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MP122 ‘Operational Metrics’

Business requirements – version 1.0

About this document

This document contains the business requirements that support the solution for this Modification Proposal. It sets out the operational metrics for which the DCC is expected to provide following the Operations Group Operational Metrics Review (OMR). The DCC will use this information to provide an assessment of the requirements that help shape the complete solution.

The DCC must confirm for each requirement if there are any impacts on the DCC Systems and would therefore require a Preliminary Assessment and Impact Assessment be undertaken. Any that do not impact the DCC Systems may subsequently be raised under a separate Modification Proposal so that they can follow their own implementation plan.

The DCC is expected to advise if any of the metrics outlined in this document can be grouped, irrespective of the requirement they fall under. This is to ensure the optimal development and implementation approach for each metric.

If a manual mechanism of the proposed solution can be delivered to enable the DCC to implement these changes on or before 1 April 2021, the DCC is requested to investigate this and advise in its Preliminary Assessment. Any automated mechanisms could then be implemented at a later date, as and when they are ready.

1. Business requirements

This section contains the functional business requirements. Based on these requirements a full solution will be developed.

Business Requirements	
Ref.	Requirement
1	The DCC will report and measure monthly service performance for User business processes using Service Reference Variants (SRVs)
2	The DCC shall add specific outcome-based measures to the PMR to provide a Measure of performance as well as Indicators on the success of the key business processes
3	The DCC will measure end to end service availability across the DCC environment and report this by Communication Services Provider (CSP) region
4	The DCC shall reduce the time it takes to create the Performance Measurement Report (PMR) to within 10 Working Days from the end of the measurement reporting period
5	In relation to Code Performance Measure (CPM) 5, the DCC will improve transparency in the reporting provided for incident Categories 3, 4 and 5

Solution Options					
Option	Req. 1	Req. 2	Req. 3	Req. 4	Req. 5
Option 1	✓				
Option 2		✓			
Option 3			✓		
Option 4				✓	
Option 5					✓
Option 6	✓	✓	✓	✓	✓

2. Considerations and assumptions

This section contains the considerations and assumptions for each business requirement.

2.1 Definitions

Definitions	
Term	Definition
Measure	A “Measure” is something that the DCC is responsible for providing a level of service for, and against which targets for DCC performance can be set.
Indicator	An “Indicator” is something the DCC is not accountable for but that provides a KPI that may be of value or use to the industry but cannot have a target attributed to it.

2.2 General

The following requirements are based upon the recommendations made by the OMR, specifically the recommendations that require modifications to the Smart Energy Code (SEC).

It is not certain which, if any of these, will require DCC System changes.

More information on each of these requirements can be found in the following sections of the OMR:

Business requirement and OMR cross referencing	
Business requirement	OMR Section
Req. 1	3.3
Req. 2	3.4
Req. 3	3.5
Req. 4	4.7
Req. 5	4.2

2.3 Requirement 1: The DCC will report and measure monthly service performance for User business processes using SRVs

Rate, Speed, Volume and Payload (RSVP) will be used as an indicator of performance for identified key User business processes. The RSVP metric will measure the relevant SRVs, service responses, acknowledgements and Alerts processing times within the DCC Total Systems.

2.3.1 RSVP definitions

Each measurement of RSVP is defined as follows:

Definitions	
Term	Definition
Rate	The sample period over which the performance is measured. For the purposes of the PMR the rate will be either daily or monthly. A daily measure provides the level of granularity required to capture service degradation or outages that impact a User's business process. A monthly measure will provide a higher-level executive view of service performance.
Speed	A measure of the Round Trip Time (RTT) for an SRV or group of SRVs measured within the rate period. The RTT is measured from receipt of the SRV from the User, to sending a Service Response to the User, and includes time spent within the HAN. Speed should be measured as an average (mean) as well as a median, as an average can be skewed by extremely large or small values. The OMR acknowledges that measuring RTT excluding the HAN would provide a more useful measure of DCC performance but introduces a number of challenges as this is not currently a technical capability of the system. However, an interim solution would be to calculate a response time using the CSP test message average response time, added to the DSP measured response time for the SRV. This time should be reported and plotted alongside the RTT. This solution is dependent on the CSP test message issues raised in section 3.2.5 of the OMR being addressed.
Volume	The total number of Service Requests or group of SRVs processed by the DCC Total System within the period.
Payload	The success or failure of the Service Request within the period. A failure is recorded when a Service Response contains an Error Response Code relating to a communications failure or timeout (E20 ¹ or E21 ²), or a subsequent failure alert code (N12 ³ or N13 ⁴).

2.3.2 Business processes and applicable SRVs

The performance of a business process will depend on whether the SRV relates to a Smart Metering Equipment Specifications (SMETS)1 or SMETS2+ Device and should therefore be reported on separately. Not all SRVs are applicable for SMETS1 and these are marked within the table as (n/a).

¹ Communications Failure – Unable to Communicate with Device

² Communications Failure – No Response Received from Device

³ Failure to deliver Command to Device

⁴ Failure to receive Response from Device

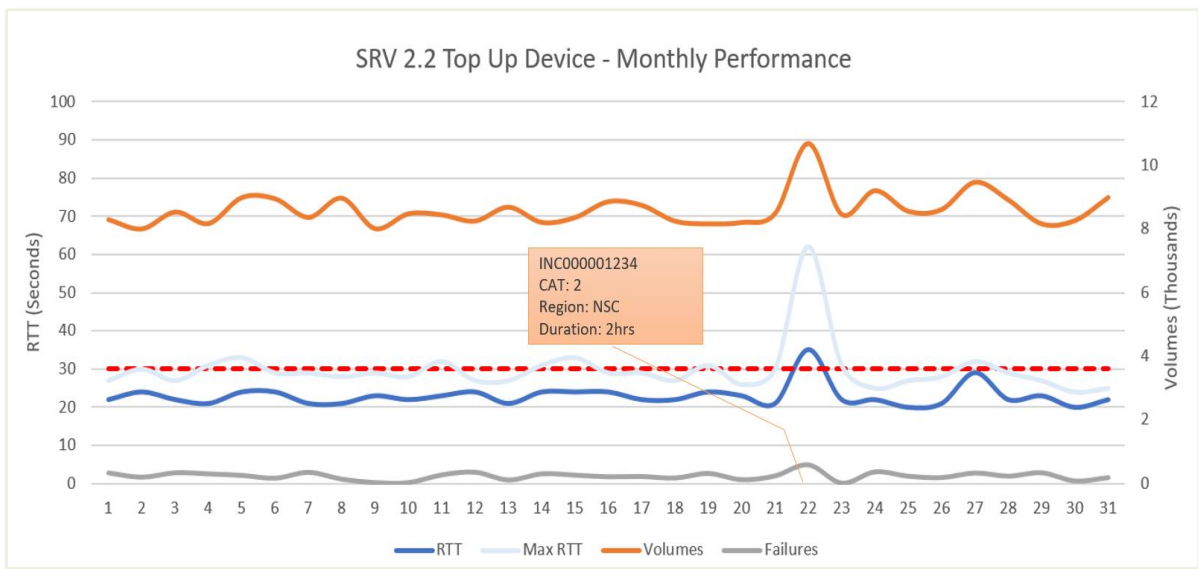
Table 1: Business processes and Applicable SRVs	
Business Process	Common Service Reference Variants
Install and Commission ESME GSME CH	SR8.11 'Update HAN Device Log' SR6.21 'Request Handover of DCC Controlled Device' (Update Supplier Certificates) (n/a) SR8.1.1 'Commission Device SR' SR8.7.2. 'Join Service' (Join GPF with GSME) SR6.20.1 'Set Device Configuration' (Import MPxN) (n/a) SR1.1.1 'Update Import Tariff' (Primary Element) SR6.8 'Update Device Configuration' (Billing Calendar) SR8.14.1 'Communications Hub Status Update Install Success' (n/a)
Change of Supplier (Gain)	SR6.23 'Updated Supplier Security Certificate Credentials Supplier Certificates' SR1.1.1 'Updated Import Tariff' (Primary Element) SR6.8 'Update Device Configuration' (Billing Calendar)
Change of Tenancy	SR3.2. Restrict Access for Change of Tenancy SR3.5. Disable Privacy PIN SR1.1.1. Update Import Tariff (Primary Element) – Update Tariff & Price SR1.6. Update Payment Mode
Tariff Updates ESME GSME	SR1.1.1 'Update Import Tariff' (Primary Element)
Pre-Payment Top Up Device Remotely	SR2.2 'Top Up Device' (Update Balance with positive value)
Security and Key Management Device Certificate Update	SR6.15.2 'Update Security Credential' (Device) – Credential Type = Digital Signature (n/a) SR6.15.2 'Update Security Credential' (Device) – Credential Type = Key Agreement Key (n/a)
In Life Device Management Update Device Change of Mode CR – PP Update Firmware Activate Firmware	SR2.1 'Update Prepay Configuration' SR1.6 'Update Payment Mode' (Payment Mode = Prepayment) SR1.1.1 'Update Import Tariff' (Primary Element) SR11.1 'Update Firmware'. Note: In respect of SMETS2+ Devices the DCC must ensure that the associated firmware update has been delivered to all relevant Communications Hub Functions within 5 days of receipt of the Service Request. SR11.3 'Activate Firmware' (Individual SR for each GUID for firmware activation). Note: SMETS1 5day Target Response Time (TRT).
Logistics CH Ordering and Returns	SR8.14.3. – Communications Hub Status Update – Fault Return (n/a) SR8.14.4. – Communications Hub Status Update – No Fault Return
Distribution Networks Post I&C Activity	SR6.15.1 'Update Security Credentials' (Update Network Operator Certificates) SR 6.5 'Update Device Configuration' (Voltage) SR6.22 'Configure Alert Behaviour' (Update ENO Alter Configuration) (n/a)
Alerts Management	AD1 Power Outage Event 8F35 Supply Outage Restored 8F36 Supply Outage Restored – Outage >= 3 minutes

2.3.3 RSVP Data representation of SRVs

The RSVP metric shall be reported within the PMR and plotted using a line graph representation with daily data points:

- The x-axis will indicate the day of the month and the y-axis shows response time and volumes.
- Data points are plotted for the SRV daily average RTT, volume of daily requests and daily request failures.
- The average monthly RTT for the SRV or group of SRVs is provided to give a reference point and indicate whether daily response times are above or below the monthly average.

This is shown as a dotted red line on the example provided below:



The SRVs in table 1 above shall also be reported at a monthly level to provide a summary of performance over the period. The summary will calculate performance of identified SRVs to provide a representative metric for the service for the business process. The summary will include both Indicators and Measures as defined below. The measures are to be reported for SMETS1 and by region for SMETS2+ devices.

2.3.4 Monthly PMR metrics

The following monthly metrics are to be recorded and reported within the PMR:

- An Indicator of the Monthly Average (Mean) and Median RTT including time spent within the Home Area Network (HAN). The Median is recommended because, when compared to the average/mean, this measure is less likely to be skewed by extremely large or small numbers and therefore provides a better idea of the typical response time.
- An Indicator of the range of RTT values measured within the month to show the longest and slowest response time recorded.
- A Measure of the percentage of responses delivered within the Target Response Time is calculated by including the response time for all Service Requests that compose a business process. For example, the Install and Commission process will be represented by the seven common SRVs that make up the SMETS2 Install and Commission process for Electricity

Smart Metering Equipment (ESME) Devices. In the case of Install and Commission, the TRT target should also be provided for Gas Smart Metering Equipment (GSME) Devices. The TRT has the meaning given to that expression in SEC Section H3.14 'Target Response Times'. Targets are those defined in SEC Appendix E 'DCC User Interface Services Schedule'.

- An indicator of the total number (volume) of SRV requests recorded for the period.
- An Indicator of the percentage of SRVs that failed to be delivered due to a communications failure or timeout (E20 or E21) or a subsequent failure alert code (N12 or N13).

An illustrative example of these measures is shown in table 2 below:

Table 2: Prepayment – Top Up Device Remotely				
Monthly Performance Measure	Region A	Region B	Region C	SMETS1
Average RTT	29	15	33	12
Median RTT	26	15	35	11
Range (Shortest)(Longest)	(4)(200)	(1)(20)	(20)(49)	(10)(20)
Percentage of Service Responses delivered within the Target Response Time	97%	99%	95%	99%
Volumes	100K	90K	110K	5K
Percentage of Service Requests that failed to be delivered	2%	9%	4%	10%

2.4 Requirement 2: The DCC shall add specific outcome-based measures to the PMR to provide a Measure of performance as well as Indicators on the success of the key business processes

The following section defines a set of Measures and Indicators for each of the identified business processes.

These metrics are to be made available to Users in addition to the RSVP metrics defined within the previous section 'requirement 1'. The column labelled "M/I" indicates whether the definition is for a Measure or an Indicator.

2.4.1 Install and Commission

Install and Commission metrics			
ID	Requirement	M/I	Definition
IC1	Provide a greater level of visibility for the time taken for the DCC Total System for the install and commission process. Note: Install and Commission is a complex process and is orchestrated differently by each User making measurement of the end-to-end process challenging.	M	Measure the Response Times of the common Service Requests and report the percentage that failed to meet the Target Response Times.
		I	Measure daily total volume of successful and failed meter installations broken down by CH/ESME/GSME and Region.
		I	Provide information on the total number of installs for the period against the predicted number of installs. The predicted installations will be based on historic DCC recorded installation volumes data and therefore may only be used for informational purposes.
		I	Provide information on the number of Install and Commission verses Install and Leave.
IC2	Provide information on the impact of service degradation and outage on the User.	I	The DCC uses predictive modelling techniques to record and predict behaviour of meter installations in near real-time. The deviation from the norm provides a good indicator of degradation in service and the volume of messages provides a proxy measure of impact on Users. In addition, Sev1 and Sev2 incident data can be combined to provide a more accurate reflection of the User's experience.

2.4.2 Change of Supplier

Change of Supplier metrics			
ID	Requirement	M/I	Definition
CoS1	Provide a measure of the success of the Change of Supplier Process.	M	Measure the percentage of successful SRV6.23 SRVs delivered. Where the response erroneously reports a failure, the presence of subsequent critical and non-critical SRs sent by the gaining supplier will be used as an indicator of success.
		I	Provide the measure above by device type and region.
		I	Provide information on the reason for failure e.g. where a CoS database becomes unavailable or other Service Provider issue materialises.

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2.4.3 Billing

Billing metrics			
ID	Requirement	M/I	Definition
B1	Provide a measure of the success of the scheduling of meter reads and delivery of meter reads.	M	Measure the percentage of successful SRV5.1 SRVs successfully delivered.
		M	Measure success of DSP to deliver read (or failure response) within 24hrs of start of execution time.
B2	Provide a measure of the success of on demand meter reads.	M	Measure the percentage of successful SRV4.6.1 SRVs successfully delivered.

2.4.4 Prepayment

Prepayment metrics			
ID	Requirement	M/I	Definition
PP1	Provide a measure of the success of topping up a device remotely.	M	Measure the percentage of successful SRV2.2 SRVs successfully delivered to the devices. Include a measure by device type and region.
		I	Provide information on the volumes of success and failures within the period.
		I	Use non-communicating devices identified during the meter read process as a proxy for gauging estate health.
		I	Provide a table showing the percentage attempts to top up before success. Provide metric for the first and second attempts and the percentage of failures. Where failure is above 5%, provide further details on the reason for the failure.

2.4.5 Update Device Firmware

Update Device Firmware metrics			
ID	Requirement	M/I	Definition
DF1	Provide a measure of the success of delivering the device image to the Communications Hub.	M	Measure the percentage of successful SRV11.1 SRVs firmware payload images successfully delivered to the CH.
DF2	Provide information of the success of transferring the device images from CH to the device.	I	Measure device image verification success (0x8F72) and verification failures (0x8F1c) to provide information on the percentage of images that are successfully transferred from the CH to the device. Record devices that did not issue an alert after the SLA has elapsed to identify failure to transfer from CH to the device.
DF3	Provide information on successful activation of device firmware image.	I	Measure the percentage of success and failure responses to the SRV11.3 Activate Firmware request.

2.4.6 Update CH Firmware

Update CH Firmware metrics			
ID	Requirement	M/I	Definition
CHF1	Provide an indicator of the success of delivering CH firmware image to the Communications Hub.	I	Measure the percentage of successful CH firmware payload images successfully delivered to the CH.
CHF2	Provide an indicator of the successful activation of the CH firmware image.	I	Measure the percentage of successful CH firmware image activations.

2.4.7 Alerts

Alerts metrics			
ID	Requirement	M/I	Definition
A1	Provide a measure of the success of delivering alerts.	M	Measure the percentage of alerts successfully delivered within required SLA time (60 seconds). For alerts impacted by throttling, i.e. during an alert storm, this will measure all alerts sent to the User.
		I	Measure the individual alerts that fail to be delivered within the SLA time to identify the type of alert impacting overall performance.

2.5 Requirement 3: The DCC will measure end to end Service Availability across the DCC environment and report this by CSP region

2.5.1 Defined DCC Services

Note: This section refers to the combination of each of the following DCC interface and supporting sub-systems as a 'Service':

- the DCC User Interface
- the Registration Data Interface
- the Smart Metering Key Infrastructure (SMKI) Repository Interface
- the SMKI Services Interfaces
- the Self-Service Interface (SSI)

Service availability shall be measured as a percentage for all the above Services.

Whilst this approach accounts for overall service availability of each Service, it would not be reflective of instances in which the Service is partially unavailable.

Those key business processes impacted by partial availability shall be reported alongside the metrics and indicators for service availability of a particular Service. An illustrative example of this is provided in Table 3 below. Note that the Service Level percentages reported for each key business process are an indicator, and would quantify the time, during the reporting period, in which the DCC has the capability to successfully process and deliver a particular Service Request that makes up a particular business process, as defined in Table 1 of this document.

2.5.2 Service Availability metrics

In addition to the considerations above, the DCC is asked to report on how much cost and effort will be required to include these elements in the solution.

Monthly view of end-to-end Service availability

A monthly view of end-to-end service availability for each of the Services described above is reported on as a single percentage figure, as well as depicted as a line graph across the days of the month. This will enable a higher level of granularity and easier identification of potential issues that might have impacted Users throughout the reported period. As stated before, this measure for end-to-end availability should include sub-systems linked to each individual interface. If a particular sub-system (i.e. server) is responsible for supporting multiple interfaces, and this sub-system experiences an outage, then the availability measure for each of the affected Services should be impacted and reflected in the monthly measure.

End-to-end Service availability by CSP region

The view for service availability, where relevant, is split by CSP regions, for better correlation with Users operational experience.

Reporting Service availability by time of day

Time of day is considered when measuring and reporting on service availability for any particular Service, as this can have a direct impact on User's operations.

The OMR suggests a split (Monday to Friday) between hours where installations are more prominent (08:00-20:00) and hours where other business processes (i.e. CoS) take place (20:00-08:00).

With regards to weekends, the OMR recommends Saturdays to be split between 08:00-12:00 (on-site activities are still performed, i.e. installations) and 12:00 to 08:00, and Sundays are generally considered as days of on-site operations inactivity.

Measuring Service downtime

Service downtime for each interface and its supporting system components is measured in minutes, and then expressed in hours over the reporting period (e.g. 235 minutes of unavailability in a month would equate to a total of 3.91 hours).

The OMR recommends that from the total time of service unavailability (expressed in the formula as the Unplanned Downtime), the percentage of overall availability for a particular Service is calculated as follows:

$$\text{Service Availability} = \frac{\text{Uptime} - \text{Unplanned Downtime}}{\text{Uptime}} [\%],$$

where $\text{Uptime} = \text{Planned Uptime (total time in the month)} - \text{Planned Maintenance}$

Additionally, as each Service provided by the DCC is made up of an interface and multiple supporting sub-systems, a particular Service is to be considered available (therefore contributing to the argument 'Uptime' in the formula) only when all of its supporting sub-systems are available, and is to be considered unavailable (and therefore contributing to the argument 'Unplanned Downtime' in the formula) otherwise.

Note: In accordance with SEC Section H8, the DCC "*shall (insofar as is reasonably practicable) undertake Maintenance of the DCC Systems in such a way as to avoid any disruption to the provision of the Services (or any part of them).*" Additionally, the DCC shall limit Planned Maintenance of the DCC Systems generally to not more than six hours in any month (including maintenance of the SSI). Given this allowance, the OMR acknowledges that Planned Maintenance, complying with Section H8.4 of the SEC, should be excluded from, and not impact, the calculation for Service Availability defined in the formula above.

Measuring Service reliability

The DCC shall produce reliability measures for each of the interfaces described above and reported alongside the figures for service availability. Recommended measures for reliability of a system are reported below:

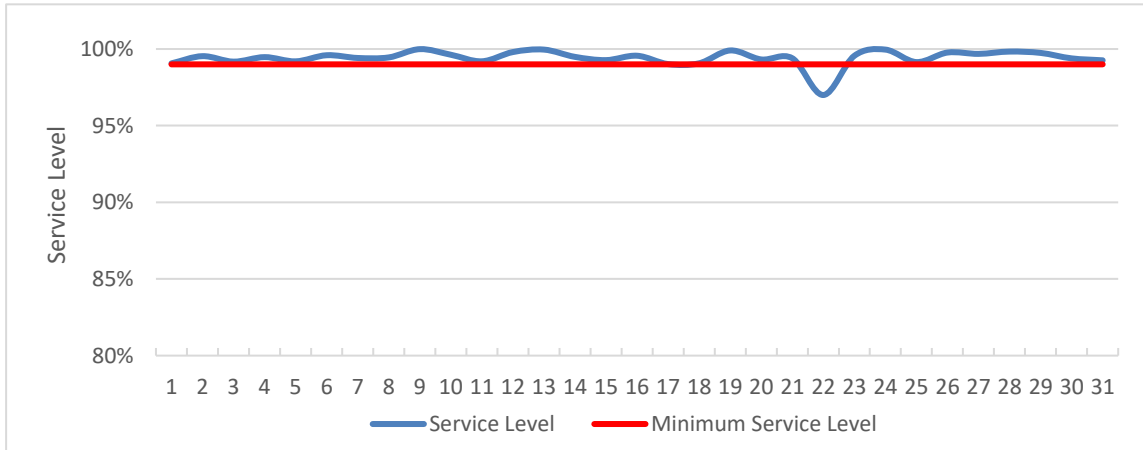
- Total Number of Incidents (category 1 to 5) across the reporting period. Additional Indicators to inform Users on the reliability of the DCC services would include the overall number of Category 1 & 2 incidents per Reporting Period (the OMR notes that the DCC already provides summary information about Category 1 & 2 Major Incidents to Users voluntarily). The OMR also believes the PMR should include the total volume of Category 3, 4 & 5 Incidents in the

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Reporting Period, where the Incident resolution is attributed to the DCC as the Responsible Party.

- Average amount of downtime per event (related to the Mean Time To Repair (MTTR) measure, which is defined as total maintenance time divided by the total number of repairs).
- Mean Time Between Failures (MTBF), calculated across the reporting period, as operating time (hours) divided by the total number of failures.

An illustrative example of the recommended Measures (M) and Indicators (I) proposed by the OMR for the reporting of service availability and reliability of each interface is provided in Table 3 below:

Table 3: Service Availability Measures					
Service Availability DCC User Interface – Service Level					M/I
Monthly Performance Measure	Previous Service Level	Service Level	Target Service Level	Minimum Service Level	
Service Availability – DCC User Interface	99.95%	99.40%	99.95%	99.00%	M
Service Availability DCC User Interface – Monthly View					
<div></div>					I
Service Availability DCC User Interface – Time of Day Breakdown					
Monthly Performance Measure	Hours of Operational Activity		Hours of Operational Inactivity		
Service Availability – DCC User Interface	98.80%		100.00%		I
Service Availability DCC User Interface – Service Availability by Region*					
*N/A, regional split not applicable for this interface					
Monthly Performance Measure	Region A	Region B	Region C		
Service Availability – DCC User Interface	99.00%	99.80%	99.40%		I
Service Availability DCC User Interface – Reliability					
Total Number of Incidents (of which cat. 1,2) (of which cat. 3,4,5)			4 (1) (3)		I
Mean Time To Repair (MTTR)			3.02 hours		I

Mean Time Between Failures (MTBF)			8.09 days	I
Service Availability DCC User Interface – Business Processes View				
Monthly Performance Indicator	Previous Service Level	Service Level	Status	
Install and Commission (ESME)	99.80%	99.40%	Degraded	I
Install and Commission (GSME)	98.20%	99.90%	Available	I
Change of Supplier (Gain)	XX.XX%	XX.XX%	Available	I
Change of Tenancy	XX.XX%	XX.XX%	Available	I
Tariff Updates	XX.XX%	XX.XX%	Available	I
Billing (Scheduled)	XX.XX%	XX.XX%	Available	I
Billing (Unscheduled)	XX.XX%	XX.XX%	Available	I
Pre-Payment	XX.XX%	XX.XX%	Available	I
Security and Key Management	XX.XX%	XX.XX%	Available	I
In-Life Device Management	XX.XX%	XX.XX%	Degraded	I
Logistics CH Ordering and Returns	XX.XX%	XX.XX%	Available	I
Distribution Networks Post I&C Activity	XX.XX%	XX.XX%	Available	I
Alerts Management	XX.XX%	XX.XX%	Available	I

2.6 Requirement 4: The DCC shall reduce the time it takes to create the PMR to within 10 Working Days from the end of the measurement reporting period

The SEC states that the DCC must create the PMR within 25 Working Days. However, the DCC shall reduce the time it takes to create the PMR to within 10 Working Days from the end of the measurement reporting period. This is to ensure the PMR remains operationally relevant to Users.

The effect would be that, depending on bank holidays and month end falling on Working Days, the report could be reviewed by the Operations Group the month following the end of the reporting period. For example, a report for the month of February could be reviewed at the end of March at the Operations Group report review meeting.

2.7 Requirement 5: In relation to CPM 5, the DCC will improve transparency in the reporting provided for incident Categories 3, 4 and 5

Feedback from Distribution Network Operators (DNO) highlighted a lack of transparency in the reporting of Incident Categories 3, 4 & 5 where the DCC is the responsible Party for the resolution of the incident in accordance with the SEC Appendix AG 'Incident Management Policy'.

CPM5 does not split out the resolution of these per Incident Category. Therefore, in order to improve transparency and confidence in the reporting provided for incident Categories 3, 4 and 5, CPM5 is to be amended to show individual incident resolution times for each incident category. This would be supplemented by further Indicators detailing;

- the number of Incidents per Category 3, 4 and 5 raised in the reporting period,
- those that met the Initial Target Response Time; and
- those that met the Target Resolution Time.

3. Glossary

This table lists all the acronyms used in this document and the full term they are an abbreviation for.

Glossary	
Acronym	Full term
CH	Communications Hub
CoS	Change of Supplier
CPM	Code Performance Measure
CSP	Communication Services Provider
DCC	Data Communications Company
ESME	Electricity Smart Metering Equipment
GSME	Gas Smart Metering Equipment
KPI	Key Performance Indicators
MTBF	Mean Time Between Failures
MTTR	Mean Time To Repair
OMR	Operational Metrics Review
RSVP	Rate, Speed, Volume and Payload
RTT	Round Trip Time
SMETS	Smart Metering Equipment Specifications
SMKI	Smart Metering Key Infrastructure
SR	Service Request
SRV	Service Reference Variant
SSI	Self-Service Interface
TRT	Target Response Time