



LOW CARBON
CONTRACTS COMPANY

Fuel Measurement and Sampling Process Guidance

Operational Condition Precedent 2.3

Version 1.0

Issued on 29 March 2018

Applicable to Investment Contracts, CFD Agreement and CFD Standard
Terms and Conditions issued in August 2014 and March 2017

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Disclaimer

This guidance does not and is not intended to supersede or replace the provisions of the CFD. This guidance does not constitute legal or investment advice and should not be relied upon as such. Generators should consult their professional advisors where they require advice, whether legal or otherwise. LCCC further reserves the right to amend this guidance and any associated guidance from time to time.

This guidance should not be viewed as in any way restricting LCCC in the nature, type and/or amount of evidence, information and documentation it will require to satisfy itself of the Generator's fulfilment of the Operational Conditions Precedent 2.3, nor as to the nature, level and timing of our consideration or reconsideration of the evidence that is provided. LCCC reserves the right at any time to request further or additional evidence, and to review or reconsider the evidence already provided.

Section 1: Introduction

This document provides Generators with guidance on the forms of evidence, information, and documentation that the Low Carbon Contracts Company (LCCC) considers necessary in order to demonstrate fulfilment of Fuel Measurement and Sampling (FMS) requirements under the Contracts for Difference (CFD).

- 1.1 Part B of Schedule 1 to the Conditions includes Operational Condition Precedent (OCP) 2.3, which requires FMS Procedures to be agreed and documented between LCCC and the Generator. This, along with the other OCPs, must be fulfilled by the Generator in order for it to be able to issue a Start Date Notice and commence generation that is eligible for CFD payments.
- 1.2 This guidance is intended to assist CFD Generators subject to FMS requirements in considering what evidence they will need to provide to LCCC to demonstrate that they have agreed FMS Procedures and fulfilled OCP 2.3.
- 1.3 LCCC would encourage Generators to engage in the FMS arrangement process early. This will enable the parties to discuss the approach. It would also enable LCCC to gain familiarity with the Generators' proposed FMS Procedures.
- 1.4 Before the Generator proceeds with formal submission, we recommend that submissions are made in draft form so that LCCC can comment on any evidence that the Generator is intending to submit with its FMS Proposals Notice.
- 1.5 LCCC has appointed Ofgem e-serve, as a contractor to support and advise LCCC on the FMS and sustainability aspects of the CFD scheme. As the CFD Counterparty, all Notices and relevant Supporting Information under the CFD should be addressed and submitted to LCCC and any Notices to be issued by the CFD Counterparty will be from LCCC.
- 1.6 It is up to the Generator to make a proposal for their FMS Procedures and it is not possible to outline all possible scenarios within a guidance document.

Section 2: Definitions

- 2.1 The “CFD Counterparty” is the Low Carbon Contracts Company Ltd.
- 2.2 Defined terms used in this guidance and not defined herein should be given the meaning provided in the “CFD” (which is comprised of the CFD Agreement and the CFD Standard Terms and Conditions as published by the Department of Energy and Climate Change on 29 August 2014¹ and by the Department of Business, Enterprise and Industry Strategy in March 2017²). This guidance is also applicable to Investment Contracts. However, Generators with Investment Contracts are advised to review the equivalent clauses.

¹Department of Energy and Climate Change, [Contract for Difference: Standard Terms and Conditions](#), published in 29 August 2014.

²Department for Business, Energy & Industrial Strategy, [Contracts for Difference: standard terms and conditions, version 2](#) published in 13 March

Section 3: Setting Up FMS Procedures

- 3.1 Annex 7 of the Conditions specifies that FMS arrangements only apply if the Renewable Qualifying Multiplier (RQM) is expressed to apply to the Contract for Difference in the CFD Agreement.
- 3.2 Details of what technologies the RQM applies to can be found in the Standard Terms Notice³ issued by the Secretary of State prior to each allocation round.
- 3.3 Please see Appendix 1 of this guidance for the RQM calculation methodology.
- 3.4 Paragraph 1.1 of Part A of Annex 7 provides that:
- “As soon as reasonably practicable following the Agreement Date, the Generator shall give a notice to the CfD Counterparty (an “FMS Proposals Notice”) outlining the FMS Procedures which it proposes to be adopted for the purposes of the Contract for Difference.”*
- 3.5 Agreeing FMS Procedures is one of the OCPs which must be fulfilled before a Generator can issue a valid Start Date Notice and start to receive payments under the CFD.
- 3.6 FMS Procedures need to be agreed between LCCC and the Generator prior to operation, to enable and assist LCCC to do all of the following:
- a) calculate the RQM;
 - b) where the Facility is a Baseload Dual Scheme Facility, determine the Imported Electricity Allowance in accordance with the Conditions;
 - c) verify that FMS Reports are accurate, complete and not misleading; and
 - d) assess compliance or non-compliance:
 - i) by the Generator and the Facility with the FMS Exemption Criteria (where relevant);
 - ii) of the Facility with the Fuelling Criteria; and
 - iii) by the Generator with Part A, Annex 7 of the Conditions.
- 3.7 Measuring and sampling fuels enables a Generator to determine, among other things, the following information in respect of the Facility:
- the quantity of each of the fuels used in generating the Facility’s gross output in each RQM Calculation Month;
 - the energy content of each fuel; and
 - the fossil-derived contamination percentage by Energy Content of each fuel.
- 3.8 Generators who expect to meet the FMS Exemption Criteria will still need to propose Full FMS Procedures as part of their FMS Proposals Notice. This is to account for any instances where the Generator either does not meet the FMS Exemption Criteria in a given RQM Calculation Month or uses a fuel that is unsustainable. This also helps support reporting against the Sustainability Criteria (SC) per consignment.
- 3.9 For further guidance on OCPs please read Guidance: Operational Conditions Precedent⁴ which is available on LCCC’s website.

³ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/598827/CFD_STANDARD_TERMS_NOTICE.pdf

⁴ Download OCP guidance from here: https://lowcarboncontracts.uk/publications?f%255B0%255D=field_publications_category%3A31&f%5B0%5D=field_publications_category%3A31&f%255B0%255D=field_publications_category%3A31

Section 4: Amending FMS Procedure

- 4.1 FMS Procedures may be amended, supplemented, restated or replaced from time to time by agreement between the Generator and LCCC.
- 4.2 FMS Procedures are a dynamic and potentially changeable process, since fuel supply arrangements may change, the configuration of a generating station may be modified, and advances may be made in measuring, sampling and testing techniques. It is, therefore, essential that there is transparency and on-going dialogue between the Generator and LCCC, both during the development of the FMS Procedures and after the FMS Procedures have been agreed.
- 4.3 If the Generator requires changes to be made to previously agreed FMS Procedures, then the Generator will have to inform LCCC that there is a need for potential changes. LCCC will then assess the changes requested, on a case by case basis, to determine whether:
 - the changes requested are appropriate and LCCC should consent to the adoption of changes or not, and
 - if LCCC consents to changes whether the Generator should submit a new FMS Proposals Notice.
- 4.4 We do not expect a new FMS Proposals Notice to be needed for minor changes that do not impact on the existing procedures, however, LCCC reserves the right to require any additional information that may be helpful in fully understanding the proposed changes.
- 4.5 The following examples are provided to give an impression of the circumstances that would likely require a new FMS Proposals Notice:
 - changes to the FMS Procedures that need to be reflected in an updated FMS questionnaire, e.g. changing the way fuels are measured and sampled;
 - proposing to use a new fuel at the Facility.

Section 5: FMS in Practice

- 5.1 This chapter provides some more practical advice to Generators who are considering their FMS Procedures. It follows the key sections of the FMS Questionnaire to provide some tips and considerations.
- 5.2 The FMS questionnaire is used as a starting point for initiating discussions about Generator's FMS arrangement. FMS questionnaire should be included in the Generator's FMS Proposals Notice.
- 5.3 In the FMS questionnaire, the Generator confirms the following about their Facility:
- procedures to measure and sample the fuels;
 - details of consignment(s);
 - any mixing of consignments and a use of Mass Balance System;
 - information on all Fossil Fuel use for the purpose of Permitted Ancillary Activities² ("PAA");
 - any other relevant Supporting Information.
- 5.4 Questionnaires are available for the different technologies supported under CFD and these can be found on LCCC website. Please follow this link⁵ to access the questionnaire templates for completion and submission to LCCC.

Consignment

- 5.5 Paragraph 2.3 of Annex 7 to the Conditions sets out what to consider when identifying the number of consignments.
- 5.6 The consignments will be outlined within the FMS Procedures and once approved form the basis of the monthly FMS Report.
- 5.7 For ACT specifically, the consignments will be reported as consignments of the Advanced Fuel and therefore this will be impacted by the consignments of feedstock which go into the gasifier or pyrolyser. The Generator should therefore consider feedstock consignments in the first instance and then apportion the Advanced Fuel based on these in order to report in their FMS Report and SC Monthly Information.
- 5.8 If the Generator is using or plans to use a bioliquid they should confirm the date from which the installation, from which the bioliquid is sourced, started producing bioliquids. This will impact the savings in carbon that the Facility must achieve against the Fossil Fuel Comparator.

Mixing of consignments and mass balance

- 5.9 Paragraph 2.4 of Annex 7 of the Conditions sets out the usage of a Mass Balance System where consignments are mixed, whether this is within the supply chain or at the Facility. Using a Mass Balance System ensures that the Generator is able to track the sustainability information associated with each consignment for reporting purposes.

⁵Permitted Ancillary Activities" means the cleansing of other fuels from the Facility's combustion system prior to using Fossil Fuel or Waste to heat the combustion system to its normal temperature, the heating of the Facility's combustion system to its normal operating temperature or the maintenance of that temperature, the ignition of fuels of low or variable calorific value, emission control, standby generation or the testing of standby generation capacity, corrosion control and fouling reduction.

5.10 We accept the use of either: (1) a proportional Mass Balance System; or (2) a non-proportional Mass Balance System. We know that some Generators use a combination of these systems to manage their consignments and this is acceptable too.

5.11 When using a proportional Mass Balance System the quantity of fuel that is removed from the mix of consignments must be assigned the sustainability characteristics in the same proportions as the mixture.

For example, if a fuel mixture is 400 litres of 'A' and 600 litres of 'B' a ratio of 2:3 must be applied to any quantity.

5.12 For a non-proportional Mass Balance System, the Generator can freely assign the fuel removed from the mixture to any of the consignments. The Generator must not assign more of a particular consignment than is contained in the original mixture.

For example, using the same starting mixture as the example above (400 litres of 'A' and 600 litres of 'B') when you extract a volume of bioliquid you are free to set out whether it composes all of 'A', all of 'B' or a combination of the two.

5.13 The non-proportional method is generally operated on a first in first out (FIFO) basis. This reduces the risk that there is an amount of unsustainable Biomass within the mix that is never assigned to an extracted quantity of Biomass. If a Generator does not follow a FIFO approach the independent auditor may wish to consider this risk as part of the annual verification process.

5.14 There may be reasons why, based on the fuels the Generator is using, that they should use a particular Mass Balance System.

For example, if the Generator is using a Biomass fuel which has Fossil Fuel contamination, it would be preferable to use the proportional method as CFD payments shall not be made for any generation that is not from renewable sources.

Fossil fuel use

5.15 In line with the Fuelling Criteria in Annex 4 of the CFD Agreement, any use of Fossil Fuels by the Facility must not be for the express purpose of the Fossil Fuel being used as a fuel (other than to undertake Permitted Ancillary Activities or, in the case of the following technologies - Energy from Waste with CHP, Anaerobic Digestion with CHP, Advanced Conversion Technology, Advanced Conversion Technology with CHP, Landfill Gas, Sewage Gas, either to undertake PAA or to form part of Waste from which the fuel or gas is produced).

5.16 All use of Fossil Fuel by the Facility must be evidenced to LCCC and Ofgem in order to determine: (1) that, if used, Fossil Fuel is only used for the purpose of PAA or as otherwise permitted in certain cases under Annex 4 of the CfD Agreement for certain technologies where the Fossil Fuel forms part of Waste from which the fuel is produced; and (2) to confirm that the Energy Content of all Fossil Fuels used does not exceed 10% of the Energy Content of all fuels used by the Facility, as defined in "Permitted Ancillary Activity Exception" of the CFD Agreement; and (3) the RQM. For ACT, this also includes information on Fossil Fuels used to gasify/pyrolyse the feedstock to produce the Advanced Fuel.

5.17 It is assumed that all Fossil Fuels used contribute toward generating the Facility's gross output, and for this reason the total amount of Fossil Fuels used is incorporated into the calculation of the Facility's RQM, unless the Generator demonstrates that only a proportion of the total amount of Fossil Fuels used results in generation of Facility's gross output. If doing so Generators shall explain why discrete amounts of Fossil Fuels do not result in generating the Facility's gross output and explain how an accurate measure of those Fossil Fuel amounts will be achieved.

Determining the quantity of renewable fuels used

5.18 The Generator must propose how they will determine the quantity of fuel used in a given RQM Calculation Month.

When using a solid fuel, examples of how this could be done include:

- measurement over the weighbridge to establish deliveries with stocks run down at the end of the RQM Calculation Month;
- via a weighbridge on delivery and then performing a stock calculation to establish what is left in the stock pile. A calculation will then enable the Generator to establish the quantity that has been burnt in the RQM Calculation Month; or
- measurement might be taken just prior to combustion on a beltweigher.

5.19 When using a liquid/gas fuel our preference is for the amount to be measured using flow meters. It might be possible to demonstrate quantity in a month by using a stock calculation and measuring the stock within the storage tank, however this is only acceptable for negligible quantities of fuel and our preference remains for flow meters to be used.

5.20 For stations such as ACT stations, where the Advanced Fuel is made up of a number of consignments, the Generator will likely need to measure the quantity of Advanced Fuel as well as the quantity of the individual feedstock consignments.

Determining the GCV of the fuel used

5.21 The Generator must propose how fuel will be sampled, including the method and frequency, and to give an accurate measure of Gross Calorific Value (GCV). They will also need to outline what tests will be undertaken of these samples to establish their GCV.

5.22 The Generator will need to consider how frequently they are sampling their fuel in order to have accurate and reliable results each RQM Calculation Month for CFD Payments to be made.

5.23 We expect the properties of the fuel, such as its variability, to impact on the proposed sampling.

5.24 The location of the sampling within the Facility can vary. Some Generators may propose sampling fuel on delivery while others may propose automatic samplers immediately prior to combustion. Our preference is for sampling to happen as close to combustion as possible. If sampling on delivery, the Generator may need to demonstrate that the GCV won't have degraded between sampling and combustion.

5.25 If the stock of fuel is being carried over from month to the next, the Generator will likely sample the stockpile if they are not sampling just prior to burn.

5.26 Generators must propose how frequently samples are analysed at a laboratory to determine the GCV. Some examples include:

- Generators send each sample to the lab and then perform a weighted average to determine what the GCV is of that consignment to be reported in the FMS Report; and
- Generators put each sample into a sealable tub to create a 'consolidated' sample. This is then mixed and a sample is taken from this for lab analysis.

- 5.27 As part of the FMS Proposals Notice the Generator shall set out what tests the lab will perform to determine the GCV.
- 5.28 Whilst the most common approach tends to be via taking samples for lab analysis there are other approaches. For gases it can be particularly challenging to obtain a representative sample for lab testing.
- 5.29 For ACT, the Generator might install an online analyser which takes regular readings of the composition of the Advanced Fuel to determine the GCV. For ACT Facilities, the analysis should be located after gasification and immediately prior to combustion.

Fossil derived contamination

- 5.30 Any fossil derived contamination of a renewable fuel must be noted in the FMS Report to ensure it is accounted for within the RQM.
- 5.31 Generally, this evidence will be in the form of a letter from the fuel supplier to confirm that the fuel is free from fossil fuel contamination or will be evidenced through similar wording within the fuel supply contract.

Other considerations

- 5.32 When outlining FMS Procedures, we recommend that Generators follow recognised national or international standards. There are numerous standards available which link heavily to the FMS requirements and its helpful if Generators can assess any that might be relevant and note them within their procedures.
- 5.33 Weighing devices vary substantially in accuracy according to their principle of operation, construction and installation. The Organisation Internationale de Métrologie Légale (OIML)⁶ has classified those intended for commercial use into three classes. Good practice is considered to be class 0.5. Calibration.
- 5.34 Regular calibration is an integral part of the quality assurance of all weighing devices. It is recommended that, where possible, inaccuracies from excessive tension or stiffness in the belt, irregular loading, or installation too close to non-weighing rollers should be avoided. Guidance for the calibration of stand-alone electronic weighing devices can be found on the OIML website.
- 5.35 The Generator should consider how their fuel is stored at their site, this will be important to remove any potential for fossil contamination of renewable fuels and also to prevent fuels from degrading which can occur if they are stored in the open.

Submission of Monthly Reports (FMS Report and SC Monthly Information)

- 5.36 Generators must submit monthly FMS Reports and SC Monthly Information (and accompanying Directors' Certificates) via email directly to Ofgem copying in their Contract Manager in LCCC. Ofgem will then review the submission and engage with LCCC regarding the review of the data and recommend a RQM to LCCC. Generator must submit the monthly reports by the RQM Submission Deadline which is the final Business Day of the second calendar month falling immediately after the RQM Calculation Month.

⁶ OIML Website: <https://www.oiml.org/en>

FMS Audit

- 5.37 LCCC has the right to perform FMS Audits. If LCCC intends to carry out an FMS Audit, LCCC shall give an FMS Notice to the Generator, specify that LCCC (or any persons nominated by it) intends to exercise the FMS Audit Right and the date by which the Generator must permit the exercise of the FMS Audit Right.
- 5.38 Ofgem will assist LCCC in appointing an auditor and delivering the programme of FMS Audit under the CFD. Scope of the FMS Audit can be found on LCCC's website. This scope sets out the type of information and data LCCC and Ofgem would expect the auditor to review as part of the audit report. Please note that LCCC and Ofgem will add Facility specific points to the scope of FMS Audit as and when needed.

Appendix 1: RQM Calculation Methodology

- 6.1 RQM is calculated for each RQM Calculation Month of electricity generation and is applied to any “Settlement Units” falling in that calendar month.
- 6.2 There are four (4) different ways in which an RQM can be determined:
- a) Deemed, if applicable (i.e. if an FMS Exempted Generator);
 - b) Calculated according to fuel data received following FMS Procedures;
 - c) If neither of the above apply, by application of the last-known RQM;
 - d) Assumed, if applicable (if none of the above apply, by a deemed value agreed between LCCC and the Generator).
- 6.3 RQM is defined in a mathematical formula:
- $$\text{Renewable Qualifying Multiplier} = \frac{\mathbf{A}}{\mathbf{B}}$$
- where:
- A** is the Energy Content of all of the Fuels with Variable Renewable Content used in generating that Facility’s gross output during the relevant RQM Calculation Month, less the Energy Content of any Fossil Fuel from which those Fuels with Variable Renewable Content are in part composed; and
- B** is the Energy Content of all of the fuels used in generating that Facility’s gross output during that RQM Calculation Month.
- 6.4 In addition to the RQM calculations above, there will or may be revisions to RQM values particularly but not exclusively when actual FMS Data is “truing-up” provisional values which may have not been a last know RQM or when an “Assumed RQM” has been used.
- 6.5 It is important that there is clarity on how LCCC arrives at the RQM, which is a vital element in the calculation to determine the amount of generated electricity eligible for difference payments.

Appendix 2: FMS Proposals Notice

To: Low Carbon Contracts Company Limited (the “CfD Counterparty”)
Fleetbank House
2-6 Salisbury Square
London
EC4Y 8JX

From: [●] (the “Generator”)
Unique reference number: [●]

Dated: [●]

[INVESTMENT CONTRACT/ CONTRACT FOR DIFFERENCE] – FMS PROPOSALS NOTICE

Dear Sirs,

1. We refer to the agreement dated [●] between you as the CfD Counterparty and us as the Generator (the “Agreement”). Terms and expressions defined in or incorporated into the Agreement have the same meaning when used in this notice.
2. We further refer you to paragraph 1.1 of Part A of Annex 7 (FMS arrangements, Sustainability Criteria and RQM Calculation Methodology).
3. This is an FMS Proposals Notice.
4. ***[We consider that we, (and the Facility) will or are reasonable likely to, comply with the FMS Exemption Criteria.]***
5. Our Generator FMS Proposals [including our proposals in respect of FMS Exempted Procedures]] are as follows: [●]

Yours faithfully

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For and on behalf of

the **Generator**

Appendix 3: FMS Proposals Notice

To: Low Carbon Contracts Company Limited (the “CfD Counterparty”)
Fleetbank House
2-6 Salisbury Square
London
EC4Y 8JX

From: [●] (the “Generator”)
Unique reference number: [●]

Dated: [●]

CONTRACT FOR DIFFERENCE – GENERATOR FMS EXEMPTION NOTICE

Dear Sirs,

1. We refer to the agreement dated [●] between you as the CfD Counterparty and us as the Generator (the “**Agreement**”). Terms and expressions defined in or incorporated into the Agreement have the same meaning when used in this notice.
2. We further refer you to paragraph 4.2 of Part A of Annex 7 (*FMS arrangements, Sustainability Criteria and RQM Calculation Methodology*).
3. This is a Generator FMS Exemption Notice.
4. We have determined that **[we are]/[the Facility is]** not complying with the FMS Exemption Criteria on the following basis: [●].
5. Our reasons for concluding that **[we are]/[the Facility is]** not complying with the FMS Exemption Criteria are as follows: [●].
6. We have determined that **[we]/[the Facility]** ceased to comply with the FMS Exemption Criteria from the following date: [●].

Yours faithfully

.....

For and on behalf of
the **Generator**

