



**LOW CARBON**  
CONTRACTS COMPANY

# Final Installed Capacity (“FIC”) - Guidance for Thermal Technologies

**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

# Contents

1	Introduction	3
2	Definitions	4
3	Context	6
4	Commissioning Evidence	7
5	Installed Capacity Test	9
6	Main assets comprising the Facility	11
7	Appendix 1: Equipment Ratings	12

#### 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.*

## Section 1: Introduction

This document provides generators with guidance on the forms of evidence that the Low Carbon Contracts Company considers acceptable to be provided with the Final Installed Capacity (“FIC”) Notice.

- 1.1 No later than ten Business Days after the Longstop Date, the Generator must submit to Low Carbon Contracts Company (LCCC) a Final Installed Capacity (“FIC”) Notice. The FIC Notice specifies the Installed Capacity that has been Commissioned and is accompanied with evidence and Supporting Information (including details of the assets comprising the Facility). It is therefore important that Generators give proper consideration ahead of time to how they intend to evidence that they have fulfilled the requirements for the FIC Notice.
- 1.2 LCCC has considered how to assess that the Facility has been Commissioned, and a proportionate, repeatable, auditable, and robust way to measure Installed Capacity including what Supporting Information is needed.
- 1.3 This guidance is intended to assist CFD Generators with the technologies listed below in considering what evidence they will need to provide to LCCC to demonstrate that they have fulfilled the FIC requirement in the Contract for Difference (“CFD”). The Generation Technologies covered by this guidance are:
  - Biomass Conversion
  - Dedicated Biomass with Combined Heat and Power (“CHP”)
  - Energy from Waste (“EfW”) with CHP
  - Advanced onversion Technologies (“ACT”) with and without CHP
- 1.4 LCCC would encourage Generators to engage early in the FIC process. This will enable the parties to discuss the approach; and for LCCC to gain an understanding of the Generators’ approach and the project specific characteristics (as these characteristics may well be of particular importance in some cases).
- 1.5 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 are already available as submittable evidence, providing that these meet the requirements of the CFD and are in accordance with the Reasonable and Prudent Standard. This guidance is indicative of what evidence would be acceptable to LCCC. Generators are also encouraged to contact their Commercial Manager as soon as possible to discuss any concerns they may have in more detail.
- 1.6 For CHP schemes in particular, while the principles outlined in this document will apply, we ask that Generators discuss the requirements and intended approach with their Commercial Manager, given the individual design philosophy and characteristics of each plant.
- 1.7 Before the Generator proceeds with the formal submission, we recommend that submissions are made in draft form so that LCCC can facilitate the final submission and comment on the following:
  - any evidence that the Generator is intending to submit with the FIC Notice;
  - whether the evidence is consistent with the LCCC’s expectations as described in this guidance; and
  - the draft FIC Notice and associated Directors Certificate.
- 1.8 Where Supporting Information submitted by Generators in order to demonstrate the Final Installed Capacity of the Facility is the same evidence as was submitted to fulfil the Operational Condition Precedents (“OCP”), the Generator is required to resubmit the Supporting Information. The CFD requires the submission of the Supporting Information and resubmitting the evidence provides a clear link to, and certainty on, the Supporting Information provided and maintains robustness and auditability of the submission.

## Section 2: Definitions

2.1 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 2014<sup>1</sup> and in March 2017<sup>2</sup>, with both sets of published documents being identical in relation to the relevant provisions). This guidance is also applicable to Investment Contracts. However, Generators with Investment Contracts are advised to review the equivalent clauses.

2.2 The “CFD Counterparty” is the Low Carbon Contracts Company Ltd.

2.3 “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;”*

2.4 “Facility” as set out in the CFD means:

*“the generating facility comprising:*

- (A) all assets (including all Generating Units):*
  - (i) which are used (or intended to be used) to generate or deliver electricity;*
  - (ii) which were taken into account by the Generator in determining the Initial Installed Capacity Estimate; and*
  - (iii) which are (except as otherwise agreed in writing by the CfD Counterparty) situated (subject to paragraph (d)) within the area shaded on the map provided pursuant to paragraph (C)(ii) of Part A of Schedule 1, and which has the geographical coordinates specified in Annex 1 (Description of the Facility)”*

2.5 “Installed Capacity” as set out in the CFD means:

*“the capacity of the Facility (expressed in MW) were it to be operated on a continual basis at the maximum capacity possible without causing damage to it (assuming any source of power used by it to generate electricity was available to it without interruption)”.*

Please note that Installed Capacity is determined at the export metering point. For further guidance on Installed Capacity please refer to the Installed Capacity and Final Installed Capacity guidance<sup>3</sup> issued by LCCC.

2.6 “Installed Capacity Estimate” as set out in the CFD means:

*“the Generator’s estimate of the Installed Capacity from time to time, being the Initial Installed Capacity Estimate as may be adjusted pursuant to Condition 5 (Adjustment to Installed Capacity Estimate: Relevant Construction Event) and Condition 6 (Adjustment to Installed Capacity Estimate: Permitted reduction);”*

2.7 “Initial Installed Capacity Estimate” has the meaning given to that term in the CFD Agreement as is specific for each project;

2.8 “Maximum Contract Capacity” as set out in the CFD means:

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

<sup>2</sup>Department for Business, Energy & Industrial Strategy, [Contracts for Difference: standard terms and conditions, version 2](#) published in 13 March 2017.

<sup>3</sup>Low Carbon Contracts Company, [Guidance: Installed Capacity and Final Installed Capacity](#), published in January 2017.

*“the Installed Capacity Estimate and, subject to and in accordance with the provisions of Condition 7 (Final Installed Capacity; Maximum Contract Capacity), the Final Installed Capacity;”*

- 2.9 “Required Installed Capacity” has the meaning given to that term in the CFD Agreement, and for thermal technologies is 95% of the Installed Capacity Estimate (other than for Investment Contracts, where it is 85%).

## Section 3: Context

3.1 The CFD<sup>4</sup> states that:

*“the Generator shall, following the Start Date, and no later than ten (10) Business Days after the Longstop Date, submit to the CFD Counterparty (a “Final Installed Capacity Notice”). A Final Installed Capacity Notice shall:*

- (A) specify the Installed Capacity that has been Commissioned as at the date of such notice which shall not, in any event, exceed the Installed Capacity Estimate (the “Final Installed Capacity”); and*
- (B) include such Supporting Information, in reasonable detail, as the Generator considers to be relevant to and supportive of its conclusion, including details of the assets comprising the Facility as at the date of such notice.”*

3.2 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)...”*

3.3 This guidance therefore requires Generators to submit a FIC Notice that specifies the Installed Capacity, with Supporting Information to evidence:

- how the Generator derived this figure;
- that the Facility has been Commissioned; and
- the assets comprising the Facility.

3.4 The FIC must not exceed the Installed Capacity Estimate and must not be less than the Required Installed Capacity<sup>5</sup>, effectively giving an upper and lower limit for the FIC.

3.5 No later than twenty (20) Business Days of receiving the FIC Notice, LCCC is required to provide a FIC Response Notice specifying either that:

- FIC as specified in the FIC Notice is agreed; or
- LCCC has not received sufficient Support Information to determine the FIC or the assets comprising the Facility, and requires additional specified Supporting Information.

3.6 Once the FIC is agreed, this will determine the Maximum Contract Capacity, which is effectively the capacity cap that limits difference payments in each Settlement Unit<sup>6</sup>.

3.7 In summary, **four** overarching requirements need to be evidenced in relation to FIC:

1. that the Facility has been “Commissioned” meaning that the Commissioning Tests have been successfully completed and it can generate electricity or, is fit for commercial operation (Section 4);
2. an Installed Capacity at least equal to the “Required Installed Capacity” (and not more than the Installed Capacity Estimate) has been Commissioned (Section 4);
3. the “Installed Capacity” of the Facility (were it to be operated on a continual basis at the maximum capacity possible without causing damage to it) (Section 5); and
4. the main assets comprising the Facility (Section 6).

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<sup>4</sup>Under Condition 7.1 (“Final Installed Capacity; Maximum Contract Capacity”) of the CfD Standard Terms and Conditions.

<sup>5</sup>Under Condition 53.1 (D)(i) (“Termination Events”) of the CfD Standard Terms and Conditions, the CFD can be terminated if the FIC is lower than the Required Installed Capacity.

<sup>6</sup>Pursuant to Part A of Annex 3 to the CFD Agreement and Part 5A Payment calculations: Baseload Technologies of the CfD Conditions.

## Section 4: Commissioning Evidence

4.1 The submission to demonstrate that the Facility has been Commissioned should include:

(A) Dated, valid and signed transfer of title and risk of loss certificate(s) ("TOCs"), which may include Practical Completion, Provisional Acceptance, or Take Over Certificates, covering the key systems;

(B) The Criteria under which those TOCs can be issued in the form of either:-

- a document, to the satisfaction of LCCC, with extracts of the relevant contractual provision for issuing the TOCs under the contracts accompanied by a letter signed by an appropriately qualified and authorised person referencing the contract and its date, confirming such contractual provisions are the only relevant provisions in relation to the TOCs; or
- extracts from relevant contracts (where appropriate these can be redacted, subject to LCCC being able to review the unredacted extract where it considers this to be necessary), including both the front and signatory pages and the relevant contractual provisions, accompanied by a letter signed by an appropriately qualified and authorised person referencing the contract and its date and confirming that these provisions extracted are a true reflection of the relevant provisions of the contract and are the only relevant provisions in relation to the TOCs; and

(C) A letter from the Generator's engineer confirming that the Commissioning of the Facility is complete to a Reasonable and Prudent Standard and that no material items are outstanding.

4.2 An indicative list of key systems would include:

- Material handling system;
- Turbine and generator package;
- ACC/Condenser package;
- Boiler package;
- Combustion system package;
- Electrical package;
- Firefighting package;
- Civil package;
- Heat offtake package.

4.3 LCCC will consider on a case by case basis alternative forms of evidence in circumstance where TOCs have not yet been issued and the Longstop Date is approaching.

4.4 An Installed Capacity test will demonstrate that the Required Installed Capacity has been Commissioned. This test should be against a recognised standard for assessing capacity and ensure an accurate and complete determination of gross (nameplate) capacity; parasitic loads; electrical losses; and net generating capacity (as measured at the export meter).

4.5 The Installed Capacity test should follow the same benchmarks, conditions and reporting criteria as applied to achieve OCP 2.1 (B), as described in section 5 of the Thermal Commissioning Guidance<sup>7</sup>.

4.6 The following options are available to Generators in respect of the Installed Capacity test:

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<sup>7</sup>Low Carbon Contracts Company, [Thermal Commissioning Guidance](#), published in November 2017

- a) Repeat the Installed Capacity test as completed for the OCP 2.1(B) and submit an updated report;
- b) Resubmit the OCP 2.1(B) Installed Capacity test if it demonstrates an Installed Capacity greater than the Required Installed Capacity and provide a statement confirming that there is no reason to believe (such as confirming there have been no changes in the configuration of components/systems that might impact the Installed Capacity) that this Installed Capacity will be different from that demonstrated for the purposes of OCP2.1(B);
- c) Submit EPC capacity test or other alternative capacity tests if such tests meet the test criteria for OCP2.1(B) (Thermal Commissioning Guidance - Section 5).

## Section 5: Installed Capacity of the Facility

- 5.1 For the purposes of FIC, the Generator must demonstrate the Installed Capacity of the Facility were it to be operated on a continual basis at the maximum capacity possible without causing damage to it.
- 5.2 The FIC should be determined through a desktop study (taking into account matters such as those set out in paragraph 5.4) demonstrating the maximum achievable capacity on a continuous basis under normal operating conditions, identifying the limiting factor/component, and then deducting the theoretical auxiliary loads and losses.
- 5.3 The study should be undertaken on the Facility 'as built' and any changes to the design should be incorporated into the desktop study.
- 5.4 The Generator should provide a FIC Report that includes:
- statement of the FIC;
  - identification of the component, which at the design ambient temperature, is limiting power production. (e.g. turbine, generator, boiler, balance of plant equipment and, for example, if the limiting factor was the engine rating the Generator should demonstrate the continuous power rating for the purposes of FIC);
  - evidence supporting the rating of this limiting component (e.g. manufacturers data sheets);
  - a narrative setting out the rationale for the sizing of the limiting component in the design and why the evidenced rating reflects the component's maximum continuous capacity;
  - a list of all the auxiliary loads and the rated (theoretical) load of the equipment in kW;
  - for each auxiliary load, the average under normal operating conditions including the diversity/load factor for the intermittent loads (i.e. average auxiliary load required over a generating cycle reflecting the different operating conditions);
  - the sum of the average auxiliary loads referred to above (with LCCC generally expecting that it will be appropriate for this sum to be deducted in calculating the FIC);
  - list of the auxiliary loads that are on continuously;
  - the measured actual values of all the auxiliary loads from the Installed Capacity test (for validation of the rated (theoretical) loads only);
  - transformer and other electrical losses according to industry standards such as IEC 60076-8 (to be deducted in calculating FIC).
- 5.5 Generators should provide a heat and mass balance calculation ("HMB") containing the gross, net and auxiliary load data, flow rates, pressure, temperature, and enthalpy around the process system. To be able to evaluate the Supporting Information, LCCC would expect a HMB for (i) minimum conditions (ii) maximum conditions (iii) design ambient conditions and (iv) a HMB to align with the Installed Capacity Estimate value.
- 5.6 Generators should, as a minimum, complete and submit Appendix 1 - the equipment ratings of the main components, and supplement this with other key equipment ratings where applicable. Additionally, for identifying the main assets comprising the Facility, this table should record information to enable identification of the equipment, including the equipment manufacturer and the serial numbers.
- 5.7 LCCC has noted Generator feedback and representations that it is possible that the calculation of the Installed Capacity (following the desktop study for thermal projects referred to above) might on occasion result in a figure which is higher than the Installed Capacity Estimate due to design tolerances, margins or contingency ("design contingency") in the 'as built' environment or contractors or subcontractors specifying additional design contingency in order to avoid potential contractual issues due to plant being under the required capacity.

- 5.8 LCCC would expect Generators to be aware of the possible issues if a Facility exceeds its Installed Capacity Estimate (and thus its FIC limitations) and to seek to avoid these issues as far as practicable. LCCC would also expect Generators to be aware of any potential cumulative aggregation issues arising where each successive contractor in a chain and/or manufacturer adds in a design contingency.
- 5.9 Having said this, LCCC currently expects, on the case by case basis referred to in paragraph 5.8, to consider design contingency as part of the FIC determination, subject to the Generator evidencing that it has acted (i) appropriately in relation to the above matters and (ii) in good faith in relation to these matters and in its approach to not exceeding the Installed Capacity Estimate.
- 5.10 LCCC will also take into account (i) whether the Generator is able to evidence that the degree of design contingency provided for in its original design was in accordance with the Reasonable and Prudent Standard, (ii) any relevant assumptions relating to which auxiliary loads are included/excluded and to what extent and (iii) any material impact on costs to LCCC or consumers.
- 5.11 LCCC would not expect any design contingency to affect the FIC by more than a (relatively low) single digit percentage. LCCC also reserves the right to adopt a different approach to this issue should it consider that the situation relating to any Generator or by several Generators makes it undesirable for LCCC to continue with this approach.
- 5.12 Generators should discuss any design contingency identified with their Commercial Manager as soon as it becomes practicable to discuss the individual scenario and the evidence that will be required. The Supporting Information the Generator would generally be required to provide would include:
- statement of capacity (MW) by which the calculation of the Installed Capacity by the desktop study exceeds the Installed Capacity Estimate applying (i) the sum of the average auxiliary loads (as per the FIC calculation) and (ii) only the auxiliary loads that are on continuously to identify the maximum potential capacity;
  - justification, supported with evidence, of the factors in design and construction which have resulted in the calculation of the Installed Capacity exceeding the Installed Capacity Estimate;
  - evidence of the intended design capacity (e.g. contractors' tender responses, guarantees covering net power generation capacity in the main construction contract(s)), supplemented as required to account for design variations in the construction process;
  - project specific information to evidence the other matters referred to in paragraphs 5.8 to 5.10.
- 5.13 The Installed Capacity as notified in the FIC notice (which determines the Maximum Contract Capacity and is effectively the capacity cap that limits difference payments) cannot exceed the Installed Capacity Estimate. Where a Generator has demonstrated to the satisfaction of LCCC, and at LCCC sole discretion, that the Facility has a calculated Installed Capacity greater than the Installed Capacity Estimate as a consequence of design contingency, the Generator should not issue a FIC Notice which states that the Installed Capacity that has been Commissioned is higher than the Installed Capacity Estimate without LCCC's prior written consent. (Such consent, if given, would be subject to conditionality and in particular, that the FIC Notice shall not operate in such a way as to set the Final Installed Capacity (and Maximum Contract Capacity) above the Installed Capacity Estimate).

## Section 6: Main assets comprising the Facility

6.1 The Generator should provide the following, as a minimum, to detail the main assets comprising the Facility:

- a list of key equipment components including the equipment manufacturer and the serial numbers (a completed Appendix 1);
- a Single Line Diagram including electrical ratings for generator(s), export transformer(s), connections to external network(s) outside the Facility and the position of metering as at the time of submitted the FIC Notice; and
- the Facility layout and a site plan (with co-ordinates) as at the time of submitting the FIC Notice.

## Appendix 1: Equipment Ratings

Item	Min site ambient temperature [ ] °C	Max site ambient temperature [ ] °C	Construction contract design point ambient temperature [ ] °C	Ambient temperature to achieve ICE [ ] °C	Identification of key equipment (including manufacturer and serial numbers)	Example evidence supporting the rating of the limiting component
Boiler steam production rate			[ ] kg/s	[ ] kg/s		Calculation as per the design standard, e.g. ASME
Superheater outlet temperature and pressure			[ ] °C [ ] barg	[ ] °C [ ] barg		Please state the values at the flow rate above
Fuel flow rate into boiler			[ ] kg/s	[ ] kg/s		Manufacturers data sheets, system descriptions or rating plates
Induced air fan mass flow			[ ] kg/s	[ ] kg/s		Manufacturers data sheets, system descriptions or rating plates
Steam swallowing capacity of ST generator	[ ] kg/s	[ ] kg/s	[ ] kg/s	[ ] kg/s		Manufacturers data sheets and rating plates
Generator electrical rating at Class B temperature rise and Class F insulation (if other please state)	[ ] MVA	[ ] MVA	[ ] MVA	[ ] MVA		Manufacturers data sheets and rating plates
Turbine mechanical rating	[ ] MW	[ ] MW	[ ] MW	[ ] MW		Manufacturers data sheets and rating plates
Generator transformer rating ONAF/OFAF/ONAN (delete cooling mode as appropriate)	[ ] MVA	[ ] MVA	[ ] MVA	[ ] MVA		Manufacturers data sheets and rating plates
Any other limiting factor						Documentary evidence as appropriate

### NOTES

- A) The information should be provided at rated conditions with no other process restrictions. (e.g. Full boiler steam raising capacity as provided by the manufacturer should be provided even if this exceeds steam swallowing capacity of the steam turbine)
- B) The information should not be limited by any plant control system (e.g. the control set point for pumps and fans should not be set below rated capacity to limit the overall system performance) unless this is required for safety reasons. Where plant control system limits are in place for safety reasons, these must be identified and explained.

