



**LOW CARBON
CONTRACTS COMPANY**

POWERING NET ZERO

Wind Commissioning Guidance

80% of Installed Capacity

Operational Condition Precedent 2.1 (B)

Issued February 2022

Version 3

Applicable to Investment Contracts, CFD Agreement and CFD Standard Terms and Conditions
issued in August 2014, March 2017, May 2019 and November 2021

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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, 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.



1. Introduction

This document provides Generators with guidance on the forms of evidence that the Low Carbon Contracts Company considers acceptable in order to demonstrate that no less than 80% of the Installed Capacity Estimate has been commissioned.

- 1.1 The Operational Conditions Precedent (OCP) 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. It is therefore important that Generators give proper consideration ahead of time to how they intend to evidence that they have fulfilled the OCPs.
- 1.2 This guidance is intended to assist CFD Generators whose Generation Technology is Onshore Wind or Offshore Wind in considering what evidence they will need to provide to the Low Carbon Contracts Company (LCCC) to demonstrate that they have fulfilled the Operational Condition Precedent 2.1(B) at Schedule 1 (Conditions Precedent) to the Contract for Difference (“CFD”).
- 1.3 As a general principle, it is LCCC’s intention that, insofar as it is possible, a Generator should be able to utilise processes, procedures, documentation, and tests that already form part of its commissioning plan as submissible evidence, providing that these meet the requirements and are in accordance with the Reasonable and Prudent Standard. This guidance is indicative of what would be acceptable to LCCC. If a generator is concerned their project may not be in a position to provide any of the alternatives listed in Section 4, 5 and 6 they are encouraged to contact their Contract Manager as soon as possible.
- 1.4 LCCC would encourage Generators to engage early in the OCP process. This will enable the parties to discuss the approach, if the submission of any of the evidence is at risk and for LCCC to gain an understanding of the Generators’ commissioning plan.
- 1.5 Before the Generator proceeds with the formal submission, we recommend that submissions are made in draft form so that LCCC can comment on the following:
 - any evidence that the Generator is intending to submit with the OCP Notice; and
 - the details of any commissioning programmes / proposed pass-fail criteria / planned tests intended to meet the requirements of OCP 2.1(B).



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, March 2017², May 2019³ and November 2021⁴). This guidance is also applicable to Investment Contracts. However, Generators with Investment Contracts are advised to review the equivalent clauses.
- 2.3 The CFD defines “Commissioned” as meaning *“all of the Commissioning Tests have been successfully completed, followed or passed (as appropriate) in relation to the Facility (or a part of the Facility)...”*
- 2.4 The definition of “Commissioning Tests” as set out in the CFD means *“all of the procedures and tests which, in accordance with the Reasonable and Prudent Standard, and in compliance with industry guidelines, practices and standards, are:*
- A *relevant to generating facilities which are the same as, or similar type to, the Facility (including those which are relevant to the Facility Generation Technology); and*
 - B *required to be completed, followed or passed (as appropriate): (i) in order for a generating facility to generate electricity; or (ii) to demonstrate that a generating facility is fit for commercial operation”.*
- 2.5 Please note that Installed Capacity is determined at the Defined Metering Point⁵. The *Installed Capacity and Final Installed Capacity guidance*⁶ issued by LCCC defines Installed Capacity as *“...the capacity of the Facility (expressed in MW) were it to be operated at optimal operating conditions at*

¹ Department of Energy and Climate Change, Contract for Difference: Standard Terms and Conditions, published 29 August 2014.

² Department for Business, Energy & Industrial Strategy, Contracts for Difference: standard terms and conditions, version 2 published 13 March 2017, version 3 in 1 May 2019

³ Department for Business, Energy & Industrial Strategy, [Contracts for Difference: standard terms and conditions, version 3 published 1 May 2019](#).

⁴ Department for Business, Energy & Industrial Strategy, [Contracts for Difference: standard terms and conditions, version 4 published 25 Nov 2021](#)

⁵ The Defined Metering Point, as defined in the relevant Code of Practice 1, 2 or 3 associated with the Balancing and Settlement Code

⁶ See footnote 3

the Facility on a continual basis for a sustained period at the maximum capacity possible without causing damage to it, net of:

- A all electrical loads required so to operate the Facility and/or deliver electricity; and*
- B All electrical losses that would be incurred from the Generating Unit(s) to the Metering Equipment at the Boundary Point in so operating the Facility and/or delivering electricity*

assuming any source of power used by the Facility to generate electricity was available to it without interruption) and provided that, where a Facility uses combined heat and power, the capacity of the Facility shall be determined by reference to a condition where any reduction of heat generated would not result in any increase in electrical generation.”





3. Context

- 3.1 The CFD⁷ requires the delivery to the CFD Counterparty of: “evidence, in form and content satisfactory to the CFD Counterparty, acting reasonably, that an Installed Capacity of not less than eighty per cent. (80%) of the Installed Capacity Estimate has been Commissioned”.
- 3.2 As a result of the definitions that are relevant to OCP 2.1 (B), two overarching requirements need to be evidenced:
1. that the Facility has been “Commissioned” meaning that the Commissioning Tests have been completed and it can generate electricity or, is fit for commercial operation; and
 2. a capacity of at least 80% of its Installed Capacity Estimate can generate electricity on a continuous basis without causing damage to the Facility.

3.3 To fulfil requirement 1 above, LCCC would expect to see evidence of:

- Turbines commissioned;
- Electrical Balance of Plant (EBoP) commissioned;

To fulfil requirement 2 above, LCCC would expect to see evidence of:

- Sufficient number of turbines commissioned to meet 80% installed capacity threshold;
- Facility layout is consistent with other evidence;
- Whole Facility producing electricity (without damaging facility, supporting functioning of SCADA).

Sections 4, 5 and 6 of this document set out specific documents that we have considered acceptable to satisfy the two overarching requirements. We have sought to rely as far as possible on industry standard documents.

The table overleaf summarises broadly which main documents as a minimum LCCC considers will satisfy each requirement.

⁷ At Schedule 1, Part B (Further Conditions Precedent), paragraph 2.1 (B).



Requirement to be evidenced (as per section 3.5)	Minimum acceptable evidence to satisfy requirement					
	Commissioning Completion Certificates (CCCs)	Type Certificates, power output	List of Functional Tests for EBoP	Facility layout, single line diagram	ION / ION B with 70% threshold lifted	Whole Facility test
4A. Turbines commissioned	✓					
4B. EBoP commissioned			✓			
4C. Sufficient number of turbines commissioned		✓				
4D. Facility layout is consistent with other evidence				✓		
5A-E. Facility as a whole able to and producing electricity					✓	✓





4. Commissioning Evidence

4.1 This section provides further guidance on the form and nature of evidence LCCC is prepared to accept and would expect to find in an Onshore or Offshore Wind Generator's submission of evidence to demonstrate the capabilities listed under 3.5:

– **A Evidence of successful commissioning of the Wind Turbine Generators (WTGs) comprising in aggregate not less than 80% of the Installed Capacity Estimate of the Facility in the form either a) or b), followed by the mandatory submission of c);**

- a) Dated, valid Take Over Certificates (TOCs) for each of the WTGs comprising in aggregate not less than 80% of the Installed Capacity Estimate of the Facility (see Section 4.1 D on how to perform the 80% calculation). The TOC must be supplemented with Supporting Information of the technical requirements and tests undertaken to enable the issuance of respective certificate(s); or
- b) Dated, valid Commissioning Completion Certificates (CCCs) including appropriate certification(s) on HV commissioning, start-up commissioning and energisation readiness for each of the WTGs comprising in aggregate not less than 80% of the Installed Capacity Estimate of the Facility. The CCCs must be supplemented with Supporting Information of the technical requirements and commissioning tests undertaken to be able to issue the respective certificate.
- c) In addition to either of the above, the submissions must be accompanied by a Directors' Certificate (DC) certifying that the WTGs installed and commissioned are ready for commercial operation. This may be submitted as a single DC or included as part of a consolidated 2.1B Directors' Certificate, as detailed in Section 7.

The Supporting Information of the technical requirements and commissioning tests undertaken should include the agreed technical procedures between the parties required to be able to issue the TOC / CCC. For the avoidance of doubt, LCCC is not requesting the actual test report(s) in this example, however, LCCC retains the right to request the submission of actual test reports.

Alternatively, the Supporting Information could take the form of a handover pack comprising of a list of the commissioning and energisation tests performed on the WTGs. The list should include the type of test performed, date of the test, results of the test in binary fashion (pass/fail) and a summary of any anomalies that occurred during the test.

In all instances, LCCC does not require the submission of a related snagging list; the Directors' Certificate referenced in c) substitutes as satisfactory evidence.

– B Evidence of successful commissioning of the Electrical Balance of Plant (EBoP) system required to export energy of not less than the 80% of the Installed Capacity Estimate of the Facility in the form either a) or b), followed by the mandatory submission of c);

- a) Dated, valid TOCs with respect to each contractor supplying and/or installing parts of the main components forming the EBoP (array power cables, transmission power cables, overhead lines, switchgear, transformers, power quality compliance equipment, reactive compensation equipment, Facility Metering Equipment). The TOC must be supplemented with Supporting Information of the technical requirements and tests undertaken to enable the issuance of the respective certificate(s); or
- b) Supporting Information of the technical requirements and commissioning tests performed on each of the main components forming the EBoP. The list should include the type of test performed, date of the test, results of the test in binary fashion (pass/fail) and a summary of any anomalies that occurred during the test.
- c) In addition to either of the above the submission must be accompanied by a Directors' Certificate (DC), certifying the EBoP is ready for commercial operation. This may be submitted as a stand-alone DC or included as part of a consolidated 2.1B Directors' Certificate, as explained in Section 7.

The Supporting Information of the technical requirements and commissioning tests undertaken should include the agreed technical procedures performed on each of the main components forming the EBoP. For the avoidance of doubt, LCCC is not requesting the actual test report(s) in this example, however LCCC retains the right to request the submission of actual test reports.

Alternatively, the Supporting Information could include a list of the commissioning tests performed on the main components forming the EBoP. The list should include the type of test performed, date of the test, results of the test in binary fashion (pass/fail) and a summary of any anomalies that

occurred during the test. As a minimum, the list should include Factory Acceptance Tests (FATs), Site Acceptance Tests (SATs), Pre-energisation Tests and Energisation Tests for the main components.

In all instances, LCCC does not require the submission of a related snagging list; the Directors' Certificate referenced in c) substitutes as satisfactory evidence.

– **C There are three necessary components to establish that a sufficient number of turbines have been commissioned to meet the 80% threshold:**

- a) **Calculation of the equivalent net capacity of turbines** to establish whether enough turbines have been commissioned to meet the 80% threshold. This determines the number of WTGs that need to have the TOCs / CCCs issued as referred to in point 4.1A.

To establish the number of WTG required to achieve the 80% Installed Capacity Estimate threshold, the gross WTG capacity must be assessed on a net capacity basis. When assessing whether sufficient TOCs / CCCs have issued as referred to in point 4.1A, LCCC will assume that total electrical losses for the project are 2%, as per the example below.

Example: if the Installed Capacity Estimate is 100MW and with 2% losses, the Generator will need to provide TOCs or CCCs (point 4.1A above) for WTGs totalling at least $[(100\text{MW} \times 80\%)] \text{ divided by } (1-0.02) = 81.63 \text{ MW}$ of nameplate capacity⁸

A full Electrical Losses study will need to be provided to justify the use of a value lower than 2%. An example of the requirements for an Electrical Losses study can be found in the Final Installed Capacity guidance and the exact criteria for the OCP Electrical Losses study should be agreed in advance with your Contract Manager.

- b) **Type certificate of the WTGs** issued by the turbine manufacturer indicating the nameplate capacity⁸ of the WTG, with the incorporation of power modes/operating modes reflected on the type certificate itself or supplementary data sheet.
- c) **Directors' Certificate** clearly identifying the corresponding specification of turbine and operating mode that has been installed and the consequent rated output power of each turbine. In cases where only one turbine specification is incorporated in the type

⁸ Nameplate capacity being equal to the sum of the capacity indicated in the type certificates (taking into account any power modes incorporated) and any other additional capacity noted in the Directors' Certificate referenced in 4.1C(c).

certificate/data sheet, the Generator will still need to provide a Directors' Certificate certifying accordingly. This may be submitted as a stand-alone DC or included as part of a consolidated 2.1B Directors' Certificate, as explained in Section 7.

- **D In order to gain full understanding and context of the Facility (and validating the EBoP) which is progressing through OCP 2.1 (B) the Generator must provide:**
 - a) **Facility layout**, containing a scale drawing of the Facility, in high resolution, with the following clearly shown:
 - Layout of the WTGs including the locations of the main components (as referenced in 4.1B)
 - Depiction of the Facility boundary (asset ownership boundary)
 - General arrangement of the onshore/offshore substation(s)
 - All power cables from WTGs to the Facility boundary
 - Location of Facility Metering Equipment
 - b) **Single line diagram** indicating the main components (as referenced in 4.1B) and their locations.



5. Facility Commissioning Evidence

5.1 This section provides further guidance on the form and nature of the evidence LCCC is prepared to accept and would expect to find in an Onshore or Offshore Wind Generator's submission of evidence to demonstrate the whole Facility producing electricity (without damaging facility). See Annex C for a summary view (based on the Grid Code applicable at the time of this document's publication) of the expected evidence for your project.

- **A All Facilities that are distribution connected must provide the G99 test certificate⁹** (except where already accepted under an alternative Operational Condition Precedent and the CP Response Notice confirms that the Generator has fulfilled the Operational Condition Precedent).
- **B All Facilities connected to the Transmission System, all 'Large' distribution connected projects as defined in the Grid Code, and all 'Medium' distribution connected projects as defined in the Grid Code that are subject to a Bilateral Agreement¹⁰, must provide an ION/ION (B)** (except where already accepted under an alternative Operational Condition Precedent and the CP Response Notice confirms that the Generator has fulfilled the Operational Condition Precedent).
- **C All Facilities** (except those >100MW that are able to separately demonstrate the removal of the 70% ION/ION (B) restrictions) **must Perform a "Whole Facility" test¹¹ and provide historic metered output data** to demonstrate that the commissioned WTGs and all the associated Facility equipment are effectively operating together (rather than in isolation), while indirectly supporting SCADA system functionality, as described in a) and b) below.

a) The Whole Facility Test ("WFT")

All turbines being evidenced for the purpose of the OCP submission must, in a 30-min WFT:

- demonstrate 100% of the WTG (every WTG included as part of 4.1A) have generated in every 10-minute intervals (where smaller intervals data sets will be adjusted accordingly to assess the same requirements).

⁹ Or provide evidence of a derogation having been issued, demonstrating a G99 test certificate isn't available.

¹⁰ As defined in the Connection and Use of System Code (CUSC).

¹¹ Phased projects greater than 100MW, could be required to complete the WFT as the ION B 70% restriction might not be able to be lifted without the subsequent phase(s) being commissioned.

Below is a simplified example of a SCADA whole Facility test output, demonstrating successful WTG generation (to be clear, any generation in that 10-minute period would signify a pass of this condition).

date / time (interval)	WTG 01 (2MW capacity)	date / time (interval)	WTG 02 (2MW capacity)
	generation (kWh)		generation (kWh)
01/01/2021 10:00	320	01/01/2021 10:00	310
01/01/2021 10:10	330	01/01/2021 10:10	310
01/01/2021 10:20	330	01/01/2021 10:20	320
Total	980	Total	940

b) **Historic metered output data.** LCCC will review the provided historic metered output data and assess whether the total generation outputs are broadly expected and aligned with local weather conditions and the timing of the installation of your WTGs. If your SCADA output provides wind speed data, please provide this also.

– **D All Facilities >100MW can, instead of the WFT, provide:**

a) an Interim Operational Notification (ION), or for Offshore wind projects an ION (B), together with the Schedule of Unresolved Issues with the previously applied 70% restrictions (hold-off points) lifted.

The Schedule of Unresolved Issues, which identifies the application of the 70% restriction when first issued, is often presented as a working document that includes tracked changes and strike-through text as issues are resolved and restrictions are lifted; subsequently the Schedule can often look like a draft document. Please provide one of the following for verifying authenticity, providing it is clear the restrictions are lifted;

b) ION or ION (B) certificate and Schedule showing that all applicable restrictions are lifted.

c) The email from National Grid attaching the ION or ION (B) certificate and the latest Schedule of Unresolved Issues. The email should be copied and pasted by the original recipient as an attachment and should not be provided in a 'forwarded' form to the LCCC. It should also not be a pdf or printed form of the email. LCCC need to be able to verify that the attachment belongs to the National Grid email and comes from a National Grid email address.

d) ION or ION (B) certificate and Schedule of Unresolved Issues certified by NGENSO as being correct and up to date by a person with appropriate authority.

- E **The submission must be accompanied by a Directors' Certificate (DC),** certifying that in the immediate and foreseeable future there is no expected or anticipated risk of failure that should be brought to the CfD Counterparty('s) attention, nothing to stop exporting at no less than 80% of the Installed Capacity Estimate and the Facility is fit for commercial operation certifying the EBoP is ready for commercial operation. This may be submitted as a stand-alone DC or included as part of a consolidated 2.1B Directors' Certificate, as explained in Section 7.



6. Phased Projects

- 6.1 The commissioning evidence requirements set out in Sections 4 and 5 of this guidance apply per phase for multi-phased projects. However, there may be singular items of evidence that satisfactorily cover the requirements of multiple phases of your project, therefore only need to be uploaded to the data room once. In these instances, each file name will still need to be referenced as appropriate in each phase's OCP Notice and Directors' Certificate.
- 6.2 When a document/test is by industry standard applied to more than one phase, any requirements will be assessed according to the MWs of the phase, and any other phase to which it applies, to ensure the provided Supporting Information continues to *"evidence, in form and content satisfactory to the CFD Counterparty, acting reasonably, that an Installed Capacity of not less than eighty per cent. (80%) of the Installed Capacity Estimate has been Commissioned"*.
- 6.3 Phased projects that have an apportioned metering arrangement, have an Information and Monitoring System Obligation to;
- accurately record the active turbines for each Billing Period; and
 - provide the respective Information Monitoring Report no later than one Business Day after each Billing Period.
- 6.4 If a Generator breaches this obligation, it will result in suspension of any Net Payable Amounts until it is resolved. LCCC also have the Information and Monitoring System Audit Right to ensure this obligation is met.
- 6.5 In demonstrating these requirements have been met, the formal OCP process is not used and alternative contractual mechanisms are applied (full details can be found in the CFD Agreement for apportioning metering contracts). In practical terms and to ensure payments are correctly made from the Start Date, LCCC's recommendation is to progress the below, concurrently, with the OCP process.
- A Provide a procedural document to demonstrate that a robust and consistent procedure is followed to meet the Information and Monitoring System Obligation. It should;
 - explain the source(s) of data required to meet the obligation, how the data is captured and handled by any individual or software solution;

- detail how the data is altered in any way (manual, algorithm, machine learning) for the purposes of calculating the Apportionment Percentage for each Billing Period;
- describe the quality measures, controls, checks and testing procedures in place to ensure the data is accurate, and meets the formatting and time requirements of EMRS;
- detail any other activity that plays a role in shaping the final Information and Monitoring System Report (the requirement met by the Apportioned Metering Data Interface File to EMRS), as well as the data file transfer procedure itself; and
- include your schedule for undertaking reviews / audits to ensure robust data is provided and data integrity is maintained.

Additionally the document should also describe how the commissioning of SCADA and WTGs are considered for the Information and Monitoring System Obligation Report, including how the relevant information is accurately reflected in the report, particularly after a WTG is first commissioned or brought back online.

Discuss, agree and undertake an appropriate testing procedure with your Contract Manager and EMRS for the Information and Monitoring System Report (Apportioned Metering Data Interface File). This report is required to be submitted via SFTP to EMRS no later than one working day after the Settlement Date, in the format specified in page 15 and Appendix 8 of the WP195 guidance document (www.emrsettlement.co.uk/document/working-practice/wp195-cm-cfd-metered-data). The first report must be uploaded successfully from the Generator's Start Date in order to receive timely payments.



7. Directors' Certificate Requirements

- 7.1 Operational Condition Precedent 2.1 (B) must be accompanied by a Directors' Certificate certifying that the information contained in, and enclosed with, the Operational CP Notice is true, complete and accurate in all material respects and is not misleading, in each case by reference to the facts and circumstances then existing.
- 7.2 A Directors' Certificate must also be provided to certify each of the following:
- the wind turbine generators installed and commissioned are ready for commercial operation;
 - the corresponding specification of turbine and operating mode that has been installed and the consequent rated output power of each turbine;
 - for the equipment forming the Electrical Balance of Plant (array power cables, transmission power cables, overhead lines, switchgear, transformers, power quality compliance equipment, reactive compensation equipment, Facility Metering Equipment), the commissioning process implemented is in line with good wind industry practice, that nothing material is outstanding and that the commissioning process has been completed successfully; and
 - in the immediate and foreseeable future there is no expected or anticipated risk of failure that should be brought to the CfD Counterparty('s) attention, nothing to stop exporting at no less than 80% of the Installed Capacity Estimate and the Facility is fit for commercial operation.

For convenience, a consolidated Directors' Certificate template is attached at Annex A of this guidance.



8. Annexes

8.1 Annex A: Directors' Certificate

<https://www.lowcarboncontracts.uk/publications/wind-commissioning-guidance>.

8.2 Annex B: OCP Wind Commissioning Guidance Tracker

<https://www.lowcarboncontracts.uk/publications/wind-commissioning-guidance>.

8.3 Annex C: Section 5: Facility Commissioning (expected evidence summary table)

	Transmission	Distribution
Small	whole Facility test, ION / ION B	whole Facility test, G99
Medium	whole Facility test, ION / ION B	whole Facility test, ION / ION B, G99
Medium*	N/A	whole Facility test, G99
Large	ION / ION B	ION / ION B, G99
Large**	whole Facility test, ION / ION B	whole Facility test, ION / ION B, G99
*Your Facility is a distribution 'Medium' Power Station that is not subject to a Bilateral Agreement as defined in the Grid Code		
**The capacity of your Facility is less than 100MW and the 70% ION restriction does not apply, or your Facility is part of a phased project where, due to the capacity of the Facility, the 70% restriction cannot be lifted without the subsequent phase(s) being commissioned.		



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