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Public

Overview of Metering Assurance in the Capacity Market

21 February 2017

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Tushar Singh – EMR Delivery Body

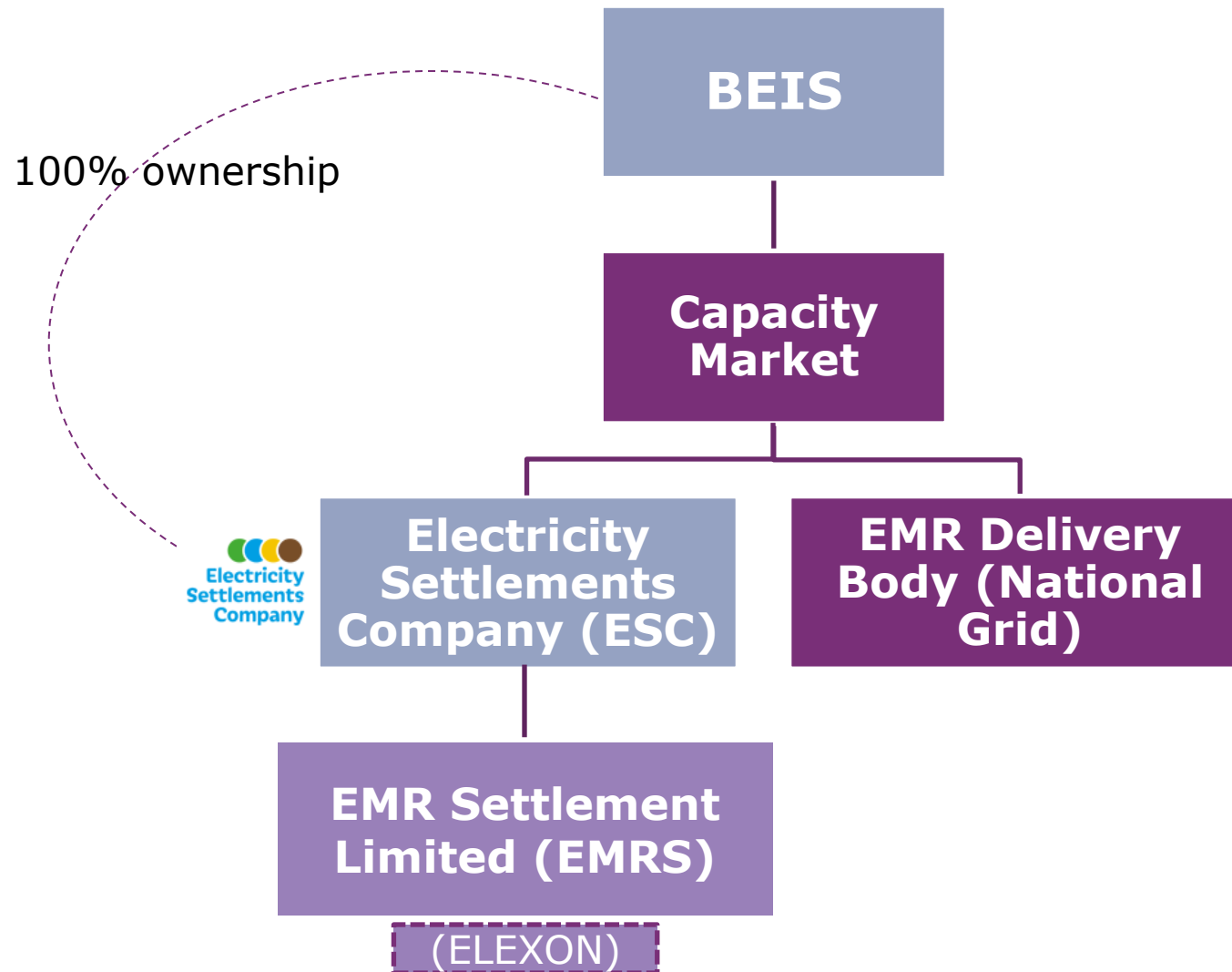
Joy Nnamani – EMRS

Matthew Johnson – ESC

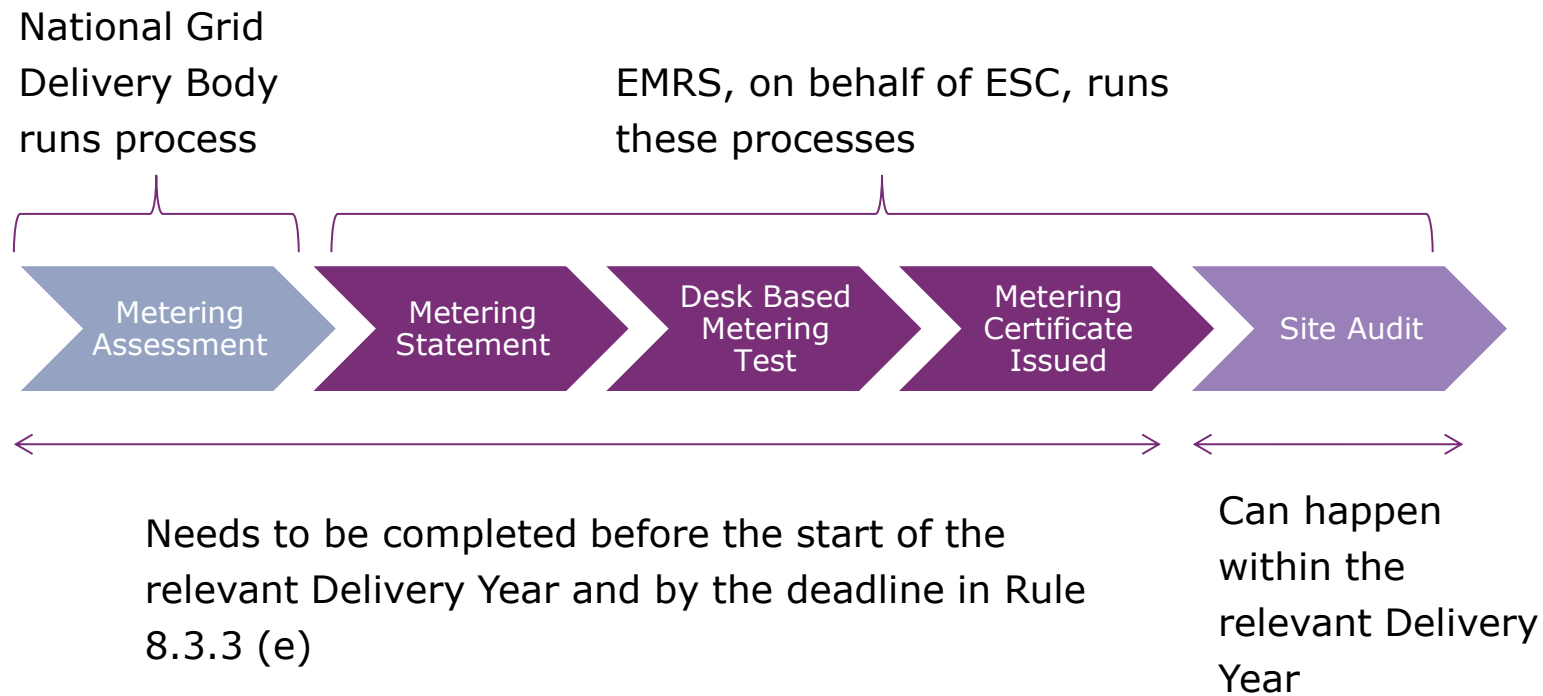
What we will cover today?

Topic	Presenter
Roles and responsibilities	Iain Nicoll
Metering Assessments	Tushar Singh
Break for questions	
Metering Tests Overview	Joy Nnamani
Metering Statements	Iain Nicoll
Break for questions	
Metering Tests – desk based	Joy Nnamani
Timelines and further information	Matthew Johnson
Questions	

Roles and responsibilities



Roles and responsibilities - Metering Assurance



Metering Configurations

	Relevant governing standards	Data Submission Method
Balancing Mechanism Unit (BMU)	BSC Section L and the applicable Code of Practice	EMRS receive all metered volumes from SAA.
Supplier Settlement (Non-BMU)	BSC Section L and the applicable Code of Practice	Capacity Provider informs supplier they are participating in Capacity Market and supplier instructs HH Data Aggregator (D0354) to send data flow (D0357) to EMRS.
Existing Balancing Services	Relevant Balancing Services Agreement	Capacity Provider or their appointed data collector submits metered data to EMRS in the defined file format.
Bespoke	Bespoke Technical Requirements Schedule 7 Capacity Market Rules 2015	Capacity Provider or their appointed data collector submits metered data to EMRS in the defined file format.



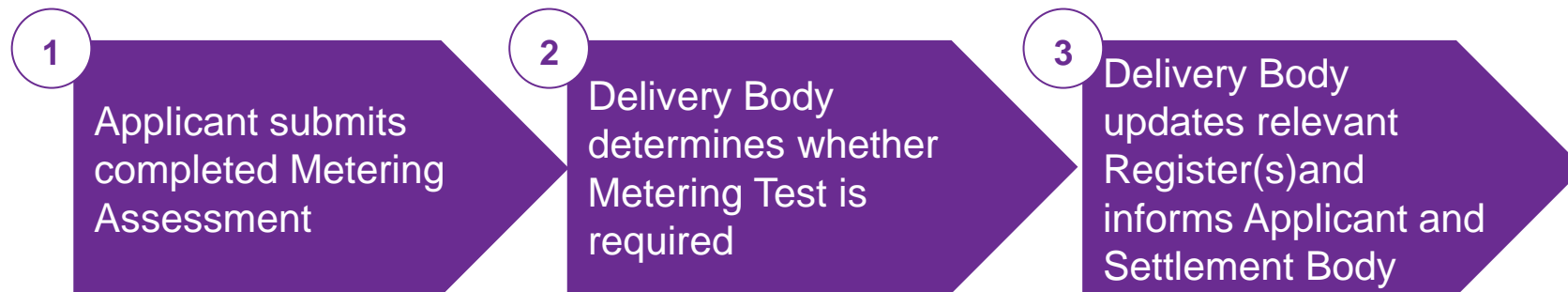
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Metering Assessments

What is a Metering Assessment?

- It is a questionnaire relating to the Metering arrangements for a CMU
 - with different questions for different CMU Types
 - completed offline for 2014 Auction and online for the rest
 - determines the requirement for a Metering Test
- Single Line Diagrams showing electrical configurations and metering sites at which the Generating Units or DSR Components are located
 - should also be provided within the same timescales

Metering Assessment Process Flow



Metering Assessment Deadlines

Auction	CMU Type	Deadline	CM Rule Reference	Channel
T-4 2018/19	Existing Generating and Proven DSR*	3 years prior to start of Delivery Year (1st Oct 2015)	Rule s 3.6.4 (b) & 3.9.4 (b)	N/A
	Prospective (New Build and Refurbishing)	Long Stop Date (1st Oct 2019 – New Builds and 1st Oct 2018 – Refurbishing)	Rule 8.3.3 (ba) (ii)	Offline
	Unproven DSR	Prior to Date falling 1 month prior to the start of the Delivery Year (31st Aug 2018)	Rule 3.10.2 (b)	
T-4 2019/20	Existing Generating & Interconnector and Proven DSR*	Prequalification 2015	Rule 3.6.4 (a) (ii) & 3.9.4 (a)(ii)	N/A
	Prospective (New Build and Refurbishing)	Long Stop Date (1st Oct 2020 – New Builds and 1st Oct 2019 – Refurbishing)	Rule 8.3.3 (ba)(ii)	Online
	Unproven DSR	Date falling 1 month prior to the start of the Delivery Year (31st Aug 2019)	Rule 3.10.2 (b)	
TA 2016/17	Existing Generating*	Prequalification 2015	Rule 3.6.4 (a) (ii)	N/A
	New Build Generating*	Long Stop Date (1st Oct 2016)	Rule 8.3.3 (ba)(ii)	
	Unproven DSR*	Date falling 1 month prior to the start of the Delivery Year (31st Aug 2016)	Rule 3.10.2 (b)	

*The deadline for completion of metering assessments has passed

Metering Assessment Deadlines

Auction	CMU Type	Deadline	CM Rule Reference	Channel
	Existing Generating & Interconnector and Proven DSR	3 years prior to start of Delivery Year (1st Oct 2017)	Rule s 3.6.4 (b) & 3.9.4 (b)	
T-4 2020/21	Prospective (New Build and Refurbishing)	Long Stop Date (1st Oct 2021 – New Builds and 1st Oct 2020 – Refurbishing)	Rule 8.3.3 (ba) (ii)	Online
	Unproven DSR	Prior to Date falling 1 month prior to the start of the Delivery Year (31st Aug 2020)	Rule 3.10.2 (b)	
EA 2017/18	Existing Generating & Interconnector and Proven DSR	Date falling 1 month after the auction (3rd Mar 2017)	Rules 3.6.4 (b)(iii) , 3.6A.3 (aa)(v), 3.9.4 (b)(iii) , 3.9.4 (b)(iii) & 8.3.3 (iii)	Online
	Prospective (New Build and Refurbishing)	Long Stop Date (1st Oct 2017)	Rule 8.3.3 (ba)(ii)	
	Unproven DSR	Date falling 1 month prior to the start of the Delivery Year (31st Aug 2017)	Rule 3.10.2 (b)	
TA 2017/18	Unproven DSR	Date falling 1 month prior to the start of the Delivery Year (31st Aug 2017)	Rule 3.10.2 (b)	Online

Key Metering Assessment Questions

1. Meter Location - Are the meters on the boundary with the Distribution Network (as opposed to embedded within the site)?

Yes	Metering Test is not required	✘
No	Metering Test is required	✔

2. Multiple Connections - Does the site have additional connections to the Distribution Network (other than the connection used by the CMU Component)?

Yes	Metering Test is required	✔
No	Metering Test is not required	✘

3. Generating Units with associated load - Is there other load or generation on site (other than the CMU generating units and their associated demand)?

4. Proposed Metering Option - This indicates which of the three metering pathways is to be used to monitor the performance of the proposed CMU component should it be awarded a capacity obligation.

Option (a)	Metering Test is not required	✔
Option (b)	Metering Test is required	✘
Option (c)	Metering Test is required	✘



Guidance Document:

<https://www.emrdeliverybody.com/SiteAssets/Lists/Latest%20News/NewForm/Metering%20Guidance%20Document%20Final.pdf>

Latest Capacity Market Rules:

[https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/538235/Informal consolidation of Capacity Market Rules July 2016.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/538235/Informal%20consolidation%20of%20Capacity%20Market%20Rules%20July%202016.pdf)

- Metering Assessment Guidance is available on the portal covering
 - How to complete offline metering assessments?
 - How to complete metering assessments on the EMR portal?
 - Deadlines for different CMU types and auctions



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Break for questions



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Metering Test Overview

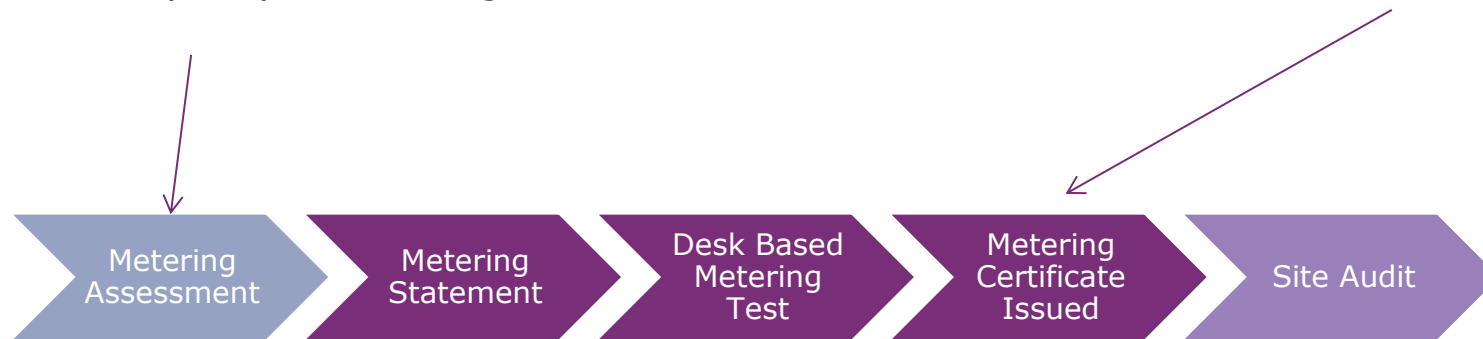
What is the purpose of a Metering Test?

- To determine whether or not the metering arrangements comprised in a CMU constitutes an **Approved Metering Solution**.
- The main objectives of the Metering Test are to determine:
 - **compliance** with the relevant governing documents and the Capacity Market Rules
 - whether the **Net Output** is metered for a Generating Unit or
 - whether all **import or export of electricity to or from** a DSR CMU Component is metered
 - the **overall accuracy** for the Metering System
 - **how data** is being sent from the Meter to the EMR Settlement System (in Half Hour Settlement period format)

How do I know I need a Metering Test?

The outcome of the Metering Assessment determines the CMU or CMU Components that require to undertake a Metering Test. It will be confirmed on the Capacity Market Register.

If the Metering Test is passed EMRS will issue a Metering Test Certificate for the CMU to the Capacity Provider



Capacity Provider has to complete a Metering Statement for every CMU or CMU Component that has to undertake a Metering Test

What is it being tested against?

- The relevant governing standards for Approved Metering Solutions

BSC Metering

- Codes of Practice (CoP)
- Alpha CoPs
- At time of Registration for Settlement

Balancing Services Metering

- Relevant Balancing Services Agreement
 - Short Term Operating Reserve (STOR)
 - Frequency Control by Demand Management (FCDM)
 - Firm Frequency Response (FFR)

Bespoke Metering

- Bespoke Technical Requirements
- Schedule 7 Capacity Market Rules 2015

How long is the Metering Test Certificate valid for?

- A Metering Test Certificate will be **valid in subsequent** Capacity Auctions.
 - As long as the Metering Configuration Solution for the CMU **hasn't changed** (e.g. from Bespoke Solution to Supplier Settlement Solution). If so, a **new Metering Assessment** will need to be completed.
 - Prior to any change** the Capacity Provider must inform National Grid and ESC
- Where a Site Audit has identified a **non-compliance** the Metering Test Certificate can be invalidated



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Metering Statement

Metering System Information

- The Metering Statement is specified in **Schedule 6 of the CM Rules** <https://www.gov.uk/government/publications/capacity-market-rules>
 - CMU and Metering System details
 - Technical Specifications
 - Equipment certificates (e.g. meters, measurement transformers)
 - Commissioning evidence (e.g. proving measurement transformer ratios applied correctly)
 - Data Provision

Not all parts of Schedule 6 will be applicable to every Metering System (e.g. Power Transformer test certificates are only applicable to BSC Metering Systems where the actual metering point isn't at the defined metering point)

What have been the common problems?

1. Metering Technical Details
2. CSV files for Bespoke and Balancing Services Metering Systems
3. Evidence of the ratio, accuracy class and rated burden of the Measurement Transformers
4. Commissioning test results for the meters
5. Proving test results for the meter
6. Commissioning test results for the Measurement Transformers
7. Demonstrating the Overall Accuracy of the Metering System is within allowed limits

1. Meter Technical Details

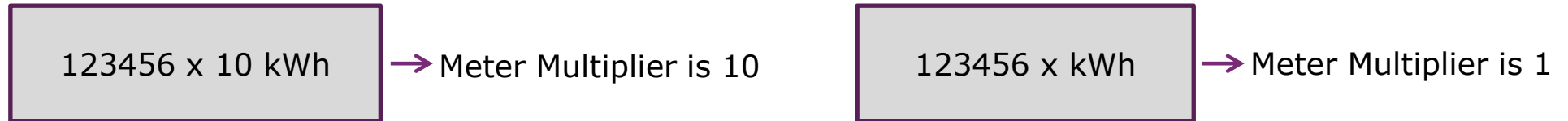
- **Meter Serial Numbers** - This should include the Main and the Check Meters (where applicable)
- **Outstation ID** – This is dependant on the Meter type. Typically can be:
 - The **Meter serial number** where that is the reference used by the Data Collector to address the Meter during dial up
 - A **PIN number** configured in the Meter where that is the reference used by the Data Collector to address the Meter during dial up (e.g. 001)
 - Where the Meter is not dialled remotely and pulse outputs are used it will be the **Meter serial number**
 - Where a separate Outstation to the Meter is used in the BSC the separate Outstation may use the **serial number or a PIN number**

1. Meter Technical Details

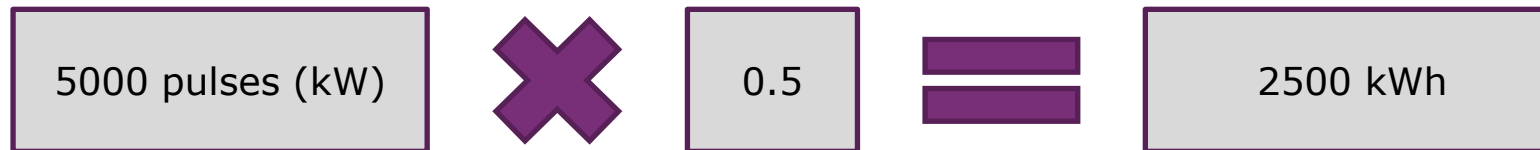
- **Number of Channels** - This is the number of channels **configured in the Meter** and not just those used in the Capacity Market
 - If the Meter is setup for Active Import, Active Export, Reactive Import and Reactive Export the number of channels would be 4
- **Measurement Quantity ID** – the number of these should **match** the number of channels setup in the Meter. Typically these can be:
 - Active Energy Import AI / Active Energy Export AE
 - Reactive Energy Import RI / Reactive Energy Export RE
 - Reactive Import associated with Active Import Q1 / Reactive Export associated with Active Export Q2 / Reactive Import associated with Active Export Q3 / Reactive Export associated with Active Import Q4

1. Meter Technical Details

- **Meter Multiplier** - This is the multiplier on the cumulative register displayed on the Meter



- **Pulse Multiplier** - This is any multiplier applied to Half Hourly data to convert to energy (i.e. kWh or MWh)

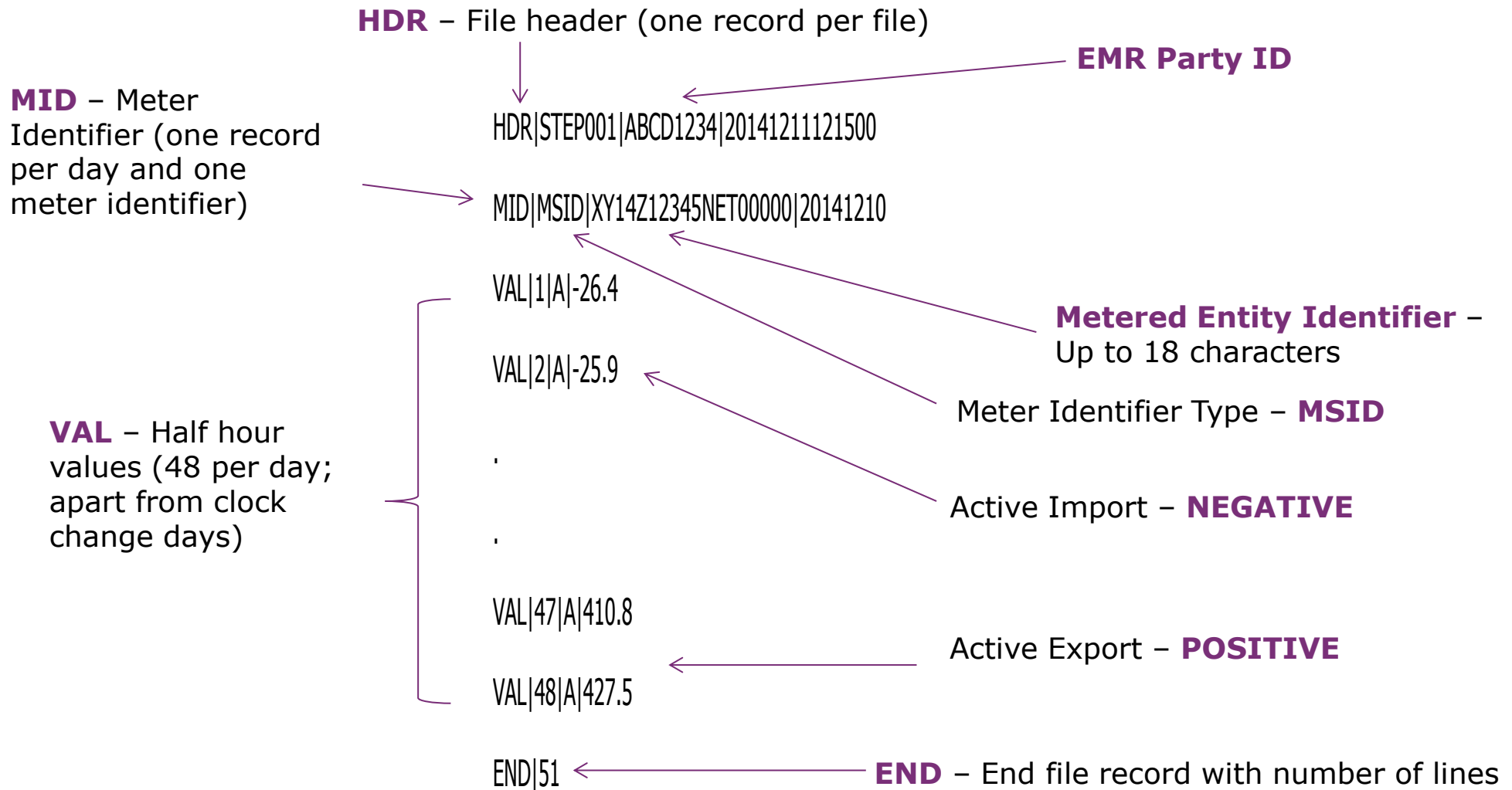


Pulse Multiplier is 0.5

2. CSV files

- If a Capacity Provider needs to submit data using a non-settlement process (i.e. for Balancing Services or Bespoke):
 - Use a **defined CSV format** and submit over **SFTP**
 - Part of the CSV file header includes the **EMR Party ID**. A Capacity Provider has to register with EMRS to receive their EMR Party ID.
 - This CSV file should be from the **date of the Meter commissioning** and **Proving Tests** for the Metering Test to confirm the data in the CSV file.

2. CSV format



3. Measurement Transformer Evidence

- Evidence needs to demonstrate the **ratio, accuracy class and rated burden** of the installed Measurement Transformers
- This can be a manufacturers test certificate or a photograph of the rating plate



4. Commissioning

- The Metering Statement has to demonstrate the Metering System has been **Commissioned** and is measuring primary energy **accurately**.
- It is split into two parts:

Part 1 - Meter	Part 2 - Measurement Transformers
<ul style="list-style-type: none">• Part 1a - Meter Commissioning• Part 1b - Meter Proving	

Where the Meter is direct connected, or whole current, the Meter measures primary energy directly and there are no Measurement Transformers. In this instance only the Meter commissioning/Proving Test evidence needs to be submitted.

4. Commissioning – Meter

- Metering Commissioning will typically confirm
 - **Accuracy** (e.g. measurements of V, I, W, VAr, VA and an accuracy test)
 - **Phase rotation**
 - **No alarms**
 - **Programmed ratios** (if applicable)
 - **Independent Primary values** (e.g. kV, A, kW)
- Where the original Meter Commissioning and Proving Test results are unavailable they must be redone.
- For any CMU that is submitting data through a non-settlement process a CSV file must be submitted for the day the commissioning/Proving Tests are being carried out.
- Commissioning and Proving Tests should ideally be done at the **same time** so prevailing load and Half Hourly data can be compared

5. Commissioning - Proving Test

- The purpose of the Proving Test is to demonstrate that energy recorded by the meter over a 30 minute period can be submitted to EMRS
- Does the Half Hourly advance match?

- Take a Meter reading

11:00 000027 kWh

- Take another Meter reading

11:30 000394 kWh

- What is the increase?

Advance 367 kWh

How do we know it is accurate?

Compare with commissioning evidence

- Check half hourly data matches

Independent Primary Indication

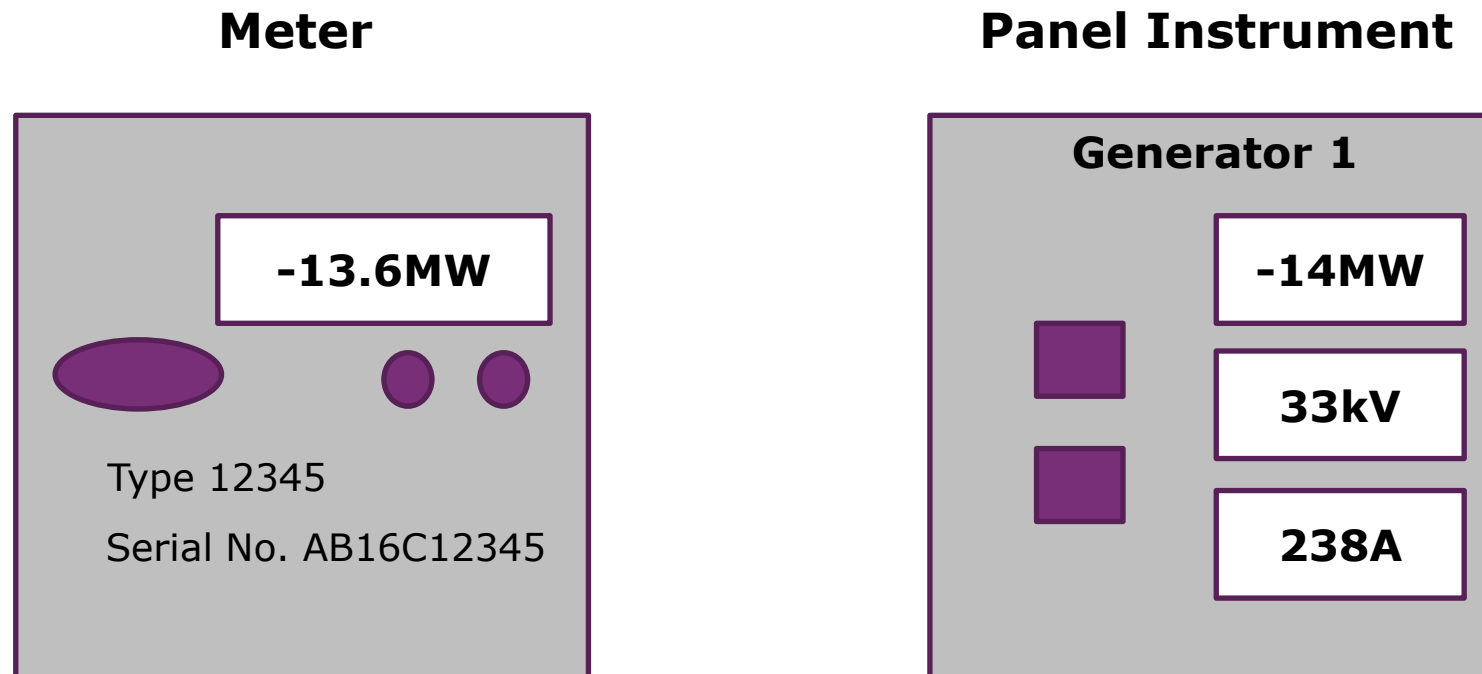
V	11	kV
I	38	A
P	724	kW
PF	1.00	

6. Commissioning - Measurement Transformers

- The Measurement Transformers should have had **primary injection testing** carried out to prove their ratio and polarity.
- Where the original test results are unavailable, there are agreed options with ESC/EMRS to provide alternative evidence to determine that primary energy is being recorded correctly.
- The options can be broadly described in three areas:
 - i. Comparison with an independent Metering System; **OR**
 - ii. Comparison of a primary and secondary measurement; **OR**
 - iii. Prove the programmed ratio in the meter.
- Capacity Providers **should agree with EMRS in advance** the alternative option to be used and the evidence to be submitted.

6. Example of the Comparison Option

- Compare instantaneous parameters on the Meter to an independent primary instrument (e.g. substation protection and instrumentation panel).



The panel instrument is connected to protection CTs and VTs

7. Overall Accuracy

- The Metering System must be within the Overall Accuracy limit specified by relevant governing document
- If the Capacity Provider only provides photographs of the CT/VT rating plates and the meter certificate of conformity:
 - CT Accuracy Class 0.5
 - VT Accuracy Class 1.0
 - Meter Accuracy Class 1.0
- Individually they all meet the requirements for a Type 3 Bespoke site
- The Overall Accuracy calculation uses the **worst case** scenario



- The overall accuracy limits for a Type 3 Bespoke site are $\pm 1.5\%$ and the CMU would fail the Metering Test



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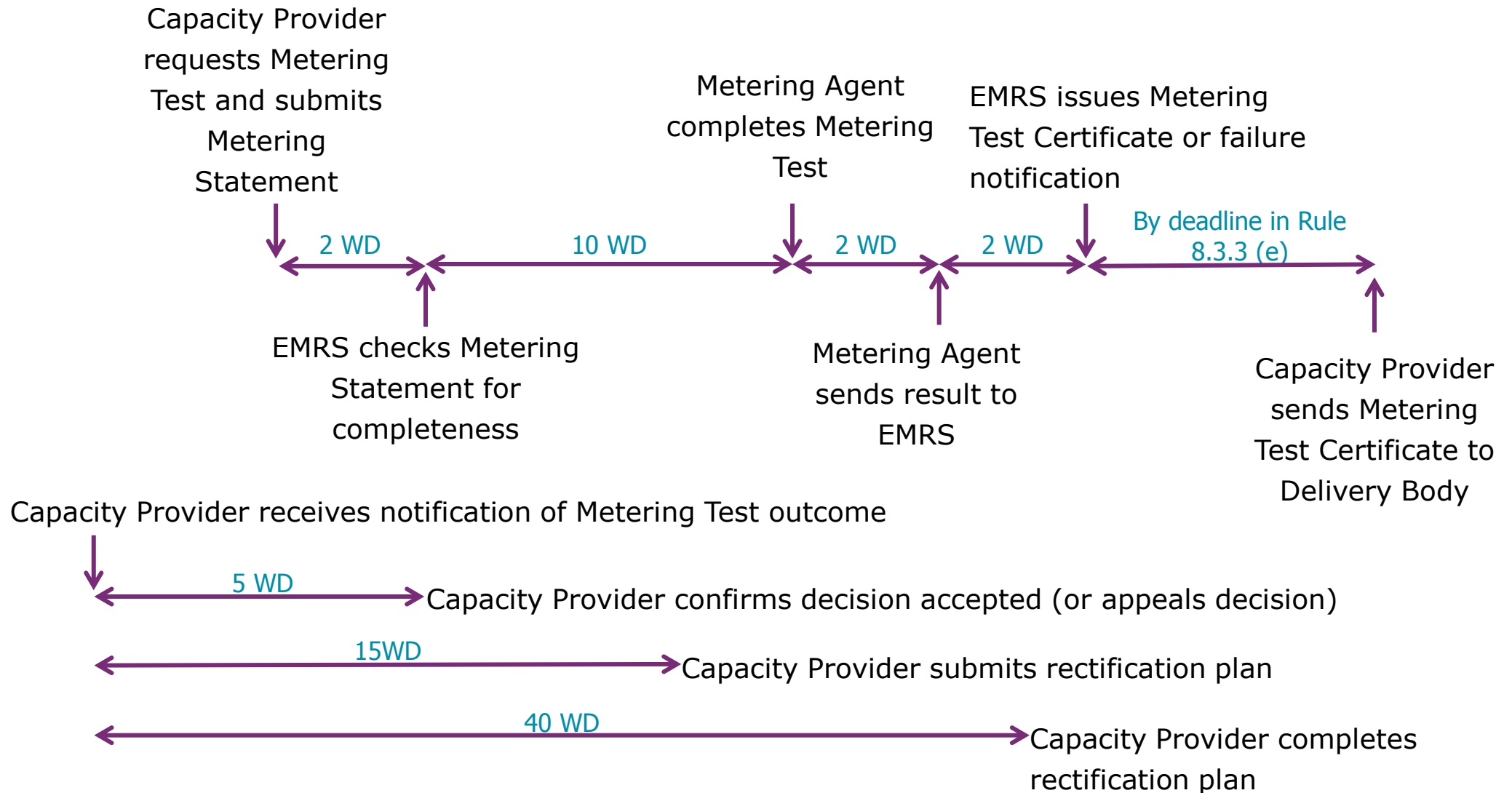
Metering Test

Starting the process

- Submit a **Metering Test request and a Metering Statement** to EMRS at contact@emrsettlement.co.uk for **all Components** that have triggered a Metering Test.
 - Must include **details on all Components and Metering Configuration Solutions** used (and what Balancing Services Agreement e.g. STOR)

Component ID	Metering Configuration Solution	Metering System Identifiers	Metering Test Required	Metering Statement Required
Component 1	Supplier Settlement	All MPANs	No	No
Component 2	Supplier Settlement	All MPANs	No	No
Component 3	Supplier Settlement	All MPANs	No	No
Component 4	Balancing Services	All Metered Entity IDs	Yes	Yes
Component 5	Bespoke	All Metered Entity IDs	Yes	Yes

Metering Test Timeline



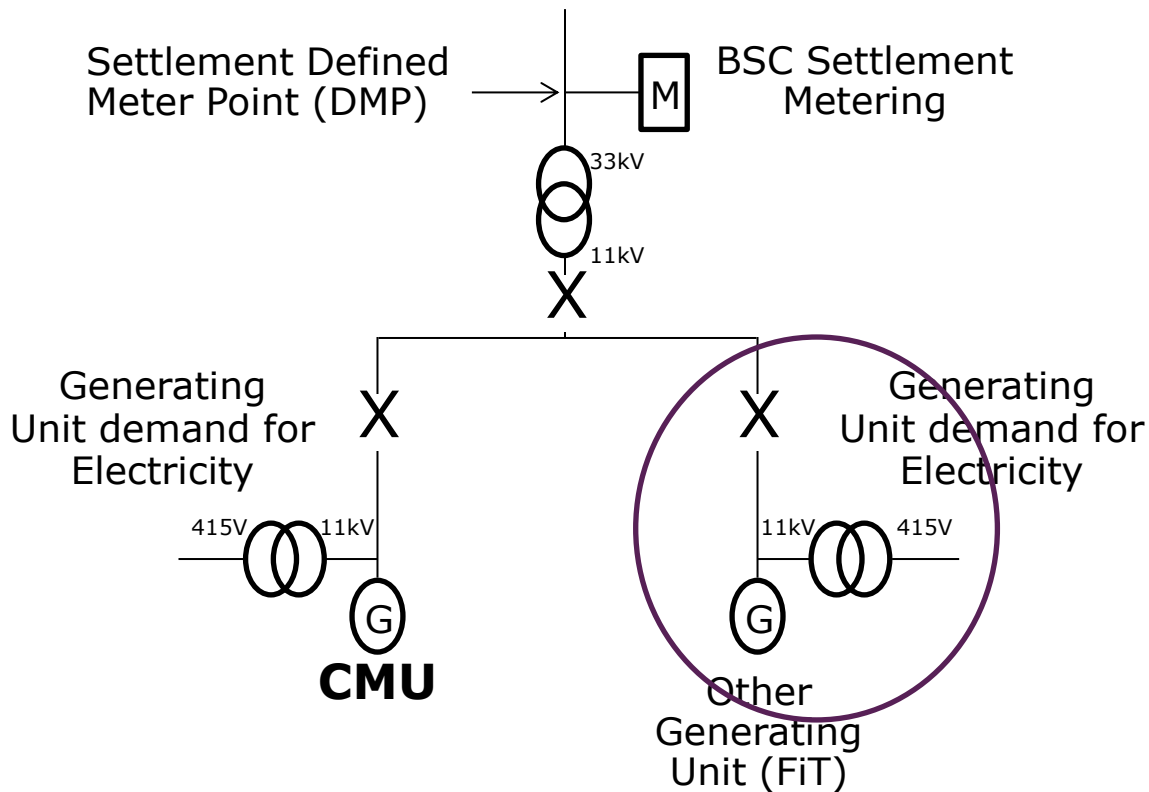
What will happen during the Metering Test?

- Check the **Metering Statement** is fully completed
- Check Metering System **compliance** against relevant governing documents and Capacity Market Rules
- Check from the line diagram that the Meter Point(s) measure
 - **Net Output** for a Generating Unit; **OR**
 - all **import or export of electricity to or from** a DSR CMU Component
- Determine the **overall accuracy** of the Metering System
- Check that the Metering System has been **commissioned**
- Check the method the Capacity Provider is using to **submit Metered Volumes** to EMRS

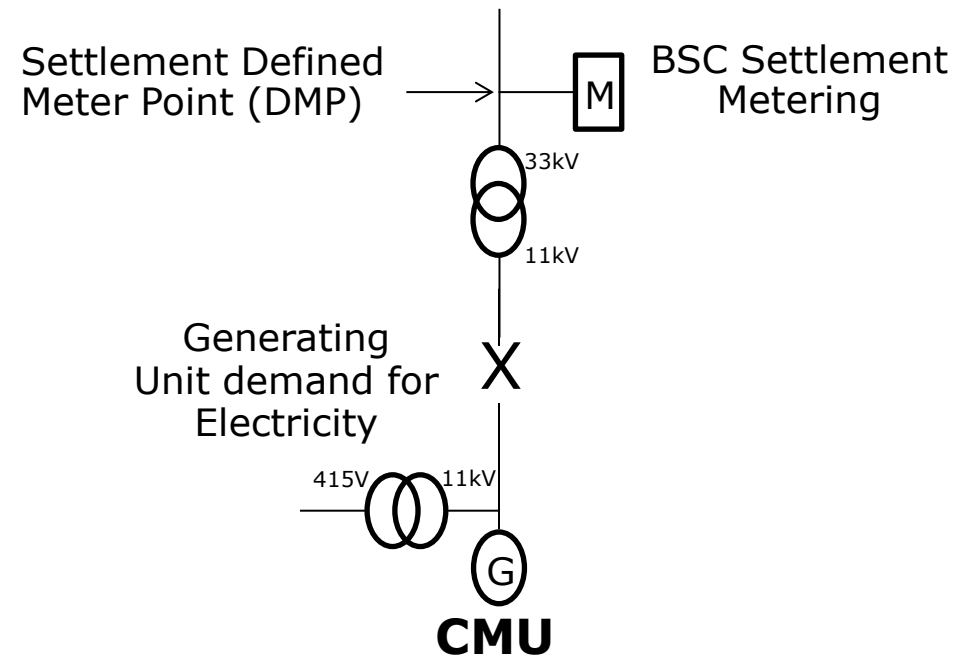


How do we check net output from the line diagram?

Compliant ❌



Compliant ✅



Why non-compliant? Other ineligible generation on site



Data Submission Checks

- The method the Capacity Provider is using to submit Metered Volumes to EMRS will be checked.
 - Option 1: Through a settlement process (BMU or MPAN)
 - Option 2: Through a non-settlement process (Bespoke and Balancing Services Meters)
 - Where a non-settlement process is used (i.e. a CSV file submitted via SFTP) an example should be provided as part of the Metering Statement.
 - This CSV file should be from the date of the meter commissioning and proving tests for the Metering Test to confirm the data in the CSV file.



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Timescales

When do I have to complete my Metering Test?

- Depends on Type of CMU and Auction (Rule 8.3.3 (e))

Auction	CMU Type	Deadline	Upcoming Deadline	ESC Submission Deadline ²
T-4	Existing CMU or Proven DSR	18 months prior to start of 1st Delivery Year	T-4 2014 - 31 March 2017	31 January 2017
T-1 (TA)	Existing CMU or Proven DSR	1 month prior to start of 1st Delivery Year	EA 2017 TA 2016 - 31 August 2017	1 June 2017
Any	Unproven DSR	1 month prior to start of relevant Delivery Year	EA 2017 TA 2016 - 31 August 2017	1 June 2017
Any	Prospective CMU	By the Long Stop Date ¹		

¹ The Long Stop Date is different depending on whether the CMU is New Build or Refurbishing. In the case of a Refurbishing CMU it is the date falling at the start of the Delivery Year and for a New Build CMU it is the date falling 12 months after the start of the first scheduled Delivery Year

² Any requests received after this date cannot be guaranteed to be completed in time.

Advice

- Any retesting driven by rectification / resubmissions must be completed within the given timescales.
- ESC encourages Capacity Providers to submit Metering Test requests / Metering Statements to EMRS ASAP.
- Metering Test requests / statements should be of a high standard to ensure efficient use of Metering Test resources. Effort spent failing tests is effort that could be used to pass tests.
- If a Capacity Provider expects to withdraw from the CM process it would be appreciated if they inform ESC/EMRS so resources can be reallocated as required.
- Any Capacity Provider who is unable to present a Metering Test Certificate to the Delivery Body by the relevant deadline will face termination.

Any questions?

- Metering Assessment Queries
 - emr@nationalgrid.com
 - 019 2665 5300
- Website:
<https://www.emrdeliverybody.com/cm/home.aspx>
- Request a Metering Test
 - contact@emrsettlement.co.uk
 - 020 7380 4333
- Metering Test Queries
 - metering@emrsettlement.co.uk
- Website:
<http://emrsettlement.co.uk/>

Reference Documents

- **EMRS registration Process**

- WP22 – Applicant and Capacity Provider Registration

- **Submission of data**

- WP195 – Capacity Market and CFD Metered Data

- **Metering Test**

- WP196 – CM Metering Technical Assurance
- WP197 – Capacity Market Metering Test
- G1 – Capacity Market Metering

- **Metering Statement**

- G20 – Metering Statement Guidance

All documents can be found on the publications section of the EMR Settlement Website.





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