Consultation on Dynamic Switching in the Smart World

11 April 2012

We are seeking information and views relating to the dynamic switching of metering systems and customers' heating/hot water loads. There are a number of issues with the current Radio Teleswitch Service (RTS) infrastructure and changes will be required by the industry with the advent of smart metering and introduction of the Data and Communications Company (DCC). The consultation seeks to establish exactly what load/meters are currently being switched dynamically, by whom and for what purposes. It also seeks to establish what changes to BSC arrangements are required to accommodate dynamic switching once smart meters with load switching capabilities have been rolled out.

Executive Summary

ELEXON is continuing its review of the profiling and Settlement arrangements and is now looking at the changes that are required to ensure the existing profiling and Non Half hourly (NHH) arrangements are fit for purpose in a smart metered world and the Settlement processes are maintained in a cost reflective, equitable and robust way that facilitates competition.

Furthermore, we are looking to identify what Settlement should look like in the future. We believe the time is right to consider how any changes will affect our customers and the wholesale electricity market under the Balancing and Settlement Code (BSC).

We have already undertaken a Cost Benefit Analysis (CBA) of mandating HH settlement for larger commercial customers (Profile Classes 5-8) who are having their meters replaced with Advanced meters. Furthermore, we have undertaken a CBA on settling customers in Profile Classes 1-4 on a Half-Hourly basis when smart metering is rolled out (see Profiling and Settlement Review Group (PSRG)).

We are now working with the Profiling and Settlement Review Group (PSRG) to explore the implications for Settlement of how dynamic switching of meter registers and customers' load will operate for smart meters. This consultation seeks to obtain feedback from a wider industry audience on the risks and issues arising from the transition to smart metering. We have sought to differentiate between shorter and longer term issues and requirements by developing a draft roadmap. This draft roadmap is presented for consideration as part of this consultation. The consultation goes on to define potential changes that may be required to transition the arrangements as smart metering is rolled out.

Parties are requested to review and comment on the risks, assumptions, issues and dependencies set out in this paper. We would also like your feedback on the timescales set out in the draft roadmap and your views on what arrangements and infrastructure will be required in a future market where dynamic switching is facilitated through smart metering systems.

The consultation questions are set out in Section 8 this document.

You should provide your response to *BSC.Admin@elexon.co.uk* **by 11 May 2012.**

Any questions or clarifications relating to this document should be directed to Justin Andrews (*justin.andrews@elexon.co.uk*) on 020 7380 4364, Jon Spence (*jon.spence@elexon.co.uk*) on 020 7380 4313) or Kevin Spencer (*kevin.spencer@elexon.co.uk*) on 020 7380 4100.

Contents

1. Introduction

The introduction of smart metering and the Data and Communications Company (DCC) will result in changes to how remote load control and dynamic switching instructions are issued.

Currently the Radio Teleswitch Service (RTS) is the only widely-used mechanism for the dynamic switching of Non Half Hourly tariff registers. Almost two million customers have their electrical storage and immersion heating controlled remotely via the RTS. Messages are sent via the BBC's 198 kHz long wave network to a teleswitch device in the customers' meters to turn the customers' heating on and off.

Over the next few years this mechanism will fall into disuse, as the BBC's 198 kHz long wave service is discontinued, and the new smart metering infrastructure will become the primary mechanism for dynamic switching.

Under the current arrangements the Energy Networks Association (ENA) provides a single, daily report of teleswitch times to the Supplier Volume Allocation Agent (SVAA). The SVAA uses this file as part of the calculation of profile coefficients to ensure that energy (meter advances, energy that is recorded over longer periods by meter registers) is allocated to the correct half hour periods. Under the new smart arrangements the DCC (via the Data Services Provider) will process meter register switch requests and remote load control requests from Suppliers (and potentially) network operators and send commands to be applied by the relevant smart Electricity Metering System (EMS). This means that the mechanism for notifying switching times to the SVAA will need to be reviewed.

2. Current Arrangements: The Radio Teleswitch Service (RTS)

Under the current arrangements there are two ways in which the switching of load or time of use registers can be effected:

- locally by clock switching i.e. via a clock in (or attached to) the meter; or
- remotely by Radio Teleswitching.

In the case of clock switched meters, both the time-of-use registers and the switching times are pre-defined and registered as part of Market Domain Data (MDD). In the case of teleswitched meters, the registers are pre-defined and registered in MDD, but the switching times are notified to the SVAA on a daily basis by an agent of the ENA.

Both clock switched and teleswitched meters can support a static regime – i.e. where the registers are switched at the same time every day of the year or semi-static (i.e. where the registers are switched at the same time every day within a defined season). Teleswitched meters can also be switched dynamically, for example, some night storage heaters are controlled dynamically to take into account prevailing or forecast weather. Suppliers are responsible for determining register switching times and communicating them to the RTS Access Provider for onward transmission to Metering Systems via the administrator of the switching infrastructure (the role fulfilled by the ENA).

Teleswitch commands can be programmed (i.e. issued in advance) or immediate – i.e. to shed/boost load quickly (e.g. in the event of loss of generation or periods of high demand). The latter is currently used sparingly, and creates issues for profiling accuracy in terms of determining whether a Settlement Period in which load shedding occurred should be treated as "on" or "off".

The current RTS arrangements are described in more detail in Appendix A. A glossary of terms is provided in Appendix B.

3. The future of the Radio Teleswitch Service (RTS)

The BBC has announced that it plans to discontinue long wave broadcasting from 2013. The Energy Retail Association (ERA) and Licensed Distribution System Operators (LDSO) have asked the ENA to investigate options, possibilities and costs of extending the service to 2016 or 2017.

The BBC's 'Delivering Quality First' report[1] notes that there will be "no re-investment in Long Wave once the current infrastructure—which relies on technology that is no longer being manufactured—has reached the end of its life. In the long term, this will result in the end of Radio 4 on LW, although we do not expect the transmitters to fail in the current Charter period. If they do fail suddenly, we are committed to safeguarding the programming on Radio 4 LW and will use our analogue services to provide continued coverage".

The ENA has engaged with the BBC and Arqiva (who operate the transmitters) and are hopeful that Arqiva will be able to continue to run the service, even with service restraints, to increase the life of the infrastructure up until 2016/17. This is reliant on the BBC agreeing a contract extension with Arqiva without re-engineering the infrastructure beyond 2013. The BBC cannot make commitments beyond the end of the current Charter period in 2015, but have indicated that they have no objections to extending the RTS contract to use long wave, with any caveats that Arqiva put into the contract regarding resilience or signal strength being mirrored in the ENA contract.

4. Load Control / Register Switching via the DCC

The current process design assumption is that the DCC will not hold any information that allows Metering Systems to be grouped (e.g. by Standard Settlement Configuration) and meters to be addressed as a group. Suppliers and network operators will need to identify all the Metering Systems that they wish to address in requests to the DCC. As such it is envisaged that Suppliers and network operators will need to provide feedback on switch times to the SVAA, rather than the DCC. When registration is incorporated within the scope of the DCC in 2016/17, this may need to be reviewed.

Version 1.0 of the Smart Metering Implementation Programme (SMIP) Smart Metering Equipment Technical Specifications (SMETS)[2] excludes functionality relating to the opening and closing of auxiliary load switches and relays. It is anticipated that details will be provided in SMETS version 2.0.

It is not currently anticipated that there will be a SMIP requirement on communications service providers to support broadcast or multicast messages. This is because such a requirement would rule out certain communications technologies from the procurement process. As such, it is likely that load control instructions will be issued as "multiple unicast" messages – i.e. addressing individual Electricity Smart Metering Systems (ESMS) in quick succession. This is not to rule out broadcast or multicast messages entirely, but national coverage may not be complete, depending on the technologies selected.

[1] http://www.bbc.co.uk/bbctrust/assets/files/pdf/review_report_research/dqf/dqf.pdf.

[2] Smart Metering Implementation Programme : Smart Metering Equipment Technical Specifications (URN 12D/038) April 2012

5. Statistics for existing Teleswitched Metering Systems

Under the current arrangements about two million customers have their electrical storage and immersion heating controlled remotely via the RTS. Of these just over 130,000 (6%) are Profile Class 4 customers and the remainder are Profile Class 2 customers. A breakdown by regime type is shown below. Part-dynamic indicates that switching is based on a static or semi-static regime, with additional switched load programmed on a dynamic basis.

Regime	Profile Class 2 MSID Count	Profile Class 4 MSID Count	Total MSID Count
Dynamic	1,133,455	68,103	1,201,558
Part-Dynamic	365,349	7,599	372,948
Semi-Static	142,417	18,750	161,167
Static	318,100	29,889	347,989
Total MSIDs	1,959,321	124,341	2,083,662

An energy breakdown by regime type is shown below. Values are annualised energy on the switched register only.

Regime	Profile Class 2 Annual Switched Energy (MWh)	Profile Class 4 Annual Switched Energy (MWh)	Total Annual Switched Energy (MWh)
Dynamic	2,782,542	435,390	3,217,932
Part-Dynamic	1,473,553	61,728	1,535,281
Semi-Static	606,117	148,759	754,876
Static	1,031,470	232,203	1,263,672
Total (MWh)	5,893,682	878,079	6,771,761

Metering System counts and energy totals by regime type within Profile Class and GSP Group can be found in Appendix C.

6. Draft Roadmap for Dynamic Switching

6.1 A Phased Approach

We have identified three phases, which are described in more detail below:

- Phase One – continuity of service for existing RTS customers;
- Phase Two – new mechanism for dynamic switching; and
- Phase Three – future developments.

The purpose of describing these phases is to facilitate debate and planning. Given the duration of the smart metering roll-out, there are likely to be overlaps between the phases and the eventual implementation phases may be different.

Although the developments described in Phase Three may be some years away, it is important that they are considered during the development of solutions in Phases One and Two, to ensure that these solutions are as future-proof as they can be.

Whilst the PSRG is focused on the implications that the likely new mechanisms of dynamic switching will have for settlement, we recognise that the Settlement impacts cannot be fully considered in isolation of the wider industry context. As such this consultation is also seeking to drive out when wider changes may be required.

6.2 Phase One – continuity of service for existing RTS customers

Whilst the proposed removal of the current RTS has implications for profiling, the primary impact is on those customers who rely on the service for their storage heating. Therefore, the priority for Suppliers is to develop contingency proposals, in the event that the service is discontinued before a viable alternative has been implemented for dynamic switching.

Any Metering Systems on static or semi-static teleswitch regimes can be migrated to a new 'clock-switch' Standard Settlement Configuration (SSC) on installation of a smart meter, with switching scheduled via the ESMS or by the Supplier, depending on the functionality defined in SMETS version 2.0. No changes to the current BSC arrangements would be required in order to migrate Metering Systems on static and semi-static regimes. This would include any Metering Systems currently allocated to dynamically switched SSCs, which the Supplier and their customer are happy to move to a static or semi-static regime.

Version 2 of the SMETS (incorporating the HAN and security requirements) is due to be notified to the EU in Quarter 4 2012, with SMETS 2 compliant smart meters being manufactured from Quarter 1 2013. With the DCC expected to be in place and mass roll-out expected to begin in Quarter 3 2014, this would allow (as a working assumption) a period of 2-3 years to install smart meters for RTS customers before the end of the current RTS service in (say) 2016/17.

6.3 Phase Two – new mechanism for dynamic switching

6.3.1 New SVAA notification mechanism

In order to reflect switched load in profiling, there needs to be a mechanism for Settlement to capture switch times. Currently, switch times for meters on dynamic meters are notified to the SVAA by the ENA on a daily basis as a single file. A new mechanism will be required for Suppliers to notify the SVAA of switching times and for the SVAA to process switch times from multiple sources. This will require a BSC Modification Proposal.

This is assuming that Suppliers continue to settle dynamically switched Metering Systems under the Non Half Hourly arrangements. Trading dynamically switched Metering Systems under the Half Hourly arrangement would negate the need for such a mechanism, if applied globally.

6.3.2 Supplier-specific Standard Settlement Configurations

When a smart meter is installed, it is likely that the Metering System will need be changed to a new SSC. For static and semi-static regimes, this could be an existing or new clock-switched SSC. The DCC access control processes will not allow Suppliers to issue load control instructions to other Suppliers' smart meters, so for dynamic regimes, the likelihood is that Supplier-specific SSCs will be needed. Smart meters will allow meters to be easily re-configured on change of Supplier, making Supplier-specific SSCs a practical proposal.

We will need to consider whether Supplier, supplier agent and SMRAs need to validate Supplier/SSC combinations and how to ensure that smart meters for dynamically switched Metering Systems are always reconfigured on change of Supplier. Any changes to SMRS validation will need to be reviewed in the context of registration services moving to the DCC in 2016/17.

We will also need to consider the availability of SSC codes (given that existing teleswitch SSCs will need to be retained for at least the duration of the smart roll-out) and also the impact of the increased dimensions of the Supplier Purchase Matrices processed by the DCC. There are currently about 4,700 combinations of Supplier and teleswitched SSC, but rather than leading to a proliferation of SSCs, the introduction of Supplier-specific SSCs would be an opportunity for the rationalisation of codes.

6.3.3 Supplier-LDSO framework for dynamic switching

Currently, LDSOs have to agree SSCs installed on their networks by Suppliers so that they can associate them with the correct Common Distribution Charging Methodology (CDCM) tariff in their billing systems, and record a valid Line Loss Factor Class/Meter Timeswitch Class (MTC)/ SSC combination in Market Domain Data (MDD). This process would be further complicated by the addition of Supplier-specific SSCs. The PSRG may wish to encourage LDSOs to review whether they will have an enduring requirement (under the new switching arrangements) to agree the SSCs used on their networks.

Under the current arrangements, the Radio Teleswitch Agreement (to which Suppliers must become a party under section 28 of the Distribution Connection and Use of System Agreement (DCUSA)), sets out the responsibilities of the RTS Access Providers (i.e. the LDSOs) in providing Suppliers with access to the teleswitch infrastructure. Under any new arrangements there is likely to be a need for some form of framework agreement between Suppliers and LDSOs. This will need to protect LDSOs from any adverse impact on network loads from Supplier-specific load switching regimes or time of use tariffs. It will also need to protect Suppliers from any adverse impact that LDSO load control/load shedding may have on Suppliers' imbalance positions.

The PSRG recognises that other groups, both inside and outside the industry, such as the ENA / ERA and Sustainability First, are taking forward work to consider the potential benefits and complexities around demand-side response. Ofgem also identified that changes to regulatory and commercial arrangements may be needed to facilitate efficient allocation of demand-side response in the future, as part of their consultation on promoting smarter energy markets. In the context of this consultation we are seeking views on how respondents see the relationship between potential changes to the BSC and these other initiatives.

6.4 Phase Three – future developments

6.4.1 Time of Use Tariffs

The need to capture switch times also applies to dynamically switched registers, where there is no load switching (or rather, load is switched by the customer in response to price messages from their Supplier). If Suppliers start to introduce innovative tariffs, such as critical peak pricing, there will be a need to a) notify Settlement of the switch times and b) consider the impacts of such switching on network management.

6.4.2 LDSO load control / demand side management

Under the present RTS arrangements, Suppliers set the expectation of how a regime will work, but LDSOs can use the flexibility within the regime to manage local network constraints. We need to identify LDSOs future requirements for managing such constraints and their requirements to carry out their own load control/load shedding via the DCC. We will need to consider the impact that this may have on Supplier imbalance positions. There are clearly wider implications in terms of customers having their load managed by both Suppliers and LDSOs.

Other developments may include:

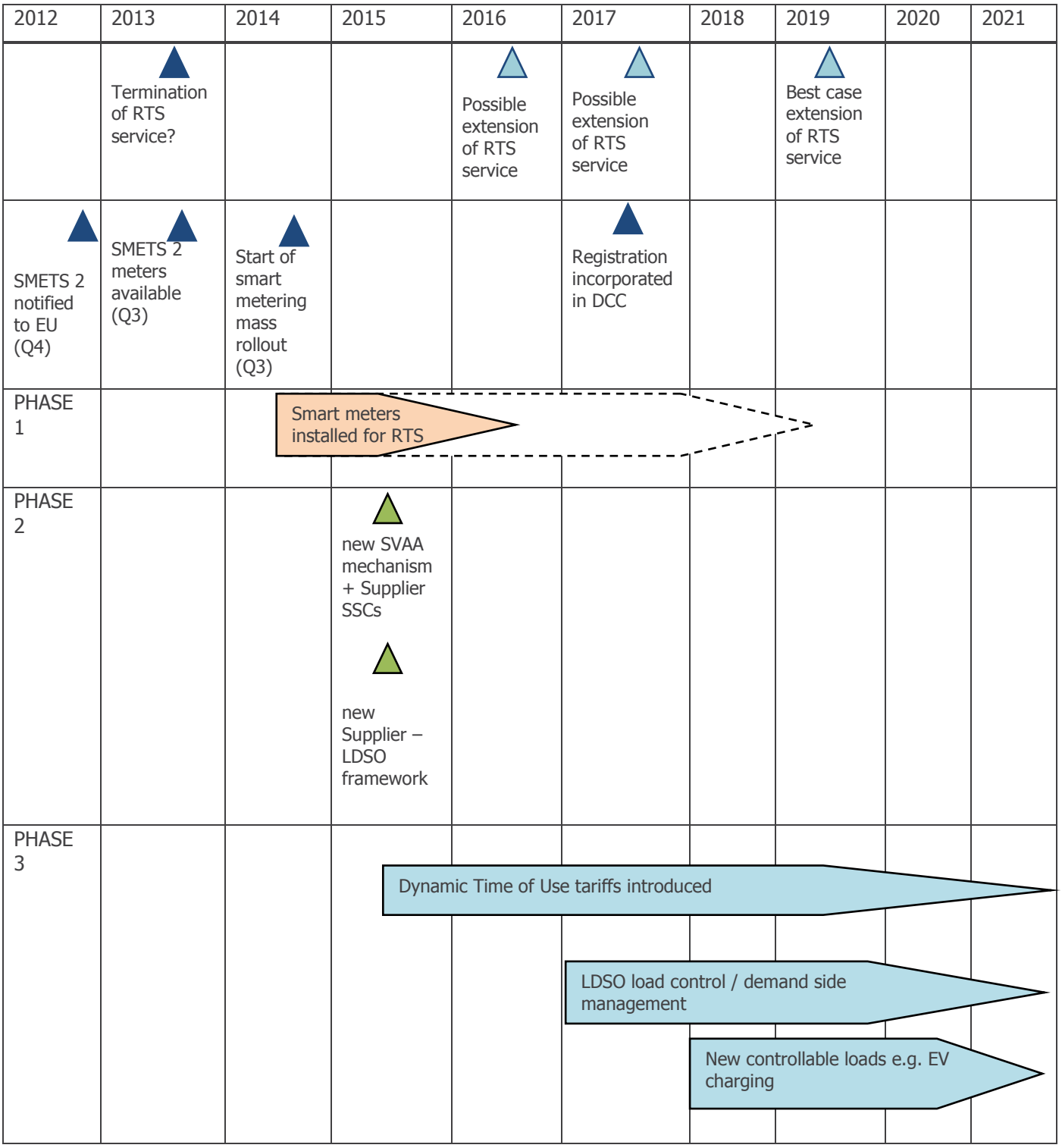
- LDSOs procuring demand side response in critical areas of their network (as an alternative to network reinforcement);
- LDSOs using their own Time of Use registers (different to Supplier tariff registers) for network charging purposes (subject to LDSO registers being agreed as part of the SMETS).

6.4.3 New Types of Controllable Load

Currently remote load management can be used to control electrical storage heating and immersion (e.g. Economy 7 and variants). In the future, remotely controlled load limiting/load shedding could be possible for other types of circuit – for example, at electric vehicle charging points. Smart appliances may also provide new possibilities for remote load management. There may be more than one type of controllable load at an individual customer's premises.

Where electric vehicle charging points are public, the charging infrastructure may be shared between Suppliers (e.g. the customer swipes an ID card at the EV charging point to allocate the power to their own Supplier), which would clearly have implications for Settlement.

6.4.4 Possible Timescales



7. RAID Log

The following Risks Assumptions Issues and Dependencies have been identified.

7.1 Risks

No.	Risk	Comments
R01	RTS equipment failure[3] prior to the transition of teleswitched customers to a new arrangement, could leave customers without heating.	
R02	Failure to extend the existing RTS contracts sufficiently will leave short timescales for migrating RTS customers to smart meters.	
R03	Delays to specification of SMETS 2 meters could result in delays in transitioning dynamically switched consumers, particularly if meter variants are required to support dynamic load control.	
R04	There is likely to be a discrepancy between the number of Metering Systems assigned to a Teleswitched SSC and the number of consumers who actually have switched load. Suppliers may not be aware that consumers no longer have electrical storage heating. This presents a risk to transition planning for Suppliers.	
R05	A majority of RTS regimes were set up before competition was introduced in the retail market in 1998. Some of the rational for these regimes has been lost over time, so there is no clear picture of what RTS is used for. This creates uncertainty about the implications for the consumer, if they were to be allocated to a static/semi-static regime in future, and also the implications on network management, were this to happen. This presents a risk to transition planning for Suppliers and LDSOs.	
R06	On installation of a smart meter, the Metering System is likely to be assigned a new SSC (because it will no longer form part of the teleswitch group). This is likely to have implications for consumers (if not completely like-for-like), which Suppliers will need to manage. It could also have implications for Suppliers in terms of demand forecasting and for LDSOs in terms of network management.	
R07	There may also be demand forecasting / network management issues as a result of smart meters	

[3] News reports suggest that specially crafted glass valves used by the Droitwich transmitter in Worcestershire are "so rare that engineers say there are fewer than 10 in the world, and the BBC has been forced to buy up the entire global supply. Each lasts anywhere between one and 10 years, and when one of the last two blows the service will go quiet". (Dan Sabbagh, guardian.co.uk, Sunday 9 October 2011)

No.	Risk	Comments
	keeping better time than the existing devices used for clock-switching.	
R08	Load shedding, remote load control by LDSOs will impact Supplier imbalance positions and may cause customer issues.	
R09	Supplier-specific load switching regimes or time of use tariffs may have an adverse effect on network management for LDSOs.	

7.2 Assumptions

No.	Assumption	Comments
A01	Under the new smart arrangements, Suppliers will communicate directly with the administrator of the switching infrastructure (i.e. the DCC), rather than with an RTS Access Provider.	
A02	Under the new DCC processes, instructions issued by Suppliers may have to relate to individual Metering Systems, rather than groups of Metering Systems (due to the requirements of the DCC service)	
A03	SMETS version 2.0 will support static/semi-static switching, and immediate switch load commands.	
A04	If any smart meters are installed during the Foundation Phase, they will be switched statically or semi-statically.	

7.3 Issues

No.	Issue	Comments
I01	The SVAA needs to be notified of dynamic switch times in order to allocate profiled energy to the correct Settlement Periods. The change from centralised switching by the ENA's agent to distributed switching by Suppliers (and potentially LDSOs), will require a change to the mechanism for notifying switch times to the SVAA (unless dynamically-switched Metering Systems are settled Half Hourly).	
I02	Having a "sponsoring Supplier" in the form of an RTS Access Provider will not work under the new DCC arrangements. Suppliers will only be able to issue requests in respect of their own registered Metering Systems. This is likely to lead to Supplier-specific SSCs.	

No.	Issue	Comments
I03	Consideration will need to be given to the validation of Supplier-specific SSCs in SMRS and Supplier agent systems and how to ensure that a need SSC is allocated when a dynamically switched consumer changes Supplier.	
I04	The need to maintain existing SSCs for legacy RTS Metering Systems in parallel with new Supplier-specific SSCs could result in a (short-term) proliferation of codes with MDD implications and impacts on the dimensions of Supplier Purchase Matrix (D0041) flows.	
I05	In order to protect Suppliers from adverse impacts of load control and load shedding by LDSOs and to protect LDSOs from adverse effects on their networks resulting from Supplier driven load control and Time of Use, there is likely to be a need for a common framework within which load control can be operated.	
I06	Currently LDSOs have to agree the SSCs installed on their networks by Suppliers (in order that they can associate them with the correct Common Distribution Charging Methodology (CDCM) tariff in their billing systems, and record a valid LLFC/SSC/MTC combination in MDD). These requirements need to be reviewed in the light of smart metering and smart grids. Is there an enduring requirement for LDSOs to agree the SSCs used on their networks and how will this be reconciled with Supplier-specific SSCs, which Suppliers will presumably wish to use on a national basis?	

7.4 Dependencies

No.	Dependency	Comments
D01	Migration of RTS customers to the new smart arrangements will depend on the availability of sufficient smart meters with switching capability and interoperable auxiliary load control devices.	

8. Consultation Questions

Please identify in your responses any information that you wish to be kept confidential. The questions are listed below for your information but are contained within a separate Word document for you to complete.

Ofgem, DECC, Consumer Focus, other code administrators and any other interested parties are welcome to respond to this consultation.

8.1 Questions on the Draft Roadmap

No.	Question	Response
1	Have we identified all key milestones in the draft roadmap? If not, please identify any missing milestones and supporting rationale.	
2	When do you think a new mechanism for Suppliers to notify switching times to the SVAA would need to be implemented? *(Please provide responses on the need for such a mechanism in your comments on the RAID Log).*	
3	Please provide a view on the lead times required to develop such a mechanism.	
4	When do think a new framework for agreeing switching regimes between Suppliers and LDSOs would need to be implemented? *(Please provide responses on the need for such a framework in your comments on the RAID Log).*	
5	Please provide a view on the lead times required to develop such a framework?	
6	Please provide a view on the timescales for the developments described in Phase 3 (i.e. Time of Use Tariffs, LDSO load control / demand side management and new controllable loads e.g. electric vehicle charging). *(Given commercial sensitivities, reporting of your responses will be generalised and not attributed to individual respondents).*	
7	Given the volumetrics provided in this consultation, do you think it is feasible to adopt a phased approach, where smart meters are installed for consumers on static/semi-static regimes (or who could be put on a static/semi-static regime going forward) ahead of those on dynamic regimes (i.e. do you think that there is a viable distinction between Phases One and Two)?	
8	Do you have any other observations on the draft roadmap?	

8.2 Questions on the RAID Log

No.	*Question*	*Response*
9	Please comment on the Risks, Assumptions, Issues and Dependencies set out in the RAID log. (*A Word version of the RAID log has been provided for this purpose*).	
10	For each Risk and Issue, please identify the market roles which you think are impacted.	
11	For each Risk and Issue, please identify where you think responsibility for mitigation/solutions rests (e.g. BSC, Suppliers, LDSOs, DCUSA/ENA, other).	
12	Are there any other Risks, Assumptions, Issues and Dependencies which you think should be included in the RAID log?	

8.3 Questions on the List of Dynamic Regimes (Appendices D and E)

No.	Question	Response
13	Using your knowledge as Supplier, RTS Access Provider or LDSO, please can you identify any of the regimes listed as dynamic in Appendix D, which are no longer subject to dynamic switching. (*A Word version of Appendix D has been provided for this purpose*).	
14	Please identify any dynamic switching regimes which must be carried forward into the new arrangements and the reason (e.g. to preserve a consumer tariff, to manage network constraints).	
15	Please identify any dynamic switching regimes which could be discontinued in future, if consumers were offered an equivalent tariff using a static or semi-static switching regime.	
16	Are there any other observations you wish to make in relation to the list of dynamic and part-dynamic regimes?	
17	Appendix E lists Teleswitch Users/Groups which are included in the Teleswitch Contact Intervals Data File sent to the SVAA, but which have no associated Standard Settlement Configurations. Please provide information about what loads these are controlling and whether a replacement will be needed. (*A Word version of Appendix E has been provided for this purpose).*	

8.4 Other

No.	Question	Response
18	Do you have any other comments you wish to make?	

9. Next Steps

Responses to the questions above are requested by 11 May 2012.

ELEXON will collate these responses and complete its own analysis. ELEXON will present the findings of the Consultation to the PSRG for consideration and then a final report will be published.

Appendix A: Radio Teleswitch Service

Switching Instructions

The Radio Teleswitch Service (RTS) is co-ordinated by the Energy Network Association (ENA).

Suppliers and LDSOs liaise to create new switching regimes. These are approved under the BSC and recorded in Market Domain Data (MDD) as Standard Settlement Configurations (SSC), Teleswitch Time Pattern Regimes and Teleswitch Register Rules. Meter Operators then configure meters according to these pre-defined rules.

Switching Instructions

The radio teleswitches installed at consumer premises each respond to a pre-set Block Application Code (BAC), User ID (LDSO-specific) and Group Code. Radio teleswitches with the same BAC, User ID and Group Code respond simultaneously to a command (apart from a random offset to prevent demand spikes). The load is therefore aggregated. For example, a command to Group Code XX might switch 100MW. This aggregated load can be geographically dispersed. Charge to a storage heater can be a single block (e.g. 7 hours) or split into small blocks (down to a resolution of 7.5 minutes).

Under the Radio Teleswitch Service Agreement, each Teleswitch Group has a sponsoring Supplier, who determines the switching times. The LDSOs act as providers of access to the teleswitch infrastructure. Switching instructions are notified to the Central Teleswitch Control Unit (CTCU), where switching instructions are validated and queued for transmission.

LDSOs can also issue immediate messages (used to shed or boost load) in addition to programmed messages, within pre-determined operating windows.

The CTCU is owned by the Energy Network Association (ENA) who co-ordinate the RTS service on behalf of LDSOs. The CTCU is operated and maintained by Cygnet Solutions under a contract with the ENA. The BBC then encodes switching instructions on its 198 kHz signal and these are transmitted simultaneously via three radio transmitters at Droitwich, Westerglen and Burghead (operated by Arqiva). This process is illustrated in Figure 1.

Teleswitch Monitoring

Teleswitch Monitoring is defined as a BSC service in Section E of the Code. The role of Teleswitch Agent is fulfilled by the ENA. The primary functions of the Teleswitch Agent, as defined in Section S 4.3 of the BSC, include monitoring and logging switching time messages and sending details to the SVAA. The ENA uses a network of monitors, provide by Cable and Wireless, to log the messages broadcast by the three radio transmitters. Translation of the data log into files for notification to the SVAA is then performed by PowerDev on behalf of the ENA. The data is sent to the SVAA daily on a Teleswitch Data Interface File (D0277). This process is illustrated in Figure 2.

Figure 1 **RTS Transmission**

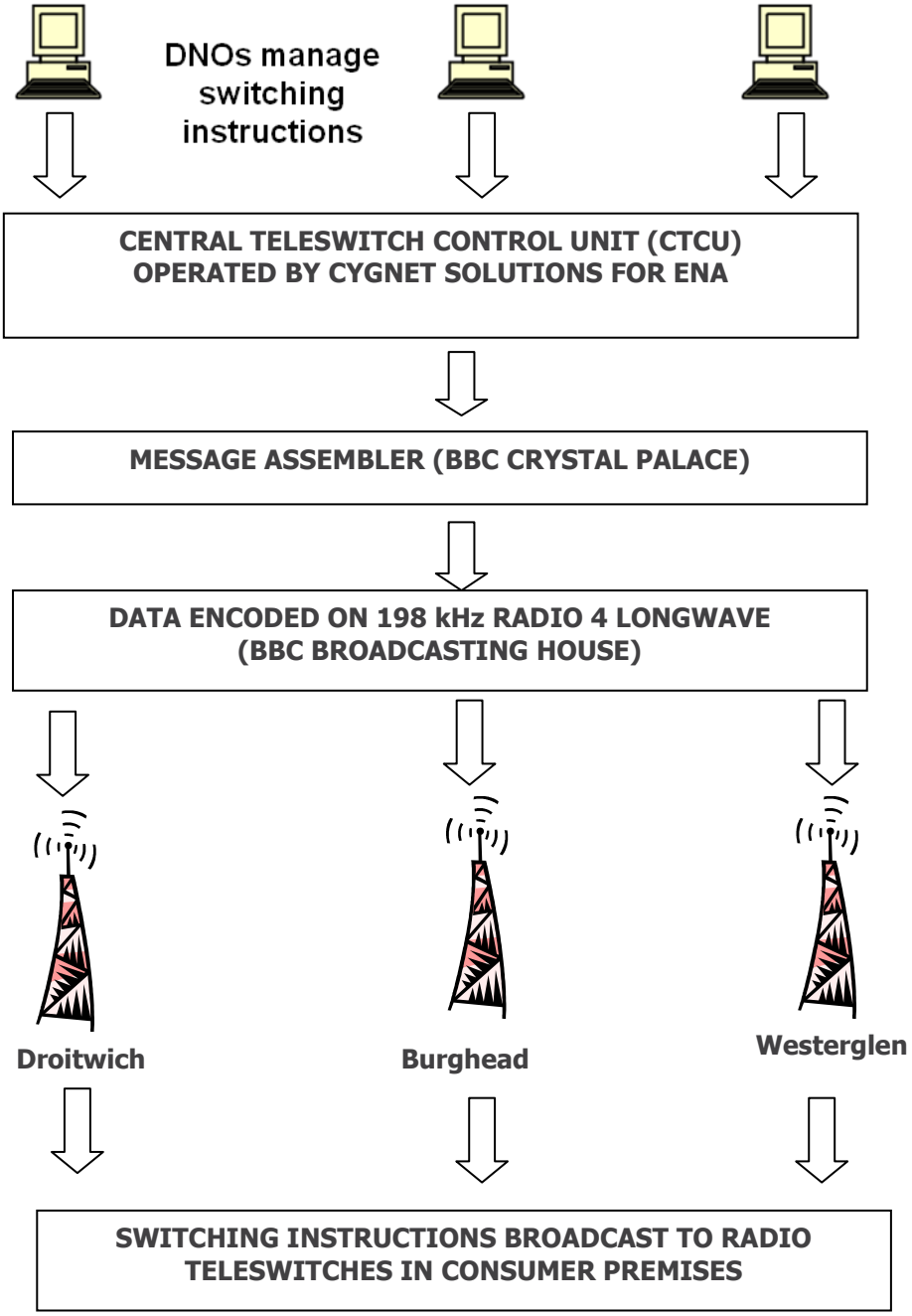
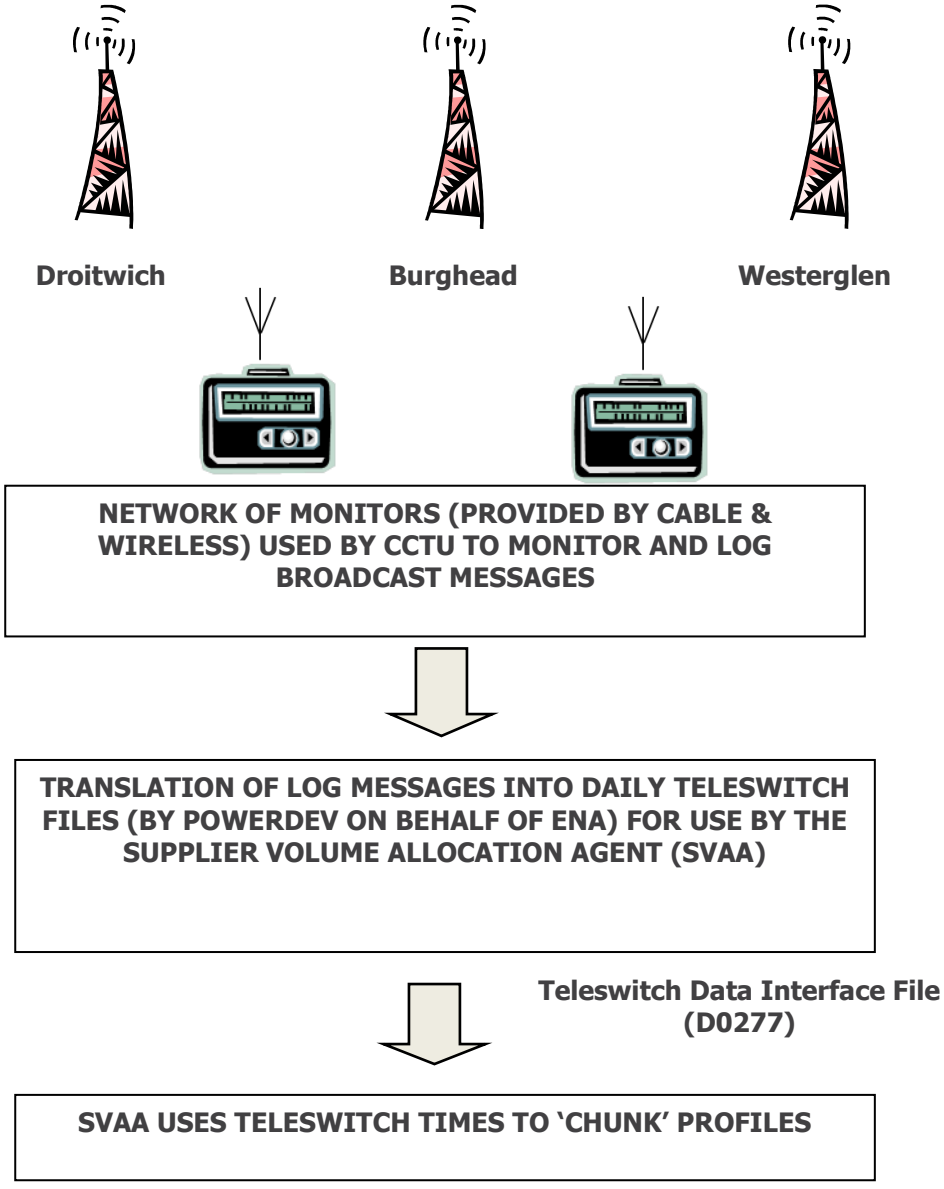


Figure 2 **RTS Monitoring**



Appendix B Teleswitch Glossary

The table below explains the roles and technical terms referred to in this consultation.

Term	Explanation
Administrator of switching infrastructure	This role is responsible for the IT systems and communications infrastructure needed to transmit signals to meters. It is currently performed by the Energy Network Association (ENA) and its contracted agents (including the BBC). The smart metering equivalent will be the DCC and DCC Service Providers.
Broadcast	Transmit the same data to all possible destinations (see also Multicast and Unicast).
Central Teleswitch Control Unit (CTCU)	The system used to collate and direct switching times to the British Broadcasting Corporation (BBC).
Data and Communications Company (DCC)	The new entity that will be created and licensed to deliver central data and communications activities for smart metering.
Dynamic Switching	Teleswitching that can vary by both time and duration on a daily basis.
Foundation Phase	The period between publication of the Government's Response to the Smart Metering Prospectus consultation (March 2011) and the beginning of the mass roll-out of smart meters (assumed to be start of Quarter 4 2014). In particular, the period following the finalisation of the Smart Metering Equipment Technical Specification (during 2012) and the mass roll-out, when parties responsible for delivering smart meters test the end-to-end system and its individual elements.
Group Code ID	An identifier used to define groups of teleswitch metering systems that will be switched simultaneously defined in MDD as the Teleswitch Group ID.
Message Assembler (BBC Crystal Palace)	The device that encodes the teleswitch instructions for broadcast on 198 kHz RADIO 4 Longwave.
Multicast	Transmit messages to a specified group of destination addresses (see also Broadcast and Unicast).
Profile Class 2 (Domestic Economy 7 Customers)	Customers at a domestic premises, as defined in the terms of the Supply licence, that are on a Domestic Economy 7 or similar tariff that have a metering system that is capable of switching load, e.g. Storage and Immersion Heating.
Profile Class 4 (Non-Domestic Economy 7 Customers)	Customers at a non-domestic premises, as defined in the terms of the Supply licence, that are on a Non-Domestic Economy 7 or similar tariff that have a metering system that is capable of switching load, e.g. Storage and Immersion Heating.
RTS Access Provider	The design of the RTS infrastructure limits the number of 'users' to 16, making it impossible for individual Suppliers to communicate directly with the administrator of the switching infrastructure. To overcome this, the Radio Teleswitch Agreement assigns to LDSOs the role of RTS Access Provider, acting as 'middle man' between Suppliers and the administrator of the switching infrastructure.
Radio Teleswitch Agreement (RTA)	The commercial framework that allows Suppliers access to the teleswitching infrastructure.

Term	Explanation
Radio Teleswitch Service (RTS)	The Service co-ordinated by the Energy Networks Association (ENA) on behalf of Market Participants.
Semi-Static	Teleswitching that varies occasionally e.g. at weekend or by GMT/BST.
Static Switching	Teleswitching that is the same every day.
Teleswitch Agent	The BSC Agent (currently the ENA) responsible for monitoring and logging switching time messages and sending details to the SVAA.
Teleswitch Data Interface File (D0277)	The data file sent to the Supplier Volume Allocation Agent detailing the Switching times for each Teleswitch Group.
Teleswitch Monitors	The devices that record the broadcast teleswitch signals and log them on the CTCU.
Teleswitch Register Rules	The rules that define which Teleswitch Registers are operational when the teleswitched meters implement switching instructions.
Teleswitch Time Pattern Regimes	The mapping of Teleswitched Registers to the Teleswitch Users Ids and Teleswitch Group Ids in MDD.
Teleswitched meters	Meters that are connected to a Teleswitch.
Unicast	Transmit messages to a single destination identified by a unique address (see also Broadcast and Multicast).
User ID (LDSO-specific)	The ID of the LDSO acting as the RTS access provider defined in Market Domain Data (MDD) as the Teleswitch User ID.

Appendix C: RTS Volumetrics

	PC 2 count	PC 4 count	Total	PC4 annual MWh	PC4 annual MWh	Total
East Midlands	**421,833**	**16,694**	**438,527**	**725,389**	**81,204**	**806,592**
Dynamic	421,318	13,783	435,101	722,095	61,846	783,941
Semi-Static	1	2,911	2,912	4	19,357	19,362
Static	514	-	514	3,289	-	3,289
Eastern	**249,130**	**14,618**	**263,748**	**612,605**	**91,337**	**703,942**
Dynamic	187,316	13,743	201,059	459,030	84,946	543,976
Part-Dynamic	53,822	-	53,822	130,684	-	130,684
Static	7,992	875	8,867	22,891	6,391	29,282
London	**94,558**	**5,858**	**100,416**	**278,502**	**47,369**	**325,871**
Dynamic	94,555	5,858	100,413	278,498	47,369	325,867
Static	3	-	3	4	-	4
Manweb	**11,675**	**-**	**11,675**	**55,422**	**-**	**55,422**
Semi-Static	2,607	-	2,607	15,773	-	15,773
Static	9,068	-	9,068	39,649	-	39,649
Midlands	**58,850**	**395**	**59,245**	**146,210**	**1,782**	**147,992**
Static	58,850	395	59,245	146,210	1,782	147,992
North Western	**66,104**	**4,152**	**70,256**	**229,213**	**28,920**	**258,132**
Semi-Static	152	1	153	549	1	551
Static	65,952	4,151	70,103	228,663	28,918	257,581
Northern	**60,729**	**3,397**	**64,126**	**183,341**	**24,202**	**207,543**
Semi-Static	20,473	749	21,222	99,702	7,849	107,551
Static	40,256	2,648	42,904	83,640	16,353	99,992
Scottish Hydro	**107,591**	**6,733**	**114,324**	**738,640**	**80,105**	**818,745**
Dynamic	5,759	-	5,759	27,228	-	27,228
Part-Dynamic	92,463	1,385	93,848	660,336	18,537	678,872
Semi-Static	1,217	163	1,380	9,566	2,223	11,788
Static	8,152	5,185	13,337	41,511	59,345	100,856
Scottish Power	**249,374**	**10,875**	**260,249**	**838,612**	**89,928**	**928,540**
Part-Dynamic	192,333	6,214	198,547	607,226	43,192	650,418

	PC 2 count	PC 4 count	Total	PC4 annual MWh	PC4 annual MWh	Total
Semi-Static	52,405	3,414	55,819	213,215	35,903	249,118
Static	4,636	1,247	5,883	18,171	10,833	29,004
South Eastern	**266,301**	**24,539**	**290,840**	**618,750**	**167,641**	**786,391**
Dynamic	240,420	20,299	260,719	554,284	128,614	682,898
Part-Dynamic	23,816	-	23,816	58,999	-	58,999
Semi-Static	-	3,899	3,899	-	37,057	37,057
Static	2,065	341	2,406	5,467	1,970	7,437
South Wales	**32,651**	**6,288**	**38,939**	**118,445**	**48,233**	**166,677**
Static	32,651	6,288	38,939	118,445	48,233	166,677
South Western	**85,135**	**9,199**	**94,334**	**347,348**	**58,421**	**405,768**
Semi-Static	65,250	7,523	72,773	265,963	45,735	311,697
Static	19,885	1,676	21,561	81,385	12,686	94,071
Southern	**197,426**	**16,299**	**213,725**	**807,198**	**127,403**	**934,601**
Dynamic	184,087	14,420	198,507	741,407	112,615	854,022
Part-Dynamic	2,915	-	2,915	16,308	-	16,308
Static	10,424	1,879	12,303	49,482	14,788	64,271
Yorkshire	**57,964**	**5,294**	**63,258**	**194,008**	**31,537**	**225,545**
Semi-Static	312	90	402	1,346	633	1,979
Static	57,652	5,204	62,856	192,662	30,904	223,566
Grand Total	**1,959,321**	**124,341**	**2,083,662**	**5,893,682**	**878,079**	**6,771,761**

Appendix D: List of Dynamic Regimes

TS User	TS User Id	TS User Group	SSC	SSC Description	Comment
London	1	1	156	7-hour E7	
London	1	2	157	7-hour E7	
London	1	6	313	Domestic E9 A	
London	1	6	324	Domestic E9 B	
London	1	7	158	7-hour E7	
London	1	9	245	7-hour night	
South Eastern	2	7	160	7-hour E7	
South Eastern	2	17	161	7-hour E7	
South Eastern	2	27	162	7-hour E7	
South Eastern	2	32	339	Local Authority Heating	
South Eastern	2	34	340	Local Authority Heating	
South Eastern	2	36	341	Local Authority Heating	
South Eastern	2	37	163	7-hour E7	
South Eastern	2	40	288	Budget Warmth	
South Eastern	2	47	164	7-hour E7	
South Eastern	2	48	165	7-hour E7	
South Eastern	2	52	289	Budget Warmth	
South Eastern	2	57	241	7-hour E7 (differential switching)	
South Eastern	2	60	350	Warmwise heating	
South Eastern	2	60	395	Warmwise Day/Night	
South Eastern	2	67	166	7-hour E7	
South Eastern	2	70	290	Budget Warmth	
South Eastern	2	100	291	Budget Warmth	
South Eastern	2	120	292	Budget Warmth	
Southern	3	1	299	Budget Warmth	
Southern	3	2	303	Budget Warmth	
Southern	3	6	167	7-hour E7	
Southern	3	7	168	7-hour E7	
Southern	3	8	169	7-hour E7	
Southern	3	9	170	7-hour E7	
Southern	3	10	171	7-hour E7	
Southern	3	11	172	7-hour E7	
Southern	3	12	173	7-hour E7	
Southern	3	17	174	7-hour E7	
Southern	3	20	175	7-hour E7	
Southern	3	29	300	Flexiheat Day/Evening/Weekend	
Southern	3	29	351	Flexiheat heating	
Southern	3	30	304	Budget Warmth	

TS User	TS User Id	TS User Group	SSC	SSC Description	Comment
Southern	3	31	305	Domestic heating tariff	
Southern	3	32	306	Domestic heating tariff	
Southern	3	37	271	8-hour OP	
Southern	3	38	272	8-hour OP	
Southern	3	39	273	8-hour OP	
Southern	3	40	307	Domestic heating tariff	
Southern	3	41	308	Domestic heating tariff	
Southern	3	50	301	Flexiheat (weather) Day/Evening/Weekend	
Southern	3	50	352	Flexiheat (weather) heating	
Southern	3	51	309	Superdeal (weather) Day/Night	
Southern	3	51	425	Superdeal (weather) heating	
Southern	3	52	302	Superdeal Day/Night	
Southern	3	52	353	Superdeal heating	
Southern	3	70	10	10.5-hour OP	
Southern	3	90	274	8-hour OP	
Eastern	5	10	310	E10 type 1 (general purpose)	
Eastern	5	10	401	E10 type 1(heating circuit)	
Eastern	5	64	381	split 7-hour E7	
Eastern	5	66	382	split 7-hour E7	
Eastern	5	88	248	7-hour E7	
Eastern	5	95	384	7-hour E7	
Eastern	5	97	426	7-hour E7	
Eastern	5	98	188	7-hour E7	
Eastern	5	99	126	7-hour E7	
East Midlands	6	40	358	split 10-hour Heatwise	
East Midlands	6	41	359	split 10-hour Heatwise	
East Midlands	6	42	360	split 10-hour Heatwise	
East Midlands	6	43	361	split 10-hour Heatwise	
East Midlands	6	44	362	split 10-hour Heatwise	
East Midlands	6	45	363	split 10-hour Heatwise	
East Midlands	6	46	364	split 10-hour Heatwise	
East Midlands	6	47	365	split 10-hour Heatwise	
East Midlands	6	48	366	split 10-hour Heatwise	
East Midlands	6	49	367	split 10-hour Heatwise	
East Midlands	6	50	368	split 10-hour Heatwise	
East Midlands	6	51	369	split 10-hour Heatwise	
East Midlands	6	52	370	split 10-hour Heatwise	
East Midlands	6	53	371	split 10-hour Heatwise	

TS User	TS User Id	TS User Group	SSC	SSC Description	Comment
East Midlands	6	70	189	7-hour E7	
East Midlands	6	85	191	7-hour E7	
East Midlands	6	86	192	7-hour E7	
East Midlands	6	87	193	7-hour E7	
East Midlands	6	88	194	7-hour E7	
East Midlands	6	89	195	7-hour E7	
East Midlands	6	90	196	7-hour E7	
East Midlands	6	91	197	7-hour E7	
East Midlands	6	92	198	7-hour E7	
East Midlands	6	93	199	7-hour E7	
East Midlands	6	101	385	split 7-hour E7	
East Midlands	6	106	388	split 7-hour E7	
Scottish Power	13	20	770	18-hour dynamic	
Scottish Power	13	30	787	E7 accompanying Birmingham Weathercall	
Scottish Power	13	30	788	Birmingham Weathercall	
Scottish Power	13	31	789	E7 accompanying Manchester Weathercall	
Scottish Power	13	31	790	Manchester Weathercall	
Scottish Power	13	32	791	E7 accompanying Anglesey Weathercall	
Scottish Power	13	32	792	Anglesey Weathercall	
Scottish Power	13	33			
Scottish Power	13	34			
Scottish Power	13	97	764	8.5 hour WM	
Scottish Power	13	97	765	Weathercall heating	
Scottish Power	13	98	766	8.5 hour WM	
Scottish Power	13	98	767	Weathercall heating	
Scottish Power	13	99	768	8.5 hour WM	
Scottish Power	13	99	769	Weathercall heating	
Scottish Power	13	100	752	8.5 hour WM	
Scottish Power	13	100	753	Weathercall heating	
Scottish Power	13	101	754	8.5 hour WM	
Scottish Power	13	101	755	Weathercall heating	
Scottish Power	13	102	756	8.5 hour WM	
Scottish Power	13	102	757	Weathercall heating	
Scottish Power	13	103	758	8.5 hour WM	
Scottish Power	13	103	759	Weathercall heating	
Scottish Power	13	104	760	8.5 hour WM	
Scottish Power	13	104	761	Weathercall heating	

TS User	TS User Id	TS User Group	SSC	SSC Description	Comment
Scottish Power	13	105	762	8.5 hour WM	
Scottish Power	13	105	763	Weathercall heating	
Scottish Power	13	109	793	8.5 hour WM	
Scottish Power	13	109	794	8.5 hour WM Heating	
Scottish Power	13	111	727	8.5 hour WM	
Scottish Power	13	111	728	8.5 hour WM Heating	
Scottish Power	13	112	729	8.5 hour WM	
Scottish Power	13	112	730	8.5 hour WM Heating	
Scottish Power	13	113	731	8.5 hour WM	
Scottish Power	13	113	732	8.5 hour WM Heating	
Scottish Power	13	114	733	8.5 hour WM	
Scottish Power	13	114	734	8.5 hour WM Heating	
Scottish Power	13	115	735	8.5 hour WM	
Scottish Power	13	115	736	8.5 hour WM Heating	
Scottish Power	13	116	737	8.5 hour WM	
Scottish Power	13	116	738	8.5 hour WM Heating	
Scottish Power	13	117	739	8.5 hour WM	
Scottish Power	13	117	740	8.5 hour WM Heating	
Scottish Power	13	118	741	8.5 hour WM	
Scottish Power	13	118	742	8.5 hour WM Heating	
Scottish Power	13	119	743	8.5 hour WM	
Scottish Power	13	119	744	8.5 hour WM Heating	
Scottish Power	13	120	745	8.5 hour WM	
Scottish Power	13	120	746	8.5 hour WM Heating	
Scottish Power	13	122	748	8.5 hour WM	
Scottish Power	13	122	749	8.5 hour WM Heating	
Scottish Hydro	14	15	802	Two rate with 8 hours night	
Scottish Hydro	14	15	803	Dynamic	
Scottish Hydro	14	16	804	Two rate with 8 hours night	
Scottish Hydro	14	16	805	Dynamic	
Scottish Hydro	14	17	806	Two rate with 8 hours night	
Scottish Hydro	14	17	807	Dynamic	
Scottish Hydro	14	18	850	Dynamic	
Scottish Hydro	14	25	808	Two rate with 8 hours night	
Scottish Hydro	14	25	809	Dynamic	
Scottish Hydro	14	26	810	Two rate with 8 hours night	
Scottish Hydro	14	26	811	Dynamic	
Scottish Hydro	14	27	812	Two rate with 8 hours night	
Scottish Hydro	14	27	813	Dynamic	

TS User	TS User Id	TS User Group	SSC	SSC Description	Comment
Scottish Hydro	14	28	933	Two rate with 8 hours night	
Scottish Hydro	14	28	934	Dynamic	
Scottish Hydro	14	32	890	Dynamic	
Scottish Hydro	14	35	814	Two rate with 8 hours night	
Scottish Hydro	14	35	815	Dynamic	
Scottish Hydro	14	36	816	Two rate with 8 hours night	
Scottish Hydro	14	36	817	Dynamic	
Scottish Hydro	14	37	818	Two rate with 8 hours night	
Scottish Hydro	14	37	819	Dynamic	
Scottish Hydro	14	38	851	Dynamic	
Scottish Hydro	14	45	820	Two rate with 8 hours night	
Scottish Hydro	14	45	821	Dynamic	
Scottish Hydro	14	46	822	Two rate with 8 hours night	
Scottish Hydro	14	46	823	Dynamic	
Scottish Hydro	14	47	824	Two rate with 8 hours night	
Scottish Hydro	14	47	825	Dynamic	
Scottish Hydro	14	63	865	Two rate with 8 hours night	
Scottish Hydro	14	63	866	Dynamic	
Scottish Hydro	14	64	867	Two rate with 8 hours night	
Scottish Hydro	14	64	868	Dynamic	
Scottish Hydro	14	65	869	Two rate with 8 hours night	
Scottish Hydro	14	65	870	Dynamic	
Scottish Hydro	14	66	871	Two rate with 8 hours night	
Scottish Hydro	14	66	872	Dynamic	
Scottish Hydro	14	67	826	Two rate with 8 hours night	
Scottish Hydro	14	67	827	Dynamic	
Scottish Hydro	14	68	828	Two rate with 8 hours night	
Scottish Hydro	14	68	829	Dynamic	
Scottish Hydro	14	69	830	Two rate with 8 hours night	
Scottish Hydro	14	69	831	Dynamic	
Scottish Hydro	14	71	873	Two rate with 8 hours night	
Scottish Hydro	14	71	874	Dynamic	
Scottish Hydro	14	75	834	Two rate with 8 hours night	
Scottish Hydro	14	75	835	Dynamic	
Scottish Hydro	14	76	836	Two rate with 8 hours night	
Scottish Hydro	14	76	837	Dynamic	
Scottish Hydro	14	77	838	Two rate with 8 hours night	
Scottish Hydro	14	77	839	Dynamic	
Scottish Hydro	14	78	897	Dynamic	

TS User	TS User Id	TS User Group	SSC	SSC Description	Comment
Scottish Hydro	14	79	898	Dynamic	
Scottish Hydro	14	80	891	Dynamic	
Scottish Hydro	14	81	875	Two rate with 8 hours night	
Scottish Hydro	14	81	876	Dynamic	
Scottish Hydro	14	94	840	Two rate with 8 hours night	
Scottish Hydro	14	94	841	Dynamic	
Scottish Hydro	14	95	842	Two rate with 8 hours night	
Scottish Hydro	14	95	843	Dynamic	
Scottish Hydro	14	96	844	Two rate with 8 hours night	
Scottish Hydro	14	96	845	Dynamic	
Scottish Hydro	14	97	892	Dynamic	
Scottish Hydro	14	98	893	Dynamic	
Scottish Hydro	14	110	877	Two rate with 8 hours night	
Scottish Hydro	14	110	878	Dynamic	
Scottish Hydro	14	111	879	Two rate with 8 hours night	
Scottish Hydro	14	111	880	Dynamic	
Scottish Hydro	14	120	881	Two rate with 8 hours night	
Scottish Hydro	14	120	882	Dynamic	
Scottish Hydro	14	121	883	Two rate with 8 hours night	
Scottish Hydro	14	121	884	Dynamic	
Scottish Hydro	14	122	885	Two rate with 8 hours night	
Scottish Hydro	14	122	886	Dynamic	
Scottish Hydro	14	123	846	Two rate with 8 hours night	
Scottish Hydro	14	123	847	Dynamic	
Scottish Hydro	14	124	848	Two rate with 8 hours night	
Scottish Hydro	14	124	849	Dynamic	
Scottish Hydro	14	125	887	Two rate with 8 hours night	
Scottish Hydro	14	125	888	Dynamic	

Appendix E: Dynamic Regimes with no corresponding Standard Settlement Configuration

Teleswitch User	Teleswitch User Id	Teleswitch User Group	What is this used for? Is it needed on an enduring basis?
London	1	65	
London	1	66	
London	1	100	
South Eastern	2	1	
South Eastern	2	110	
Southern	3	92	
Southern	3	93	
Southern	3	100	
Southern	3	127	
South Western	4	0	
South Western	4	24	
Eastern	5	1	
Eastern	5	2	
Eastern	5	3	
Eastern	5	4	
Eastern	5	11	
Eastern	5	96	
Eastern	5	123	
East Midlands	6	2	
East Midlands	6	4	
East Midlands	6	30	
East Midlands	6	37	
East Midlands	6	38	
East Midlands	6	60	
East Midlands	6	61	
East Midlands	6	62	
Midlands	7	93	
Midlands	7	94	

South Wales	8	7	
South Wales	8	15	
South Wales	8	100	
South Wales	8	126	
Manweb	9	2	
Manweb	9	102	
Yorkshire	10	40	
Northern	11	0	
Northern	11	39	
North Western	12	12	
North Western	12	14	
North Western	12	15	
North Western	12	21	
North Western	12	71	
Scottish Power	13	4	
Scottish Power	13	5	
Scottish Power	13	33	
Scottish Power	13	34	
Scottish Power	13	110	