SEC
Smart Energy Code

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MP102A

‘Power Outage Alerts triggered by an OTA firmware upgrade’

Modification Report

Version 1.0

17 August 2020

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About this document

This document is a draft Modification Report. It currently sets out the background, issue, and progression timetable for this modification, along with any relevant discussions, views and conclusions.

Contents

This document also has three annexes:

- **Annex A** contains the business requirements for the solution.
- **Annex B** contains the redlined changes to the Smart Energy Code (SEC) required to deliver the Proposed Solution.
- **Annex C** contains the full responses received to the Refinement Consultation.

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1. Summary

This proposal has been raised by Matthew Alexander from Scottish and Southern Electricity Networks (SSEN).

Power Outage Alerts (POA) are used by Distribution Network Operators (DNOs) to improve customer service. They allow DNOs to become aware of power outages sooner rather than relying on the Customer to contact them. This enables DNOs to restore supply to affected customers more efficiently and quickly.

Over the Air (OTA) firmware updates on some Electricity Smart Metering Equipment (ESMEs) generate a POA. The DNO is unable to establish whether there is a real issue with the power to the premises or whether it was just a firmware upgrade to the ESME.

OTA firmware upgrades have been required to stop this happening; however an informal industry agreement was reached to agree that EMSE manufacturers would ensure their Devices did not exhibit this behaviour. This agreement should be seen as being an interim solution until an enduring solution is implemented as a new ESME Manufacturer may be unaware of the informal agreement or not comply with such an agreement.

Alongside this, there are still a set of ESMEs currently installed, that will continue to initiate a POA when an OTA firmware update is implemented.

Investigations during the Refinement Phase found the scale of the issue affecting existing meters much greater than initially envisaged. This could result in a lengthy lead time for implementation where meter Manufacturers could potentially still produce Devices that cause erroneous Power Outage Alerts (POAs). Therefore, it has been agreed that there should be two separate solutions to address the issue;

- MP102A (this modification) – a Technical Specifications document change for meter Manufacturers to enshrine the agreement into the SEC, and
- MP102B – an enduring solution for meters that are currently installed.

There will be no impact to SEC Parties to implement this modification and no DCC System changes are required. If approved, this modification is targeted for the November 2020 SEC Release.

2. Issue

What are the current arrangements?

Power Outage Alerts (POA) are intended to identify when the incoming power supply from a Distribution Network Operator (DNO) to a Customer's premises fails for a period greater than three minutes. Such POAs are used by DNOs to improve customer service by becoming aware of power outages sooner than relying on the customer to phone in, and to develop a faster, more complete view of the premises affected and hence enable them to restore supply to affected customer more efficiently and more quickly.

Electricity Distributors have an obligation under Statutory Instrument 2002 No. 2665 'The Electricity Safety, Quality and Continuity Regulations 2002 (as amended)' to have and use distribution

equipment in such a way so as to prevent interruption of supply to Customers' premises, so far as is reasonably practicable. Hence there is a legal obligation to maintain supplies to Customers.

Electricity Distributors further have an obligation under Statutory Instrument 20015 No. 699 'The Electricity (Standards of Performance) Regulations' to pay Customers a prescribed sum of money where the supply to a Customer's premise is interrupted as a result of a fault on their network which is not restored in a prescribed period of time. There is therefore a need for the Electricity Distributors to know when a Consumer's supply is interrupted so that they can respond appropriately.

In order to achieve this, a DNO needs to be confident that the POAs it receives are genuine and actually relate to supply interruptions to Customers' premises.

What is the issue?

Experience has shown that implementing an Over the Air (OTA) firmware update on some Electricity Smart Metering Equipment (ESMEs) generates a POA. This is because when some ESMEs activate a new firmware version it results in an interruption of the power supply to the Communications Hub (CH), which is powered by the ESME. If the power supply for the CH is interrupted for more than three minutes, then the CH must send a POA (the AD1 Alert). The Data Communications Company (DCC) then sends the AD1 Alert to the relevant DNO, who can't tell whether there is a real issue with the power to the premises or whether it was just a firmware upgrade to the ESME.

In some instances (mainly in the Communication Service Provider (CSP) North region) a loss of power to the CH of 30 seconds results in an AD1 Alerts being sent to the CSP where it is held. If the power returns to the CH within two and a half minutes (giving a Power Outage of less than three minutes) a Power Restoration Alert (PRA) is sent to the CSP and the AD1 discarded. If the CSP North does not receive the PRA, the AD1 Is then forwarded to the DCC and on to the DNO.

As DNOs need to respond to each POA, a POA initiated by an OTA firmware update will require a DNO to investigate every POA to understand if it relates to a genuine power outage.

Failure to respond and restore supplies within the prescribed time will have an adverse impact on consumers and create an obligation on the DNO to pay compensation.

Depending on the location of the faulty equipment, Electricity Distributors have a number of means of detecting the interruption of supplies to a customer's premise. At the moment under the RIIO-ED1 Regulatory Instructions and Guidance (RIGs) Annex F 'Interruptions', published by Ofgem and which forms part of the Electricity Distributors licence obligations, the Electricity Distributor need not respond on receipt of a single AD1 Alert, but there is a clear expectation that when the AD1 Alerts become more reliable the RIGs will be changed accordingly. It is therefore essential that the AD1 Alerts are as reliable as possible; when the RIGs are changed, Electricity Distributors will need to respond to an AD1 Alert. False or spurious AD1 Alerts are likely to initiate an unnecessary Customer contact either by phone or a site visit, which will increase costs, ultimately borne by Customers, and have an adverse impact on Customer service.

This issue was previously highlighted in industry forums and resolved by current ESME Manufacturers agreeing that all future OTA firmware updates would be designed so as not to initiate a POA event (the ESME must not cut the CH power supply for three or more minutes during a firmware upgrade to prevent the CH (or CSP North) from sending the AD1 to the DCC.

OTA firmware upgrades have been required to implement this change – however an informal industry agreement was reached to agree that EMSE manufacturers would ensure their Devices did not exhibit this behaviour. This agreement should be seen as an interim solution until an enduring

obligation is implemented as ESME Manufacturers may be unaware or not comply with such an agreement.

Alongside this, there are still a set of ESMEs, that will continue to initiate a POA when an OTA firmware update is implemented. This issue relates to the ESMEs already installed and is being investigated under MP102B 'Power Outage Alerts triggered by an OTA firmware upgrade – enduring solution'. Ultimately these ESMEs would need to be replaced to resolve the problem. During this time, there is currently no solution that can stop POAs from being forwarded to the relevant DNO unnecessarily.

In summary there are two issues:

1. There is no obligation in the SEC to require an OTA firmware update not to generate a POA.
2. There is no means of identifying or supressing erroneous POAs associated with an OTA firmware update from the high number of ESMEs in service.

How does this issue relate to the SEC?

The Proposer has stated that there should be amendments to SEC Schedule 9 'Smart Metering Equipment Technical Specifications' (SMETS) and SEC Schedule 10 'Communications Hub Technical Specifications' (CHTS). At the moment there is no specific text in the Device specifications (SMETS or Great Britain Companion Specification (GBCS)) prohibiting a POA from being issued during an OTA firmware upgrade. Nor is there a mechanism to supress POAs from being generated incorrectly when an OTA firmware update is processed by a Device that cannot be modified to inhibit their creation.

What is the impact this is having?

As DNOs need to respond to each POA, the issue of a POA initiated by an OTA upgrade will require a DNO to investigate (either by phone or site visit or by sending an SR7.4 'check supply' Service Request) every POA to establish if it relates to a genuine power outage.

What is the impact of doing nothing?

There are two significant impacts if this issue is not addressed:

- DNOs will either need to check the energisation status of each meter from which POA is received, or
- DNOs will need to send a member of staff to site to investigate.

Both these options will result in the DNO incurring additional costs.

3. Solution

Proposed Solution

The Proposed Solution is to formalise the agreement within the SEC to ensure that a POA is not generated when an OTA firmware upgrade takes place. Amendments will be made to SMETS2 sections 4.3, 5.4, 5.10 and 5.16. This will ensure that the obligations are applied to single phase ESME, twin element single phase ESME, poly-phase ESME and Gas Smart Metering Equipment (GSME). The document changes will state that under no circumstances will a smart meter cut the power to a CH for more than three minutes when an OTA firmware upgrade takes place. Once implemented, meter Manufacturers will have to produce Devices that are compliant with the Technical Specifications and will therefore resolve the issue going forwards.

Comments were received during the Refinement Consultation advising that amendments should also be made to the CHTS. This was reviewed by the Proposer, the DCC and the CSPs. The CSPs stated that due to the behaviour built into the CHs, the amendment is not necessary. This was agreed by the Proposer. The issue surrounding meters that are currently installed will be investigated under MP102B 'Power Outage Alerts triggered by an OTA firmware upgrade – enduring solution'.

The business requirements for this modification can be found in Annex A.

4. Impacts

This section summarises the impacts that would arise from the implementation of this modification.

SEC Parties

SEC Party Categories impacted			
	Large Suppliers		Small Suppliers
✓	Electricity Network Operators	✓	Gas Network Operators
✓	Other SEC Parties		DCC

This modification will impact meter Manufacturers (Other SEC Parties) as they will have to produce ESME and GSME that are compliant with the Technical Specifications. The modification will also impact Electricity and Gas Network Parties as the solution will reduce the risk of receiving erroneous POAs from new Devices.

DCC System

This modification will have no impact on DCC Systems.

SEC and subsidiary documents

The following parts of the SEC will be impacted:

- Schedule 9 ‘Smart Metering Equipment Technical Specifications 2’
- Schedule 11 ‘TS Applicability Tables’

The changes to the SEC required to deliver the proposed solution can be found in Annex B.

Technical specification versions

Provided that this modification is implemented into the November 2020 SEC Release, the Proposed Solution will impact SMETS2 v5.0. If the modification is implemented after this date, it will be included in the next subsequent version 5.X.

Consumers

This modification will ensure DNOs are aware when there is a genuine Power Outage and enable consumers to be reconnected quickly. It will also ensure the DNOs do not have to visit consumers properties to check supply is on.

Other industry Codes

This modification will have no impact on other industry Codes.

Greenhouse gas emissions

This modification will have no impact on greenhouse gas emissions.

5. Costs

DCC costs

There are no DCC System costs to implement this modification.

SECAS costs

The estimated SECAS implementation costs to implement this modification is two days of effort, amounting to approximately £1,200. The activities needed to be undertaken for this are:

- Updating the SEC and releasing the new version to the industry.

SEC Party costs

During the Refinement Consultation, SECAS received responses stating that there are no anticipated SEC Party costs to implement this modification.

6. Implementation approach

Recommended implementation approach

SECAS is recommending an implementation date of:

- **29 November 2020** (November 2020 SEC Release) if a decision to approve is received on or before 13 November 2020; or
- **25 February 2021** (February 2021 SEC Release) if a decision to approve is received after 13 November 2020 but on or before 11 February 2021.

The earliest Release this modification could be implemented in is the November 2020 SEC Release. This modification does not have any DCC System impacts so if a decision is received after the cut-off date, it could be implemented in the February 2021 SEC Release.

7. Assessment of the proposal

Observations on the issue

The proposal was presented to the Change Sub-Committee (CSC) for comment. The CSC discussed the issue and a DNO representative stated that the issue only relates to SMETS2 Devices and is limited to two manufacturers.

Solution development

It was suggested by the Working Group that the two different issues identified required two different and separate solutions. Due to the anticipated lengthy lead times of a solution that would address meters that are currently installed, the Proposer agreed that there should be two separate modifications. It was agreed that this modification (MP102A) should be a Technical Specifications document change that meter Manufacturers will abide by. Once implemented, this will prevent meter Manufacturers from producing Smart Metering Equipment (SME) that cut the power to the CH for more than three minutes when an OTA firmware upgrade takes place.

Views of BEAMA

During the Refinement Process SECAS sought the views of the British Electrotechnical and Allied Manufacturers Association (BEAMA) regarding the modification and the proposed legal text. BEAMA approved of the modification and provided a recommendation for the legal text. BEAMA stated that the CH reboot time would be out of the ESME's control and therefore a section of the legal text should be removed. SECAS discussed this with the Proposer, the DCC and CSPs. This resulted in the section being removed as per BEAMA's recommendation.

Views of CSPs

SECAS held discussions with the CSP North and CSP South & Central Service Providers to ascertain CH behaviour in the case of a loss of power.

The CSP North stated that CHs contain a super capacitor that enables the CH to remain operational for approximately ten minutes after a power loss on the Intimate Communications Hub Interface Specification (ICHIS) interface. Upon detecting a loss of power the CH starts a timer, if the power loss persists for three minutes the CH will send an AD1 power outage Alert.

The CSP South & Central regions operate in a different way. The CH is designed to remain operational for approximately 20 seconds after a loss of power on the ICHIS interface; prior to shutting down the CH will send a notification to the network. Once the power has been restored on the ICHIS interface the CH performs a reboot which will take approximately 60 seconds. After the reboot is completed the CH will send a notification to the network; the sending of this notification is randomized over a period of 2 minutes to prevent all CHs from sending notifications at the same time following power restoration after a wide-spread power failure. In case the time between both CH notifications is seven minutes or more the CSP will create an AD1 power outage Alert.

Both CSPs confirmed that their procedures comply with the proposed legal text amendments.

Support for Change

Working Group

A Working Group member stated that this modification would safeguard against the possibility that a new meter Manufacturer producing ESME and GSME which cuts the power to the CH for more than three minutes in the case of an OTA firmware update. Another Working Group member suggested that in some cases the AD1 Alert was generated due to the combined times of the meter and CH reboot. They were concerned that the draft legal text was not explicit enough to address this point. The legal text has been updated to account for this.

Refinement Consultation responses

SECAS received seven responses to the Refinement Consultation. The respondents were generally supportive of the modification and felt that it would better facilitate SEC Objective (a)[1]. There were also views that the modification better facilitates SEC Objective (e)[2].

One respondent, a Large Supplier, believed that further investigation should take place for the solution. They agree with the business requirements, however they feel that the proposed solution is targeted entirely on the ESME and GSME without consideration for erroneous behaviour from the CH or CSP systems. They commented that there should be amendments CHTS as there are instances where a CH can generate an AD1 Alert if the ESME has lost power for one minute due to the CH reboot time. They also believed that any relevant considerations on CHTS and CSP backend behaviour also need to be assessed to know what form the solution should take. The Proposer outlined that the purpose of this modification is to prevent further meters being produced that could

[1] (a) Facilitate the efficient provision, installation, operation and interoperability of smart metering systems at energy consumers' premises within Great Britain.

[2] (e) Facilitate innovation in the design and operation of energy networks to contribute to the delivery of a secure and sustainable supply of energy

result in a spurious AD1 Alert being generated post implementation. SECAS also confirmed that some of the points raised in the response will be investigated under MP102B.

Comments were received recommending amendments to the proposed legal text. The respondents felt that there should be some wording changes for the consistency of terminology, as well as further detail for poly-phase meters and hot shoe Devices (a hot shoe provides direct current (DC) power to the CH where gas-only installations have taken place). Furthermore, it was suggested that further guidance should be added into the CHTS document. This was discussed with the CSPs who confirmed that this was not necessary due to CH behaviour already aligning to what is required.

The full responses to the Refinement Consultation can be found in Annex C.

On 14 August 2020 the SEC Panel approved the Modification Report and implementation approach.

Views against the General SEC Objectives

Proposer's views

The Proposer feels this modification would better facilitate SEC Objective (a). Reducing the non-genuine AD1 Alerts will better facilitating the efficient operation and interoperability of smart metering systems at energy Consumers' premises within Great Britain.

Industry views

The Working Group agreed that this modification would better facilitate SEC Objective (a).

The industry agrees that this is an issue that needs to be resolved. After being discussed at industry forums, an agreement was put in place between meter Manufacturers to mitigate the issue for new Devices. This however is not codified in the SEC, which could lead to issues relating to new meter Manufacturers.

Appendix 1: Progression timetable

This modification will now be presented to Panel and be issued for Modification Report Consultation, followed by Change Board vote.

Timetable	
Event/Action	**Date**
Draft Proposal raised	18 Dec 2019
Modification discussed with Working Group	1 Apr 2020
Legal text developed with Proposer	Apr 2020
Legal text discussed with Working Group	6 May 2020
Refinement Consultation	11 May 2020 – 1 Jun 2020
Modification discussed with BEAMA	Jun 2020
Modification Report presented to Panel	14 Aug 2020
Modification Report Consultation	17 Aug 2020 – 4 Sep 2020
Change Board Vote	23 Sep 2020

Appendix 2: Glossary

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

Glossary	
Acronym	**Full term**
BEAMA	British Electrotechnical and Allied Manufacturers Association
CH	Communications Hub
CHTS	Communications Hub Technical Specifications
CSC	Change Sub-Committee
CSP	Communications Service Provider
DCC	Data Communications Company
DNO	Distribution Network Operator
ESME	Electricity Smart Metering Equipment
GBCS	Great Britain Companion Specification
GUID	Global Unique Identifier
ICHIS	Intimate Communications Hub Interface Specification
OTA	Over The Air
POA	Power Outage Alert
SEC	Smart Energy Code
SECAS	Smart Energy Code Administrator and Secretariat
SMETS	Smart Metering Technical Specifications