

SEC Modification Proposal, SECMP0162, DCC CR4434

SEC Changes Required to Deliver Market- wide Half Hourly Settlement (MHHS)

Preliminary Impact Assessment (PIA)

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1 Executive Summary

The Change Board are asked to approve the following:

- Total cost to complete the Full Impact Assessment of £532,785.00.
- The timescales to complete the Full Impact Assessment of 40 days.
- ROM costs for SECMP0162, including SMETS1 and SMETS2 Design, Build, up to the end of Pre-Integration Testing (PIT) and additional infrastructure of between £29.1m and £59.0m.

Problem Statement and Solution

Most smaller businesses and households today are settled on a 'non half-hourly' basis. For these consumers, periodic meter reads are taken, at intervals of weeks, or even years, are entered into the electricity settlement process called profiling, where this consumption data is calculated into 30 minute intervals. MHHS will be achieved by mandating that electricity suppliers settle all customers with capable meters (or equivalents) in a HH capacity using actual data that is recorded at 30 minute intervals, although domestic customers will retain the option to opt out of this for import settlement data (but not export).

Both SMETS1 and SMETS2+ Electricity Smart Metering Equipment (ESME) can record the amount of energy consumed or exported within every half hour period. To support this MHHS, substantial changes will need to be introduced to the SEC and DCC that enables the correct industry parties to retrieve this additional settlement data.

Modification Benefits

The MHHS draft business case relies on exposing energy suppliers to the exact HH costs of customer consumption patterns, rather than being profiled as they are now for Non Half- Hourly (NHH) customers. This exposure will incentivise electricity suppliers to offer Time of Use (ToU) tariffs, which in turn will incentivise customers to shift load patterns. Customer load shifting will benefit both intermittent generation balancing and reduce network infrastructure investment. Ofgem's Electricity Settlement Reform Significant Code Review (SCR) has concluded that settling all consumers on a half-hourly basis would bring net benefits of between £1.6bn and £4.5bn by 2045.

MHHS will also increase overall settlement accuracy. It will also help to enable new products and services, for example, in supporting the use of electric vehicles, heat pumps or making use of smart appliances. These can deliver positive outcomes for consumers through lower bills, reduced environmental impacts, enhanced security of supply and a better quality of service.

2 Document History

The Preliminary Impact Assessment was requested of DCC on 18th August 2021, and accepted on the 25th August 2021.

2.1 Revision History

Revision Date	Revision	Summary of Changes
07/09/2021	0.14	First draft
16/09/2021	0.15	Updated following SP's PIA submission
17/09/2021	0.16	Updated following DCC internal review
17/09/2021	1.0	For SECAS review

2.2 Associated Documents

This document is associated with the following documents:

Ref	Title and Originator's Reference	Source	Issue Date
1	DP162 Modification Report v0.5	SECAS	11/06/2021
2	MP162 Business Requirements v0.3	SECAS	18/08/2021

References are shown in this format, [1].

2.3 Document Information

This Modification forms part of a wider solution to deliver the Market-wide Half-Hourly Settlement (MHHS). This change will include other elements such as changes to Balancing and Settlement Code (BSC) systems, changes to Smart Energy Code (SEC) Parties' systems, and different ways of working.

This document contains a high level architecture, details associated with the business requirements, volumetric calculations, design principles, and the costing information required to complete the Preliminary Impact Assessment.

The Proposer for this Modification is Richard Vernon of Smart DCC. The problem statement was submitted to SECAS on the 7th May 2021.

3 Context and Requirements

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

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

3.1 Context

As the smart metering rollout continues, there will be more and more premises with Electricity Smart Metering Equipment (ESME) installed capable of recording consumption in each half-hour period. Ofgem's Electricity Settlement Reform Significant Code Review (SCR) has concluded that settling all consumers on a half-hourly basis would bring net benefits of between £1.6bn and £4.5bn by 2045¹. It has therefore concluded that Suppliers should be mandated to settle their customers on a half-hourly basis (if that consumer has not opted out). Delivering the full solution for market-wide half-hourly settlement (MHHS) will require changes to the Smart Energy Code (SEC) and to the DCC Systems. Ofgem requested the DCC raise a SEC modification to progress and deliver these changes.

3.2 Problem Statement

The largest consumers, such as industrial sites, are already required to be settled on a 'half-hourly' basis, and have the metering already equipped to measure consumption in each half-hour period. Suppliers can also choose to settle consumers half-hourly through Ofgem's elective half-hourly settlement work. However, most smaller businesses and households continue to be settled on a 'non half-hourly' basis.

For these consumers, periodic meter reads are taken, usually at intervals of weeks or months. Profiles of average customer usage are then used to allocate the customer's consumption to the half-hourly periods between the meter reads, and these estimates that are then used in settlement.

Both SMETS1 and SMETS2+ Electricity Smart Metering Equipment (ESME) can record the amount of energy consumed or exported within every half hour period. This provides an opportunity to improve both the speed and the accuracy of settlement. This can also help to enable new products and services, for example in supporting the use of electric vehicles, heat pumps or making use of smart appliances. These can deliver positive outcomes for consumers through lower bills, reduced environmental impacts, enhanced security of supply and a better quality of service.

This Modification forms part of a wider solution to deliver MHHS which will include other elements such as changes to Balancing and Settlement Code (BSC) systems, changes to Smart Energy Code (SEC) Parties' systems, and different ways of working. The Modification solution will therefore need to meet the requirements of the wider solution as set out in the MHHS Target Operating Model (TOM) to form a single, integrated solution. Changes to the DCC Total System required to implement MHHS are covered in the following sections.

3.3 Overview of the Required MHHS Solution

To meet the MHHS requirements, the DCC System shall be able to accept Service Requests from Eligible Users to

¹ As detailed at <https://www.ofgem.gov.uk/publications/electricity-retail-market-wide-half-hourly-settlement-decision-and-full-business-case>

retrieve Import consumption data (Half-Hourly (HH) Intervals, Daily Consumption totals and Register Reads) and where configured, Export generation data (HH Intervals, Daily Consumption totals and Register Reads) from SMETS1 and SMETS2 ESMs enrolled within the DCC Systems.

MHHS-related Service Requests received from Users will be subject to Access Control authentication to ensure that only registered Users can retrieve the relevant Import consumption / Export generation data from each Smart Meter.

Where data is successfully retrieved from both SMETS1 and SMETS2 Smart Meters this data shall be returned across the Smart Metering communication networks and these Service Responses shall be returned to the requesting User for use in the wider Settlements purposes.

3.4 Business Requirements

This section identifies and expands on the business requirements for this Modification.

Note that there are several requirements which do not apply to the DCC Total System, but they have been maintained for completeness.

#	Requirement
1	A new DCC User Role will be created for Meter Data Retrieval (MDR) Users
2	MDR Users will need to accede to the SEC and undergo User Entry Process Testing (UEPT)
3	There shall be Access Control for MDR Users
4	The applicable Service Requests will have extended Target Response Times

#	Requirement
	(TRTs) when submitted to obtain MHHS data
5	Only Eligible Users shall have access to retrieve specified data
6	The end-to-end security arrangements for half-hourly settlement will be put in place
7	An MDR User will be subject to the SEC privacy arrangements

Table 1: Marketwide Half Hourly Settlement Requirements

Requirement 1: A new DCC User Role will be created for MDR Users

The DCC will create a new DCC User Role for a MDR User.

The DCC shall support the introduction of a new SEC User Role of 'MDR' for MDR Agents (MDRAs) to support the introduction of MHHS.

The Identity of the new MDR Party will be added to Industry Registration Data with a Market Participant Identifier (MPID) and an associated Effective From Date (EFD) and Effective To Date (ETD) ²for each Meter Point Administration Number (MPAN). It is assumed that a change of MDRA will take effect at 00:00 on the relevant Settlement Day and that the outgoing MDRA will not be able to access data for Settlement Days on or after the EFD for the incoming MDRA.

It is assumed that each MPAN will always have an associated MDRA within the registration data, regardless of whether the MDRA is the Supplier itself or an external third-party agent.

It is assumed that for an MDRA registration completed prior to the relevant EFD, the current and the future MDRA and the relevant EFDs

² The current TOM does not include a requirement for the ETD to be provided in the registration data. Including an ETD will align with existing registration data received by the DCC.

Without this, additional processing will be required by the DCC to determine who is the active MDRA.

will both be included within the registration data.

This new mapping of MDR Party to MPAN Registration data is expected to be passed to the DCC to use via the Central Switching Service (CSS) and Enduring Change of Supplier (ECoS) Interface. Relevant data extensions will be added to these interfaces. The expectation is that changes to the registration data needed for MHHS will be delivered through the MHHS programme.

Requirement 2: MDR Users will need to accede to the SEC and undergo UEPT

Any market participant operating as an MDRA will be required to accede to the SEC. A new Party Category for 'MDR Users' will be established under the SEC. Unless otherwise specified in these requirements, the 'MDR Party' Party Category will be treated the same as the 'Other SEC Party' Party Category under the SEC. Any 'Other SEC Party' Party Category seats on the Panel and Panel Sub-Committees will be shared between 'Other SEC Parties' and 'MDR Users'.

An MDR User will be required to undergo appropriate UEPT for the role. New Test Scenarios will be defined for MDR Users undertaking the User Entry Process.

Suppliers will have a choice of either appointing themselves as the MDRA, or an external third-party agent under commercial arrangements for each of their registered MPANs.

A Supplier who elects to operate as an MDRA will not need to register under the new 'MDR Party' Party Category or the MDR User role and may continue to operate under the SEC as a 'Large Supplier' or a 'Small Supplier' as applicable.

Any Supplier agent operating as an MDRA on behalf of a Supplier will be required to accede to the SEC under the new 'MDR Party' SEC Party Category. It will also be required to register as a DCC User in the new MDR User role.

Requirement 3: There shall be Access Control for MDR Users

A MDR User will only be allowed to submit the following Service Requests to support MHHS:

SR	Service Request name	On Demand?	DCC Scheduled?
4.1.1	Read Instantaneous Import Registers	Yes	No
4.2	Read Instantaneous Export Register Values	Yes	No
4.6.1	Retrieve Import Daily Read Log	Yes	Yes
4.6.2	Retrieve Export Daily Read Log	Yes	Yes
4.8.1	Read Active Import Profile Data	Yes	Yes
4.8.3	Read Export Profile Data	Yes	Yes
4.17	Retrieve Daily Consumption Log	Yes	Yes
5.1	Create Schedule	Yes	No
5.2	Read Schedule	Yes	No
5.3	Delete Schedule	Yes	No
8.2	Read Inventory	Yes	No

Table 2: Valid Service Requests for an MDR User

The DCC shall perform Access Control for any Service Requests send by any MDR User to authenticate and authorise that the Service Request is send from a valid SEC Party and that the User is an Eligible User for the Service Request being sent and is authorised to access the relevant Device.

The DCC shall validate and authorise the MDR User sending each Service Request against Industry Registration Data to check that the MDR User is the registered MDRA for the MPAN associated with the Device ID on the corresponding Settlement Day(s) that the Service Request is targeted for.

The DCC shall validate the Identity of the MDRA requesting data from an ESME using the Industry Registration Data in the same manner as the existing Registered Supplier Agent (RSA) User Role Validation Check.

Requirement 4: The applicable Service Requests will have extended TRTs when submitted to obtain MHHS data

The relevant Service Requests will be subject to extended Target Response Times (TRTs) when submitted for the purpose of retrieving import consumption and export generation data for MHHS service purposes.

Users shall inform the DCC where the Service Requests in Section 2.4 are sent for the purposes of retrieving data for MHHS purposes. Where this is identified, extended TRTs shall be operated to enable the DCC to manage the additional Service Request volumes arising from the introduction of the MHHS service.

The TRTs for the relevant Service Requests are shown in the table below:

SR	SR sent to support existing services <i>Eligible Users³: IS, ES</i>				SR sent to support MHHS service <i>Eligible Users³: IS, ES, MDR</i>			
	SMETS2		SMETS1		SMETS2		SMETS1	
	Scheduled	On Demand	Scheduled	On Demand	Scheduled	On Demand	Scheduled	On Demand
4.1.1	N/A	30 secs	N/A	16 secs	N/A	24 hrs	N/A	24 hrs
4.2	N/A	30 secs	N/A	16 secs	N/A	24 hrs	N/A	24 hrs
4.6.1	24 hrs	30 secs	24 hrs	16 secs	24 hrs	24 hrs	24 hrs	24 hrs
4.6.2	24 hrs	30 secs	N/A	N/A	24 hrs	24 hrs	N/A	N/A
4.8.1	24 hrs	5,600 secs	24 hrs	16 secs	24 hrs	24 hrs	24 hrs	24 hrs
4.8.3	24 hrs	30 secs	24 hrs	16 secs	24 hrs	24 hrs	24 hrs	24 hrs
4.17	24 hrs	30 secs	N/A	N/A	24 hrs	24 hrs	N/A	N/A
5.1	N/A	24 hrs	N/A	24 hrs	N/A	24 hrs	N/A	24 hrs
5.2	N/A	24 hrs	N/A	24 hrs	N/A	24 hrs	N/A	24 hrs
5.3	N/A	24 hrs	N/A	24 hrs	N/A	24 hrs	N/A	24 hrs
8.2	N/A	30 secs	N/A	16 secs ⁴	N/A	30 secs	N/A	15 secs

Table 3: TRTs for Eligible Users for MHHS data retrieval Service Requests

To implement extended TRTs for On Demand services to support the DCC's demand and capacity management process for the MHHS Service, the DCC requires all Eligible Users to identify whether Service Requests are a request for MHHS data retrieval.

Import Suppliers and Export Suppliers may continue to use the existing Service Requests and associated TRTs for data requests that are not sent for the MHHS Service and where

existing non-extended TRTs for On Demand services are required.

It should be noted that a TRT is a maximum response time, and it is likely that any Service Request would be processed sooner than the specified TRT.

Further information on Volumetrics is given in section 5.4.1 following.

Requirement 5: Only Eligible Users shall have access to retrieve specified data

Suppliers and MDR Users will be required to be Eligible Users for each of the Service Requests that allow existing Users to retrieve Interval or Register Read Consumption and Generation data sets from ESME.

This requirement has been based on assumptions made by the DCC against the MHHS TOM.

Import Suppliers, Export Suppliers and MDR Users will need to use the DCC Scheduling Service to schedule the standard set of data retrieval activities to support the MHHS

service. This will depend on the level of granularity the customer has consented to. It is assumed the level of granularity specified by the customer is the lowest level of granularity that can then be collected by the Import Supplier, Export Supplier or MDR User.

This Modification will define the data that is required from the registration system to enable this Requirement 5. The expectation is that any changes needed to the registration system for MHHS will be delivered through the MHHS programme

³ IS = Import Supplier; ES = Export Supplier; MDR = MDR User

⁴ The current SMETS1 TRT for SR8.2 is an anomaly. The process for reading Device details from the Smart Metering Inventory (SMI) is the same for both SMETS2 and SMETS1

Devices with processing of such requests limited to the DSP systems. This TRT will be amended to 30 seconds for all Users as part of this Modification for alignment with other DCC-Only Service Requests.

Half-hourly Granularity

This will apply where the domestic customer has **not opted out** of half-hourly data collection to support half-hourly settlement. For this level of granularity, it is assumed a User will:

- Each day, collect a set of 48 half-hourly intervals of Import consumption data and, where configured, an additional set of 48 half-hourly intervals of Export generation data.
- Once a calendar month, collect a set of register read data for the Import consumption and where configured an additional set of register read data for the Export generation for reconciliation to the half-hourly interval data to act as a check process.

Daily Granularity

This will apply where the domestic customer has opted out of half-hourly data collection to support half-hourly settlement. For this level of granularity, it is assumed a User will:

- Each day, collect the daily register read for Import consumption and, where configured, the daily register read for Export generation.

It is assumed there is no requirement for additional data collection to support reconciliation data.

Monthly Granularity

This will apply where the domestic customer has opted out of half-hourly data collection to support half-hourly settlement. The monthly option has been included to allow enduring customer-Supplier contracts to complete without changing the consent arrangements. It is anticipated that monthly read sites will

convert to daily reads over time. For this level of granularity, it is assumed a User will:

- Once a calendar month, collect a monthly register read for the Import consumption data and where configured a monthly register read for the Export generation data.

There is no requirement for additional data collection to support reconciliation data.

Assumptions around the collection of data

To support the DCC's demand and capacity management processes, where an Eligible User wishes to retrieve consumption data or generation data from an ESME for the purposes of supporting MHHS, the User shall ensure that all first attempts to retrieve a new data set from each target ESME device shall be made using Scheduled Services.

Where either:

- the use of Scheduled Services fails to return the required data to the requesting Eligible User; or
- Scheduled Services are not possible to retrieve the required data,

then an Eligible User may use On Demand Services to request (or re-request) the required consumption data or generation data to ensure that the required data is successfully retrieved from each target ESME.

Collecting reconciliation data monthly, evenly spread across the month for a User's portfolio of ESMEs, will allow an Import Supplier, Export Supplier or MDR User to fulfil its wider obligations while allowing the DCC to effectively manage capacity on the DCC Systems. More frequent collections

would require additional capacity on the DCC Systems, which will increase the cost of the solution.

3.4.1 Service Requests Applicable to Each Scenario

The table below summarises the Service Requests that may reasonably be requested by an Import Supplier, Export Supplier or MDR User for MHHS depending on the level of data granularity the customer has consented to.

SR	Service Request Name	Half-hourly	Daily	Monthly
4.1.1	Read Instantaneous Import Registers	Yes	Yes	Yes
4.2	Read Instantaneous Export Register Values	Yes	Yes	Yes
4.6.1	Retrieve Import Daily Read Log	Yes	Yes	No
4.6.2	Retrieve Export Daily Read Log	Yes	Yes	No
4.8.1	Read Active Import Profile Data	Yes	No	No
4.8.3	Read Export Profile Data	Yes	No	No
4.17	Retrieve Daily Consumption Log	Yes	Yes	No

Table 4: Service Requests applicable to Each Level of Data Granularity

This information has been used by the DCC to inform its assumptions around expected Service Request traffic demand and capacity requirements. Any changes to this over time may impact on these assumptions.

It is assumed that the User will be responsible for ensuring that the Service Requests that it sends to the

DCC are in line with the level of granularity the customer has consented to. The DCC will not be required to perform any additional validation on this. The DCC will act in accordance with the Service Requests sent by the User.

Requirement 6: The end-to-end security arrangements for half-hourly settlement will be put in place

The existing User Security Assessment for a Supplier will be used for any Supplier operating as its own MDRA.

MDRAs who are not Suppliers will need to undergo an initial Full User Security Assessment which will form part of the User Entry criteria in SEC Section H1.10(c). The MDRA will then be required to adhere to the same SEC Section G 'Security' obligations as an Other User and will need to have annual User Security Assessments as defined in SEC Section G8.40.

Requirement 7: An MDR User will be subject to the SEC privacy arrangements

MDR Users will be subject to Privacy Assessments. These will be based on a gap analysis carried out between the Panel's requirements and what will be implemented under the BSC. This approach will need to ensure that any outstanding requirements not met under the BSC are fully contained in the SEC.

Any Supplier operating as its own MDRA will, as now, not need to undergo a Privacy Assessment.

MDRAs who are not Suppliers will need to undergo an initial Full Privacy Assessment which will form part of the User Entry criteria in SEC Section H1.10(c). The MDRA will then be required to adhere to the same SEC

Section I 'Privacy' obligations as an Other User and will need to have annual Privacy Assessments as defined in SEC Section I2.

4 Key points noted from Service Providers PA Responses

DCC has reviewed the Preliminary Impact Assessment (PIA) responses received from our Service Providers (SPs). The following section summarises the key points which need resolving prior to issuing a Full Impact Assessment (FIA) request.

These key points create a level of uncertainty which has influenced the variable ROM costs. Resolving these in a clear and unambiguous manner should significantly reduce solution costs as part of any requested FIA and maximise the value of the FIA.

4.1 User Behaviours and impact on additional SRV message volumes

From the PIA discussions and responses received, DCC are keen to stress the importance of gaining a greater understanding and better definition of how Users will access the Service Request Variants (SRV) defined within the business requirements to support the new MHHS service.

There are several variables within the requirements relating to User behaviours that influence the volume of additional SRVs that DCC may be requested to process. DCC have attempted to model this variability and gain an understanding from our SPs of the impact of potential demand for additional SRV message volumes, within the PIA stage. However it is clear that the high level of variability in User behaviours and the associated volume of additionality has a significant impact on the overall solution design, associated costs and delivery timescales.

A major factor on the DCC solution and its associated performance is dependent on the additional MDR and/or Supplier data collection activities to support the new MHHS service.

This is largely dependent on how and when MHHS data is collected aligned to User expectations and behaviours and the level to which these can be predicted and /or controlled.

The number of and associated durations of the DCC Scheduling window(s) to support all scheduled data collection activities has been identified as an increasingly key part of the ongoing DCC solution design. More specifically, the proportion of DCC Scheduled SRVs that will be collected: either in the existing CSP/S1SP Scheduling window, and extension to the CSP/S1SP Scheduling window; or a potentially new MDR Scheduling window. It is, therefore, transaction volumes during these pre-defined CSP/S1SP Scheduling windows that are likely to determine DCCs required infrastructure requirements.

- The existing DCC Scheduling window is circa midnight to 6am (a single 6 hour window common to most CSPs / S1SPs)
- This is based on the existing smart meter roll out volumes, but will come under pressure as the smart roll out increases and adding extra SRV volumes into this existing window will create additional capacity challenges.
- Ideally, the DCC solution would be designed to adapt over time, as the smart meter roll out volumes increase. Additional MHHS message

volumes are expected to increase the amount of time used for the DCC Scheduling window, in order to maximise the use of the 24 hour Target Response Time. This will also smooth the total User SRV demand across the day to avoid large demand spikes which increase capacity requirements and associated solution costs to fulfil these.

- The DCC Systems (via DSP solution) can support CSP/S1SP-specific DCC Scheduling windows to be defined within the solution to allow the start and end time of the Scheduling window to be defined separately. This allows for individual CSPs/S1SPs to manage the number of SRV volumes to be passed to each CSPs/S1SPs at the most appropriate time and rate for processing, maximising the capacity without creating demand spikes, which would result in inefficiencies due to the extra headroom required. The timing of these DCC Scheduling windows will impact each of the SPs infrastructure requirements.
- DCC are not currently in a position to determine Suppliers' and MDR's intentions for potential re-use of data collected via existing DCC Schedules for MHHS purposes or, , to know if current DCC Scheduled collection patterns are likely to continue. Since the DCC systems are sized for message volumes within

the CSP/S1SP Scheduling window, any additional MHHS SRVs processed will need to be supported by additional infrastructure.

- The S1SPs provided their ROM costs on the basis of using, or slightly extending the existing DCC Scheduling window, which has artificially increased the Transaction Per Second (TPS) processing requirement and has resulted in high variable ROM costs.
- DCC will work with Industry and SPs during the Refinement stage to define the boundaries to help define solution requirement, better inform the FIA response and reduce costs.

A recommendation would be to move away from the single current DCC Scheduling window and use an updated more appropriate pre-defined DCC Scheduling window, or create a Scheduling window across 24 hours to meet the TRT requirements and reduce capacity impacts on the DCC System and deliver greater infrastructure re-use efficiencies to Users.

4.2 Need for a firmer DCC System E2E solution design

Discussions with SPs and their PIA responses has highlighted that a greater level of detail on an integrated E2E design across the Total DCC System is needed. This will ensure that all SPs are costing against a common detailed understanding of the E2E solution, design decisions and assumptions.

This is especially true for the SMETS1 device solution where additional lower level detailed design options have

been raised by SPs for further consideration as part of the detailed E2E design. E.g. introduction of short-term caching capability of meter reads data at S1SP likely to reduce the numbers of SMETS1 device interactions against the additional MHHS volume of Service Requests resulting in less impact on the DCO and SMETS1 CSP for specific cohort. Each of these will have an impact on costs depending upon which design options are taken forward in addition to clarifying the points as described in section 4.1.

4.3 Challenge of determining impacts on additional capacity for SMETS1 FOC service

For the SMETS1 FOC cohort of meters, Service Providers have noted that they have experienced challenges in estimating the additional message volumes impacts of the proposed MHHS service changes on their solution as they are still at the early stages of implementation and extended capacity is difficult to estimate accurately currently as they have limited data from production to base further capacity increases on. DCC will work with these SPs during the next period of time to help mitigate this risk / issue, but additional clarity on expected SRV usage would help mitigate this risk and get a better FIA response to better determine solution costs.

4.4 Issues noted with Business Requirements

As per the Business Requirements published for this modification, requirement 3 defines the valid Service Requests for an MDR User. This includes SRV4.1.1 - Read Instantaneous Import Registers but DCC have identified that there is an issue/inconsistency for SMETS2 Devices only. In the latest version of GBCS, there is no defined support for Access Control Broker Remote Party Role to support MDR User access to this SRV.

GBCS Use case ECS17b is associated to SRV4.1.1 and this currently only grants Use Case access permissions to the Supplier and Network Operator Remote Party Roles and not the Access Control Broker.

In order for the DCC to create the associated Command for SRV4.1.1/ECS17b for the new MDR User request, using the URP processing pattern, GBCS would need to ADD "Access Control Broker" as a valid Remote Party Role with Use Case access permissions.

For clarity, SMETS1 Devices are not impacted by this issue as they are not subject to GBCS definitions and the use of SRV4.1.1 for MDR Users is possible for SMETS1 ESMEs.

For PIA purposes and simplicity at this stage, DCC has assumed that the MDR Users will not be able to use SRV4.1.1 for SMETS2 Devices and that subsequent GBCS changes will not be made to enable the Access Control Broker User to have use case permissions to ECS17b. However, DCC recognise that this identified issue will need further discussion and a formal decision, as a GBCS change would have knock on impacts on the existing portfolio of installed ESME

devices. This may need to be impact assessed before a final decision is made to keep the existing requirement, or update it.

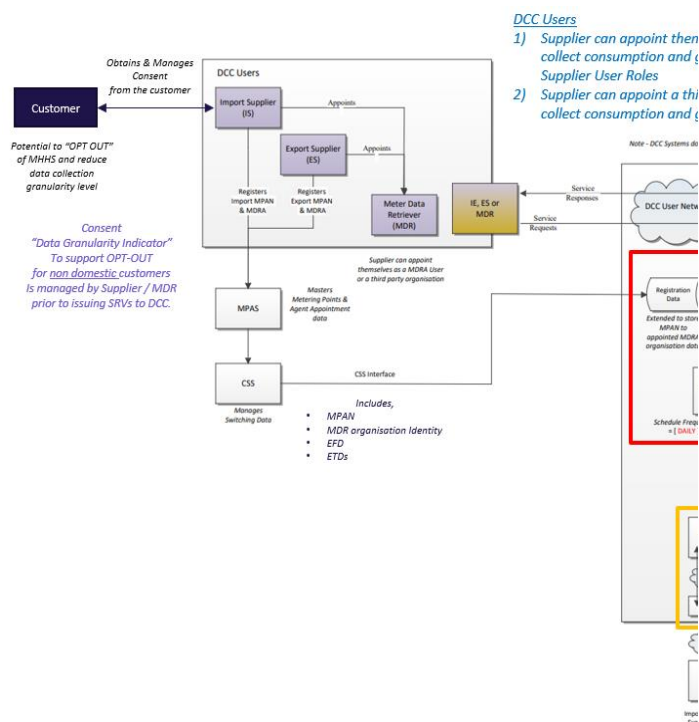
Please see *Appendix D: MDR User Access and GBCS Use Case Potential Changes* for details of further observations on Business Requirements for decision prior to any FIA request.

5 The DCC Total System Technical Solution

The following sections give an overview of the high level outline solution created to support the PIA discussion and associated PIA responses from DCC and its Service Providers, along with considerations of design principles and volumetric calculations associated with the solution.

5.1 High Level Architecture

The following diagram gives a high level architecture view of the intended MHHS solution.



5.2 Solution Summary

The key points of the solution are as follows:

- The DCC shall be able to accept Service Requests from a new MDR User Role or existing Import / Export Suppliers to retrieve Import consumption data (Half-Hourly Intervals, Daily Consumption totals and Register Reads) and, where configured, Export generation data (Half-Hourly Intervals, Daily Consumption totals and Register Reads) from specified SMETS1 and SMETS2+ ESMEs enrolled within the DCC Systems.
- All Service Requests received from new MDR Users will use the existing DCC User Gateway and be subject to Access Control authentication against the identity of the MDR User stored and provided to the DCC within Industry Registration Data via the Central Switching Service and ECoS interfaces⁵. This will ensure that only registered MDR Users can retrieve the relevant Import consumption and/or Export generation data from each ESME.
- All authenticated data requests from Suppliers and MDR Users shall be retrieved from each ESME using Data Service Provider (DSP) scheduling services wherever possible, and Users will set up a schedule for all applicable Service Requests. Any on-demand requests shall be kept to a minimum and will be processed in line with the Target Response Times (TRTs) specified in Requirement 4.

⁵ The Registration data that is to be used by the ECoS Party is a direct copy of that received and stored by the DSP as part of the Access Control check. When the ECoS solution is implemented, the DSP and the ECoS Party will each use the same CSS data feed and updated data format. Any changes to this interface and associated data transfer format will

impact both DSP and ECoS Party alike as the same set of changes are assumed applied once to the single CSS data set / interface so that it remains consistent. Changes will have to be assessed against the ECoS programme, but this will be out of scope for SECMP0162.

- Where data is successfully retrieved from both SMETS1 and SMETS2+ ESMEs, this data shall be returned across the Smart Metering communication networks and these Service Responses shall be returned to the requesting User for use in the wider Settlements purposes.
- Users will be encouraged to use Scheduled Services wherever possible to collect the required consumption and generation data from ESMEs to allow the DCC to maximise efficiencies across its systems and minimise the impacts of any demand spikes that could be caused by a large number of on demand Service Requests being sent to collect the required MHHS data.

5.3 Design Principles

This section includes the design principles associated with this Modification.

- The implementation of the MHHS solution should not negatively impact the wider existing smart metering arrangements.
- Re-use existing DCC User Interface Specification (DUIS) Service Requests to limit impacts on SEC Parties.
- Consumption and Generation data sets will remain available to multiple different authorised Users, but these data sets are not stored long-term on the DCC Total System.
 - Note - Short term local caching of some Consumption and Generation data sets within S1SP solutions may be appropriate and deliver processing

benefits. The potential for including this within the E2E design will be investigated further during the next period of time prior to the FIA being requested.

- Wherever possible, future proof the Data Retrieval service for Consumption and Generation data sets for any other authorised Users to create operational efficiencies and minimise any future impacts for demand or capacity issues.
- This solution will be applied to SMETS1 and SMETS2 Devices and supporting systems, and wherever possible, offer the same service irrespective of SMETS1 or SMETS2 meters.
- Settlement data and the MHHS solution as a whole is separate and additional to existing business processes and system requirements.
- There is no requirement to check the number of MHHS requests made by a User in a particular period.

A review of the current valid Service Requests for the proposed MDR User with an 'Other' RemotePartyRole will need to be assessed as part of the FIA. This will use the same data retrieval pattern as the existing "Other User" (OU) User Role for SRVs such as 4.17 for the OU User Role using the Access Control Broker (ACB) Use Case permissions as they are also an Unknown Remote Party (URP), like the new MDR User Role will be for Devices. The expected Remote Party Role code to be contained within a SMKI Organisation Certificate for new MDR users when communicating with devices for encryption purposes is '127'. Initial notes on the SRVs and changes are included in Appendix D:

MDR User Access and GBCS Use
Case Potential Changes.

Note that the assumptions used as part
of the outline high level design and
Service Provider PIA submissions are
provided in

5.4 Demand Modelling and Volumetrics

The DCC has made the following assumptions regarding capacity as part of its high-level solution discussions with Ofgem under the Significant Code Review (SCR):

- Re-use existing User Interfaces (such as the DCC User Interface Specification (DUIS)) to limit impacts on existing SEC Parties.
- Re-use existing Service Requests for MHHS data retrieval rather than create new SRVs to reduce ongoing maintenance and testing costs.
- Wherever possible, offer the same service for both SMETS1 and SMETS2 Devices.
- Consumption and generation data sets remain available to multiple different authorised Users.
- Manage demand and capacity using 'value for money' principle for Users, seeking to reduce the overall cost of the solution.
- Calculations of extra load and throughput assume MHHS readings are made with additional infrastructure and system capacity, rather than utilising any spare capacity currently on systems.

Eligible Users (Import Suppliers, Export Suppliers and Meter Data Retrievers) will send Service Requests either to create DCC schedules to retrieve data or collect data on demand for DCC enrolled Smart Meters, to retrieve all the import consumption and export generation data required to perform HH Settlement activities according to the new TOM and associated settlement timetables.

The DCC Total System must be able to meet these demand usage levels and therefore each Service Provider solution must also therefore support these demand usage levels. DCC recognises that determining the likely usage requirements from Users and the associated potential impacts on capacity for the DCC and individual Service Provider solutions is a key part of the total DCC solution for the new MHHS service. It is noted that the usage requirements will have a level of variability based on the assumptions made against key variables.

DCC notes that a decision on how to manage the potential high levels of variability and fluctuation of User demand over time associated with the MHHS service is a key input to the solution proposed by the DCC for this modification.

5.4.1 Volumetric Scenarios

For PIA purposes, DCC created three potential volume scenarios, (Low-A, Medium-B, and High-C) for Service Providers to respond against to illustrate the potential range of additional daily Service Request volumes and associated message sizes that need to be supported for the new MHHS service.

Note - These volumes scenarios were created using a “MHHS – Demand Forecast Model” that was created by DCC using a set of Key Service Parameters (with associated ‘assumed’ values) and a set of Modelling assumptions to help illustrate the potential usage requirements to help cost the solution design against.

- *DCC notes that any variations in these have a direct effect on daily Service Request volumes and associated message sizes that need to be supported for the new MHHS service.*

Scenario Key Variables	A	B	C
% Export Take Up	10%	30%	50%
% MHHS data collected by Import / Export Supplier	75%	50%	0%
% MHHS data collected by MDR	25%	50%	100%
% of Data Re-use for MHHS by Registered Supplier (Data Already Collected for existing BAU activity)	100%	50%	0%
Additional SRV demand across DCC Service			
Expected SRVs Volume per day (million)	circa 11.1m	circa 44.3m	circa 73.6m
Expected Data Transfer Volumes per day	15.1 GB	55.5 GB	91.3 GB
Scenario Implications	Suppliers do not flag any Service Requests as being solely for MHHS as all data is assumed to be already collected via existing schedules => 25% MHHS data collected in MHHS Scheduling window	Suppliers flag 50% of MHHS data collected as being solely for MHHS (25% of total MHHS data) => 75% MHHS data collected in MHHS Scheduling window	100% MHHS data is flagged as collected solely for MHHS as all being sent by new MDR users => 100% MHHS data collected in MHHS Scheduling window

Table 5: Volume Scenarios and Parameter Settings

The following spreadsheet contains the *key volumetric assumptions* that were used to determine impacts on Service Providers, the likely usage requirements and therefore the



MHHS - Demand
Forecast Model - Key

associated potential impacts on capacity for their solutions.

While the DSP and CSPs are able to calculate impacts based on the number and size of the additional SRVs, the SMETS1 S1SPs/CSPs calculations are based on the number of transactions per second throughput with the following implications needing to be considered as part of the impact assessment:

- Data Volume – How much additional data is each meter/comms hub expected to consume per month as a result of the Half-Hourly reads?
- SMS Volume - How many additional Mobile terminating SMS messages (MT SMS)⁶ is each meter/comms hub expected to consume as a result of the Half-Hourly reads?
- Data Rate - What is the expected maximum data throughput as a result of the Half-Hourly reads?
- API Rate – How many API calls/sec to SMETS1 CSP system are expected as a result of the Half-Hourly reads?
- Connections – What is max number of concurrent data sessions (Packet Data Protocol context) and how long does the PDP context remain active for?

Both SMETS1 and SMETS2 Service Providers were also asked to consider a suitable processing window for scheduling and executing additional MHHS data requests (SRVs). This does not form part of this PIA, but will be required as part of the E2E solution design required prior to any FIA request.

5.5 DSP Solution

CGI have highlighted the following high level impacts upon the DSP solution.

Solution Impacts

1. Service Request Processing

DSP motorway processing will be modified to accommodate the new User Role of Market Retrieval Data Agent (MDRA) such that a DCC Service User, as an MDRA user, will be able to submit and retrieve a response to a limited set of Non-Critical Read Only Service Requests, in line with the business requirements, in order to retrieve half hourly settlement data from ESME devices.

A new optional attribute named 'ForSettlement' will be introduced in the Service Requests listed above. This attribute will be set to true by the Service Users to indicate that a Service Request has been submitted for the purpose of MHHS. The following table summarises the expected behaviour in terms of setting this flag for each User Role.

Service User Type	Usage of "ForSettlement" flag
-------------------	-------------------------------

⁶ A MT SMS is used to wake up a SMETS1 device to create a Data session

MDR	Always set to TRUE
Import / Export Suppliers	Set to TRUE only when the SRV is used solely for the purpose of MHHS
Network Operators/ Other Users	Never set to TRUE

Table 6: Usage of "ForSettlement" flag

Updates to the DUIS schema and DUGIDS are anticipated to incorporate the new attribute to indicate dedicated MHHS reads, additional error codes and responses. A new DCC Alert for schedule deletion resulting from MDR appointment changes may be required, subject to clarification.

No Message Mapping Catalogue (MMC) XML changes have been identified.

Subject to the SMETS2 GBCS issues noted regarding SRV4.1.1 being used only for SMETS1 devices, no changes to GBCS have been identified.

The Southbound Parameter configuration needs to be modified to distinguish between User Roles and to accommodate the retry strategies adopted by each CSP/S1SP.

The revised DUIS XML Schema and the S1SP SMWAN Gateway Schema will need to be deployed.

2. MDR Scheduling

The CSPs and S1SPs may require different strategies in order to accommodate the increased load in daily WAN traffic from the MDR Service Requests and Responses:

- DSP scheduling will be modified so that MDR specific windows can be configured for CSPs/S1SPs in order to ensure that DSP is not overloaded. This schedule window will apply to all MDRA requests (on demand, future dated and scheduled).

3. Maintenance of MDRA Appointment Data

To support the authorisation against Industry Registration data, the DSP will receive and maintain MDR appointments associated with MPANs held within the Smart Metering Inventory (SMI). These will be sent to DSP via CSS.

The CSS Gateway will need to be modified to accept MDRs as new role in the context of Supplier Arranged Appointments.

4. The MDRA User Role within SSI and SSMI

Changes are required in SSI to allow access to the new MDR User Role.

MDR users will be able to use the Self-Service Interface (SSI) with the same access rights as users with the RSA User Role and hence will be able to view Service Audit Trail (SAT) records for their own requests.

The Self-Service Management Interface (SSMI) will be modified in order for a DCC Service User to be assigned to an MDR role.

5. Reports and Data Extracts

Reports and data extracts to both the DCC and S1SP will be modified to include the MDR User Role. The new MDR User Role will be included in all relevant Reports to the DCC/SSMI and Data Extracts to the S1SPs. It is anticipated that additional reports may be required for MDR reporting purposes, to be defined as part of detailed design.

Performance Impacts

a) Motorway performance

Based on the volumetric projections in the requirements section, it is anticipated that the amount of Service Request processing will roughly double in size.

b) Non-Motorway performance

Other areas of the system which are impacted are as follows:

- The CSS Interface will need to process new MDR Appointments for each Electricity Registration;
- Reporting will be impacted by the increased volume (roughly double in size) of Service Requests. This will be particularly noticeable in the Service Audit Trail;
- There will be an increase in the number of Service Requests sent to the DCO;
- The number of logs written by the various logging functions (generated by motorway and non-motorway activity) will increase (Event Logs, Diagnostic Logs, Alert Logs, SM WAN Usage logs;
- The number of incidents raised will increase.

Due to the small number of additional DCC Service Users, the impact on SSI usage is considered to be negligible.

Infrastructure Impact

Since the DSP system is sized for the existing CSP/S1SP Scheduling window, any additional MHHS transactions processed during this period will require additional infrastructure.

The impact of additional MHHS message volumes is likely to require between zero (0) and six (6) additional Motorway Lanes, depending on the expected volume scenario (subject to confirmation from Industry of the expected User behaviours) and the number and associated length of the CSP/S1SP Scheduling windows (determining when the additional SRV message volumes can be scheduled within the overall DCC solution).

Additional infrastructure may also be required to cater for,

- Increased volume of Service Requests and Registration data;

- Additional processing and storage capacity for the Data Warehousing Solution;
- Additional capacity for the transferring of reports to the DCC;
- Additional disk storage for increased logging;
- Increased capacity for HSMs;
- Increased disk and memory for Oracle;
- A revised archiving strategy to accommodate the off-lining of a greater amount of data.

Service Impact

The DSP solution changes will require additional effort to support and maintain them on an ongoing basis. This change results in an expanded and more complex DSP solution.

5.6 CSP North Solution

Arqiva have highlighted the following high level impacts upon their solution.

Solution Impacts

- Comms Hub
 - Assessing the impact of Message Compression
- SMWAN (RAN/RNI)
 - Modelling of additional MHHS messaging within a specified DSP scheduling time window to assess the impact on RAN (Radio Access Network) capacity and channel requirements for all radio base stations
- BSS (Business Support Systems)
 - TRT management, reporting, logging functionalities, including infrastructure capacity and licence
- Security
 - Assessing the impact to IT Security and vulnerabilities
- Platform Test & Build
 - Assessing testing of SMWAN and Comms Hubs
 - Assessing impact on design, application release analysis, deployment planning, and integration test definition
- Comms Hub Manager (CHM)
 - No Impact
- OSS (Operational Support Systems)
 - No Impact
- Service & Ops
 - No Impact

Infrastructure / Capacity Impact

- ASML is proposing message compression to gain efficiency on the radio channels, this proposal becomes more or less required dependent on the volume of traffic and the scheduling window over which it is distributed.

- Low priority message compression in both the uplink and downlink will be investigated as an option to reduce SMWAN capacity loading and channel requirements. If scheduling window is incorrect (too long), then it will be required for any shorter duration on Scenario B and C volume projections.
- Solution assumes an additional MHHS scheduling window that is outside of the current DSP Scheduled Read window of 00:00-06:00 with discussion of these being either 8 or 12 hours in duration used for ROM impact purposes to minimise additional demand impacts, help avoid demand spikes and make the most efficient use of the radio channels.
- Several variations of response have been requested. The table below seeks to explain the variations in the responses as driven by the lack of certainty for volumetric requirements and the wide range of scenario options.

Scenario	MHHS Scheduling Window (hrs)	Radio RF Channels	50% Compression
A	8	8 / 4	No / Yes
	12	4	No
B	8	8	No
	12	8 / 4	No / Yes
C	8	8	Yes
	12	8	No

Table 7: Arqiva Volumetric Scenarios

- Each table entry showing 8 channels will incur additional channel costs (4 is current baseline).
- Each table entry showing Yes in the Compression column will incur the costs relating to the development of that functionality

5.7 CSP South and Central Solution

Telefonica have highlighted the following high level impacts upon their solution.

Solution Impacts

- Uplift to the Telefónica SMWAN Networks (Routers and Firewalls) to be able to support the increased volumes for scheduled meter read collection for Half Hourly Settlement.
- In order to minimise the load on the Telefónica SMWAN Network and also to avoid any interruptions to planned activities (e.g. firmware schedule), Telefónica's proposal is to allow the daily meter to read for Half Hourly Settlement, to be scheduled for collection by

the DSP over a 13 hour window daily between 7AM – 8PM, in addition to the existing meter read which currently exists daily for the DSP meter read collection from midnight to 6am. This will remove any peaks in the load that the Telefónica infrastructure would need to accommodate. The details of the proposed timeslot for meter read to be collected daily for settlement will be discussed and confirmed during the IA stage. Telefónica's pricing is subject to this time slot being agreed.

- Uplift to the Telefónica MFT platform such that it is able to deliver the daily SMWAN feeds from the DSP, which includes the "additional" scheduled meter read data collected for "settlement" purposes, to the Telefónica Cloud reporting platform. Telefónica assumes that there will be identifiers in the SMWAN Usage records from the DSP, which highlights the meter reads collected for Half Hourly Settlement, such that they can be included in the new Performance Measure Reports (3.3) to manage extended TRTs.
- Design, build and unit test updates to Performance Measure Reports in the Telefónica Cloud reporting platform:
 1. PM 3.1 - Percentage of Category 2 HAN Interface Commands delivered to the DCC WAN Gateway interface within the relevant Target Response Time.
 2. PM 3.2 - Percentage of Category 3 Alerts delivered to the DCC WAN Gateway interface within the relevant Target Response Time.

Due to the additional meter read traffic (approx. 8m to 51m per day as per DCC-L volume scenario), introduced in this CR and in order for Telefónica to be able to continue to comply with the existing Performance Measure PM 3.1 and PM 3.2 contractual SLA's, Telefónica will need to move to a Cloud based reporting platform, such that it is able to meet its Contractual reporting capabilities for Performance Report on PM 3.1 and PM 3.2 as well as support and report on the additional scheduled meter collection for MHHS.

Further, as the meter reads collected for this CR are potentially for a new separate industry user role, Telefónica has assumed the need for a new contractual Performance Measure (PM 3.3-TBC) in order to provide Performance Reports on the meter reads collection for Half Hourly Settlement.

- ☐ Modification to the Telefónica Billing solution to be able to bill and generate the DCC-L invoices for additional SMWAN Usage traffic, which includes the meter reads collected for "Settlement".
- ☐ Deployment of the Telefónica IT solution changes within the Telefónica's PIT environment in accordance with the existing PIT Approach document.

5.8 Critical Software Solution for SMETS2

Critical Software highlighted following impacts on various tools in SMETS2 ecosystem.

- To support the updated DUIS schema, the Parse & Correlate software needs to be updated.
- To support the changes in GBCS Use Case - ECS17b (subject to resolution of issue reported in section 4.4), following tools need to be updated
 - GFI
 - GBCS Message Sizing Tools
 - RTDS

5.9 SMETS1 CGI Instant Energy Solution

Following high level impacts are identified at CGI – Instant Energy SMETS1 Service Provider.

- New Meter Data Retrieval Agent (MDRA) User Role need to be implemented through the changes in S1SP Management Interface.
- Application changes are required to handle the new flag in Service Requests which indicates the data retrieval are solely for MHHS purposes.
- For the volumetric scenarios as in section 5.4.1, the resulting total volume of Service Requests in all three scenarios is higher than the volume in the production system today (as of August 2021). These additional Service Requests will cause an increase in device interactions which will require an uplift to infrastructure across all Instant Energy (IE) S1SP components in the area of
 - additional server components for key technical component
 - additional licenses including HSM licenses
 - additional memory for existing databases
 - additional long-term storage
 - Scenario B and C require additional cache capability
- Above infrastructure uplifts are required for each production site and performance test environment.

See Appendix C for risks and assumptions related to above solution impact.

5.10 SMETS1 Secure Meter Impact

Secure Meters identified the following high level impact.

- Changes in S1SP Management Interface and subsequent systems to support new Meter Data Retrieval Agent (MDRA) User Role.
- Changes in DUIS Request processing to support service requests which indicates the data retrieval are solely for MHHS purposes.
- For the volumetric scenarios as in section 5.4.1, Secure Meter estimates that the production environment needs to support additional 26%-58% transactions per second. These require
 - procuring and deploying additional infrastructure.
 - database performance enhancement changes.
 - changes in the offline systems to accommodate the associated volumetric extensions.
 - changes in management and monitoring systems due to additional infrastructure and volumetric traffic.
 - changes to segregate the SRVs based on the TRT processing requirements.

- **increase the capacity of the SMETS1 CSP systems for Secure Meter Device cohort.**
- Increase the capacity of the SMS MDA/sec (wake up SMS) service.

These infrastructure uplifts are required for production and performance test environment.

See Appendix C for risks and assumptions related to above solution impact

5.11 SMETS1 Trilliant Impact

Following high level impacts are identified at Trilliant for the software changes of SMETS1 Service Provider for this SMETS1 Device cohort.

- new Meter Data Retrieval Agent (MDRA) User Role need to be supported with appropriate access control.
- code changes are required to handle the new flag in service requests which indicates the data retrieval are solely for MHHS purposes.
- Additional cache capability for subsequent MHHS related Service Request to reduce device interaction.

See Appendix C for risks and assumptions related to above solution impact

5.12 SMETS1 DXC Impact

Note that the due to relatively low number of SMETS1 devices enrolled in FOC cohort, non-functional estimates for full-scale deployment are subject to a greater variance.

[TBC]

5.13 SMETS1 Critical Software Impacts

Following high level impact are identified on Critical Software for SMETS1 DCO component.

- Based on provided requirement and high level analysis, impact of this SECMOD on the DCO software would be purely non-functional.
- The non-functional impact on DCO software due to additional numbers of Service Request are significant and may require redesign of technical architecture solution. Critical Software will provide technical support for these significant non-functional activities carried out by the ANSO (Capgemini) party.

5.14 SMETS1 Capgemini DCO Impact

Capgemini has acknowledged that though there are no functional impact on DCO software solution, there are significant impact on DCO technical system component for additional volume of MHHS related Service Requests. Due to the non-availability of a cross ecosystem solutioning at this PIA stage, Capgemini provided a high level impact on technical component such as hardware, software/licenses with the assumption of a standalone MHHS environment based on volume metrics provided by the DCC. It is anticipated that following

the FIA and design, final solution will have a significant number of solution and cost optimisations once built onto the existing DCC infrastructure.

Following are high level impact on Capgemini for SMETS1 DCO component

- Redesign of DCO technical system architecture (where required)
- Procure infrastructure, services and any new licences
- Install additional infrastructure for DCO
- Integrate and develop necessary tooling and business reporting mechanisms
- Install any new management licences
- Add infrastructure to management tooling
- Update Configuration Management Database
- Deploy any updated Dual Control Organisation (DCO) software from Critical Software (CSW) where required
- Produce a test plan & approach for verifying the new infrastructure meets the requirements stated in the High Level Design (HLD) and testing the updated SRV's
- Execute functional tests to demonstrate that the new SRV's are handled by the DCO software
- Regression test of existing functionality
- Perform system capacity tests to verify the new infrastructure can meet the updated volumetric requirements
- Produce a Test Completion Report

See Appendix C for risks and assumptions related to above solution impact

5.15 SMETS1 Vodafone Impact

Vodafone has undertaken a review of the SECMOD requirements, volumetric information provided by the DCC. Based on the analysis of current data volume usage in production for similar Service Request, projected volume of Service Requests and in-flight change request of additional IP addresses in APN pool, assumption is Vodafone's service would not be meaningfully impacted by this SECMOD.

However, following the cross ecosystem solutioning at FIA Stage, Vodafone would like to re-evaluate this assumptions.

5.16 SMETS1 Telefonica Impact

Considering relatively low number of enrolled SMETS1 Devices with Telefonica SMETS1 WAN solution, the impact of additional volume of MHHS related Service Request are not evaluated on Telefonica SMETS1 WAN Solution at this PIA stage.

6 Impact on Systems, Processes and People

This section describes the impact of SECMP0162 on Services and Interfaces that impact Users and/or Parties.

6.1 Security Impact

The implementation will be security assured during the implementation phase. This includes reviewing designs, test artefacts and providing consultancy to the implementation and test teams components of DCC Total Systems.

Security oversight and support will be required for the DUIS uplift as well as the additional security components that result from the volume increases and the motorway lanes that are needed. Data privacy implications may need to be assessed if any short-term cache capability is introduced.

A more detailed security impact will be carried out as part of the Full Impact Assessment. Penetration testing and updates to protective monitoring may be required.

6.2 Infrastructure Impact

This Change Request requires additional infrastructure across DSP, CSPs, DCO and SMETS1 Service Providers system for additional motorway lanes, WAN traffic and technical infrastructure component.

The impact of this additional infrastructure is expected to be significant for this change and therefore has been included in the indicative pricing in the accompanying ROM costs. That pricing reflects the upper and lower limits.

The price for the remaining options is expected to fall between these values based on economies of scale. It should be noted that, to realise those economies, the additional infrastructure would need to be implemented at the same time.

6.3 Service Impact

The DCC solution changes will require additional effort to support and maintain them on an ongoing basis across DCC Total Systems. This change results in an expanded and more complex solution. The functionality to accommodate MDRA requests will require additional effort from the Service Team to:

- Update service procedures and knowledge bases to include information relating to the expanded functionality;
- Transfer knowledge to all service personnel to ensure awareness of the expanded functionality;
- Provide incubation and enduring support in relation to the expanded functionality.

Specifically for this change, additional effort will be required for:

- The onboarding of MDRAs;
- Ongoing management of the archiving strategy which requires update to accommodate increased data volumes in the processing of logs, reports, etc.

7 Implementation Timescales and Approach

This change is expected to be included in a future SEC Release. Design, Build, and PIT is expected to take up to 12 months to complete after the CAN is signed. Ofgem is requesting that all changes for MHHS are in place by 1 April 2024. The November 2023 SEC Release is the latest scheduled SEC Systems Release that these changes can be included in to meet this deadline.

Details of the implementation will be finalised in the FIA.

7.1 Testing and Acceptance

There will be significant impact to Systems Integration Testing (SIT) as a result of this change. It is assumed that the change will be implemented and tested as part of a major release and will include release based regression testing in SIT and UIT.

8 Costs and Charges

The table below details the PA ROM cost of delivering the changes and Services required to implement this Modification Proposal.

As described in Section 5.4, a significant percentage of the total costs associated with these changes are directly linked to the additional volume of Service Requests that Users send to the DCC associated with the collection of import consumption and export generation data sets from ESMEs. The number of SRVs sent is directly proportional to the amount of processing capacity needed by each Service Provider, to successfully manage the required User demand.

The ROM costs are indicative amounts to implement solutions to meet the defined requirements and are not offered or open to acceptance. The change has not been subject to a sufficient level of analysis that would be performed as part of an FIA. There may be elements missing from the solution or the solution may be subject to a material change, which could impact the final offered fixed price.

The table below details the cost of delivering the changes and Services required to implement this Modification. For a PIA, only the Design, Build and PIT indicative fixed costs are supplied.

	ROM Cost Lower	ROM Cost Upper
SMETS2 Service Providers*	Circa £8.5m	Circa £12.3m
SMETS1 Service Providers*	Circa £20.6m	Circa £46.7m
TOTAL	Circa £29.1m	Circa £59.0m

Table 8: SECMP0162 Cost Breakdown – High Level

DCC recognises the significant range of the ROM costs presented. These discrepancies are a result of the level of variability that exists in expected User behaviour, impacting message volumes and over what time period these are to be processed, as part of the new MHHS service.

DCC will work with Industry and Service Providers prior to any FIA request to refine capacity requirements, [Ref:Section 4 – Key points noted from SPs PA responses and Appendix C-Dependencies section.]

DCC is confident that once the requirements are clarified and the assumptions are updated as appropriate this should reduce the overall costs within the subsequent FIA.

Each Service Provider was asked to provide ROM costs split by Fixed and Variable Costs as described in section 5.4.1.in recognition that a significant percentage of the total costs associated within these changes are directly linked to the processing of a variable additional volume of Service Requests that Users send to the DCC to support the new MHHS service.

Fixed Costs All costs of change required to support the MHHS change requirements irrespective of SRV or data volumes that are sent from Users to the DCC.

This includes:

- Design: production of detailed designs
- Build: development of the designed Systems and Services to create a solution (e.g. code, systems, or products)
- PIT: testing in isolation of other Service Providers

Variable
Costs

These costs are influenced by the MHHS requirements that increase or decrease SRV volumes sent from Users to the DCC. This may include infrastructure upgrades to support additional SRV volumes. These variable costs are split into indicative “Volume Scenarios” (a, b and c) for ROM costing purposes to provide a range of costs based on variable User demand levels.

This is the first time DCC have asked Service Providers to model capacity volumes and provide indicative fixed and variable cost ranges. Some Service Providers have struggled to respond to this request due to the number of outstanding unknowns. This has highlighted the importance of refining the solution, ahead of issuing the FIA.

This early stage ROM Cost request for variable costs has resulted in a higher level of ROM costs for the Variable costs than the Fixed costs which is more in line with usual requests for PA ROM costs, as can be seen from table 9 below

The breakdown of these costs are shown below.

	Fixed Costs	Variable Costs; Scenario A	Variable Costs; Scenario B	Variable Costs; Scenario C
SMETS2 Service Providers	Circa £7m	Circa £1.5m	Circa £3.8m	Circa £5.3m
SMETS1 Service Providers	Circa £6.1m	Circa £14.5m	Circa £28.1m	Circa £40.6m
TOTAL	Circa £13.1m	Circa £16.0m	Circa £31.9m	Circa £45.9m

Table 9: SECMP0162 Cost Breakdown – Fixed / Variable Costs Split

Based on the existing requirements, the fixed price cost for a Full Impact Assessment is **£532,785** and would be expected to be completed in 40 working days.

Please note the list of Dependencies contained within Appendix C that need to be addressed appropriately prior to any FIA request, in order to maximise the value of the FIA.

8.1 Contracts and Schedules

Service Providers have indicated changes are required in number of Contract schedules and these will be detailed during the FIA.

Appendix A: Glossary

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

Acronym	Definition
ACB	Access Control Broker
ANSO	Application, Network, System Operator
BSC	Balancing and Settlement Code
CAN	Contract Amendment Note
CGI IE	CGI Instant Energy
CR	DCC Change Request
CSP	Communication Service Provider
CSS	Central Switching Service
DCC	Data Communications Company
DCO	Dual Control Organization
DSP	Data Service Provider
DUGIDS	DCC User Gateway Interface Design Specification
DUIS	DCC User Interface Specification
EFD	Effective From Date
ES	Export Supplier
ESME	Electricity Smart Metering Equipment
ETD	Effective To Date
FIA	Full Impact Assessment
GB	Gigabytes
GBCS	Great Britain Companion Specification
GFI	GBCS Integration Testing For Industry
HH	Half-Hourly
IS	Import Supplier
MDR	Meter Data Retriever -(New User Role)
MDRA	MDR Agents
MHHS	Marketwide Half-Hourly Settlement
MPAN	Meter Point Administration

	Number
MPID	Market Participant Identifier
MT SMS	Mobile terminating SMS message
OU	Other User
PDP Context	Packet Data Protocol context
PIA	Preliminary Impact Assessment
PIT	Pre-Integration Testing
RAN	Radio Access Network
RF	Radio Frequency
ROM RNI	Rough Order of Magnitude (cost) Regional Network Interface
RSA	Registered Supplier Agent
RTDS	Reference Test Data Set
SCR	Ofgem's Electricity Settlement Reform Significant Code Review
SEC	Smart Energy Code
SECAS	Smart Energy Code Administrator and Secretariat
SIT	Systems Integration Testing
SLA	Service Level Agreement
SMETS SMWAN	Smart Metering Equipment Technical Specification Smart Metering Wide Area Network
SMI	Smart Metering Inventory
SR	Service Request
SRV	Service Request Variant
TOM	Target Operating Model
TRT	Target Response Times
UEPT	User Entry Process Testing
UIT	User Integration Testing
URP	Unknown Remote Party

Appendix B: Design Assumptions

Some of these assumptions overlap with Section 5.3, Design Principles, but have been retained to show the criteria used by Service Providers for their PIA estimates.

Ref#	Assumption Description
DA1	The DCC Total System changes associated with the introduction of the new MHHS Service is targeted for implementation as part of the November 2023 SEC Release, with the Market Wide Half-Hourly Settlement service currently expected to start operating from early 2024 (Q1). For the PIA volumetrics calculations, Service Providers should assume 100% implementation of each scenario at Go Live.
DA2	<p>The data collected by Users to support the new MHHS service needs to be presented wherever possible/available to the (Elexon) Central Service for use in the Initial Settlement (SF) Run, which is proposed to take place 5-7 working days after the settlement date. Final Reconciliation (RF) for ALL data is proposed to take place four months after the settlement date.</p> <ul style="list-style-type: none"> This provides indicative timescales for SPs for how long Users and the DCC must collect import consumption/export generation data including retries and re-requests.
DA3	There will be no changes to any Smart Metering Devices to support the introduction of the new MHHS service.
DA4	No new DUIS Service Request Variants (SRVs) will be added to the DCC Systems to support the introduction of the new MHHS service.
DA5	The Market Wide Half-Hourly Settlement service will operate for both Import Consumption data and Export Generation data sets. Both sets of data will need to be retrieved from ESME as part of the new MHHS service.
DA6	<p>Service Requests sent by Users to retrieve import consumption and export generation data will be expected to be Scheduled, wherever possible and practical by the DSP, to provide flexibility and mitigate capacity impacts.</p> <ul style="list-style-type: none"> The DCC solution shall permit the DSP to control these times and schedule in least impact times to smooth overall traffic (in agreement with CSPs and S1SPs) DCC is encouraging this to be regulated by the SEC and, where possible and practical to do so, technically enforced within the DCC Systems
DA7	<p>Data Collection –HH Profile Data can be collected by the new MDR User Role irrespective of whether the Energy Supplier has already collected the same data sets from the same ESME. The MHHS service solution must allow for this and there is no regulation design to prevent multiple requests for the same data from different Users.</p> <p>It is expected there may be efficiencies created by industry to reduce costs, but it cannot be guaranteed; the DCC's working assumption to date is to assume that all the new MDR User traffic is additional SRV network traffic in addition to the existing base load currently being used by existing Users.</p>
DA8	<p>DCC will need to be notified of which Meter Data Retriever (MDR) User Role is appointed to each MPAN by each Registered Energy Supplier and hence which maps to which ESME Device.</p> <p>DCC assume that the DSP would receive this information via the CSS interface and the CSS Interface definition will be extended to add new additional data items to support the transfer of this information from Industry Registration Systems to the DCC.</p>
DA9	<p>The additional data items that will be added to the CSS Interface will be defined by ELEXON's MHHS programme. This is expected to include the following:</p> <ul style="list-style-type: none"> The identity of the Registered Suppliers appointed MDR (using MPID) The Effective From Date associated with the appointment of the MDR User The Effective To Date associated with the appointment of the MDR User

Ref#	Assumption Description
DA10	<p>The User requesting either Import Consumption data or Export Generation data sets for the MHHS Service will be responsible for ensuring that they have the relevant consumer permissions to do so and that the Service Requests sent to the DCC are in line with the consumers agreed Consent Granularity.</p> <p>The DCC Total System will not validate any consumer consent as part of the DCC solution.</p>
DA11	<p>Half Hourly Data Granularity Opt-Out:</p> <ul style="list-style-type: none"> Domestic consumers have the choice to "Opt-Out" of providing HH granularity Data for their Import Consumption Data for MHHS service purposes and instead inform their Supplier of their required Consent Granularity of either "Daily" or "Monthly". Domestic customers DO NOT have the choice to "Opt-Out" of providing HH granularity Data for their EXPORT Generation Data for MHHS service purposes and Consent Granularity must be "Half-Hourly".
DA12	<p>Half Hourly Data Granularity Opt-Out:</p> <ul style="list-style-type: none"> Non-domestic customers cannot opt out of sharing Half Hourly Profile Data for Import Consumption data or Export Generation data for MHHS service purposes.
DA13	<p>Data Retrieval User request behaviours</p> <p>Where an Eligible User wishes to retrieve consumption data or generation data from an ESME for the purposes of supporting MHHS, the User shall ensure that all first attempts to retrieve a new data set from each target ESME device shall be made using Scheduled Services.</p> <p>In cases where either:</p> <ul style="list-style-type: none"> the use of Scheduled Services fails to return the required data to the requesting Eligible User; or Scheduled Services are not possible to retrieve the required data, <p>then an Eligible User may use On Demand Services to request (or re-request) the required consumption data or generation data to ensure that the required data is successfully retrieved from each target ESME.</p>

Appendix C: Risks, Assumptions, Issues, and Dependencies

The tables below provide a summary of any Risks, Assumptions, Issues, and Dependencies (RAID) observed during the production of this PIA. Scope exclusions are also noted.

Risks

Ref	Description	Status/Mitigation
MP162-R1	Should the meter read collection for Half Hourly Settlement not be uniformly distributed during the extended 13 hour proposed scheduling window by Telefónica, there is a risk that the Telefónica network would need to accommodate and for Telefónica to assess the platform impact in order to handle the additional meter read traffic.	Open
MP162-R2	There is a risk that the Telefónica network may receive a high volume of on-demand meter read requests for Half Hourly Settlement, which are outside of the Telefónica proposed meter read scheduled collection window and thereby having a negative impact on the Telefónica network to carry out other critical DCC-L business functions.	Open
MP162-R3	Unavailability of short term caching capability at S1SP will continue increasing the SMETS1 device interaction resulting additional load on DCO and SMETS1 CSP.	Open
MP162-R4	The scheduling of the service requests for Itron and Aclara devices should be rate limited by the DSP to avoid overloading the APNs. This risk is already present, but could be exacerbated by the MHHS traffic.	Open
MP162-R5	Infrastructure procurement lead times could increase substantially due to the impact of COVID-19, and also global component shortages. Service Provider will provide an updated position on lead times at the point of providing the Impact Assessment.	Open

Table 10: Risks

Assumptions

Please also see Appendix B: Design Assumptions

Ref	Description	Status/Mitigation
MP162-A1	A DUIS/DUGIDS change is required to expand the User Role Access for new MDR User Role.	Open
MP162-A2	No new DUIS Service Request Variants (SRVs) being introduced as part of these MHHS changes, just updates to existing SRVs.	Open
MP162-A3	No new GBCS commands / Device Alerts being introduced as part of these MHHS changes	Open

MP162-A4	No changes to Comms Hub functionality arising from MHHS service changes, so no design changes for hardware or firmware updates expected.	Open
MP162-A5	Service Requests to collect the required Consumption and Generation data from ESMEs will be based on the DSP schedule request rather than being device schedulable i.e., the data will be “pulled” from the ESME every day instead of the smart meter data being “pushed” to the DSP.	Open
MP162-A6	The meter reads collected for Half Hourly Settlement will be based on the DSP Schedule read collection and will not be on-demand.	Open
MP162-A7	DCC assumes there is no requirement and impact to its Service Management triage team to investigate any missing Consumption and Generation data not collected for Half Hourly Settlement, as per existing Schedule management process.	Open
MP162-A8	The expected Remote Party Role code to be contained within a SMKI Organisation Certificate for the new MDR users when communicating with devices for encryption purposes will be set to ‘127’ representing ‘other’ as the User type similar that that used by the ‘Other User’ User Role	Open
MP162-A9	As Secure Meter’s S1CSP-1 carries more than 90% of the production traffic, it is assumed that Secure’s S1CSP-1 will be materially impacted, and Secure’s S1CSP-2 will not be materially impacted.	Open
MP162-A10	S1SP have assumed that Gamma interfaces and existing network hardware will be adequate to support the extended TPS being requested in the CR. The Gamma link bandwidth will need to be increased, but existing network hardware will be adequate to support new requirements.	Open
MP162-A11	The additional MHHS messages will be added to a baseline traffic model that is based on the message volumes per Comms Hub within the DCC Capability Forecast in the 2025-2025 timeframe.	Open
MP162-A12	CSPN assume cessation of retry of MHHS messaging before the full 24-hour TRT is realised, in order to prevent over-spill into the existing DSP Scheduled Read window that starts at midnight.	Open
MP162-A13	CSPN assume that Message Compression will need to be included as part of the scope of this change and is included within the ROM Price provided.	Open
MP162-A14	A new priority setting for incoming MHHS SRVs will be required to be implemented within the DSP to CSP/S1SP interface to support the 24-hour TRT and facilitate the specific CSPN scheduling requirements	Open

Table 11: Assumptions

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Issues

Ref	Description	Status/Mitigation
MP162-I1	The Infrastructure sizing approach has used a non-standard method to achieve the timeframes of this PIA.	Open
MP162-I2	Whilst the overall TRT for MDR SRVs could be 24 hours, but DCO has no mechanism to identify MDR reads or an ability to prioritise workload, the DCO 4 second TRT will apply to all MDR SRVs. This directly impact the non-functional requirement of the DCO component, so as the cost.	Open

Table 12: Issues

Dependencies

Ref	Description	Status/Mitigation
MP162-D1	As per PIA Section 4, each of the key issues noted from Service Provider responses need to be discussed / actioned and decisions formally recorded, or assumption updated (as appropriate) prior to any FIA request.	Open
MP162-D2	As per PIA section 5.4, DCC requires Industry to provide additional clarity and guidance on the Key Parameters and Assumptions that have been used in the Demand Modelling and Volumetrics section, in an attempt to model the potential range of additional daily Service Request volumes and associated message sizes that need to be supported for the new MHHS service.	Open
MP162-D3	As per PIA section 5.4, DCC notes that a decision on how to manage the potential high levels of variability and fluctuation of User demand over time associated with the MHHS service is a key input to the solution proposed by the DCC for this modification.	Open
MP162-D4	DCC need to agree with Industry a set of volumetric SRV forecast assumptions for the MHHS service in order to create an updated messaging model for sharing with Service Providers to cost against for any FIA request. This will create greater certainty of SRV demand volumes and reduce the range of the costs and the current high level of variability and risk based costing.	Open
MP162-D5	Prior to the FIA stage, DCC need to work with industry Telefónica would need an hourly meter read breakdown for MHHS, such that it is able to assess for platform load and any impacts to its planned activities.	Open
MP162-D6	Prior to the FIA stage, DCC need to work with industry to gain a view of the % of read anticipated due to on-demand requests and what process controls will be introduced to regulate this such that it does not impact other business process activities	Open

Table 13: Dependencies

Appendix D: MDR User Access and GBCS Use Case Potential Changes

SRV	SR Name	On Demand?	DCC Scheduled?	SMETS2 GBCS Use Case	GBCS Use Case access permissions	Notes and Potential Changes
4.1.1	Read Instantaneous Import Registers	Yes	No	ECS17b	Supplier Network Operator	No support for ACB Remote Party Role to support MDR User access Add GBCS "Access Control Broker" as a valid Remote Party Role with Use Case access permissions in order for DCC to support this SRV for new MDR User using the URP processing pattern. SRV 4.1.1 is NOT currently defined as available for DCC Scheduling and is only available to send on an On-Demand basis. DCC could request that this is changed to make this SRV capable of being scheduled by Users? Could be considered an edge case for the Domestic MONTHLY Opt Out Service.
4.2	Read Instantaneous Export Register Values	Yes	No	ECS17a	Network Operator Access Control Broker	SRV 4.2 - Read Instantaneous Export Register Values is NOT currently defined as available for DCC Scheduling and is only available to send on an On-Demand basis. All other core data requests for MHHS service are schedulable by the DCC and so this is an outlier. For efficiency purposes SHOULD DCC request that this is changed to make this SRV capable of being scheduled by Users?
4.6.1	Retrieve Import Daily Read Log	Yes	Yes	ECS21a	Supplier Access Control Broker	
4.6.2	Retrieve Export Daily Read Log	Yes	Yes	ECS21c	Access Control Broker	
4.8.1	Read Active Import Profile Data	Yes	Yes	ECS22b	Supplier Network Operator Access Control Broker	
4.8.3	Read Export Profile Data	Yes	Yes	ECS22a	Network Operator Access Control Broker	
4.17	Retrieve Daily Consumption Log	Yes	Yes	ECS66	Supplier Network Operator Access Control Broker	
5.1	Create Schedule	Yes	No	n/a		
5.2	Read Schedule	Yes	No	n/a		
5.3	Delete Schedule	Yes	No	n/a		
8.2	Read Inventory	Yes	No	n/a		

Table 14: MDR User Access and Potential GBCS Use Case Changes