

# **SEC Modification Proposal, MP162, DCC CR4434**

## **SEC Changes Required to Deliver MarketWide Half Hourly Settlement (MHHS)**

### **Full Impact Assessment (FIA)**

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**1.0**

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# 1 Executive Summary

The Change Board are asked to approve:

- Total cost to implement MP162 of £9,039,740 which comprises:
  - £6,155,154 SMETS2 Service Provider costs
  - £2,884,586 SMETS1 Service Provider costs
- A timescale to complete the implementation of **17** months
- Include MP162 in the February 2024 SEC Release

## 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 Suppliers or Meter Data Retriever Agents (MDRAs) settle all customers with smart meters in a Half-Hourly (HH) capacity using actual data. Domestic customers will retain the option to opt out of this for import settlement data (but not export). To support this, changes will need to be introduced to enable the correct industry parties to retrieve this settlement data.

## Modification Benefits

The MHHS 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 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 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 and 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.

## Updates from PIA Response

Following on from Working Group feedback received from the Working Group based on the Preliminary Impact Assessment (PIA), DCC and the Service Providers have taken a conservative risk-based approach to estimating the volumetrics and user demand levels, along with the principles of maintaining existing on demand performance and directing any MHHS demand to times of the day when existing capacity is available. This approach has ensured that:

- a. DCC are not building out infrastructure to support increased peak processing loads at already busy times of the day
- b. Costs have been kept down, and only the capacity and infrastructure required to meet the assumed lower demand/usage profile is purchased upfront and implemented for the MHHS service going live

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There is a risk with this approach that the proposed solution is heavily aligned to anticipated User behaviours and volumetric assumptions and any changes to these will have an impact on the proposed solution, potentially making it less efficient and requiring capacity and infrastructure changes.

## 2 Document History

### 2.1 Revision History

Revision Date	Revision	Summary of Changes
15/02/2022	0.1	Initial compilation
01/03/2022	0.2	Reviewed with Service Providers' Response
07/03/2022	0.4	Internal reviews completed, revised costs, released to SECAS
25/03/2022	0.52	Further reviews
13/04/2022	0.7	Changed SEC Release date, added detail to Scheduling windows
29/04/2022	1.0	Added Northbound Prioritisation, supporting DUIS changes information, update DCO solution

### 2.2 Associated Documents

This document is associated with the following documents:

#	Title and Originator's Reference	Source	Issue Date
1	MP162 Modification Report v0.4	SECAS	17/12/2021
2	MP162 Business Requirements v0.5	SECAS	17/12/2021
3	SECMP0192 CR4443 - PIA - Extend Scheduled Services v1.0	DCC	17/09/2021

### 2.3 Document Information

This Modification forms part of a wider solution to deliver the 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 the design for the complete MHHS solution along with the business requirements, volumetric calculations, design principles, and the costing information required to complete the Full Impact Assessment.

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

The Preliminary Impact Assessment (PIA) was requested of DCC on 18<sup>th</sup> August 2021, and accepted on 25<sup>th</sup> August 2021. The completed PIA was submitted on 17<sup>th</sup> September 2021.

A Full Impact Assessment (FIA) request was accepted from SECAS on 7<sup>th</sup> January 2022.

## 3 Solution Requirements and Overview

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 2045<sup>1</sup>. 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 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.

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

### 3.3 Business Requirements

The table below contains the business requirements provided by SECAS that support the solution(s) for this Modification and are expected to be used by the DCC to shape the solution.

#	Requirement
1	A new DCC User Role will be created for Meter Data Retriever (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 (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: Functional Requirements for MHHS*

The valid SRVs for MHHS usage are unchanged from the PIA as follows.

SR ref.	Service Request Name	On Demand?	DCC Scheduled?
4.1.1	Read Instantaneous Import Register	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: Service Requests Available to MDR Users*

Although the business requirement for TRTs for “On-Demand” for MHHS data collection is 24 Hours, Existing User Roles already have access today for a 30 second TRT for these same SRVs for other existing non MHHS data collection use cases.

DCC can technically only operate a single TRT for “On-Demand” SRVs without asking Users to state the business purposes for each Service Request. This option was rejected as part of the DCC solution. Therefore, although the “logical” regulatory TRT for “On-Demand” for MHHS data collection is 24 Hours, existing User Roles such as Suppliers will in practice receives responses quicker within 30 secs as per the existing solution design.



The Target Response Times associated with MHHS data retrieval and User Roles remain as defined in the PIA, but have been modified as follows:

- Existing Business as Usual Import Supplier (IS) and Export Supplier (ES) Service Requests can remain as On Demand
- Service Request 4.2 will be updated to be both Scheduled and On Demand
- All MHHS-related SRs, for all Users, should be Scheduled for a first attempt to retrieve MHHS data
- Any retry to retrieve data can be set as an On Demand Service Request

Eligible Users	SR to Support Existing Services <i>IS, ES</i>				SR sent by MDR User <i>MDR</i>			
	SMETS2		SMETS1		SMETS2		SMETS1	
SR	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	24 hrs	30 secs	24 hrs	16 secs	24 hrs	24 hrs	24 hrs	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	30 secs	N/A	30 secs	N/A	30 secs

*Table 3; Target Response Times for MHHS Service Requests*

The DCC has noted an issue around permissions for SRV 4.1.1 relating to the Access Control Broker (ACB) Remote Party Role. For SMETS2 Devices, currently the use case does not allow this role to use this Service Request, meaning that a MDR User would not be able to use this. After discussion at the Working Group and TABASC, it was confirmed that SRV 4.1.1 will not be supported for SMETS2 Devices.

It should be noted that the concept of adding "tags" and changing the DCC User Interface Specification (DUIS) to enforce "correct" usage envisaged before the PIA has been dropped as this was seen as too complex and costly. However, it would be appropriate to baseline the level of MHHS-related Service Requests prior to the implementation of this Modification, and for a regular review of the usage of On Demand and Scheduled SRVs to check that Suppliers and MDRs are using the MHHS functionality in an appropriate way.

Further requirements and design principles were used for this solution design, and are included in section 4.1 and following, as well as Appendix C: Supporting Materials;

- Design Principles
- Design Assumptions
- Non-Functional Requirement Assumptions
- Functional Requirement Enhancements
- Assumptions for User Demand and Infrastructure Capacity

In addition, see the document “MP162 Business Requirements v0.5” as listed above in section 2.3 for additional requirement context and information.

### **3.4 Updates from PIA Response**

As part of the PIA Response, DCC noted that there were several key points that created a level of uncertainty which heavily influenced the variable ROM costs. DCC further noted that 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.

DCC is happy to report that with the support of the Working Group, DCC has managed to reduce the level of ambiguity in the key areas noted within the PIA, by proposing a more complete set of anticipated User behaviours and key volumetric assumptions as well as a firmer DCC System end-to-end (E2E) solution design using these, that the FIA proposed DCC solution has been designed against.

This has resulted in reduced solution costs as anticipated but has meant that the proposed DCC solution is now more sensitive to any future changes to the documented anticipated User behaviours and key volumetric assumptions and this should be noted by Industry.

### **3.5 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 retrieve Import consumption data (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 ESME enrolled in the DCC Total System.

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 and Export generation data from each Smart Meter.

MHHS-related Service Requests received from Suppliers and Meter Data Retriever Agents (MDRA) will be scheduled by the DSP for completion at Off Peak hours. 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.

## 4 Requirement and Solution Design Refinement Methodology

As part of the work required to review the PIA, and to develop the MHHS solution to a level where Service Providers could provide accurate and timely FIA responses, DCC have worked with Industry on how and when the data required to support the MHHS service is expected to be collected by Users and create a greater alignment within the DCC solution to User expectations and behaviours. DCC worked with SECAS and the Working Group to review the requirements and to develop assumptions and guidelines that would allow DCC and the Service Providers to provide accurate forecasts for the required functionality, capacity, and infrastructure to meet the MHHS requirements.

The following sections identify the themes and outputs associated with key points noted by DCC as part of the solution design, developing the assumptions, design principles, and non-functional requirements into the basis for the FIA.

A complete RAID submitted by DCC, and the Service Providers is included in Appendix A: Risks, Assumptions, Issues, and Dependencies.

### 4.1 Key Points for Consideration

DCC is keen to re-iterate the key risks associated with this Modification.

#### 4.1.1 Non-Functional Requirement Concerns

The functional requirements for this Modification are well established, but the non-functional requirements have been a challenge to identify, document and reach firm agreement with a sufficient level of confidence that they are representative for the new MHHS service; this creates a risk for the DCC solution.

The proposed DCC solution has been created against a more than usual number of assumptions rather than firm requirements. This increases the risk associated with the proposed solution as if there are changes/variances to these design assumptions over time, this will reduce the solution appropriateness and effectiveness, which in turn, would have a significant negative impact on the service experienced by Users. The key concerns are:

1. *What size solution are DCC being asked to build and support?*
2. *How does DCC quantify the potential additional User Demand for SRV processing for MP162 ?*
  - a. *High level of variability in SRV volumes*
  - b. *Different expectations for User Behaviours and key volumetric variables*

As part of the solution for this Modification, DCC has defined sets of assumption relating to the following areas to answer these key questions:

- General scope and service assumptions
- Anticipated User SRV usage patterns associated with the new MHHS service for both SMETS1 and SMETS2 electricity Smart Meters
- User Demand modelling assumptions
- Non-functional requirement assumptions

DCC recognises that these sets of assumptions have been discussed with the Working Group and TABASC throughout the Modification refinement process and so will not be a surprise, but DCC requests all parties recognise that the absence of firm and true non-functional requirements in this area is a risk for the proposed solution. Note the level of impact is variable and dependent upon the number of variations and the size of the deviation from the assumptions listed.

DCC have taken on board direction from the Working Group for the sizing of the solution as defined in assumption NFR-11 as follows:

*“In line with customer feedback, the DCC shall take a conservative risk-based approach to estimating the volumetrics and User demand levels associated with the proposed MP162 solution. This creates a risk that any significant changes from anticipated User behaviours as increased demand and capacity requirements are not included within the initial design for MP162.”*

The implications of this are reflected in the DCC Design Principles as follows:

- The DCC shall take a conservative risk-based approach to limit any additional infrastructure to deliver increased SRV processing capacity and reporting associated with MHHS service changes
- The DCC shall initially deploy only additional infrastructure to deliver increased SRV processing capacity directly based upon the defined non-functional requirements associated with MHHS
- After implementation, if DCC Demand Management identify significant variations to the expected User behaviours with impacts on the DCC Total System, DCC may need to increase these capacity levels

Any significant changes in anticipated User behaviours that create a gap between the operational service experience by Users and the MP162 Modification assumptions that the solution was designed against, could result in service issues for Users. This risk would be mitigated by monitoring by DCC Demand Management after implementation of the solution, and the potential addition of capacity and infrastructure to support any additional system load.

#### **4.1.2 Non-Functional Requirements**

As part of the development of this Modification, DCC derived detailed non-functional requirements for the solution which are intended to show the detailed behaviour of a solution when fully operational. These were reviewed and approved by the Working Group and TABASC before the FIA was started.

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, or 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 recognised 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 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.

#### 4.1.3 Volumetrics

The table following illustrates the anticipated additional daily Service Request volumes and associated message sizes to be supported by the new MHHS service for service start. The DCC Forecast Volume column uses the conservative risk based approach to estimating the volumetrics and user demand level identified in section 4.2.

Key Variables	Forecast Volume
Installed ESMEs for DCC MHHS service	23.9 m
% MHHS data collected by Supplier	75%
% MHHS data collected by MDR	25%
% Export Take Up	10%
Expected additional SRV requests per day to retrieve data	circa 18.7 m
Expected additional Data Transfer Volumes per day size associated with additional SRV requests	circa 8.6 GB

#### 4.1.4 Operating at Scale - Future Scaling and Optimisation Still to Occur

The SMETS2 Smart Meter Roll-out and has not yet reached “at scale” operational levels and the volume of enrolled meters is increasing every day for SMETS1. There is still work scheduled to complete scaling and optimisation activities for the DCC Total System to support “At Scale” operational levels by the end of the Smart Rollout.

This makes an additional challenge of determining the impacts of additional capacity for the service in two years’ time, against a moving demand / capacity baseline, when scaling and optimisation activities are ongoing for the existing service being delivered today at lower enrolled Smart Meter volumes. For example, for the SMETS1 Final Operating Cohort (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.

It should be noted that CSP North are undergoing a programme titled "Service Scaling and Optimisation" which is designed to improve service reliability and performance in this region. It is assumed that this work will be complete when MP162 goes live.

#### 4.1.5 Modification Alignment to the Wider MHHS Programme

DCC is concerned that industry-related MDRA information documented as part of the SECMP0162 PIA, which was discussed with the Working Group during the refinement stage, carried through into the FIA request and included in the solution, is not currently documented within the wider MHHS programme. This creates a potential gap or misalignment and a solution design risk. This could have a significant impact on the proposed solution, as if these assumptions are not true then the DCC solution is at risk of not working.

The general scope and service assumption A8, states:

- *The DCC will be notified of the MDRA appointed to each MPAN by each Supplier and hence which maps to which ESME DeviceId. The DCC assumes 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. The additional data items that will be added to the CSS interface will be defined by Elexon's MHHS programme. These include:*
  - *The identity of the Registered Supplier's appointed MDR User (using the 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*

New registration appointment data relating to the new MDR parties needs to be recorded in central registration systems, passed to CSS and then on to DCC. The recorded data is outside the scope of this Modification, but is a dependency on the wider Elexon programme.

DCC and the Service Providers have neither received the interface specification for this required change, nor any documented evidence that this is expected for the overall E2E process, nor a change mechanism to enact the required changes. This means that there is a Risk that this Modification is the only place where this is assumed, and it may not happen. The impact of this would be that DCC would not receive data on who the registered MDR parties are for each MPAN and that all MDR SRVs sent to DCC would fail Access Control and leave the new MDR User role unable to access Smart Meters.

There is also an associated concern of any consequential changes associated with the change to existing Meter Operator roles changing to Metering Services Parties for each market segment and how this will be handled by Registration changes, how this flows through to DCC for the Registered Supplier Agent (RSA) User Role and how Access Control will be performed by the DCC Systems.

For both these issues, the current assumption is timely delivery of the interface specification and no change to the existing Operator roles. Any change to this, would require a DCC Change Request to assess the impact..

## 4.2 Assumptions

As part of the review of the PIA, the Working Group clearly instructed the DCC to take a conservative risk based approach to estimating the volumetrics and user demand levels associated with the proposed MHHS solution. This created a risk that any significant changes from anticipated user behaviours that could result in increased demand and capacity requirements are not included in the solution design. In addition, the volumetrics used as the basis for the Service Provider and DCC designs should be viewed as "best estimates" in that SEC Parties were unable to state their projected anticipated activities and plans for key assumptions such as Supplier take up of the MDR services.

This FIA does not include information on how Suppliers might send their MHHS data to the Elexon Service, as that design is out of scope for the DCC.



## 4.3 Design Principles

As part of the Modification development, DCC developed a series of design principles to be used in the design of the MHHS solution. These are included in Appendix C: Supporting Materials. In addition three further principles and approaches were establishing during the PIA reviews working with the Working Group and TABASC.

### 1. Approach to User Demand / Infrastructure Capacity

DCC have worked with Industry to stress the importance of gaining a greater understanding and better definition of how Users will access the Service Request Variants (SRV) defined in the business requirements to support the new MHHS service and better define the expected User Behaviours and their associated impacts on additional SRV message volumes.

The expected Service Request Variants behaviour expected to be used by Users to retrieve data from ESME for MHHS purposes varies slightly between SMETS2 and SMETS1 devices. The following diagrams illustrate the anticipated behaviours.

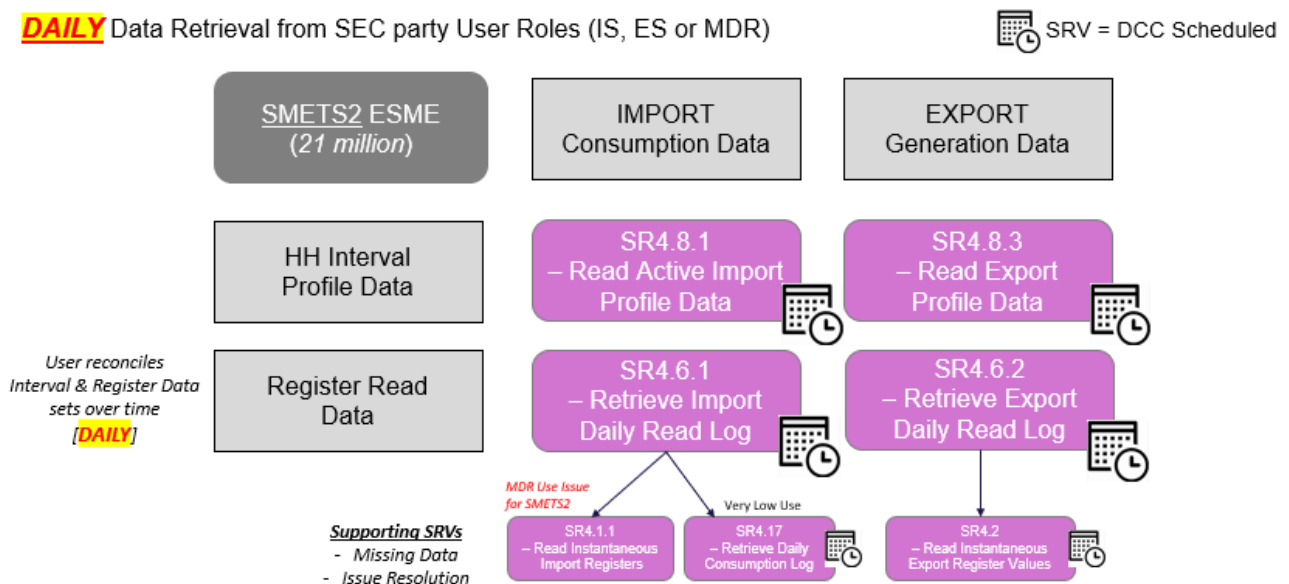



Figure 1: MHHS Anticipated User Behaviours - SMETS2 ESME

**DAILY** Data Retrieval from SEC party User Roles (IS, ES or MDR)

 SRV = DCC Scheduled

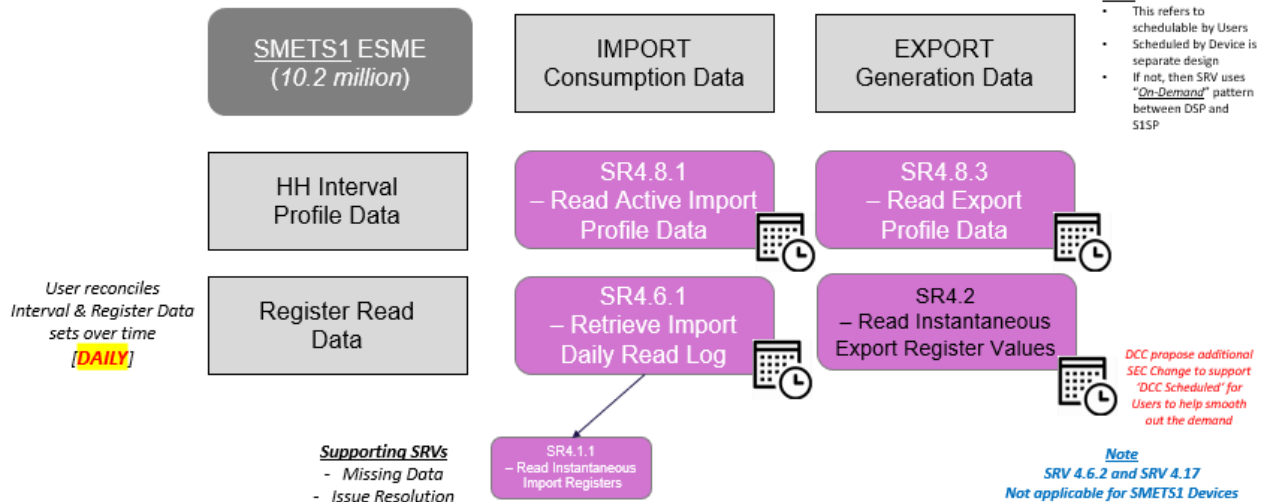


Figure 2: MHHS Anticipated User Behaviours - SMETS1 ESME

## 2. Scheduling Services – Definition of Scheduling Windows for MHHS Data

The DSP Systems will define the following configurable scheduling windows for each CSP and S1SP:

- 'Peak' Scheduling Window
- 'Off Peak' Scheduling Window

The DSP Systems shall use these scheduling windows to control the Transactions per Second (TPS) processing rate for scheduled SRVs that are sent to each CSP or S1SP within the start and end times for these scheduling windows.

This will control the processing rate for each CSP and S1SP throughout the scheduling window and minimise the impact of creating demand spikes within the DCC Total System. A time gap after the end of the Peak window has been allowed for retries and the start of Install and Commission (I&C) activity, while the gap after the Off Peak window and 00:00 is in place to allow retries and the SRVs to complete before the start of next day's Peak window.

CSP/S1SP Name	Service	Peak Scheduling Window	Off Peak Scheduling Window	Notes
CSP North (Arqiva)	SMETS2	00:00 to 08:00	10:00 to 20:00	[10 hour] window
CSP South and Central (VM02)	SMETS2	00:00 to 07:00	10:00 to 20:00	[10 hour] window
S1SP-1 (CGI-IE)	SMETS1	00:00 to 06:00	10:00 to 20:00	[10 hour] window
S1SP-2 (Secure)	SMETS1	00:00 to 06:00	14:00 to 22:00	8 hour] window
S1SP-3 (Trilliant/DXC)	SMETS1	00:00 to 06:00	09:00 to 23:00	Maximum [14 hour] window
DCO (Capgemini)	SMETS1	00:00 to 06:00	09:00 to 23:00	Covers the duration of all the above S1SP individual times

Table 4: Scheduling Windows



The allocation of SRVs to Peak or Off Peak processing periods will be set as shown following. The MHHS Additional Demand shown in red matches the red entries in the Scheduling window below, such that Export Suppliers using Scheduled Service Requests will be added to the Off Peak Scheduling Window.

## Scheduled Services – Supporting MHHS

User Role	SRV	Scheduling Window
IS / GS / MDR	4.1.1	n/a
ES / MDR	4.2	Off Peak
IS / GS	4.6.1	Peak
MDR	4.6.1	Off Peak
ES / MDR	4.6.2	Off Peak
IS / GS	4.8.1	Peak
MDR	4.8.1	Off Peak
ES / MDR	4.8.3	Off Peak
IS / GS	4.17	Peak / Off Peak
MDR	4.17	Off Peak

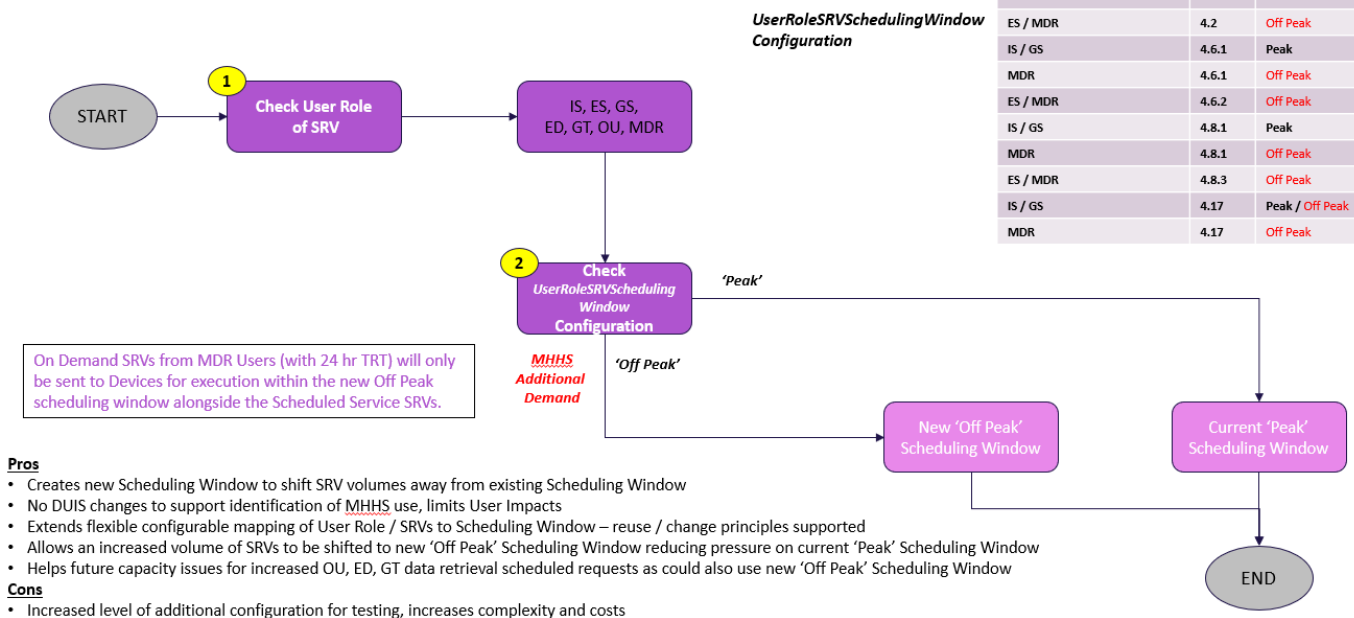


Figure 3: Scheduled Services for MHHS

For both SMETS1 and SMETS2 devices, all MHHS-related SRVs shall be DSP Scheduled for a first attempt to retrieve MHHS data.

DCC notes that scheduling works best if Users do not specify specific times, to give the DSP maximum flexibility around smoothing the load. The DCC is therefore maintaining its guidance for Users not to specify specific times in their schedules, as stated in Guidance Point 32 of the DCC Guidance Note, Use of DUIS.<sup>2</sup>

## 4.4 Northbound Prioritisation

After revising the design based on the assumption that DCC should use existing off peak capacity resulting in the introduction of the Off Peak Scheduling Window, concerns were raised by both the Working Group and TABASC that traffic for the Export Suppliers and MDRA scheduled requests could impact on I&C request delivery times during the day. To alleviate these concerns, DCC have introduced the concept of Northbound Prioritisation to ensure that On Demand Service Requests sent during the Off Peak Scheduling Window are prioritised for sending to Users over Scheduled SRs ahead of any Service Responses received relating to DCC Scheduled Requests.

The following additional Business Requirements have been added for Northbound Prioritisation for implementation as part of the proposed MHHS solution.

- The DCC Systems shall ensure that any Service Responses received to 'On-Demand' requests within the new additional MHHS Scheduling window (referred to as the Off Peak

<sup>2</sup> <https://smartenergycodecompany.co.uk/download/26144/>

Scheduling Window) shall always be prioritised for sending to Users ahead of any Service Responses received relating to DCC Scheduled Requests.

This will protect DCC's Performance Measures relating to TRTs and support Users 'within day' priority operational activities e.g., Install and Commission and Prepay top up activities.

2. Any Service Responses received relating to a DCC Scheduled Request in the new, additional MHHS Scheduling window may be queued within the DCC Systems to ensure that the Priority Service Responses received relating to 'On-Demand' requests are not subject to processing delays.

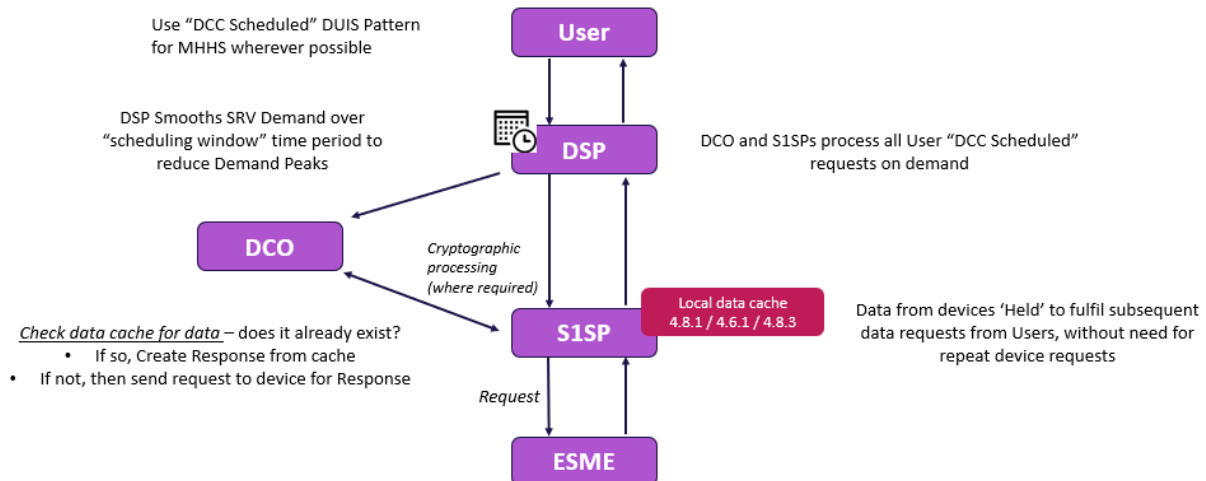
For example in a case where the receipt of large volumes of DCC Scheduled Responses would slow down the delivery of the priority "On Demand" responses, the solution shall ensure the On Demand Service Responses are returned to Users before DCC Scheduled Responses.

Northbound Prioritisation specifically relates to the Off Peak Scheduling Window only. This control is designed as a single control to apply to all CSPs (SMETS1 and SMETS2).

## 4.5 SMETS1 Approach to Caching Solution

As part of the PIA development, it was clear that the potential introduction of short-term caching capability of meter reads data at the S1SPs would reduce the number of SMETS1 device interactions against the additional MHHS volume of Service Requests, resulting in less impact on the Dual Control Organisation (DCO) and SMETS1 CSP for each cohort. This is referred to as the approach to Caching Solution for Consumption and Generation Data.

### SMETS1 – S1SP ‘local’ Caching of Smart Meter Data



As part of the MHHS solution, DCC proposed:

- a temporary local cache at each S1SP for the response data of the following:
  - SRV 4.8.1 – Read Active Import Profile Data
  - SRV 4.6.1 – Retrieve Import Daily Read Log
  - SRV 4.8.3 - Read Export Profile Data
- when any of the above Service Requests with the same ReadLogPeriod are subsequently received from either the same or other Users within the Data Retention Period, the S1SP may return the data from the local data cache instead of retrieving the data from the Meter.
- the Data Retention Period for S1SP local cache shall not be more than 48 hours, from the date and time of the original SRV response receipt and storage. After the Data Retention Period, data shall be deleted from the S1SP local cache.

This cache solution is based on the existing capabilities of SMETS1 cohorts and will be transparent to the users. It will reduce the system impact on the DCO and SMETS1 CSPs for above mentioned SRVs.

A similar cache solution for SMETS2 was not considered in the scope of this Modification due to the cryptographic complexity of data retrieval from SMETS2 meters.

There was a challenge from the Department for Business, Energy & Industrial Strategy (BEIS) which questioned the concept of the caching solution which temporarily stores retrieved data for the Final Operating Cohort (FOC). The BEIS decision limits data retention to 48 hours and requires data encryption at rest. The MHHS solution design is subject to the completion of a Data Protection Impact Assessment (DPIA) by the DCC and applying any relevant security measures.

The following diagram gives a high level architecture view of the complete MHHS system.



Changes to the DSP are required to support these requirements, although there are no Security-based changes anticipated.

- processing a new Registration message from CSS to create, maintain or remove MDRA appointments, using a message similar to RECM\_SN\_CSS03200 (Smart Metering MEM Synchronisation) and delivered over the existing RMPRegApptSync interface
- the physical RegistrationEventSynchronisation message will be extended to allow roles of MDR and Supplier as well as Supplier Nominated Agent in the Supplier Arranged Appointments

Data from this new flow will be maintained in the DSP and not passed on to another parts of the DCC Total System. DSP will require updates to store and maintain MDR data associated with Electricity Registrations.

DSP will introduce a new MDR User Role with access to the Service Request Variants listed in Table 2: Service Requests Available to MDR Users, and associated DCC Alerts. DSP will perform Role-Based Access Control (RBAC) with respect to Service Requests received from MDR Users including:

- validation that the sender is a valid MDR
- validation that the sender has an MDRA appointment for the specified MPAN for the entire duration of the requested period of consumption/export data
- validation that the sender is requesting a valid Service Request Variant/Mode of Operation combination

### 5.1.1 Service Request Processing

DSP motorway processing will be modified to accommodate the new User Role of MDR such that a MDR user will be able to submit and retrieve a response to a limited set of (Non-Critical Read Only) Service Requests as follows, in order to retrieve half hourly settlement data from ESME:

SRV4.1.1	read instantaneous import registers (SMETS1 only**)
SRV4.2*+	read instantaneous export registers (SMETS1 & SMETS2+)
SRV4.6.1*	retrieve import daily read log (SMETS1 & SMETS2+)
SRV4.6.2*	retrieve export daily read log (SMETS2+ only)
SRV4.8.1*	read active import profile data (SMETS1& SMETS2+)
SRV4.8.3*	read export profile data (SMETS1& SMETS2+)
SRV4.17*	read daily consumption log (SMETS2+ only)

#### Notes

\* = SRV may be scheduled

\*+ = SRV can be scheduled (new for this Modification)

\*\* = although SRV4.1.1 is supported by SMETS1 and SMETS2+ devices, MDR Users can only use it to retrieve data from SMETS1 devices (as GBCS does not support the Unknown Remote Party (URP) pattern for 4.1.1 on SMETS2+ devices); E040101 will be extended to validate that if the user's role is MDR then the device must be SMETS1.

The DSP will also allow a DCC Service User, as a MDR user, to maintain Schedules for those Read Only Service Requests above that allow a DSP Scheduled Mode of Operation, using the scheduling Service Requests:

SRV5.1	create Schedule
SRV5.2	read Schedule
SRV5.3	delete Schedule

DSP scheduling will be modified so that specific windows can be configured as Peak and Off Peak for CSPs and the S1SPs in order to ensure that the DSP, CSPs, and S1SPs are not overloaded. Multiple windows can be defined for each SP in a day, with a maximum TPS throughput set as well. The schedule windows will apply to all requests (on demand with 24 hour Target Response Time, future dated and scheduled).

### **5.1.2 Northbound Prioritisation Changes**

As part of the PIA review, the Work Group directed that DCC should endeavour to use existing off peak capacity rather than building out the capacity to support increased peak traffic. This design decision resulted in the introduction of the Off Peak Scheduling Window, but concerns were raised by both the Working Group and TABASC that traffic for the Export Suppliers and MDRA scheduled Service Requests could impact on I&C request delivery times during the day. To alleviate these concerns, the DCC have introduced the concept of Northbound Prioritisation to ensure that On Demand SRVs sent during the Off Peak Scheduling Window are prioritised over Scheduled SRVs. This will protect DCC's Performance Measures relating to TRTs and support User's daytime priority operational activities e.g., Install and Commission and Prepay top up activities.

The requirement has been worded to specifically relate to the Off Peak Scheduling Window only. This control is designed as a single control to apply to all SRs sent to all CSPs, both SMETS1 and SMETS2.

### **5.1.3 Infrastructure**

After reviewing the anticipated changes to load, the DSP peak demand requirements are within the current capacity forecasts for Supplier data collection in the overnight period and are therefore catered for in current capacity planning.

The off-peak demand requirements introduce an additional load of 614 TPS which is within the spare capacity calculated above for the 10:00 – 00:00 period and on this basis, it is assumed that no further processing capacity uplift is required to handle the additional MHHS load on the DSP.

Some increases in storage arrays for the reporting and data analysis components is anticipated, and are included in the solution implementation and application support costs.

### **5.1.4 MDR User Support in the Self-Service Interface (SSI)**

MDR users will be able to use the SSI with the same access rights as users with the RSA User Role, and hence will be able to view SAT records for their own requests.

### **5.1.5 Reporting**

The MDR User Role will be added to all relevant Reports to the DCC SSMI and Data Extracts to the S1SPs as a new User. Note that there are no specific requirements relating to Reporting, and hence no changes to the DCC Technical Operations Centre (TOC) Reporting solution. However, it would be appropriate to baseline the level of MHHS-related requests against Service Users prior to the implementation of this Modification, and for a regular review of the usage of On Demand and Scheduled SRVs to check that Suppliers and MDRs are using the MHHS functionality in an appropriate way.

### **5.1.6 Technical Specifications**

Updates to the DUIS schema and DCC User Gateway Interface Design Specification (DUGIDS) are required to incorporate a change in definition of E040101 error code and new error E050111. A new DCC Alert N66 for schedule deletion resulting from MDRA appointment changes is required. Updates to DUIS are shown with tracked changes in the following file:





SEC-Appendix-AD-  
DUIS-v5.1 MHHS Ch.

For avoidance of doubt, and in line with DCC's standard DUIS design principles, Users are not mandated to move to this new later version of DUIS (version TBC) that will be introduced to support the proposed MHHS solution. The DUIS uplift would only be required for Users wishing to use the new MDR User Role, or to take advantage of the potential scheduling of SRV 4.2. A further explanation is given in Appendix D: DUIS Uplift Supporting Information.

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

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

As noted in the Business Requirements [2], the current SMETS1 TRT of 16 seconds for SR8.2 is an anomaly, which is a SEC wording issue rather than anything material to the DSP or S1SP MHHS implementation. 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. SEC Appendix E, DCC User Interface Services Schedule which currently shows the TRT for all "DCC Only" (that is, DSP Only) Service Requests as 16 seconds for SMETS1 whereas in fact they should all be 30 seconds for both SMETS2 and SMETS1 since these Service Requests only go to the DSP. The DCC contract is for a 30 second TRT for these Service Requests (including SR8.2).

### **5.1.7 Impact on Performance**

Based on the volumetric projections in the requirements section, it is anticipated that the amount of Service Request processing, whilst increasing, will not require the procurement of additional motorway lanes for the DSP as part of this Modification.

Other areas of the DCC Total System which may be performance impacted are:

- the CSS Interface will need to process MDRA Appointments for each Electricity Registration.
- reporting will be impacted by the increased volume of Service Requests. This will be particularly noticeable in the Service Audit Trail (SAT), the volume of files sent to the TOC. Registration data extracts sent to the TOC will increase slightly in size to include the MDR appointments.
- 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 and DNS Timing Reports for CSP S&C, CSS Message Log and the Registration Audit Trail).

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

### **5.1.8 Impact on Resilience and Disaster Recovery**

There will be no change to the system resilience solution or the Disaster Recovery solution procedures as a result of this change.

### 5.1.9 Changed DSP Component Summary

The following DSP components will be impacted by this Modification.

CSS Gateway	The CSS Gateway will need to be modified to accept MDRAs as new role in the context of Supplier Arranged Appointments (SAA).
CSS Processor	The CSS Processor will need to be modified to process MDRAs and SNAs within the SAA element of a Registration message.
Request Manager and Data Management Changes	<p>Authorise, validate, schedule and process the MDR SRVs, including the management of the new type of Schedule Window.</p> <p>Process the MDRA appointments received from the CSS.</p> <p>Extend CSS processing to close off any MDRA appointments as a result of a change of Supplier, from a RegistrationEventSynchronisation message or a RegistrationSecuredInactiveSynchronisation message notifying the end of a Supplier's Registration.</p>
Message Gateway	Will use the revised DUIS schema
Data Model	The Data Model will require modification to store the MDRA appointments and to accommodate the new schedule window.
SSI and SSMI	<p>Changes are required in SSI to allow access to the new MDR User Role.</p> <p>Changes are required in SSMI to allow the MDR User Role to be assigned to a DCC Service User.</p>

The revised DUIS XML Schema will need to be deployed on the corresponding DataPower appliances.

## 5.2 Changes to CSP South and Central

Changes to the CSP South and Central (CSP S&C) are mostly limited to capacity and infrastructure increases related to the additional traffic related to MHHS data requests. There will be a new 10 hour scheduling window (10:00 to 20:00) for the DSP to schedule and collect the meter reads for MHHS purposes.

This Modification will cause additional SMWAN read traffic across the network, and CSP S&C to be able to store and process the daily SMWAN files from the DSP, additional storage and bandwidth related to MHHS in both test and production is required. Changes to the SMWAN Gateway interface between CSP S&C and the DSP will be delivered by the DSP. Additional storage and bandwidth for moving the increased SMWAN usage file size to the reporting systems is also required.

## 5.3 Changes to CSP North

To support MHHS in the 10-hour DSP scheduled window from 10:00 to 20:00, CSP North will:

- make three new messaging channels available to the radio network
- create a channel plan to assign the required additional channels to each base station Transceiver Kit (TK)
- provide MHHS service in the Fylingdales area with additional channel licences being granted by OFCOM – an application to OFCOM has been made



- increase Splunk data analytics licensing and data storage capacity by 10% (or 22GB) per annum to deal with the additional log data.

The main impact on the SMWAN is the additional capacity requirements, which drive additional radio channels at the Base Station Transceiver Kits (TKs) once Communications Hubs and SRVs reach a certain level. The standard SRVs (excluding firmware downloads) are carried over-the-air on bulk messaging channels between the base stations and Communications Hubs. The current radio network design based upon ISFT (Submit Final Tender, as set out in the Agreement) allows for four bulk messaging channels to be deployed at each TK. As the baseline case within the provided messaging model, it is assumed that 70% or 4,557,000 SMETS2 Communications Hubs are enrolled for MHHS in CSP North.

The new messaging in the new 10-hour window was calculated in terms of the additional downlink and uplink packets to be supported and it was found that the downlink is the limiting case for capacity at each TK. This additional capacity was then used to calculate the additional channel requirements at the highest loaded TK supporting circa 10,000 Communications Hubs enrolled in the MHHS service. Channel requirements are calculated assuming a maximum channel loading of 70% to account for peak-to-average loading and provide some capacity headroom.

Based on these assumptions, three additional channels are required per TK to support MHHS in the Off Peak scheduled window. The number of additional channels required per TK is dependent on the number of MHHS enrolled Communications Hubs connected. These additional channels would be assigned from a pool of 10 new messaging channels made available to the radio network and a channel plan created that assigns the required additional channels to each TK.

No other changes or upgrades are required to the radio network. Without these infrastructure and capacity upgrades, the MHHS solution could not function on the CSP North network.

It should be noted that the Fylingdales area is currently not in scope for this Modification, as CSP North have applied for additional channel licenses, but have not had any response from OFCOM to date.

## **5.4 Changes to SMETS2 Critical Software**

For Parse and Correlate (P&C) there are no functional impacts as there are no GBCS changes or new SRVs. However the DUIS XML Schema includes a section defining DSPScheduled SRVs, which means there is a need to add SR4.2 into this list. This is a DUIS Schema change which means a minor uplift to P&C.

Both GBCS Integration Testing For Industry (GFI) and DCC Boxed will also use the new DUIS schema.

There would be a small change to the Reference Test Data Set (RTDS) to show an example of a SR4.2 that is scheduled but this is very minor.

## 5.5 Changes to the SMETS1 Service Provider Solutions

The changes to the SMETS1 Cohorts are summarised in the following table.

	Functionality	S1SP 1 (CGI-IE)	S1SP 2 (Secure Meters)	S1SP 3 (Trilliant & DXC)
Functional Impacts	Introduction of New DCC User Role (MDR)	Support the changes in S1SP Management Interface between DSP and S1SPs to receive the new mapping of MDR Party to MPAN Registration data.		
		SRVs from the new MDR user are non-critical and therefore no changes are required in existing RBAC and validation checks.		
	Supporting SRV4.2 Schedule	Enhanced processing of SRV5.1 and 5.3 for support of new scheduled SRV4.2.		
		Support new DUIS schema due to change on SRV5.1 for SRV4.2 schedule.		
Non-functional Impacts	Off-peak schedule window for MHHS SR volume	Support a 10-hour scheduling window to distribute the MHHS Scheduled requests to CGI IE.	Support an 8-hour scheduling window with multiple slots with varying SRV/second flow rate to distribute the MHHS Scheduled requests to Secure Meter S1SP.	Support a 14-hour scheduling window to distribute the MHHS Scheduled requests to S1SP-3.
	S1SP local cache	<p>A local cache will be built for the Service Requests as mentioned in section 4.5. When subsequent SR is requested for the same datetime range within the Data Retention Period, data is retrieved from cache instead of the meter resulting in less impact on the DCO and the WAN.</p> <p>This solution will be designed based on the existing technical architecture of S1SP system and device data retrieval capability, but the technical solution and implementation could be different across S1SPs. Where a SMETS1 Device is capable of configuring the data push, that S1SP will configure the device appropriately to push data to cache, based on creation of SR schedule; where it cannot, data will be retrieved from the meter and stored in cache when requested data cannot be served from cache for a scheduled or on demand read.</p> <p>This solution will not supersede any existing functionality related to data cache of the MHHS-related SRVs and Data Retention Period.</p>		

			Update SRV 5.1 and SRV 5.3 processing functionality appropriately to enable/disable device push capability.	Update SRV 5.1 and SRV 5.3 processing functionality appropriately to enable/disable device push capability.
	Impact on the SMETS1 CSP	<p>Peak load: Use DSP Schedule capability for MHHS SRs to spread additional SR volume throughout the day. Hence no increase required for:</p> <ul style="list-style-type: none"> <li>• physical connectivity with both SMETS1 CSP (e.g. MPLS)</li> <li>• APN sizing</li> <li>• API traffic</li> <li>• Data usage per device – while MHHS SRV volumes are expected to result in more data usage per device, the additional data is anticipated to be within the contracted data volume.</li> </ul>	Similar observations are anticipated for this cohort.	Similar observations are anticipated for this cohort.
	Impact on the Infrastructure	Additional storage, servers, memory uplifts and licenses would be required to support the additional MHHS SRV volumes.	Infrastructure uplift required for additional data on IP5B, S1SP offline system, Secure's offline reporting system, import engine, validation engine, SQL tuning and cache storage	Additional adapter nodes, task manager per data centre, servers for microservices. Adapters are required along with PROD and DR RACs needs to be scaled horizontally.

All the S1SPs have collaborated with the relevant SMETS1 CSPs to analyse the impact of additional volume of MHHS SRVs, the increase in data volume for MHHS SRV Responses, and the number of API calls relating to the use of S1SP cache solution. Based on this analysis, all SMETS1 CSPs have indicated that there is enough capacity on the physical network, IP pool, API calls and data volume as per current contract and no upgrade is required for this Modification.

## 5.6 Changes to DCO

### Functional Changes

Considering the business requirements of reusing existing Service Requests for retrieving half-hourly consumption and generation data by DCC Users (Supplier or MDR), no functional change is required on the DCO component.

### Non-Functional Changes

The following areas are considered to assess the non-functional impact on the DCO component:

- Based on the non-functional requirements and volumetric assumptions in section 4.1.3, significant amounts of Service Requests sent by Suppliers and MDR user will be delivered by the DSP to the DCO
- Only S1SP1 (CGI-IE) interacts with the DCO for cryptographic processing for "Read" non-critical Service Requests
- Availability of local cache at S1SP is expected to reduce the DCO interaction with S1SP1 though it is subject to User behaviour
- Use of the DSP scheduling for MHHS SRs to spread the load though the day has little impact on the DCO because DCO cryptographic processing is done in real-time as an on demand request

Considering the current production system utilisation, enrolled meters volume, daytime utilisation of DCO system capacity for firmware related Service Request and projected MHHS related Service Requests, a proposal to route and process firmware related Service Requests in a separate piece of DCO infrastructure (DCO2) to ensure the existing DCO system infrastructure can deal with the off-peak MHHS SR volume effectively was proposed in the PIA. However working with SMETS1 meter providers, DCC determined that almost all SMETS1 meter manufacturers have no plans for firmware updates for SMETS1 functionality changes, and that one remaining tranche of firmware updates is planned to complete this year. Given that the firmware updates have been most problematic for the DCO, and that the DCC Demand Management team believe that any future significant traffic increases through the DCO could be covered by temporary on demand scaling managed by the DCC and Capgemini Demand Management, the proposal for a DCO-2 change has been descope from the MHHS release.

## 5.7 Changes to SEC Party Systems

While out of scope of the work for the Service Providers, changes will be required to Supplier and MDRA systems:

- Set up SRVs to retrieve data from ESME belonging to customers that have agreed to provide HH data
- Potentially modify their own systems to handle data retrieved during DCC Total System Off Peak Scheduling window
- Manage the handling of the data whenever retrieved
- Sending the data to the Elexon MHHS central service
- Suppliers or Adapter Providers will need to update their DUIS schema if they wish to schedule SRV 4.2 for SMETS1 devices

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If a Supplier elects to use the MDRA service, then they still have to manage their own ESME.

## **5.8 Guidance to SEC Parties**

Guidance to SEC Parties, namely Suppliers and MDRAs will be developed by DCC after the Modification is approved, and issued as part of the supporting materials for the SEC Release. This information will also be shared at the Design Release Forum (DRF).

DCC will maintain the guidance for Users not to specify set times in their schedules for a SRV such as 4.8.1. Other content of the guidance will include preferred usage patterns, such as daily reads of 48 HH readings, the use of scheduled services, and so on. As part of accreditation process, MDR Users will need to request DCC User Gateway connections appropriate to their anticipated Service Request volumes, and this will be included in the guidance.

## 6 Testing Considerations

This Full Impact Assessment includes the cost to develop, fully test and deliver this SEC Modification.

DCC has challenged, and continues to challenge, all the Service Providers' figures for Testing. In some cases, the Service Provider is moving to a different model with a greatly reduced run rate, but the approvals and permission to change must be gathered from different teams such as DCC Commercial and Test Assurance.

### 6.1 Testing Assumptions

The following Testing Assumptions were provided to Service Providers for their FIA submissions.

PIT Area	Assumption
Scope	Include only Production codebase products, e.g., exclude ITCH or RTL
Communication Hub	Change testing will be limited to PIT testing of the new functionality outlined in the Modification plus one cycle of targeted regression testing.
Repeat Testing	A subset of PIT System test cases will be conducted for DCC Test Assurance witnessing
Non-Functional & Performance Testing	Will be carried out at the PIT stage

SIT and UIT Area	Assumption
Standalone Release	As required by SECMP0049, with costs calculated as if no other Modifications or CRs are in the SEC release
SIT Testing	Eight weeks
UIT Testing	Six weeks
Test Sets (SMETS2)	10 Test Sets per Communication Hub type (meaning 20 for CSP South and Central 5 Single Band CH, 5 Dual Band CH but two manufacturers). A device set will be agreed.
Regression Testing	Risk based regression testing.

Note that CSP South and Central reduced the required test sets to 16.

This Modification is characterised by limited functionality changes and capacity uplifts, with a high proportion of the overall costs associated with SIT and UIT. In previous SEC Releases, the testing mandate has been to provide full-sized SIT and UIT (A and B-stream) environments. DCC recommends the investigation of the testing regime with a view to potentially reducing the test environment sizing and testing extent in some of those environments, with consequential significant cost saving implications at a low risk to testing integrity. This work would be carried out by DCC Test Assurance as part of the definition of the Release (post-PIT) Change Request for the SEC Release.

## 6.2 Pre-Integration Testing (PIT)

PIT activities will include the following Service Provider activities.

DSP	<ul style="list-style-type: none"> <li>• <b>Development</b> of the technical implementation of the functional and non-functional requirements, including Technical Assurance activities to ensure quality of code and lead integration activities.</li> <li>• <b>Security</b> changes are very limited in this Modification; penetration testing will not be required.</li> <li>• <b>Performance Testing</b> in the PIT performance environment.</li> </ul>
CSP S&C	None
CSP N	<ul style="list-style-type: none"> <li>• deploy and test the TK channel plan update in the PIT environment</li> <li>• verify all Comms Hubs types successfully passing SRVs</li> </ul>
CGI IE	<ul style="list-style-type: none"> <li>• Validation of MHHS functionality changes</li> </ul>
Secure	<ul style="list-style-type: none"> <li>• Testing cycles with targeted testing containing positive and negative testing use cases and scenarios</li> <li>• A regression cycle to ensure the associated components are working as expected</li> <li>• Extract data to its reporting systems where development and testing would be required in both the S1SP system and Offline system</li> <li>• Test the changes within its offline system against scheduled SRV 4.2</li> <li>• End-to-end testing including performance reporting</li> </ul>
Trilliant	<ul style="list-style-type: none"> <li>• Testing to ensure new functionality correctly implemented</li> <li>• Limited regression testing to validate components not impacted by MHHS</li> <li>• Performance testing</li> </ul>
DXC	<ul style="list-style-type: none"> <li>• Validation of MHHS functionality changes</li> <li>• Check that infrastructure for Production built and implemented correctly</li> </ul>
Capgemini (DCO)	<ul style="list-style-type: none"> <li>• regression test existing DCO non-firmware functionality</li> <li>• tests for system capacity against the updated infrastructure model</li> <li>• test DCO functionality against the updated infrastructure</li> <li>• test DCO system capacity against the updated infrastructure</li> </ul>
	<ul style="list-style-type: none"> <li>•</li> </ul>

Table 5: PIT Activities for MHHS

## 6.3 System Integration Testing (SIT)

The expected SIT activities are documented below. All testing is expected to be carried out as part of February 2024 SEC Release testing on the "B Stream" environments, in accordance with existing practices for SEC releases. At this time it is considered unlikely that this Release will contain other Modifications and CRs,

The DSP SIT team will plan, prepare and execute tests that demonstrate the key changes in behaviour across the DCC Total system, comprising:

- a. maintenance of MDRA appointments within the registration data for each MPAN, with the CSS responsible for the data and its distribution to DSP, covering the initial bulk load and changes of MDRA party for an MPAN



- b. maintaining Users in the MDR role, mapping them to registration data and obtaining their SMKl certificates
- c. providing the MDR Users with access to SSI functions
- d. MDR Users are able to submit only the 11 SRVs identified for their use
- e. collection of the HH data for meter sets with variations to the Customer and Supplier preference
- f. SMETS1 meters for each S1SP and SMETS2 meters for each CSP
- g. concurrent collection of MHHS data from multiple meter sets, across multiple Suppliers, some using MDR Users, for both Import and Export data over a period of time to measure performance
- h. reporting of MHHS collections and the MDR User activities<sup>3</sup>

The DSP SIT team will be in control of all tests executed within the SIT environment, planning and co-ordinating test across all other Service Providers and CSS.

CSP North will also deploy and test the TK channel plan update in the SIT environments.

The SMETS2 and SMETS1 Service Providers will provide SIT support, including Test Lab, Functional / Regression test support, Triage, Release, Defect and Test Management support. The estimates for this effort reflect previous SEC Releases, and will be recalculated as part of the Release (post-PIT) CR. As currently specified, the SIT-A and SIT-B environments will need to be created for the S1SPs.

Critical Software will provide general support for other SIT-B activities.

## 6.4 User Integration Testing (UIT)

The scope and extent of the testing is expected to include:

- the creation of DSP schedules as the new MDR user creating schedules for the relevant Service Requests
- performing tests against three already migrated SMETS1 (IOC, MOC, FOC) meter sets to test the change to the S1SP interface
- performing tests against two SMETS2 meter sets
- running automated Service Request regression test packs on one SMETS2 meter set to regression test the DUIS changes
- running the automated Service Request regression test packs on one (1) SMETS1 meter set to regression test the DUIS changes

The SMETS2 Service Providers, S1SPs and SMETS1 CSPs will provide defect, triage and Release Management support in UIT for the MDR new role. CSP North will also deploy and test the TK channel plan update in the UIT environments.

As currently specified, new UIT-A and UIT-B environments will need to be created for the S1SPs with extensive testing.

Critical Software will provide support to DCO testing carried out by Capgemini as part of UIT-B, and general support for other UIT-B activities.

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<sup>3</sup> Notice that this item is not a requirement for the Modification, rather a test artefact



## 6.5 User Entry Process Tests (UEPT)

Although not part of the technical solution, in terms of the MDRs carrying out UEPT, DCC believe . MDRs should start testing in time for UIT. This assumes that the SMKI Repository Entry Process Testing (SREPT) process is complete before UEPT. DCC's UIT team has indicated that the Common Test Scenarios Document (CTSD) would have to be in force before the start of UIT, with an anticipated release of the CTSD in the November 2023 SEC Release. That is a staggered implementation, but not of the technical solution.

## 6.6 System Integration

The role of the DSP Systems Integrator (SI) will be focused on release management of the integrated SIT-B, UIT-B, SIT-A and UIT-A environments; particularly maintaining the Release Baselines where any changes or defect fixes will increment the release baseline in that environment. This activity will also include uplift management of SIT-A, UIT-A and Production environments.

The Modification will significantly increase the volume of messages being processed by the DSP, and as such, the DSP Operational Service will require an uplift in order to support and maintain the solution. DSP has provisioned an increase in the support during the SIT and UIT period to ensure that any issues raised during this period are resolved with minimal impact. Also during this period DSP will refine and review alerting thresholds based on the increased volumes in SRV processing. Due to the potential impact of the additional traffic volumes the operational support will include increased, ongoing, monitoring of the solution as well as technical support.

## 6.7 Implementation and Deployment

DXC are required to deploy new software in any of the Trilliant regulated test environments.

## 7 Implementation Timescales and Releases

This Modification is expected to be included in a SEC Release in February 2024. Implementation timescales will be finalised as part of the relevant SEC Release Change Request.

### 7.1 Change Lead Times and Timelines

From the date of approval (in accordance with Section D9 of the SEC), to implement the changes proposed DCC requires a lead time of approximately **17 months**.

The broad breakdown of the testing regime is shown in the following table in months after an approval decision date (D).

Phase	Timing
SECAS agreement on scope of release	D
CAN signature	D+1 month
Design, Build and PIT Phase	D + 9 months
SIT and UIT Phase, aligned with Release Dates	D + 17 months
Transition to Operations and Go Live	D + 17 months

### 7.2 SEC Release Allocation and Other Code Impacts

This Modification is expected to be implemented as part of the February 2024 SEC Release, however the allocation to a release may be dependent on other Modification timings and the suitability of a release. No functionality overlap with other Modifications has been identified at the time of undertaking this Impact Assessment.

It should be noted that there are no shared code elements, such as DUIS changes or Parse and Correlate updates, nor is there any shared regression testing in the February 2024 Release.

### 7.3 Costs and Charges

This section indicates the quote for all phases of application development stage for this Modification. Note these costs assume a release of just this SEC Modification without any other Modifications or Change Requests, and as planned, this Modification is likely to make up all of the February 2024 SEC Release. A further calculation of the post-PIT will be costs determined through a "Release CR" also referred to as a "post-PIT CR".

£	Design and Build	PIT	SIT	UIT	TTO	Total
SMETS2 Service Providers	£2,894,166	£862,410	£1,947,638	£297,544	£153,396	£6,155,154
SMETS1 Service Providers	£1,257,034	£876,091	£413,897	£272,681	£30,531	£2,884,586
Total	£4,151,200	£1,738,500	£2,361,535	£570,225	£183,927	£9,039,740

**Design** The production of detailed System and Service designs to deliver all new requirements. General mobilisation activities may be included in this phase.

**Build** The development of the designed Systems and Services to create a solution (e.g. code, systems, or products) that can be tested and implemented.

**Pre-Integration Testing (PIT)** Each Service Provider tests its own solution to agreed standards in isolation of other Service Providers. This is assured by DCC.

**Systems Integration Testing (SIT)** All the Service Provider's PIT-complete solutions are brought together and tested as an integrated solution, ensuring all SP solutions align and operate as an end-to-end solution. If the Modification makes up the entire release, there are unlikely to be reductions in costs of PIT and SIT typically seen in other SEC Releases.

**User Integration Testing (UIT)** Users are provided with an opportunity to run a range of pre-specified tests in relation to the relevant change.

**Implementation to Live (TTO)** The solution is implemented into production environments and made ready for use by Users as part of a live service.

## 7.4 Application Support

The Modification is expected to significantly increase the volume of messages being processed by the application, and as such, the Operational Service will require an uplift in order to support and maintain the solution. In general, the potential impact of the additional traffic volumes will include hardware and capacity upgrades with associated running costs, increased, ongoing, monitoring of the solution as well as technical support. A generalised monthly cost is provided, as each SP has a different end of contract date, for example, DSP will support the additional functionality until the end of the current Term of the Agreement (31st October 2024).

DSP	Application Support related to increased traffic, monitoring and increases of support calls, plus infrastructure running costs.
CSP S&C	Additional Storage and bandwidth support in its reporting platform (due to SMWAN traffic) – to be able to handle the increase in the SMWAN traffic introduced in this change. Monitoring support for the SMWAN traffic received in the new window.
CSP N	Additional frequency costs, data licencing, additional volume charges for data relating to data, monthly charge for additional SMWAN channels provided for MHHS for Standard 420 and Standard 420 DB Communications Hubs.
CGI IE	Additional Redis database support and licensing costs
DXC	Hardware, Application Support and Annual Elastic Search Licence Charge running costs
Vodafone	30 days enhanced Support at initial rollout.

Note that DCC are challenging all the Service Provider's figures for Application Support. In some cases, the Service Provider is moving to a different model with a greatly reduced run rate, but the approvals and permission to change must be gathered from different teams such as DCC Commercial and Test Assurance.

App Support Subsequent months	£194,687
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## 7.5 Contracts and Schedules

The contract updates will be detailed within the CAN and will impact the following schedules:

- Schedule 1 (New definitions)
- Schedule 2.1 (DCC Requirements)
- Schedule 3 (DCC Responsibilities)
- Schedule 4.1 (Contractor Solution)
- Schedule 6.1 (Implementation Planning)
- Schedule 7.1 (Charges and Payment)

## Appendix A: Risks, Assumptions, Issues, and Dependencies

The tables below provide a summary of the Risks, Assumptions, Issues, and Dependencies (RAID) observed during the production of the Full Impact Assessment. DCC requests that the Working Group considers this section and considers any material matters that have been identified. Changes may impact the proposed solution, implementation costs and/or implementation timescales.

This RAID should be viewed in conjunction with the following sections relating to the DCC design which were used by the Service Providers in their FIA submissions in Appendix C: Supporting Materials:

- Design Principles
- Design Assumptions
- Non-Functional Requirement Assumptions
- Functional Requirement Enhancements
- Assumptions for User Demand and Infrastructure Capacity

### Risks

Ref	Description	Status/Mitigation
MP162-DR1	Should the Assumption in Section 4.2 regarding User Behaviours prove not to be true, there is a risk that the volumetric assumptions, provided by DCC in section 4.1.3, will need to be reviewed and, therefore, the assumptions and costings of this Modification will need to be reviewed.	Medium risk, high impact. Additional capacity would be required as part of DCC Demand Management
MP162-DR2	The SMETS1 local cache solution discussed in Section 4.5 was proposed during the PIA and discussed with the Industry via the Working Group and TABASC. However DCC is aware of recent issues using a similar cache solution in FOC cohort at the time of submission of this FIA and assumes the FOC issues around data cache (Opt-in, Opt-out) will be resolved before the approval of this Modification. Any changes in proposed SMETS1 cache solution would require re-assessment of SMETS1 solution for this Modification due to overall assumptions made in the non-functional area as explained in section 4.	Closed. Decision made to allow the S1SP cache for selected SRVs with limited period for retention.
MP162-DR3	The lack of an integrated performance test environment could result in unpredictable behaviour once Service Provider solutions are deployed to the Production environment.	DCC will assure each SP's performance testing and validate compliance with the agreed volumetric assumptions. Further, DCC will carefully plan the MHHS rollout schedule with industry bearing in mind the inability to test at

		volume across the DCC Total System.
MP162-DR4	There is currently an operational problem with Service Users inability to receive Service Responses at the rate they are generated during overnight Scheduled data collection. The collection of Settlement data during the working day increases the risk of this problem occurring in working hours and impacting other Service User activity such as Install and Commission of SMETS2 devices.	While MHHS does not provide a solution to this concern, other DCC programmes including BaU enhancement will mitigate this concern. The Northbound Prioritisation component will mitigate concerns on I&C activity.
MP162-DR5	Infrastructure procurement lead times could increase due to the impact of COVID-19 and global component shortages.	No risk for SPs with no infrastructure upgrades, low risk for remaining SPs.
MP162-CR6	Given the predicted change in user behaviour, it is likely that the number of Service Requests the DCO is going to receive after Go Live (Feb24) will increase. That poses the risk that if no action is taken, the overall system performance will degrade.	Carefully monitor Service User behaviour around the CGI-IE S1SP load in terms of SRVs impacted by MHHS, and take action to scale the DCO System if/when needed. This monitoring will be undertaken by DCC.
MP162-DR7	After consultations with SMETS1 meter manufacturers, DCC have determined no firmware updates for SMETS1 meters are planned in 2023 or later. This led to the descoping of the DCO2 change. If there is a requirement for a firmware update this could be a risk to the DCO.	DCC Demand Management to carefully monitor system load, and DCC to monitor if there is a need for firmware updates. DCC Demand Management can scale the solution if required.

## Assumptions

These assumptions have been used in the creation of this Full Impact Assessment. Any changes to the assumptions may require DCC to undertake further assessment, prior to the contracting and implementation of this change.

Ref	Description	Status/Mitigation
MP162-DA1	The DSP will maintain MDRA appointments to Meter Point Administration Numbers (MPANs) by processing a new data flow received over the CSS interface. However as described in section 4.1.5, this design has not been confirmed yet for the wider MHHS programme.	DCC will continue to press wider MHHS programme for interface specifications.
MP162-DA2	The on boarding of MDRs to use the DSP will be a similar process to that of other DCC Service Users, including the setting up of SMKI certificates.	Accepted
MP162-DA3	The MDR will sign XML messages using the generic "XML Signing" role and the SMKI policy will be updated to allow the User Role MDR to request Key Agreement Key (KAK) certificates for encryption with a SMKI role of "Other".	Accepted
MP162-DA4	Since the MHHS is a new service, there is no requirement to process a backlog of MDRA appointments.	Accepted.
MP162-DA5	The appropriate modifications to the CSS interface to include the data will be made before work commences on this Modification, and the MDR appointment data will be provided to DCC Data Systems via CSS.	Similar to MP162-DA1
MP162-DA6	The CSS RegistrationEventSynchronisation message can be extended to accommodate MDRA assignments as Supplier Arranged Appointments.	Accepted
MP162-DA7	SIT Device sets only need to contain a Comms Hub and an ESME.	Accepted although CSP N test sets relating to network optimisation are likely to contain GSME and PPMIDs.
MP162-DA8	The DCC Total System has no knowledge of the Opted Out status of any meter point, e.g. SIT will not be able to validate the correct SR is submitted by a MDR or Supplier for any meter point. It is down to the Supplier or MDR to collect MHHS data from the correct device.	Accepted
MP162-DA9	An MDR User will not use SRV4.1.1 to collect data from a SMETS2+ device. It is therefore not required to update GBCS to accept an ECS17b command from the ACB.	Accepted
MP162-DA10	DUIS schema and DUGIDS need to be updated to support scheduling of SRV 4.2. There will be no changes to the SMETS or CHTS technical specifications.	Accepted, likely to be a minor change
MP162-DA11	Newly accredited MDR Users will request DCC User Gateway connections appropriate to their anticipated Service Request volumes.	Accepted, but guidance should



		be given to MDRAs
MP162-DA12	For some SMETS1 ESME where device is configured to push data based on DSP schedule, data against scheduled SRV 4.2 will be returned with last midnight snaps only.	Accepted
MP162-TA13	Assume no changes to Comms Hubs, Comms Hub memory, or Comms Hub firmware related to this Modification.	Accepted
MP162-TA14	CSP S&C assumes that the list of devices and emulators to validate this CR in SIT, UIT will be similar to that of previous SEC Programme Releases, e.g., November 2021 SEC Release.	Not the case, but this will be re-assessed as part of the Release CR.

## Issues

Ref	Description	Status/Mitigation
MP162-AI1	For CSP North to provide the MHHS service in the Fylingdales area, additional channel licences must be granted by OFCOM. CSP North have requested licenses, but have received no responses from OFCOM. Currently MHHS cannot be rolled out in the Fylingdales postcodes.	Open. If OFCOM provide the required licenses, this will be added to the scope of this Modification.

## Dependencies

Ref	Description	Status/Mitigation
MP162-DCCD1	The DSP will maintain MDRA appointments to Meter Point Administration Numbers (MPANs) by processing a new data flow received over the CSS interface. However as described in section 4.1.5, this design has not been confirmed yet for the wider MHHS programme.	Accepted
MP162-DCCD2	Changes to the CSS will be required to accept the new data flow from the wider MHHS programme, and to pass the required data to the DSP.	Accepted



## Appendix B: Glossary

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
Comms Hub, CH	Communications Hub
DCC	Data Communications Company
DCO	Dual Control Organization
DPIA	Data Protection Impact Assessment
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
E2E	End to End
FIA	Full Impact Assessment
FOC	Final Operating Capability
GB	Gigabytes
GBCS	Great Britain Companion Specification
GFI	GBCS Integration Testing For Industry
GSME	Gas Smart Metering Equipment
HH	Half-Hourly
IOC	Initial Operating Capability
IS	Import Supplier
I&C	Install and Commission
KAK	Key Agreement Key
MDR	Meter Data Retriever - (New User

	Role)
MDRA	MDR Agents
MHHS	Marketwide Half-Hourly Settlement
MOC	Middle Operating Capability
MPAN	Meter Point Administration Number
MPID	Market Participant Identifier
MT SMS	Mobile terminating SMS message
NHH	Non Half-Hourly
OU	Other User
PDP Context	Packet Data Protocol context
PIA	Preliminary Impact Assessment
PIT	Pre-Integration Testing
P&C	Parse & Correlate
RAN	Radio Access Network
RBAC	Role Based Access Control
RF	Radio Frequency
ROM	Rough Order of Magnitude (cost)
RNI	Regional Network Interface
RSA	Registered Supplier Agent
RTDS	Reference Test Data Set
SAA	Supplier Arranged Appointments
SAT	Service Audit Trail
SCR	Ofgem's Electricity Settlement Reform Significant Code Review
SEC	Smart Energy Code
SECAS	Smart Energy Code Administrator and Secretariat
SIT	System Integration Testing
SLA	Service Level Agreement
SMETS	Smart Metering Equipment Technical Specification
SM WAN, SMWAN	Smart Metering Wide Area Network
SMI	Smart Metering Inventory
SR	Service Request
SRV	Service Request Variant

SSI	Self Service Interface	TK	Transceiver Kit
SSMI	Self Service Management Interface	TOM	Target Operating Model
S1SP	SMETS1 Service Provider	TRT	Target Response Times
TABASC	The Technical Architecture and Business Architecture Sub-Committee	UEPT	User Entry Process Testing
		UIT	User Integration Testing
		URP	Unknown Remote Party

## Appendix C: Supporting Materials



FIA-SECMP016  
Context and Require

## Appendix D: DUIS Uplift Supporting Information

For avoidance of doubt, and in line with DCC's standard DUIS design principles, Users are not mandated to move to the new version of DUIS that will be introduced to support the proposed MHHS solution.

Existing Users have a choice to implement this new version or not, and if not, can continue to use their existing DUIS interface version.

Existing User?	Will use MDR User Role?	New DUIS Version Impacts?
Yes	No	<p>Existing Users have the choice to implement this new version, and if not, can continue to use their existing DUIS interface version.</p> <p>This scenario would apply for any existing Supplier who is not looking to use the new MDR User Role and use their existing Supplier User Role(s) for MHHS data collection purposes.</p> <ul style="list-style-type: none"> <li><u>Limitation</u> – Users who do not upgrade to use the latest DUIS version would not be able to use the additional DCC Scheduling Services for <u>SRV 4.2 – ReadInstantaneousExportRegisters</u> and these would have to be sent to the DCC using "On-Demand"</li> <li>Until an existing User upgrades to the latest released DUIS version to support the proposed MHHS solution changes, DCC recognises SRV 4.2 sent for MHHS purposes can ONLY be sent on an "On Demand" basis by Users.</li> <li>DCC would encourage all Users to upgrade to the latest DUIS version as soon as practically possible to help DCC and Users manage the additional SRV 4.2 Request and Response Volumes for SMETS1 meters as using this as an On Demand SR is not as efficient as using the new scheduled service option.</li> </ul>
Yes	Yes	Existing Users who want to extend their Eligible User Roles to include the new MDR User Role must upgrade their DUIS version to align with the new MDR User Role definition and Eligible Users status in the updated DUIS version.
No	Yes	<p>New Users are usually expected to use the latest DUIS version and so will be able to use all the new features and functionality included within the latest DUIS version.</p> <p>This scenario would apply for any new MDR party who is not an existing User of DCC Services.</p>
No	No	New Users are usually expected to use the latest DUIS version and so will be able to use all the new features and functionality included within the latest DUIS version.