

SEC Modification Proposal, MP0176

Customer Analytics Reporting

Final Impact Assessment (FIA)

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1 Executive Summary

The Change Board are asked to approve the following:

- Total cost to implement SECMP0176 which comprises:
 - £72,000 in Design, Build, Implementation and execution costs
 - £63,720 Application Support costs, chiefly infrastructure and software licensing. Note these will be absorbed by DCC after the 1st year.
- A timescale to complete the implementation of six (6) months

Problem Statement

As part of SECMP0122A the DCC provides SEC Parties through the SEC Operations Group with industry wide level of reporting on the timings, success, or failure of Service Reference Variants (SRVs) relating to key customer business processes. This reporting applies to all SEC Parties in an anonymised view.

Benefit Summary

This Modification will provide a standardised set of benchmarked individualised reports to all DCC Users which will enable them to identify their performance for key business processes in comparison to their peers and to allow them to diagnose reasons for poor performance so that they can take steps to address it. The Modification will provide both PDF files and "raw" CSV data relating to Service User performance over the last month.

2 Document History

2.1 Revision History

Revision Date	Revision	Summary of Changes
02/05/2022	0.1	DCC Internal Review
01/06/2022	0.3	Second DCC Internal Review

2.2 Associated Documents

This document is associated with the following documents:

Ref	Title and Originator's Reference	Source	Issue Date
1	MP176 Modification Report	SECAS	17/11/2021
2	MP176 Business Requirement v0.2	SECAS	17/11/2021
3	MP176 Legal Text v0.1	SECAS	17/11/2021
4	MP176 Preliminary Assessment Request	SECAS	17/11/2021
5	SECMP0176 Customer Analytics Reporting Preliminary Impact Assessment (PIA)	DCC	10/12/2021

References are shown in this format, [1].

2.3 Document Information

The Proposer for this Modification is Easton Brown from the Data Communications Company (DCC).

The original Preliminary Impact Assessment was requested of DCC on 17th November 2021.

Note that the DCC Technical Operations Centre (TOC) previously identified as the DCC team providing the reporting has been renamed to the Data Science and Analytics (DS&A) team and is described in Section 4 as part of the Technical Solution.

3 Context and Requirements

In this section, the context of the Modification, assumptions, and the requirements are stated.

The problem statement and requirements have been provided by SECAS, the Working Group, and the Proposer.

3.1 Problem Statement

Following the implementation of SECMP0122A, the DCC provides SEC Parties through the SEC Operations Group with industry wide level of reporting on the timings, success, or failure of Service Reference Variants (SRVs) relating to key customer business processes. This reporting is an anonymised view of reporting which does not provide customers with a view of their own performance, how they compare with other SEC Parties, or the ability to simply diagnose factors (Devices, Firmware, Geographic Location, Orchestration) that could be affecting their performance against key business processes, which in turn reduces the ability of Users to drive improvement, and the ability of the DCC to assist them in doing so.

The Proposer seeks to provide a standardised set of benchmarked reporting to all DCC Users which will enable them to identify their performance for key business processes in comparison to their peers and to enable them to diagnose reasons for poor performance so that they can take steps to address it. The DCC's workshops with DCC Users (including Import Suppliers, Export Suppliers, Gas Suppliers and Electricity Distributors) and via DCC's Quarterly Finance Forum provided a unanimous view that this should be implemented via a SEC Modification as it would mandate receipt of this information by all Parties and therefore offer equal benefit to them.

3.2 Business Context and Requirements

During the initial development of SECMP0122, the reporting requirements were dimensioned by SRV and Region. To better understand the shortcomings in performance, the DCC extended the reporting model to Device and Party levels, which revealed a significant disparity in performance levels between DCC Users across several key business processes. As not all SEC Parties have the reporting capabilities to assess their own performance against these key metrics, they have a reduced ability to drive improvement within their own businesses and in their interactions with the DCC. The inability to identify areas of concern can lead to delays in industry processes and have financial and reputational costs across all Parties.

3.3 Business Requirements

This solution will be applied to Smart Metering Equipment Technical Specifications (SMETS) 1 and SMETS2+ Devices.

The DCC will provide anonymised league tables for key business processes, identifying average performance per Smart Energy Code (SEC) Party for that Business Process and identifying the positioning on those league tables of only the SEC Party to whom that report is directed. DCC Customer Analytics Reporting will not share any Device Level data with any party other than the target SEC Party. Any SEC Party which is active in DCC Systems can request a new report to be added to the Customer Analytics Reporting suite, or request a change to an existing report, by making a request to a DCC group mailbox, but additional design, build and test costs will be incurred.

Ref.	Requirement
1	For the User Roles: Import Supplier, Export Supplier, Gas Supplier, Electricity Distributor and Other User, the DCC will provide inventory reporting identifying the User's Metering Estate.
2	The DCC shall provide reporting to its Users on the business processes defined in the Customer Analytics Reporting, which will include a view of the Users' performance against anonymised performance data for all Parties in the same User Role.
3	The DCC shall provide reporting on DCC, and Device Alerts received by an Import Supplier, Export Supplier or Gas Supplier, which will consist of a total of all Alerts and individual reporting for each Alert, to the relevant Users.

Requirement 1: For the User Roles: Import Supplier, Export Supplier, Gas Supplier, Electricity Distributor and Other User, the DCC will provide inventory reporting identifying the User's Metering Estate

1. A single bar graph for each Device Type (Electricity Smart Metering Equipment (ESME), Gas Smart Metering Equipment (GSME), In Home Display (IHD), Pre-Payment Meter Interface Device (PPMID), and Other identifying each Device Model (on the x-axis) and the volume of meters and of each firmware model (on the y-axis).
2. A single Device Model bar graph giving a breakdown of each SEC Party's estate firmware version, highlighting the report recipient and the industry average

The DCC will provide for each customer a CSV data file identifying all Devices on their estate with the following data fields:

- Device Identifier;
- Smart Metering System (SMS) Identifier;
- Device Type;
- Device Model;
- Firmware version;
- Communication Service Provider (CSP) Id;
- Energy Supplier Id;
- Distribution Network Operator (DNO) Id;
- MPxN;
- Postcode;
- Last Meter Read time/date;
- Last Alert time/date;
- Last Alert Code;
- Commissioned Status;
- Power Outage Alert Count in last month (including Polyphase Supply Interrupted Alerts);
- Prepayment flag;
- SMETS version;
- whether the Device expires on the Central Products List (CPL) within 30 days;

- Devices whose Security Certificates are due to expire; and
- Change of Supplier Start and End dates.

Requirement 2: The DCC shall provide reporting to its Users on the business processes defined in the Customer Analytics Reporting, which will include a view of the Users' performance against anonymised performance data for all Parties in the same User Role.

1. The DCC will report for each of the requirements noted in this section, identifying in separate graphs:
 - A monthly average benchmark of success or failure against other customers operating in the same User Role.
 - A monthly view of Round-Trip Time or Alert delivery time, identifying customer best, worst, mean and median against those same metrics at an industry level for other customers operating in the same User Role.
 - A daily average view of success/failure and average Round Trip Time for that customer compared to industry average. Where relevant, performance will be broken down by meter type, Region and SMETS1/SMETS2, and 'Category 1 & 2' Incidents will be highlighted. The report will identify all failures by Reason Code alongside all additional signifiers to enable Users to diagnose common themes.
2. The DCC will provide a monthly CSV data file for each Service Reference Variant (SRV), identifying at an aggregated level all dimensions that Speed, Volume, Payload (SVP) report on:
 - Success/Failure;
 - Failure reason code;
 - Communications Hub Manufacturer;
 - Communications Hub Model;
 - Communications Hub Function;
 - Communications Hub Firmware;
 - Device Type;
 - Device Manufacturer;
 - Device Model;
 - Device Firmware Version;
 - Region; and
 - Round Trip Time.

Requirement 3: The DCC shall provide reporting on DCC, and Device Alerts received by an Import Supplier, Export Supplier or Gas Supplier, which will consist of a total of all Alerts and individual reporting for each Alert, to the relevant Users.

Electricity Distributors will receive reporting on the following subset of Alerts:

- AD1 – Power Outage Alert;
- 8F35 – Supply Outage Restored;
- 8F36 – Supply Outage Restored - Outage \geq 3 minutes;
- 8F58 – Supply interrupted on Phase 1;
- 8F59 – Supply interrupted on Phase 2;
- 8F5A – Supply interrupted on Phase 3;
- 8F37 – Supply Outage Restored on Phase 1;
- 8F38 – Supply Outage Restored on Phase 2 Restored - Outage \geq 3 minutes;
- 8F39 – Supply Outage Restored on Phase 2 Restored;
- 8F3A – Supply Outage Restored on Phase 2 Restored - Outage \geq 3 minutes;
- 8F3B – Supply Outage Restored on Phase 3 Restored;
- 8F3C – Supply Outage Restored on Phase 3 Restored - Outage \geq 3 minutes;
- 8F0C – Clock not adjusted (adjustment greater than 10 seconds);
- 81C6 – Clock not adjusted (outside tolerance);
- N12 – Failure to deliver Command to Device;
- N13 – Failure to receive Response from Device;
- N53 – Command not delivered to ESME; and
- N55 – SMETS1 Service Provider (S1SP) Service Request Validation Failure

This reporting will provide the following views:

1. A daily average view of success/failure of Alert sending and average delivery time for that customer compared to industry average.
3. A monthly summary of success compared to industry average.
4. The DCC will provide a monthly CSV data file for each Alert type, identifying at an aggregated level all dimensions that SVP report on:
 - Success/Failure
 - Failure reason code
 - Comms Hub Manufacturer
 - Comms Hub Model
 - Comms Hub Function
 - Comms Hub Firmware
 - Device Type

- Device Manufacturer
- Device Model,
- Device Firmware Version,
- Region,
- Round Trip Time

Reports for the Electricity Distribution role for the Alerts N13 'Failure to receive Response from Device' and N55 'S1SP Service Request Validation Failure' will receive an additional view identifying a breakdown of the Alerts split by Meter Make, Model, Firmware Version.

In addition, the following reports will be produced specifically for the Electricity Distribution role:

- a) Report comparing the daily monitoring of N16 'Device Identity Confirmation' Alerts with N42 'Security Credentials Updated on the Device' Alerts identifying volumes which haven't a seven-day Service Level Agreement (SLA) for receipt of the N42 following N16 and those that have failed this metric, sorted by Energy Supplier.
- b) Standardised Reporting identifying Power Outage Alerts with no Power Restoration Alerts:
 - i) AD1 with no 8F35
 - ii) AD1 with no 8F36
 - iii) 8F35 with no AD1
 - iv) 8F36 with no AD1

4 Description of Technical Solution

Following workshops and consultations with Users, the DCC Data Science and Analytics (DS&A) team has proposed three application components to be included in the Customer Analytics Reporting suite in accordance with the requirements:

- Inventory data-marts
- Business Process Analytics
- Alert Reporting and Metrics

The solution does include technical flexibility to add or amend metrics to the reporting suite in future. Such changes would be requested by Service Users and paid for under a Change Request.

4.1 DCC Data Science and Analytics

DCC's Data Science and Analytics (DS&A) function was formed from a specific sub element of the Technical Operations Centre (TOC). It has particular focus on underpinning the existing TOC capability with dedicated emphasis on utilising the considerable data DCC generates and captures. This team is responsible for all aspects of the data across the Data Analytics lifecycle from initial structuring and organisation, ensuring its timeliness availability across TOC and wider DCC. Within DS&A however, further data-analytical processing techniques are employed in order to derive insights for industry. The DS&A function also has DCC responsibility for its regulatory reporting.

DS&A operate secure and scalable cloud computing with powerful analytic software to help identify and understand how the DCC service is used with objectives to evaluate application execution, message flow and orchestration performance, device, HAN configuration compliance and more. The team is staffed by dedicated DCC sourced system experts, experience data scientists supported by cloud technologists and database developers and administrators.

DS&A have developed much of the DCC operational capability incorporating Service Visualisation of Operational Management dashboards, proactive alerting of operational metrics and anomaly detection systems. It is, however, it's Operations Analytics tools that will be utilised to fulfil this modification. Operational Analytics allow highly accurate monitoring of key DCC KPI's across many aspects of the end-to-end service and is operatable at Device, Meter-point, or transactional request identity level for a forensic analysis of specific behaviour and troubleshooting. It is when such seemingly discreet data is connected and aggregated that allow the correlation of trend analysis and generation of meaningful insights such that will drive this Modification.

DCC DS&A will be responsible for the design, development, implementation and BAU maintenance of the solution for this Modification.

4.2 DS&A Solution Overview

Utilising the data extracts presented by the Enterprise System Interface (ESI) between DSP and DCC, the DS&A team oversee custom written, automated Extract, Transform and Load (ETL) processes to maintain both Inventory and Transactional databases which will underpin the data model as utilised within this Modification. Inventory information, typically device, meter-point level data is received incrementally every 4 hours, whereas transactional records as logged by Service Audit Trail (SAT), Power Outage & Restoration Timing Logs are received continuously as they are written by DSP. This data is duly written to the database and is fully queryable for use by DS&A analytic systems.

The transactional data records (solicited Service Requests issued by Service Users and unsolicited device and DCC System alerts) are written out to specifically structured data-tables where they combine with dynamically built inventory information to tag critical information about each distinct transaction as follows:

- Responsible Supplier (Energy Participant fulfilling which Energy Role) at time of transaction (Service Request or Alert)
- Originator of ServiceRequest or Destination of Alert
- Responsible Network Operator Participants
- Device Configuration i.e., Device Model, Manufacturer, and the Active Firmware at time of transaction (Service Request or Alert)

Key fields of Service Audit Trail and related Power Outage / Restoration timing logs to be utilised in this Modification are:

- Mode of Operation and Command variant utilised
- Device ID and related Meter-point numbers
- Current lifecycle status, i.e., completed, pending delivery
- Device Execution status, i.e., Success, Failure
- Time spend in Northbound direction flow
- Time Spent in Southbound direction flow
- Start time of transaction (incorporating Power Outage and Restoration timestamps where relevant)
- End/Latest time of transaction (incorporating latest Power Outage and Restoration delivery timestamps and ENO Acknowledgement timestamp)
- Communications Service Provider utilised
- Response Code
- SLA Target for the Transaction for both DSP and DCC end to end
- SLA Performance Pass / Fail

- SLA Exclusion Time

Calculated metrics for this Modification include:

- Round Trip Time (distinct per transaction)
- Mean Round Trip Time (aggregated)

When aggregated the following optional metrics can be calculated:

- Max, Min, Median, Sum of Round-Trip Time.

4.2.1 Delivery Mechanism

Across all three reporting requirements stated within this Modification, DCC will publish all relevant files at the stated frequency to each Service User's secure SharePoint repository. The files will be of type PDF with exception for the three stated *data files* which will be in CSV format. Where possible and upon request, other file formats may be accommodated where a Service User has a different and specific preference.

4.3 Solution Constraints and Changes

DS&A have reviewed the requirements and concluded they can be met in full and delivered using existing data available and subsequently working within the constraints of the current solution should involve no commercial change to the DCC Solution, although there will be a direct impact on support and maintenance. DS&A is unaware of any additional data requirements specified to support this Modification since the release of the PIA and will deliver in accordance with this FIA.

4.4 Working Methodology

During the requirement gathering and refinement, principally as part of the SECMP0122 process which has driven this Modification requirement, the DCC and SECAS hosted workshops with the Working Group. These workshops aimed to validate the proposals in the Operational Metrics Review (OMR) in terms of the viability of implementing the recommendations, to refine the requirements further, and to enable fast delivery of new requirements and improvements.

It is proposed that the reporting as specified within this Modification will be delivered by DS&A via an iterative delivery mechanism, whereby a Minimum Viable Product (MVP) will be available in a first prototype release in the Implementation phase and following consultation with the Working Group, further functionality can be delivered in a fast and frequent continuous delivery mechanism until the final product is complete, using the same methodology as SECMP0122. This is considered the fastest and most exact method in ensuring the requirements are fulfilled and described further in Section 6.

4.5 Data Delivery, Testing, and User Acceptance

The development and testing will not follow the PIT, SIT, and UIT pattern associated with a "conventional" SEC Release, and will not require the testing services of the System Integrator or CSPs.

For any subsequent changes to requirements, external data provided by the Service Providers will require a limited technical change to reflect the provision of the data to the DCC. There are also several separate Modification proposals that are *'in-flight'* that may add

additional use-cases into scope for this modification, e.g., Throughput of Alert and CSP metrics and if delivered would also fall into a similar limited technical change to incorporate.

In some cases, however, mostly relating to the SMETS1 Service Providers (S1SPs), there is no current data provision, so a data transfer mechanism will have to be developed and is seen as outside of the scope for this Modification FIA.

5 Impact on Systems, Processes and People

As defined the change included in this document is confined to data already within DCC and available to DS&A, with no expected changes impacting SMETS1 or SMETS2 Service Providers.

5.1 Infrastructure Impact

No impact to existing infrastructure, however, to meet the requirements within this modification, an additional cloud instance of DS&A statistical computing platform is needed for monthly processing and shall be recorded as a explicit line item cost.

It should be noted that the solution as proposed should not add any traffic or processing to the Smart Metering System or network.

5.2 Security Impact

The solution will be security assured during the implementation phase and will comply with standard DS&A reviews, however no impact from such assessments is anticipated.

5.3 Technical Specifications

No change to DUIS, GBCS, or any other Technical Specification.

5.4 Data Science & Analytics Team and wider DCC Operations

The full range of activities required to implement these requirements including design, development, testing, and implementation would be performed by DCC DS&A utilising in-house contractors and permanent staff. There will be a slight increase in the Full Time Equivalents (FTEs) required to do this and support, maintain, and deliver the reporting monthly. These activities are defined within the following table:

DCC Operations Area	Service provided for this Modification	Additional FTE
DS&A Data Science	<ul style="list-style-type: none"> • Development of new database tables and relevant stored procedures to fulfil them • Development of new reporting scripts for each reporting requirement • Building visualisations and report structures • Testing, documentation of above • Supporting all DCC Operational Areas with requirements below 	0.6
DS&A Reporting	<ul style="list-style-type: none"> • Configuring the automated publishing delivery sources and destinations • Required to support and maintain the DS&A Reporting System Business as Usual, building DCC data throughout month and packaging report in 10-day production cycle • For Reports requirements: Support and query answering, plus maintenance and optimisation • Testing, documentation of all above 	0.3
DS&A Data Solutions	<ul style="list-style-type: none"> • Incremental admin changes to database system backup, data-warehousing etc to accommodate all the above. 	0.1
Service Management / Incident Management	<ul style="list-style-type: none"> • Incident handling such as: investigation will be required to identify whether the performance deterioration is as a result of issues with system, Comms Hubs, Meters, Orchestration, or areas entirely outside DCC visibility (actions taken by SEC Parties e.g., Staff being taken off work due to training, system issues with customers etc.) 	N/A

6 Implementation Timescales and Approach

A key factor in planning and delivering this Modification's implementation and release is that the changes are neither part of the Smart Metering System, nor do they impact any Technical Specifications, such that they can be implemented separate from the now-standard SEC Release dates. This work should be completed within six (6) months of approval.

As described in Section 4.4 and shown in Figure 1 an iterative approach will be utilised to deliver this Modification.

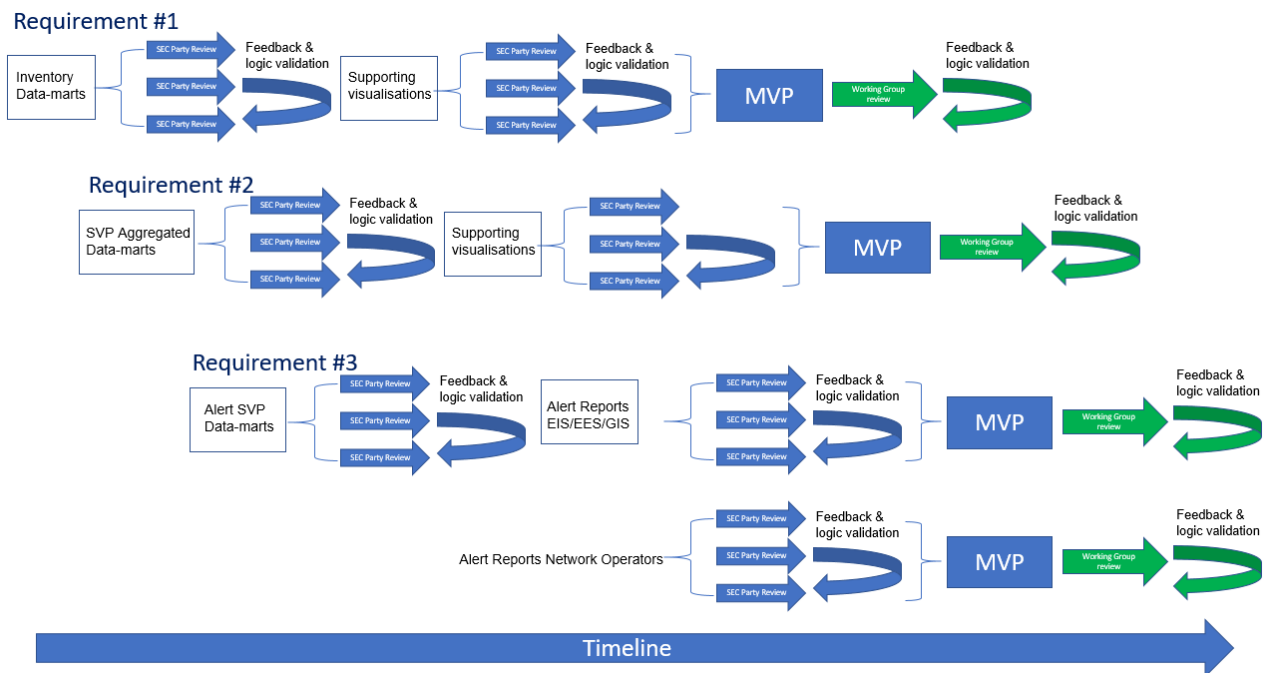


Figure 1 Implementation approach

6.1 Modification Development Timescales

Development schedule will broadly align to the MVP release dates on a per Requirement deliverable basis and will commence upon commercial acceptance.

The initial MVP for Requirement 1 will be available for Working Group review within 3 months from commercial acceptance. As indicated in Figure 1 this will involve Service User participation within this period.

Delivery of the remaining Requirements MVPs will be available within the following 3 months from release of Requirement 1 MVP and subsequently overall solution acceptance, to be achieved within 6 months of overall commercial acceptance of this Modification.

These timescales assume no significant delays are encountered within Working Group review phases. In summary, DCC will deliver the full solution within 6 months from Commercial Acceptance with first initial release available at end of month three (3).

6.2 Testing and Acceptance

It is assumed that the change will be implemented and tested as a separate release and will include testing iteratively, sometimes with Users, during development. The development and testing will not require the specific testing services of any external parties and instead utilise a collaborative approach with Service Users as is indicated in Figure 1.

7 Costs and Charges

This section indicates the total quote for the application development stage for this modification. Note these costs assume a standalone release of just this SEC Modification without any other Modifications or Change Requests.

7.1 Design, Build and Testing Cost Impact

Design, build, testing and implementation will attract one off cost as identified and will not follow the PIT, SIT, and UIT pattern associated with a "conventional" SEC Release.

Service Users would be engaged in the test phases for this Modification for each relevant MVP, although there would be no impacts on their systems.

7.2 Infrastructure and Software

An additional cloud instance of the DS&A statistical computing platform is required and will conform to an Amazon Web Services (AWS) z1d.6xlarge Instance server specification at 25% utilisation / month. This will equate to £7320 per year.

A single additional Management Information system license at £30,000 per year.

DCC DS&A will absorb these annual infrastructure and software license costs after the first year.

7.3 Applications Support

This refers to keep the application maintained and running. It is quoted as an annual cost and incorporates FTE effort, infrastructure and software licensing costs.

7.4 Year 2022 Solution Delivery Desi

£	Design, Test and Implement	Application Support (One Year)
FTE costs as identified in Section 5	72,000	
FTE Reporting		30,000
Infrastructure and Software costs		37,320
Total	72,000	67,320

The quoted Application Support costs are for one year only. After that time, the costs will be considered as part of Business as Usual, and will be covered by annual DS&A costs.

Appendix A: Glossary

The table below provides definitions of the terms used in this document.

Acronym	Definition
BAU, BaU	Business As Usual
CPL	Central Products List
CSP	Communication Service Provider
CSV	Comma Separated Variable
DCC	Data Communications Company
DNO	Distribution Network Operator
DS&A	Data Science and Analytics
DSP	Data Service Provider
DUIS	DCC User Interface Specification
ESME	Electricity Smart Metering Equipment
FIA	Full Impact Assessment
FTE	Full Time Employees
GBCS	Great Britain Companion Specification
GSME	Gas Smart Metering Equipment
IHD	In Home Display
KPI	Key Performance Indicators
MVP	Minimum Viable Product
OMR	Operational Metrics Review
PIA	Preliminary Impact Assessment
PIT	Pre-Integration Testing
PPMID	Payment Meter Interface Device
ROM	Rough Order of Magnitude (cost)
SMS	Smart Metering System
SVP	Speed, Volume, Payload, a measure of performance of SRVs
SEC	Smart Energy Code
SECAS	Smart Energy Code Administrator and Secretariat
SIT	Systems Integration Testing
SLA	Service Level Agreement
SMETS	Smart Metering Equipment Technical Specification
SMS	Smart Metering System
SRV	Service Request Variant
SVP	Speed, Volume, Payload
S1SP	SMETS1 Service Provider
TOC	Technical Operations Centre
UIT	User Integration Testing