

SEC Modification Proposal, SECMP0244, DCC CR5312

Device Alerts for Smart Meter Credit Replenishment

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 **£20,694**.
- The timescales to complete the Full Impact Assessment of 40 working days.
- ROM costs for SECMP0244, up to the end of Pre-Integration Testing (PIT) of £60,000 to 200,000
- Significant Integration testing from the Communication Service Providers

Problem Statement and Solution

Scenarios exist where the supply to a prepayment meter could be cut off through reaching certain credit limits. If this were to happen frequently, it may identify a trend where a prepayment energy consumer may be self-disconnecting or rationing their credit. If the Supplier needs an update on the status of the Device following the receipt of a credit exhaustion alert, they will need to send Service Reference Variant (SRV) 7.4 'Read Supply Status'. This SRV may be sent multiple times in a scenario where power loss is caused by credit exhaustion, adding potentially unnecessary traffic to the Data Communications Company (DCC) System. If the power remains lost, there may be a need to visit the site to investigate the issue, as well as take behind the scenes remedial actions.

Although an Alert is sent to the Supplier to inform them of an issue', the Device will not automatically inform the Supplier if the Supply has been enabled through some form of remedial action. A Supplier will not receive an update or Alert on the Disablement Threshold issue in relation to Supply re-enablement until they take some form of action such as sending SRV 7.4 to the Device.

This Modification seeks to introduce a new device alert through changes in the DSP and on the Devices.

Modification Benefits

A direct consequence of submitting an increased volume of Service Requests (SR) is an increase of traffic within the DCC System, possibly leading to increased response times, as well as adversely affecting DCC messaging limits. DCC have identified the total number of SRV 7.4 sent in January 2024 was of the order of 4.7million, out of a monthly total of just over 2,000million. By defining a new Supply Enabled Alert, the device would automatically send an Alert at the time of re-enablement removing the need for the Supplier to send SRV7.4 and the receiving a response, potentially reducing traffic on the network.

The new Alert would allow Suppliers to take a proactive approach to protecting vulnerable customers, and in cases where the initial Off-Supply Alert is not generated this Alert would notify Suppliers of disconnects that would otherwise be hidden, potentially masking Self-Disconnecting Customers. There would be reputational advantages for the Smart Metering Implementation Programme (SMIP) in being able to proactively manage and support any vulnerable customer's Self-Disconnect behaviours.

2 Document History

2.1 Revision History

Revision Date	Revision	Summary of Changes
23/02/2024	0.1	Initial version, for DCC internal review
27/02/2024	0.3	Review complete and published

2.2 Associated Documents

This document is associated with the following documents:

Ref	Title and Originator's Reference	Source	Issue Date
1	MP244-Modification-Report-v0.4	SECAS	2/02/2024
2.	MP244 - Business Requirements Document v0.5	SECAS	9/02/2024

References are shown in this format, [1].

2.3 Document Information

The Proposer for this Modification is Kevin Clark of Utilita Energy Ltd. The Modification was raised on August 8th, 2023.

The Preliminary Impact Assessment (PIA) was requested of DCC on 9th February 2024.

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

When a Smart Meter has been installed successfully, a Supplier can configure the Device to perform in prepayment mode, as well as triggering specific Alerts and notifications depending on scenarios. When a Supplier receives a particular Alert or notification, they can take remedial actions to rectify issues if required.

The Proposer has identified scenarios where a Supply could be cut off through reaching certain credit limits. If this scenario were to happen frequently, it may identify a trend where a prepayment energy consumer may be self-disconnecting or rationing their credit.

If a Supplier wishes to retrieve an update on the status of the Device following the receipt of a credit exhaustion alert, they will need to send SRV 7.4 'Read Supply Status'. This SRV may be sent multiple times in a scenario where power loss is caused by credit exhaustion, adding potentially unnecessary traffic to the Data Communications Company (DCC) System. If the power remains lost, there may be a need to visit the site to investigate the issue, as well as take behind the scenes remedial actions.

3.2 What is the Issue?

The Proposer has identified that although an Alert is sent to the Supplier to inform them of an issue, e.g., for example Alert 0x8F0F 'Credit Below Disablement Threshold (prepayment mode)', the Device will not automatically inform the Supplier if the Supply has been enabled through some form of remedial action. A Supplier will not receive an update or Alert on the Disablement Threshold issue in relation to Supply re-enablement until they take some form of action such as sending SRV 7.4 to the Device.

3.3 Impact of the Issue

The Proposer has advised that SRV 7.4 may need to be triggered multiple times over the course of an event. This means the Supplier is spending time and resource retrieving the status of the Supply, in conjunction to taking remedial action to resolve any outstanding issues. A Supplier will be unable to provide accurate information to the consumer about the state of their supply unless they manually initiate SRV 7.4 when questioned about the Supply. This may have an impact on services offered by Suppliers to consumers experiencing difficulties with their Supply, such as offering welfare checks, providing discretionary or emergency credit, or accurately responding to Supply faults and/or concerns.

A direct consequence of submitting an increased volume of Service Requests (SR) is an increase of traffic within the DCC System, possibly leading to increased response times, as well as adversely affecting DCC messaging limits. DCC have identified the total number of SRV 7.4 sent in January 2024 was of the order of 4.7million, out of a monthly total of just over 2,000million.

3.4 Business Requirements

The business requirements are as follows.

Ref.	Requirement	MoSCoW Rating
1	A SMETS2 Device Alert notifying a Supplier of the re-enablement of a Supply following the receipt of three different Device Alerts relating to scenarios where credit limits have been exceeded or exhausted.	M

The Proposer requires a new Alert with the name 'Supply Enabled', which would be triggered upon a Supply being re-enabled. The Alert would support any organisation monitoring any potential Energy Consumers who are 'rationing' their credit, triggering regular Alerts and re-enablements.

This solution relates to Smart Metering Equipment Technical Specification (SMETS2) Devices, and will apply to both Electricity Smart Metering Equipment (ESME) and Gas Smart Metering Equipment (GSME).

The three Device Alerts provided below form the basis of the Proposer requesting the proposed new Device Alert:

1. Credit below Disablement Threshold (prepayment mode) (Alert Code 0x8F0F)
2. Emergency Credit Exhausted (Alert Code 0x81AA)
3. Combined Credit Below Low Credit Threshold (prepayment mode) (Alert Code 0x810D)

The new Alert would need to be made configurable, meaning that the DCC Users can choose whether they receive it or not. No further information is required within the Device Alert detailing how the Supply was re-enabled.

The following diagram shows a potential flow for existing and the new Alert.

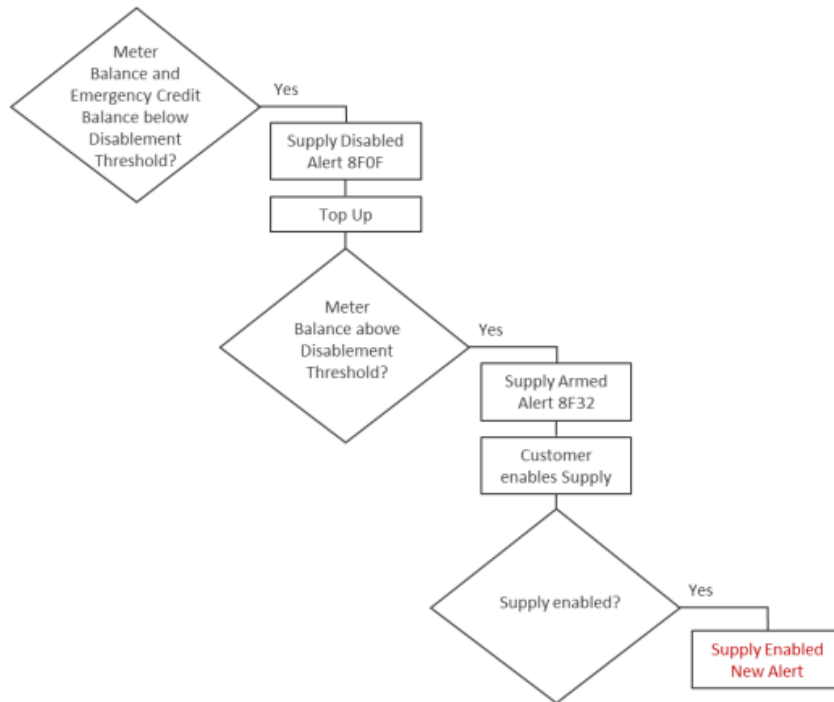


Figure 1: Process Flow for Supply Enabled New Alert

DCC notes that the Supply Armed Alert could be seen as an adequate indicator that the customer has taken some action to top up the meter balance; is the new Enabled Alert seen as an indicator of prepayment customers who Self-Disconnect or Self-Ration?

3.5 Business Case

Business benefits and the basis of the business case are given in detail in document [2]. The key points associated with the new Alert can be summarised as:

- An increased understanding of, and support for, prepayment customers who Self-Disconnect or Self-Ration.
- The new Alert would allow Suppliers to take a proactive approach to protecting vulnerable customers.
- In cases where the initial Off-Supply Alert is not generated this Alert would notify Suppliers of disconnects that would otherwise be hidden, potentially masking Self-Disconnecting Customers. DCC notes that whatever is stopping the Off-Supply Alert from being sent might also prevent the new Enabled Alert from being sent in turn.
- Reputational advantages for the Smart Metering Implementation Programme (SMIP) in being able to proactively manage and support vulnerable customer's self-disconnect behaviours.
- An automated Alert would have a positive impact on the traffic across DCC network, as the Alert would be an Alert from the end device to the Supplier as opposed to a Supplier SR 7.4 and response. However, it is possible that the Alert would be generated on multiple occasions if the customer repeatedly self-disconnects and reconnects.

3.6 Solution Approach

This Modification seeks to introduce a new device alert through changes in the DSP. It will also be necessary to implement changes in the Great Britain Companion Specification (GBCS) at a device level. The latter aspect is not covered in this PIA, and would require a separate SECAS-led consultation with meter manufacturers to assess the cost and effort required.

In terms of the properties of the new GBCS Device Alert:

- If the Alert is Non-Mandated, all Manufacturers would be required to adopt this Alert, and there is a likelihood of high implementation costs as a result.
- If the Alert is Mandatory, all relevant Users would receive the Alert in relation to 'Supply Re-Enablement'. There would be no option to switch the Alert off. This option would be a 'text-only' change to the DCC User Interface Specification (DUIS) requiring minor amendments.
- If the Alert is designated as configurable, a DCC User could choose whether they receive the Alert, and in which scenarios it applies to. However, a configurable alert has a more significant impact to DUIS, including a DUIS Schema amendment.

The Proposer decided to progress with a configurable Device Alert.

As the proposed Device Alert will be Supply critical, the Alert would need to be returned to the Supplier as soon as possible. This may require an amendment to Northbound Prioritisation Alert priority levels.

DCC notes that the term "Supply critical" is not an official term, and should not be confused with "Critical Alerts" as the latter alerts cannot be configurable. Is the Supply Armed 8F32 Alert considered Supply critical?

4 Description of Solution

Changes in the DSP to DUIS, the Message Mapping Catalogue (MMC), and GBCS will be required to meet the requirements.

4.1 DSP Changes

The extent of the changes for this Modification include:

1. Amend the DUIS SRV6.22 request to allow a new Supply Enabled Alert to be configurable for both ESME and GSME devices
2. Amend the MMC SRV6.2.10 response to include the configuration setting of the Supply Enabled Alert
3. Create new DUIS and MMC XML schemas (assumed to be version 5.4) for the revised SRV definitions
4. Add support for a new GBCS version (assumed to be v4.4) that includes the new Supply Enabled Alert

To allow a new GBCS Alert to be configurable requires a change to the DUIS XML schema definition for SRV6.22 to add the new Supply Enabled Alert code to the list of possible XML tags that may be present in a SRV6.22 request. Similarly, for that configuration to be read from the device requires a change to the MMC XML schema definition to add the new Supply Enabled Alert code to the list of possible XML tags that may be present in a SRV6.2.10 response.

For GBCS compatibility, the processing of SRV6.22 will only allow the new Supply Enabled Alert code to be configured if the target device is at a GBCS version which supports the new Supply Enabled Alert (potentially v4.4 or later). The existing error code E062203 will be returned if the GBCS version is not compatible with a request to configure the new Supply Enabled Alert.

There is no requirement for any GBCS compatibility validation on SRV6.2.10 since a device will only return the configuration of GBCS Alerts which it supports.

The DSP solution will be updated to support new DUIS and MMC XML schemas (assumed to be v5.4) for the revised SRV definitions, and will also be updated to support a new GBCS version (assumed to be v4.4) that includes the new Supply Enabled Alert.

4.1.1 Security Impact

There will be no significant change to the security design as a result of this change. There are no interface or major changes to functionality meaning there is no requirement for a penetration test or any changes to the existing protective monitoring approach.

The implementation will be security assured throughout. This assurance includes reviewing designs, test artefacts and providing consultancy to the implementation and test teams.

A more detailed assessment of Security impact will be carried out as part of the Full Impact Assessment.

4.1.2 Technical Specifications

Changes to DUIS, MMC, and GBCS will be required to meet the requirements.

4.1.3 Service Impact

As part of the implementation, a provision is anticipated for service support in the following areas:

- as part of the setup activities, the Application Management Support (AMS) team will extend the monitoring solution to include the new device alert. The solution allows DSP to proactively monitor the health of the Production system and take action to address potential service disruption, although none is anticipated.
- a Data Power schema change will be required in all the environments due to the required DUIS change.
- activities required for transition to operations (TTO) at time of implementation will be minimal following completion of testing. However, there will be a small effort required to ensure that all applications continue to function correctly during and post cutover. A small amount of effort will be included in the FIA to cover knowledge transfer sessions.

A more detailed assessment of service impact will be completed as part of any Full Impact Assessment for this Modification.

4.1.4 Infrastructure Impact

No infrastructure impact is expected from this Modification.

4.2 Critical Software

Critical Software as the Parse and Correlate provider will make the required changes to support the revised MMC schema definition for SRV6.2.10.

4.3 Communications Service Providers

This Preliminary Impact Assessment contains no impacts on the SMETS 2 Communications Service Providers (CSP) or the Network Evolution Service Providers (4G Comms Hub). As there are no requirements for the Communications Hub to implement any functionality beyond the passthrough of the new Supply Enabled Alert, no firmware changes are required. In addition, specific exemptions apply to all the CSPs:

- No modification to any test approaches.
- No changes to network traffic.
- No changes to performance measures.
- No changes to alert prioritization within the CSP solutions
- No changes to GBCS which will impact the CSPs

4.4 Data Science and Analytics Reporting

While there is no specific requirement relating to reporting, a new Alert is likely to impact the current DCC Data Science and Analytics (DS&A) reporting of SRVs and Alerts which are included in the existing SECMP0122B reporting. Provision for this is included in the cost in section 6.1 to produce a FIA.

5 Implementation Timescales and Approach

This Modification is expected to be implemented in a future SEC Release. Design, Build, and Pre-Integration Testing (PIT) is expected to take approximately four (4) months to complete after the CAN is signed. The Modification would be added to a suitable SEC release after the FIA is completed, and although this change would be expected to be part of a SEC Release, due to the DUIS schema changes would most likely be implemented in a Release with other DUIS changes.

5.1 Implementation Approach

Implementation of this change is assumed to follow a hybrid of agile and waterfall methodology. The release lifecycle duration and implementation details will be confirmed as part of the FIA.

5.2 System Integration Testing

System Integration Testing (SIT) will include DUIS and GBCS Compatibility testing, System Regression testing, and SIT management as well as governance activities. More specifically the SIT scope for this Change will consist of:

- testing across both CSPs on all three sets of Comms Hubs
- testing using the Network Evolution WAN and a 4G Comms Hub
- the use of real ESME and GSME devices on new firmware versions which support the uplifted GBCS version and device alert
- Install and Commission of the device sets using the new GBCS firmware version, with service users supported by the uplifted DUIS version
- validating changes to the updated SRV 6.22 and SRV 6.2.10 support the configuration of behaviour for the new alert
- executing key business scenarios which result in disabled supply, including Emergency Credit Exhausted and Credit Below Disablement Threshold
- testing the Device Top-up business scenario to verify supply is re-enabled and the new alert is sent
- testing to verify that submitting SRV6.22 using a previous GBCS version results in DSP error E062203.

It is understood that, as part of this CR5312, new DUIS and GBCS versions will be required to implement the changes to SRVs to allow for alert configuration. Therefore, it is expected that new test scripts and scenarios will need to be created. This will be carried out as part of the SIT preparation activities, including the creation of test artefacts such as the Heatmap. It is expected that minor updates to the Motorway Automation Framework will be required to accommodate these changes.

It is estimated that for this Modification, approximately four hundred and eighty tests will be executed within the proposed SIT-B scope in order to verify the new behaviour. While the cost and duration are not included as part of the PIA, it is clear that this testing and any

required regression testing with all the CSPs will require significant effort and associated cost.

5.3 User Integration Testing

The UIT team will conduct testing specific for this change by enabling consumption on an ESME and GSME, running-down the credit available on the device and then running a top-up SR as follows:

1. set the ESME or GSME in Prepayment mode
2. set tariff and meter balance to be a specific value and ensure the Test Lab Operator (TLO) has enabled consumption on the device
3. wait for the credit on the ESME or GSME to be exhausted
4. run a SR2.2 to apply a top-up to the device and then check via the Service User Simulator (SUS) or Self Service Management Interface (SSMI) that the new 'Supply Enabled' alert has been generated

It is anticipated that significant support will be required from the CSPs to complete UIT.

6 Costs and Charges

The scope of supply under this PIA includes design, development (build), system testing, and performance testing within the PIT environments.

The Rough Order of Magnitude cost (ROM) shown below describes indicative costs to implement the functional requirements as shown in section 3.4. The price is not an offer open to acceptance. It should be noted that the change has not been subject to the same level of analysis that would be performed as part of a Full Impact Assessment and as such there may be elements missing from the solution or the solution may be subject to a material change. As a result, the final offer price may result in a variation.

6.1 Design, Build and Testing Cost Impact

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 costs are supplied.

£ ROM	Design, Build and PIT
Create a new Supply Enabled Alert	£60,000 to 200,000

The range of charges includes provision for a DUIS uplift. However, if the targeted SEC Release date includes another Modification or Change Request with a DUIS uplift, that cost will be shared equally between the two (or more) changes, and the cost of Design, Build, PIT, and subsequent Integration Testing will come down.

Although not included in this PIA, it is expected that there will be high integration testing costs associated with this Modification. As with the DUIS uplift, if the targeted SEC Release date includes another Modification or Change Request with regression testing, that cost will be shared equally between the two (or more) changes, and the cost of Integration Testing will come down.

Based on the existing requirements, the total fixed price cost for a Full Impact Assessment is **£20,684** and would be expected to be completed in 40 working days.

6.2 Contract and Schedule Impacts

No changes to Schedule 2.2 (Performance Measures and Reporting) are expected as a result of this Change.

Updates to the DSP Design Baseline (Schedule 4.1) and Payment milestones (Schedules 6.1 and 7.1) are anticipated.

Appendix A: Glossary

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

Acronym	Definition
AMS	Application Management Support
CAN	Contract Amendment Note
CH, Comms Hub	Communications Hub
CR	DCC Change Request
DCC	Data Communications Company
DSP	Data Service Provider
DS&A	Data Science and Analytics
DUIS	DCC User Interface Specification
ESME	Electricity Smart Metering Equipment
FIA	Full Impact Assessment
GBCS	Great Britain Companion Specification
GSME	Gas Smart Metering Equipment
MMC	Message Mapping Catalogue
MRT	Meter Read Transaction
PIA	Preliminary Impact Assessment
PIT	Pre-Integration Testing
ROM	Rough Order of Magnitude (cost)
SAT	Service Audit Trail
SEC	Smart Energy Code
SECAS	Smart Energy Code Administrator and Secretariat
SIT	Systems Integration Testing
SMIP	Smart Metering Implementation Programme
SR	Service Request
SRV	Service Reference Variants
SSI	Self-Service Interface
TTO	Transition to Operations
UIT	User Integration Testing

Appendix B: RAID and Clarifications

No Risks or Issues have been identified at this time.

Assumptions

Ref	Description	Status/Mitigation
SECMP244-A1	SIT testing will involve the use of real devices where available, otherwise emulators will be used.	Accepted
SECMP244-A2	Systems Integrator Programme and Release Management activities are not included in this PIA.	Accepted

Dependencies

Ref	Description	Status/Mitigation
SECMP244-D1	In the case that emulators will need to be used during SIT testing, firmware versions must be readily available, and compatible with the uplifted GBCS version to test this change.	Accepted

Clarifications

In order to help complete the Full Impact Assessment, the DSP will require clarification on the following points:

1. Confirmation of the GBCS Alert Code to be used for the new Supply Enabled Alert.
2. A likely indication of the new GBCS version number.
3. A likely indication of the new DUIS version number.