
Teagasc is pleased to submit this response to the above consultation. Teagasc is the Agriculture and Food Development Authority and is the national body providing integrated research, advisory and training services to the agriculture and food industry and rural communities. Teagasc have prepare this response based on feedback from internal staff involved in the various enterprise sectors and in consultation with the industries which they represent.

Respondent name: Barry Caslin (Teagasc, Energy Specialist)
Ger McCutcheon (Teagasc, Pig Specialist Advisor)
JJ.Lenehan (Teagasc Buildings Officer)
Dermot Callaghan (Teagasc, Head of Horticulture)
Michael Gaffney (Teagasc, SRO Horticulture)

Organisation name: Teagasc
E-mail address: barry.caslin@teagasc.ie
Contact address: Teagasc, Longford, Town Centre, Co. Longford
Contact telephone: 076 11 11 213
Agricultural Sectors and RHI

Mushroom Sector
The mushroom industry is the largest horticultural sector in Ireland. The industry has a farm gate value of €121.7 million to the Irish economy with 215,050 tonnes of compost cropped in 2016. The sector makes an important economic contribution and generates significant ancillary employment in areas such as compost production, mushroom harvesting, packing produce, distribution and research and development. It currently employs over 3,500 people. Bord Bia indicate that the UK market for mushrooms is growing steadily in recent years at about 2% per year.

The majority of fresh mushrooms produced in Ireland are distributed to the UK market with a small percentage being sold in Ireland. The sector faces competitive pressures, particularly due to high input costs, notably energy and labour costs. The sector is currently navigating significant issues which have arisen since the Brexit vote, specifically currency fluctuations on the back of a weakening sterling. Notwithstanding this, the sector has potential for further development through the development and adoption of new technology. RHI can facilitate renewable energy technology adoption in the sector.

Energy contributes 5-6% of the cost of production per kg of mushrooms. The industry must be competitive in the UK market and to do so Irish growers must compete with British, Dutch and Polish producers. British producers have benefited from an RHI scheme for many years.

The Irish growers must become more efficient than competitors. Energy costs must be reduced by at least 50% for the Irish mushroom sector to remain competitive. RHI will have a significant role to play here. In the next investment cycle, the industry will need to continue investing in biomass in particular but other technologies will play a part in attaining this reduction.

It is of paramount importance that the RHI scheme will be available to the maximum number of mushroom producers including early adopters of renewable heat technology.

Protected Crops
The Protected Crop growing sector is a significant sector within Irish Horticulture (second largest), with a farm gate value to the Irish economy of €87.3 million, providing 20% of food horticulture farm gate output and 28% of the amenity horticulture farm gate output. The protected crops food sector currently employs 830 people. The major crops include Strawberry, Tomato, Lettuce and other soft fruits. Apart from a limited amount of sales into Northern Ireland, all produce is sold within Ireland. The sector makes an important contribution and generates significant ancillary, seasonal employment as well as roles in packing produce, distribution and supports a significant industry in structure and heating maintenance.
The sector faces continual competitive pressures, particularly due to high input costs, notably energy and labour costs. In the glasshouse sector, energy costs can be as high as 22% of total input costs, usually equal to that of labour costs. Glasshouse and polytunnels crops have a requirement for heat, but also a requirement for carbon dioxide. Within vertical crops in is normal practice for carbon dioxide to be extracted and cleaned from the boiler emissions and pumped into the glasshouse. Crops such as tomato can utilise up to 50kg of CO2/hour/Ha, so the access to CO2 and Heat is important. Other crops, such as strawberry and lettuce also respond favourably to heat and carbon dioxide supplementation. The sector is constantly competing against imports from lower cost economies. The sector has significant potential for further development, however high capital costs and the high energy costs remain barriers to expansion and new entrants.

Pig Sector
Heat must be provided to the younger pigs on a pig unit. The temperature in the farrowing rooms is critical for the survival of newly born piglets. The ideal is to have a farrowing room temperature of 24°C once the first piglet is born in the room. This should be reduced to no more than 20°C when the youngest piglet in the room is over 2 days old. It is vital to minimise uncontrolled heat loss to save money and improve output.

Accurately controlling heat pads and lamps is another key area along with enclosing creeps to accurately control temperature, prevent heat loss and reduce heating requirements. The pig sector is highly competitive and does not receive government subsidies or CAP payments. Energy costs vary significantly on pig farms throughout Ireland. An appropriate RHI which promotes technologies such as heat pumps and biomass boilers would be necessary to maintain competitiveness within this sector.

1 Consultation Responses
The consultation paper has set out specific consultation questions along with a preferred approach from DCCAE. The position of Teagasc is set out below under the relevant sub-heading.

Question 5.2 Should the ETS sector be included or excluded

The promotion of large scale biomass is vulnerable from a raw material supply perspective. The larger systems around Europe to date have mostly been fed by local timber residues from forestry or sawmills, which are difficult to transport over long distances, hence this policy is further restricted to certain areas of Ireland. However, medium and small scale biomass are usually fed by wood pellets, which can be supplied from far greater distances and which benefit from the strong world market and growing production. There are about 30mT of pellets traded and 42mT of production capacity in the world today, and scope for this to grow strongly and sustainably for many years to come.

It is believed that larger-scale biomass fired heat might be used in energy intensive industries. The large heat loads that are suitable for RHI biomass are nearly always on the gas grid, which would require a higher tariff to compete with gas. There are large heat loads
in energy intensive industry which is suitable for biomass, but there are significant barriers, such as a shortage of investment capital and a requirement for a higher rate of return than the RHI can offer. The RHI might not be the appropriate policy tool to unlock this particular market, and this should be reflected in the forecasted deployment estimates. There are several barriers to deployment of large scale biomass. Two key barriers are the requirement for quicker returns on investments and a shortage of investment capital.

The support required by the sub-1MW is higher than what would be required from the large biomass tariff, but this does not mean it provides less value-for-money, as in general, it is still very cost-effective compared to the other renewable technologies supported under the RHI, and will mitigate the risk of non-delivery by large biomass and heat pumps.

**Recommendation**

Teagasc recommends that the ETS Sector should be excluded from the initial proposed RHI scheme. This will spread the benefit across a wider area and will affect more workplaces and communities. The development of the associated regional supply chains will in turn underpin the mobilisation of indigenous biomass resources and the creation of rural jobs. The visibility of the scheme would therefore be greater, which we expect would help continue the normalisation and acceptance of bioenergy among the general public.

If ETS sites are to be eligible, it is important that there is a restricted budget allocation, ensuring that the majority focus of the scheme is on non-ETS sites, in keeping with DCCAEs stated preference. By focusing solely on large scale biomass and proposing a tariff that would make sub-1MW project economically unviable, the DCCAE would be losing out on very low cost renewable heating that would help to meet 2020 targets and beyond.

**Question 5.4 should energy efficiency standards be included?**

Force drying of wood chip is an important part of the supply chain process, which enables fuel suppliers to respond to growing demand. However, we are concerned that certain systems dry fuel, perhaps to increase RHI income rather than need for dry chip. A potential solution could be to set a minimum efficiency for such drying systems, which is enforced by a simple desk-top audit comparing the amount of wet chip purchased and the amount of dry chip sold by the operator by reviewing their chip purchase and chip sales invoices. This will give the amount of water removed and therefore the amount of heat required to remove that water. The RHI payment can then be limited to this figure, regardless of how much heat has actually been used. This rewards installers of efficient, more expensive drying systems and does not over-pay those who have installed cheaper, less efficient drying systems. Alternatively, RHI can be paid only if a minimum efficiency is achieved.

The use of records to assess usage of fossil fuels to provide heating requirements on farms in previous years could be the benchmark for assessing suitability to join the scheme. The focus of the scheme should be to improve the heat efficiency of buildings and this could be incorporated into the assessment of buildings at the application stage.
Teagasc sees great opportunity within the agriculture sector for the deployment of technologies which benefit from an RHI payment. Industry consultation indicated that the introduction of the SEAI “Exceed” programme would add considerable delays and costs to project development. We do not believe that the EXCEED or another existing programme would be fit for purpose to ensure energy-use best practice here. Teagasc has developed a series of fact sheets for the various agricultural sectors indicating methods of improving on-farm efficiency. Teagasc also work with SEAI on developing seminars and a major national event called Energy in Agriculture which highlights awareness and best practice in energy use on farms. A design approval or energy audit carried out by a competent and approved body could be considered as an alternative approach to the time consuming and costly implications of Exceed certification process.

The tariff system should be designed in a manner that will discourage the loss heat to the atmosphere.

The Energy Efficiency Obligation Scheme promotes verification of energy efficiency savings at the concept stage and could be considered pre-qualifying criteria. The RHI’s main goal should be on fuel switching. However existing efficient technologies which use wood chip should not be discriminated against in the RHI accreditation or selection process. Some agricultural units in the agricultural sector have already made strides by investing in biomass technologies in the horticulture / mushroom sector / poultry sector or heat pumps in the pig production sector. If the owners of such units propose to install new technologies after the RHI introduction or qualifying grandfathering period, Teagasc feel that such businesses should be allowed benefit from the new RHI as otherwise they could be deemed ineligible because they were innovative and early adopters of such technologies.

But energy efficiency standards should not be at the expense of excluding existing installations. A mechanism should exist to allow existing adopters to upgrade their existing technology/infrastructure to required standards.

Question 5.5 Should Minimum Technology Standards be included?

It is recommended that minimum technology requirements are introduced as part of the scheme. The use of minimum technology standards makes sense. All installations should be appropriately sized and specifics of how to replace existing and potentially new requirements for heat should be catered for in the scheme. There is currently EU legislation in this area and the existing UK RHI requirements.

- The RHI scheme should, from the outset, specify a requirement in relation to means by which RHI eligible biomass (and other) installations must be installed by an appropriate qualified and certified individual/organisation and through any adopted or approved certification scheme.
- There is currently no “centrally approved” certified (or accredited) installer/competent person scheme in existence for biomass combustion appliances in Ireland. Such a scheme would be a positive development in ensuring the appropriate installation of appliances.
• Consider the adoption of the existing UK RHI emission certification system, for biomass installations which do not have an appropriate air emissions permit/licence, as part of RHI. Support this recommendation by verifying applicability of the UK RHI emission limit values in an Irish context and assessing the interactions of these values with requirements of the Eco-design and MCP Directives.

In principle the Triple E register should be a good means of maintaining product quality standards. The Triple E (Excellence in Energy Efficiency) Products Register is an initiative introduced by the SEAI which gives recognition to products within Ireland that are ‘best in class’ in terms of energy efficiency. Under the European Communities (Energy Efficient Public Procurement) Regulations 2011 (S.I. 151 of 2011), it is a requirement that public bodies must purchase products that are specifically listed on the register.

**Question 5.6 Eligibility of Heat Use for the RHI**

Process heat, Production heat, Space heat are the key economically justifiable heating requirements. As the business model is always evolving and innovation and technology adoption happen at pace in this sector, additional emerging indirect uses which are economically justifiable should be permitted. Example: drying down spent mushroom substrate for emerging uses. There must be a requirement for heat in the production process. The scheme should be eligible only where a heat requirement exists (or will exist in an expansion situation).

We recommend that only economically justified heat for space heating, water heating and industrial process heating should be eligible. The definitions as outlined in section 7.14 of the first RHI consultation document refer specifically to ‘useful heat’ and ‘justifiable demand’ in the context of co-generation and REFIT-3. The definition of ‘useful heat’ in the context of a RHI will need to consider that the load can be shown to be an existing or new heat requirement (i.e. not created artificially, purely to claim the RHI) and that the acceptable uses are space heating, water heating or process heat:

• Heat for new builds
• Heat a space in an enclosed building or structure that is permanent
• Heat water within a building for commercial use
• Carry out a process within a building or boundary site

Similar to the UK, exemptions should be made for the drying of biomass prior to combustion i.e. high-moisture, low-grade biomass may require pre-drying to maximise its calorific value during combustion. There may be economic benefits of pre-conditioning bark for example prior to it being used as a blended biomass fuel.

It will be important to define the types of structures eligible and the definition of ‘permanent’ structure as there are many types that may be more difficult to classify such as portacabins, static mobile homes, greenhouses, shipping containers, drying sheds etc. Consideration will need to be given to whether the building is required to be wholly enclosed with four walls and a roof.
Question 5.7a Should the WFQA be mandatory?

Yes, the WFQA should be mandatory as a means for ensuring the supply of quality-assured wood fuel. IrBEA established the WFQA and is the custodian, although it has an oversight committee which includes a range of stakeholders beyond IrBEA members. This includes among others the Department of Agriculture, the SEAI and the NSAI. It has an independent auditor, a standalone website, branding and quality mark.

Many fuel suppliers are already certified through the WFQA. Teagasc does recognise the need to expand the range of fuels and the number of certified providers under the WFQA if it is a mandatory requirement. There is an enormous potential for further developing Irish produced biomass. Ireland should be aiming to produce 5 million tonnes of indigenous biomass. This should be made up from 300,000 tonnes of straw, 2.5 million tonnes of perennial energy crops such as short rotation coppice (SRC) and miscanthus (grown on 250,000 hectares of farmland) and 2.0 million tonnes from enhanced forest management. There is a large area of potentially available land for planting of perennial energy crops in Ireland, even after making allowance for food production –

The straw and forest resource are already there waiting to be exploited. Currently perennial crops have an area of around 3,000 hectares so a significant increase in planting will need to be stimulated for this potential to be realised.

The task of quality assurance (QA) is to assure the buyer that the quality of the delivered fuel is in agreement with what was specified in the contract. This is done by internal WFQA procedures followed by a quality declaration to the customer. WFQA thus does not have to mean that the quality of the fuel is as required by a standard. From a compliance perspective EN ISC 17225-2:2014 Solid biofuels - Fuel specifications and classes - General requirements, could be applied.

From there, supplier and customer can agree to a set of specifications for a contract. QA checks that the delivered fuel complies with that agreement. Members of the WQQA submit their internal quality control measures for external auditing. The scheme includes random testing to see if the quality of the products is in agreement with the contracts. The WFQA has developed a quality mark, so that one can see on the packing materials or on the delivery notice that the products comply to the quality requirements. Non wood biomass need to be recognised such as miscanthus, straw, poultry manure and Spent Mushroom Compost.

Question 5.7b Should Minimum standards for PM and NOx emissions be required?

Teagasc agrees with the adoption of minimum standards for PM and NOx emissions similar to those in the UK though Emissions Certification and on-site emission testing where required. There should be a requirement to use approved installers and if biomass combustion is used an assessment of PM and NOx should be done to verify compliance with appropriate standards.

However, some applicants may be regulated under IPPC license. To avoid duplication and additional administration burden the limits set out in the license should apply and the
compliance testing and reporting should satisfy the SEAI (assuming they are the nominated regulator).

Question 5.8 – Biomass Sustainability Criteria

A series of sub-questions are posed here.

It should be noted that there is a potentially large resource of grass available in Ireland for use as a feedstock for biogas/biomethane production in addition to the current & projected demand for grass for conventional agricultural production. Ireland is unique in Europe in terms of its agricultural output predominated by bovine products with associated GHG emissions. Ireland exports c.85% of the bovine product output and the relatively low population (and its corresponding low energy demand) exacerbates the unfavourable GHG contribution from agriculture. The production of biogas/biomethane from grass offers a unique opportunity for agriculture to reduce overall GHG emissions provided that the benefits associated with grass based biogas/biomethane can be accrued by agriculture.

Ireland must identify indigenous biofuel resources which can be available in the short term (i.e. immediately) and ensure production is carried out in an environmentally sustainable manner. At a land use of 90%+ grassland an obvious feedstock for energy production is grass.

Should the same biomass sustainability criteria apply to domestic and imported biomass?

Yes, as installations should be able to source fuel from NI and further afield under a harmonised approach.

Should the same biomass sustainability criteria apply to forestry & energy crop based biomass?

No, the LCA treatment and LULUCF are established as being different land-use categories for forestry and energy crops. A reasoned assessment of sustainability criteria needs to be made for each.

(i) Should EU, UK or other biomass sustainability criteria apply?
There is a preference for harmonisation with EU legislation, which has to be transposed into Irish legislation in any case. If there are delays in using EU criteria, UK criteria are acceptable as an interim solution.

(ii) Should maximum biomass lifecycle emissions eligibility criteria apply? How should compliance be demonstrated?
No. The focus should be on supply chain assessment and harmonisation with EU criteria.

(iii) Should the certification of GHG be mandatory?
Yes, in keeping with the Renewable Energy Directive, which will make this mandatory for installations above 1MW.

(iv) Should tariffs be differentiated by CO2 intensity?
We cannot envisage a functioning or equitable RHI that would have a variable tariff based on CO2 intensity. We would not support a situation where a particular technology was given a tariff linked to the CO2 intensity as a whole. This is in no way linked to competitiveness, or a reasoned analysis of the IRR required to stimulate RES-H. A higher rate of tariff should be considered for technologies and systems utilised to grow crops which assimilate high levels of CO2 as these crops are in essence carbon negative (assimilate more CO2 than is created in the production of heat), and through this assimilation significantly increase the efficiency and lower the environmental impact of the system.

(v) How should GHG reductions in specific supply chains be demonstrated?
In principal the "UK Solid and Gaseous Biomass Carbon Calculator" could apply. Otherwise by using defaults based on published EU/JRC reference, or approved open-access tools, such as the Biograce tool. GHG reductions could be demonstrated by developing models for each technology that could demonstrate the GHG's produced by each technology.

Question 5.9 – Differentiation of Tariff by Renewable Heat Technology

We recommend the introduction of tariff differentiation by technology type and heat output using a tiered approach. In principle tiering should provide a better balance for higher risk and larger scale projects. Key criteria for setting the tariffs should be - Gas as the counterfactual fuel rate (including large energy user rebates / discounts) - ‘Retrofit’ projects – the market reference should not be to displace a fully depreciated fossil fuel boiler at the end of its useful life.

Question 5.10 – Differentiation of Tariff by Installation Size or Output

We recommend the introduction of tariff differentiation by technology type and heat output using a tiered approach. There is no public information on the financial modelling completed by Element Energy or Ricardo Energy & Environment on the scheme which leaves it difficult to critically comment as a result.

Banding of the biomass tariffs have led to a disproportional number of 190-199kW and 950-999kW installations in the UK, to receive the higher tariff of the lower band. We agree that a tiered tariff, like the biomethane tariff in UK, would be more efficient, as it reduces incentive to over- and undersize installations for maximum financial benefit. Small boilers (100KW+) should be eligible to encourage a diverse array of participation in the scheme, particularly as they may be utilised by small to mid-sized horticultural pig producers and poultry units as well as new entrants. A higher tariff should be available to these participants as the return on investment is reduced due to scale and size. Given that some horticultural crops are significant net assimilators of atmospheric CO2 (an actively growing tomato crop requires supplementation of 50Kg of CO2 /hour/Ha), participants growing such crops should be considered for a higher rate tariff.

A three-tier tariff structure which applies to projects of all sizes, and the Tier 1 tariff is paid for the first X MWth, after which the project receives the Tier 2 tariff, followed by the Tier 3 after Y MWth. X is assumed to be the same for projects of all sizes - improving the incentive to size installations optimally for operational needs. This tariff structure has been effective
for the biomethane sector in the UK, it has been easy to understand by Industry and to operate for Ofgem in administering the scheme in the UK.

Question 5.11 – Age of Existing Fossil Fuel Heating Technologies being Targeted for Replacement

Targeting only counterfactual technologies that are at the end of their useful life will significantly limit uptake to the scheme.

The RHI scheme should not be limited to technologies that are at the end of their useful life or new builds. The cost assessments need to assume that the existing technology is not fully depreciated. End of life varies on a case by case basis and is difficult to determine correctly as it requires data on level of use, quality of equipment, service intervals and maintenance.

Any tariff clearly needs to address this via choice of counterfactual scenario. The cost assessment methodology should not depreciate the existing boiler to end of life, and assume the baseline that an investment was going to be made at that time.

Earlier replacement has the positive side-effect of improving energy efficiency, in addition to fuel-switching.

Question 5.12 – Duration of Support and Profile of Payments to Scheme Participants

Teagasc supports the proposed 15-year tariff payment period (with possible quarterly payments) which would not alone exert less pressure on the exchequer and refrain the participants from reverting to the counterfactual but also give certainty to the biomass supply chain. The appropriate IRR to use over a 15 year period is 12%.

Question 5.13 – Payments based on Metered heat or Deemed heat

To avoid any abuse of the system the scheme must be based on metered heat. Metered heat will reduce the risk of any under / over payments.

Question 5.14 – Systematic Adjustment to Tariffs

It is recommended that any RHI tariff be indexed to CPI. This also needs to be considered when setting the initial tariff.

Question 5.15 – Budget Management Mechanism / Cost Controls

A tariff regression and budget cap mechanism similar to the UK is welcomed. However, activation of either mechanism should detail a minimum early warning time window to allow projects which may have commenced sufficient time to claim accreditation. If such an advance warning system is not put in place then it presents a risk to projects whose feasibility depends on the RHI.

Question 5.17 – Implementation Options

While this section doesn’t ask for a direct response it is imperative that once SEAI are acting as administrators that they resource accordingly to as to avoid any unnecessary delays. Given that biomass installations can take anywhere from 12 – 24 months to fully commission and become operational, adding administrative delays due to lack of personnel in SEAI would be extremely frustrating and undesirable.
Question 5.18 – Pre-accreditation

To give stakeholders of large and complex projects the security to invest in technologies supported by the RHI scheme we recommend that pre-accreditation should be included for installations over 1MW in size. As the lead time for these projects can range from 12 to 24 months the pre-accredited tariff rate must be “locked in” and continue to apply at the final commissioning date. It is very important that pre-accreditation for all projects be included as it will facilitate participants to finance proposals for renewable installations.

This would reduce risks for investors and help fast track developments. Applications could be made for pre-accreditation at a “locked in” tariff.

Some thought needs to be given to avoiding widespread pre-accreditation of projects that won’t proceed. An application fee may be appropriate, or a rule that prevents applicants from applying for pre-accreditation of the same site in two successive tariff periods.

2 Grandfathering

Teagasc recommend that producers who were proactive and installed biomass systems prior to the 8th July 2014, should not be excluded from the scheme in any way. The possibility of a RHI scheme has been around for a longer period than 2014. Producers who have invested have made a considerable contribution to lowering carbon fuel usage and the release of GHG in Ireland, and are contributing towards the 2020 targets. It was assumed that a scheme would be eventually introduced, when government finances allowed for, and that existing users would be in a position to qualify for incentives available. It now appears that these producers who have made substantial investments in superior environmental technology, will be disadvantaged relative to later entrants. This is unfair to these early adopters.

In addition producers who upgrade / replace biomass systems to the RHI scheme standards will be able to avail of the RH incentive.

In some instances, Producer Organisations have invested in biomass systems on producers’ farms. EU Producer Organisation assistance has been obtained for these investments. Producers have incurred the costs associated with purchasing biomass feedstock. These investments have been made before and after the 8th of July 2014.

The following option could be considered to support these producers / early adopters:

If an installation has been funded under a separate scheme, producers and / or producer organisations should be allowed the opportunity to pay back any remaining portion of the grant that was originally obtained, to allow entry into the RHI scheme. If the producer is outside the terms of the original scheme (5 years), then no payback should be required and they should be allowed entry into the RHI Scheme. It is unreasonable and anti-competitive
to exclude any type of producer from the RHI scheme, because they have been progressive and proactive in regards to helping Ireland to achieve their targets.