Verified Carbon Standard
A VERRA STANDARD

Comments received during the 16 August - 14 September 2021 Public Consultation on VM0041 *Methodology for the Reduction of Enteric Methane Emissions from Ruminants Through the Use of Feed Ingredients, v2.0*: Verra responses

Comment #	Organization	Commenter	Section	Comment	Response
1	Volta Greentech	Fredrik Åkerman	Applicability Conditions	I saw that the new revision of the methodology use the term “feed additive” instead of “feed supplement”. In our opinion, this have high chance limiting the speed of commercialisation of methane reducing feed, since the term feed additive in some geographies have a very narrow scope. The terms “feed supplement” or “feed ingredient” are broader and would in my opinion suit better for the methodology. To take Volta Greentech as an example, we are working with natural seaweed and our product is defined as a “feed material”, not a “feed additive” in EU. With a change to “feed additive” in the methodology, the worst case scenario I’m imagining is that natural seaweeds can’t be used in projects to reduce methane emissions. This would be a total roadblock for our commercialisation.	The use of the term 'Feed Additive' was not meant to be restrictive but to represent innovations used to mitigate methane emissions. Based on the feedback received, it has been replaced with 'Feed Ingredient' following the definition of the Codex Alimentarius. Feed Ingredient: A component part or constituent of any combination or mixture making up a feed, whether or not it has a nutritional value in the animal’s diet, including feed additives. Ingredients are of plant, animal or aquatic origin, or other organic or inorganic substances. Drawn from: the Codex code of practice on good animal feeding CAC/RCP 54-2004 http://www.fao.org/3/i1379e/i1379e06.pdf
2	DSM	Mark van Nieuwland & Maik Kindermann	Project Boundary	p.12 - change "major change in the overall rumen.." to detrimental change	Your point is noted; the text has been revised.
3	DSM	Mark van Nieuwland & Maik Kindermann	Project Boundary	p. 12 - Take out "as is... processes", this is not needed as it does not add any additional information, nor is it fully scientifically correct	Your point is noted; the text has been revised.
4	DSM	Mark van Nieuwland & Maik Kindermann	Quantification of GHG Emission Reductions and Removals	p. 18 - "can be used" replace by "needs". This is to avoid products and projects only conducting peer reviewed studies in feed conditions with high methane reductions, and thereafter claiming this would be globally relevant.	Your point is noted. The nutrient profile should be considered when applying the ERF, if the project diet varies from that of the meta-analysis used to establish the ERF.
5	DSM	Mark van Nieuwland & Maik Kindermann	Monitoring	p. 34 - EFp - Better to use GHG emitted per kg of the feed additive.	Your point is noted, the text has been revised such that EFp refers to GHG/kg feed *ingredient* (ingredient per the shift in terminology from feed additive to ingredient)
6	DSM	Mark van Nieuwland & Maik Kindermann	Monitoring	p. 34 - Monthly frequency - Production processes are relatively fixed, and therefore, demonstrating once, and thereafter only updating if new information is available would be more practical	In the revised methodology, annual monitoring is permitted as long as there have been no significant changes to project parameters (including feeding regime, animal type, etc.).
7	DSM	Mark van Nieuwland & Maik Kindermann	Monitoring	p. 40 - VS - if something is volatile, it cannot be solid, so something appears to be missing in this sentence. Additional question, is this parameter really relevant if the product has demonstrated not to be affecting excreta.	The parameter VS , or Volatile Solid, refers to a substance that can easily shift between solid to vapor state, bypassing liquid. The parameter is relevent for scenarios where the feed ingredient is documented to shift manure composition.
8	DSM	Mark van Nieuwland & Maik Kindermann	Appendix I	p. 53 - " The majority of feed additives applicable under this methodology are natural products which occur during a certain time of year (seasonal crops)." Is this still relevant given the methodology covers natural and non-natural products.	It is still relevant because the majority of feed ingredients commercially available appear to be nature-based. Considering that, it remains important to emphasize the impacts that seasonality may have on natural ingredients.

9	Mooh	Andreas Zweifel	Quantification of GHG Emission Reductions and Removals	The formula for calculating GE (eq. 4) and default values for GE according to fat content of feed have been deleted. On farm, the energy intake of cows is measured using Net Energy (NE) and not the gross energy (GE). Indeed, the farmer is interested in managing the energy that is available to the animal (i.e. Net energy), as this will determine whether or not the needs of the cows are met. The gross energy is not used by farmers, as it is not a relevant indication for feeding purposes of the animal. Therefore, if GE is needed in the method, a clear way of calculation must be shown *Suggestions:* - Reinstate equation 4 and default values for ED - Give a new option to calculate GE	As originally drafted, equation 4 did not give GE - it was the wrong equation for GE intake. GE and ED are synoymous as both have units of MJ/dry matter while GEI would be in in units of MJ/day. Equation 4 will be reinstated but redefined as GEI = DMI * ED (or GE). The default for ED or GE will be as described in the methodology.
10	Mooh	Andreas Zweifel	Quantification of GHG Emission Reductions and Removals	ERF Option 1: Requirement of meta study of at least 3 papers. This requirement makes a case-specific case study ineligible. *Suggestion:* Do not remove p.18: "or farm-specific emissions data that was determined by following the guidelines specified in Appendix II." to allow for an on-farm protocol.	An on-farm protocol is allowed, however if farm specific data is available then that can be used for that farm only. It cannot be extrapolated to other conditions. Meta-analysis allows for extrapolation depending on dose and diet quality.
11	Mooh	Andreas Zweifel	Quantification of GHG Emission Reductions and Removals	A difference of 5% between geographic regions and management practices: these are two very extensive and not defined parameters. *Suggestion:* Exclude.	Your point is noted, the difference in effect is largely related to differences in feed quality. The methodology has been revised to delete geographic regions and management practices.
12	Mooh	Andreas Zweifel	Monitoring	The cow adjusts a faire share of energy use by building and using fat reserves. Therefore, feeding plans are established to cover the average energy needs over the lactation period. A lactation period typically takes one year. Giving just one value for a specific day would be very inaccurate and lead to worse approximations than using a yearly value. *Suggestion:* A yearly average of the GE intake would be much more precise on farm level than a daily intake. Change to MJ per head and year.	Your point is noted, the methodology has been revised to allow for annual monitoring.
13	Mooh	Andreas Zweifel	Monitoring	See comment above. Suggestion: DMI should be assessed per head on a yearly basis as it changes dramatically depending on the stage of lactation.	Your point is noted, the methodology has been revised to allow for annual monitoring
14	Mooh	Andreas Zweifel	Monitoring	Section for determining ED was cancelled Suggestion: Reinstate the section for ED and adapt the factor on a yearly basis rather than using a daily basis.	Equation 4 has been reinstated but redefined as GEI = DMI * ED (or GE). Annual values will be allowed in the revisions.
15	Mooh	Andreas Zweifel	Monitoring	On a farm, the total number of animals is generally rather stable from year to year. However, the number of animals in each group changes daily as cows are continuously being moved in/between/out of groups for various reasons (entering/exiting lactation, separation for recovery, new arrivals or slaughtering …). A daily record of the exact number of animals in each group on the farm does not exist. Therefore, having to provide a daily record of the number of animals is not feasible or would rely on 365 estimates. The requirement to provide weekly data forces farmers to make 52 estimates per year and not only means unnecessary effort but leads to very inaccurate results. Using yearly numbers on the other hand would allow for exact data and more accurate numbers as each cow goes through one production cycle per year (305 days of lactation and 60 days of dry stage). *Suggestion*: Provide the possibility to use a yearly number of cows per group. The yearly approach gives a more accurate number of cows within a group as each cow goes through the entire lactation and dry cycle within a year. Farmers can easily report the average number of cows per group on a yearly basis as this number is used for other administrative duties.	Your point is noted, the methodology has been revised to allow for annual monitoring.
16	Industry	Anonymous	Applicability Conditions	*Evidence for no increase in manure:* What is considered sufficient and reliable proof? If there is published evidence of increased milk yield and feed efficiency, can it be assumed that more energy and nitrogen is extracted from the feed so there will be no increase	Proof can be provided through 1) Documentation of on-farm analysis comparing manure from treated and control animals or 2) A published study that documents feed efficiency, especially in terms of energy and nitrogen production.

17	Industry	Anoynmous	Quantification of GHG Emission Reductions and Removals	*Option 2: GEI calculation No 4* - GE is not available to dairies. They work with net energy, metabolizable energy or digestible energy. Which they use varies from farm to farm and across the world. Better and at least as accurate to take a standard GE per kg of feed for cows by region. Take an average for different groups across the year (not by day). Most dairies do know their animals DMI. Suggest to use the data previously proposed with equation 4 (EF enteric Option 2) including the two alternative ED figures depending on oil/fat content of the diet giving a standard GE figure to be multiplied by DMI.	Equation 4 has been reinstated but redefined as GEI = DMI * ED (or GE). The default for ED or GE will be as described in the protocol.
18	Industry	Anonymous	Quantification of GHG Emission Reductions and Removals	*Meta analyses of 3 peer reviewed articles:* additionally added parameters5% differences between geographic region and management practices: these are two very extensive and not defined parameters. DMI differences will indicate differences from the meta-analyses so there is no reason to introduce the 5% difference clause. *Suggestion:* exclude	The difference in effect is largely related to differences in feed quality. The methodology has been revised to delete geographic regions and management practices.
19	Industry	Anonymous	Quantification of GHG Emission Reductions and Removals	Gross energy intake calculation refers to equation 4 that is removed. See comment 2 above. *Suggestion:* reinstate formula 4 noting comment 2	Please review the response to comment 17
20	Industry	Anonymous	Monitoring	*DMI* - It is no longer used in an equation Suggestion: reinstate formula 4 with comments in 2 above	Please review the response to comment 17.
21	Industry	Anonymous	Monitoring	Ym - Percentage of gross energy *Suggestion*: reinstate equation 4 including comments in 2 above in order to calculate GE	Please review the response to comment 17.
22	Industry	Anonymous	Monitoring	N - Frequency of monitoring: recordings of farmers are mostly based on yearly data. This is confirmed by the definition of animal grouping (see 9.2; j) that states that the individual animal characteristics remain constant for a given period. *Suggestion*: use annual	Please review the response to comment 6.
23	Industry	Anonymous	Appendix III	Use of NDF and DE in calculation DE is not available to many dairy farmers (not used in the USA for example). *Suggestion:* take average figures by animal group and geographical location. Perhaps include NDF only (not DE) to further classify Ym	If DE is not available, NDF can be used to determine the best-fit Ym value
24	Industry	Anonymous	Definitions	Ferment food…. Suggestion: Replace “food” with “feed”	Thank you for your contribution, your suggestion will be implemented.
25	Industry	Anonymous	Definitions	Feed Additives - Many of the mentioned products are not added in a pure form. Suggestion: add “and their premixtures”	The new definition of feed ingredient covers premixtures.
26	Industry	Anonymous	Project Boundary	Manure decomposition - Changes in CH4 or N2O. Suggestion: define changes through the expression “significant, p≤0,05”	Your point is noted, the text will be revised.
27	Industry	Anonymous	Quantification of GHG Emission Reductions and Removals	Option 2 is based on GEI (gross energy intake). Most farmers do not get this information on the feed analyses. Suggestion: reinstate calculation n°4'	Please review the response to comment 17.
28	Industry	Anonymous	Quantification of GHG Emission Reductions and Removals	Formula 5: Formula of annual emission calculates the annual reduction. Suggestion: adapt	Formula 5 (now Formula 6) calculates the annual project emissions, or the sum of annual emissions from enteric fermentation and from the production, transportation and application of the additive
29	Industry	Anonymous	Quantification of GHG Emission Reductions and Removals	Meta-analyses of 3 peer reviewed articles: additionally added parameters. Suggestion: the trials used for the meta-analyses should be carried out at least two different locations.	The meta-analysis requirement is intended to cover a range of variables, including location.
30	Industry	Anonymous	Quantification of GHG Emission Reductions and Removals	Meta analyses of 3 peer reviewed articles: additionally added parameters. 5% differences between geographic region and management practices: this are two very extensive and not defined parameters Suggestion: exclude	Your point is noted; as the effect is primarily on feed quality and animal type, geographic regions and management practices will be removed as parameters.
31	Industry	Anonymous	Quantification of GHG Emission Reductions and Removals	GHG emissions from shifts in manure decomposition… Suggestion: define “shifts” as p≤0,05	The text has been revised to include your suggestion.

32	Industry	Anonymous	Monitoring	Gross energy intake calculation refers to equation 4 that is removed Suggestion: reinstate formula 4	Please review the response to comment 17.
33	Industry	Anonymous	Monitoring	GE, MJ/head/Day of DM. Energy intake on a farm varies during the production cycle. Cows are adjusting their energy use through body fat reserves. The calculation of a ration is based on the average energy need during lactation. In other words, using a value per only one day could be inaccurate. Suggestion: change to MJ/head/year	The units will be maintained to accomodate on-farm protocols that take daily measurements, but annual monitoring frequency is permitted under the revised methodology.
34	Industry	Anonymous	Monitoring	DMI. It is no more used in an equation as well as take into consideration remark 10. Suggestion: reinstate formula 4	Please review the response to comment 17.
35	Industry	Anonymous	Monitoring	Ym, description. Percentage of gross energy Suggestion: reinstate equation 4 in order to calculate GE	Please review the response to comment 17.
36	Industry	Anonymous	Monitoring	ED. The calculation for the ED of dry matter was deleted, but is helpful to calculate the energy intake of an animal Suggestion: reinstate	Please review the response to comment 17.
37	Industry	Anonymous	Monitoring	Nij. Frequency of monitoring: recordings of the farmers are mostly based on yearly data. This is confirmed by the definition of animal grouping (see 9.2; j) that states that the individual animal characteristics remain constant for a given period.	Please review the response to comment 6.
38	Industry	Anonymous	Appendix II	Direct enteric methane measurements Suggestion: add to the methods the SF 6 tracer gas technique	SF6 will be included in the revised methodology as an accepted measurement technology.
39	Industry	Anonymous	Appendix II	Recording duration Recording duration excludes minimal trial duration Suggestion: add a minimal trial duration of 8 weeks (EFSA guidelines for zootechnical additives)	Your point is noted, the minimum trial duration should be 8 weeks. The text has been revised.
40	Industry	Anonymous	Appendix II	Recording duration, green feed. Sampling days and data follow Hristov et al, 2015) Suggestion: experience from C.lock inc. (producer of green feed system) as well as other system producers	The recommended sampling procedure follows Hristov et al. 2015 or the recommendation of the manufacturer.
41	Industry	Anonymous	Appendix II	Table 5 It is written: “Table 5 provides the description of three different techniques”, but only 2 techniques are described Suggestion: change to 2 techniques or add the SF6 tracer gas technique	Your point is noted, SF6 measurement technology has been added as an accepted measurement technology.
42	Industry	Anonymous	Appendix II	Table 6 Source: table 10.12 contains a description concerning milk yield per animal and year Suggestion: use the not adapted table 10.12, p. 45, IPCC, 2019	Your point is noted, the table has been revised.
43	Industry	Anonymous	Appendix II	Table 7 Source: table 10.11 contains a description concerning milk yield per animal and year Suggestion: use the not adapted table 10.11, p. 42, IPCC, 2019	Your point is noted, the table has been revised.
44	Industry	Anonymous	Appendix I	I do not understand the reference to plants or algae at page 54. For example, SOP products are based on natural raw materials which are not only plant based, overcoming the seasonality issue that is correctly raised here. Is this specific line implying that all feed additives that are not based upon plants or algae are not eligible for this methodology?	This line is not meant to imply that only plant/algae based products are eligible; any natural compound is eligible per scientific evidence demonstrating its efficacy and compliance with the Applicability Conditions. This section refers to potential issues with the seasonality of natural compounds and resulting impact on their uptake.

45	Mootral	Christelle Girard	Definitions	p. 8 - Replace “Feed Additive” by “Feed Ingredient” in the text Feed Ingredient definition: A component part or constituent of any combination or mixture making up a feed, whether or not it has a nutritional value in the animal’s diet, including feed additives. Ingredients are of plant, animal or aquatic origin, or other organic or inorganic substances - Code of Practice on Good Animal Feeding CAC/RCP 54 (FAO and WHO, 2004) and FAO (2020). We request to define the solution as “Feed ingredient” instead of “Feed Additive” to broaden the scope of solutions, enabling more technologies, such as plants, yeasts, etc. to be eligible to accelerate the effort of reducing methane from enteric fermentation. For that we can avail ourselves of the same source, namely the Codex Alimentarius Code of Practice on Good Animal Feeding CAC/RCP 54 (FAO and WHO, 2004) and FAO (2020) This will also help avoid inconsistencies in terms of nomenclature used by the various regulatory authorities to classify feed ingredients, which varies significantly across the countries.	Your point is noted; please review the response to Comment 1.
46	Mootral	Christelle Girard	Applicability Conditions	p. 9 - Proposed text: The feed ingredients must have been demonstrated to comply with feed and food regulations by way of being legal to feed to animals in each national or subnational (including local) jurisdiction included in the scope of the project. Where conflict arises between regulations, the most stringent standard must apply. Approved feed ingredients are usually listed as legal/safe to feed to animals in each country. It is that list that should be the determining factor for compliance with feed and food regulations. This is to ensure broadest possible applicability for feed ingredients, including feeds themselves or feeds with bioactives incorporated for a synergistic effect that demonstrate a reproducible reduction of methane from enteric fermentation. In combination with all other applicability conditions, this will ensure sufficient rigor in terms of animal safety and efficacy.	If feed ingredients comply with all feed and food regulations, then they are inherently legal to feed to animals, based on respective jurisdictional regulations. As such, the phrase "by way of being legal" does not add additional value to the text.
47	Mootral	Christelle Girard	Applicability Conditions	p. 9 - Proposed text: The feed ingredient fed to the animal must have no significant negative impact on animal health or performance. This must be shown through regulatory approval on registers of approved feed ingredients relevant to the territories for any proposed project and the submission of published evidence demonstrating no negative impacts on animal health. Animal welfare is very important, but also very difficult to assess for a feed ingredient . However, the impact of a feed ingredient on health or performance can be assessed very well. There is no standard protocol for assessing welfare of a feed ingredient. The EFSA describes this in the Guidance on the assessment of the efficacy of feed additives as “The selection of the endpoints should be properly justified. For example, long-term studies would be needed to detect changes in morbidity/mortality while short-term studies may be sufficient to measure reduced stress levels as monitored by metabolic indicators.” We would propose to focus on animal health and not on animal welfare. If focus on animal welfare, then endpoints for assessment should be proposed.	Your point is noted, the methodology has been revised to indicate that the feed ingredient must have no significant negative impact on animal health or performance.
48	Mootral	Christelle Girard	Definitions	GWP should be defined in the definition section (3) with a generic definition. The value of GWP should not be mentioned (like in page 14) to ensure that the methodology is always up to date. Instead a reference to IPCC last assessment report and VCS rules by Verra shall be made. GWP accepted by Verra is the one to be used	The methodology has been updated to reflect this suggestion.
49	Mootral	Christelle Girard	Quantification of GHG Emission Reductions and Removals	p. 16 Calculation 4 of Gross Energy intake is removed, but is necessary to calculate methane emission in equation 3. This is not replaced by the modification in Appendix III. In 9.1 for GE intake this equation is also referred to. Change numbers of equations accordingly.	Please review the response to Comment 17.

50	Mootral	Christelle Girard	Quantification of GHG Emission Reductions and Removals	p. 16 Option 2: , =[● , /100 ● , ● ,] ● −1 Equation 3 to be corrected. The conversion factor Ym in Appendix III is expressed as % and not $EFEnteric\,i\,j \quad GEj \quad Ym\,j \qquad Ni\,j \quad Daysi\,j \quad EC$ as a factor. In the calculation this needs to be taken into account.	Your point is noted; the equation has been updated.
51	Mootral	Christelle Girard	Quantification of GHG Emission Reductions and Removals	p. 18 - Proposed text: The enteric emission reduction factor can be established through a meta-analysis of at least 3 peer-reviewed publications in reputable journals that are listed in the Science Citation Index Expanded (SCIE) and Emerging Sources Citation Index (ESCI). The Science Citation Index Expanded (SCIE) and Emerging Sources Citation Index (ESCI) are both included in the Web of Science Core Collection. The ESCI includes new Journals with Open Access scholarly literature covering all disciplines with a broad scope.	The rigor of review in broad scope journals not included in the SCI is questionable. The papers used for the meta-analysis need to be reviewed by experts in the field, which is not always the case in some broad scope journals. Thus, we will maintain the text as is.
52	Mootral	Christelle Girard	Quantification of GHG Emission Reductions and Removals	p. 18 - Additional text: Where such studies were performed and published prior to the current amendment of the methodology, but were published in publications outside the scope of SCIE and ESCI, a maximum of one such study may count towards the required three peer-reviewed studies. As some companies have, in good faith, conducted and published studies that were published outside the scope of SCIE and ESCI prior to the proposed amendments, we propose that no more than one such study may count towards the required amount of three studies. This should in reality only cover a few studies, but it would allow companies to continue capturing the benefit of these valuable studies.	To ensure the rigor of the enteric emission reduction factor, we maintain the need to use three peer reviewed studies listed in the SCI for the meta-analysis.
53	Mootral	Christelle Girard		p. 18 - Proposed text: The conditions of the project should not deviate largely from the conditions under which the enteric methane emission reduction factor is determined in the meta-analysis of published results. This applies to the categorical parameters (animal type, production system; Appendix IV, Table 7)) and variable parameters (dry matter intake, digestible energy, NDF; Appendix III, Table 6)). The project variable parameters are within the 95% confidence interval of measured parameters determined in the meta-analysis. In the meta-analysis, meta-regressions for the ERF can be derived for measured variables to correct for measured variables within a project outside the 95% confidence interval (e.g. ERF = a x DMI + b). The description is not clear (e.g. 5% of a categorical parameter as animal type is not possible). The aim is to describe that the conditions of a project are within the conditions of trials where the ERF is based on, and if conditions of the project are outside the trial conditions correction can be made with a regression for the ERF. The conditions of the trial are specified for categorical parameters (animal type, production system; Appendix IV, Table 7)) and variable parameters (dry matter intake, digestible energy, NDF; Appendix III, Table 6). The region as categorical parameter is not included, as conditions can be similar across regions and would be too restrictive. The 95% confidence interval is used to determine the range of conditions of trials included in the meta-analyses.	We appreciate your suggestion. As the effect is primarily on diet and animal type, this proposed language has been adapted and included in the revisions.

54	Mootral	Christelle Girard	Appendix II	Proposed text: 5. The recommended measurement protocol needs to determine 1) optimal sample size and 2) recording duration. Calculation of sample size is an important component of design of animal studies. Using a few animals may lead to missing any significant difference even if it exists in the population. The following formula can be used for calculation of sample size for comparison between baseline and project groups (Charan and Kantharia, 2013): Sample size: 2 SD2 (1.96 + 0.842)2/ d2 where SD is standard deviation from previous studies or pilot study with observed variability between animals and d is the minimumexpected difference between observed means of two groups (baseline vs project). The recording duration depends on the measurement method used. Methods with short measurement periods should preferably last three days with repetitions in time and all measurements should preferably be conducted divided over a day to account for diurnal variation in methane emissions. A summary overview of the conditions that the measurement technology must meet was described by item 6. Item 5 is enlarged and split in different items which is not logical. The different item numbers are removed and all is in item 5. The condition aims at 1) sample size and 2) recording duration. The formula is described in the reference. The formula added and the description was not correct: formula is corrected, “within cow” is changed into “ between cows” and “control vs baseline” is changed into “baseline vs project”. The recording duration depends on the measurement method used. The recommendation for measurement duration and accounting for diurnal variation is given. This can’t be too limiting as under certain conditions (e.g. day and night grazing on pasture) it is not feasible.	The methodology recommends using a sampling design following the manufacturer's guidelines. For GreenFeed for example, it is recommended to follow Hristov et al. (2015). Your point is noted, and we have changed control vs baseline and also within cow to between cows.
55	Mootral	Christelle Girard	Appendix II	Table 5: Measurement technologies for methane emissions are described in Table 5 for demonstration and should not be restricted. The measurement technologies for methane for which the method is well described and evaluated in peer-reviewed publications of method development, trials and reviews shall be considered as appropriate.The list of technologies is extended with the methods that are described in reviewed articles of methane measurements (Hammond ea 2016, Patra 2016, Hristov ea 2017, Garnsworthy ea 2019, Zhao ea 2020). The list of methodologies should not be restrictive as technologies develop and may result in more accurate, practicable and repeatable measurements of methane emissions. + Table 5 (revised and shown below). The heading of the table is changed and the list of technologies is extended based on review articles. Measurement technologies for methane emissions are described in Appendix II, Table 5 for demonstration and are not restricted. The measurement technologies for methane of which the method is well described and evaluated in peer-reviewed publications of method development, trials and reviews should be considered as appropriate. The list of technologies is extended with the methods that are described in review articles of methane measurements (Hammond ea 2016, Patra 2016, Goopy ea 2016, Hristov ea 2017, Garnsworthy ea 2019, Zhao ea 2020). See Annex A. This list should also not be restrictive as technologies develop and may result in more accurate and repeatable measurements of methane emissions.	The list is restricted to three at the moment because these are the most reliable methods for feed additive research. Others may be more appropriate for genetic work but not feed additives. We considered those reviewed by Hammond and others not only what works but what makes sense for feed additive work. If a study can demonstrate that a measurement technology shows comparable results to a chamber-based approach, then it may be considered.
56	Mootral	Christelle Girard	Summary Description	p. 6 Proposed Text: Feed ingredients applicable under this methodology reduce CH4 emissions directly through inhibition of methanogenesis by archaea in the rumen, or indirectly through modification of the rumen microbiome.	Your point has been noted.
57	Mootral	Christelle Girard	Definitions	p. 8 - The formation of methane in the rumen anaerobically by **microorganisms** known as methanogens	Thank you for this suggestion, the text has been revised.

58	Mootral	Christelle Girard	Applicability Conditions	p. 9 - Proposed text: Livestock producers must feed their animals a feed ingredient which reduces enteric CH4 emissions by inhibiting methane production in the rumen through a variety of mechanisms of action. In order to broaden applicability of the methodology , modes of action should be described broader. Suppression is removed. Inhibition of methanogens is mainly by inhibition of enzymes that reduces the activity. "Suppression" and "inhibition" is a repetition. Remove “or suppression” throughout the document.	Your point has been noted; however, we will maintain the text as is.
59	Mootral	Christelle Girard	Project Boundary	p. 11, 12 - Proposed text: As indicated in Table 2, the project boundary includes CH4 emissions from enteric fermentation. Enteric CH4 is produced mainly in the rumen (87%) and to a smaller extent (13%) in hindgut (Murray et al., 199976; Dini et al., 2012). Ruminants release CH4 by direct eructation from the rumen, by expiration of absorbed methane in blood and exhaled by lungs and by the hindgut in the flatus. However, 89% of the hind gut produced methane is expirated through the lungs (Murray et al., 1976). Exhaled gas is the combined gas released by eructation and expiration through their mouth and nostrils. As methane is almost all released by exhalation, the project boundary does not include CH4 emissions from flatulence. Further, due to rumen physiology, In some cases, the feed ingredient could have an effect on digestibility parameters, which will affect manure nutrient composition and potential CH4 emissions during storage and field application. Changes in methanogenesis do not impact manure decomposition. For this reason, If the feed ingredient is demonstrated to shift manure composition, then the project boundary must include CH4 or N2O emissions from decomposing manure.	The text has been modified to read: Enteric CH4 is produced mainly in the rumen (87%) and, to a smaller extent (13%), in the hindgut (Murray et al., 1976). Ruminants release CH4 by direct eructation from the rumen, by expiration of absorbed CH4 in blood and exhaled by lungs and by the hindgut in the flatus. However, 89% of the hind gut produced methane is exhaled through lungs (Murray et al., 1976). Exhaled gas is the combined gas released by eructation and expiration through their mouth and nostrils. As CH4 is almost all released by exhalation, the project boundary does not include CH4 emissions from flatulence. However, due to rumen physiology, in some cases, the feed ingredient could have an effect on digestibility parameters, which will affect manure nutrient composition and potential CH4 emissions during storage and field application. Changes in methanogenesis do not impact manure decomposition. For this reason, if the feed ingredient is demonstrated to shift manure composition, then the project boundary must include CH4 or N2O emissions from decomposing manure.
60	Mootral	Christelle Girard	Quantification of GHG emissions reductions and removals	p. 21 - VSi,j Annual average **volatile solids** (VS) excretion per animal grouping j, for farm i	The text has been revised to spell out VS.
61	Mootral	Christelle Girard	Monitoring	p. 23 - Gross energy intake can be calculated by multiplying dry matter intake by the **gross energy content** of the feedstuff using equation 4	Your point is noted, but we will leave as energy density. Gross Energy (GE) and Energy Density (ED) are synoymous; both have units of MJ/dry matter
62	Mootral	Christelle Girard	Monitoring	p. 24 - Kg **DM** head-1 day-1	The text has been revised to include DM.
63	Mootral	Christelle Girard	Monitoring	p. 25 - The table provides Ym values derived from cattle with diets containing various levels of neutral detergent fibers (NDF) and **digestible energy (DE)**	The text has been revised.
64	Mootral	Christelle Girard	Monitoring	p. 26 - Keep Table ED from version 1	The table has been reinstated.
65	Mootral	Christelle Girard	Monitoring	p. 30 - kg CH4 head-1 **day-1**	The text has been revised.
66	Mootral	Christelle Girard	Definitions	p. 7 - Dry Matter Intake (DMI) **Dry matter intake is the amount of feed an animal consumes per day on a moisture-free basis**	Your point is noted, the definition has been updated.
67	Mootral	Christelle Girard	Quantification of GHG emissions reductions and removals	p. 16 - Option 2 is completed with: When DMI cannot be collected on farm, DMI of lactating dairy cows is estimated by: DMI = 0.0185 BW + 0.205 FCM. Where BW = body weight (kg), FCM = fat-corrected milk (kg/d; 0.4324 kg of milk + 16.216 x kg of fat). As per Equation 10.18B from Tier 2, IPCC 2019 On most dairy farms, certainly with grazing, DMI is estimated, and data is not stored for 3 years. Equation 10.18B from Tier 2, IPCC 2019 is then used for estimating DMI of lactating cows.	Equation 4 has been reinstated, which is where this information for estimating DMI would be most appropriate. When on-farm data is not available, defaults can be drawn from IPCC.
68	Mootral	Christelle Girard	Quantification of GHG emissions reductions and removals	DE is % of GE	Your point is noted.

69	VNV Advisory Services Pte. Ltd	Nayan Jyoti Deka	Applicability Conditions	As per Section 4 of the methodology, Supplements are replaced by additives however as per Section 3 of the methodology, there is a minuscule difference in the meaning of both the words and we have found the article in which supplement and additives are used for same context as link provided below- https://www.agric.wa.gov.au/climate-change/carbon-farming-reducing-methane-emissions-cattle-using-feed-additives Also, basic nutritional benefit and purpose of both are same only concentration and mechanism of function is different as per the article below- https://www.appclonescript.com/feed-additives-vs-feed-supplements/ Besides this, in Market as well, both the words, supplements and additives are used interchangeably. Could we have both supplements and additives included in the methodology? Moreover, projects where they use feed supplements and not feed additives for dairy cattle are eligible under this revised methodology VM0041? Please clarify.	Please refer to the response to Comment 16.
70	VNV Advisory Services Pte. Ltd	Nayan Jyoti Deka	Applicability Conditions	In Section 4 point 7 (a) it is stated that project areas involve livestock farms. Could you consider a project which involves a group of small households with 3-4 cattle/buffalo each in this methodology, practically in developing country like India, almost every house in the villages domesticate dairy animals for commercial use .	Per the VCS rules, grouping of project activities is allowed.
71	Industry	Anonymous	Quantification of GHG emissions reductions and removals	The following language in section 8.2.1 “Enteric methane emissions reduction factor” is unclear. “Additionally, there must be no greater than 5% differences between project parameters (e.g., feed regime, animal type, weight, production phase, geographic region, and management practices) and the manufacturer’s default enteric emission reduction factor established through a meta-analysis. The nutrient profile of the feed can be used to adjust using the published meta-analysis if there are differences between the average in the meta-analysis and the project diet. Where there are significant differences in the project parameters that cannot be adjusted the meta-analysis, the project must use Option 2.” It is unclear how the percent difference between project parameters and manufacturer’s default emission reduction factor is established. For example, if the average weight of the cattle in the published study is 2,000lbs and the average weight of the cattle in the project is 2,101lbs, would the emission factor be invalid because the cattle weight deviated over 5%? It is also unclear how a project proponent could calculate the percent difference in geographic region. Would projects in the same country as the published studies result in 0% difference? For example, a project could be located in a mountainous region of Brazil and the published study could have been conducted in a coastal region of Brazil. We suggest Verra returns to the qualitative language of “significant difference” to avoid overly complicated calculations and determinations of 5% difference. We believe project developers and verifiers can adequately assess significant differences with a reasonable level of assurance. If “significant” difference is not	As the effect is primarily on diet and animal type, the project parameters to be considered in the meta-analysis have been changed. Please refer to Comment 53.

72	Industry	Anonymous	Quantification of GHG emissions reductions and removals	We suggest updating language in section 8.2.2 to allow the project to set a project specific emission reduction factor for the project crediting period provided no significant project parameters have changed. “Determine the enteric methane emissions reduction factor for each animal group by performing direct enteric methane measurements to estimate the methane production per animal group per day while consuming the feed additive during the monitoring period.” A project proponent should be allowed to perform direct enteric methane measurements during the first monitoring period to be validated and eligible for use during the entire project crediting period provided no significant project parameters (e.g., feed regime, animal type, weight, production phase, geographic region, and management practices) have changed. There is no reason to believe the emission reduction factor would change year over year if the project parameters have not changed, and this would significantly reduce operating costs for the project lifespan.	The section has been modified to include: 'The project proponent can perform direct enteric methane measurements (following the guidelines in Appendix 2) during the first monitoring period, to be validated and eligible for use during the entire project crediting period, provided no significant project parameters (e.g., feeding regime, animal type, weight, production phase, conditions) have changed'.
73	Industry	Anonymous	Applicability Conditions	Applicability conditions - 3b: “The feed additive must have no significant negative animal welfare, health or performance impacts on the animal to which it is fed. This must be shown through regulatory approval and the submission of published evidence demonstrating no negative impacts on animal welfare.” Avoiding significant negative animal welfare, health or performance impacts is a fundamental expectation for all additives. Ensuring safety is the central function and core competency of state and federal feed, food and drug regulators. The FDA uses a risk-benefit approach for approving new drugs, allowing the possibility of side effects when the benefits substantially outweigh the risk1. Furthermore, the FDA evaluates drugs under a set of “intended conditions of use”2 and notes that using drugs outside of that context may cause harm3. Consistent with this approach, we suggest replacing “the submission of published evidence demonstrating no negative impacts on animal welfare” with “the submission of published evidence demonstrating that the additive has no significant negative impacts on animal welfare, when administered in accordance with its intended conditions of use”.	Your point is noted; applicability condition 3b has been revised to include "in accordance with its intended conditions of use"
74	Industry	Anonymous	Appendix II	Appendix 2 - Section 2.6 (Direct enteric methane measurements): Sample size = 2 SD2 (1.96 + 0.842) 2/d2 We note that this formatting may be confusing for people to follow, as “SD2” could be interpreted to mean “double the standard deviation” rather than “square the standard deviation”, as we believe is intended in the original Charan and Kantharia paper. Updating the formatting to “Sample size = 2 SD2 (1.96 + 0.842)2 / d2 ” could help clear up this confusion	We appreciate your suggestion, the formatting has been revised to improve readability.

75	Industry	Anonymous	Meth Title	*Title: Removing "100% natural" and Applicability Conditions: Original condition 3a* Nature-based solutions to climate change are in demand, fast growing, and high value. For example, the latest installment of Ecosystem Marketplace's "State of the Voluntary Carbon Markets 2020" report1 notes that prices for Nature-Based Solutions and Natural Carbon Solutions increased by 30% in 2019, with interviews of market participants suggeting a "maintained trend in favor of nature-based solutions". The focus on "100% natural" feed supplements or additives differentiates the Verrra methodology and makes those credits more attractive to the market. This, in turn, may support increased project development and higher credit issuance. Therefore, we recommend retaining the words "100% natural" in the title and retaining applicability condition 3a ("The active ingredients of the feed supplement must be 100% natural plant based or macroalgae-based and non-GMO. This includes extracted components of plants. The feed manufacturer must provide a non-GMO certificate based on lab analysis."), as the methodology was originally intended, and perhaps developing another parallel methodology for solutions that are not nature-based.	Your point is noted; however, the revised methodology expands the applicability conditions to include any type of feed ingredients approved for animal use and with scientific evidence demonstrating its efficacy. Per leading experts in the field, limiting to 100% natural feed ingredients could restrict innovations with a great potential to reduce methane emissions from livestock.
76	South Pole	Hannes Etter	Applicability Conditions	*Feed additive eligibility: Evidence for no increase in manure: Proof for showing no significant increases in manure composition* No specification of reliability of proof (i.e. what is considered a sufficient and reliable proof). Further, increased emissions from manure have not been perceived in the literature (1, 2), hence this requirement appears as unnecessary constraining. Suggestion: Remove the requirement	Please refer to the response to comment 17.
77	South Pole	Hannes Etter	Applicability Conditions	*Feed additive eligibility*: As many products are blended, feed premixed should also be mentioned	With the change from feed additive to feed ingredient, feed premixed will be covered. Please refer to the response to Comment 1 for more details on the definition of a feed ingredient.
78	South Pole	Hannes Etter	Applicability Conditions	*Feed additive eligibility: Evidence for no increase in manure: Proof for showing no significant increases in manure composition* What is considered a significant difference? What are the requirements for documentation (in relation to #9)? Suggestion: Define what is considered as significant and how to get this information. Does the evidence need to be context, additive or animal type specific, as all factors will impact manure emissions. Suggestion: Define clear and applicable criteria Further, the current document states a burden proof to showcase that NO additional emissions are expected. Suggestion: Define a clearly defined requirement	Please refer to the response to Comment 16.
79	South Pole	Hannes Etter	Project Boundary	*If the feed additive is demonstrated to shift manure composition, then the project boundary must include CH4 or N2O emissions.* Will it be necessary to demonstrate that manure composition will be shifted OR that it will NOT be shifted (see #2)?	It will be necessary to either show that manure composition has not shifted or demonstrate that the emissions are lower so there is no emission displacement. Please refer to the response to Comment 16 for details on documenting proof.
80	South Pole	Hannes Etter	Quantification of GHG emissions reductions and removals	*Baseline emissions: GEj* The calculation formula (ex-4) has been removed, yielding no option to derive GE according to the methodology Suggestion: Reinstate the previous calculation approach based on fat content and DMI	Equation 4 has been reinstated but redefined as GEI = DMI * ED (or GE). The default for ED or GE will be as described in the protocol.
81	South Pole	Hannes Etter	Quantification of GHG emissions reductions and removals	*Project emissions: Formula 5* The formula indicates the overall emission reductions instead of the project emissions Suggestion: Correct the reference	The reference has been corrected.
82	South Pole	Hannes Etter	Quantification of GHG emissions reductions and removals	*ERF Option 1: Calculate enteric emission reduction factor (%) of the feed additive and calculate the emissions using Equation 5* Formula 5 indicates the project emissions but not the reduction factor of the feed additive. Suggestion: Revise reference (see #6)	Your point is noted; the text has been revised.

83	South Pole	Hannes Etter	Quantification of GHG emissions reductions and removals	*ERF Option 1: Requirement of meta study of at least 3 papers* With this requirement, a case-specific case study would be ineligible, but a global meta-study with coarser values would be eligible. This would not be beneficial. Suggestion: Further, do not remove p.18: “or farm-specific emissions data that was determined by following the guidelines specified in Appendix II.” to allow for an on-farm protocol.	Your point is noted. If farm specific data is available then that can be used for that farm only. It cannot be extrapolated to other conditions. Meta-analysis allows for extrapolation depending on dose and diet quality.
84	South Pole	Hannes Etter	Quantification of GHG emissions reductions and removals	*ERF Option 1: Deviation of project values should be <5% between meta study & project parameters* A five % threshold to determine eligibility of reference would be difficult to achieve based on the fact that the covered literature in a meta-analysis would possibly vary more than 5% from each other. This could -for example- lead to the situation that a case study included in the meta analysis would itself become not eligible due to higher variations in the meta-research? Further, with a dynamic project, the key parameters might change, leading to a deviation from the narrow 5% threshold corridor. Suggestion: If a thorough meta-study is utilized, it should be possible to utilize the indicated reduction factors. Dynamic adaptation to the local environment will be incorporated through the localized feed parameters. If an adaptation is deemed required, please clearly define the relevant parameters that need to be within the given thresholds and apply a realistic threshold. However, please make sure to reflect the initial concern with deviations within a meta study!	As the effect is primarily on diet and animal type, the project parameters to be considered in the meta-analysis have been changed. Please refer to the response to Comment 53.
85	South Pole	Hannes Etter	Quantification of GHG emissions reductions and removals	*ERF Option 1: Footnote 4* Is the manufacturer indication still relevant?	Your point is noted; footnote 4 has been removed as it is no longer relevant
90	Eco-sens	Olivia Garcia	Appendix II	This part mentions the different ways to measure methane emissions to define the baseline. In our opinion, the methodologies described in this document to calculate methane emissions leave out an existing methodology, nowadays largely recognised and used on fields. Indeed, it is possible to estimate methane emissions thanks to milk data: milk yield and/or milk composition (for example milk fatty acids) The link between fatty acids and methane emissions have been largely documented (e.g., Chilliard et al., 2009; Van Lingen et al., 2014, included in appendix 1). An equation has been published in 2009 (Weill et al.) based on milk fatty acids analysis and milk production. The equation is: $CH4 = \Sigma C \leq 16 \times a \times MY\text{-}b$ With $\Sigma C \leq 16$ the sum of milk fatty acids with 16 carbons or less; and MY, the milk yield. The equation has been patented in 2009 and you can find a description on the appendix 2. This equation allows to estimate methane emissions for animals in their natural environment and represent the emission of the whole herd (no need for sampling the animals). It is based on an output proxy (milk) which reflects the ruminal fermentation. We can measure frequently and it can represent the methane emissions over several months. It is now used largely mainly in France, the UK, Germany, Switzerland, Sweden, Spain, Hungary. The database contains almost 300 000 measurements.	Your point is noted. Unfortunately the equation is not deemed accurate enough as it is not sensitive to a number of parameters and it will not be included.

91	Valorex	Solveig Mendowski	Applicability Conditions	As it is written, this methodology seems to include only feed additives as solutions to reduce enteric methane. But several publications show that some feed ingredients can also reduce methane, some of them with a clear rumen effect, with rumen fermentation modifications, with or without a productivity increase. So we suggest to include into this methodology such feed ingredients as part of the solution. The climate change challenge we have to face is so huge that we absolutely need to combine various solutions. One example of feed ingredients is extruded linseed. The meta-analysis in appendix shows the average effect of one extruded linseed product on methane in cattle from 10 different peer-reviewed publications: 12 – 24 – 36 % methane reduction for respectively 1 – 2 – 3 kg of extruded Linseed fed to cattle. It is one example of solution available which should be included in the perimeter of this methodology.	The text has been revised; please refer to the response to Comment 1.
92	Valorex	Solveig Mendowski	Meth Title	We suggest changing into: “METHODOLOGY FOR THE REDUCTION OF ENTERIC METHANE EMISSIONS FROM RUMINANTS THROUGH THE USE OF FEED INGREDIENT”	The text has been revised; please refer to the response to Comment 1.
93	Valorex	Solveig Mendowski	Definitions	We suggest replacing the feed additive definition by the feed ingredient definition, which include feed additives, following the same Codex alimentarius of FAO. It would become: Feed Ingredient: A component part or constituent of any combination or mixture making up a feed, whether or not it has a nutritional value in the animal’s diet, including feed additives. Ingredients are of plant, animal or aquatic origin, or other organic or inorganic substances. Feed additive, including in the feed ingredients family, are any intentionally added ingredient not normally consumed as feed by itself, whether or not it has nutritional value, which affects the characteristics of feed, animal productivity or emissions. Microorganisms, enzymes, acidity regulators, trace elements, vitamins, phytogenic substances, functional ingredients and other products fall within the scope of this definition depending on the purpose of use and method of administration - Codex Alimentarius Code of Practice on Good Animal Feeding CAC/RCP 54 (FAO and WHO, 2004) and FAO (2020)	The text has been revised; please refer to the response to Comment 1.
94	Industry	Anonymous	Definitions	We wish to ask you to use "feed ingredients" in the title and use the definition of the same source, namely, Codex Alimentarius Code of Practice on Good Animal Feeding CAC/RCP 54 (FAO and WHO, 2004) and FAO (2020) "Feed Ingredient definition: A component part or constituent of any combination or mixture making up a feed, whether or not it has a nutritional value in the animal's diet, including feed additives. Ingredients are of plant, animal or aquatic origin, or other organic or inorganic substances." We suggest this change as the use of feed ingredients provides a broader scope of solutions and has a more precise definition across geographies than just feed additives.	The text has been revised; please refer to the response to Comment 1.
95	Industry	Anonymous	Appendix II	Table 5 We suggest that this list should not be fixed but rather be open to all well-documented peer-reviewed methods	Please refer to the response to Comment 55.
96	Barry Callebaut	Kelly Ann Ross	Applicability Conditions	The required demonstration of no significant difference in manure emissions should include an option for scientific reasoning to not test this, such as absence of metabolic by-products that would affect manure decomposition.	Please refer to the response to Comment 17 for details on providing proof of no significant shift in manure composition; proof can be provided in the form of published studies.
97	Barry Callebaut	Kelly Ann Ross	Quantification of GHG emissions reductions and removals	Removal of the ED to estimate the GE from DMI: Given the mix-up in the default factor ED used to estimate GE from DMI in the previous version, will this return to the methodology corrected or was it meant to be removed?	Equation 4 has been reinstated but redefined as GEI = DMI * ED (or GE). The default for ED or GE will be as described in the protocol.

98	Barry Callebaut	Kelly Ann Ross	Quantification of GHG emissions reductions and removals	Deriving GE: There needs to be a means to estimate the GE as an option in this methodology. A default factor to estimate GE from DMI, NE or DE (ME in the USA) with the removal of ED is required. We suggest reinstating corrected ED factors since DMI composition is the best means to estimate GE.	Equation 4 has been reinstated but redefined as GEI = DMI * ED (or GE). The default for ED or GE will be as described in the protocol.
99	Barry Callebaut	Kelly Ann Ross	Quantification of GHG emissions reductions and removals	Reference to Appendix III added: Please clarify which feed and animal grouping parameters should be used to classify Ym.	Table 6 in Appendix III provides default values for Ym based on livestock category (eg., dairy cow, buffalo, sheep, goat) and feed quality (in terms of digestible energy and neutral detergent fiber). Default values should be selected based on a project's animal group composition and feed type.
100	Barry Callebaut	Kelly Ann Ross	Quantification of GHG emissions reductions and removals	Additionally, there must be no significant greater than 5% differences between project parameters (e.g., feed regime, animal type, weight, production phase, geographic region, and management practices) and the manufacturer's default enteric emission reduction factor established through a meta-analysis. A meta-analysis to establish the statistical significance of the enteric emission reduction factor whilst maintaining a no greater than 5% difference between the project parameters (…) and the enteric emission reduction factor is challenging given the obvious methodological and possible study heterogeneity with the various study designs.	The text has been revised to add more clarity around the meta-analysis; please refer to the response to Comment 53 for more detail.
101	Barry Callebaut	Kelly Ann Ross	Quantification of GHG emissions reductions and removals	The nutrient profile of the feed can be used to adjust using the published meta-analysis if there are differences between the average in the meta-analysis and the project diet. What is meant by the nutrient profile. Furthermore, what can 'nutrient profile' be used to adjust?	The nutrient profile refers to the NDF (neutral detergent fibre) and DE (feed digestibility) of the animal feed. These parameters should be used to adjust the ERF when there are differences between the average nutrient profile in the meta-analysis and the project diet. Meta-regressions for the ERF can be derived to correct for measured variables within a project that are significantly different from the project (e.g. ERF = a x NDF + b).
102	Barry Callebaut	Kelly Ann Ross	Monitoring	Nij - Frequency of monitoring/recording: Measured by daily or weekly average records. Average number of animals per grouping based on animal*head days calculation should be applied e.g., 365 days of milking 100 cows daily means the lactating animal group had an average of 100 cows over the project cycle.	Correct, your example is an appropriate interpretation of Nij.
103	Agoro Carbon	Giulia Sartori		PDF	
104	Private Sector	Anonymous	Quantification of GHG emissions reductions and removals	We noted that you have eliminated completely equation (4) (GE=DMI x ED) in VM0041 revision Red Lined.pdf P .16 EF Enteric Option 2. However in P.23 9.1. Data and Parameter Available for Validation for GE, it is specified that Gross Energy Intake can be calculated by multiplying dry matter intake by the Energy Density of the feed stuff using equation 4. So in this sense we believe that equation (4) should not be eliminated. Please kindly confirm.	Equation 4 has been reinstated.
105	Private Sector	Anonymous	Quantification of GHG emissions reductions and removals	Also as to p.23 DMI, we believe that this is a figure to be monitored in the course of the project activity. Please kindly clarify.	Correct; DMI is included in the monitoring parameters.
106	Terragen	Jim Cooper	Summary Description	Terragen is pleased to see that this methodology encompasses procedures that supress and/or inhibit methanogenesis. It is acknowledged that methodologies proposed in the scientific literature act by either inhibiting methanogenesis directly or by suppressing methanogenesis through changes in the biochemistry and microbiome that preclude methane biosynthesis	We appreciate your feedback and your interest in the methodology.

107	Terragen	Jim Cooper	Appendix II	Terragen recommends that the methodology must provide for measurement of methane with additional technologies such as laser methane detectors and SF6 tracer technology. Properly managed as part of a scientific protocol, these additional technologies provide more options for measuring larger cohorts of cattle in outdoor settings. Terragen observes that the methodology refers to only two measurement technologies. The methodology should explicitly provide for the use of all technologies, including laser methane detectors and SF6. In Terragen's opinion, the key sentence is "Experience in animal studies is required to develop a protocol to generate accurate results." Terragen also notes that the methodology requires methods that have specific integrity requirements including: • well documented in the literature; • experienced scientists who have conducted animal studies and can develop a robust protocol; • measurements can be performed in the animal's 'normal' environment; • measurement error and sampling error must be able to be calculated • an optimal sample size, and adequate recording duration; and • able to calculate or estimate measurement uncertainties. Presumably, if these requirements are met then employing any device dedicated and designed to measure methane emissions must be acceptable.	Your point is noted, however, per external experts in the field, laser methane detectors are not reliable to measure methane emissions from ruminants. They can be used for genetic screening but not for nutritional/feed additive trials. SF6 is well documented and will be included in the revisions, although it does contribute to climate change as it has very high radiative forcing. Please refer to the response to Comment 55 for more detail.
108	Terragen	Jim Cooper	Applicability Conditions	Terragen is pleased to see a clear set of conditions of applicability, and to see the adoption of an industry-recognised definition of feed additive (which includes microorganisms) – also see "Definitions". However, with respect to manure emissions, Terragen asks for a more definitive description of what is meant by "no significant differences in manure composition". For example, are the differences specific to the chemical and fibre composition of the manure?	These differences are specific to energy and nitrogen content in the manure as they may affect methane and nitrous oxide emissions downstream.
109	Terragen	Jim Cooper	Quantification of GHG emissions reductions and removals	Terragen agrees that a meta analysis of at least three papers is appropriate but Terragen contends that '5% differences between project parameters' isn't a helpful guide to selecting the studies to be included in a meta analysis. For example, it is hard to see how a measure of 5% can be applied to differences in a geographic region, management practices or the production phase of a cow.	The requirements related to the 5% differences between project parameters have been revised to exclude geographic region and management practices.
110	Terragen	Jim Cooper	Quantification of GHG emissions reductions and removals	Figure 1. This is a helpful decision tree for project proponents. It provides a good outline of the steps involved for determining the options for calculating baseline and project emissions. But, there is a misspelling of the word 'measurements' in the box headed Section 8.1.	Your point is noted, and the methodology has been revised to correct the decision tree
111	Terragen	Jim Cooper	Quantification of GHG emissions reductions and removals	In the phrase "If the feed additive is documented to impact manure nutrient composition and related methane emissions from manure decomposition …", what does 'documented' mean?	Documented means proof is provided that manure composition has not changed or that there is less energy and nitrogen compared to the control scenario. See response to Comment 16 for details on the proof needed.
112	Terragen	Jim Cooper	Quantification of GHG emissions reductions and removals	p. 20 In the citation (mid-paragraph) Rob Kinley's name has been spelt incorrectly.	Thank you for this contribution, the spelling has been corrected.
113	Terragen	Jim Cooper	Appendix I	this methodology is based on plants or algae … -Is the proposed revised methodology still based on those? Production of microbial feed additives is not affected by seasonality.	The revised methodology allows for natural and non-natural feed ingredients. This section refers to potential barriers to uptake of feed ingredients that use natural ingredients, which may be impacted by seasonality.

114	Terragen	Jim Cooper	Appendix II	Condition 5 contains a sentence that could be better constructed. “Using too few animals may lead to a finding that there is no significant difference between groups even if a difference exists in the population.”	Your point is noted, the text has been updated to better convey the concept.
115	Terragen	Jim Cooper	Appendix II	The preamble to Table 5 mentions ‘three’ different technologies but Table 5 contains only two technologies. What is the benefit of inserting the table when there are specific conditions required for any method of methane measurement?	The table has been edited to include three technologies, chambers, Greenfeeds, and the SF6 technique.
116	Terragen	Jim Cooper	Appendix IV	This should read “… for cattle and buffalo."	Your point is noted, the text has been revised.