18.0 million	£ 34.7 million	£ 20.1 million	£ 22.2 million	£ 4.9 million	£ 43.4 million	£ 4.9 million
July 2013	£ 120.2 million	£ 60.1 million	£ 27.2 million	£ 41.3 million	£ 23.2 million	£ 25.1 million	£ 6.0 million	£ 54.4 million	£ 6.0 million
October 2013	£ 143.3 million	£ 71.6 million	£ 36.3 million	£ 48.0 million	£ 26.3 million	£ 28.0 million	£ 7.2 million	£ 65.5 million	£ 7.2 million
January 2014	£ 166.3 million	£ 83.2 million	£ 45.5 million	£ 54.6 million	£ 29.4 million	£ 30.9 million	£ 8.3 million	£ 76.5 million	£ 8.3 million
April 2014	£ 192.8 million	£ 96.4 million	£ 55.5 million	£ 61.8 million	£ 32.7 million	£ 34.0 million	£ 9.6 million	£ 89.5 million	£ 9.6 million
July 2014	£ 226.1 million	£ 113.1 million	£ 67.5 million	£ 70.2 million	£ 36.2 million	£ 37.3 million	£ 11.3 million	£ 106.7 million	£ 11.3 million
October 2014	£ 259.5 million	£ 129.8 million	£ 79.5 million	£.78.5 million	£ 39.7 million	£ 40.7 million	£ 13.0 million	£ 123.9 million	£ 13.0 million
January 2015	£ 292.9 million	£ 146.5 million	£ 91.5 million	£ 86.9 million	£ 43.2 million	£ 44.1 million	£ 14.6 million	£ 141.0 million	£ 14.6 million