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MP184 ‘Increase Smart capability of SMETS2 Twin Element ESME to support Solar and Storage use cases’ Business requirements – version 0.5

About this document

This document contains the business requirements that support the solution(s) for this Modification Proposal. It sets out the requirements along with any assumptions and considerations. The Data Communications Company (DCC) will use this information to provide an assessment of the requirements that help shape the complete solution.

1. Business requirements

This section contains the functional business requirements. Based on these requirements a full solution will be developed.

Business Requirements			
Ref.	Requirement	Responsible for delivery	MoSCoW
1	Active Export kWh register on the secondary element.	Device Manufacturers, DCC	M
2	Four Time of Use (TOU) tariffs to support Active Export kWh on the secondary element.	Device Manufacturers, DCC	M
3	A Profile Data Log specifically for the Active Export kWh on the secondary element.	Device Manufacturers, DCC	M
4	An Export Meter Point Administration Number (MPAN) on the secondary element.	Device Manufacturers, DCC	M
5	Export Data to be made available on the Home Area Network (HAN).	DCC	C
6	Existing reporting for export on the primary element to include information about export on the secondary element.	DCC	M

Key

- M = Must have
- S = Should have
- C = Could have
- W = Won't have

2. Considerations and assumptions

This section contains the considerations and assumptions for each business requirement.

2.1 General

This solution will be applied to SMETS (Smart Metering Equipment Technical Specifications) 2 Devices. To enable support for solar panel and other microgeneration type applications, the proposal is to enhance the current UK SMETS specification to maximise the number of potential applications, by supporting the additional data.

In particular, the Proposer would like to enable a scenario whereby they would be able to install solar panels and a battery at the Consumers premises at no cost to the Consumer. The Proposers organisation would then enter into a Power Purchasing Agreement (PPA) with the Consumers to sell them the electricity generated from the solar panels behind-the-meter at a discounted rate.

In the case the Consumer defaults on the PPA, they are still able to consume electricity behind the meter. The Proposers organisation would also find it difficult to recover the generation equipment and battery.

If MP184 was approved, the Proposer would install the solar panels and battery on the secondary element, with the customer paying the agreed PPA fee for their electricity. Introducing an export register on the secondary element would mean all generation would be used as export and reduce the risk to the Proposer's organisation.

The Proposer cannot achieve this given the existing arrangements for twin element meters.

2.2 Requirement 1: Active Export kWh register on the secondary element

The Proposer would like to alter the existing arrangements to allow measurement of export energy on the secondary element. Introducing this functionality would allow the Proposer to install solar generation equipment with all generation being used as export, lessening the likelihood of their assets being stranded at the customer property if they default on the PPA.

SMETS currently defines that the Electricity Smart Metering Equipment (ESME) should be capable of recording Active Energy Imported and Exported. This proposal is requesting to allow 'cumulative Active Energy Exported via the secondary measuring element of its Electricity Meter in the Secondary Active Export Register'.

2.3 Requirement 2: Four TOU tariffs to support Active Export kWh on the secondary element.

The Proposer would like to enable Consumers to have as much choice as possible when choosing who they import and export their energy consumption and generation to. This is especially important as the Proposer wishes to enter into a PPA with the Consumer to sell them the electricity generated from the solar panels behind-the-meter at a discounted rate.

They would like the Consumer to have the ability to engage with other Supplier Parties for the primary element, enabling them to choose the best possible option for their needs (eg, electric vehicle).

The proposal of a new section in SMETS that defines pricing to be applied to the secondary element on a twin element meter as follows:

5.13.1.3 Secondary Export Tariff TOU Price Matrix [INFO]

A 1 x 4 matrix containing Prices for Time-of-use Pricing Tariffs relating to Supply via the secondary measuring element of the Electricity Meter

2.4 Requirement 3: A Profile Data Log specifically for the Active Export kWh on the secondary element.

The Proposer needs to identify how much generation has taken place in order to fulfil the PPA they have signed with the Consumer. A sixth section should be added to SMETS Section 5.13.2.7 'Profile Data Log'.

A log capable of storing UTC date and time-stamped half hourly data (the amount of energy Imported or Exported in a half hour period) arranged as a circular buffer such that when full, further writes shall cause the oldest entry to be overwritten.

The log shall be capable of storing a minimum of:

- vi. 3 months of Active Energy Exported via the secondary measuring element of the Electricity Meter.

2.5 Requirement 4: Export MPAN on the secondary element.

This is necessary to ensure for balancing and settlement of Export Data on the secondary element.

The proposal of a new MPAN shall be defined and provide specific support for the export channel on the secondary element.

2.6 Requirement 5: Export Data to be made available on the HAN.

The Proposer believes that having as much information readily available to the Consumer on their IHD or PPMID would be beneficial. The Proposer acknowledges that import and export data from the primary element is available and would like this functionality to be mirrored onto the secondary element.

The proposal is to include additional HAN items as follows: -

- Active Export kWh on the secondary element
- 4 x TOU's that are related to the secondary element
- Load profile channel for Active Export – Secondary

2.7 Requirement 6: Existing reporting for export on the primary element to include information about export on the secondary element.

The Proposer would like the export on the secondary element to match what is possible for the export on the primary element. In terms of reporting, this means any existing reporting on export on the primary element should now include information about the export on the secondary element.

3. Supplementary questions

Will there be any reporting requirements for the export on the secondary element?

Reporting must be the same as the existing reporting requirements for export on the primary element in terms of settlement, information to the In-Home Display (IHD)/ Pre-payment Meter Interface Device (PPMID) etc. The modification seeks to align the secondary element with the primary element.

Why is requirement 5 'could have', whilst the other requirements are 'must have'?

Requirement 5 doesn't affect the Total DCC System as this relates only to the communications on the HAN between the ESME and the HAN devices (IHD, PPMID, Consumer Access Device (CAD)). There is no cost or effort for the DCC associated with this requirement.

The ESME will operate on 2.4 GHz and for HAN devices also operating on 2.4 GHz the additional HAN data traffic, which may be passed via the Communications Hub, relating to the Export Data from the Secondary Element will be low.

For HAN devices (IHD, PPMID, CAD) operating in the Sub-GHz band the additional information passed via the Communications Hub may impact the duty cycle of the Communications Hub (or that of the other HAN device). If the additional data causes the limits to be exceeded then the existing mechanisms for the limitation of the Communications Hub duty cycle will apply. This might need further testing.

What are the impacts of this modification on Change of Supplier (CoS), Supplier of Last Resort (SoLR) and Market Wide Half-Hourly Settlement (MHHS)?

CoS and SoLR is expected to follow the standard procedures.

Any Export on the Secondary Element is currently not measured and will result in MHHS data to be incorrect. MP184 enables the measurement of Export on the Secondary Element and in turn augment the accuracy of MHHS data.

Which Smart Energy Code (SEC) Party or User Role could utilise the export on the secondary element?

User Role - Export Supplier.

Would access to the secondary element be subject to certificates arrangement on the device? For example, to update tariff for the export secondary element would any SEC Party (or just the Responsible Supplier) have the ability to set the tariff on the device?

The existing Great Britain Companion Specification (GBCS) Use Cases and Service Requests for the Export functionality don't allow the setting of tariffs.

Is this modification seeking to allow a SMETS2 Twin Element ESME could have a Party assigned to each MPAN? Furthermore, that they could be four different Parties? For example, where both export channels are in use with a battery on the primary element (say a V2G enabled Electric Vehicle battery) and solar on the secondary.

Yes - the Proposer would like the possibility of having a different Party assigned to each MPAN.

The existing specifications require the Twin Element ESME to support three MPANs, two for Import and one for Export. MP184 will add a fourth MPAN for the Export on the Secondary Element. This means that there could be up to four Suppliers associated with the Twin Element ESME.

This will need verifying with the Retail Energy Code (REC) as the registration data needs to clearly define the MPANs and the Suppliers.

Will all SEC Parties need to take consumption/generation readings from the ESME? Who will have access to what data?

Data can be collected by the responsible Supplier who has the Appropriate Permission.

Are new SRVs needed for EC Party to communicate with export on the secondary element?

New SRV's will be required to communicate with the Export on the secondary element.

Who is responsible for the ESME and Communications Hub?

The responsible Supplier for the ESME and CH will be the Supplier for the Import on the Primary Element.

Would the import capability on the secondary element be required in this use case if all generation is going to be exported?

Yes. Different use cases still require this functionality away from MP184.

Is the secondary element on the ESME always to be used for export only, i.e. the import channel would not be in use for this modification?

The wiring together with the load and/or generation in the premise will determine whether the Secondary Element is used for Import or Export or both. There shouldn't be any restriction on the use of the Secondary Element.

What business rules will be defined (and by whom) for Export MPANs for the Secondary Element? E.g. will it be mandatory to have an Import MPAN for the Secondary Element in order for an Export MPAN to also be allocated (i.e. mirroring the current arrangements for Export on the Primary Element)?

These business rules will be set via the REC rather than the SEC. We assume that the current arrangements will be mirrored from the primary element on the secondary element.

Is it expected that the Import Supplier for the Primary MPAN will include all relevant MPANs for both Elements in SRV 8.11 at the time of installation (in which case, although not in DCC's scope, how will the Proposer orchestrate the installation of a Twin Element ESME with the Import Supplier for the Primary MPAN)?

Assigning the Export Supplier for the secondary element may not be necessary at I&C if e.g. there isn't any generation at the premises. If generation is installed at a later time then the secondary MPAN would be required.

The accuracy of Balancing and Settlement would be increased by MP184 as any Export through the secondary element isn't currently measured.

Is it correct that this requirement would require changes to the ESME, PPMID and CH?

There is currently no obligation for the IHD/PPMID to display the requested information so changes are needed. Changes are also needed to the ESME in order to provide the requested information to the IHD/PPMID. SECAS does not believe any changes are needed to the Communications Hub.

4. Appendix: Solution Exploration MP184 - Summary of changes most likely required

The table below lists the Technical Specifications SMETS, GBCS and DCC User Interface Services Schedule (DUIS) in the first column. The next columns list the MP184 business requirements and give a high-level overview of the changes which are most likely required to support MP184; additional changes not identified in the below table may be required:

Specification	Business requirement				
	[1] Active Export kWh register on the secondary element	[2] Four TOU to support Active Export kWh on the secondary element	[3] Load profile channel Active Export kWh on the secondary element	[4] Export MPAN on the secondary element	[5] Export data to be made available on the HAN
SMETS					Define the data to be displayed by IHD and PPMD (historic, instantaneous)
SMETS	Define Secondary Active Export Register		Add Secondary Active Export Register to Profile Data Log		Define Secondary Active Export Register
SMETS, GBCS, DUIS		Define Export Tariff TOU Price Matrix; define new GBCS Use Cases for setting and reading Export Tariff TOU Price Matrix			
SMETS	Explore whether a Secondary Reactive Export Register is required		Explore whether a Secondary Reactive Export Register must be added to Profile Data Log		

Specification	Business requirement				
	[1] Active Export kWh register on the secondary element	[2] Four TOU to support Active Export kWh on the secondary element	[3] Load profile channel Active Export kWh on the secondary element	[4] Export MPAN on the secondary element	[5] Export data to be made available on the HAN
SMETS		Define Export Tariff TOU Register Matrix			Define Export Tariff TOU Register Matrix
SMETS		Define Export Tariff Switching Table			Define Export Tariff Switching Table
GBCS, DUIS		Define new GBCS Use Cases for reading Export Tariff TOU Register Matrix			
GBCS, DUIS		Define new GBCS Use Cases for a) setting Export Tariff Switching Table b) reading the Export Tariff Switching Table			
SMETS	Add Secondary Active Export Register to the Daily Read Log				
SMETS	Add Secondary Reactive Export Register in the Daily Read Log				

Specification	Business requirement				
	[1] Active Export kWh register on the secondary element	[2] Four TOU to support Active Export kWh on the secondary element	[3] Load profile channel Active Export kWh on the secondary element	[4] Export MPAN on the secondary element	[5] Export data to be made available on the HAN
GBCS, DUIS	Replacement of ECS17b or new Use Case for reading Reactive Energy Import Registers				
GBCS, DUIS	Replacement of ECS17a or new Use Case for reading Energy Export Registers				
GBCS, DUIS	Replacement of ECS21c or new Use Case for Read Electricity Daily Read Log (export only)				
GBCS, DUIS			ECS22a Read Electricity Half Hour Profile Data (export) replacement; new OBIS object		
GBCS, DUIS				New Use Case similar to ECS39b to Set Export MPAN Value on the ESME; Combining Export MPAN(s) in a single OBIS object	

Specification	Business requirement				
	[1] Active Export kWh register on the secondary element	[2] Four TOU to support Active Export kWh on the secondary element	[3] Load profile channel Active Export kWh on the secondary element	[4] Export MPAN on the secondary element	[5] Export data to be made available on the HAN
GBCS, DUIS				New Use Case similar to ECS40 to Read MPAN Value on the ESME; New GBCS Use Case to include Secondary Export MPAN	
DUIS				SR8.11 Update HAN Device Log; Add Secondary Export MPAN DUIS	
DUIS				SR8.4 Update Inventory; Add Secondary Export MPAN	
DUIS				SR8.2 Read Inventory; Add Secondary Export MPAN	
GBCS					Section 10.4.2.11 'Other attributes' and GBCS Table 7.4; add the Secondary Export MPAN to the ESME: Energy Services Interface (Twin ESME secondary ESI Endpoint).

Specification	Business requirement				
	[1] Active Export kWh register on the secondary element	[2] Four TOU to support Active Export kWh on the secondary element	[3] Load profile channel Active Export kWh on the secondary element	[4] Export MPAN on the secondary element	[5] Export data to be made available on the HAN

Table 1: Overview of changes required for MP184

5. Glossary

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

Glossary	
Acronym	Full term
CAD	Consumer Access Device
CoS	Change of Supplier
DCC	Data Communications Company
DUIS	DCC User Interface Services Schedule
ESME	Electricity Smart Metering Equipment
GBCS	Great Britain Companion Specification
HAN	Home Area Network
IHD	In-Home Display
MHHS	Market Wide Half-Hourly Settlement
MPAN	Meter Point Administration Number
PPA	Power Purchasing Agreement
PPMID	Prepayment Interface Device
REC	Retail Energy Code
SEC	Smart Energy Code
SMETS	Smart Metering Equipment Technical Specifications
SoLR	Supplier of Last Resort
TOU	Time of use