POLICY ISSUES PAPER – CONTROL SHEET

Title of Paper	**Interactions between Switching and Smart Metering**		
Issue Ref	BPD i36	Date:	4 October 2016
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Status of Paper	1 – Initial Development and Review 2- Draft for Workstream Leaders Review 3 – Draft for User Group Review 4 – Draft for EDAG Review 5 – Final Recommendation to DA		
Timing			
Dependencies			

Circulation	Workstream Leaders / Design Team / User Group / EDAG /DA Huddle / Website *Papers which discuss issues which are sensitive as between stakeholders or which contain any information provided in response to an Information Request should not be shared externally and must be protectively marked*

Issue	This paper addresses questions relating to the interaction between customer switching and smart metering, in particular concerning the timing of processing switch-related transactions on the smart meter and whether the switch should be aborted if communication with a smart meter fails.		
Impacts Domestic?	Yes (only those customers with smart meters)	Impacts Non-Dom?	Yes (only those customers with smart meters)
Policy Objective (and reference to TOM v2)	The introduction of smart metering is widely referred to in the TOM in relation to: the use of remote connectivity when undertaking 'triangulation'; the ability of smart meters to promptly notify the customer that a switch has occurred and the access control arrangements operated by DCC to validate access to smart meters. This paper concentrates on the practical issues associated with the last of these issues – transferring the right to issue critical commands to a meter from Supplier A to Supplier B and ensuring that DCC's access control arrangements are robust.		
Previous Positions on this/related Issues	New issue		

Summary of Recommendations	The ability of a gaining supplier to access a smart meter should not constrain a customer from switching. Where remote access fails, gaining suppliers need to make arrangements to update the smart meter as soon as possible. Changes to the configuration of a smart meter which are driven by the switching process should be executed between 'gate closure' and midnight[1]. The switch read should be taken from the Daily Read Log.

Internal and External Engagement and Record of Decisions		
Business Process Design	Author	
Regulatory Design		
Delivery Strategy		
Commercial Strategy		
DIAT		
Legal		
Other Ofgem Teams		
Meetings at which this paper has been discussed		
Workstream Leaders Mtg	7.9.16	Paper discussed – approved for circulation to UG
User Group	19.9.16	Paper discussed at meeting and in WEBEX session on 4.10.16
EDAG		
PWC		
Other External		
DA		

[1] The timing of gate closure will need to be considered during the design and implementation period to ensure there is sufficient time to handle all switching transactions that might arise on that day.

POLICY ISSUES PAPER – CONTENT

Issue

1. By the time that the new switching arrangements are implemented a significant proportion of customers will have smart meters operated by DCC. Arrangements are being developed by industry to integrate 'smart CoS' steps into the existing change of supplier arrangements. This paper considers the impact of the new switching arrangements on smart metering; these are expected to lift many of the constraints that led to the design of the interim 'smart CoS' processes.

2. Smart meters provide visibility to customers of their energy consumption and of the way in which they are being charged for that energy. The charges shown on the meter[2] are calculated using tariff information provided by the customer's supplier. At the point that a customer switches supplier their tariff will change and the customer will expect the energy values shown on their smart meter to reflect the new tariff.

3. TOM v2 makes reference to supply being switched at midnight for electricity and 5:00am for gas (para. 5.17) adding that these should be the times at which the tariff uploaded by the gaining supplier should take effect. The TOM also makes reference to the need to update security credentials on smart meters but does not explore the choreography required to achieve alignment between switching and updates to smart meters.

4. As in other papers, this paper refers to the customer's initial supplier as Supplier A and the gaining supplier as Supplier B.

Essential Background

Energy contracts

5. Domestic energy contracts state that supply starts from a date advised by the supplier: this is the effective date or supply start date. No mention is made of the time of day that supply starts (for example to refer to the 05:00 start of the gas settlement day): customers could infer from their contract that their supply starts from midnight.

6. For business customers on published tariffs (i.e. generally micro or smaller non-domestic sites) the same arrangements apply as for domestic contracts. In the very large industrial gas market where Daily Metering is employed, measurement is aligned with settlement days and the commencement of supply begins at 05:00 on the relevant day.

[2] These charges are only indicative. The definitive account balance is maintained by the supplier in their billing system.

7. The remainder of this paper covers domestic and non-domestic customers with smart meters installed. No changes are proposed to the meter reading arrangements at supplier switching for customers with non-smart meters.

Smart meters

8. Smart meters conforming to the SMETS2[3] specification[4] are designed to be interoperable between suppliers. When a customer switches from Supplier A to Supplier B there is no need to change the meter as both suppliers have equal capability to operate the functionality that the meter provides. This inter-operability is enabled by DCC which acts as a central communications 'router' between suppliers and smart meters.

9. In addition to providing meter reads, smart meters include capabilities which allow them to be controlled by the supplier (e.g. remote disconnect) and suppliers can upload tariff and other information to smart meters so customers can monitor their energy consumption. Smart meters can also be changed between credit mode (where the meter merely records consumption and can indicate the value of energy consumed to the customer) and prepayment mode where a financial balance is maintained by the meter (based on tariff and consumption) and supply is disconnected when the balance falls below a preset threshold.

10. Given the potential for smart meters to be the subject of malicious or accidental interference, a sophisticated security regime has been established covering the meters, the DCC and the communications between users (e.g. suppliers, network operators, other users) and smart meters. Cryptographic security credentials are employed in this security regime, key features of which are that:

    a. The security credentials of the registered supplier are stored in each smart meter[5]. These have to be exchanged when a customer switches to a new supplier
    b. Certain smart metering commands are designated as 'critical'. Only the registered supplier is permitted to perform supplier-related critical commands and the smart meter verifies that the supplier that created the critical command is the supplier whose security credentials it holds. Critical commands are those which result in an update to the information held by the smart meter (e.g. tariff, prepayment balance, ALCS configuration) or which execute sensitive functions (e.g. remote disconnect or change of payment mode)
    c. Non-critical commands can be requested by the registered supplier and other parties (e.g. Retrieve Daily Read Log, Retrieve Network Data). DCC operates an access control procedure to ensure that only valid requests are processed (e.g.

[3] Some SMETS1 meters may also be inter-operable via DCC and, from a switching perspective, may be considered equivalent to SMETS2 meters. SMETS1 meters which are not operated by DCC are considered separately, below.

[4] https://www.smartenergycodecompany.co.uk/docs/default-source/sec-documents/developing-sec/baselined-sec-subsidiary-documents/smets2-v1-59-final.docx?sfvrsn=7

[5] The term 'smart meter' is used in a generic sense to refer to GSME, ESME, comms hub GPF and HCALCs as defined in SMETS2.

that a supplier was the registered supplier for the period for which they are retrieving a meter read or that a gas transporter is only accessing meters within their territory)

11. The government's smart metering programme (SMIP) has set a policy objective that the exchange of security credentials be managed on a devolved basis with Supplier A being responsible for initiating the Update Security Credentials command to load the credentials of Supplier B. This is referred to as the Enduring Change of Supplier (ECoS) process and ensures there is no single point at which all security credentials could be compromised. However in the initial stages of DCC operation a derogation to this policy will be implemented (known as Transitional CoS or TCoS) under which DCC will load Supplier B's credentials onto the meter. SMIP is currently working on the design of the ECoS process.

12. A key capability of smart meters is the Daily Read Log[6]. This log comprises 'snapshots' of the consumption registers and other data items taken at midnight every day. 31 instances of the Daily Read Log are stored on the meter at any time.

13. Smart meters are relatively simple electronic devices with limited processing speed and limited storage capacity. This means that transactions can take a noticeable time to complete. Smart meters also have the capability to store certain transactions and execute them at a predefined time although the number of future dated commands that can be transferred in advance may be limited. These processing restrictions are particularly significant in the case of smart gas meters which are battery powered and only 'wake up' every 30 minutes. Accordingly there can be delays between commands being received from DCC (on the in-home comms hub) and being executed by smart gas meters.

14. Smart meters and the DCC operate on UTC time. In GB, UTC is the same as GMT: neither GMT nor UTC are adjusted for BST.

Current arrangements for the timing of a CoS event - electricity

15. In electricity the change of supplier (CoS) process is governed by the Master Registration Agreement (MRA) and supported by the MPRS systems operated by DNOs and iDNOs. Suppliers submit applications to register a meter point and (assuming the application is valid and there are no objections) the switch is deemed to occur at midnight on the specified Supply Start Date. Thus the date from which Supplier B starts billing the customer is synchronised with the date that Supplier B starts assuming responsibility for wholesale electricity costs (via the BSC settlement process) and for network charges (via the DUoS and TUoS network charging processes).

16. The BSC and the MRA operate to BST in the summer.

[6] Capitalised data items are references to the SMETS2 specification. Where a meter is being operated in prepayment mode, references to the Daily Read Log should be interpreted as including the Prepayment Daily Read Log.

17. Suppliers are required to submit change of supplier meter readings within 5 days of the supply start date (before or after). Various provisions are made for disputed reads and situations where multiple reads are available (e.g. a supplier read and a customer read).

Current arrangements for the timing of a CoS event - gas

18. In gas the change of supply (CoS) process is governed by the Uniform Network Code (UNC) and supported by the UKLink system operated by Xoserve. Shippers submit confirmation requests to register a meter point and (assuming the request is valid and there are no objections) the switch is deemed to occur at 05:00 on the specified Effective Start Date (i.e. the start of the gas settlement day).

19. The UNC operates to BST in the summer.

20. Shippers are required to submit meter readings within 5 days of the Effective Start Date (before or after). Various provisions are made for disputed reads and situations where multiple reads are available (e.g. a supplier read and a customer read).

21. The effect of these arrangements is that there is currently a mismatch in gas between the start of supply as defined in the contract between the customer and the supplier (inferred as being at midnight – see para 6) and the start of the settlement day. However as readings from traditional gas meters can be submitted within 5 days of the supply start date this 5 hour 'gap' does not impact the billing or settlement process.

Interim smart CoS arrangements

22. Industry parties have been considering how smart meters should be handled under the existing change of supplier arrangements. The interim arrangements being developed are designed to operate within the constraints of existing systems notably the timing of updates to DCC's access control information.

23. The current change of supplier (or shipper in the case of gas) processes are supported by MPRS (for electricity) and UKLink (for gas). These systems perform batch processes and pass daily updates to DCC[7]. DCC takes these files (1 from Xoserve and 19 from the DNO/iDNOs) and uses them to update its access control information. In order for Supplier B to have service requests processed:

    a. DCC's access control information must have been notified of the switch by the Registration Data Provider (DNO or Xoserve); and
    b. The date for the service request must be on or after the effective date of the switch

24. The current service level arrangement are for:

[7] Working days only

a. Registration Data Providers (Xoserve and DNO/iDNOs) to submit daily update files to DCC following their daily batch processing
b. DCC to process these update files within 3 hours of receipt

25. In practice these arrangements mean that DCC should generally have completed its daily processing of update files by around 06:00.

26. The information provided by the Registration Data Providers includes advance registrations. This means that the DCC can accept service requests from Supplier B ahead of the switch date, provided that the service request is scheduled for execution after the switch. These transactions can be 'DSP scheduled' within DCC. However in the event that the registration request is withdrawn (e.g. because the customer or Supplier B identify that an erroneous transfer has been raised) these 'DSP scheduled' transactions need to be cancelled.

27. The interim CoS arrangements have been designed within the context of the existing switching arrangements and expect that Supplier B will request security credentials to be updated soon after midnight on the effective date and for their configuration to be set on the meter shortly afterwards. Suppliers have also been concerned that comms issues could result in access to the meter being further delayed.

28. A further topic of discussion has been the treatment of smart prepayment customers at CoS. Ofgem has supported industry proposals that Supplier A should configure the meter into credit mode prior to the smart meter being transferred to Supplier B[8]. This will mitigate the risk of a prepayment customer being unable to top up their meter post the switch. This policy will be implemented through modifications to the MRA (MAP CP0275) and SPAA (CP16/334).

29. The above points highlight the difficulty that suppliers will have in the interim period to choreograph updates to smart meters such that they reflect the contractual position between supplier and customer. For example:

a. Supplier A will have been notified that their responsibility for a meter point will end at switch date: this makes it hard for Supplier A to determine when to switch a smart meter in prepayment mode into credit mode
b. Supplier B will receive confirmation from the relevant registration system that their responsibility for the meter will start at switch date but will not be certain when the DCC's access control information has been updated: they are unable to request a change of security credentials until this has happened
c. Supplier A will find it particularly difficult to manage a situation where a switch is confirmed and then withdrawn (e.g. as a result of an ET)

[8] https://www.ofgem.gov.uk/system/files/docs/2016/03/smart_prepayment_for_a_smarter_market_-_final_0.pdf

30. Recognising these timing issues, industry has developed the P302 modification to the BSC. The effect of this modification is to fix the switch as occurring when Supplier B 'takes control' of the meter and can take meter readings and update the meter configuration. These meter readings will be copied to Supplier A such that the same information is used for calculating the customer's opening and closing bills and the allocation of settlement charges. It is envisaged that a similar process will be required for gas. This means that , as now (when the CoS read can be taken from D-5 to D+5), the accounting changeover from Supplier A to B may differ from the Supply Start Date recorded in the registration systems.

SMETS1

31. SMETS1 smart meters are not required to conform to the detailed messaging formats set out in the GBCS[9], or to the encryption and other security requirements associated with them. Furthermore there is no requirement for SMETS1 meters to be operated by DCC although DCC is undertaking a project which is likely to result in the enrolment and adoption of some SMETS1 meters. The consequence is that at least some SMETS1 meters are likely to be operated by parties other than DCC.

32. A customer switch involving a SMETS1 meter operated outside DCC will therefore be more complex than for a smart meter which is enrolled into DCC (SMETS 1 or 2). For these ex-DCC meters Supplier B will need to determine whether or not to take over the site and contract with the relevant operator. They will then need to establish with the operator how to communicate with the meter. Alternatively Supplier B could replace the meter with a DCC-operated SMETS2 meter.

Analysis

33. The following lines of enquiry have been pursued:

    a. To what extent will consumers expect 'tight coupling' between their contractual arrangements and the information displayed on their smart meter?
    b. What lessons can be learnt from other sectors?

Customer expectations for 'tight coupling'

34. No customer research has been undertaken on this issue but our starting assumption is that customers will expect their smart meter / IHD to display the name of their current supplier and the tariff that the supplier has advised them of. When the customer decides to switch from Supplier A to Supplier B and the switch has been confirmed for a specified switch date, the customer will expect a new supplier name and tariff to be displayed on their smart meter from the switch date[10].

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[9] https://www.smartenergycodecompany.co.uk/docs/default-source/sec-documents/developing-sec/baselined-sec-subsidiary-documents/gbcs-v0-8-2-final.docx?sfvrsn=2

[10] Our working assumption is that customers would expect – by default – that the changeover from Supplier A to B would happen at midnight (i.e. the start date inferred from their contract).

35. One point to note is that for meters in prepayment mode, the only top-up instructions that can be used are those of the supplier whose security credentials are held in the meter and that the tariff employed in calculating the running balance will be that displayed on the meter. However on all prepayment meters the running balance is only an indication of the amount due to/from the customer. The definitive account is that maintained in the supplier's billing system. Thus, even if a meter in prepayment mode cannot be accessed remotely (i.e. it cannot be remotely switched to Supplier B) the supplier's billing systems can be used to determine the amounts due to each supplier[11].

36. As noted above, DCC's service level agreements are for – on average – 99% of transactions to be communicated to the smart meter comms hub within 30 seconds. Although the number of occasions when a switching transaction is subject to a communications failure should be low, there is a question of what action could be taken, ranging from aborting the switch, to proceeding with the switch but deferring the smart meter update. These options are considered below.

Lessons from other sectors

37. We have not identified any direct analogues to electricity and gas where the contractual arrangements are not tied to delivery of the service (i.e. where delivery of the service continues irrespective of a change in the party providing the service). Examples with some similarities to energy are discussed below:

    a. Mobile phones: a transfer from one operator to another is generally linked to the issue of a new SIM card and can be timed to within a narrow window (generally less than an hour). New services (e.g. a data roaming bolt-on) can be provisioned remotely and customers are led to expect that they will be activated within a few hours. The service provider and the availability of 'bolt-ons' is visible on the mobile phone so the customer has confidence that what they see on the device reflects their contractual commitment
    b. Pay TV: switching from one provider to another is generally accompanied by the installation of new equipment (e.g. Sky dish, set top box, viewing card). Commencement of the service – and the associated charging – is aligned to the equipment being installed. As with mobile phones the provisioning of new services (e.g. addition of Netflix) generally occurs within a few hours of sign-up to that service and is visible via the PayTV menu on screen
    c. Landline communications: devices such as broadband routers are not generally exchangeable between providers and the 'cease and re-provide' process is timed to occur after the new device has been received by the customer

Options

38. Two sets of options are considered in this section:

[11] If communications to the smart meter are unavailable manual top-ups may be made via the meter or a PPMID and, in extremis, all transactions (including an update to the security credentials) may be delivered to the meter via a handheld terminal.

a. Options regarding the tightness of coupling between switching and updates to smart meters
b. Options for the timing of a switch, with a focus on the choreography of changes to the switching system and the smart meter and the timing at which the 'switch read' should be taken. These options have a bearing on how 'next day' should be defined

Coupling of switch to smart meter updates

39. **Option A1: Tight coupling.** This option is predicated on the view that the smart meter must always display the name of the customer's current supplier and be configured with the tariff currently in effect. Thus at a switch, if the customer's smart meters cannot be updated with the new supplier's details (name, tariff, etc.) the switch should be aborted.

40. Assuming that gate closure for switching is a few hours prior to the switch date (e.g. 5pm) under this option the suppliers (via DCC) would have the period between gate closure and midnight to update the security credentials and re-configure the meter to reflect the contract agreed between the customer and Supplier B. If these steps had not been completed (including re-tries) by midnight the switch would be aborted and the customer would remain with Supplier A. The supplier would be advised that the switch had failed. If the customer still wished to switch, Supplier B would need to re-submit a registration request with a new switch date. In the meantime Supplier B would need to investigate with DCC why the first attempted switch had failed and resolve any problems.

41. If there was a longer-term issue with remote access to the smart meter (e.g. scaffolding around a building blocking mobile communications) the gaining supplier would have to consider whether to perform the switch by making a site visit with a handheld terminal to update the meter.

42. **Option A2: No coupling.** Under this option switching transactions would proceed independently of updates to smart meters. A 'best endeavours' approach would be taken to align the information displayed on the meter with the contractual position between the suppliers and the customer.

43. As with Option A1 there is a period between gate closure and midnight when suppliers – using DCC services – can manage the transition of the meter from Supplier A to Supplier B, and Supplier B can configure the meter to reflect the contract with the customer. However if it is not possible to communicate with the meter by midnight the switch would still take place. Supplier B would then attempt to update the meter configuration as quickly as possible following the switch, using a site visit with a handheld terminal as a final contingency option.

Options for the choreography of switching and updates to smart meters

44. If Option A1 is adopted, the options discussed under this section will not apply because the smart meter has to be updated by midnight otherwise the switch is aborted. Under

Option A1 the Daily Read Log can be used by both Supplier A and Supplier B to retrieve the switch read and this can be used for both opening and closing bills and for settlement.

45. If Option A2 is adopted the options discussed below become relevant.

46. Option B1: Switch takes place at midnight. When the customer enters a contract with Supplier B and agrees a switch date, their expectation is that their energy will be supplied by Supplier B from midnight on the switch date. Given that they can access daily consumption readings from their IHD or apps linked to a Consumer Access Device they will expect the 'switch read' to be the reading as at midnight.

47. Happily, the SMETS2 specification was written in anticipation of this requirement and smart meters take a snapshot of their consumption registers and store them in the Daily Read Log at midnight. A significant reason for including this feature in SMETS was to provide an accurate CoS read, accessible by both suppliers.

48. Smart meters support a wide range of tariff types and their consumption registers can be programmed to record the amounts of energy consumed in each of the time periods or blocks that form part of the tariff. In order that billing can be performed efficiently suppliers need to configure the tariff settings on the meter to come into effect at the point that their contract with the customer commences. Again the design of smart meters has anticipated this requirement and allows tariffs to be downloaded to the meter in advance so that they can be 'turned active' at a predefined date/time.

49. Under option B1 the steps to be undertaken following gate closure are as presented In Appendix 2 and would comprise:

    a. Switching system notifies DCC's access control information that Supplier B will become the registered supplier from midnight and that service requests from B should now be accepted
    b. If relevant, Supplier A sends service requests to the meter to switch it from prepayment to credit mode and to retrieve any balances it needs when preparing its final statement
    c. Supplier A confirms to Supplier B that there are no further critical commands that it wishes to issue to the meter. Supplier A would have to complete their 'release' process within an agreed time: once this has expired Supplier B would be entitled to assume that Supplier A had 'released' the meter
    d. Supplier B sends a service request to DCC to update the meter's security credentials[12]
    e. Supplier B issues service requests to configure the meter according to its contract with the customer (e.g. supplier name, payment mode, tariff). Service requests

[12] The process described here is as currently (i.e. the TCOS arrangement). Under ECOS, Supplier B would instruct Supplier A to update the security credentials.

which can be future dated on the device would be programmed to come into effect at midnight, others would be actioned soon after midnight

f. After midnight both Supplier B and Supplier A retrieve the Daily Read Log for use in opening and closing bills and for settlement. If the meter is subject to HH settlement (elective or mandatory) Supplier A would retrieve the Daily Profile Log for the preceding day and Supplier B would retrieve the log for switch date onwards

50. If the above steps cannot be completed by midnight on the switch date (e.g. because of a comms failure) then:

    a. Supplier A can issue a closing bill based on the Daily Read Log at switch date
    b. The Daily Read Log can provide a CoS read for settlement – in the event of HH settlement this can be supplemented by the Profile Data Log which will contain all relevant entries to allow settlement charges to be calculated for Supplier A up to switch date and for Supplier B thereafter
    c. The customer may find that the changes to their meter do not appear until a few hours (or longer in exceptional circumstances) after midnight on switch date – assuming they are awake and avidly watching their meter or IHD
    d. If Supplier B is using a complex tariff, energy consumption will be assigned to the 'wrong' consumption register until the meter is re-configured. The supplier could access the Profile Data Log and use HH readings to correct the data in their billing system

51. Option B2: Switch is deemed to occur when Supplier B reconfigures the meter.

This option overcomes the issue facing Supplier B in point (d) above in that both suppliers will have consumption registers aligned with the tariff they are using for billing. Supplier B would retrieve a copy of the consumption registers at this point and pass a copy to Supplier A for final billing. This reading would also be used for settlement. However:

    a. The customer will be billed by Supplier A for energy consumed after the point that the customer had switched to a contract with Supplier B
    b. In the event of HH settlement there will be a mis-alignment between the readings used for billing and those used for settlement
    c. The customer may find that the changes to their meter do not appear until a few hours (or longer in exceptional circumstances) after midnight

52. This option is consistent with the interim 'smart CoS' arrangements that are being established to deal with change of supplier between the launch of DCC services and implementation of new switching arrangements.

Options assessment

Coupling of switch to smart meter updates

53. Once a customer has received confirmation of a switch they will expect it to be executed on the specified date. Equally their experience of technologies such as mobile phones and pay TV will lead them to expect that their smart meter is updated to coincide with a supplier switch. Experience with other technologies means they will probably be prepared to accept that the smart meter update may take place a few minutes (or possibly a few hours) after a midnight switch and – given that switching takes place overnight – most consumers will probably be happy to see their meter updated by the time they wake up next morning.

54. Although DCC is contracted to deliver a highly reliable communications service, there will be instances where the remote communications with a smart meter fail. The question is whether in these circumstances the customer would prefer:

    a. The switch to go ahead and for the meter to be synchronised with Supplier B's tariff at the earliest opportunity; or
    b. The switch to be aborted such that the customer stays with Supplier A

55. Our assessment is that customers would prefer the switch to go ahead on the confirmed switch date and for the re-configuration of the smart meter to follow later. Our rationale is:

    a. The customer will have chosen to switch for good reason (e.g. a lower tariff) and will accept the meter being out of synch for a short period
    b. Reports of switches being blocked due to failed communications with their smart meters will have a negative impact on customers' willingness to switch and may also tarnish the image of smart meters
    c. Incumbent suppliers may be less motivated to resolve smart meter communications issues if they know that these customers are unable to switch

Options for the choreography of switching and updates to smart meters

56. In essence Option B1 places emphasis on performing all the smart metering transactions relating to a switch between gate closure and midnight while in Option B2 the timetable is dependent on the efficiency of Supplier B, supported by DCC. Our preference is for Option B1 on the following grounds:

    a. Reconfiguration of the meter is programmed to occur at midnight, coinciding with the start of Supplier B's contract with the customer
    b. All parties (customer, Suppliers A and B, and DCC) are aligned with a single switch date. There can be no confusion that the switch was on one date but billing under Supplier B's tariff started at another
    c. Information presented to the customer on their IHD will be aligned with that used for their closing and opening bills

d. Both suppliers can access the same Daily Read Log for switch date, thus reducing the opportunity for disputed reads. This builds on the principle that there should be a 'single source of truth' for all data items related to switching
e. This arrangement is compatible with both profiled and HH settlement
f. If its contract includes a multi-rate tariff, Supplier B will be incentivised to act with appropriate urgency to re-configure the meter

Recommendations

57. The recommendations set out in this paper have been designed to present a customer-friendly approach, tempered by pragmatism, recognising the practical challenges of communicating with >50m smart meters.

58. We invite EDAG to comment on our recommended positions as follows:

a. Completing a switch should not be reliant on being able to re-configure a smart meter with the name and tariff of Supplier B: a switch should not be aborted if communications to a smart meter fail
b. The switch transaction should be assumed to be effective as at midnight in all cases (but see notes below re gas)
c. Reconfiguration of the meter should be programmed to occur at midnight or as close to it as feasible
d. switch reads should be retrieved from the smart meter's Daily Read Log. If the meter is subject to HH settlement the suppliers would retrieve the Profile Data Logs for the periods that they are responsible for the supply
e. The new switching arrangements and DCC procedures should be designed to enable the following smart meter transactions to be processed between gate closure and midnight:
    i. Supplier A to undertake any 'close-out' transactions (e.g. change Payment Mode from credit to prepayment)
    ii. DCC to action the update of security credentials of the smart meter (on request from Supplier B)
    iii. Supplier B to send service requests to the meter which can be activated at midnight to reconfigure the tariff and other parameters

59. There are a few areas which present additional complexity and are discussed below. We would welcome further feedback on these topics.

Exceptions and error handling

60. In discussion, some suppliers raised concern that a variety of circumstances could arise which would prevent them from being able to reconfigure smart meters at midnight. While they agreed that priority should be given to establishing clear principles to be followed for the vast majority of switches which will not experience problems, it is important to recognise where exceptions and errors might arise.

61. Some of the exception conditions identified in discussion were as follows:

a. Lack of communications to a smart meter: short-term loss of comms could result in Supplier B being unable to configure the meter until a few hours after the midnight switch. Supplier B would have to decide how to manage the remediation of this with options including:
    i. Where a time of use tariff applies, estimating the allocation of units to time periods for energy consumed between midnight and reconfiguration (the total units consumed can be determined by reference to the cumulative register and the daily read log)
    ii. Where a time of use tariff applies, writing off the value of units consumed prior to configuration of the meter
b. Lack of communications – longer period of no access: when access is restored the Daily Read Log for the switch date could be retrieved or if the no access period is likely to stretch beyond 31 days the gaining supplier may need to make a site visit to retrieve readings and reconfigure the meter. Suppliers could mitigate the risk of 'no comms' by including a step in their sale process to test the comms to the meter by running a CIN test
c. Meter in a 'failed state' (e.g. tamper condition or battery failure): the general principle is that switching should be led by the gaining supplier. Thus, in these circumstances it will be the gaining supplier's responsibility to resolve these issues
d. Meter with invalid firmware: the gaining supplier can access both the DCC Inventory and the firmware version on the meter (which Supplier B can read as an 'other user') and determine whether the device is compliant with the Certified Products List
e. Install and leave: if a switch happens after the meter is installed but before it is connected to DCC processes will be required to transfer the meter to Supplier B (or C or D)

62. In the discussion of exception conditions it was noted that most of these conditions could also arise when a supplier is performing a tariff update. The remedial steps required (e.g. to allocate units to time of use bands) will be similar in both cases, the difference with a switch being that two suppliers are involved, not just one.

63. Suppliers also highlighted that introduction of the ECoS process (wherein Supplier A is required to initiate the update of security credentials) will introduce a hard dependency on Supplier A. This could prevent Supplier B from being able to re-configure the meter by midnight. It was agreed that design of the ECoS process should include the definition of service levels for Supplier A, a performance assurance regime and the sanctions that should apply in cases where Supplier A failed to comply with the service standards.

64. A further issue noted by suppliers was the need for DCC to establish sophisticated processes for scheduling the dispatch of service requests across its comms networks. Without such scheduling there is a high risk that switching transactions could be delayed, for example by the issue of a very large number of tariff changes for activation on a single date. It was recognised that experience of DCC's scheduling and delivery

performance is required before it will be possible to confirm the length of time required between gate closure and midnight.

65. **Recommendation**: We recommend that exceptions and error handling are addressed during the design stage with a focus on ensuring that customer expectations can be managed and that error handling procedures are not overly onerous.

Verification of CoS read

66. In order to avoid double billing or billing gaps it is essential that Supplier A and B are using the same meter reading. Using this read as the basis for settlement ensures that suppliers' revenue and settlement charges are aligned.

67. Suppliers expressed concern that relying on both Supplier A and Supplier B to access the Daily Read Log could result in readings being retrieved from different meters and/or dates. They highlighted that the interim P302 arrangements address this risk by requiring the two suppliers to exchange readings and validate that there are no discrepancies.

68. We consider that the Daily Read Log should be the source of the switch read. However, given suppliers concerns, we concur that for an initial period it would be sensible for suppliers to continue to exchange meter readings using the D10 (electricity) and NOSI (gas) flows. Once parties are comfortable that everyone is able to access and use the Daily Read Log without error these data flows may be retired.

69. **Recommendation:** For an initial period when the new switching arrangements are introduced, industry procedures should require switch reads to be exchanged between suppliers, allowing them to verify that the same readings are being used on both closing and opening bills.

Prepayment

70. Where a smart meter is being operated in prepayment mode there are additional issues to be addressed when the customer switches supplier. The risk is that, following a switch, the customer is unable to top-up the meter and their energy supply is disconnected. Top-ups can be conveyed to a smart meter in three ways:

    a. The supplier can send the top-up as a remote service request using DCC's communications infrastructure
    b. The supplier can provide a top-up code (a string of [21] digits) which the customer can enter at the meter (directly or via a prepayment interface device)
    c. The supplier can load the top-up onto a handheld terminal, carry it to the customer's premises and load it locally

71. The expectation is that almost all top-ups will follow the remote communications route described in (a) above: the other options are fallbacks in the event of communications failures.

72. At the time of a switch the following cases may arise:

a. Prepayment to prepayment - a customer switching from a prepayment tariff with Supplier A to a prepayment tariff with Supplier B: Supplier A is required to change the Payment Mode to credit prior to the switch to Supplier B. If the meter cannot be accessed remotely this transaction will not be received and the Payment Mode will remain as 'prepayment'. But if this happens it is probable that transactions from DCC (to change credentials) and from Supplier B (to reconfigure the meter) will also fail. In this case the meter will still be operating in prepayment mode under the control of Supplier A even after the contractual switch from Supplier A to Supplier B. If the communications failure persists, Supplier A will need to issue manual top-up codes which the customer can enter[13]. In this situation Supplier A would benefit from receiving top-ups while Supplier B (as the registered supplier) would be responsible for wholesale energy and transportation charges and a business process will be required to transfer payments from Supplier A to B[14]
b. Prepayment to credit: this is similar to the situation described above in that if service requests cannot reach a smart meter it will remain in prepayment mode and manual top-ups will need to be issued by Supplier A
c. Credit to prepayment: in this situation if the switching transactions fail due to loss of communications to the meter it will remain in credit mode. This avoids the risk that the consumer could be disconnected but may leave Supplier B bearing a credit risk. This could be mitigated if Supplier B invoked the CIN process as part of their customer acquisition procedure. Proving that the customer can read the meter (to access the CIN) might also help suppliers to build confidence that the customer can meet the requirements of operating a meter in prepayment mode

73. One further point to consider in relation to switching of prepayment customers concerns refunding the outstanding balance to the customer and finalising the amount of debt outstanding. The Meter Balance and debt balances (for debt being recovered and/or debt incurred while in emergency credit mode) are updated on the meter based on the tariff, consumption and other parameters provided by the supplier. They are designed to provide an indication to the customer of the balance available on the meter and the level of debt that the customer owes to the supplier. However, as noted above, the definitive record of the customer's account is maintained in the supplier's billing system.

74. At the point the customer switches supplier, Supplier A will refund the balance to the customer and will wish to recover amounts owing. This may involve the transfer of an outstanding debt under the Debt Assignment Protocol. The customer will expect that the refund is equal to the balance shown on the meter.

[13] Manual top-ups procedures are required in all situations where communication to the smart meter fails.
[14] This issue will arise as soon as DCC goes live with prepayment services so industry will need to devise an appropriate resolution process well before the new switching arrangements are implemented.

75. If Supplier A switches a prepayment meter into credit meter soon after gate closure (e.g. at 17:30) then:

    a. At the time of changing the meter to prepay Supplier A will retrieve the meter balances. The customer will expect these balances to be reconciled with their closing bill
    b. The meter will be in credit mode from that point to midnight on switch date. If this is start of next day the meter would (if it remained in prepay mode) be in a non-disconnect period. Supplier A will need to show the value of energy consumed in this period on the closing bill (had the meter remained in prepay and the balance was zero it would be incrementing the Emergency Credit Balance in respect of these units of energy)
    c. Supplier A will issue a closing bill to the customer together with any refund that is due. If there is debt outstanding Supplier A will recover it from the customer – or if a debt assignment to Supplier B has been agreed – transfer it to Supplier B

76. **Recommendation**: Suppliers will need to be able to manage 'smart' prepayment customers through a switch under the interim switching arrangements. During the Detail Level Specification and DBT phases these interim arrangements will need to be assessed and – as appropriate – carried forward into the new switching arrangements implemented by this programme.

Alignment with 05:00 gas settlement

77. Currently the start of a customer's supply contract (at midnight) does not align with the gas settlement day (at 05:00). The TOM suggested that under the new arrangements that the date/time of switching might also be set at 05:00, thus aligning the retail and wholesale markets.

78. In discussion with the User Group it was noted that existing arrangements for non-daily metered (NDM) customers allow the CoS read to be taken at any point from D-5 days to D+5. Discussion also highlighted that:

    a. Customers would expect supply to be switched at midnight to align with their contract
    b. Customers may be confused as to why electricity switches at midnight while gas is at 05:00 – for the 5hr period the IHD might show one supplier for electricity and another for gas
    c. Given smart meter customers are not large users of gas, the value of energy consumed between 00:00 and 05:00 is unlikely to be material and would be treated on a 'swings and roundabouts' basis between suppliers
    d. If there are any problems communicating with the meter the time available for retries between 05:00 and the customer waking up would be reduced (this is especially significant in the case of 'sleepy' gas meters)
    e. Suppliers would be unable to use the Daily Read Log (a snapshot at midnight) for the switch read

79. **Recommendation**: The switch of gas supplier should become active at midnight with no adjustment provisions in relation to the period between 00:00 and 05:00.

UTC and local time

80. SMETS2 meters and DCC operate to UTC which differs from local time by 1 hour during British summer time. This is different to settlement for both gas and electricity which operate in local time (GMT or BST).

81. Discussions with the User Group highlighted that changing settlement to operate in UTC would be a significant change, although it was noted that the introduction of elective and/or mandatory HH settlement in electricity might trigger consideration of this issue. The financial implications of not being aligned for 6mths of the year were considered to be neutral and not material.

82. **Recommendation:** Pending any further analysis of this issue through the HH settlement initiatives, a rule is required in the appropriate Code to allow switches to be made effective on smart meters with effect from 00:00 UTC even though the settlement days will continue to run from 00:00 and 05:00 local time for electricity and gas, respectively. This would also require gate closure to be defined by reference to UTC rather than local time.

Appendix 1 - Options Evaluation

A: Coupling of switch to smart meter re-configuration

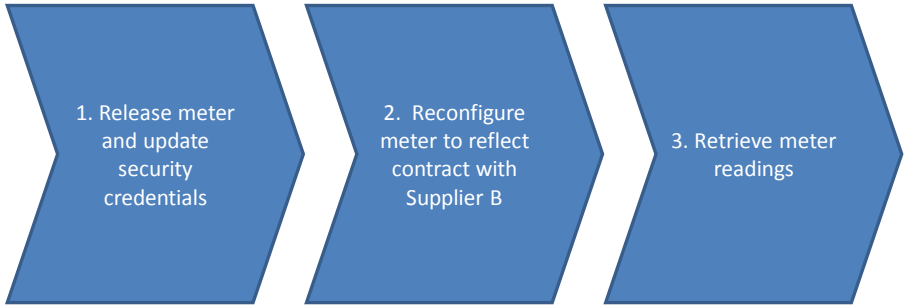
Design Criteria	A1: Tight Coupling	A2: No coupling
1 Reliability for customers	If comms to the smart meter failed the customers would be confused as to why their switch had not taken place, as confirmed by the gaining supplier	The switch would always happen as confirmed but the smart meter would not reflect the current supplier / tariff if comms fails
2 Speed for customers	Comms failure to smart meter would delay the switch	No delay
3 Customer coverage	Comms failures to smart meters could result in differential speed of switching between smart and other customers	All customers handled in the same way
4 Customer switching experience	Could be very confusing to customer	Failures to smart meter comms will always have the potential to generate inconsistency between meter and contract/bill but this is a general issue with smart and is not further compounded by issues relating to switching
5 Competition	Incumbent supplier could delay resolution of comms issues to thwart switch to a new supplier	No impact
6 Design – simplicity	Requires the introduction of additional functionality in DCC to handle comms failures. Especially complex if supplier specifies OFAF for a dual fuel switch	Maintains separation between switching and smart functionality
7 Design – robustness	Might need to extend the standstill arrangements to ensure integrity of smart and switching data	No risks to robustness of switching
8 Design – flexibility	Inflexible – switch of a smart customer would be prevented by a comms failure	Provides flexibility to deal with various error conditions including loss of comms to smart meter
9 Solution cost / benefit	More expensive to implement and operate with no tangible customer benefit	Cheaper to implement
10 Implementation	Requires complex changes to smart metering systems to be implemented in conjunction with new switching arrangements	Changes to smart metering systems will be required but less complex than A1

B: Choreography of switching and updates to smart meters

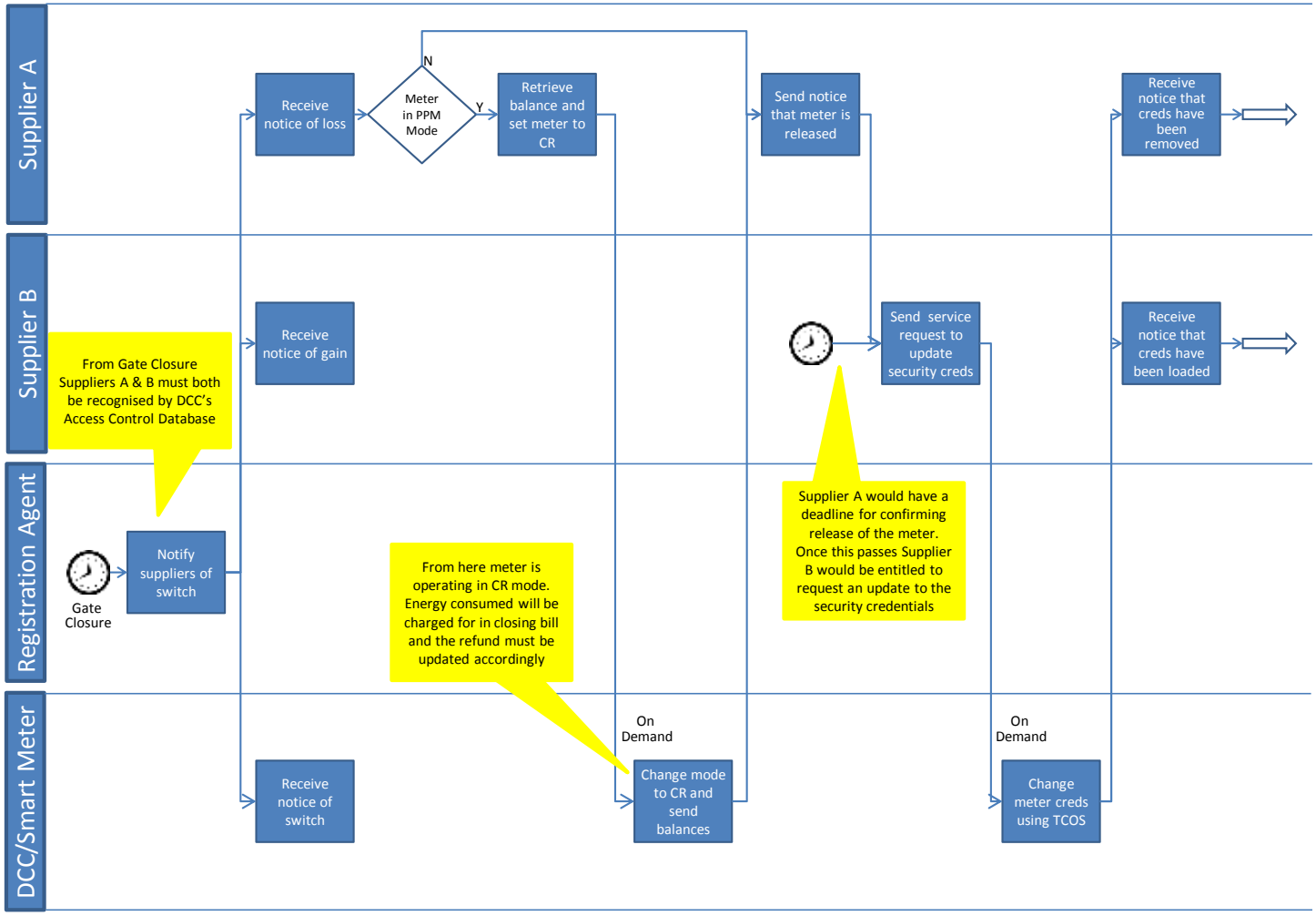
Design Criteria	B1: Switch takes place at midnight	B2: Switching deemed to occur when Supplier B updates the meter
1 Reliability for customers	Customer sees new supplier details appear at the time their contract becomes effective	Customer confused as to why effective date of contract does not coincide with changes to smart meters
2 Speed for customers	No gap between switch date and start of billing from Supplier B	Uncertainty as to how quickly Supplier B will start billing
3 Customer coverage	Occasional slips from this timetable will arise due to comms failures	Consistent across all customers
4 Customer switching experience	Vast majority of customers will enjoy a predictable switching experience	Experience may vary according to performance of Supplier B
5 Competition	No difference between options	
6 Design – simplicity	Requires some changes to DCC smart systems	Could be implemented without changes to DCC smart systems but some complexity to supplier systems to deal with CoS reads taken during the day
7 Design – robustness	Minimises scope for complications	More complex to deal with CoS reads
8 Design – flexibility	Provides platform for introduction of HH settlement	Further changes required to deal with HH settlement
9 Solution cost / benefit	No clear differentiation between options	
10 Implementation	Changes to DCC smart systems would need to be implemented alongside new switching arrangements	Changes to coordinate smart meter updates with switching might be deferred but DCC smart systems will need to be changed to accommodate new switching arrangements

Appendix 2 – Process map of switching transactions on smart meters (Option B1)

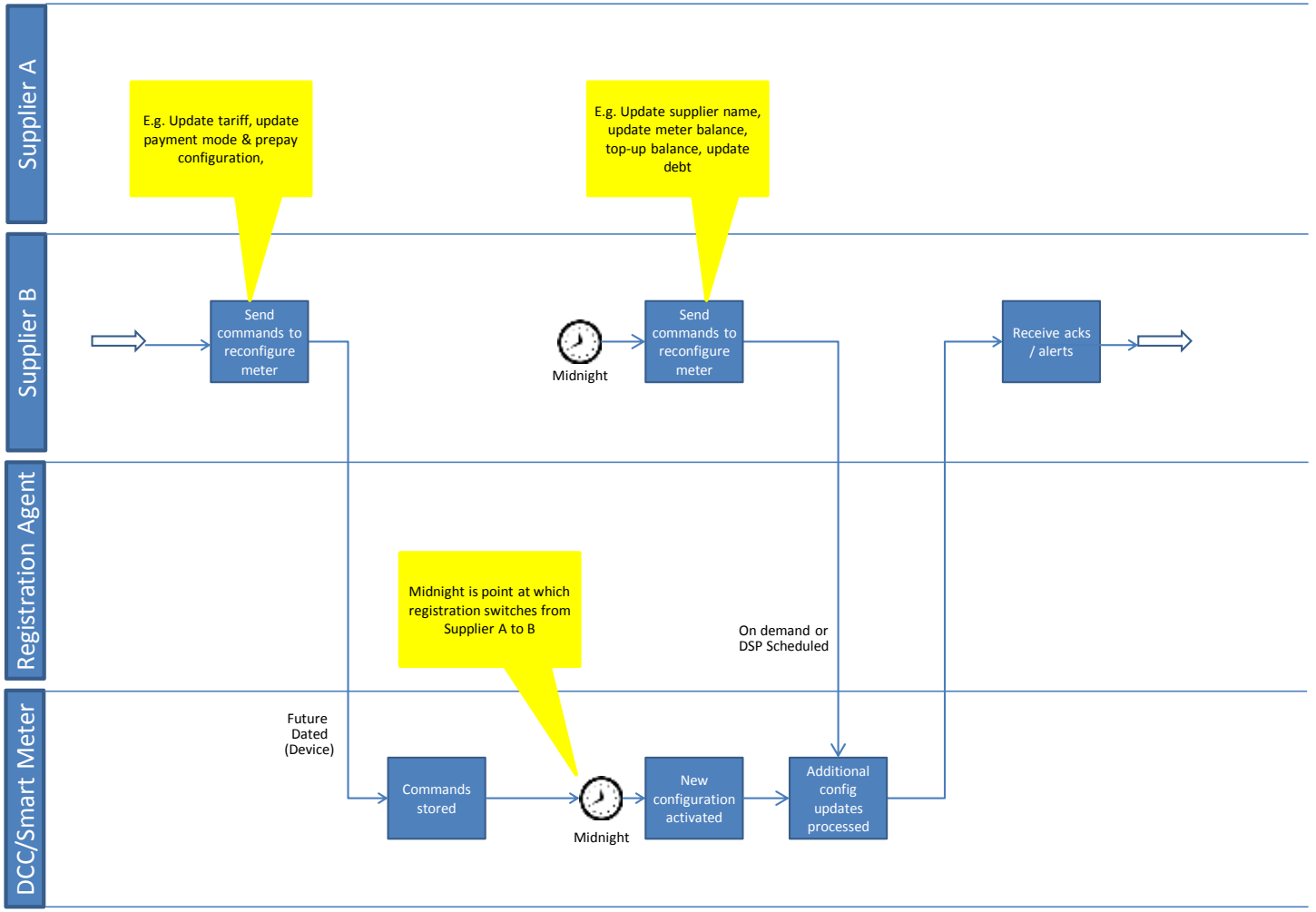
Process steps in switching a smart meter



1. Release meter and update security credentials



2. Reconfigure meter to reflect contract with B



3. Retrieve meter readings