Department for Business, Energy & Industrial Strategy

SMART METER CAD PAIRING

Guiding principles supporting third party CAD testing and pairing for SMETS1 meters

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Introduction

Government's Vision

The development of a world-leading smart energy system delivering secure, cheap and clean energy is an important part of the government's Industrial Strategy.[1] As our Clean Growth Strategy highlights, smart technologies and services will play a vital role in decarbonising the energy sector.[2]

Smart meters are a vital upgrade to our energy infrastructure enabling these smarter energy systems and energy consumers to be better informed and engaged. Smart meters are also an important foundation for the Government and Ofgem's Smart Systems and Flexibility Plan which was published last year.[3] This Plan sets out a number of actions to deliver a smarter, more flexible energy system that supports innovation in new smart products and services.

The smart metering rollout in Great Britain will create an unprecedented new platform for innovation in energy data – smart electricity and gas meters will be offered by energy suppliers to homes and small businesses by the end of 2020, each securely storing a range of technical information such as energy consumption and tariff information. This platform will support the development of a wide range of new technologies and services as well as empowering consumers to take control of their energy use, ending estimated bills and enabling faster and more convenient switching.

The Government's vision is not only for data to be accessed remotely via the Data Communications Company (DCC) but that consumers can retrieve data from their smart meter locally via devices connected to the Home Area Network (HAN). Subject to relevant exceptions, licence obligations (Electricity Supply Standard Licence Condition 49.4(d), Gas Supply Standard Licence Condition 43.4(d)) require suppliers to take all reasonable steps to pair relevant consumer devices with smart metering systems (and thereafter maintain a connection through the HAN) on request of a domestic or microbusiness consumer.

Smart Meters communicate via a secure wireless HAN in a consumer's home. In most cases this is based on ZigBee Smart Energy[4] which gas and electricity smart meters, and in-home displays (IHD) use to communicate data. Consumers are able to pair other devices that operate the same communication protocol to this network; known as Consumer Access Devices (CADs). SMETS1 requires that the smart metering equipment

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[1] See: www.gov.uk/government/topical-events/the-uks-industrial-strategy
[2] See: www.gov.uk/government/publications/clean-growth-strategy
[3] See: www.gov.uk/government/publications/upgrading-our-energy-system-smart-systems-and-flexibility-plan
[4] SMETS1 does not specify a communication standard for the HAN, evidence suggests however that the majority of implementations are making use of ZigBee Smart Energy version 1.0 or 1.1. SMETS2 specifies ZigBee Smart Energy version 1.2a or 1.4.

in the home supports a minimum of one CAD[5] that is capable of providing the consumer with access to certain specified information.[6] SMETS2/CHTS specifies a minimum of four CADs.[7]

Once a CAD has been paired to the consumer's HAN, it will be able to access consumption and tariff information directly from their smart meter; a CAD can request updates of electricity information every 10 seconds and gas information every 30 minutes.

To promote innovation, BEIS has not set detailed regulatory requirements for CAD functionality.[8] We envisage businesses developing CADs that, as well as operating ZigBee, also operate other communications protocols such a Wi-Fi or Bluetooth. Subject to data protection legislation data can then be forwarded to other devices in the home or via the internet creating a smart ecosystem through which new services and products can be offered.[9]

Purpose & Scope

Working with stakeholders[10] a number of practical issues have been identified with the testing and pairing of third party CADs[11] to SMETS1 systems. Issues include the ability of CAD providers[12] to gain access to specific meter model specification and test infrastructure, uncertainty around what it means in practice to pair a CAD and the responsibilities of different parties.

The purpose of this note is to provide an informal set of non-binding guiding principles aimed at clarifying the roles and responsibilities of the different relevant parties. They are a suggestion, based on discussion and consensus with industry, of how industry processes could be executed in support of realising Government's vision for CADs.

Parties are encouraged to use these principles as a starting point for defining their own processes, and for developing industry good practice, facilitating the early adoption of CADs and related services for SMETS1 deployments.

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[5] SMETS1 refers to Consumer Devices. These are devices that interface with the HAN to provide consumer access to data and specifically includes the IHD.
[6] We intend to look into the SMETS1 constraint on CAD port availability as a part of enrolment and adoption.
[7] Under SMETS2/CHTS a distinction is made between Type 1 and Type 2 Devices. We consider CADs and IHDs to be Type 2 Devices.
[8] Details of data available to CADs can be found in SMETS1 and SMETS2. SMETS2 in addition contains more detailed ZigBee-related implementation information
[9] See DECC 2015 *Smart Meters, Smart Data, Smart Growth* for example applications
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/591322/0
9022017_-_Smart_Meters__Data__Growth_DR_-_updated.pdf
[10] A series of industry workshops and meetings were held in late 2017 and early 2018.
[11] When referring to third party CADs we mean devices which have been developed and supplied to a consumer independent of a smart meter install or any arrangements with an installing supplier.
[12] A CAD provider may not always be the CAD manufacturer. In some circumstances a CAD provider may have white labelled their CAD hardware.

Introduction

These principles are not intended to take the place of regulatory requirements and in the event of any conflict or inconsistency between this note and any relevant licence conditions, the SEC or any other relevant regulation, the relevant licence conditions, SEC and/or other relevant regulation shall take precedence over this note.

This note is intended to support energy suppliers, CAD providers, smart meter system operators (SMSOs) and meter manufacturers. It applies to both enrolled and unenrolled SMETS1 systems.

Stakeholder engagement to date has not identified significant issues with CAD pairing in SMETS2 systems. As the SMETS2 rollout progresses we will continue to monitor the situation, taking further action as appropriate.

What is a CAD?

A CAD is a Consumer Device as defined in SMETS1 and a Type 2 Device as defined in SMETS2.

A CAD can be any device which communicates with the HAN to provide it access, to the tariff information and energy consumption data stored on the smart electricity meter (electricity data) and communications hub (gas proxy function, gas data).

Please note that whilst in-home displays (IHDs) are a type of CAD, they have not been included within the scope of this paper.

IHDs are a physical device offered to domestic consumers as a part of their smart meter installation. They provide near-real time information on actual energy consumption (kWh and price) taken from smart electricity and gas meters via the HAN. Subject to certain exceptions, when installing smart meters energy suppliers are required to offer domestic consumers an IHD. The IHD must, on the date it is provided, as a minimum have the functional capability specified by and comply with the other requirements of a valid version of the IHD Technical Specification set out in SMETS.

Data Privacy and Protection

Energy Consumption Data and Legislative Requirements

Detailed energy consumption data from smart meters may be 'personal data' for the purposes of the Data Protection Act 2018 (DPA)[13] where the data can be related to identifiable individuals. In recognition of this and owing to the potential sensitivity of energy consumption data, the Government established the smart metering Data Access and Privacy Framework which was designed to safeguard consumer privacy, whilst enabling proportionate access to data. The Framework is given legal effect through conditions in energy supplier[14] and network operator[15] licences and the Smart Energy Code (primarily through Section I). The provisions of the Framework are designed to complement but not replace wider data protection legislation, and it is the responsibility of all parties to ensure that they are compliant with all relevant legislation.

Pairing and Consumer Consent under the SEC

In recognition of the fact that CADs will facilitate access to detailed energy consumption data, requirements relating to pairing and unpairing of these devices to enrolled smart metering systems have been established in the Smart Energy Code (SEC). These requirements apply to CADs connected to any enrolled smart metering system (i.e. in domestic, microbusiness and non-domestic premises). Subject to certain specified exceptions, a DCC User must not pair or unpair a device unless it has the Energy Consumer's Unambiguous Consent.[16] In addition, when pairing a device, the DCC User must clearly inform the energy consumer before obtaining Unambiguous Consent that a consequence of joining the device may be that data relating to the consumer will be shared with third parties (see Section I 1.3).

The SEC does not stipulate how consent must be obtained from the Energy Consumer, recognising that different approaches may be relevant in light of consumer preferences and business models. However, the SEC is clear that this consent must be explicit and informed, and sets out that consent shall not be treated as having been given explicitly unless the Energy Consumer has either of his or her own volition communicated to the DCC User a request for it to undertake that action, or in response to a specific request by

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[13] See: https://www.gov.uk/government/collections/data-protection-act-2018
[14] Electricity Supply Standard Licence Condition 47 and Gas Supply Standard Licence Condition 41.
[15] Electricity Distribution Standard Licence Condition 10A and Gas Transporter Standard Licence Condition 15.
[16] Both terms as defined in Section A of the SEC.

the DCC User for him or her to indicate consent to it undertaking that action, taken a positive step amounting to a clear communication of that consent.[17]

An obligation is also placed on the DCC User pairing or unpairing the device to put in place and maintain arrangements designed in accordance with Good Industry Practice[18] to ensure that each person from whom consent is obtained is the Energy Consumer.[19] It is anticipated that further information on how this obligation will be assessed as part of the privacy assurance process will be provided in the Privacy Controls Framework[20] and interested parties are encouraged to contact SECAS if they require more details.

Whilst these provisions of the SEC concerning pairing and unpairing of CADs do not apply to SMETS1 metering systems (which are not enrolled with the DCC), given the intention to eventually enrol and adopt SMETS1 metering systems into the DCC,[21] the obligations described above could be applied as good practice.

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[17] See definition of "Unambiguous Consent" in SEC Section A.

[18] As defined in the SEC Section A, Good Industry Practice means, in respect of a Party, the exercise of that degree of skill, diligence, prudence and foresight which would reasonably and ordinarily be expected from a skilled and experienced person engaged in a similar type of undertaking as that Party under the same or similar circumstances.

[19] SEC Section I 1.5

[20] The SEC panel are currently consulting on v2.0 of the Privacy Controls Framework. Further information can be found at https://smartenergycodecompany.co.uk/privacy-controls-framework/

[21] See Government proposals on SMETS1 enrolment and adoption online at https://www.gov.uk/government/consultations/maximising-interoperability-for-first-generation-smets1-smart-meters and https://www.gov.uk/government/consultations/enrolment-of-smets1-meter-cohorts-with-the-data-communications-company

SMETS1 Third Party CAD Pairing Principles

It is the legal responsibility of all industry participants to ensure that they comply with licence conditions and relevant legislation, including but not limited to the Gas Act 1986, Electricity Act 1989 and the Data Protection Act 2018.

These principles seek to provide an informal set of non-binding guiding principles clarifying the roles and responsibilities of different parties as they relate to the pairing of third party CADs to SMETS1 smart meter systems.

These principles are not intended to take the place of regulatory requirements and in the event of any conflict or inconsistency between this note and any relevant licence conditions, the SEC or any other relevant regulation, the relevant licence conditions, SEC and/or other relevant regulation shall take precedence over this note.

Parties are encouraged to use these principles as a starting point for defining their own processes, developing industry good practice.

Energy Supplier Responsibilities

Standard Licence Conditions 49.4 (Electricity supply) and 43.4 (Gas supply) oblige energy suppliers to take 'all reasonable steps' to pair relevant consumer devices upon request from a domestic or microbusiness consumer, subject to relevant exceptions. Energy suppliers must also take all reasonable steps to ensure that the pairing enables the consumer access, at any time (and in the case of domestic consumers free of charge), to the relevant data available from their smart metering system.

To facilitate this, suppliers should:

- Ensure testing resource [22] is available for deployed SMETS1 smart metering systems (incl. electricity meter, gas meter, communications hub), allowing those offering CAD services to design products that can interface.
  This could include:
  - o Requiring, through procurement contracts, meter manufacturers to make relevant meter specifications available.[23]
  - o Requiring SMSO, where relevant, to make system interface specifications available.[24]

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[22] This testing is not aimed at testing the full functionality of a CAD. Instead it provides a level of assurance that the device works as intended with the HAN. Importantly demonstrating that it does not interrupt functions of the meter/communications hub and does not introduce new security vulnerabilities.
[23] By virtue of the commercial relationship between supplier and meter manufacturer.
[24] By virtue of the commercial relationship between supplier and SMSO.

o Providing information, on request from CAD provider, identifying appropriate testing contacts within SMSO, where relevant, and meter manufacturer.

There is no requirement on suppliers to directly engage in CAD testing, however as per Standard Licence Conditions 46/46a (Electricity supply) and 40/40a (Gas supply) they are accountable for ensuring all aspects of their end-to-end smart metering system is appropriately secured. Suppliers are further required by Section G of the SEC to use best endeavours to ensure any enrolled SMETS1 smart metering systems are secure. Suppliers should carry out any assurance they feel necessary to remain compliant with this, ensuring their system is secure against external interference from third party CAD. It is expected that each supplier will adopt an approach appropriate to their circumstances.[25]

– Ensure information on minimum testing and assurance requirements is made available, in a timely manner, upon request by a CAD provider, SMSO, the DCC, or a meter manufacturer.

– Ensure customer service processes are in place to manage pairing queries from consumers. Supplier contact details for CAD services (email, phone, letter, website) should be shared with CAD providers, allowing information to be passed directly through to consumers.

Ensure system processes are in place to process pairing requests in a timely manner. Details on process, timing and cost should be transparent and made available upon request to a CAD provider and/or an SMSO or the DCC as relevant. Costs associated with pairing requests may be payable to multiple parties. It is therefore important that costs are open, transparent, and justified, avoiding and avoid double charging.

– Ensure details of firmware releases and related management processes are made available in a timely manner. Allowing CAD providers to initiate any changes to ensure a CAD remains compatible with the smart metering system minimising the risk of disruption to consumer services.

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[25] Additionally, under Section I1.3(b)(ii) of the SEC a supplier does not need to obtain the Energy Consumer's Unambiguous Consent to unpair a CAD where it has reasonable grounds to believe that the CAD has compromised or is likely to compromise any device forming part of the enrolled smart metering system.

CAD Provider Responsibilities

CAD providers have a direct commercial relationship with consumers for the delivery of CAD hardware and related services. The specific design and function of a CAD can differ depending on the commercial offering.[26]

Regardless of whether or not they are also the CAD manufacturer, a CAD provider is responsible for ensuring their device is fit for purpose and has been tested with relevant smart metering systems, evidencing that it does not compromise the integrity of such system.

In relation to CAD pairing a CAD provider is also responsible for ensuring that processes are in place to support consumers in pairing the device to their smart metering system.

To facilitate this CAD providers should:

- Ensure CAD is ZigBee certified and provide evidence of certification upon request by an energy supplier, SMSO, the DCC, a meter manufacturer, or other relevant SEC Party as relevant.

- Engage in end-to-end system testing to provide a level of assurance that the device works as intended with the HAN and does not interrupt the functions of the meter/communications hub or introduce new security vulnerabilities. A CAD should be designed so as to ensure that any failure or compromise of its integrity shall not compromise the integrity of the smart metering system.

  This includes:
  - o Demonstrating that each device works with individual supplier meter sets (engaging with meter manufacturers and energy suppliers as relevant).
  - o Making details of firmware release and management processes available to relevant parties in a timely manner and where required demonstrating that a device continues to work with individual supplier meter sets (engaging with meter manufacturers and energy suppliers as relevant) after a firmware update.[27]
  - o For unenrolled SMETS1 cohorts demonstrating that each device works with individual SMSO infrastructure.
  - o For enrolled SMETS1 cohorts demonstrating that each device works with DCC infrastructure.

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[26] CAD providers should note the National Cyber Security Centre Security Design Principles for Digital Services (https://www.ncsc.gov.uk/guidance/security-design-principles-digital-services-main) and Government's Secure by Design: Improving customer security of consumer Internet of Things Report (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/686089/Secure_by_Design_Report_.pdf)

[27] Any testing should be completed prior to the firmware being released/installed.

  o Paying for costs, as defined by the market, in relation to testing and qualification of the device. This includes any costs for registering (sometimes referred to as 'whitelisting') a device with an SMSO or the DCC as relevant.[28]

CAD providers are expected to provide evidence to show they meet the minimum testing and assurance requirements (as set out by the supplier). Confirming hardware and firmware compatibility with a metering system, upon request by an energy supplier, SMSO, the DCC, a meter manufacturer, or other relevant SEC Party as relevant.

— Ensure CAD specifications are made available, in a timely manner, upon request by an energy supplier, SMSO, the DCC, or meter manufacturer or relevant SEC Party as relevant.

— Provide customers with details on operational requirements for CAD functionality. This could include meter compatibility, power requirements and other connectivity requirements (e.g. WiFi).

— Provide consumers with the information required to pair the device to their smart meter.

This includes:
  o MAC address and Install Code of CAD device.
  o Details on how to access additional information required to process a pairing request such as meter number.
  o Details on actions the consumer needs to take to pair the device. In some instances, a CAD provider may pair the device on the consumer's behalf,[29] in others a consumer may be required to contact their energy supplier direct.
  o Energy supplier contact details relevant to CAD pairing.

— Ensure customer service processes are in place to manage pairing and fault queries from consumers.[30] Contact details (email, phone, letter, website) should be made clearly available to consumers and should also be shared with suppliers allowing information to be passed through to consumers.

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[28] CAD providers can reasonably be expected to pay costs associated with re-testing, re-qualification and re-registering a CAD, in situations where a CAD has been removed from a smart metering system due to concerns around the security and/or stability of the smart metering system.
[29] The DCC User Interface Specification (DUIS) allows DCC Other Users to invoke the relevant DUIS Service Request to pair CADs with SMETS1 devices enrolled into the DCC. A CAD provider may execute requests as a DCC Other User in their own right or through commercial relationships with one.
[30] CAD providers should have in place processes to troubleshoot faults, identifying who is responsible for a resolution and providing information to consumers on next steps.

- Where a CAD provider, which is not a DCC User in their own right, facilitates pairing on behalf of the consumer through agency, ensure adequate processes,[31] in accordance with good industry practice, are in place to confirm
    - Consumer identity (person, property, meter);
    - Unambiguous informed[32] consumer consent for the device to be paired to their smart meter.

A CAD provider should provide evidence of the above upon request of the supplier (or where applicable DCC Other User) supporting such parties to meet their obligations under the SEC for enrolled SMETS1 metering systems.

As mentioned further above in this note, the relevant provisions of the SEC concerning the pairing and unpairing of CADs do not apply to unenrolled SMETS1 metering systems but given the intention to enrol and adopt SMETS1 metering systems into the DCC this principle could be applied as good practice.

- Where a consumer requests a CAD be unpaired from their smart metering system for whatever reason a CAD provider should have in place a process to notify the energy supplier (or where applicable DCC Other User) to enable the CAD to be removed from the consumer's HAN.[33] Once confirmation of the device's removal is received the CAD provider is expected to take all reasonable steps to notify the consumer.[34]

- Ensure processes are in place to monitor and act on Change of Tenancy. CAD providers should make available to suppliers, upon request, details of this process.[35] [36]

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[31] BEIS is currently working with SECAS, the Independent Privacy Auditor (IPA), and other interested parties to consider approaches to consent authentication.

[32] In line with good industry practice Consumers should be clearly informed about the implications of pairing a CAD. This includes, but is not limited to, explanation that data may be shared with third parties and that an IHD may need to be unpaired.

[33] In some instances, a CAD provider may be a DCC User in their own right. In such situations the CAD provider can execute the appropriate service requests to unpair the device directly.

[34] A consumer can also request the unpairing of a CAD directly to their supplier. In such instances the consumer should be encouraged to also notify their CAD provider.

[35] Where a change of tenancy notice has been received by a supplier, by the old or new tenant, the supplier is required to set a Change of Tenancy flag. This will prevent data from before the date of the flag being accessible via the smart metering system. CAD providers are expected to have in place processes to monitor for Change of Tenancy and having in place processes, depending on CAD functionality, to manage access to stored personal data on a CAD or ongoing flows of data, ensuring compliance with data protection legislation around the collection, processing and use of data.

[36] In 2017 BEIS published guidance to SEC parties on data privacy where the bill-payer does not occupy the premises to which energy is supplied. See: https://smartenergycodecompany.co.uk/latest-news/letter-to-sec-parties-regarding-privacy-and-smart-metering-energy-consumption-data-in-domestic-and-microbusiness-premises/

SMSO Responsibilities

SMSOs have entered into contracts with individual energy suppliers for data and, in some cases, communications services on a commercial basis. The specific nature of services can differ depending on commercial arrangements.

In relation to CAD pairing to unenrolled[37] SMETS1 systems an SMSO is responsible for ensuring that infrastructure is accessible, supporting CAD testing to ensure system integrity is not undermined. Depending on the commercial arrangement with individual suppliers an SMSO may also be responsible for executing CAD pairing service requests.

To facilitate this SMSOs, as per instruction from energy supplier, should:

- Ensure details on the timing and cost for the testing and qualification of devices are reasonable (as defined by the market), transparent and available upon request by a CAD provider and/or energy supplier.

- Ensure that testing resource is made available in a timely manner. Allowing those offering CAD services to demonstrate that devices work as intended with the HAN and do not interrupt the functions of the meter/communications hub or introduce new security vulnerabilities.

  This includes:
  o Defining a set of testing requirements.
  o Establishing a testing script.
  o Providing meter or system specifications (*where required*).

  An SMSO may decide to make testing resource available in-house or they may outsource this function. SMSOs are expected to adopt an approach appropriate to their individual circumstances. Where a company decides to outsource testing to third party facilities this should be made clear to CAD providers and information should be provided to point them towards accredited facilities.

- Ensure that system processes are in place to execute CAD pairing service requests in a timely manner. Details on process, timing and cost should be transparent and made available upon request to a supplier and/or a CAD provider.

- Ensure details of firmware releases and related management processes are made available in a timely manner. Allowing CAD providers to initiate any changes to ensure a CAD remains compatible with a smart metering system will minimise the risk of disruption to consumer services.

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[37] Following enrolment CAD providers pairing to SMETS1 systems would be interfacing with the DCC.

Meter Manufacturer Responsibilities

Meter manufacturers are responsible for the design and build of smart meters, as per procurement contracts with individual energy suppliers.

In relation to CAD pairing energy suppliers should encourage meter manufacturers, through procurement contracts, to make meter infrastructure accessible, supporting CAD testing to ensure system integrity is not undermined.

To facilitate this meter manufacturers, as per instruction from energy supplier, should:

- Ensure details on the timing and cost for the testing and qualification of devices are reasonable (as defined by the market), transparent and available upon request by a CAD provider and/or energy supplier.

- Ensure that testing resource is made available in a timely manner. Allowing those offering CAD services to demonstrate that devices work as intended with the HAN and do not interrupt the functions of the meter/communications hub or introduce new security vulnerabilities.

  This includes:
  o Defining a set of testing requirements.
  o Establishing a testing script.
  o Providing meter or system specifications (*where required*).

  A meter manufacturer can decide to make testing resource available in-house or they may outsource this function. Meter manufacturers are expected to adopt an approach appropriate to their individual circumstances. Where a company decides to outsource testing to third party facilities this should be made clear to CAD providers and energy suppliers, and information should be provided to point them towards accredited facilities.