THE ASSOCIATION FOR RENEWABLE ENERGY & CLEAN TECHNOLOGY

# REA draft response to consultation on *Green Gas Support Scheme* and Feedback sought on RHI Closure consultation

10th June
2:30 pm
Gotowebinar

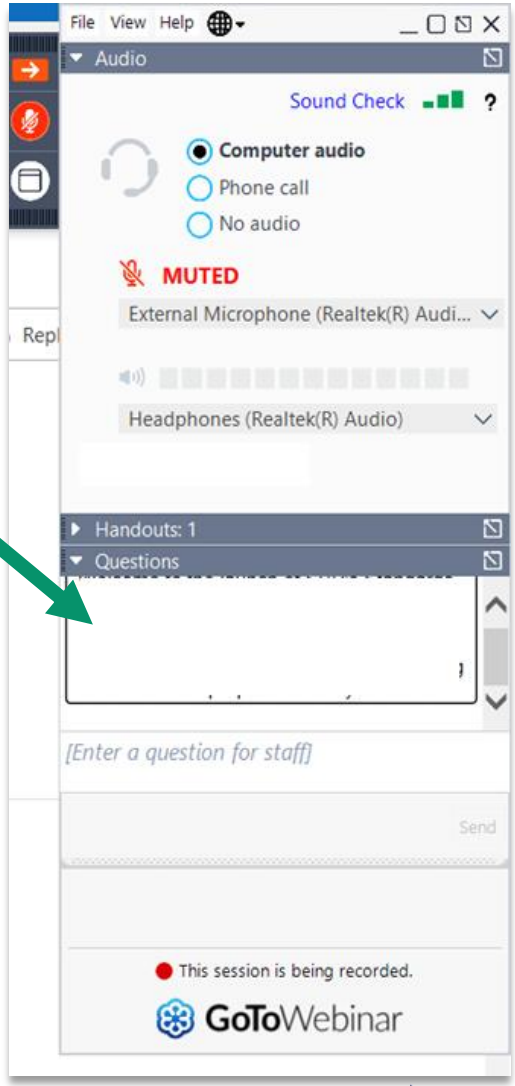
## Housekeeping for the Webinar

- All participants are muted
- Please note where the *question box* is. Questions are being monitored by REA staff and we shall read them out during the Discussion sections.

The session will be recorded for accurate note taking and to allow us to ensure we answer all your questions.

Participants of the webinar will receive a copy of the slides.

Thank you

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# Agenda

- Welcome and introductions
- Feedback from members on key proposals in 'GGSS sections' of 'Future support for low carbon heat' consultation
- Feedback from members on RHI closure consultation
- TG Stakeholder Notice and REA's response
- Next steps

Note:

- *Black text on slides: background*
- *Red text: REA's draft response / feedback sought from members*

# Indicative Timeline

- Initial draft response sent to members on 8th June 2020
- Members to send any comments on draft response on GGSS by 17th June 2020
- Members to send any comments on RHI Closure consultation by 17th June 2020
- REA to send out two draft responses on w/c 22nd June for further feedback
- REA to send out full responses (integrated with Clean Heat Grant sections) on w/c 29th June
- REA to submit response before 7th July

Key proposals on GGSS for discussion today

Consultation on '[Future support for low carbon heat]', sections on new Green Gas Support Scheme)

**New Green Gas Support Scheme (GGSS)**

- A new tariff based support scheme for biomethane injection to the gas grid
- To open to new applications from Autumn 2021 and run until 2025/26
- BEIS consulting on proposals around:
  - Tariff payment length, tariff setting and the tiering structure
  - Mechanisms including Tariff Guarantees and degression
  - Sustainability criteria, waste feedstocks, feedstock reporting and digestate
  - Plant eligibility, interaction with other government schemes and barriers to deployment

# GGSS budget (impact assessment)

**Table 4: Green Gas Support Scheme spending profile (£m, 2020 prices)**

*Figures are rounded to the nearest £5m.*

| Deployment Scenario | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 to 2040/41 (average per annum) | Total (2020/21 to 2040/41) |
|---|---|---|---|---|---|---|
| High | 5 | 25 | 65 | 115 | **165** | **2,840** |
| Central | 5 | 20 | 50 | 90 | **125** | **2,160** |
| Low | < 3 | 10 | 30 | 55 | **70** | **1,250** |

*Figures may not sum due to rounding.*

*Source: Consultation's impact assessment*

- Target for Green Gas of 2.8TWh by 2030/2031, an with an annual projected spend of £115m in 2024/25
- Conservative target compared to other estimates (even the CCC 's one) – see next slide
- Is this ambitious enough? Size of waste market is limited, but when sustainable bioenergy crops are included the potential is much greater
- Do members feel that a target should be assessed on the resource availability or as % of existing gas network?

# GGSS budget (impact assessment) - Continued

Recent estimates on the potential for biomethane (from AD) by 2026, 2030, 2032 and 2050 (TWh/annum)

| Source | By 2026 | By 2030 | By 2032 | By 2050 |
|---|---|---|---|---|
| **REA's Bioenergy Strategy, 2019** | 31 | NA | 52 | NA |
| **ENA's Decarbonisation Pathways (Balanced scenario), 2019** | NA | 22 | NA | 57 |
| **Net Zero: Technical Report, CCC, 2019** | NA | 20 (buildings only) | NA | NA |
| **Biomethane: the pathway to 2030 (ADBA, 2020)** | NA | ~54 (conversion from 5,677 million $m^3$ biomethane potential) | NA | NA |
| **GGSS consultation, BEIS April 2020** | NA | 2.9<br><br>[Under new Green Gas Support Scheme only – exclude deployment under RHI. We estimate between 4 and 6 TW/annum delivered under the RHI by 2021. BEIS have said they intend to treble the amounts of green gas injected in the grid by 2030, compared to the 2018 level of 3.3 TWh/annum]. | NA | NA |

# Biomethane from gasification (scope)

- RHI covers biomethane that is produced by AD and through gasification and pyrolysis. However, it is proposed that the Green Gas Support Scheme will be narrowed the support to biomethane produced from AD only.
- Do members think the scheme should be neutral to the technology used to produce biomethane and should also support biomethane produced from thermal gasification?
  - The REA is supportive of this technology, however would be this type of support mechanism correct and suitable for gasification?
  - Would it be better if it was given a different, more appropriate form of support?
  - The risk would be that the development of thermal plants would lead to faster degression of that tariff (if degression was still in place) reducing support for AD.
- Any other comments?

# First discussion:

- Do you agree with the target and budget set by BEIS?
- Should a target be assessed on the resource availability or as % of existing gas network?
- Do you think biomethane from thermal gasification should be in scope?

# Proposed tiering structure for the Green Gas Support Scheme

## Tiers structure (Q1)

| | |
|---|---|
| Tier 1 | First 60,000 MWh of eligible biomethane |
| Tier 2 | Next 40,000 MWh of eligible biomethane |
| Tier 3 | Remaining eligible biomethane |

- Generally, the expansion of Tier 1 to 60,000 MWh is seen as a positive step forward to allow better economies of scale
- Some risks identified:
  - Significant volumes of feedstocks needed
  - Bed blocking of NEA capacity and greater committed spend with risk of degressions
- Expansions of existing assets should be included as can deliver value for money – should these require setting of separate, appropriate tiering and tariffs?

# Tariff levels (Q 4 & 5)

## Proposed tariff levels

| Table 3: Proposed New Biomethane Injection | | Tariff Amount (p/kWh) |
|---|---|---|
| Tier 1 | First 60,000 MWh of eligible biomethane | 4.9-5.5 p/kWh |
| Tier 2 | Next 40,000 MWh of eligible biomethane | 3.25-3.75 p/kWh |
| Tier 3 | Remaining eligible biomethane | 1.5-2.75 p/kWh |

- Top end of ranges are just about viable, but serious concern over the impact that degression will have on plants' viability
- Drop from Tier 1 to Tier 2 from 5.5 p/kWh to 3.75 p/kWh is too great and create a cliff edge in plant sizing and generation output. This could be avoided by having a 2 stage Tier 2
- Defra and Environmental Regulators moving to higher standards and Best Available Techniques for design, operation and digestate quality
  - **Support levels and policy design need to reflect additional costs to industry**
  - **BEIS policy offers an opportunity for energy and environmental policies to be fully aligned: joined up approach required across Government**

# Tariff length (Q 2 & 3)

- BEIS minded to offer a shorter tariff payment length
- Consulting on 15 year and 10/12 year payment periods

- Overall, we don't support the shortening of the tariff
- Shortening the period from 20 to 15 years – let alone to 12 or 10 years - would lead to greater investment risks, leading to higher cost of capital and less sustainable roll out of the industry
- This is true especially if the tariff period is shortened without increasing the level of the tariff, resulting in significantly less support available to projects under the scheme
- BEIS should be focusing on reducing risk as much as possible: sector requires long-term investors, rather than short-term high risk investors, to drive down the cost of capital. Having a tariff period longer than 15 years would help deliver this

# Tariff guarantees (Q8)

- Replicate TGs seen as positive to give funders confidence
- Extension of the end of the TG commissioning window to end of the Green Gas Support Scheme is also welcome – give plants more time to commission
- Suggestion that BEIS could introduce flexible deadlines / grace periods, especially for circumstances outside the developers' control
- Concerns raised over the new requirement to inform Ofgem once construction commences
  - Positive to avoid speculative applications, however
    - Different interpretations of constructions
    - Gives Ofgem an opportunity to micromanage a plant construction programme (as it happened for 'plant commissioning')
- Evidence of financial close should be sufficient - if this thoroughly checked by Ofgem
- Still many concerns on the 'commissioning definition' and the way Ofgem has micromanaged the process of checking whether a plant has been commissioned – way beyond the policy's objective

# Degressions, cost gathering and tariff review (Q6 and new proposals)

- BEIS seeking views on size and frequency of degression, and other ways to deliver VfM
- Degression mechanism no longer required for biomethane
  - **Stage 0 TG Budget Check** which enables applications for TGs to be processed only on the provision there is budget available
  - **Limited scope for cost reductions** ie it would only make sense to adjust the tariff if the costs have fundamentally changed.
  - Current **levels** and the levels proposed in the consultation are already much **closer** to the point at which any reduction would make the **tariff unviable** and stop deployment. Even only one single degression would likely cause a hiatus / halt deployment.

# Degressions, cost gathering and tariff review (Q6 and new proposals)

- Further to the above proposals, BEIS have published more detail here and have suggested to
  - Request more **detailed costing information from tariff applicants**
  - Having a **tariff review mechanism** that could provide a way to adjust tariffs during the life of the scheme
- We support a review of the tariffs instead of the degression mechanism as a way to adjust levels to reflect changes in the cost base
  - as a single review point midway through the scheme - an annual review not long enough
  - Not mechanistic but rather a value judgement based on emerging picture as seen by BEIS
- Concerns raised over the request of costing information from applicants, as this may increase administrative burden if done through Ofgem.
- Suggestion that cost are collated by BEIS (not Ofgem) from a representative samples of AD plants on the Scheme and interpreted with the help of an appropriate consultancy firm who has experience in assessing costs associated with AD across the industry.

# Second discussion:

- Tiering structure
- Tariff length
- Support levels
- Tariff guarantee mechanism
- Degression mechanism
- Tariff review and collation of costing information

# Waste feedstocks (Q9)

- BEIS currently limits payments for eligible biomethane where less than 50% of the total biogas yield is derived from wastes and residues. **Seeking views on whether they should increase min % of wastes above 50%.**
- REA supportive of Defra's policy on food wastes, and circular economy, but we cannot support an increase to this %:
  - Current availability of food wastes is limited / future availability is uncertain and only starting from 2023
  - For farm-based / agricultural plants the current 50% is already a challenge (technical, economic, access to residues/wastes etc)
  - Agricultural plants - unlikely to be set up to take food wastes from commercial sources and local authorities. This is because of the higher capital, processing and operational costs that come with treating these types of wastes
  - There are significant volumes of slurries and manures generated (~90m tonnes), however often limited access to these and uneconomic to transport over long distances
- Benefits to farming businesses from the integration of AD cropping into arable rotations, by providing robust rotational options, local markets and opportunity for improving soil health and biodiversity
- There shouldn't be a blanket restriction on all crops, but perhaps an approach more aligned to RED II and/or RTFO?

# Waste feedstocks (Q9) – continued

- **RED II Annex IX lists feedstocks** that the Commission seek to encourage to make advanced biofuels (for transport). **These can be double counted** (they may be considered twice their energy content). Current list is limited (it already includes dedicated non-food energy crops) but is being reviewed and may ended being wider and include other crops such as intermediate crops and grasses.
- The Commission Delegated Regulation (EU) 2019/807 supplements the Directive with **criteria to certify low ILUC (Indirect Land-Use Change) risk biofuels, bioliquids and biomass fuels from feed and food crops**. Criteria are laid down in Art. 5, while Art. 6 regulates the auditing and verification requirements for certification. REA to look into this further.
- The RTFO addresses ILUC risks by capping the amount of biofuels made from "relevant crops". Feedstocks in Annex IX of RED II are non relevant crops.
- In summary, transport policy does not restrict all crops, so should RHI policy align to that?

# Waste feedstocks (Q9) – our recommendations

- We would also ask that BEIS redefines what is counted towards this percentage. Two options:
  - For the purpose of that calculation, there should be no limitation on payments on biomethane made from wastes, residues **and any other feedstocks that are 'not relevant crops' as per the RTFO, or that are included in the Annex IX of RED II part A, or are certified as low ILUC risk feedstocks , OR**
  - The GGSS scheme could state that biomethane producers **can derive no more than 50% of their yield from relevant crops, as defined by the RTFO.**
- Are there any other crops we should exclude from the payment restriction/calculation? E.g. rotational break crops and intermediate crops where best practice has been adopted in the production, cultivation, harvest and storage (Certified to a LEAF Marque Standard or equivalent)

# Third discussion:

- Do you support an increase in the minimum % of wastes/residues from 50% in the payment calculation?
- Do you agree with our draft response ie suggestions to align heat and transport policy and be more precise of what non wastes and residues BEIS want to discourage?

# Sustainability (Q10)

- BEIS seeking feedback on whether the GGSS should reflect any of the recent amendments to the sustainability criteria in RED II.

| **Total Number of biomethane consignments in the dataset= 3578** | **GHG emission threshold** | **Number of failed consignments** | **Percentage of failed consignments** |
|---|---|---|---|
| 60% savings currently required under RHI compared to current EU Fossil Fuel Comparator (87 g $CO_2$e/MJ ) | 34.8 g $CO_2$/MJ | 45 | 1% |
| **70%** savings required from 2021 in RED II compared to heat comparator (80 g $CO_2$e/MJ) | 24 g $CO_2$/MJ | 1074 | 30% |
| **80%** savings required from 2026 in RED II compared to heat comparator (80 g $CO_2$e/MJ) | 16 g $CO_2$/MJ | 1638 | 46% |

**Source: Official data of all UK biomethane plants supported through the RHI provided by Ofgem to the REA in October 2019, following a FOI request**

- If GHG emission threshold in the future Green Gas Support Scheme is aligned to RED II Annex VI, a significant proportion of biomethane likely to fail.

# Sustainability (Q10) Continued

However,

- **Averaging of consignments** to calculate lifecycle GHG emissions against the target should be allowed in line with RED II.
- The **methodology** to calculate the lifecycle GHG emissions could be **improved** to recognise a number of benefits from AD or best practice techniques that are currently unaccounted for. This would encourage the sector to deliver best practices and deliver minimum or event negative GHG emissions if confident that these are recognised within the methodology:
  - Agronomic value of digestate
  - Digestate should not be regarded as a fuel
  - Techniques to minimise emissions from cultivation should be recognised (e.g. use of nitrogen inhibitors)
  - Are there any other problems / issues with the methodology that we should raise?
- Also, worth noting that RED II GHG calculation includes an **input for emissions from transport and distribution of the fuel** (which comes from methane leaks in the grid) whereas the current RHI calculation is only up to the point of injection.

# Methane slip

- The consultation makes no mention of **methane slip**. BEIS should put in place tighter requirements on methane slip to promote industry good practice.
- We would recommend that one of the requirements for plants funded under the Green Gas Support Mechanism should be to introduce mandatory testing and reporting of methane emissions and potentially a maximum allowable methane slip.

- Do you agree with the above?

# Feedstock reporting (Q11)

Feedstock reporting: should it be amended compared to the existing RHI requirements?

Current FMS process is not working

- Wastes and residues often available only for short periods and subject to spot market pricing changes
- AD plants need to have the ability to secure these feedstocks when they are available
- Process takes too long

Suggestions on how to improve it:

- Public register of all the approved feedstocks
- FMS approval procedures should be expedited
- Ofgem approval process could be entirely replaced by an assessment from an independent auditor /specialist
- Allow participants to have a much wider choice of feedstocks on the FMS (even though they may not use them immediately:
  - Remove the 'review period' for Ofgem and have a predefined list of feedstock categories.
  - There have been cases where Ofgem have rejected an FMS because a used added lots of feedstocks. So Ofgem are actively managing this to ensure only feedstock that definitely will be used are added to the FMS. This is an unnecessary restriction.

# Fourth discussion:

- Do you think BEIS should align Sustainability criteria under the GGSS with RED II? Do you agree with our response?
- Do you agree with our suggestions on the feedstock reporting protocol?
- Do you agree with our suggestions on monitoring and controlling methane slip?

# Digestate (Q12 & 13)

- Measures and technologies exist for reducing ammonia emissions from digestate and barriers
- We have listed key strategies
- In all cases the barrier is the cost, so if BEIS/Defra want to encourage these the cost needs to be covered in the level of support provided
- Regulatory constraint in the Quality Protocol for Anaerobic Digestate and BSI PAS 110 specification for digestate as further processing of digestate after separation is not within scope
- We would like to make it mandatory for plants funded under the GGSS to cover all forms of digestate storage and also to have sufficient storage on or off site to store the digestate when it cannot be spread
- **Views?**

# Digestate (Q12 & 13) Continued

- Reasons for the lack of commercial demand for digestate and how can the market for digestate be strengthened
- There is often demand for digestate, but its innate value does not always cover the logistics' costs associated with its application to land.
- Storage is a fundamental issue for some plants ie several plants have been built without or with little storage ie they don't have enough storage to supply the digestate at the time of most demand
    - AD plants should be built with sufficient storage capacity in order to be able to commercialise / market digestate, however this additional cost needs to be either reflected in the level of support provided under the Green Gas Certification Scheme, or supported via separate grants / funding (e.g. Defra's funding).
- Regulatory barrier: digestate with 'product' status cannot be supplied to high value markets such as professional and amateur horticulture as well soft landscaping
- For food waste based digestates the presence of plastics and contaminants, or the perception that these may be present, is a critical factor that could negatively affect digestate demand and undermine market confidence in these products

# Fifth discussion:

- Digestate: do you agree with our proposed response and recommendations?
- Have we missed out important points?

# Additional capacity (Q14)

- Proposal not to include an additional capacity mechanism within the Green Gas Support Scheme?
- Link with consultation on RHI closure, where is also proposed that the additional capacity mechanism is removed.
- On the basis that fewer than 10 biomethane projects have applied for this during the scheme's lifetime and that the new tiering arrangements should reduce the need for this, BEIS intends to not to include this mechanism under the new GGSS.
- We shouldn't support, would you agree?
- Very little feedback so from members, other than that the reason a few plants applied is because of the way the regs are written – poorly (you have to inject for a quarter above the level before you are allowed to apply)
- If BEIS wants to achieve better VfM, then expansions should be allowed

# Change of scheme participant (Q15)

- There are instances where biomethane plants are bought or sold for a variety of business reasons. Under the current RHI, while the biomethane plants themselves may be bought and sold, the scheme registration, and therefore the ability to receive payments for injected biomethane, cannot be transferred with the plant.
- Link to proposals in the RHI Closure consultation, where BEIS intends to introduce a clearer mechanism for the transfer of scheme registration for biomethane under the RHI
- Any views on this?

# Interaction with the RHI (Q16)

- BEIS are proposing to not allow any interaction between the RHI and the GGSS as scheme interaction would also be administratively burdensome, so prohibiting interaction will ensure smoother scheme operation. Do you agree?
- No. For example, the Scheme should allow expansions / upgrades to biomethane from biogas heat plants accredited under the RHI.
- In general, no specific mention in the consultation for participants of existing AD installations (be it electrical or other) to be able to apply for the Green Gas Support scheme (GGSS). In one of the Q&A sessions, BEIS clarified that the scheme was not intended to be eligible for existing installations that are supported via other schemes.
  - REA should push for allowing existing installations to apply under the new GGCS.
  - Should this be for electricity only plants or could it also include plant extensions of existing RHI plants (assuming the RHI extension rules close under the RHI reform)?
  - Should 'extension' or plant conversions from electricity warrant a different tariff such as other countries (Italy)?

# Interaction with the RHI and other schemes (Q17)

- BEIS proposing to allow biomethane producers participating in the Green Gas Support Scheme to claim RTFCs in the same quarter as receiving subsidy under the Green Gas Support Scheme.
- Link with RHI Closure consultation (wording in RHI regs currently mean you must either claim RHI or RTFCs within a given quarter
- BEIS suggests the payment calculation formula under the RHI to be amended to allow for claiming across multiple schemes within a quarter. This will presumably included in the GGSS too.
- REA's response to be expanded. REA very supportive of this change. We have lobbied for this for a long time.
- Would you agree?

# Sixth discussion:

- Additional capacity proposals
- Interaction with RHI
- Interaction with other Scheme
- Transfer of registration / change of scheme participant

Other important questions where we seek your views

BEIS seeking views on:

- a longer term support, more focused on market-based mechanisms and possibly including other green gases (hydrogen and biomethane from gasification) (Q201 & 21) – our position is set out here . REA is also developing a position on $H_2$ (Gaynor Hartnell).
- Key barriers to deployment of biomethane plants (Q18 & 19)
- Budget control (Q36)
- Biogas combustion: BEIS recognises that on certain rural areas off the gas grid on-site use of biogas may provide a beneficial use of waste feedstocks and they welcome evidence on substantial decarbonisation opportunities (Q39). REA response to be expanded on this.

# Seventh discussion:

- Long-term support
- Budget control
- Barriers to deployment
- Biogas combustion

Any comments on the above?

Key questions on RHI Closure on which members' feedback is sought

Consultation on '[Non-domestic Renewable Heat Incentive: ensuring a sustainable scheme]', sections relevant to biogas & biomethane

- Do you agree or disagree with the proposal to close the NDRHI from midnight on 31st March 2021? (Q1)
- Mechanism to allow transfer of registration for production of biomethane (Q 9 to 12)
- Contamination of feedstocks (Q13 to 15) – introduce provisions on the use of ancillary fossil fuels and fossil fuel contamination in feedstocks for AD
- Interaction with the RTFO (as set out in previous slides) (Q16 to 19)
- Replacement plant (Q32 & 33) – do you agree with current approach
- Removal of additional capacity and additional biomethane regs (Q34 to 37)
- Budget and reporting (Q43 to 50) – e.g. remove quarterly and monthly degression publications? Any additional data should be made available?

# TG Notice

The REA's Response to BEIS Stakeholder Notice 'Changes to RHI Support and COVID-19 Response' can be found here. Key points:

- We welcome extension to the Domestic RHI to March 2022
- We welcome the extension to current TGs and introduction of third round of TGs, but we seek urgent clarifications on the interaction between the two (lots of questions raised by members)
- We ask to prolong the extension to 6 months (ie to the end of September) to reflect delays due to the lockdown
- We strongly oppose the decision not to extend the Non Domestic RHI as projects that are not eligible for TGs will not have any mitigation against COVID-19 delays and face a cliff edge

BEIS should be able to issue a response by the end of this month which should provide further clarity

# Questions?

# Thank you

# RED II:

# Key changes to sustainability policy

**Annex VI of RED II** include:

- GHG emission default and typical life-cycle GHG emission values and saving for different biomass fuel production pathway and the fossil fuel comparators across power, transport and heat
- New comparators for biomass fuels (biogas and biomethane)
- A new life-cycle GHG calculation/methodology

New RED II comparators for biomass fuels (biogas and biomethane) are:

- Heat: 80 $gCO_2e/MJ$
- Transport: 94 $gCO_2e/MJ$
- Power: 183 $gCO_2e/MJ$

| | Transport biofuels | | Heating and cooling | | Power | |
|---|---|---|---|---|---|---|
| **Plant operation start date** | **Min GHG Saving (%)** | **GHG threshold (g $CO_2e/MJ$)** | **Min GHG Saving (%)** | **GHG threshold (g $CO_2e/MJ$)** | **Min GHG Saving (%)** | **GHG threshold (g $CO_2e/MJ$)** |
| Before October 2015 | 50% | 47 | - | - | - | - |
| After October 2015 | 60% | 37.6 | - | - | - | - |
| After January 2021 | 65% | 32.9 | **70%** | **24** | 70% | 54.9 |
| After January 2026 | 65% | 32.9 | **80%** | **16** | 80% | 36.6 |

B. METHODOLOGY

1. Greenhouse gas emissions from the production and use of biomass fuels, shall be calculated as follows:

(a) Greenhouse gas emissions from the production and use of biomass fuels before conversion into electricity, heating and cooling, shall be calculated as:

$$E = e_{ec} + e_{l} + e_{p} + e_{td} + e_{u} - e_{sca} - e_{ccs} - e_{ccr},$$

Where

$E$ = total emissions from the production of the fuel before energy conversion;

$e_{ec}$ = emissions from the extraction or cultivation of raw materials;

$e_{l}$ = annualised emissions from carbon stock changes caused by land-use change;

$e_{p}$ = emissions from processing;

$e_{td}$ = emissions from transport and distribution;

$e_{u}$ = emissions from the fuel in use;

$e_{sca}$ = emission savings from soil carbon accumulation via improved agricultural management;

$e_{ccs}$ = emission savings from $CO_2$ capture and geological storage; and

$e_{ccr}$ = emission savings from $CO_2$ capture and replacement.

Emissions from the manufacture of machinery and equipment shall not be taken into account.

(b) In the case of co-digestion of different substrates in a biogas plant for the production of biogas or biomethane, the typical and default values of greenhouse gas emissions shall be calculated as:

$$E = \sum_{1}^{n} \cdot E_n$$

where

E = greenhouse gas emissions per MJ biogas or biomethane produced from co-digestion of the defined mixture of substrates

$S_n$ = Share of feedstock n in energy content

$E_n$ = Emission in g $CO_2$/MJ for pathway n as provided in Part D of this Annex (*)

$$S_n = \frac{P_n \cdot W_n}{\sum_{1}^{n} \cdot W_n}$$

where

$P_n$ = energy yield [MJ] per kilogram of wet input of feedstock n (**)

$W_n$ = weighting factor of substrate n defined as:

$$W_n = \frac{I_n}{\sum_{1}^{n} I_n} \cdot \left( \frac{1 - AM_n}{1 - SM_n} \right)$$

where:

$I_n$ = Annual input to digester of substrate n [tonne of fresh matter]

$AM_n$ = Average annual moisture of substrate n [kg water/kg fresh matter]

$SM_n$ = Standard moisture for substrate n (***).

# RED II:

# Key changes to sustainability policy

Key aspects to notice:

- RED II gives a bonus to management of raw manures through AD of -45g $CO_2$/MJ which I actually forgot to mention in the response.
- Averaging of consignment is allowed under RED II (co-digestion).
- RED II GHG calculation includes an input for emissions from transport and distribution of the fuel  ie methane leakage from the point of injection. RHI methodology doesn't.  Under the RTFO you have to include the transport and distribution and the default value is 0.15% methane leakage.