



## **URS - Estimation of Annual Consumption (EAC/AA) System**

**Abstract** This document defines the requirements for a system to calculate Estimated Annual Consumptions (EACs) and Annualised Advances (AAs) for individual settlement registers of metering systems.

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**0 DOCUMENT CONTROL**

**i Authorities**

This section is not consistent with the Release 2 Project Plan (reference 13). This is because the Release 2 Project Plan was written before the Trading Stage 2 structure was confirmed. Variances with the Release 2 Project Plan have been agreed with the Release 2 TAC.

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**iv Change History**

- Issue 1.0 For inspection by nominated Expert Group Members.
- Issue 1.1 First authorised issue. Approved by SDG.
- Issue 1.2 Incorporates Change Requests 007 and 017. The list of reviewers has been substantially reduced accordingly. Issued for Information Only.
- Issue 1.3 incorporates Change Requests 044, 047 and 075. Not issued.
- Issue 1.4 incorporates Change Requests 235 and 316. Issued for Programme Review.
- Issue 1.5 incorporates Programme Review comments on Issue 1.4. Issued for Programme User Group review.
- Issue 2.0 is unchanged from Issue 1.5. It has been approved by the SDG and authorised for use. Issued with Copyright notice added as per Change Request 356.
- Issue 2.1 incorporates Baseline 3.0 changes consisting of Change Requests 156, 392, 407. Issued for Programme review and Programme User Group review.
- Issue 2.2 incorporates review comments. Issued for SDG approval.
- Issue 3.0 is unchanged from Issue 2.2. It has been approved by the SDG and authorised for use.
- Issue 3.1 incorporates Release 2 change requests: CR171 and CR508 (Pool SIRs: R664 and R653 respectively). Issued for peer review.
- Issue 3.1 had no peer review comments and so was also issued for formal review.
- Issue 4.0 incorporates review comments. Issued for Trading Stage 2 Group approval.
- Issue 4.1 is amended to clarify that the Smoothing Parameter is received from the MDD Agent rather than the ISR Agent.
- Issue 5.0 Authorised for use by S2F 19<sup>th</sup> May 1999.
- Issue 5.1 For project review. Includes changes associated with the TA2000 Project SIR R0295 (Change Request R1178).

Note that the following SIRs (and associated change requests) were raised against this product but no change was found to be necessary: SIR R0200 (CR R1157) and SIR R0391 (CR R1188).

- Issue 5.2 Contains review comments. Issued for formal review.
- Issue 6.0 as issue 5.3. Issued for TS2 approval. Authorised for use.
- Issue 6.1 Incorporates changes for SIR R1610 (CR R1986).
- Issue 7.0 No changes were required by Peer review of Version 6.1. Issued for Use.
- Issue 7.1 Incorporates changes for SIR R2296 (CR R2796). Distributed for combined Peer Group and Formal Review.
- Issue 8.0 Application of Peer Group and Formal Review Comments. Final version authorised for use.
- Issue 8.1 Application of late review comments. Authorised for Use.
- Issue 8.2 include draft changes for BETTA and is for combined peer and formal review.
- Issue 8.3 incorporates peer & formal review comments and is for second formal review,
- Issue 8.4 incorporates all comments and is for SVA Developer review.
- Issue 8.5 Incorporated all comments and is for SVG review and Authorisation.
- Issue 9.0 is Authorised for Use.
- Issue 9.1 incorporates changes for Nov 05 Release (CP933 and CP1081) for peer and formal review
- Issue 9.2 incorporates peer and formal review comments and is for second peer and formal review
- Issue 9.3 incorporates peer and formal review comments and is for formal review
- Issue 9.4 incorporates minor amendments to front page and is for external formal review
- Issue 9.5 incorporates comments from external formal review
- Issue 10.0 is Authorised for Use
- Issue 10.1 incorporate changes for Feb 10 Release (CP1311) for peer and formal review
- Issue 10.2 incorporate changes for Feb 10 Release (CP1311) from formal review and is for external formal review.
- Issue 10.3 Issued for external review
- Issue 10.4 Incorporates changes for Feb 10 Release (CP1311) from external review and design workshop.
- Issue 10.5 incorporates changes for Feb 10 Release (CP1311) from peer review and is for formal review.
- Issue 10.6 incorporate changes for Feb 10 Release (CP1311) from formal review.
- Issue 11.0 is Authorised for Use

## **v Changes Forecast**

None.

## **vi Related Documents**

- Reference 1 1998 Operational Framework - Business Requirements - Release 4.2  
26 March 1996
- Reference 5 1998 Programme User Requirements Specification Standard,  
Programme Reference 001PQS
- Reference 6 SSADM Manuals ISBN 1-85554-004-5

Reference 7	URS - Initial Settlement & Reconciliation Agency, Programme Reference 001IBR
Reference 8	URS - Non Half Hourly Data Collection, Programme Reference 002DBR
Reference 9	URS - Non Half Hourly Data Aggregation, Programme Reference 003IBR
Reference 10	Security and Control Framework, Programme Reference 012PAT
Reference 11	1998 Invitation To Tender - Initial Settlements and Reconciliation, Programme Reference 001IPI
Reference 12	Proposed Timetable for Initial Settlement Activities, Programme Reference 003AAT
Reference 13	1998 Technical Architecture Policy, Programme reference 011PAT
Reference 14	Data Interfaces, Programme Reference 005PAT
Reference 15	Data Catalogue, Programme Reference 002AAT
Reference 16	Market Domain Data Management - Data Requirement Specification 004XIT
Reference 17	Programme Baseline 3.0, Programme Reference 002AAR

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# **1 INTRODUCTION**

## **1.1 Introduction**

1. The franchises for electricity supply held by Public Electricity Suppliers are due to expire on 31 March 1998. As a consequence, all electricity customers will be free to seek competitive supplies from 1 April 1998. The current arrangements for administering settlement payments between Suppliers and Generators - which require metered consumption data for each half-hour - are unsuited to this expanded market, primarily because of the practicalities involved and the costs that would be incurred.
2. Accordingly, the Electricity Pool of England and Wales (the Pool) has developed proposals for new arrangements for electricity trading and settlement to support the "1998 market". The 1998 Operational Framework (Reference 1) has been prepared to document the Pool's proposals and to provide a Programme Brief for the programme of work for introducing the new arrangements. This programme of work is referred to as the Pool's 1998 Programme.
3. The original version of the Operational Framework, release 3.1, provided the basis of a response to OFFER on the Pool trading systems to be adopted for the 1998 market. The OFFER statement "The Competitive Electricity Market from 1998: Supply Code, Trading Arrangements and Costs January 1996" challenged many of the trading and commercial proposals contained within the original document and went on to propose revisions to the scope of the Pool's responsibility in the 1998 market.
4. In the light of the January statement the Pool initiated a review of the OFFER proposals and in addition undertook an assessment of other possible areas where simplification might provide benefits. This review was undertaken by a Business Requirements Group of Pool Members reporting to the 1998 Steering Group. The conclusions arising from the work of the Business Requirements Group were published in release 4.2 of the Operational Framework (Reference 1).

## **1.2 Purpose and Scope**

1. This specification describes the requirements for a system which uses daily profile coefficients determined by the Initial Settlement and Reconciliation Agency (ISRA) system to calculate estimates of annual consumption for individual settlement registers of metering systems. This process comprises the Estimation of Annual Consumption (EAC/AA) system. The system will be nationally developed as part of risk management and Data Collectors will have the option of using it for calculating Estimates of Annual Consumption, Annualised Advances and Deemed Meter Advances (Operational Framework 4.2, para 510). The concepts of EACs and AAs are described in Appendix E.
2. The EAC/AA system must work within the defined context of the Trading Arrangements (TA) for the 1998 market, and therefore this specification includes details of the interfaces between the EAC/AA system and the other systems in the TA. The principles and structure of the TA for the 1998 market are described in detail in the 1998 Operational Framework (Reference 1).
3. This specification excludes descriptions of other developments to be carried out as part of the 1998 Programme.
4. The specification is developed in accordance with the 1998 URS Standard (Reference 5). SSADM Version 4 is used. Stages 1 and 2 and Steps 310 and 320 are complete. Steps 330, 360 and 380 have been partially carried out. These have been provided to enhance the document and clarify the requirements analysis. A full Stage 3 specification should not be inferred from the inclusion of these products. The remaining elements of Stage 3 will be completed during Logical Design (see section 1.4).

## **1.3 Summary of the Document**

The User Requirements Specification (URS) comprises:

- a statement of the high level principles and the objectives of the Estimation of Annual Consumption (EAC/AA) system;
- a summary of the constraints and assumptions on which the URS is based;
- a description of the scope and functions covered by the URS;
- the detailed Requirements for the EAC/AA system;
- supporting information, including the required Data Flow Model, Logical Data Model, Data Catalogue, Function Descriptions, System Event Descriptions, User Roles and Glossary.

Definitions of the acronyms and terminology used in the URS are given in Appendix A.

An explanation of how Estimated Annual Consumptions (EACs) and Annualised Advances (AAs) are used elsewhere in the Settlement process is given in Appendix E.

## **1.4 Responsibilities**

This URS will be used as the basis for the Logical Design (completion of SSADM Stage 3 and 5) of the systems described. The URS will also form the basis of an Invitation to Tender (ITT) for competitive tender for the logical design, physical design and build of the systems described which will be the responsibility of the appointed Contractors. Acceptance testing of these systems and their integration with other 1998 systems will be the responsibility of the 1998 Programme.

## **1.5 Terminology**

The terms Metering System and Settlement Register, as used in this document, refer to logical entities which may not correspond directly to physical meters and registers. For example, Metering Systems and Settlement Registers must satisfy the following constraints:

1. A Metering System must be assigned to a single Profile Class. If there is a requirement to assign the registers of a physical meter to two different Profile Classes, then that meter consists of two Metering Systems.
2. Settlement Registers must not 'double count' electricity. If two physical registers record the same consumption, then the Data Collector must perform a process of differencing.

These points can be illustrated by a consideration of two different types of metering configuration currently in use to support domestic two-rate tariffs:

1. a standard Economy 7 meter has a low register and a normal register, with a timeswitch to control which one records consumption. The requirement is to assign both registers to the Domestic Economy 7 Profile Class, and therefore the meter is a single Metering System for Settlement purposes.
2. a 'restricted hours' meter is attached to a circuit, typically used for heating, which contains a timeswitch or teleswitch to restrict its use to certain hours. An unrestricted circuit, with its own meter, may be used at any time. The requirement is to assign the unrestricted register to the Domestic Unrestricted Profile Class, and the restricted register to the Domestic Economy 7 Profile Class. Therefore each meter is a distinct Metering System for Settlement purposes. A variation on this is where there is a single meter with two registers, one unrestricted and one switched. This will be treated the same way within the system.

## **2 PRINCIPLES AND OBJECTIVES**

### **2.1 Principles**

The requirements of the Estimation of Annual Consumption (EAC/AA) system all arise from a set of basic high level principles. The detailed requirements listed in the Requirements Catalogue Section of this document all relate to and support one or more of these principles. Listed below are the high level principles for the system:

1. The EAC/AA system will calculate Annualised Advances (AAs) for periods covered by a meter advance and Estimates of Annual Consumption (EACs) for the period subsequent to the last meter reading. This will be performed for individual Settlement Registers of metering systems in a consistent manner which is equitable to all Suppliers.
2. The EAC/AA system will provide a basis for establishing a meter reading and also a mechanism for manually establishing a meter reading itself, when so required, including on change of Supplier where the old and new Suppliers cannot agree a customer meter reading.
3. The EAC/AA system will provide exception and control reports to the Data Collector.
4. The EAC/AA system will support interfaces with all relevant parties and systems to facilitate the timely and accurate provision or receipt of data.
5. The EAC/AA system will be a fully auditable system, and will be capable of storing and retrieving daily profile coefficients, smoothing parameters and ad hoc deemed meter reading data to allow any calculation which it has performed to be repeated upon request.
6. The EAC/AA system will comply with the guidelines given in the Pool's 1998 Programme Security and Control Framework (Reference 10).
7. The design and implementation of the EAC/AA system shall not prevent the system, given an appropriate hardware environment, being operated to meet the prescribed settlement and reconciliation schedule.
8. The design and implementation of the EAC/AA system will not adversely constrain the operation and performance of other systems supporting the 1998 market.

### **2.2 Business Objectives**

The major business objectives are:

1. to support the 'Super Customer - Bottom Up' (defined in the Operational Framework, reference 1, paragraph 421) approach to Data Aggregation, and hence the equitable and fair allocation of Pool purchases, by calculating estimates of annual consumption (EAC/AAs) for individual Settlement Registers of metering systems in a consistent manner across all suppliers;
2. to ensure that an Annualised Advance (AA) calculated for an individual Settlement Register is consistent with the meter advance attributed to that Settlement Register across the advance period;
3. to ensure that an Estimated Annual Consumption (EAC) calculated for an individual Settlement Register is based on the history of consumption for that Settlement Register, unless there is a change in the pattern of usage;
4. to provide estimates of annual consumption at a level which supports multi-register metering;
5. to support the Data Collector in establishing a deemed meter reading when so required (including both supplier changeover where the old and new Suppliers cannot agree a customer meter reading, and when a Supplier exits the market) by providing deemed

meter advances based on estimates of annual consumption or by providing a deemed meter reading itself based on two existing readings entered manually by the user.

## **2.3 System Objectives**

The major system objectives of the EAC/AA system are:

1. to enable the calculation, on request, of Estimated Annual Consumptions (EACs) and Annualised Advances (AAs) from a meter advance. Note that the background to this objective is explained in Appendix E;
2. to enable the calculation, on request, of Deemed Meter Advances;
3. to maintain the profile data required to achieve the above and to ensure that this data remains consistent with its source in the Initial Settlements and Reconciliation Agency (ISRA) system by participating in global controls;
4. to provide interfaces with other systems in the Operational Framework (Reference 1);
5. to provide a robust system, which is not constrained by the technical architecture of the systems with which it interfaces;
6. to provide audit, security and control measures and maintain and retain sufficient audit information to satisfy Pool Members and the Pool Auditor.
7. to enable the calculation, on request, of Deemed Meter Readings;

## **2.4 Project Objectives**

The objectives of the project to develop the EAC/AA systems are:

1. to design and develop systems which satisfy the business requirements for the Estimation of Annual Consumption functions of the 1998 Trading Arrangement (TA), as stated in this specification;
2. to ensure that the design of such systems is compatible with the agreed 1998 technical architecture for the overall business requirement;
3. to design the EAC/AA system in such a way that it can form a functionally independent component within the group of Data Collector systems;
4. to design and implement the EAC/AA system in such a way that any Data Collector may run the system for the Settlement Registers for a Metering System within more than one GSP Group;
5. to define the interfaces with other Non Half Hourly Data Collection systems and the Initial Settlement and Reconciliation Agency system;
6. to ensure that the EAC/AA system delivered meets the agreed business requirements and acceptance criteria.

### **3 CONSTRAINTS AND ASSUMPTIONS**

The baseline for this specification is the 1998 Operational Framework (Reference 1) and the references below are to paragraphs in that document, unless otherwise stated.

#### **3.1 Business Constraints and Assumptions**

1. The settlement of all non half hourly metering systems will be performed on the basis of profiled EACs and AAs (OF Ref. 457).
2. Half hourly metering systems will be settled on the basis of metered data or metering system specific estimated consumption, and therefore EACs and AAs are not required for such metering systems (OF Ref. 441 & 442).
3. Estimates of annual consumption (EAC/AAs) will be updated automatically by Data Collectors as meter readings becomes available (OF Ref. 469).
4. Schedules for initial settlement and for subsequent reconciliation runs will be set by Pool members and published in the Settlements Timetable (reference 12, OF Ref. 493). The calculation of EACs and AAs will be subject to minimum levels of performance, such that Data Collectors can submit data to Data Aggregators in accordance with the Settlement timetable.
5. The updates of Estimated Annual Consumptions (EACs) and Annualised Advances (AAs) will be deemed to take effect at 00:00 hrs preceding the collection of a meter reading (OF Ref. 445).
6. The Market Domain Data Agent will publish a GSP Group Profile Class Default EAC for each Profile Class and GSP Group; and also Average Fraction of Yearly Consumption (AFYC) values. Changes to these initial values will be provided infrequently (once or twice a year) by the Market Domain Data Agent.

#### **3.2 System Constraints and Assumptions**

##### **3.2.1 Scope**

1. The system will calculate Estimated Annual Consumptions (EACs), Annualised Advances (AAs), Deemed Meter Advances and Deemed Meter Readings upon request from the Data Collector.
2. The storage of EACs and AAs and associated data, such as meter advances and metering system data, (with the exception of such data resulting from a successfully initiated request for an Ad Hoc Deemed Meter Reading Calculation) is outside the scope of the system. This functionality will be implemented by the Data Collector.
3. The EAC/AA system does not pass details of EACs, AAs or Deemed Meter Readings to Suppliers or Data Aggregators. This functionality will be implemented by the Data Collector's Data Processing system.
4. All meter advances received from the Data Collector are assumed to be for active import or active export consumption and are processed as positive meter advances (however, a negative advance may be received in the case of a correction).

##### **3.2.2 Operational**

1. The EAC/AA system will be operated by accredited Non Half Hourly Data Collectors, acting as agents of Suppliers, for the metering systems for which they are appointed.
2. The Host PES will have a two year exclusive agreement with Pool Members (under the P&SA) for Non Half Hourly Data Collection. This means that Suppliers will be obliged to

contract with the Host PES of a particular GSP Group for this service. Non Half Hourly Data Collectors (i.e. the Host PES) will thus only be processing data related to its particular GSP Group until the 31 March 2000.

3. After 1 April 2000, the Host PES exclusive agreement will have expired, and there will be fully competitive Non Half Hourly Data Collection. The consequence of this is that a Non Half Hourly Data Collector may operate in one or many GSP Groups. The EAC/AA system must be able to calculate EAC/AAs for metering systems in more than one GSP Group.
4. Calculation of EAC/AAs is driven by the receipt of meter advances from the system operator (i.e. the Data Collector). Calculation of Deemed Meter Advances is driven by a request from the system operator. In both cases, the system operator will also provide supporting Settlement Register and Metering System details.
5. It is the responsibility of the Data Collector, not the EAC/AA system, to ensure that EACs and AAs are recalculated in the event of the ISR Agent submitting a file of revised Daily Profile Coefficients.
6. Calculation of Deemed Meter Readings is driven by the manual entry of two existing meter readings from the system operator (i.e. the Data Collector). The system operator will also provide supporting Settlement Register and Metering System details.

### **3.2.3 System Interfaces**

1. The daily profile coefficients will be produced by ISRA in accordance with the Settlement Timetable.
2. If an error is found in the Daily Profile Coefficients then the ISRA agent will, in accordance with an Agreed Procedure, produce revised daily profile coefficients.
3. The Daily Profile Coefficients may not however be corrected outside the agreed Settlement Timetable.
4. The calculation of EAC and AA values for individual metering systems will only be performed if Daily Profile Coefficients have been received for all Settlement Days in the meter advance period. Failure to calculate EAC and AA values for Settlement Registers of one metering system will not however prevent calculation of EAC/AAs for other metering systems.
5. Meter Advances and requests for Deemed Meter Advances will be passed to the EAC/AA system via an electronic interface from the Data Collector except for those which are derived from a request for an Ad Hoc Deemed Meter Reading Calculation (which will be entered manually by the user).
6. EAC/AAs and Deemed Meter Advances calculated by the EAC/AA system are reported via an electronic interface to the Data Collector except for those Deemed Meter Advances used to derive an Ad Hoc Deemed Meter Reading. The Deemed Meter Reading will be subsequently reported on screen. The Deemed Meter Reading may also be obtained from the Ad Hoc Deemed Meter Reading Audit Report.

### **3.2.4 EAC/AA Calculation**

1. The system will not contain additional functionality to support metering systems where:
  - two meters exist at one site where one meter measures off-peak or restricted hour electricity consumption ("switch load") and the other measures the unrestricted consumption; or
  - a single meter exists where one register measures the "switch load" consumption while the other register measures the unrestricted consumption.

Instead, both types of metering system will be supported by assigning a distinct MSID and Standard Settlement Configuration to each meter or metering element.

1. EACs/AAs are not calculated for profiled unmetered supplies. A Certificate of Supply defines the EAC for unmetered supplies.
2. Meter Advances may be positive or negative, therefore the EAC and AA initially calculated by the system may also be positive or negative. If the calculated EAC is negative, the system will replace this with default data.
3. The system does not maintain a history of EACs or AAs (except where an AA has been calculated as part of a successfully initiated request for an Ad Hoc Deemed Meter Reading Calculation). Thus, responsibility for ensuring that Meter Advances are processed in the correct sequence and without gaps or overlaps, lies with the Data Collector's Data Processing system.
4. Similarly, the resubmission of Meter Advances to the EAC/AA system in the event of a revised set of Daily Profile Coefficients being received from the ISRA system is under the control of the Data Collector.
5. It is assumed that the Smoothing Parameter ( $\nu$ ), used in the calculation of EACs:-
  - will have a standard positive value common across all GSP Groups which is determined by Pool Members;
  - is used, but not controlled, by all Data Collectors;
  - can change over time, with changes in value (together with an effective date) notified to Data Collectors by the MDD Agent;
  - will not be subject to retrospective changes.
6. The system will regard a meter advance period as ending at midnight (00:00 hrs) preceding the meter reading date supplied by the Data Collector. A consequence of this is that the system only requires daily totals of profile coefficients, rather than profile coefficients for individual settlement periods.

### **3.2.5 Deemed Meter Advance Calculation**

1. At change of supplier, a deemed meter advance will be calculated should the old Supplier dispute a customer reading provided by the new Supplier.
2. When the new Supplier has not provided an actual meter reading in a reasonable timescale, then the old Supplier will determine the changeover reading (i.e. the EAC/AA system will determine the Deemed Meter Advance) using an EAC.

### **3.2.6 Deemed Meter Reading Calculation**

1. On an ad hoc basis, it will be possible to calculate a Deemed Meter Reading based on the AA derived from two existing meter readings and metering system data that is entered manually.
2. The results of a request for a Deemed Meter Reading will only be displayed on screen or in a report. The results will not be electronically transferred to any other system or party.
3. It will be possible to calculate a Deemed Meter Reading where the Meter Advance Period exceeds 730 days.
4. The system will maintain a history of all successfully initiated Deemed Meter Reading Calculations.

## **3.3 Project Constraints and Assumptions**

1. Offer have agreed that version 4.2 of the Operational Framework provides a satisfactory basis upon which the implementation of the Programme can proceed.

## **4 BUSINESS DESCRIPTION**

### **4.1 Introduction**

1. This section describes the business process, scope and context of the EAC/AA system.
2. The business view of the EAC/AA system can be represented in a number of ways and this section contains:
  - an overview of the process;
  - the scope of the required system in terms of the 1998 Programme Business Process Model (Reference 1);
  - diagrammatic representation of the context of the required system in terms of its interfaces with trading parties, Pool organisations, and other 1998 systems;
  - the business events which affect the EAC/AA system.

### **4.2 System Overview**

The EAC/AA system comprises the business processes required to process Meter Advances for non half hourly Metering Systems to support settlement process. There are three major business processes:-

- EAC/AA Calculation;
- Deemed Meter Advance Calculation;
- Deemed Meter Reading Calculation.

#### **4.2.1 EAC/AA Calculation**

Data Collectors pass the meter advance period for each metering system, the active registration details during the advance period, and a meter advance for each Settlement Register to the EAC/AA system. The registration details include MSID, GSP Group, Profile Class, Standard Settlement Configuration and also the Time Pattern Regime details for each Settlement Register. Note that the time of the meter reading is not included, because all meter readings will be deemed to have been taken at midnight preceding the reading (00:00 hrs).

The Initial Settlements and Reconciliation Agency (ISRA) system provides a Daily Profile Coefficient for each valid combination of GSP Group, Profile Class, Standard Settlement Configuration (or tariff) and Time Pattern Regime (or switch regime).

The system can then calculate two values from this data:-

the **Annualised Advance (AA)** is calculated by applying the summated Daily Profile Coefficients for the meter advance period to the meter advance for each register. The effect of this is to scale the advance up or down to derive an annualised figure. Annualised Advances are passed back to the operator of the system (i.e. the Non Half Hourly Data Collector).

the **Estimated Annual Consumption (EAC)** is calculated using the calculated Annualised Advance (see above) and the previous EAC to determine an estimate of future consumption. Where no previous EAC exists, the Non Half Hourly Data Collector will provide an initial EAC (based on the class average). The new EACs are passed back to the Non Half Hourly Data Collector.

The Metering System Id (MSID) will be used to identify individual metering systems when meter advance values are passed into the EAC/AA system, and EACs and AAs are returned to the Data Collector.

**4.2.2 Deemed Meter Advance Calculation**

The EAC/AA system is also required to generate a meter advance for a nominated advance period from the Estimated Annual Consumption (or Annualised Advance, if one has been calculated for the period) and the Daily Profile Coefficients for the period. This meter advance is passed to the Data Collector who can then determine a deemed meter reading for the metering system for the relevant day. This function can be used to derive a changeover meter reading on change of Supplier, when the old and new Suppliers have been unable to obtain or agree a customer reading and the new Supplier has been unable to provide an actual meter reading within a reasonable timescale. It may also be needed to establish a reading for a Supplier exiting the market.

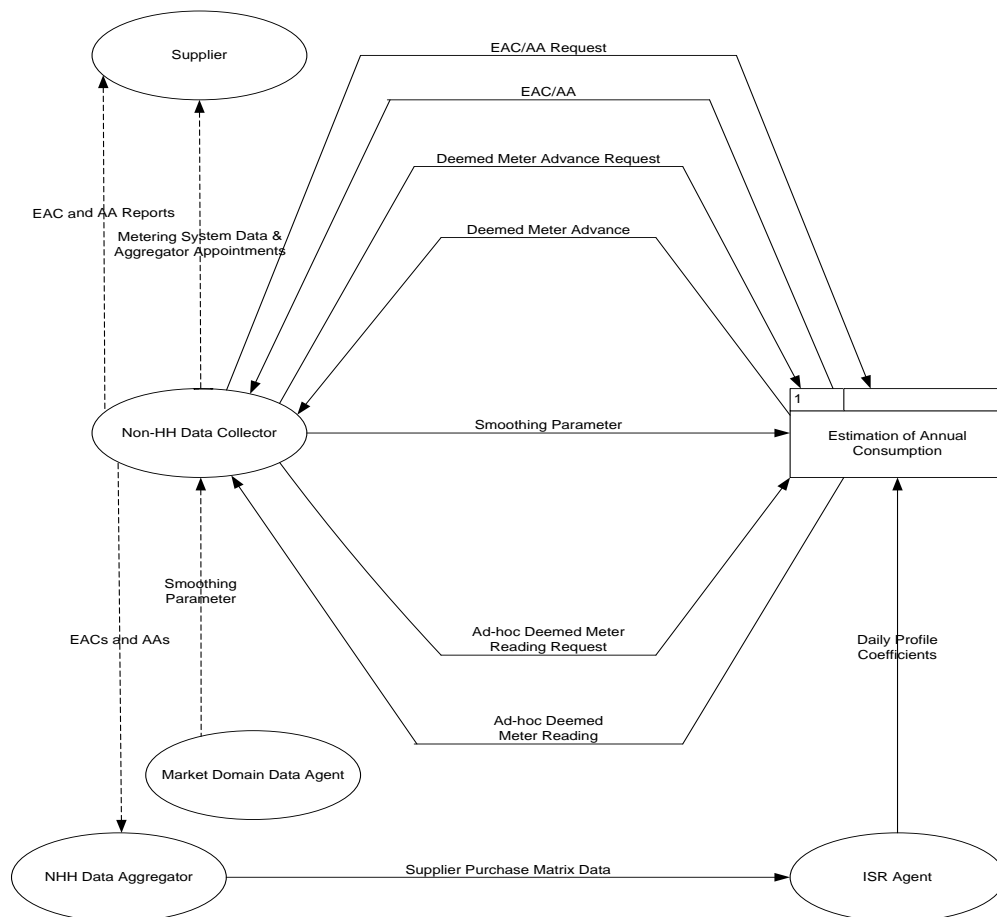
**4.2.3 Deemed Meter Reading Calculation**

The EAC/AA system is also required to derive a Deemed Meter Reading for a specified Settlement Date from two existing meter readings and metering system data manually entered by the user.

**4.3 System Scope**

The business processes included in the EAC/AA system map onto process 7a, "Data Processing, non-half hourly data", of the Business Process top level Model, in Section IV of the Operational Framework (Reference 1).

**4.4 System Context**



## **4.5 Business Events**

The EAC/AA system is affected by the following Business Events:

1. ISR Agent sends Daily Profile Coefficients
2. ISR Agent Withdraws/Changes Daily Profile Coefficients
3. Data Collector retrieves valid non half hourly meter reading
4. Change of Supplier – Request for Deemed Meter Advance
5. Data Collector determines a meter reading for a specific Settlement Date where no actual meter reading exists – Request for Ad Hoc Deemed Meter Reading Calculation
6. Archiving events

Each business event triggers a number of system events or enquiries, as described in Function Description and Events, Section 9. The distinction between an event and an enquiry is that, by definition, an event updates the system database, while an enquiry does not.

### **4.5.1 ISR Agent sends Daily Profile Coefficients**

The ISR agent sends accepted Profile Coefficients to the Data Collector. It triggers the following event:

- Daily Profile Coefficients received

### **4.5.2 ISR Agent Withdraws/Changes Daily Profile Coefficients**

The ISR agent sends notification to the Data Collector that previously accepted Daily Profile Coefficients are to be withdrawn or changed. Receipt of the revised Daily Profile Coefficients triggers the following event:

- Daily Profile Coefficients received

### **4.5.3 Data Collector retrieves valid non half hourly meter reading**

The Data Collector converts non-half hourly meter readings to meter advances and passes a file of meter advances to the EAC/AA system. It triggers the following enquiry:

- Meter Advance Received

### **4.5.4 Change of Supplier - Request for Deemed Meter Advance**

The Data Collector needs the EAC/AA system to create Deemed Meter Advances for each Settlement Register of a Metering System to enable the calculation of deemed meter reading for a specified Settlement Date.

This process is to support a change of Supplier for a metering system where the two Suppliers cannot agree a changeover meter reading within a reasonable timescale (OF 452).

The deemed meter advance will be based on an EAC unless a meter reading has been taken after the Settlement Day, in which case, it will be based on the resultant AA. In either case, the following enquiry will be triggered:

- Request for Deemed Advance

#### **4.5.5 Data Collector determines a meter reading for a specific Settlement Date where no actual meter reading exists - Request for Ad Hoc Deemed Meter Reading Calculation**

The Data Collector needs the EAC/AA system to create Deemed Meter Readings for each Settlement Register of a Metering System for a specified Settlement Date on an ad hoc basis. The manual data entry (via the user interface) of two existing meter readings and other relevant Metering System data will trigger the following event

- Request for Ad Hoc Deemed Meter Reading Calculation

For each register, a Meter Advance and subsequent Annualised Advance will be calculated from the data entered from which the Deemed Meter Reading will be derived.

#### **4.5.6 Archiving Events**

This is a scheduled event, which will normally happen after the final reconciliation run for a Settlement Day has been successfully completed, triggered by the pre-determined, published Settlement timetable. It triggers the following input system event:

- Data Collector runs the archive process for a Settlement Day or range of Settlement Days, comprising:
  - Daily Profile Coefficients & Smoothing Parameters Archived

## **5 REQUIREMENTS CATALOGUE**

### **5.1 Introduction**

The Requirements Catalogue is divided into four sections:

- Functional Requirements;
- Non-Functional Requirements;
- Operational Requirements; and
- Design Requirements.

Below this, it is structured to map onto the high level principles described in Section 2.1.

- Functional requirements:
  1. EAC/AA system must support the calculation of EACs and AAs;
  2. EAC/AA system must support the calculation of Deemed Meter Advances and Deemed Meter Readings;
  3. Reporting;
  4. Interface functionality.
- Non-Functional requirements:
  5. Audit and verifiability; and
  6. Security and control.
- Operational Requirements:
  7. Operations
- Design Constraints:
  8. Design constraints, including interface design constraints.

The scope of the Requirements Catalogue does not include Service Requirements, such as user support, training, documentation, and maintenance. These are included in the 1998 Invitation To Tender - Initial Settlements and Reconciliation (Reference 11).

### **5.2 Key to the Requirements Catalogue**

The status of each requirement is coded as M (mandatory), H (highly desirable) or D (desirable). The significance of these codes is described in the 1998 ITT (Reference 11).

The numbering within the Requirements Catalogue consists of a single digit for the high level principle (as defined in the previous section) that each requirement supports, followed by sequential numbering within the principle.

The last two columns record the source of each requirement and its resolution.

### 5.3 Functional Requirements

The Functional Requirements are organised into three groups, according to the high level principles they support:

- Internal functionality requirements, subdivided into:
  - EAC and AA Calculation functionality, supporting high level principle 1.
  - Deemed Meter Advance and Deemed Meter Reading functionality, supporting high level principle 2.
- Reporting requirements, supporting high level principle 3.
- Interface requirements, supporting high level principle 4.

#### 5.3.1 Functional Requirements - EAC and AA Calculation

These requirements support the following high level principle:

1. *The EAC/AA system will calculate Annualised Advances (AAs) for periods covered by a meter advance and Estimates of Annual Consumptions (EACs) for the period subsequent to the last meter reading. This will be performed for individual settlement registers of metering systems in a consistent manner which is equitable to all Suppliers.*

Req. Number	Status	Description	Source of requirement	Resolution and cross reference
1.1	M	For each meter advance received from the Data Collector, the system must calculate the Annualised Advance corresponding to the period covered by the meter advance. The required processing is described in EPD 1.2.	OF Para 469	EPD 1.2
1.2	M	For each meter advance received from the Data Collector, except those for which the Profile Class has changed during the Meter Advance Period, the system must calculate a new Estimated Annual Consumption for the subsequent period from the meter reading. The required processing is described in EPD 1.2.	OF Para 469 Pool Auditor	EPD 1.2
1.3	M	The system must allow the smoothing parameter v to stored and retrieved for use in calculating EACs. The system must validate that the value provided for the smoothing parameter is a positive number.	ISR UAG Pool Auditor	EPD 1.5
1.4	M	The system must be capable of processing the following:- 1. Positive and negative Meter Advances 2. Positive and negative EACs and AAs 3. Positive and negative Daily Profile Coefficients An exception report will detail all negative values.	OF App A	EPDs 1.1, 1.2 & 1.4
1.5	M	For each meter advance period for a Metering System, EAC and AA values must be calculated for all Settlement Registers. If an EAC or AA calculation fails for a metering system, for any reason, an exception report will be produced and no EAC or AA values for any register for this metering system will be reported.	ISR UAG	EPD 1.2

**URS - Estimation of Annual Consumption (EAC/AA) System**

<b>Req. Number</b>	<b>Status</b>	<b>Description</b>	<b>Source of requirement</b>	<b>Resolution and cross reference</b>
1.6	M	The system must be capable of validating Annualised Advances to ensure that they fall within agreed tolerances. Any Annualised Advances calculated that fall outside these agreed tolerances must generate an entry in an exception report.	NHHTAG	EPD 1.2
1.7	M	The system shall replace any EAC for which the system initially returns a negative EAC with a relevant default EAC value and also report a warning message to show this replacement has taken place. If the relevant default EAC value cannot be applied the system will report an exception showing that the EAC calculation has failed for a given Settlement Register.	CP1311	EPD1.7

**5.3.2 Functional Requirements - Deemed Meter Advance and Deemed Meter Reading**

These requirements support the following high level principle:

2. *The EAC/AA system will provide a basis for establishing a meter advance and also a mechanism for manually establishing a meter reading itself, when so required, including on change of Supplier where the old and new Suppliers cannot agree a customer meter reading.*

<b>Req. Number</b>	<b>Status</b>	<b>Description</b>	<b>Source of requirement</b>	<b>Resolution / Cross reference</b>
2.1	M	The system must be capable of calculating a Deemed Meter Advance based on an Estimated Annual Consumption (or Annualised Advance, if required) and a meter advance period, as described in EPD 1.4. The two cases are as follows: a) calculation uses an EAC where the required Deemed Meter Advance is for a period beyond the latest Annualised Advance; and b) calculation uses an Annualised Advance where one has already been calculated beyond the date of the required Deemed Meter Advance.	OF para 452	EPD 1.4
2.2	M	The system must be capable of deriving an ad hoc Deemed Meter Reading from a Deemed Meter Advance based on an Annualised Advance resulting from manually entered meter readings and metering system data	CP1081	EPD 1.6
2.3	M	The system must be able to derive an ad hoc Deemed Meter Reading regardless of the size of the Meter Advance Period, i.e. even if the Meter Advance Period exceeds 730 days.	CP1081	EPD 1.6
2.4	M	The system must allow ad hoc deemed meter readings to be calculated for Metering Systems with more than one register assigned to a single Time Pattern Regime.	CP1081	EPD 1.6
2.5	M	The system must be able to determine whether negative Deemed Meter Advances used to calculate ad hoc deemed meter readings are rollovers or genuine negative advances.	CP1081	EPD 1.6

**5.3.3 Reporting Requirements**

These requirements support the following high level principle:

- 3 *The EAC/AA system will provide exception and control reports to the Data Collector.*

<b>Req. Number</b>	<b>Status</b>	<b>Description</b>	<b>Source of requirement</b>	<b>Resolution / Cross reference</b>
3.1	M	The Receive Daily Profiles process must provide a report detailing the Settlement Date and the number of Daily Profile Coefficients loaded for that Date. The process will also produce an exception report if any errors are encountered. When a revised set of Daily Profile Coefficients is loaded, the number of coefficients replaced must also be reported.	ISR Expert Group	EPD 1.1

**URS - Estimation of Annual Consumption (EAC/AA) System**

Req. Number	Status	Description	Source of requirement	Resolution / Cross reference
3.2	M	<p>The system must provide an Exception and Control Report for each run of the EAC, AA and Deemed Meter Advance calculation processes.</p> <p>The report must give details of any metering system for which EAC/AAs (or Deemed Meter Advances) have not been calculated, including the reason for rejection.</p> <p><i>The report must show the details of all Metering Systems for which a default EAC has replaced a negative EAC</i></p> <p>The report must also give details of any metering systems for which AAs have been calculated that exceed the GSP Group Profile Class Tolerances.</p> <p>The report must include the following control totals:</p> <ul style="list-style-type: none"> <li>• the number of Metering Systems read;</li> <li>• the number of Metering Systems, for which no EAC/AA (or Deemed Meter Advance) has been calculated, due to errors;</li> <li>• the number of Metering Systems for which an EAC/AA (or Deemed Meter Advance) has been calculated.</li> <li>• the number of Metering Systems for which a default EAC has been used.</li> </ul>	<p>ISR Expert Group</p> <p>NHHTAG</p>	EPDs 1.2 & 1.4
3.3	M	<p>The system must support the generation of ad hoc reports on Daily Profile Coefficients.</p>	ISR Expert Group	Logical and Physical Design
3.4	M	<p>The system must support the generation of audit reports on all successfully initiated Ad Hoc Deemed Meter Reading calculations meeting any of the following criteria:</p> <ul style="list-style-type: none"> <li>• Metering System Id</li> <li>• SSC Id</li> <li>• GSP Group Id</li> <li>• Username</li> <li>• Transaction No range</li> <li>• Calculation Date range</li> <li>• Deemed Meter Advance Date range</li> </ul> <p>The reports must be produced on the server hosting the EAC/AA database, to ensure that all the audit reports are kept together. The reports generated may then be viewed using EAC/AA report viewing functionality.</p>	CP1081	EPD 1.6

**5.3.4 Interface Functionality Requirements**

These requirements support the following high level principle:

- 4 *The EAC/AA system will support interfaces with all relevant parties and systems to facilitate the timely and accurate provision or receipt of data.*

<b>Req. Number</b>	<b>Status</b>	<b>Description</b>	<b>Source of requirement</b>	<b>Resolution / Cross reference</b>
4.1	M	The system must be capable of receiving (and storing) Daily Profile Coefficients from the Initial Settlement and Reconciliation Agency (ISRA) system, as described in EPD 1.1.	OF Appendix A	EPD 1.1
4.2	M	The system must provide an electronic interface through which the Data Collector can provide meter advances, together with those details of the metering system required to calculate an EAC and AA from the advance, as described in EPD 1.2.	OF Appendix A	EPD 1.2
4.3	M	The system must provide an electronic interface through which the Data Collector can request deemed meter advances, as described in EPD 1.4.	OF Appendix A	EPD 1.4
4.4	M	The system must provide requested EAC/AAs and deemed meter advances to the Data Collector through an electronic interface, as described in EPDs 1.2 and 1.4.	OF Appendix A	EPDs 1.2 & 1.4
4.5	D	The system must allow the Data Collector to specify a subset of Standard Settlement Configurations for which the interface to the ISRA system (see requirement 4.1) should load data. This is to allow a DC with a small or specialised customer base to prevent the system loading data which will not be used. Standard Settlement Configurations are distributed by the Market Domain Data Agent.  Note that this non-mandatory requirement is not modelled in the Data Flow Model or Logical Data Model.	ISR Expert Group  Change Request 156	Logical Design
4.6	M	The system must provide an online interface through which the Data Collector can maintain the smoothing parameter v.	ISR UAG	EPD 1.5
4.7	M	The interface to the ISRA system (see requirement 4.1) must facilitate the loading of Daily Profile Coefficient files for up to 730 days, in order to allow for a Data Collector being appointed to Metering Systems in a new GSP Group. It must be easy for system operators to load such a large number of DPC files, e.g. by a single keystroke.	CR 007, 235	EPD 1.1
4.8	M	It must be possible to install the system in either automatic or manual mode. In automatic mode the processing of Daily Profile Coefficient files, EAC/AA Request files and Deemed Meter Advance Request files must be automatically triggered when the file is received. In manual mode processing of these files must be manually triggered by the NHH Data Collector.	CR171	Logical Design
4.9	M	The system must provide an online interface through which the Data Collector can request an Ad Hoc Deemed Meter Reading Calculation.	CP1081	EPD 1.6
4.10	M	The system must provide an online interface through which the Data Collector can maintain the GSPGPC Default EAC data.	CP1311	EPD 1.7

## **URS - Estimation of Annual Consumption (EAC/AA) System**

<b>Req. Number</b>	<b>Status</b>	<b>Description</b>	<b>Source of requirement</b>	<b>Resolution / Cross reference</b>
4.11	M	The system must be capable of receiving (and storing) Average Fraction of Yearly Consumption (AFYC) data provided by the Market Domain Data Agent.	CP1311	EPD 1.8

## 5.4 Non- Functional Requirements

The non-functional requirements for the EAC/AA system are in essence those concerned with Audit, Security and Control. Operational requirements and Design Constraints are covered in separate sections.

### 5.4.1 Audit Requirements

These requirements support the following principle:

- 5 *The EAC/AA system will be a fully auditable system and will be capable of storing and retrieving daily profile coefficients, smoothing parameters and ad hoc deemed meter reading data to allow any calculation which it has performed to be repeated upon request.*

Audit requirements will impact the EAC/AA system in the following areas:

- checks that data entered through electronic and other interfaces is mutually consistent;
- retention of Daily Profile Coefficients used in calculation of EACs and AAs.

Req. Number	Status	Description	Source of requirement	Resolution / Cross reference
5.1	M	The EAC/AA system must report to the Data Collector any request for a meter advance, EAC/AA or Deemed Meter Reading which cannot be processed because it relates to GSP Groups, Profile Classes or Measurement Requirements for which no Daily Profile Coefficients have been provided. The reports must distinguish between the case, where no coefficients have been received for the Settlement Day in question and the case where coefficients have been received for the Settlement Day, but not for the GSP Group, Profile Class or Measurement Requirement in question.	ISR Expert Group & CP1081	EPD 1.2 & 1.6
5.2	M	The EAC/AA system must retain all Daily Profile Coefficient files used to calculate EAC/AAs and deemed meter advances, including those subsequently replaced by revised data, for 7 years from the Settlement Date to which the data relates.	S & C Team	LDM
5.3	M	The EAC/AA system must provide a means of archiving Daily Profile Coefficients and smoothing parameters once Final Reconciliation has been carried out for that Settlement Day.	Security and Control Framework	Function 'Archive Daily Profile Coefficients'
5.4	M	The EAC/AA system must apply version controls to all sets of Daily Profile Coefficients received from the ISR Agent. It must ensure that all data received has date and version stamps attached to it, identifying the Profile Production Run and the date and time it was forwarded.	S & C Team	Logical and Physical Design
5.5	M	The EAC/AA system must add a further date and time stamp to the set of Daily Profile Coefficients received, identifying the date and time that the data was loaded.	S & C Team	Logical and Physical Design
5.6	M	The EAC/AA system must check that the date and version stamps on sets of Daily Profile Coefficients received from the ISR Agent are consistent with those on data sets already received from the ISR Agent.	S & C Team	Logical and Physical Design
5.7	M	The EAC/AA system must apply version controls to all data that it outputs. It must ensure that data output has date and time stamps attached to it, identifying when the calculation run was performed.	S & C Team	Logical and Physical Design

Req. Number	Status	Description	Source of requirement	Resolution / Cross reference
5.8	M	The EAC/AA system must be capable of using the date and time stamp of an Annualised Advance/EAC or Deemed Meter Advance output data record, together with the date and time stamp of a profile data load, to determine which Daily Profile Coefficients were used to calculate the Annualised Advance/EAC or Deemed Meter Advance.	S & C Team	Logical and Physical Design
5.9	M	The EAC/AA system must retain the following data resulting from a successfully initiated Request for an Ad Hoc Deemed Meter Reading Calculation <ul style="list-style-type: none"> <li>• A unique identifier or reference number – the transaction number - for the calculation (so that it can be easily referenced);</li> <li>• The identity of the user who initiated the calculation;</li> <li>• All of the input data items entered by the user;</li> <li>• Details of any Meter rollovers confirmed by the user;</li> <li>• The date and time at which the calculation was initiated;</li> <li>• Details of any warnings (e.g. AA values outside tolerance values);</li> <li>• The values of the Annualised Advances, Deemed Meter Advances and Deemed Meter Readings calculated by the process.</li> </ul>	CP1081	EPD 1.6

**5.4.2 Security and Control Requirements**

The requirements in this group support the following principle:

- 6 *The EAC/AA system will comply with Pool's 1998 Programme security and control framework and the Pool's 1998 Programme's standard codes and naming conventions.*

Req. Number	Status	Description	Source of requirement	Resolution / Cross reference
6.1	M	The technological infrastructure used for the EAC/AA system must provide secure and timely data and information transfers with other systems in the 1998 market.	Security and Control Framework guidelines	Physical Design
6.2	M	The EAC/AA system must check the record count and check sum values provided on input files from the Data Collector and ISR Agents to ensure that data has been received correctly and accurately.	Security and Control Team	Logical and Physical Design
6.3	M	The EAC/AA system must provide record count and check sum values on output files to the Data Collector, to allow the Data Collector to check that data has been received correctly and accurately.	Security and Control Team	Logical and Physical Design
6.4	M	The EAC/AA system must ensure that the number of EACs/AAs or Deemed Meter Advances calculated in a given run is equal to the number of requests received less the number of requests rejected due to errors.	Security and Control Team	Logical and Physical Design

<b>Req. Number</b>	<b>Status</b>	<b>Description</b>	<b>Source of requirement</b>	<b>Resolution / Cross reference</b>
6.5	M	The EAC/AA system must ensure that files of Daily Profile Coefficients are loaded in Settlement Date and version number sequence. Revised sets of Daily Profile Coefficients will not be subject to this control as they are only produced in the event of an error in the initial set. Type 1 files will be loaded before type 2 files, for a given Settlement Day.	Security and Control Team	Logical and Physical Design  Process 1.1
6.6	M	An enquiry screen will be provided to allow the Data Collector to check the latest Settlement Day for which Daily Profile Coefficients have been loaded	Security and Control Team	Logical and Physical Design
6.7	M	A control report will be produced for each run of the EAC/AA system detailing the input files used and the resultant output files created. It is the responsibility of the Data Collector to ensure that these files are archived for audit purposes. The archive functionality is outside the scope of this system.	Security and Control Framework guidelines	Physical Design
6.8	M	The system must provide facilities to control access and operation rights of users and groups of users, including modification of the Smoothing Parameter and GSPGPC Default EACs, access to input and output data files, requests for Ad Hoc Deemed Meter Readings and Ad Hoc Deemed Meter Readings Audit Reports.  (Exact access rules and controls to be defined during Logical Design, in conjunction with the owners of the data).	Audit Team, Security and Control Framework guidelines, OF Section 7.	Logical and Physical Design & CP1081
6.9	M	The system must not allow Daily Profile Coefficients to be modified, other than by the Receive Daily Profiles process (as described in EPD 1.1).	Audit Team, Security and Control Team, OF Section 7.	EPD 1.1, Logical and Physical Design
6.10	M	The system must track the identity of any user making a change to the Smoothing Parameter and the date and time of the change.	Audit Team, Security and Control Team, OF Section 7.	Logical and Physical Design
6.11	M	The system must monitor for attempts to breach security and must be able to report on such attempts.  (Exact monitoring rules to be agreed and defined during Logical Design).	Audit Team, Security and Control Framework guidelines	Logical and Physical Design
6.12	M	A count of the Annualised Advances calculated using each set of Daily Profile Coefficients must be maintained. Whenever a set of Daily Profile Coefficients is loaded, the system must report the number of Annualised Advances calculated using the previous set of Daily Profile Coefficients for the same Settlement Date. This will allow the Data Collector to check that the correct number of meter advances are re-submitted.	ISR Expert Group	Logical and Physical Design
6.13	M	The system must track the identity of any user successfully initiating a request for an Ad Hoc Deemed Meter Reading Calculation.	CP1081	Logical and Physical Design
6.14	M	The system must track the identity of any user manually creating, modifying or deleting any other user via the user interface.	CP933	Logical and Physical Design

## **URS - Estimation of Annual Consumption (EAC/AA) System**

<b>Req. Number</b>	<b>Status</b>	<b>Description</b>	<b>Source of requirement</b>	<b>Resolution / Cross reference</b>
6.15	M	The system must track the identity of any user making a change to the GSPGPC Default EAC and the date and time of the change.	Audit Team, Security and Control Team, OF Section 7.	Logical and Physical Design
6.16	M	The system must not allow Average Fraction of Yearly Consumption values to be modified, other than by the Receive AFYC process (as described in EPD 1.8).	Audit Team, Security and Control Team, OF Section 7.	EPD 1.8, Logical and Physical Design

## 5.5 Operational Requirements

### 5.5.1 Operational Requirements

These requirements support the following principle :

- 7 *The design and implementation of the EAC/AA system shall not prevent the system, given an appropriate hardware environment, being operated to meet the prescribed settlement and reconciliation schedule.*

Req. Number	Status	Description	Source of requirement	Resolution / Cross reference
7.1	M	The system must be able to process meter advances with a meter advance period of up to 2 years. An advance period longer than two years will cause an error report, and processing will continue with the next metering system.	ISR Expert Group	Physical Design
7.2	M	The system must be able to process 90,000 meter advances per day, when run in an appropriate hardware and software environment.	ISR Expert Group	Physical Design
7.3	H	The system should be able to process 150,000 meter advances per day, when run in an appropriate hardware and software environment.	ISR Expert Group	Physical Design
7.4	D	The system should be able to process 300,000 meter advances per day, when run in an appropriate hardware and software environment.	ISR Expert Group	Physical Design
7.5	M	The system must be able to receive 26,000 Daily Profile Coefficients each day, when run in an appropriate hardware and software environment.	ISR Expert Group	Physical Design
7.6	H	The system should be able to receive 192,000 Daily Profile Coefficients each day, when run in an appropriate hardware and software environment.	ISR Expert Group	Physical Design
7.7	M	The system must provide facilities (e.g. error logging, backup, restore, restarting of jobs) to allow recovery following hardware failure or other unexpected errors. Levels of service for these tasks will be defined in service level agreements.	ISR Expert Group	Logical and Physical Design
7.8	M	The system and its proposed hardware and software environment must be scaleable up and down, i.e. operational cost should be proportional to the volumes of data and processing. The system must not prevent volumes of data in excess of those specified in requirements 7.2 to 7.4.	ISR Expert Group	Physical Design

The basis of the estimated volumes for 7.2 is a Data Collector responsible for 3.6 million metering systems i.e. equivalent to the largest current PES distribution area. The basis of the estimated volumes for 7.3 is a Data Collector responsible for 6 million metering systems i.e. equivalent to a large PES distribution area, with a considerable margin allowed for market growth. The basis of the estimated volumes for 7.4 is a single Data Collector covering two such areas. The table below shows the calculation:

	7.2 Largest Current PES area	7.3 Large Data Collector	7.4 Nationwide
Metering Systems	3,600,000	6,000,000	12,000,000

## **URS - Estimation of Annual Consumption (EAC/AA) System**

Average no. of registers per Metering System	1.5	1.5	1.5
Settlement Registers	5,400,000	9,000,000	18,000,000
Advances per Year (@ 4 per Register)	21,600,000	36,000,000	72,000,000
Calculation Runs per Year	240	240	240
Advances per run	90,000	150,000	300,000

The estimated number of Daily Profile Coefficients in requirement 7.5 is based on the original 12 English and Welsh GSP Groups and 2,142 valid combinations of Measurement Requirement and Profile Class (based on details of current tariffs supplied by RECs to the 1998 Programme Business Requirements Group).

The estimated number of Daily Profile Coefficients in requirement 7.6 is based on the original 12 English and Welsh GSP Groups and a generous maximum of 16,000 valid combinations of Measurement Requirement and Profile Class.

## 5.6 Design Constraints

### 5.6.1 Design Constraints - Interfaces and Effect on Related Systems

These requirements support the following principle :

- 8 *The design and implementation of the EAC/AA system will not adversely constrain the operation and performance of other systems supporting the 1998 market.*

Req. Number	Status	Description	Source of requirement	Resolution / Cross reference
8.1	M	The software, proposed hardware and interfaces of the Estimation of Annual Consumption system must be compatible with the 1998 Technical Architecture policy.	OF Section VI	Logical & Physical Design,
8.2	M	The EAC/AA system must be designed not to be tightly coupled with any external system.	BRG	(Physical design)
8.3	M	The unavailability of the EAC/AA system must not prevent the operation of other systems.		(Physical Design)
8.4	M	The content of reports will be arranged in a predictable and practical order. That is, for given data the output will always appear the same and will be arranged in a logical manner that makes it easy for a human to read.	CR R1178	Physical Design

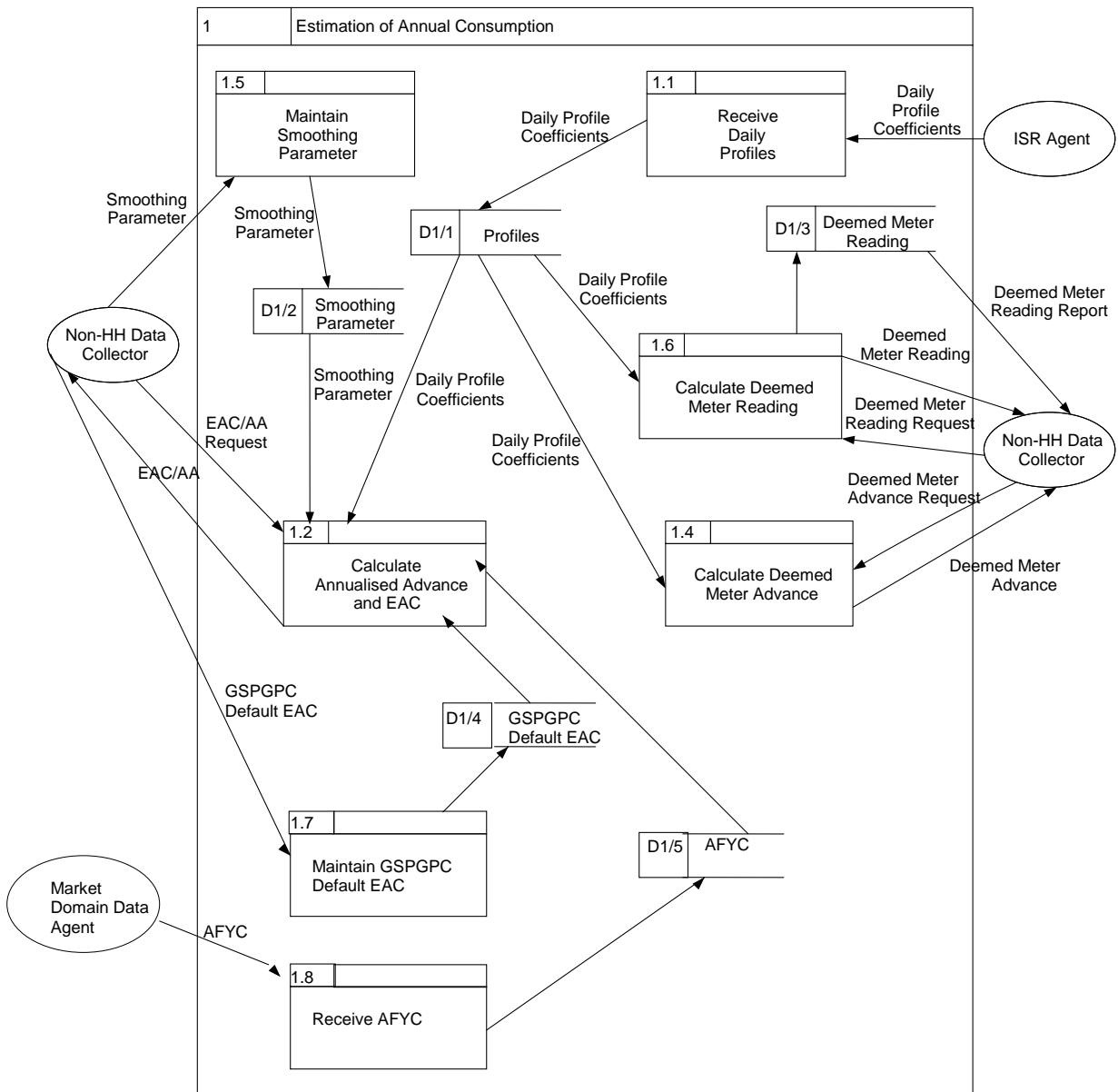
## **6 DATA FLOW MODEL**

### **6.1 Purpose and Scope**

1. The Data Flow Model describes the processes which comprise the Estimation of Annual Consumption system. It also details the flows of data between these processes, and those to and from organisations or processes which are outside the scope of the Estimation of Annual Consumption system (External Entities).
2. The model is logical rather than physical and shows, for example, what data is required from an external entity rather than how it is obtained.
3. The model consists of:
  - a top level Data Flow Diagram (DFD);
  - descriptions of the Elementary Processes (that is the processes which appear on the Data Flow Diagram);
  - a cross reference between the top level Data Flow Model and the Business Process Model in the Operational Framework (Reference 1);
  - descriptions of the external entities;
  - descriptions of the data flows to and from the external entities;
  - a list of attributes for each data flow shown on the Data Flow Diagram.
4. A key to the Data Flow Diagram notation used is given in Appendix D.

## 6.2 Data Flow Diagrams and Elementary Process Descriptions

### 6.2.1 Estimation of Annual Consumption



### 6.2.2 Process 1.1 - Receive Daily Profiles

This process will load one or more data file of Daily Profile Coefficients into the Profiles datastore. Data Files will be received from the ISR Agent a number of days in arrears of the Settlement Day to which they relate. The process supports two types of Daily Profile Coefficient files:

- Daily Profile Coefficients for all GSP Groups for which a Data Collector is responsible. Data contained in such a file will replace and invalidate any previous data for that Settlement Date received from that ISR Agent (type 1);

- Daily Profile Coefficients for a single GSP Group and Settlement Date. The data contained in such a file will not replace or invalidate any previous data stored against the GSP Group and the Settlement date. The process must be able to load up to two years of these data files for a Data Collector newly-appointed to the GSP Group (type 2).

Each (type 1) data file will contain a set of Daily Profile Coefficients for one or more GSP Groups for a given Settlement Day. Each set will comprise a Daily Profile Coefficient for each valid combination of Standard Settlement Configuration, Time Pattern Regime and Profile Class.

The EAC/AA system must ensure that files of Daily Profile Coefficients are loaded in ascending Settlement Date order (i.e. a file must already have been loaded for the previous Settlement Day, with the exception of the very first file loaded onto the EAC/AA system) and in correct version sequence (although version numbers may not be sequential) for any file type/GSP Group combination.

The EAC/AA system must ensure that files containing Daily Profile Coefficients for Scottish GSP Groups for Settlement Dates before the BETTA start date<sup>1</sup> are rejected unless they are from the Scottish ISR Agent. Also the EAC/AA system must ensure that all files containing Daily Profile Coefficients for Scottish GSP Groups for Settlement Dates on or after the BETTA start date are rejected if they are from the Scottish ISR Agent.

### **6.2.3 Process 1.2 - Calculate Annualised Advance and EAC**

This process calculates an Annualised Advance and EAC for each meter advance in a data file supplied by the Data Collector (except for Meter Advance Periods during which there is a change of Profile Class for the Metering System, in which case only an Annualised Advance is calculated).

For each Metering System the Data Collector will provide the Effective From and Effective To Settlement Dates of the Meter Advance Period, together with details of the Standard Settlement Configuration, Profile Class and GSP Group effective at the start of the Meter Advance Period, and any changes to the Profile Class or GSP Group occurring at any point during the Meter Advance Period.

N.B. a change to the GSP Group or Profile Class to which a Metering System is allocated may occur during a Meter Advance Period, but a change to a Standard Settlement Configuration will lead to one or more new Settlement Registers and hence may only occur on the Effective From Settlement Date of the Meter Advance Period.

For each Settlement Register (represented by the subscript **m**) associated with the Metering System, the Data Collector will provide the Time Pattern Regime, the Meter Advance and the Previous EAC<sub>m</sub>. N.B. for new Metering Systems (and new Settlement Registers, where there has been a change of Standard Settlement Configuration for an existing Metering System) the Previous EAC<sub>m</sub> will be the 'initial' (or 'class average') EAC.

Meter Advances will be used, along with the Daily Profile Coefficients for all Settlement Days in the advance period, to calculate Annualised Advances for each Settlement Register.

The following processing is carried out for each meter advance for each Settlement Register for each Metering System:

1. The GSP Group Id, Profile Class Id, Standard Settlement Configuration Id and Time Pattern Regime Id effective for each Settlement Day between the Effective From Settlement Date and the Effective To Settlement Date (inclusive) of the Meter Advance Period are determined (i.e. with reference to the effective dates of the Metering System's GSP Group Id and Profile Class Id, as supplied by the Data Collector).
2. For each Settlement Day (**d**) in the meter advance period, the appropriate Daily Profile Coefficients PC<sub>gptd</sub> are retrieved from the Profiles datastore. The Daily Profile Coefficients retrieved depend on:

- the Measurement Requirement for the Settlement Register during the Meter Advance Period, where Measurement Requirement is a valid combination of Standard Settlement Configuration Id and Time Pattern Regime Id (represented by the subscript **t**);
- the GSP Group Id effective for the Metering System on the Settlement Day in question (represented by the subscript **g**);
- the Profile Class Id effective for the Metering System on the Settlement Day in question (represented by the subscript **p**).

1. The fraction of the yearly consumption covered by the advance is calculated as:

$$\text{Fraction of Yearly Consumption (FYC}_m) = \sum_{d=s}^f \text{PC}_{gptd}$$

where *s* is the first Settlement Day in the meter advance period, and *f* is the last.

2. If the Fraction of Yearly Consumption is non-zero, a new Annualised Advance is calculated as:

Annualised Advance = Meter Advance / Fraction of Yearly Consumption

N.B. a meter advance may be negative, in which case the Annualised Advance will also be negative.

3. If the Fraction of Yearly Consumption is zero and the meter advance is zero, the Annualised Advance is set to zero.

The following additional processing is carried out for each meter advance only if the Metering System has not changed Profile Class during the Meter Advance Period:

1. *v* is set to the value of Smoothing Parameter (from Smoothing Parameter datastore) that is effective on the Effective To Settlement Date of the Annualised Advance.

2. The new value of the EAC is calculated as follows:

$b = \text{FYC}_m * v$  subject to the limits  $0.0 \leq b \leq 1.0$ . (Note. where  $b > 1.0$ , set  $b = 1$  and where  $b < 0$ , set  $b = 0$ .)

$\text{EAC}_m = b * \text{AA}_m + (1-b) * \text{Previous EAC}_m$

3. The Effective From Settlement Date of the EAC is set to the day after the Effective To Settlement Date of the Annualised Advance from which it was calculated.

The Annualised Advance (as calculated by process 1.2) and the EAC are output to the Data Collector. If the Metering System has changed Profile Class during the Meter Advance Period, a null EAC value and a null Effective From Settlement Date {EAC} are output.

The main exception conditions which may occur when processing meter advances are as follows:

1. If Daily Profile Coefficients are not found for the combination of GSP Group, Profile Class, Standard Settlement Configuration and Time Pattern Regime effective on any Settlement Day within the meter advance period, then meter advances are not processed for any Settlement Registers of that metering system, and an exception is reported back to the Data Collector.
2. If the Fraction of Yearly Consumption is zero and the Meter Advance is not zero, a warning message is reported back to the Data Collector and the Annualised Advance is set to zero. The EAC is calculated in the normal way.
3. If the Annualised Advance (as calculated by process 1.2) exceeds either the upper or lower GSP Group Profile Class Tolerance for the GSP Group and Profile Class associated with MSID in question, then an exception is reported back to the Data Collector. The Annualised Advance is processed in the normal way. The Data Collector will then investigate any

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<sup>1</sup> The BETTA start date is the date the British Electricity Trading and Transmission Arrangements (which extend the current England and Wales Trading Arrangements to Scotland) start.

occurrences where calculated AAs fall outside the GSP Group Profile Class tolerance, generating an exception, and report to the relevant Supplier any action taken to resolve the exception.

4. If a negative EAC is calculated this is replaced by a default EAC value determined as:

$$\text{If } EAC_m < 0, EAC_m = GGPCDEAC_{gp} * AFYC_{gpt}$$

Where  $GGPCDEAC_{gp}$  (GSP Group Profile Class Default EAC) is the latest EAC value for the combination of GSP Group and Profile Class for the relevant Settlement Register; and

Where  $AFYC_{gpt}$  (Average Fraction of Yearly Consumption) is the latest value (between 0 and 1) for the relevant Settlement Register for the combination of GSP Group, Profile Class, Time Pattern Regime and the Standard Settlement Configuration it belongs to.

The default EAC is calculated using the latest values of  $GGPCDEAC$  and  $AFYC$ . If the relevant  $GGPCDEAC$  or  $AFYC$  values are not found the EAC calculation fails for that Settlement Register and an exception is reported to the Data Collector.

#### **6.2.4 Process 1.4 - Calculate Deemed Meter Advance**

This process handles requests to calculate a Deemed Meter Advance, when an actual changeover reading cannot be obtained or agreed on change of Supplier for a Metering System.

The Deemed Meter Advance will be calculated from the EAC, or the annualised advance if one has been calculated for the period.

The Data Collector provides a data file with the following details:-

- the Settlement Register (i.e. the Metering System Id, Standard Settlement Configuration Id and Time Pattern Regime Id) for which the Deemed Meter Advance is required
- the Standard Settlement Configuration, Profile Class and GSP Group effective for the Metering System at the start of the Deemed Meter Advance Period, plus any changes to Profile Class or GSP Group that took effect during the Deemed Meter Advance Period
- the Effective From and Effective To Settlement Dates of the Deemed Meter Advance period (as described in 6.2.5 below)
- the latest EAC or latest Annualised Advance for the Settlement Register (as described in 6.2.5 below).

The processing for calculating a Deemed Meter Advance for each Settlement Register is as follows.

1. For each Settlement Day in the Deemed Meter Advance period, the appropriate Daily Profile Coefficients  $PC_{gptd}$  are retrieved from the Profiles datastore. The Daily Profile Coefficients retrieved depend on:-
  - the Measurement Requirement for the Settlement Register during the Meter Advance Period, where Measurement Requirement is a valid combination of Standard Settlement Configuration Id and Time Pattern Regime Id (represented by the subscript **t**)
  - the GSP Group Id effective for the Metering System on the Settlement Day in question (represented by the subscript **g**)

- the Profile Class Id effective for the Metering System on the Settlement Day in question (represented by the subscript **p**).
2. A Deemed Meter Advance is calculated as follows:

$$\text{Deemed Meter Advance} = \sum_{d=s}^f (\text{PC}_{\text{gptd}} \times \text{EAC}_m)$$

where *s* is the first Settlement Day in the meter advance period, and *f* is the last.  $\text{EAC}_m$  is the EAC or Annualised Advance (as appropriate) supplied by the Data Collector.

The Deemed Meter Advances calculated are output to the Data Collector.

The main exception conditions which may occur when calculating Deemed Meter Advances are as follows:-

1. If Daily Profile Coefficients are not found for the combination of GSP Group, Profile Class, Standard Settlement Configuration and Time Pattern Regime effective on any Settlement Day within the meter advance period, the Deemed Meter Advance is not processed and an exception is reported back to the Data Collector.
2. If the input data supplied by the Data Collector is incomplete or invalid.

### **6.2.5 Background to Process 1.4**

This section provides background information regarding the meaning of the Deemed Meter Advance Period submitted by the Data Collector to process 1.4.

There are two cases in which a Data Collector might require a Deemed Meter Advance to be calculated:

- a) A meter reading has been taken after the date on which the Metering System was registered to a new Supplier and a Meter Advance calculated for the period spanning the date of the new registration. The Data Collector's requirement is to replace the existing Meter Advance by a Deemed Meter Advance for that segment of the existing advance period in which the Metering System was registered to the old Supplier.
- b) A Metering System has been registered to a new Supplier and no agreed final meter reading is available. The Data Collector's requirement is to calculate a Deemed Meter Advance from date of the last meter reading until the last day on which the Metering System was registered to the old Supplier.

In case (a):-

- the Data Collector will provide the latest Annualised Advance;
- the Effective From Settlement Date of the Deemed Meter Advance Period must be the same as (or later than) the Effective From Settlement Date of the Annualised Advance.

In case (b):-

- the Data Collector will provide the latest EAC;
- the Effective From Settlement Date of the Deemed Meter Advance Period must be the same as the Effective From Settlement Date of the latest EAC.

In both cases (a) and (b):-

- The Effective To Settlement Date will be the day before that on which the new Supplier was appointed to the Metering System.

### **6.2.6 Process 1.5 - Maintain Smoothing Parameter**

This process will allow the Data Collector to maintain the Smoothing Parameter used in process 1.2. The Smoothing Parameter value is recorded, together with an Effective Date, which may not be retrospective. The Smoothing Parameter value must be a positive number.

### 6.2.7 Process 1.6 – Calculate Ad Hoc Deemed Meter Reading

This process handles requests to calculate an Ad Hoc Deemed Meter Reading,

Via the user interface, the user will enter the following details:

The Metering System Id, the Standard Settlement Configuration Id and GSP Group Id (which must be constant for the period of calculation), the Profile Class Ids for all dates within the calculation, the Time Pattern Regime Ids, the two existing meter readings and their corresponding dates for each Time Pattern Regime Id (and in case of a negative advance, whether this is a rollover or a genuine negative advance), the number of register digits for each settlement register and the Deemed Reading Date.

The processing for calculating a Deemed Meter Reading for each Settlement Register is as follows:

1. Calculate the Meter Advance between the two existing readings entered. Where  $M_1$  is the earliest existing meter reading entered,  $M_2$  is the latest existing meter reading entered and  $n$  is the number of register digits. Usually this will be equal to  $(M_2 - M_1)$  however if a rollover has occurred, this will be equal to  $(10^n + M_2 - M_1)$ .

2. Calculate the Annualised Advance from the Meter Advance using the equation:

Annualised Advance = Meter Advance / Fraction of Yearly Consumption.

The fraction of the yearly consumption covered by the advance is calculated as:

$$\text{Fraction of Yearly Consumption (FYC}_m) = \sum_{d=s}^f PC_{gptd}$$

where  $s$  is the first Settlement Day ( $M_1$ ) in the meter advance period, and  $f$  is the last ( $M_2 - 1$ ).

If the Fraction of Yearly Consumption is non-zero, a new Annualised Advance is calculated as:

Annualised Advance = Meter Advance / Fraction of Yearly Consumption

N.B. a meter advance may be negative, in which case the Annualised Advance will also be negative.

If the Fraction of Yearly Consumption is zero and the meter advance is zero, the Annualised Advance is set to zero.

For each Settlement Day ( $d$ ) in the meter advance period, the appropriate Daily Profile Coefficients  $PC_{gptd}$  are retrieved from the Profiles datastore. The Daily Profile Coefficients retrieved depend on:

- the Measurement Requirement for the Settlement Register during the Meter Advance Period, where Measurement Requirement is a valid combination of Standard Settlement Configuration Id and Time Pattern Regime Id (represented by the subscript  $t$ );
- the GSP Group Id effective for the Metering System on the Settlement Day in question (represented by the subscript  $g$ );
- the Profile Class Id effective for the Metering System on the Settlement Day in question (represented by the subscript  $p$ ).

3. If the Annualised Advance exceeds either the upper or lower GSP Group Profile Class Tolerance for the GSP Group and Profile Class associated with MSID in question, then an exception is reported.

4. Calculate the Deemed Meter Advance. The Deemed Meter Advance Period will depend on whether the Deemed Reading Date is before, between or after both existing meter readings.

If the Deemed Reading Date is before the dates of both existing meter readings, the Deemed Meter Advance Period will be from the day of  $M_3$  (the Deemed Meter Reading) to the day before  $M_1$ .

If the Deemed Reading Date is between the dates of both existing meter readings, the Deemed Meter Advance Period will be from the day of  $M_1$  to the day before  $M_3$ .

If the Deemed Reading Date is after the dates of both existing meter readings, the Deemed Meter Advance Period will be from the day of  $M_2$  to the day before  $M_3$ .

Once this has been determined, the Deemed Meter Advance can be calculated using the following equation:

$$\text{Deemed Meter Advance} = \sum_{d=s}^f (PC_{gptd} \times AA_m)$$

where  $s$  is the first Settlement Day (in the meter advance period, and  $f$  is the last.  $AA_m$  is the Annualised Advance.

For each Settlement Day ( $d$ ) in the Deemed Meter Advance period, the appropriate Daily Profile Coefficients  $PC_{gptd}$  are retrieved from the Profiles datastore. The Daily Profile Coefficients retrieved depend on:-

- the Measurement Requirement for the Settlement Register during the Meter Advance Period, where Measurement Requirement is a valid combination of Standard Settlement Configuration Id and Time Pattern Regime Id (represented by the subscript  $t$ )
- the GSP Group Id effective for the Metering System on the Settlement Day in question (represented by the subscript  $g$ )
- the Profile Class Id effective for the Metering System on the Settlement Day in question (represented by the subscript  $p$ ).

The main exception condition which may occur when calculating Deemed Meter Advances is as follows:-

1. If Daily Profile Coefficients are not found for the combination of GSP Group, Profile Class, Standard Settlement Configuration and Time Pattern Regime effective on any Settlement Day within the meter advance period, the Deemed Meter Advance is not processed and an exception is reported.

5. Calculate the Deemed Meter Reading. This calculation varies depending on whether the Deemed reading Date is before, between or after both existing meter readings.

- If the Deemed Reading Date is earlier than both existing meter reading dates, the Deemed Meter Reading will be equal to  $M_1 - \text{DMA}$ .
- If the Deemed Reading Date is between both existing meter reading dates, the Deemed Meter Reading will be equal to  $M_1 + \text{DMA}$ .
- If the Deemed Reading Date is later than both existing meter reading dates, the Deemed Meter Reading will be equal to  $M_2 + \text{DMA}$ .

In all three cases, if the Deemed Meter Reading is less than zero, add  $10^n$  (where n is the number of register digits) until the Deemed Meter Reading is between zero and  $(10^n)-1$ .

If the Deemed Meter Reading is greater than or equal to  $10^n$  (where n is the number of register digits), subtract  $10^n$  from it until the Deemed Meter Reading is between zero and  $(10^n)-1$ .

**6.2.8 Process 1.7 – Maintain GSPGPC Default EAC**

This process will allow the Data Collector to maintain the GSPGPC Default EAC used in process 1.2. The GSPGPC Default EAC must be a positive number. It is recorded together with the following data: GSP Group Id, Profile Class Id, Effective From Settlement Date {GGPCDEAC}.

**6.2.9 Process 1.8 – Receive AFYC**

This process will allow the Data Collector to load Average Fraction of Yearly Consumption (AFYC) values used in process 1.2. The AFYC value must be a positive number. It is recorded together with the following data: Standard Settlement Configuration Id, Profile Class Id, Time Pattern Regime Id, GSP Group Id, Effective From Settlement Date {AFYC}, Effective To Settlement Date {AFYC}.

**6.3 Cross Reference to Business Process Model**

The high-level processes in the Business Process Model (BPM) in Appendix A of the Operational Framework (Reference 1) map directly to the Context Diagram and Data Flow Diagram (DFD) for Estimation of Annual Consumption. The table below summarises the mapping and identifies which high-level processes in the Business Process Model appear as external entities in the EAC/AA system DFD (or context diagram) :

Business Process Model		EAC/AA DFD Name	
Number	Name	Name	Type
1	Calculate profile shape (including switching)	ISR Agent	External Entity
3	Process non-HH meter data	Non-HH Data Collector	External Entity
4	Calculate EAC & AA from meter advance & old EAC	1 Estimation of Annual Consumption	Process
5	Aggregate non-HH data	Non-HH Data Aggregator	External Entity (Context Diagram)
15	Update Registration history of Supplier's MSIDs	Supplier Non-HH Data Collector	External Entity External Entity (Context Diagram)

## 6.4 External Entity Descriptions

<b>Ext. Entity</b>	<b>Description</b>	<b>Notes</b>
ISR Agent	The Pool approved agent responsible for operating the Initial Settlement & Reconciliation Agency (ISRA) system.	
Market Domain Data Agent	The Market Domain Data Agent provides a central point of co-ordination across the 1998 Trading Arrangements. It is responsible for the maintenance and distribution of Market Domain Data.	Context Diagram only
Non-HH Data Aggregator	The Non Half Hour Data Aggregator is an organisation accredited by the Pool Accreditation Body to aggregate EACs and AAs for non half hourly meters and those unmetered supplies that are treated as non half hourly meters for the purpose of settlement.	Context Diagram only
Non-HH Data Collector	The Non Half Hour Data Collector is an organisation accredited by the Pool Accreditation Body to carry out Data Retrieval and Data Processing for non half hourly metering data. The Data Collector may be appointed by a customer, but must always be accredited and contracted to the customer's Supplier.	
Supplier	An organisation with a Supply Licence which is appointed to supply energy to particular metering systems.	Context Diagram only

## 6.5 I/O Descriptions

The attributes for each flow are listed in the data flow descriptions section of this document.

<b>Data Flow Name</b>	<b>From</b>	<b>To</b>	<b>Comments</b>
Daily Profile Coefficients	External entity ISR Agent	Process 1.1 Receive Daily Profiles	A set of Daily Profile Coefficients for a particular GSP Group and Settlement Day.
Deemed Meter Advance	Process 1.4 Calculate Deemed Meter Advance	Non-HH Data Collector	A Deemed Meter Advance, calculated at the request of the Data Collector, when an actual Meter Advance cannot be agreed on change of Supplier.
Deemed Meter Advance Request	External entity Non-HH Data Collector	Process 1.4 Calculate Deemed Meter Advance	A request issued to system by Data Collector to calculate a Deemed Meter Advance, where no Meter Advance can be agreed on change of Supplier.

**URS - Estimation of Annual Consumption (EAC/AA) System**

Data Flow Name	From	To	Comments
EAC/AA	Process 1.2 Calculate Annualised Advance and EAC	Non-HH Data Collector	The Estimated Annual Consumption (EAC) and Annualised Advance requested by a Data Collector.
EAC/AA Request	External entity Non-HH Data Collector	Process 1.2 Calculate Annualised Advance and EAC	A request for calculation of an Annualised Advance and, except when the Profile Class of the Metering System has changed, an EAC. The request will include the Meter Advances for a Settlement Register of a non half hour metering system, together with the Standard Settlement Configuration, GSP Group(s) and Profile Class(es) effective during the meter advance period.
Smoothing Parameter	External entity Non-HH Data Collector	Process 1.5 Maintain Smoothing Parameter	A standard positive factor, supplied by the Market Domain Data Agent, which determines how much weight is given to an Annualised Advance and how much is given to the previous EAC, when calculating a new EAC.
Ad Hoc Deemed Meter Reading Request	External entity Non-HH Data Collector	Process 1.6 Calculate Ad Hoc Deemed Meter Reading	An auditable request manually issued to the system by the Data Collector to calculate a Deemed Meter Reading
Ad Hoc Deemed Meter Reading	Process 1.6 Calculate Ad Hoc Deemed Meter Reading	External entity Non-HH Data Collector	A Deemed Meter Reading, calculated at the request of the Data Collector that is auditable and in accordance with the DMA equations in Annex S-2 of the BSC

Data Flow Name	From	To	Comments
GSPGPC Default EAC	External entity Market Domain Data Agent	Process 1.7 Maintain GSPGPC Default EAC	A standard positive value, supplied by the Market Domain Data Agent, which determines the GSPGPC Default EAC to replace negative EAC for a given combination of: GSP Group, Profile Class, Effective From Settlement Date {GGPCDEAC}.
AFYC	External entity Market Domain Data Agent	Process 1.8 Receive AFYC	A standard positive value, supplied by the Market Domain Data Agent, which determines the Average Fraction of Yearly Consumption for a given combination of: Standard Settlement Configuration, Profile Class, Time Pattern Regime, GSP Group, Effective From Settlement Date {AFYC} and Effective To Settlement Date {AFYC}.

**6.6 Data Flow Descriptions**

This section lists the data items for each data flow shown on the Data Flow Diagram (section 6.2).

Estimated volumes of the main external dataflows, i.e. EAC/AA Request & Daily Profile Coefficients, are included in the Requirements Catalogue.

**6.6.1 Daily Profile Coefficients**

From/To:

- External entity ISR Agent  
to Process 1 Estimation of Annual Consumption
- External entity ISR Agent  
to Process 1.1 Receive Daily Profiles
- Process 1.1 Receive Daily Profiles  
to Data store D1/1 Profiles
- Data store D1/1 Profiles  
to Process 1.2 Calculate Annualised Advance and EAC
- Data store D1/1 Profiles  
to Process 1.4 Calculate Deemed Meter Advance
- Data store D1/1 Profiles  
to Process 1.6 Calculate Deemed Meter Reading

Data Items:

Daily Profile Coefficient  
GSP Group Id  
Profile Class Id  
Settlement Date  
Standard Settlement Configuration Id  
Time Pattern Regime Id

### **6.6.2 Deemed Meter Advance**

From/To:

Process 1 Estimation of Annual Consumption  
to External entity Non-HH Data Collector  
Process 1.4 Calculate Deemed Meter Advance  
to External entity Non-HH Data Collector

Data Items:

Deemed Meter Advance  
Effective From Settlement Date {DMA}  
Effective To Settlement Date {DMA}  
Metering System Id  
Standard Settlement Configuration Id  
Time Pattern Regime Id

### **6.6.3 Deemed Meter Advance Request**

From/To:

External entity Non-HH Data Collector  
to Process 1 Estimation of Annual Consumption  
External entity Non-HH Data Collector  
to Process 1.4 Calculate Deemed Meter Advance

Data Items:

Annualised Advance  
Effective From Settlement Date {DMA}  
Effective From Settlement Date {MSGG}  
Effective From Settlement Date {MSPC}  
Effective To Settlement Date {DMA}  
Estimated Annual Consumption  
GSP Group Id  
Metering System Id  
Profile Class Id  
Standard Settlement Configuration Id  
Time Pattern Regime Id

### **6.6.4 Deemed Meter Reading**

From/To:

Process 1 Estimation of Annual Consumption  
to External entity Non-HH Data Collector  
Process 1.6 Calculate Deemed Meter Reading  
to External entity Non-HH Data Collector

Data Items:

Transaction Number  
Date and Time of Calculation  
Deemed Meter Reading  
Deemed Meter Reading Date  
Calculation Failure Reason  
Metering System Id  
Standard Settlement Configuration Id  
GSP Group Id  
Profile Class Id  
Effective From Settlement Date {MSPC}

Time Pattern Regime Id  
Register Id  
Register Digits  
Negative Advance Rollover

### **6.6.5 Deemed Meter Reading Request**

From/To:

External entity Non-HH Data Collector  
to Process 1 Estimation of Annual Consumption  
External entity Non-HH Data Collector  
to Process 1.6 Calculate Deemed Meter Reading

Data Items:

Metering System Id  
Standard Settlement Configuration Id  
GSP Group Id  
Profile Class Id  
Effective From Settlement Date {MSPC}  
First Meter Reading  
Second Meter Reading  
First Meter Reading Date  
Second Meter Reading Date  
Deemed Meter Reading Date  
Time Pattern Regime Id  
Register Id  
Register Digits  
Negative Advance Rollover  
User Id

### **6.6.6 Deemed Meter Reading Report**

From/To:

Process 1 Estimation of Annual Consumption  
to External entity Non-HH Data Collector  
Data store D1/3 Deemed Meter Reading  
to External entity Non-HH Data Collector

Data Items:

Transaction Number  
Deemed Meter Reading  
Deemed Meter Reading Date  
Calculation Failure Reason  
Date and Time of Calculation  
Metering System Id  
Standard Settlement Configuration Id  
GSP Group Id  
Profile Class Id  
Effective From Settlement Date {MSPC}  
Time Pattern Regime Id  
Register Id  
Register Digits  
First Meter Reading  
Second Meter Reading  
First Meter Reading Date  
Second Meter Reading Date  
Negative Advance Rollover  
User Id

### **6.6.7 EAC and AA Reports**

From/To:  
External entity Non-HH Data Collector  
to External entity Supplier

### **6.6.8 EACs and AAs**

From/To:  
External entity Non-HH Data Collector  
to External entity Non-HH Data Aggregator

### **6.6.9 EAC/AA**

From/To:  
Process 1.2 Calculate Annualised Advance and EAC  
to External entity Non-HH Data Collector  
Process 1 Estimation of Annual Consumption  
to External entity Non-HH Data Collector

Data Items:  
Annualised Advance  
Effective From Settlement Date {EAC}  
Effective From Settlement Date {MAC}  
Effective To Settlement Date {MAC}  
Estimated Annual Consumption  
Metering System Id  
Standard Settlement Configuration Id  
Time Pattern Regime Id

### **6.6.10 EAC/AA Request**

From/To:  
External entity Non-HH Data Collector  
to Process 1.2 Calculate Annualised Advance and EAC  
External entity Non-HH Data Collector  
to Process 1 Estimation of Annual Consumption

Data Items:  
Effective From Settlement Date {EAC}  
Effective From Settlement Date {MAC}  
Effective From Settlement Date {MSGG}  
Effective From Settlement Date {MSPC}  
Effective To Settlement Date {MAC}  
Estimated Annual Consumption  
GSP Group Id  
Meter Advance  
Metering System Id  
Profile Class Id  
Standard Settlement Configuration Id  
Time Pattern Regime Id

### **6.6.11 Metering System Data & Aggregator Appointments**

From/To:  
External entity Supplier  
to External entity Non-HH Data Collector

### **6.6.12 Smoothing Parameter**

From/To:  
External entity Non-HH Data Collector  
to Process 1 Estimation of Annual Consumption  
External entity Market Domain Data Agent

to External entity Non-HH Data Collector  
External entity Non-HH Data Collector  
to Process 1.5 Maintain Smoothing Parameter  
Process 1.5 Maintain Smoothing Parameter  
to Data store D1/2 Smoothing Parameter  
Data store D1/2 Smoothing Parameter  
to Process 1.2 Calculate Annualised Advance and EAC

Data Items:  
Effective From Settlement Date {SPAR}  
Smoothing Parameter

#### **6.6.13 Supplier Purchase Matrix Data**

From/To:  
External entity Non-HH Data Aggregator  
to External entity ISR Agent

#### **6.6.14 GSPGPC Default EAC**

From/To:  
External entity Non-HH Data Collector  
to Process 1 Estimation of Annual Consumption  
External entity Market Domain Data Agent  
to External entity Non-HH Data Collector  
External entity Non-HH Data Collector  
to Process 1.7 Maintain GSPGPC Default EAC  
Process 1.7 Maintain GSPGPC Default EAC  
to Data Store: D1/4 GSPGPC Default EAC  
Data Store D1/4 GSPGPC Default EAC  
to Process 1.2 Calculate Annualised Advance and EAC

Data Items:  
GSP Group Id  
Profile Class Id  
Effective From Settlement Date {GGPCDEAC}  
GSPGPC Default EAC

#### **6.6.15 AFYC**

From/To:  
External entity Market Domain Data Agent  
to Process 1 Estimation of Annual Consumption  
External entity Market Domain Data Agent  
to Process 1.8 Receive AFYC  
Process 1.8 Receive AFYC  
to Data Store: D1/5 AFYC  
Data Store D1/5 AFYC  
to Process 1.2 Calculate Annualised Advance and EAC

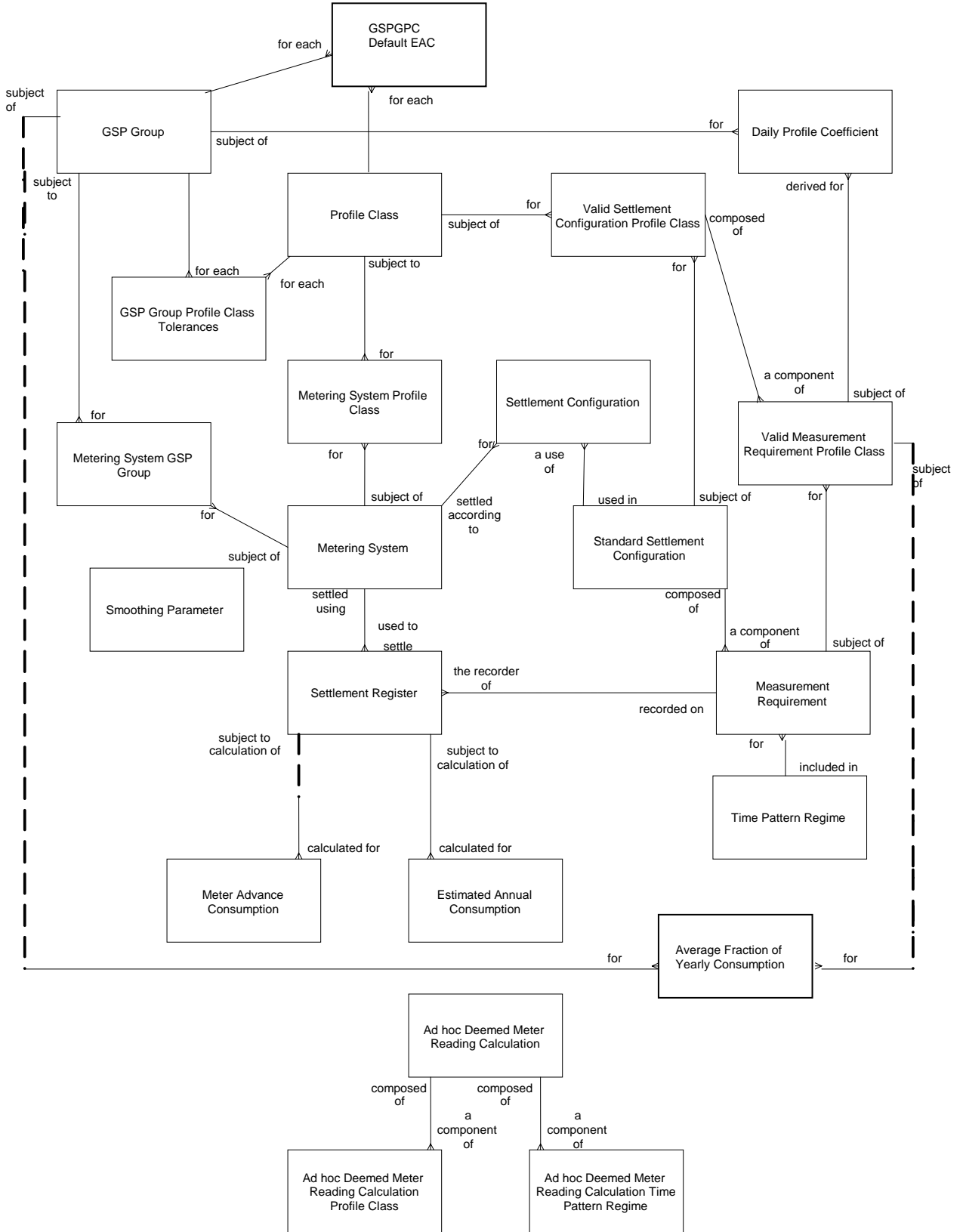
Data Items:  
Standard Settlement Configuration Id  
Profile Class Id  
Time Pattern Regime Id  
GSP Group Id  
Effective From Settlement Date {AFYC}  
Effective To Settlement Date {AFYC}  
Average Fraction of Yearly Consumption

## **7 LOGICAL DATA MODEL**

### **7.1 Purpose and Scope**

1. The EAC/AA system Logical Data Model describes the data of interest to the Estimation of Annual Consumption system.
2. The model covers the groupings of data items which are required by the EAC/AA system to perform the processes within its scope. It is **not** the basis for a database design. There is no requirement for the system database to contain details of any entity other than Daily Profile Coefficient, Smoothing Parameter, Ad Hoc Deemed Meter Reading Calculation, Ad Hoc Deemed Meter Reading Calculation Profile Class and Ad Hoc Deemed Meter Reading Calculation Time Pattern Regime. The additional entities are included in order to illustrate the structure of the input and output data.
3. The model consists of:
  - A Logical Data Structure (LDS) diagram;
  - Entity Descriptions;
  - List of the main attributes for each entity. The primary key attributes are indicated by a 'p', foreign key attributes are indicated by an asterisk and optional attributes by an 'o'.
4. Descriptions of all data items are given in the Data Catalogue in Appendix B.
5. A key to the LDS notation used in the diagram is given in Appendix C.
6. Estimated volumes for the Daily Profile Coefficients entity are given in the Requirements Catalogue (volumes for the Smoothing Parameter entity will be negligible).

7.2 Logical Data Structure



N.B. The only entities shown that are required to be stored in the system database are Daily Profile Coefficient, GSP Group Profile Class Tolerances and Smoothing Parameter, Ad Hoc Deemed Meter Reading Calculation, Ad Hoc Deemed Meter Reading Calculation Profile Class, Ad Hoc Deemed Meter Reading Calculation Time Pattern Regime, GSPGPC Default EAC , and Average Fraction of Yearly Consumption.

## **7.3 Entity Descriptions**

N.B. Only eight of the entities described in this section, Daily Profile Coefficient, GSP Group Profile Class Tolerances, Smoothing Parameter, Ad Hoc Deemed Meter Reading Calculation, Ad Hoc Deemed Meter Reading Calculation Profile Class, Ad Hoc Deemed Meter Reading Calculation Time Pattern Regime, GSPGPC default EAC, and Average Fraction of Yearly Consumption are required to be stored in the system database.

Note that only those attributes that are relevant to the EAC/AA system are listed against entities. Thus, in some cases the attributes listed for an entity may differ from those listed against the entity in other URSs delivered as part of the ISR Project.

### **7.3.1 Ad Hoc Deemed Meter Reading Calculation**

**Description :** A Deemed Meter Advance Calculation initiated by the user.

Contains Attributes

p Transaction Number  
Metering System Id  
Standard Settlement Configuration Id  
GSP Group Id  
First Meter Reading Date  
Second Meter Reading Date  
Deemed Meter Reading Date  
Date and Time of Calculation  
User Id

### **7.3.2 Ad Hoc Deemed Meter Reading Calculation Profile Class**

**Description :** A Profile Class applicable to a Deemed Meter Advance Calculation initiated by the user.

Contains Attributes

p\* Transaction Number  
p Profile Class Id  
p Effective From Settlement Date {MSPC}

### **7.3.3 Ad Hoc Deemed Meter Reading Calculation Time Pattern Regime**

**Description:** A Time Pattern Regime applicable to a Deemed Meter Advance Calculation initiated by the user.

Contains Attributes

p\* Transaction Number  
p Entry Number  
Time Pattern Regime Id  
Register Id  
Register Digits  
First Meter Reading  
Second Meter Reading  
Negative Advance Rollover  
Annualised Advance  
Deemed Meter Advance  
Deemed Meter Reading  
Calculation Failure Reason

### 7.3.4 Average Fraction of Yearly Consumption

**Description:** A specification of the average fraction of consumption which is attributed to a particular Measurement Requirement, in the context of a particular GSP Group, Standard Settlement Configuration and Profile Class.

Contains Attributes

- p \* Standard Settlement Configuration Id
- p \* Profile Class Id
- p \* Time Pattern Regime Id
- p \* GSP Group Id
- p Effective From Settlement Date {AFYC}
- Effective To Settlement Date {AFYC}
- Average Fraction of Yearly Consumption

### 7.3.5 Daily Profile Coefficient

**Description:** The sum of all Period Profile Coefficients for a Settlement Day, within a GSP Group, for a valid Profile Class and Measurement Requirement combination, as defined by the Pool.

Contains Attributes

- p \* Standard Settlement Configuration Id
- p \* Time Pattern Regime Id
- p \* Profile Class Id
- p \* GSP Group Id
- p Settlement Date
- Daily Profile Coefficient

### 7.3.6 Estimated Annual Consumption

**Description:** The Estimated Annual Consumption attributed to a Settlement Register for the purpose of Initial Settlement and Reconciliation. Initial EACs are supplied by the Host PES Distribution Business at market inception or when a new Metering System is registered. Subsequent EACs are calculated by the Data Collector. EACs must be supplied or calculated for each Settlement Register of non-HH Metering Systems. EACs will also be supplied for profiled Unmetered Supplies. Each Settlement Register will, for Settlement Days subsequent to the last meter reading, have one active Estimated Annual Consumption (EAC).

The EAC is used for profiling when the Settlement Day falls after the last Meter Reading date.

Contains Attributes

- p \* Metering System Id
- p \* Standard Settlement Configuration Id
- p \* Time Pattern Regime Id
- p Effective From Settlement Date {EAC}
- Estimated Annual Consumption

### 7.3.7 GSP Group

**Description:** A distinct electrical system, consisting of all or part of a distribution system (owned and operated by a Distributor) that is supplied from one or more Grid Supply Points for which the total supply into the GSP Group can be determined for each half hour.

Contains Attributes

- p GSP Group Id

### 7.3.8 GSPGPC Default EAC

**Description:** A default class average EAC for given GSP Group and Profile Class

Contains Attributes

- p\* GSP Group Id
- p\* Profile Class Id
- p Effective From Settlement Date {GGPCDEAC}  
GSPGPC Default EAC

### **7.3.9 GSP Group Profile Class Tolerances**

**Description:** An agreed set of upper and lower limits for each GSP Group and Profile Class against which calculated Annualised Advances are compared to check their validity.

Contains Attributes

- p \* GSP Group Id
- p \* Profile Class Id
- p Effective from date
- p Effective to date
- Lower Limit
- Upper Limit

### **7.3.10 Measurement Requirement**

**Description:** A Standard Settlement Configuration requirement for consumption (i.e. active import) to be measured during a Time Pattern Regime.

Contains Attributes

- p \* Standard Settlement Configuration Id
- p \* Time Pattern Regime Id

### **7.3.11 Meter Advance Consumption**

**Description:** The Annualised Advance calculated for a Settlement Register from a Meter Advance. An Annualised Advance in kWh is calculated for all non-half hourly meters. This Annualised Advance is available for profiling for Settlement Days during the Meter Advance Period.

Contains Attributes

- p \* Metering System Id
- p \* Standard Settlement Configuration Id
- p \* Time Pattern Regime Id
- p \* Effective From Settlement Date {MAC}
- Effective to Settlement Date {MAC}
- Annualised Advance
- Meter Advance

### **7.3.12 Metering System**

**Description:** A Metering System is a meter or configuration of meters, for which a Supplier registers liability for consumption and contracts with a Customer, Data Collector and Meter Operator. An unmetered supply will be assigned a Metering System Id and will be recorded as a pseudo Metering System.

Contains Attributes

- p \* Metering System Id
- Measurement Class Id

### **7.3.13 Metering System GSP Group**

**Description:** The GSP Group to which a Metering System is allocated for Settlement and Reconciliation purposes. The Metering System may change GSP Groups over time.

Contains Attributes

- p \* Metering System Id
- \* GSP Group Id
- p Effective From Settlement Date {MSGG}

#### **7.3.14 Metering System Profile Class**

**Description:** The Profile Class to which a Metering System is allocated. A Metering System may change Profile Classes over time.

Contains Attributes

- p \* Metering System Id
- \* Profile Class Id
- p Effective From Settlement Date {MSPC}

#### **7.3.15 Profile Class**

**Description:** A classification of profile which represents an exclusive category of Customers whose consumption can be reasonably approximated to a common profile for the purpose of attributing an Estimated Annual Consumption or Annualised Advance to individual half hours for Settlement purposes.

Valid initial set is:

domestic, unrestricted

domestic, economy 7

non-domestic, non maximum demand, unrestricted

non-domestic, non maximum demand, economy 7

non-domestic, maximum demand, load factor 0 - 20%

non-domestic, maximum demand, load factor 20 - 30%

non-domestic, maximum demand, load factor 30 - 40%

non-domestic, maximum demand, load factor 40 - 100%

Contains Attributes

- p Profile Class Id
- Profile Class Description

#### **7.3.16 Settlement Configuration**

**Description:** The Standard Settlement Configuration which applies to a Metering System.

Contains Attributes

- p \* Metering System Id
- \* Standard Settlement Configuration Id
- p Effective From Settlement Date {SCON}

#### **7.3.17 Settlement Register**

**Description:** A logical register of a Metering System to which consumption is required to be attributed for the purpose of Initial Settlement and Reconciliation. A Non Half Hourly Metering System has one Settlement Register for each Measurement Requirement in the Metering System's Standard Settlement Configuration.

Contains Attributes

- p \* Metering System Id
- p \* Standard Settlement Configuration Id
- p \* Time Pattern Regime Id

### **7.3.18 Smoothing Parameter**

**Description:** A standard positive factor, supplied by the MDD Agent, which determines how much weight is given to an Annualised Advance and how much is given to the previous EAC, when calculating a new value for an EAC.

Contains Attributes

p Effective From Settlement Date {SPAR}  
Smoothing Parameter

### **7.3.19 Standard Settlement Configuration**

**Description:** A standard configuration, supported by Initial Settlement and Reconciliation, comprising a set of Time Pattern Regimes, which together ensure that the consumption is being measured, without duplication. Settlement Configurations only apply to non half hour Metering Systems.

Contains Attributes

p Standard Settlement Configuration Id  
Standard Settlement Configuration Desc

### **7.3.20 Time Pattern Regime**

**Description:** A pattern of time representing the period or periods in the day when a Settlement Register is recording consumption. Each Time Pattern Regime is either statically controlled by a predefined set of clock intervals or dynamically controlled through teleswitching.

Contains Attributes

p Time Pattern Regime Id

### **7.3.21 Valid Measurement Requirement Profile Class**

**Description:** A valid combination of Profile Class and Measurement Requirement (where a Measurement Requirement comprises a Standard Settlement Configuration and Time Pattern Regime) for which Daily Profile Coefficients are produced by the ISRA system.

Contains Attributes

p \* Profile Class Id  
p \* Standard Settlement Configuration Id  
p \* Time Pattern Regime Id

### **7.3.22 Valid Settlement Configuration Profile Class**

**Description:** A rule defining the valid Standard Settlement Configurations for a Profile Class.

Contains Attributes

p \* Profile Class Id  
p \* Standard Settlement Configuration Id

## 8 ENTITY/DATASTORE CROSS REFERENCE

The table below gives the entities in the Logical Data Model which correspond to each data store in the Data Flow Model.

<b>ID:</b>	<b>Data Store:</b>	<b>Description:</b>	<b>Entities:</b>
D1/1	Profiles	Consumption profiles calculated daily by ISRA for each GSP Group from regression equations.	Daily Profile Coefficient
D1/2	Smoothing Parameter	The Smoothing Parameter used in calculating EACs.	Smoothing Parameter
D1/3	Deemed Meter Reading	The data resulting from a successfully initiated request for an Ad Hoc Deemed Meter Reading Calculation	Ad Hoc Deemed Meter Reading Calculation Ad Hoc Deemed Meter Reading Calculation Profile Class Ad Hoc Deemed Meter Reading Calculation Time Pattern Regime
D1/4	GSPGPC Default EAC	The EAC value used in calculating a default EAC to replace a negative EAC.	GSPGPC Default EAC
D1/5	AFYC	The Average Fraction of Yearly Consumption used in calculating a default EAC to replace a negative EAC.	Average Fraction of Yearly Consumption

## 9 FUNCTION DESCRIPTIONS AND EVENTS

### 9.1 Function Descriptions

#### 9.1.1 Archive Daily Profile Coefficients

**Description:** Allows the removal of Daily Profile Coefficients and smoothing parameters from the system to a secure storage medium once they are no longer required.

Triggered by Event

Daily Profile Coefficients & Smoothing Parameters Archived

Implemented By Process

\*\* None \*\*

#### 9.1.2 Determine Ad Hoc Deemed Meter Reading

**Description:** This function allows the calculation of Deemed Meter Readings from data input by the user

Triggered by Event

Request for Ad Hoc Deemed Meter Reading Calculation

Implemented By Process

Calculate Ad Hoc Deemed Meter Reading

#### 9.1.3 Determine Deemed Meter Advance

**Description:** This function determines a deemed meter advance for a metering system on request from the Data Collector.

Triggered by Enquiry

Request for Deemed Advance

Implemented By Process

Calculate Deemed Meter Advance

#### 9.1.4 Estimate Annual Consumption

**Description:** This function calculates EACs and AAs from meter advances provided by the Data Collector.

Triggered by Enquiry

EAC/AA Request

Implemented By Process

Calculate Annualised Advance and EAC

#### 9.1.5 Load Daily Profiles

**Description:** This function loads a file of Daily Profile Coefficients received from the ISRA system for a particular Settlement Day.

Triggered by Event

Daily Profile Coefficients Received

Implemented By Process

Receive Daily Profiles

### **9.1.6 Report on Ad Hoc Deemed Meter Reading Calculations**

**Description:** This function allows the user to generate reports on the results of Ad Hoc Deemed Meter Reading Calculations

Triggered by Enquiry

Enquiry on Results of Ad Hoc Deemed Meter Reading Calculation

Implemented by Process

Calculate Ad Hoc Deemed Meter Reading

### **9.1.7 Specify Smoothing Parameter**

**Description:** This function allows the smoothing parameter used in calculating EACs to be maintained.

Triggered by Event

Smoothing Parameter Deleted

Smoothing Parameter Entered

Implemented By Process

Maintain Smoothing Parameter

### **9.1.8 Maintain GSPGPC Default EAC**

**Description:** This function allows the GSPGPC Default EAC to be maintained.

Triggered by Event

GSPGPC Default EAC Entered

GSPGPC Default EAC Updated

Implemented by Process

Maintain GSPGPC Default EAC

### **9.1.9 Receive AFYC**

**Description:** This function allows the Average Fraction of Yearly Consumption values to be loaded.

Triggered by Event

AFYC Received

Implemented by Process

Receive AFYC

**9.2 Entity Event Matrix**

EVENTS	ENTITY						
	Daily Profile Coefficient	Smoothing Parameter	Ad Hoc Deemed Meter Reading Calculation	Ad Hoc Deemed Meter Reading Profile Class	Average Fraction of Yearly Consumption	GSPGPC Default EAC	Ad Hoc Deemed Meter Reading Time Pattern Regime
Daily Profile Coefficients Received	CU						
Profile Data Archived	D	D					
Smoothing Parameter Entered		C					
Smoothing Parameter Deleted		D					
Request for Ad Hoc Deemed Meter Reading Calculation			C	C			C
GSPGPC Default EAC Entered						C	
GSPGPC Default EAC Updated						U	
AFYC Received					CU		

Note that Daily Profile Coefficient, Smoothing Parameter, Ad Hoc Deemed Meter Reading Calculation, Ad Hoc Deemed Meter Reading Calculation Profile Class, Ad Hoc Deemed Meter Reading Calculation Time Pattern Regime, GSPGPC Default EAC and Average Fraction of Yearly Consumption are the only entities stored by the EAC/AA system database. All other entities shown on the LDS will be stored in the Data Collector's own (non-Pool developed) systems.

**9.3 System Events and Enquiries**

AFYC Received

A file of Average Fraction of Yearly Consumption is received from the Non HH Data Collector.

Frequency: Ad Hoc (typically yearly).

EAC/AA Request

A Data Collector provides meter advance(s) for the Settlement Registers of one or more metering systems, and requests the calculation of the corresponding EACs and AAs.

Frequency: Daily.

Daily Profile Coefficients Received

A file of daily profile coefficient data is received from the ISRA system.

Frequency: Daily.

Daily Profile Coefficients & Smoothing Parameters Archived

The decision is taken to archive to removable media profile data which is no longer required.

Frequency: As determined by System Manager.

Enquiry on Results of Ad Hoc Deemed Meter Reading Calculation

The Data Collector requests a report on successfully initiated requests for Ad Hoc Deemed Meter Readings.

Frequency: Ad Hoc (up to Daily)

Request for Deemed Advance

The Data Collector requests a deemed meter advance on change of Supplier.

Frequency: Ad Hoc (up to Daily)

Request for Ad Hoc Deemed Meter Reading Calculation

The Data Collector requests an Ad Hoc Deemed Meter Reading based on data manually entered.

Frequency: Ad Hoc (up to Daily)

Smoothing Parameter Deleted

A previously entered value of the Smoothing Parameter is deleted. This may occur because the value has been superseded and is no longer required, or because it was entered in error.

Frequency: Ad Hoc (occasional)

Smoothing Parameter Entered

A new value is specified for the Smoothing Parameter, together with the date on which it becomes effective.

Frequency: Ad Hoc (occasional)

GSPGPC Default EAC Entered

A Data Collector provides a GSPGPC Default EAC value for a given GSP Group and Profile Class, together with the date it becomes effective.

Frequency: Ad Hoc (occasional).

GSPGPC Default EAC Updated

A Data Collector updates the GSPGPC Default EAC for a given GSP Group and Profile Class, together with the date it becomes effective.

Frequency: Ad Hoc (occasional).

## 10 USER ROLES

### 10.1 User Catalogue

The User Catalogue defines all on-line Users of the required system and the tasks associated with them.

<b>Job Title</b>	<b>Job Activities Description</b>
Data Collector	<p>Administrator of EAC/AA system for one or more Suppliers. The activities of this job cover the operation of the EAC/AA system. This includes the following:</p> <ul style="list-style-type: none"> <li>• monitoring and support of the operation of the system</li> <li>• monitoring and support of the operation of the interfaces</li> <li>• system monitoring for performance and capacity</li> <li>• checking the electronic collection of profile data</li> <li>• initiating EAC/AA Calculation runs</li> <li>• initiating Deemed Meter Advance Calculation runs</li> <li>• initiating Ad Hoc Deemed Meter Reading Calculations</li> <li>• managing system users, user access and user roles</li> <li>• managing audit, security and control</li> <li>• managing backup, recovery and archive</li> </ul>

### 10.2 User Roles

The User Roles define, at the highest level, the different roles performed, the jobs performed and the job descriptions.

<b>User Role</b>	<b>Job Title</b>	<b>Activities</b>
EAC/AA System Operator	Data Collector	<ul style="list-style-type: none"> <li>• checking the electronic collection of daily profile data</li> <li>• initiating EAC/AA system runs</li> </ul>
EAC/AA System Manager	Data Collector	<ul style="list-style-type: none"> <li>• system monitoring for performance and capacity</li> <li>• managing audit, security and control</li> <li>• managing backup, recovery and archive</li> <li>• create, modify and delete EAC/AA users (CP933)</li> </ul>
EAC/AA Operations Supervisor	Data Collector	<ul style="list-style-type: none"> <li>• monitoring and support of the operation of the system</li> <li>• monitoring the support of the operation of the interfaces</li> <li>• initiating requests for Ad Hoc Deemed Meter Readings (CP1081)</li> <li>• Generating Ad Hoc Deemed Meter Reading Audit Reports (CP1081)</li> </ul>
EAC/AA System Auditor	Data Collector	<ul style="list-style-type: none"> <li>• examining database data</li> <li>• examining exception and run logs</li> <li>• examining audit trails</li> <li>• Generating Ad Hoc Deemed Meter Reading Audit Reports (CP1081)</li> </ul>

### 10.3 Organisational Roles

The 1998 Trading Arrangements identifies a number of 'roles' which may be undertaken by different organisations. These are not users of the EAC/AA system, but they are related to the EAC/AA system in that they may be such sources or recipients of data from the EAC/AA system, either directly or indirectly via the Data Collector.

1998 Role	Organisation	1998 Functions
Non-HH Data Collector	Host PES (to 31/3/2000) Data Collectors	<ul style="list-style-type: none"><li>• Data collection</li><li>• Data Processing</li><li>• EAC Calculation</li><li>• Meter Advance Derivation</li></ul>
Non-HH Data Aggregator	Host PES (to 31/3/2000) Data Aggregators	<ul style="list-style-type: none"><li>• Supplier Data Aggregation</li></ul>
ISR Agent	ISR Agent(s)	<ul style="list-style-type: none"><li>• Daily Profile Production</li><li>• Initial Settlement Calculation</li><li>• Reconciliation Calculation</li></ul>
Market Domain Data Agent	ISR Agent	<ul style="list-style-type: none"><li>• Market Domain Data Maintenance and Distribution</li></ul>
Distributor	Host PES Distribution Business	<ul style="list-style-type: none"><li>• Initial EAC Derivation</li></ul>
Supplier	Host PES Energy Supplier Non-Host Energy Supplier	<ul style="list-style-type: none"><li>• Energy Supplier</li></ul>
Auditor	Pool Auditor	<ul style="list-style-type: none"><li>• Audit</li></ul>

## APPENDIX A                      DEFINITION OF TERMS

### A.1      Subscripts

The following subscripts have been used in defining acronyms:

- d    Settlement Day
- g    GSP Group
- m    Non Half Hour Settlement Register
- p    Profile Class
- t    Measurement Requirement      (i.e. valid combination of Standard Settlement Configuration and Time Pattern Regime)

### A.2      Acronyms

The acronyms used to describe data items in the Elementary Process Descriptions are as follows:

Acronym	Description
AA <sub>m</sub>	Annualised Advance for Settlement Register for meter reading period for a metering system or non HH Settlement Register
AFYC <sub>gpt</sub>	Average Fraction of Yearly Consumption is the latest value (between 0 and 1) for the relevant Settlement Register for the combination of GSP Group, Profile Class, Time Pattern Regime and the Standard Settlement Configuration it belongs to.
EAC <sub>m</sub>	Estimate of Annual Consumption for a metering system or non HH Settlement Register
FYC <sub>m</sub>	Fraction of year's consumption allocated to the latest meter reading period
PC <sub>gptd</sub>	Daily Profile Coefficient for a GSP Group, Profile Class and Measurement Requirement on a given Settlement Day
v	Smoothing parameter used to calculate EACs

Other acronyms used in the User Requirement Specification are as follows:

Acronym	Description
AFYC	Average Fraction of Yearly Consumption
BETTA	British Electricity Trading and Transmission Arrangements
DA	Data Aggregator
DC	Data Collector
DFD	Data Flow Diagram
EAC	i)      Estimation of Annual Consumption (i.e. the system) ii)     Estimate of Annual Consumption (i.e. the data item)
EPD	Elementary Process Description
ESI	Electricity Supply Industry
GSP	Grid Supply Point
GSPGPC	GSP Group Profile Class
HH	Half Hour
ISR	Initial Settlement and Reconciliation
ISRA	Initial Settlement and Reconciliation Agency
LDM	Logical Data Model
LDS	Logical Data Structure

MSID	Metering System Id
OF	Operational Framework
OFFER	Office of Electricity Regulation
PES	Public Electricity Supplier
PRS	Host PES Registration System
REC	Regional Electricity Company
SSA	Settlements System Administrator
TA	Trading Arrangements
UAG	User Assurance Group

**A.3 Glossary**

<b>Term</b>	<b>Definition</b>	<b>Units</b>
Annual Fraction of Yearly Consumption (AFYC)	The estimated fraction of consumption for Metering Systems in a Profile Class and Standard Settlement Configuration which belong to a particular Measurement Requirement.	
Annualised Advance (AA)	For a meter advance period, the EAC that, when profiled, will produce a total consumption equal to the meter advance	
Consumption	The use of electricity	kWh
Customer	A user of electricity who, after 1 <sup>st</sup> April 1998, elect to buy their electricity from any supplier	
Daily Profile Coefficient (DPC)	A value which, when applied to an annualised advance value (EAC or AA), supplies an estimate of consumption for a Settlement Day. Equal to the sum of the corresponding Period Profile Coefficients for a Settlement Day.	
Data Aggregator	See Half Hour Data Aggregator and Non Half Hour Data Aggregator. Where no distinction is made in this document, Non Half Hour Data Aggregator can be assumed.	
Data Collector	See Half Hour Data Collector and Non Half Hour Data Collector. Where no distinction is made in this document, Non Half Hour Data Collector can be assumed.	
Deemed Meter Advance	See Appendix B - Data Catalogue.	
Deemed Meter Reading	A meter reading based on existing meter readings and the Deemed Meter Advance	
Distributor	The part of a PES responsible for the distribution of electricity from the National Grid to all the customers within the PES area	
Economy 7	A standard tariff supported in all PES areas	
Estimate of Annual Consumption (EAC)	For each metering system, a temperature normalised estimate of consumption over a calendar year	kWh
Extended Settlement System	The existing settlements system and the ISR settlement and reconciliation systems	
Final Initial Settlements Run	The run of the settlements process upon which payments are made to Generators via the Pool Funds Administrator.	
Fraction of Yearly Consumption	The fraction of annual consumption allocated to a meter advance period.	

<b>Term</b>	<b>Definition</b>	<b>Units</b>
Grid Supply Point (GSP)	A point where supply flows from the National Grid into a PESs distribution network	
GSP group	A distinct electrical system, consisting of all or part of a distribution system (owned and operated by a Distributor) that is supplied from one or more Grid Supply Points for which total supply into the GSP Group can be determined for each half hour. (OF410)	
GSPGPC Default EAC	A GSP Group Profile Class EAC used in the calculation of a default EAC in order to replace a negative EAC.	
GSP Group Profile Class Tolerance	An agreed set of upper and lower limits incorporated within the EAC/AA software against which calculated Annualised Advances are compared, in order to check their validity.	
Half Hour Data Aggregator	An organisation accredited by the Pool Accreditation Body to aggregate readings for half hourly meters	
Half Hour Data Collector	An organisation accredited by the Pool Accreditation Body to carry out Data Retrieval and Data Processing for half hourly metering data.	
Host PES	For a GSP group, the PES who is the distributor for the group	
Host PES Registration System	The metering system registration system operated by the Host PES. Stores all metering system registrations for all meters within the PES area	
Initial Settlement & Reconciliation Agency (ISRA) system	The ISR system containing the Daily Profile Processor and the Supplier Settlement and Reconciliation sub-systems of ISR	
Initial Settlement Run	The first run of the entire settlements system	
ISR Agent	The operator of the ISRA system for one or more GSP Groups	
Market Domain Data	Market Domain Data is data which defines the environment (Domain) of the 1998 Trading Arrangements. This comprises the parties which trade, the networks, configurations and parameters on which trading is based, as defined in Market Domain Data Management - Data Requirement Specification (Reference 16).	
Market Domain Data Agent	The Market Domain Data Agent provides a central point of co-ordination across the 1998 Trading Arrangements. It is responsible for the maintenance and distribution of Market Domain Data.	
Measurement Requirement	See Entity Descriptions in section 7.3	
Meter Advance	The difference between two meter readings	
Meter Advance Period	The period between successive meter readings	
Meter Reading	The numbers shown on the physical meter, which may be read manually or electronically. There will be one meter reading per Settlement Register	
Metering System	See Entity Descriptions in section 7.3	

<b>Term</b>	<b>Definition</b>	<b>Units</b>
Non Half Hour Data Aggregator	An organisation accredited by the Pool Accreditation Body to aggregate EACs and AAs for non half hourly meters and those unmetered supplies that are treated as non half hourly meters for the purpose of settlement.	
Non Half Hour Data Collector	An organisation accredited by the Pool Accreditation Body to carry out Data Retrieval and Data Processing for non half hourly metering data.	
Period Profile Coefficient (PC)	A value which, when applied to an annualised advance value (EAC or AA), supplies an estimate of consumption for a Settlement Period	
PES Registration System	See Host PES Registration System	
Profile	A pattern of consumption of electricity, by half hour, across a year	
Profile Class	A group of Customers whose consumption can be reasonably approximated to a common profile for Settlement purposes.	
Profile Coefficient (PC)	See Daily Profile Coefficient and Period Profile Coefficient. Where no distinction is made in this document, Daily Profile Coefficient can be assumed.	
Reconciliation	A payment between suppliers for a difference in the deemed supplier purchases caused by a re-run of the settlements calculations for a settlement day	
Reconciliation Timetable	See Settlement timetable	
Regression Equation	An equation which when evaluated, using GSP Group and Settlement Date specific parameters, produces a Period Profile Coefficient	
Settlement Day /Date	See Settlement Date in Appendix B - Data Catalogue	
Settlement Register	See Entity Descriptions in section 7.3	
Settlement Run	A full run of the SSA Settlement system and the ISR Settlement system for all GSP Groups, within the 28 day settlement timescale	
Settlement Timetable	The published timetable of Settlement and reconciliation run dates, payment dates and notification of payment dates	
Settlements System Administrator (SSA)	The Pool agent who develops and operates the existing settlement systems	
Smoothing Parameter	The value of the Smoothing Parameter (which must always be positive) determines how much weight is given to the latest meter reading and how much is given to previous history. If the meter reading covers more than $1/v$ of the annual consumption, the new $EAC_m$ equals $AA_m$ , the Annualised Advance for the latest meter reading.	
Standard Settlement Configuration	See Entity Descriptions in section 7.3	
Sunset Variable	Used by ISRA in profile processing. The number of minutes after 18.00 GMT at which sunset occurs. It will be negative if sunset is before 18.00 GMT	minutes

<b>Term</b>	<b>Definition</b>	<b>Units</b>
Supplier	A company which sells electricity to customers.	
Time of Sunset	See sunset variable	
Time Pattern Regime	See Entity Descriptions in section 7.3	
Trading Day / Date	See Settlement Day / Date	
Unmetered supply	A supply of electricity which is not metered. Examples are street furniture, such as lighting	

## **APPENDIX B DATA CATALOGUE**

A brief description of each data item or attribute used within the Data Flow Model and the Logical Data Model. The full definition of each data item will be available after the Logical Design stage.

### Average Fraction of Yearly Consumption

The estimated fraction of consumption for Metering Systems in a Profile Class and Standard Settlement Configuration which belong to a particular Measurement Requirement.

### Annualised Advance

An estimate of annual consumption for a Settlement Register, calculated from a meter advance, and used for settlement of days within the meter advance period.

### Calculation Failure Reason

Status indicating the reason for failure of requested calculation for a Metering System, or describing a warning concerning the calculation.

### Daily Profile Coefficient

The daily totalled profile coefficient, calculated by evaluating regression equations for the particular Noon Effective Temperature, Time of Sunset and Day Type, and then applying the processes of algorithmic profiling and chunking.

### Date and Time of Calculation

The date and time at which a calculation was made.

### Deemed Meter Advance

An estimated meter advance at change of supplier, calculated at the request of the Data Collector, using an EAC or Annualised Advance (if available).

### Deemed Meter Reading

An estimated meter reading at a particular date.

### Deemed Meter Reading Date

The date for which the calculation of a Deemed Meter Reading is required.

### Effective From Settlement Date {AFYC}

The first settlement date for which an Average Fraction of Yearly Consumption is effective.

### Effective From Settlement Date {DMA}

The start date of the meter advance period for which a Deemed Meter Advance is calculated by the EAC/AA system at the request of the Data Collector. Usually this will be the Settlement Date on which the previous meter reading was taken.

### Effective From Settlement Date {EAC}

The date from which an Estimate of Annual Consumption for a Settlement Register comes into effect i.e. the Settlement Day in which the corresponding meter reading was taken.

### Effective From Settlement Date {GGPCDEAC}

The start date of a GSPGPC Default EAC.

### Effective From Settlement Date {MAC}

The start date of a meter advance period (i.e. the date on which the first reading of the meter advance period was taken).

### Effective From Settlement Date {MSGG}

The date from which a Metering System is assigned to a GSP Group.

Effective From Settlement Date {MSPC}

The date from which a Metering System is assigned to a Profile Class.

Effective From Settlement Date {SCON}

The Settlement Date on which a Metering System is assigned to a Standard Settlement Configuration.

Effective From Settlement Date {SPAR}

The Settlement Date on which a value of the Smoothing Parameter, used in the calculation of EACs, becomes effective.

Effective To Settlement Date {AFYC}

The last settlement date for which an Average Fraction of Yearly Consumption is effective.

Effective To Settlement Date {DMA}

The end date of the meter advance period for which a Deemed Meter Advance is calculated by the EAC/AA System at the request of the Data Collector. Usually this will be the Settlement Date prior to that on which the change of Supplier takes effect.

Effective To Settlement Date {MAC}

The end date of a meter advance period (i.e. the day before that on which the second reading of the advance period was taken).

Estimated Annual Consumption

An estimate of annual consumption for a Settlement Register, used for settlement of days for which no annualised advance is yet available.

GSP Group Id

The unique national identifier for a particular GSP Group.

GSPGPC Default EAC

A standard, positive factor, maintained by a Non Half Hourly Data Collector to replace a negative EAC.

GSP Group Profile Class Tolerance

A set of agreed upper and lower limits for each profile class, defined at GSP Group level, against which calculated Annualised Advances are compared to check their validity.

Measurement Class Id

A measurement classification of Metering System, which determines how the power values for a Metering System are to be aggregated. The set of values valid within the EAC/AA system is as follows: Non Half Hourly Metered and Unmetered.

Meter Advance

Consumption recorded for a Settlement Register in terms of the difference between two consecutive meter readings.

Meter Reading

A meter reading taken on a particular date.

Meter Reading Date

The date on which a meter reading was taken.

Metering System Id

The unique identifier given to each metering system.

Negative Advance Rollover

Indicates that the reason for a Meter Advance being negative is that a register rollover has occurred.

Profile Class Description

A description of the profile class for a given Profile Class Id.

Profile Class Id

The unique national identifier for the profile class which holds the profile to be applied to a non half hourly metered set of supplies belonging to that class.

Register Digits

The number of digits of a register within a Metering System.

Register Id

The identifier of a register within a Metering System.

Settlement Date

The date on which energy is used and must later be settled for. Also known as the Trading Day.

Smoothing Parameter

A standard, positive factor, supplied by the MDD Agent, which determines how much weight is given to an Annualised Advance and how much is given to the previous EAC, when calculating a new value for an EAC.

Standard Settlement Configuration Desc

A brief description of a Standard Settlement Configuration.

Standard Settlement Configuration Id

A unique identifier for a logical non-Half Hourly metering configuration supported by the settlement process.

Time Pattern Regime Id

The identifier for the time pattern regime being used to calculate money owed for energy used by each customer.

Transaction Number

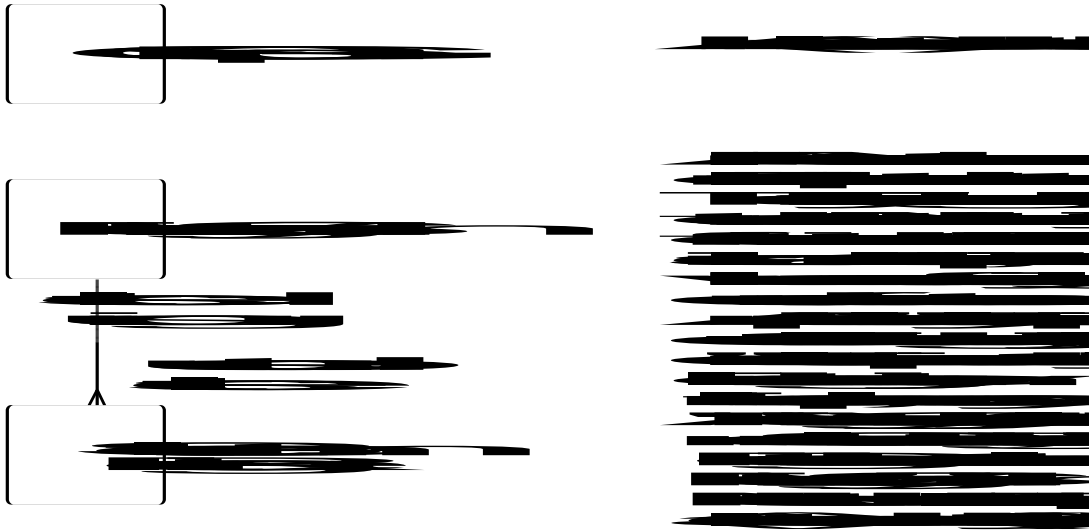
A number used to uniquely identify an instance of a calculation for a Metering System.

User Id

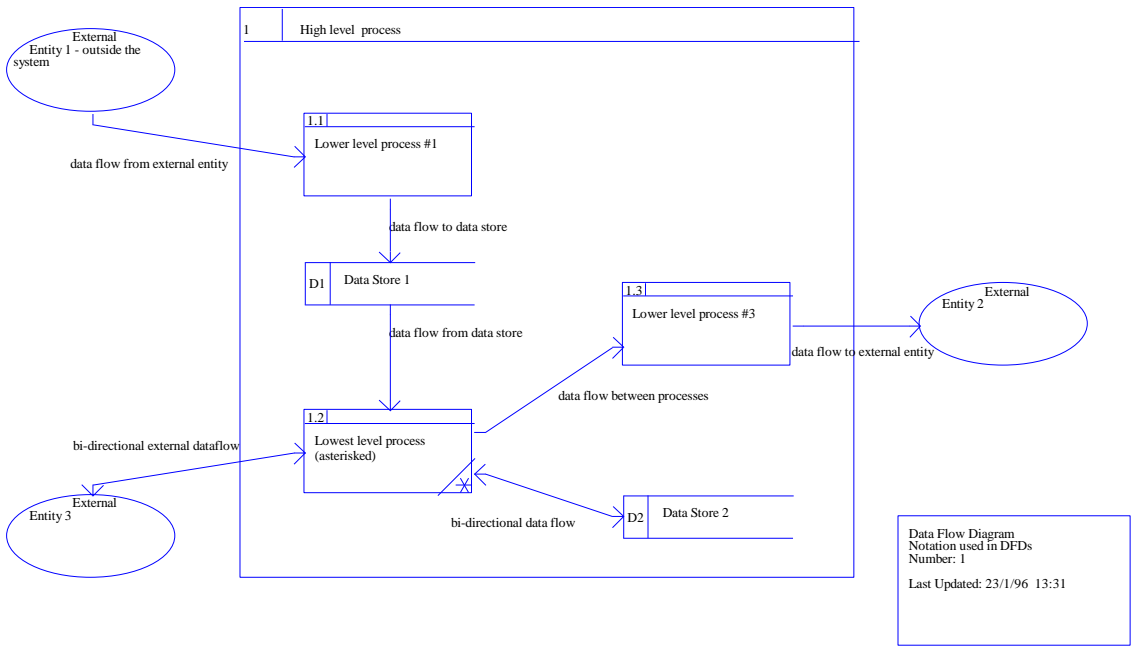
The id of the user.

APPENDIX C

LOGICAL DATA STRUCTURE NOTATION



# APPENDIX D DATA FLOW DIAGRAM NOTATION



## **APPENDIX E EXPLANATION OF EACS AND AAS**

As stated in section 4.2.1, the EAC/AA system will calculate two estimates of annual consumption from each meter advance: an Estimated Annual Consumption (EAC) and an Annualised Advance (AA). This Appendix explains how these values are used in the 1998 Settlement process. It is intended as background information and is not required in order to understand the remainder of the User Requirement Specification.

### **E.1 The Settlement Timetable**

Each Settlement Day will be the subject of a number of Settlement and Reconciliation Runs. These will be timed in accordance with a timetable agreed by the Pool, with the Final Reconciliation occurring up to two years after the Settlement Day.

In each Settlement or Reconciliation, Annualised Advances will be used for settling metering systems which have had a meter reading taken for a period covering the Settlement Day in question. Estimated Annual Consumptions will be used for those which have not. Therefore, the Settlements and Reconciliations for each Settlement Day will include more AAs and fewer EACs as time progresses.

### **E.2 Annualised Advances**

Annualised Advances are calculated from a meter reading and are used for settling days within the meter reading period. Data Aggregators will therefore require a history of Annualised Advances for each Settlement Register, with one for each meter reading.

The equation used for calculating Annualised Advances, as specified in EPD 1.2, has the property of ensuring that the total consumption attributed to a supplier by ISRA as a result of receiving that Annualised Advance will exactly match the meter advance value. In other words, there may be profile shape error (i.e. consumption attributed to wrong settlement periods within the meter advance period), but there will not be volume error.

Another property of the equation in EPD 1.2 is that it compensates for variations in temperature or time of sunset. Suppose, for example, that the weather is unusually hot. Meter advances will be unusually low. However, the profile coefficients calculated by ISRA will also be low. To the extent that the regression equations used by ISRA accurately reflect the temperature-dependent nature of demand, the Annualised Advance will be unaffected, and will reflect demand in a typical year.

### **E.3 Estimated Annual Consumptions**

Estimated Annual Consumptions are calculated from a meter reading, and are used for settling days after the end of the meter reading period, until such time as a new meter reading becomes available. Therefore only the latest EAC for each Settlement Register is ever used for any Settlement or Reconciliation.

The equation for calculating EACs, as specified in EPD 1.2, is such that each EAC is a weighted average of the current Annualised Advance and all previous Annualised Advances. More weight is given to recent Annualised Advances, and Annualised Advances based on a long meter advance period.

The smoothing factor  $v$  controls the sensitivity of this weighting. The higher the value of  $v$ , the more the weight given to recent Annualised Advances.

If the meter advance period is sufficiently long, the EAC will be equal to the most recent Annualised Advance. The period at which this will occur is approximately one year, divided by the smoothing parameter  $v$ .