# CfD – Metering Policy
# Baseload Dual Scheme Facilities and Biomass Conversions

1. This paper outlines the metering and metered Output arrangements for baseload Dual Scheme Facilities and Biomass Conversion Facilities participating in the Contracts for Difference (CfD) Scheme.

*Context*

2. The UK Government's 2011 Electricity Market Reform white paper[1] stated that *"it would be possible for an existing Generator accredited under the Renewable Obligation (RO) scheme to apply for and receive CfD support for additional (but separate) capacity installed"*.

   - In this instance, it would be possible for a Generator to have some capacity accredited under the RO scheme, and some capacity covered by a single CfD contract (for each additional but separate capacity installed).

3. These Generators have been termed 'Dual Scheme Facilities' (DSFs) under the CfD scheme.

4. Additionally, the UK Government's 2013 Transition from the Renewable Obligation to the Contracts for Difference consultation paper[2], proposed that "*RO-accredited biomass co-firers seeking to convert one or more of their generating units from fossil fuel to solid biomass should be able to apply for a CfD on an individual unit or station-basis*. *Where their application was successful, they would be withdrawn from the RO scheme as a co-firer"*.

   - In this instance it is possible for a Generator to be covered by:
     i. a single CfD contract for a full station biomass conversion; or
     ii. an individual CfD contract for each fully converted biomass generating unit.

5. This policy will only apply to those Generators converting individual generating units – they have been termed 'Biomass Unit Conversion Facilities' (BUCFs) under the CfD scheme, and for metering purposes, shall be treated in an identical manner to DSFs.

6. The CfD "Public Trading Generators" final policy will apply to those undertaking a full station biomass conversion[3].

*Issue*

7. Input electricity refers to electricity used by a generating station, irrespective of whether that electricity is generated by the Facility itself or imported from the transmission or

[1] https://www.gov.uk/government/publications/planning-our-electric-future-a-white-paper-for-secure-affordable-and-low-carbon-energy; Page 125.

[2] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/223489/ROtransitionconsultation17July2013.pdf; Page 8.

[3] https://www.gov.uk/government/policy-advisory-groups/contracts-for-difference-expert-sub-group-on-metering

distribution system. The RO and CfD schemes both require gross input electricity to be deducted from gross metered output. The product of this calculation is used as the basis to derive net Metered Output for each Settlement Unit, and therefore informs the support mechanism under each scheme. Specifically:

- The RO scheme requires operators of accredited stations to provide gross input electricity and gross output (measured at station-gate) to the scheme administrator, Ofgem. Renewable Obligation Certificates (ROCs) are then issued on the net sum in accordance with the qualifying technology band applicable. The same process for calculating net Metered Output is equally applied to both fuelled and non-fuelled generating stations without loss adjustment. ROCs can only be issued on net generation figures that are, in Ofgem's view, accurate and reliable.

- The CfD scheme requires a Facility's low carbon loss-adjusted net Metered Output to be calculated for settlement. Generators will receive/pay a difference payment based on the product of their Metered Output and the difference between strike and reference prices over each Settlement Unit. How metered data is collected (i.e. at the notional boundary point or at station-gate) and the loss adjustments applied will vary depending on whether the Generator is trading on the public electricity system or on a private wire network.

8. In July 2013, DECC released a draft policy proposal (Option 1) which set out that DSFs would need to separately and accurately meter any CfD generating units at their generation station, and that the metering arrangements adopted by these Facilities would need to be compatible with the requirements under both the RO and CfD schemes.[4]

9. Following industry consultation over August and September 2013, industry feedback indicated that due to the operational and accounting complexities faced by a DSF or BCF in undertaking the proposed CfD requirements outlined in paragraph 7, the approach would not be practically possible (nor financially sensible). They argued that any obligation to install full, separate, metering to accurately measure the net Metered Output from CfD generating units was excessively rigorous and overly complex for DSF Generators.

10. In late September 2013, DECC developed an alternative proposal (Option 2) which sought to apply the RO provisions of allowing estimates and apportionment to imported input electricity drawn by shared station services.

11. The proposal was initially presented in draft form to the CfD Expert Group on Metering in early October 2013, and a revised shared in January 2014.[5]

[4] https://www.gov.uk/government/policy-advisory-groups/contracts-for-difference-expert-sub-group-on-metering
[5] https://www.gov.uk/government/policy-advisory-groups/contracts-for-difference-expert-sub-group-on-metering

*DECC Final Policy*

12. For the purposes of the CfD scheme, DECC has adopted Option 2, reconciling estimated Loss Adjusted Metered Output values (i.e. paragraph 10) based upon results of the Fuel Measurement and Sampling (FMS) process.[6] This approach will provide Generator's with more flexibility to meet the CfD metering requirements placed on them, at reduced cost Below is an explanation of how the CfD allocations process and the metering methodology would work in practice.

13. Generators will be awarded a CfD contract for the additional (and separate) capacity installed or the generating unit/s they intend to convert from fossil fuel to solid biomass (subject to the allocations process and ongoing compliance with the eligibility criteria at award through to contract execution). Where successfully awarded contracts are executed, both DSFs and BUCFs will be entitled to determine which metering system is most appropriate to their individual circumstances, as long as it met the requirements under each scheme, and maintained compatibility with BSC metering requirements.

14. Prior to the commencement of their CfD contract and in addition to all relevant contractual Conditions Precedents, DSFs and BUCFs will need to meet the following specific requirements:

- During the CfD application process, the Generator should demonstrate to:

    a. National Grid in their CfD application, that the proposed CfD-accredited generating units meet CfD eligibility criteria (including a self-declaration certificate[7] outlined in CfD Allocation Regulations – to be published in Summer 2014) and that the gross Metered Output associated with difference payments are to be claimed only from CfD generating units.

    b. Ofgem (as set out in the Renewables Obligation Order 2014) that the site's Metered Output on which ROCs are to be claimed will only be from RO-accredited generating units and that their metering and fuel systems will remain consistent with RO requirements and agreed procedures;

- Prior to any CfD difference payments being made on the CfD-accredited capacity, the Generator must:

    a. obtain agreement from Ofgem and the CfD Counterparty (via cross-checking of database systems or alternative process to be determined then) that both are satisfied that the metering and fuel systems installed can measure Metered Output, and align with the respective Fuel Measurement and Sampling (FMS) Agreements as per individual scheme requirements; and

[6] https://www.gov.uk/government/policy-advisory-groups/contracts-for-difference-expert-sub-group-on-metering
[7] By completing the self-declaration certification, the Generator confirms to National Grid that no government support has been received for the capacity outlined in their CfD application.

b. ensure they have BSC Settlement input and output meters installed on all CfD generating units.

15. Once the Facility commences operating, two distinct processes will be run in parallel. These are:

- daily settlement – drawing on a combination of actual metered data volumes, and imported input electricity apportioned across generating units, and a Renewable Qualifying Multiplier (RQM); and

- monthly reconciliation - taking place two months after generation, once fuel data has been independently verified to recalculate the imported input apportionment and the RQM.

These processes are both described in more detail below.

16. Difference payments under the CfD scheme will be calculated using the Metered Output formula below. Under this calculation, the Facility's half-hourly (estimated) Loss Adjusted Metered Output (LAMO) per Settlement Unit for each CfD generating unit is calculated as follows:

**Metered Output per Settlement Unit** = LAMO x RQM

**Where:**

**LAMO** = {[Metered Gross Output – Metered Gross Input] – (estimated) Unit Input Power Allowance} x TLM[8]

= {BM Unit Metered Volume – (estimated) (BM Unit(s) Metered Volume $_{\text{Station Transformer/s}}$) x TLM

= (estimated) Metered Gross-Net-Net Output x TLM

17. To derive LAMO for each CfD generating unit, the Generator must provide the following data sets to the Counterparty on a daily basis:

- the gross-net half-hourly Metered Output volumes[9] for each CfD generating unit/s, per Settlement Unit; and

- the half hourly metered volumes for all imported input electricity demanded by the station.

18. All CfD generating units must have accurate metering installed to record gross-net Metered Output each trading day. This metering equipment must be capable of measuring all gross output generated by the generating unit, and all input electricity self-

[8] Transmission Loss Multiplier, as allocated under the BSC.
[9] I.e. the gross metered output less the (self-produced) input electricity of each CfD unit.

produced by the generating unit, per Settlement Unit. These values would be netted off to derive gross-net Metered Output per generating unit per Settlement Unit.

- From this gross-net Metered Output, a "Unit Input Power Allowance", based on an estimated apportionment of imported input electricity drawn by station-wide shared services (see paragraph 17), would be deducted to produce a daily estimated Metered Gross-Net-Net Output for each generating unit.

- This estimated Metered Gross-Net-Net volume would be adjusted for transmission losses, to derive LAMO.

- Lastly, LAMO would be multiplied by the assigned Renewable Qualifying Multiplier (RQM) to produce the Metered Output eligible for CfD settlement.

- The detailed explanation of the process is outlined below.

*Calculating the 'Unit Input Power Allowance'*

19. BSC-compliant metering installed on station transformers at the Facility will be used to measure half-hourly values for imported input electricity drawn by the station.

20. The CfD Counterparty will aggregate any and all imported input electricity drawn (i.e. if there is more than one station transformer) and multiply this half-hourly metered data by the CfD generating capacity as a percentage of overall station capacity. The resulting figure is the 'Input Power Allowance' for the CfD-accredited generating unit/s.

21. This allowance is necessary to work out the estimated amount of imported input electricity used by shared services to support the CfD-accredited generating unit/s, without obligating Generators to accurately meter these services.

    Worked example for one Settlement Unit:

    Total existing RO generating units= 60MW (i.e. 3 units @ 20MW each)
    Total additional CfD generating units= 40MW (i.e. 1 unit @ 10MW; 1 @30MW)
    Total generating units at the Generating Station = 5
    Half-hourly imported input electricity (station) = 3.87MWh

    'Input Power Allowance' = 3.87MWh / % of CfD-accredited capacity
    = 3.87MWh x 0.4
    = 1.55MWh for all CfD-accredited generating units.

22. The CfD Counterparty will then apportion this value across the number of CfD generating units at the Facility (where necessary), based on the capacity of each generating unit to derive an estimated 'Unit Input Power Allowance'.

Worked example for one Settlement Unit (cont.):

$\%\ \text{of Capacity produced}_{\text{CfD-accredited unit 1}} = 10\text{MW}/40\text{MW}$
$= 25\%$

$\%\ \text{of Capacity produced}_{\text{CfD-accredited unit 2}} = 30\text{MW}/40\text{MW}$
$= 75\%$

Therefore:
$\text{Unit Input Power Allowance}_{\text{CfD-accredited unit 1}} = 1.55\text{MWh} * 25\%$
$= 0.39\text{MWh}$

$\text{Unit Input Power Allowance}_{\text{CfD-accredited unit 2}} = 1.55\text{MWh} * 75\%$
$= 1.16\text{MWh}$

23. The estimated 'Unit Input Power Allowance' is deducted from the gross-net Metered Output value (as per paragraph 17) to derive daily (estimated) gross-net-net unit Metered Output for each CfD-accredited generating unit, per Settlement Unit.

24. The apportionment calculation will need to be applied to all CfD generating units at the station. This is because CfD generating units at a BUCF will be covered under separate contracts.

25. In line with policy decisions taken on FMS, the following specific steps apply to determine the RQM value applicable (prior to the FMS measurement, sampling and testing process) per RQM Calculation Month:

    i. The RQM figure may be "deemed/fixed" by the CfD Counterparty if the Generator:
        - is considered an FMS Exempted Generator;
        - uses fuel sources derived from Qualifying Waste; or
        - is required to pay a difference amount (i.e. where the reference price is above the strike price).

    ii. Where the RQM is not deemed/fixed, it is calculated using the FMS Data submitted (presented in an FMS Report).

    iii. If no FMS Report is provided, the RQM would be based on the last known actual RQM value (unless a different value had been mutually agreed with the CfD Counterparty).

iv. If no FMS Report is available AND no last known actual value exists, then a mutually agreed value is used. Where a value cannot be agreed, an Assumed RQM (as outlined in the Generator's CfD Agreement) is used.

26. If a CfD-accredited generating unit was only operational for part of the trading month, the apportionment of half-hourly imported input electricity volumes, based upon capacity, would commence as soon the CfD Counterparty received metered volumes for that BM Unit.

- Any inconsistencies in this apportionment (i.e. a CfD-accredited generating unit being allocated too much (or too little) imported input electricity) would be recalculated through the Reconciliation Mechanism following the conclusion of the RQM Calculation Month.

*Reconciliation Mechanism*

27. The Reconciliation Mechanism is core to the policy and seeks to recalculate the estimated figures from the apportionment of imported input electricity. It will also revise the RQM (where necessary) applied to derive Metered Output for each Settlement Unit. See Annex 1 for examples of how this process would work under different circumstances.

28. The Reconciliation Mechanism relies on Fuel Data collected, tested and verified (written into a FMS Report) as part of the FMS Procedures. Using the results in the FMS Report, the estimated daily LAMO and the RQM used for initial daily settlement is recalculated through CfD reconciliations, approximately two months later.

29. As the Reconciliation Mechanism draws on the amount of total fuels used by the generating station, an obligation is placed on the Generator to provide this information each RQM Calculation Month as part of its CfD FMS Report.

30. In the event that a Generator fails to produce an FMS Report for the CfD-accredited generating units, the Reconciliation Mechanism will not be undertaken until such time as the CfD Counterparty receives the FMS Report (in accordance with the FMS Procedures outlined in Annex 7 of the CfD Terms and Conditions).

31. The mechanics of the Reconciliation Mechanism are as follows:

**Metered Output (Annex 2)**

32. At the end of a RQM Calculation Month, the CfD Counterparty will calculate an aggregated:

a. actual value for the total imported input electricity that was demanded from the Total System by the generating station for every day in that month (i.e. aggregating all 48

Settlement Units at the station transformer/s per day). This calculation derives the monthly total imported input electricity.

b. metered monthly gross net Metered Output values for the CfD generating units. This calculation produces the monthly gross net Metered Output.

c. value for the monthly LAMO for each CfD generating unit (i.e. the monthly gross net net Metered output, adjusted for losses). This calculation derives the Aggregated Monthly LAMO.

**FMS Reconciliation (Annex 3)**

d. In accordance with its agreed FMS Procedures attached to its CfD Agreement and the Standard Terms and Conditions, the Generator is required to weigh, sample and test all fuels that enter a CfD generating unit/s. Samples will be tested at an independent laboratory and test results, forming part of the FMS Data compiled by the Generator, will be submitted in a FMS Report to the CfD Counterparty. This will indicate how much fuel (and the gross calorific value of that fuel) was used by each CfD-accredited generating unit.

e. The Generator will undertake the FMS Procedures for every fuelled generating unit at the station. The amount of fuel (mass/volume) consumed by a generating unit multiplied by its gross calorific value determines how much heat contribution (i.e. energy content) was produced by that generating unit. This figure is expressed in gigajoules (GJ). The sum of the heat contribution figures for each individual generating unit will provide a total figure for the generating station. The figure obtained is indicative of how much Total Heat Contribution[10] was produced by the station over the RQM Calculation Month.

f. Using the Total Heat Contribution value for the station over a RQM Calculation Month, the proportion of heat contribution produced by the CfD generating units can be determined in relation to the rest of the generating station. This proportion is then applied to the total imported input electricity across the generating station to determine the imported input electricity applicable to the CfD units for that RQM calculation Month. The calculation involves therefore dividing the Total Heat Contribution for the CfD-generating units by the Total Heat Contribution produced by the station. This recalculates the estimates of imported input electricity that were apportioned to CfD-generating units over the course of the month.

g. The value produced in f) is deducted from monthly gross net Metered Output for the CfD generating units (obtained in step 2). This figure is the Reconciled net Metered Output.

h. The Reconciled net Metered Output figure is adjusted for transmission losses, to give the Reconciled Loss Adjusted Metered Output (Reconciled LAMO) that is required for settlement under the CfD.

[10] The energy content derived from all fuel sources, including renewable and fossil sources.

i. The FMS Data contained in the FMS Report will also establish how much heat demanded by the CfD generating units was derived from renewable sources. The process produces a figure that is known as the corrected Renewable Qualifying Multiplier (RQM). The Reconciled LAMO will then be multiplied by the corrected RQM value to produce Reconciled Renewable Monthly LAMO.

j. Lastly to work out if a Reconciliation Payment is due, the CfD Counterparty will subtract the Aggregated Monthly LAMO from the Reconciled Renewable Monthly LAMO.

| |
|---|
| **Reconciliation Payment** = Reconciled Renewable Monthly LAMO – Aggregated Monthly LAMO |

*Annex 1 – Reconciliation Mechanism: Examples*

**Example 1:**

In this example, we assume both generating units one and two operate under the same CfD (i.e. additional but separate capacity). If the generating units were covered by separate CfDs (i.e. a Biomass Unit Conversion Facility), a similar calculation to that carried out in the additional examples (set out below) would be undertaken.

| **Unit** | Unit 1 | Unit 2 | Unit 3 | Unit 4 |
|---|---|---|---|---|
| **Scheme** | CfD | CfD | RO | RO |
| **Total Installed Capacity (TIC)** | 20MW | 20MW | 20MW | 20MW |
| **Total Heat Contribution (THC)** | 1500GJ | 1500GJ | 1000GJ | 2000GJ |
| **Corrected RQM %** | 95% | 95% | 98% | 98% |
| **Monthly Gross Net Metered Output** | 200MWh | 200MWh | 150MWh | 150MWh |
| **Station Input (i.e. Aggregated Imported Input electricity)** | 50MWh | | | |

a) Imported Input electricity for CfD = {Station Input x ($THC_{CfD}/TCH_{station}$)}

= (50 x (3000/6000)

= 50 x 0.5

= 25MWh

b) Reconciled net Metered Output = (Agg. Gross net Metered Output – Imported Input electricity for CfD)

= ((200 + 200)-25)

= 375MWh

c) Reconciled LAMO = Reconciled net Metered Output x TLM

= 375MWh x TLM

d) Reconciled Renewable Monthly LAMO = Reconciled LAMO x Corrected RQM

= (375x 0.95)

= 356.25MWh

NOW:

e) Reconciliation Payment = Reconciled Renewable Monthly LAMO – Aggregated Monthly LAMO

**Example 2:**

If one CfD-accredited generating unit is online for only part of the trading month, the imported input electricity will continue to be apportioned across the generating station based upon the proportion of Total Heat Contribution. This will indicate how much imported input electricity was demanded by the individual generating unit.

| **Unit** | Unit 1 | Unit 2 | Unit 3 | Unit 4 |
|---|---|---|---|---|
| **Scheme** | CfD | CfD | RO | RO |
| **Total Installed Capacity (TIC)** | 20MW | 20MW | 20MW | 20MW |
| **Total Heat Contribution (THC)** | 2000GJ | 1500GJ | 1000GJ | 2000GJ |
| **Corrected RQM %** | 95% | 95% | 98% | 98% |
| **Monthly Gross Metered Output** | 200MWh | 200MWh | 150MWh | 150MWh |
| **Station Input (i.e. Aggregated Imported Input electricity)** | 50MWh | | | |

a) Imported Input electricity for CfD $= \{(\text{Station Input} \times (THC_{CfD}/THC_{station})\}$

$= (50 \times (3500/6500)$

$= 26.92\text{MWh}$

b) Percentage of imported input electricity$_{\text{CfD Unit}} = (THC_{\text{CfD Unit X}}/THC_{CfD})$

CfD Unit 1 = (2000/3500) = 0.57%

CfD Unit 2 = (1500/3500) = 0.43%

Therefore

Imported Input Electricity$_{\text{CfD Unit 1}}$ = (Imported input for CfD  % of CfD Unit 1)

= 26.92x0.57%

= 15.34MWh

Imported Input Electricity$_{\text{CfD Unit 2}}$ = (Imported input for CfD  % of CfD Heat Unit 2)

= 26.92x0.43%

= 11.58MWh

*CfD Unit 1*

c) Reconciled net Metered Output$_{\text{CfD Unit 1}}$ = (Agg. Gross net Metered Output $_{\text{CfD Unit 1}}$ – imported input$_{\text{CfD Unit 1}}$)

= (200)-15.34))

= 184.66MWh

d) Reconciled LAMO$_{\text{CfD Unit 1}}$ = Reconciled net Metered Output $_{\text{CfD Unit 1}}$ x TLM

= 184.66MWh x TLM

e) Reconciled Monthly LAMO$_{\text{CfD Unit 1}}$ = Reconciled LAMO$_{\text{CfD Unit 1}}$ x Corrected RQM

= (184.66MW x 0.95)

=  175.43MWh

NOW:

g) Reconciliation Payment$_{\text{CfD Unit 1}}$ = Reconciled Renewable Monthly LAMO$_{\text{CfD Unit 1}}$ – Agg. Monthly LAMO$_{\text{CfD Unit 1}}$

*CfD Unit 2*

h) Reconciled net Metered $Output_{CfD\ Unit\ 2}$ = (Agg. Gross net Metered $Output_{CfD\ Unit\ 2}$ – imported $input_{CfD\ Unit\ 2}$)

= (200)-11.58))

= 188.42MWh

i) Reconciled $LAMO_{CfD\ Unit\ 2}$ = Reconciled net Metered $Output_{CfD\ Unit\ 2}$ x TLM

= 188.42MWh x TLM

j) Reconciled Renewable Monthly LAMO = Reconciled LAMO x Corrected RQM

= 178.99MWh

NOW:

k) Reconciliation $Payment_{CfD\ Unit\ 2}$ = Reconciled Renewable Monthly $LAMO_{CfD\ Unit\ 2}$ – Agg. Monthly $LAMO_{CfD\ Unit\ 2}$

**Example 3:**

Where a Dual Scheme Facility has multiple CfD-accredited generating units under its CfD contract, but one CfD-accredited generating unit (making up its CfD-accredited capacity) is offline for the trading month, the imported input electricity will continue to be apportioned across the station based upon the proportion of Total Heat Contribution demanded by the CfD. However, in this example, only the online CfD generating unit will qualify as generating CfD capacity for that month (i.e. the offline generating unit will not generate and therefore it does not receive/pay difference payments).

| **Unit** | Unit 1 | Unit 2 | Unit 3 | Unit 4 |
|---|---|---|---|---|
| **Scheme** | CfD | CfD | RO | RO |
| **Total Installed Capacity (TIC)** | 20MW | 20MW | 20MW | 20MW |
| **Total Heat Contribution (THC)** | 0 | 1500GJ | 1000GJ | 2000GJ |
| **Corrected RQM %** | N/A | 95% | 98% | 98% |
| **Monthly Gross Metered Output** | 0 | 200MWh | 150MWh | 150MWh |
| **Station Input**<br>**(i.e. Aggregated Imported Input electricity)** | 50MWh | | | |

a) Imported Input electricity for CfD $= \{\text{Station Input} \times (THC_{CfD}/THC_{Station})\}$

$= (50 \times (1500/4500)$

$= 0.334$

$= 16.66\text{MWh}$

b) Reconciled net Metered $\text{Output}_{\text{CfD Unit 2}}$ = (Agg. Gross net Metered $\text{Output}_{\text{CfD Unit 2}}$ – imported $\text{input}_{\text{CfD Unit 2}}$)

$= (200\text{-}16.66)$

$= 183.34\text{MWh}$

c) Reconciled $LAMO_{CfD\ Unit\ 2}$ = Reconciled net Metered $Output_{CfD\ Unit\ 2}$ x TLM

= 183.34MWh x TLM

d) Reconciled Renewable Monthly LAMO = Reconciled LAMO x Corrected RQM

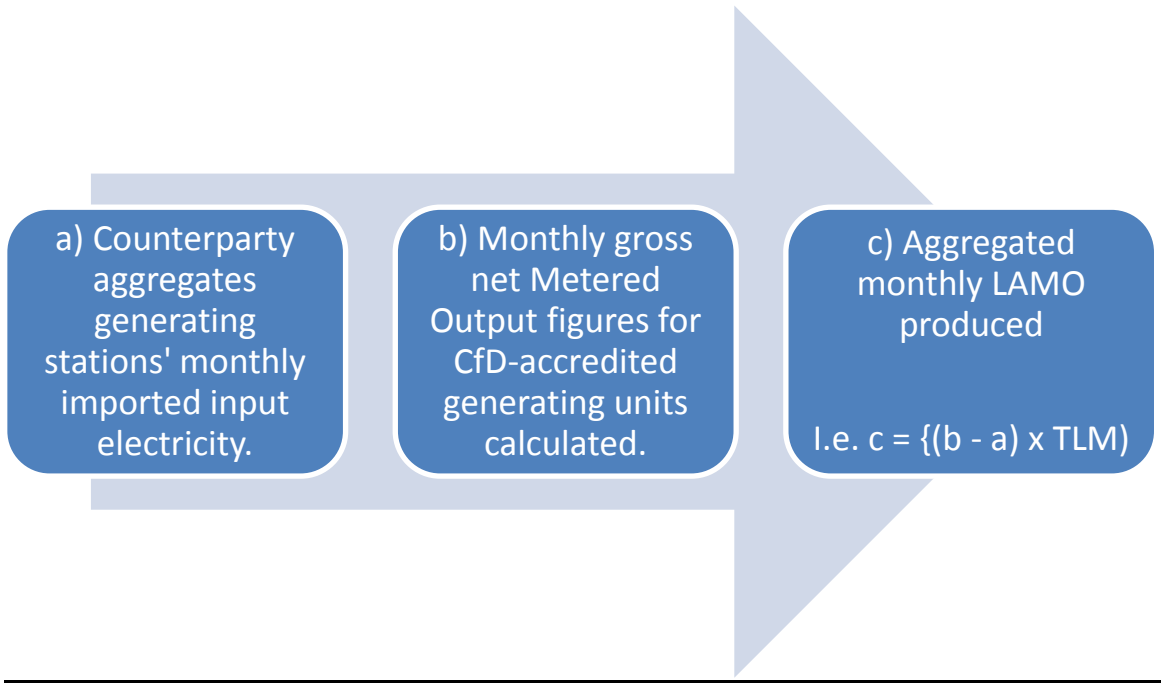
= 183.34 x 0.95

= 174.17MWh

NOW:

e) Reconciliation $Payment_{CfD\ Unit\ 2}$ = Reconciled Renewable Monthly $LAMO_{CfD\ Unit\ 2}$ – Agg. Daily Monthly $LAMO_{CfD\ Unit\ 2}$

**Annex 2: Flow Diagram of Metered Output Reconciliation Mechanism (Refer Paragraph 32)**



**Annex 3: Flow Diagram of FMS Reconciliation Mechanism (Refer Paragraph 32)**