



Project Deliverable

Neutral Market Facilitator Data Exchange and Governance



Scottish & Southern
Electricity Networks

CGI



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1. Introduction

1.1. Purpose and Scope of this Document

This document describes aspects of governance of the data stored in the Neutral Market Facilitator (NMF) and the exchange of data with other systems or people in other organisations via messages into and out of the NMF.

This document is prepared for Ofgem deliverable #2 in May 2019 for the TRANSITION project. It is not definitive, e.g. with regard to aspects of sensitivity of different data exchanges or access to different data entities by types of Industry Actor (a broad definition intended to covering all types of participant), but illustrates work being done for the TRANSITION project. Further work is required e.g. input from TRANSITION partners and further security analysis.

This document is not a detailed interface specification; that will be defined later in the project during design work.

Details of individual data items are mastered in the set of requirements documents for the NMF, including the requirements specification, information exchange requirement and data dictionary (see section 1.2).

This work is intended to be applicable irrespective of the ENA Open Networks Future World framework chosen, where feasible.

1.2. Referenced Documents

| Reference | Document Name and Version |
|--------------------------------------|--|
| NMF Requirements Specification | SSEN-NMF-REQ01-08 Neutral Market Facilitator Requirement Specification |
| NMF Information Exchange Requirement | Appendix 6.2 of the NMF Requirements Specification |
| NMF Domain Data Dictionary | Appendix 6.3 of the NMF Requirements Specification |

Table 1 Referenced Documents

1.3. Further Work

This particular document has been created for a TRANSITION Ofgem deliverable, and will not be maintained subsequently in this particular form.

Further work will continue into high level design and other project phases, including:

- which information exchanges will be automated and which enabled by other means;
- data exchange formats and standards to be used;

- identification of security requirements of data both in transit and at rest
- production of a draft interface specification for automated information exchanges;
- confirmation or selection of use & governance of any data from external data sets (e.g. identifiers for industry actors).

1.4. Key Terms

Please refer to the glossary in the NMF Requirements Specification.

Some additional definitions are provided here.

| Term | Meaning |
|----------------|---|
| BRP | Balance Responsible Party; an industry actor such as an electricity supplier with responsibility for balancing energy volumes used, or paying for imbalances, compared to declared forecasts |
| CIM | Common Information Model. Approach for standardisation of storage and transfer of information, covered by international standards such as IEC-62325 (electricity market), IEC 61968 (distribution network) and IEC 61970 (transmission network) |
| DSO | Distribution System Operator; the system operator role of an electricity distribution region |
| ESO | Electricity System Operator; the system operator role of the National Grid |
| IA | Industry Actor |
| Industry Actor | A broad definition of participants using or potentially using the NMF, intended to cover all types of participant in the NMF |
| WSC | Whole System Coordinator. This term is used to refer to a DSO or ESO system coordination component, and is intended to be irrespective of the Future Worlds approach taken (to the extent that is feasible) |

2. Conceptual Data Entities

Data entities have been identified in the NMF requirements document set; these are at a conceptual level, consistent with a requirements specification, rather than a logical or physical data model.

Please refer to the data dictionary accompanying the NMF requirements document set, which is the master document for data requirements.

This section of this document provides summary information at a data entity level.

2.1. Data Entity Descriptions

This table shows data sets using data entity names defined in the NMF requirements specification. As the TRANSITION project proceeds, terms may be selected which correspond more closely to CIM definitions, and some suggestions for relevant CIM terms are made here, primarily from IEC-62325 (framework for energy market communications).

The rest of this document will continue to use the same terms as the NMF requirements specification.

| Dataset | Relevant CIM Terms (not necessarily directly equivalent) | Description | Granularity | Source | How Updated |
|-----------------|--|---|--|--|----------------------------|
| Industry Actor | MarketParticipant, Organisation | Companies that have registered to participate in the NMF market as providers and/or users of flexible energy resources | One entry per organisation buying or selling flexibility on the NMF | NMF admin users | NMF registration processes |
| User | MarketRole (<i>though that refers to an organisation rather than individual</i>) | A User of the NMF system. Each User may have one or more roles that determine their level of access to the NMF system | One entry per individual human user | NMF admin users | NMF registration processes |
| Energy Resource | RegisteredResource, PowerSystemResource | Details of flexibility resource for generation or demand response Used in requests, bids & offers and dispatch | Location (see Location) and resource details e.g. generation/demand, min/max active & reactive power, notice period, ramp up time, variability etc | DSO and Industry Actors | NMF registration processes |
| Location | Location | Location of an NMF Energy Resource, Request or Offer including DSO region and sufficient definition according to purpose (see Granularity column). A blank location in a region | It must support precise location of an energy resource (e.g. UPRN or MPAN) and broader location for | Geographic data: Use Royal Mail postcodes, verified manually by NMF users Note that | NMF operations |



| | | | | | |
|-----------------|--------------------------------------|---|--|--|----------------------------|
| | | indicates a region wide item | flexibility request purposes (e.g. postcode or 11kV circuit) | matching location to network topology will be carried out by the DSO, by online lookup, and not within the NMF | |
| Market Category | PowerSystemResource, ServiceLocation | A set of characteristics used to categorise a NMF Energy Resource, Request or Offer. The categories are used for analysis and to inform suitability for submission of Standing Offers. For example, these could include: Voltage Level: 33kV, 11kV, LV... Energy Effect: Supply Generation, Demand Reduction Power Source: Gas, Coal, Nuclear, Hydro, Wind, Solar... Minimum Notice: Short, Medium, Long Standby Request: Y/N Low Carbon: Y/N | | NMF admin users. DSO | NMF registration processes |
| Request | Auction, ConstraintDuration | An NMF Request by the Industry Actor to purchase flexible energy. | e.g. location (specific resource or e.g. by circuit), power etc. | Industry Actors | NMF operations |
| Bid | BidTimeSeries | An NMF Bid. A Industry Actor can make a bid against a published NMF Offer. | Energy resource, power, duration etc | Industry Actors | NMF operations |
| Offer | BidTimeSeries | An NMF Offer made by the Industry Actor to sell flexible energy. It may be the subject of a bid by another Industry Actor to purchase the capacity offered. It may also be presented as part of an auction for an NMF | Energy resource, power, duration etc | Industry Actors | NMF operations |

| | | | | | |
|--------------------|---------------|--|--------------------------------------|-----------------|-----------------|
| | | Request. | | | |
| Dispatch | | Details of the physical dispatch undertaken by a winning NMF Offer or through an NMF bilateral Contract. | Energy resource, power, duration etc | Industry Actors | NMF operations |
| Intent to Dispatch | | Record of an issued NMF Intent to Dispatch. | Energy resource, power, duration etc | Industry Actors | NMF operations |
| Proof of Dispatch | | Record of an issued NMF Proof of Dispatch. | Energy resource, power, duration etc | Industry Actors | NMF operations |
| Bilateral Contract | BidTimeSeries | Information from non-NMF contracts agreed prior to registration or in parallel to the NMF system. | Details of offers agreed outside NMF | Industry Actors | Industry Actors |

Table 2 Data Entity Descriptions

2.2. Subsets of Data Entities in Information Exchange

Where data entity information is featured in information exchanges listed in the NMF IER (the information exchange definition), in many cases a subset of the data in a named data entity will be used for the interaction, e.g. the energy resource information used in a message which offers using it in a flexibility offer will not include all of the parameters required to register an energy resource with the NMF.

This approach aligns to the concept of CIM Profiles, and it is expected that will be adopted where relevant, though generic terms are used here.

Although the principle of subsets of data entities featuring in information exchange is described in this document, the precise data items to be used in subsets are not specified in this document and will be elaborated in future work.

Major subsets of data that are expected to feature in information exchanges are listed as follows, by data entity:

- Industry Actor
 - Registration data
 - Viewable data
- User
 - Account data
 - Viewable data
- Energy Resource
 - Registration data
 - Offer data



- Dispatch data
- Offer
 - Visible information of bilateral contract
 - Offer – Non-Commercial Data
- Dispatch
 - Instruction Data
 - Outcome data



3. Use of Data by Roles and Organisations

This section shows which data entities are used by which NMF user roles. This data will be derived from information in the NMF requirements specification document set.

NMF User Roles may be fulfilled by people from different organisations e.g. a Industry Actor or the DSO.

3.1. NMF Internal Roles

The following roles are only valid for people working for the NMF directly:

- Admin
- Registrar
- Report Creator

3.2. Mapping Roles to Organisations

This section illustrates the user roles which employees from different types of organisations may be allowed to hold.

The NMF requirements are flexible regarding which organisation types can have employees with which user roles, and the possible combinations will be influenced by the way the industry approaches NMF principles. This section has a potential allocation of user roles to organisation types' employees, but this is not definitive and it will be elaborated further in future iterations of requirements and design.

The requirements are written on the expectation that most message interactions are with people, e.g. by email or web page. There are some external system roles identified in the NMF requirements, such as those associated with DSO and ESO WSC systems, and those are identified as separate columns below.

| Organisation | Base User Rights | Registration Requestor | Request Manager | Request Authoriser | Request Officer | Offer Manager | Offer Authoriser | Offer Officer | Bid Manager | Bid Authoriser | Bid Officer | Dispatch Instructor | Dispatch Manager | DSO WSC System | ESO WSC System | Reporter | Auditor |
|-------------------------------|------------------|------------------------|-----------------|--------------------|-----------------|---------------|------------------|---------------|-------------|----------------|-------------|---------------------|------------------|----------------|----------------|----------|---------|
| NMF Internal | X | X | | | | | | | | | | | | | | X | X |
| Independent Auditor | | X | | | | | | | | | | | | | | | X |
| DSO WSC | X | X | X | X | X | | | | X | X | X | X | X | X | | X | |
| ESO WSC | X | X | X | X | X | | | | X | X | X | X | X | | X | X | |
| Industry Actor - Buyer | X | X | | | | | | | X | X | X | X | X | | | X | |
| Industry Actor - Seller | X | X | | | | X | X | X | | | | | | | | X | |
| Industry Actor - BRP Informed | X | X | | | | | | | | | | | | | | X | |

Table 3 Users Roles Used by Type of Organisations

3.3. Characteristics of Information Exchanges (IER)

This table shows information about individual NMF information exchanges (IERs) with regard to characteristics such as needed for compliance reasons, commercially sensitive, sensitive for personal privacy reasons. The IERs are defined in the NMF requirements document set.

Interactions are between the NMF and an external actor. The actor within the NMF (e.g. Admin or Registrar) is not specified in this table and can be seen in the NMF requirements document set.

Interactions may be by a variety of routes which might include sending electronic messages (e.g. CSV file or XML), entering data into a web page or phone app, or a manual method e.g. email or phone call.

Where data entities are listed as featuring in information exchanges listed in the IER, in many cases a subset of the data in a named data entity will be used for the interaction, e.g. the energy resource information used in a message which offers using it in a flexibility offer will not need to include all of the parameters required to register an energy resource with the NMF.

Although the principle of subsets of data entities is described in this document, the precise data items to be used in subsets are not specified in this document and will be elaborated in future work.

The “industry code compliance” column is left blank at the moment and awaits further work.

| IER ID | IER Name | BUC – NMF Sends to actor | BUC – NMF Receives from actor | Data | Required for Legal Contracts | Required for Industry Code Compliance | Commercially Sensitive | Personally Sensitive | Sensitive to Security of Electricity Networks |
|--------|--------------------------|--------------------------|-------------------------------|---|------------------------------|---------------------------------------|------------------------|----------------------|---|
| 01 | Registration Request | | BUC05 | [IA- registration data] | | | X | | |
| 02.01 | Registration Successful | BUC05 | | [IA- registration data], [User – account data] | | | X | | |
| 02.02 | Registration Rejected | BUC05 | | Rejection reason | | | X | | |
| 03.01 | Request NMF User account | | BUC02 | [User – account data] | | | | | |

| IER ID | IER Name | BUC – NMF Sends to actor | BUC – NMF Receives from actor | Data | Required for Legal Contracts | Required for Industry Code Compliance | Commercially Sensitive | Personally Sensitive | Sensitive to Security of Electricity Networks |
|--------|--|--------------------------|-------------------------------|--|------------------------------|---------------------------------------|------------------------|----------------------|---|
| 03.02 | NMF User account create | BUC02 | | [User – account data] | | | | X | |
| 03.03 | Request NMF account amendments | | BUC03 | [User – account data] | | | | X | |
| 03.04 | NMF User account amend | BUC03 | | [User – account data] | | | | X | |
| 03.05 | Industry Actor correspondence | BUC07 | | [IA- viewable data], [User – viewable data] | | | X | | |
| 03.06 | Register an Energy Resource | | BUC50 | [Energy Resource – registration data] | | | X | X | X |
| 03.07 | NMF Energy Resource registration completed | BUC50 | | [Energy Resource – registration data] | | | X | X | X |
| 03.08 | NMF Energy Resource registration fails | BUC50 | | [Energy Resource – registration data], rejection reason | | | X | X | X |
| 03.09 | NMF Energy Resource amendment request | | BUC51 | [Energy Resource – registration data] | | | X | X | X |
| 03.10 | NMF Energy Resource amendment fails | BUC51 | | [Energy Resource – registration data], rejection reason | | | X | X | X |
| 03.11 | NMF Energy Resource amendment completed | BUC51 | | [Energy Resource – registration data] | | | X | X | X |

| IER ID | IER Name | BUC – NMF Sends to actor | BUC – NMF Receives from actor | Data | Required for Legal Contracts | Required for Industry Code Compliance | Commercially Sensitive | Personally Sensitive | Sensitive to Security of Electricity Networks |
|--------|---|--------------------------|-------------------------------|--|------------------------------|---------------------------------------|------------------------|----------------------|---|
| 03.12 | NMF Energy Resource correspondence | BUC53 | BUC53 | [IA- viewable data], [Energy Resource – Offer data] | | | X | | X |
| 03.13 | Request to publish NMF Request | | BUC12 | [Request – full] | | | If from IA | | If from DSO or ESO |
| 03.14 | Request to withdraw NMF Request | | BUC12 | [Request – full] | | | If from IA | | If from DSO or ESO |
| 03.15 | NMF Request published | | BUC13 | [Request – full] | X | | If from IA | | If from DSO or ESO |
| 03.16 | NMF Request withdrawn | | BUC13 | [Request – full] | | | If from IA | | If from DSO or ESO |
| 03.17 | NMF Request selection approval request | | BUC14 | [Request – full] | | | If from IA | | If from DSO or ESO |
| 03.18 | NMF Request selection approval granted | | BUC14 | [Request – full] | | | If from IA | | If from DSO or ESO |
| 03.19 | NMF Request selection approval withheld | | BUC14 | [Request – full] | | | If from IA | | If from DSO or ESO |
| 03.20 | NMF Request auction outcome | BUC14 | | [Request – full] | X | | If from IA | | If from DSO or ESO |
| 03.21 | NMF Request published | | BUC16 | [Request – full] | | | If from IA | | If from DSO or ESO |
| 03.22 | Standing Offer Made | BUC17 | | [Request – full], | | | X | | |

| IER ID | IER Name | BUC – NMF Sends to actor | BUC – NMF Receives from actor | Data | Required for Legal Contracts | Required for Industry Code Compliance | Commercially Sensitive | Personally Sensitive | Sensitive to Security of Electricity Networks |
|--------|-------------------------------|--------------------------|-------------------------------|--|------------------------------|---------------------------------------|------------------------|----------------------|---|
| | | | | [Energy Resource – Offer data], [Offer – full] | | | | | |
| 03.23 | NMF Offer made | BUC17 | | [Request – full], [Energy Resource – Offer data], [Offer – full] | | | X | | |
| 03.24 | Request to publish NMF Offer | | BUC54 | [Request – full], [Energy Resource – Offer data] [Offer – full] | | | X | | |
| 03.25 | Request to withdraw NMF Offer | | BUC54 | [Request – full], [Offer – full] | | | X | | |
| 03.26 | NMF Offer published | | BUC55 | [Request – full], [Energy Resource – Offer data], [Offer – full] | X | | X | | |
| 03.27 | NMF Offer withdrawn | | BUC55 | [Request – full], [Offer – full] | | | X | | |
| 03.28 | NMF Offer correspondence | BUC56 | | [Request – full], [Energy Resource – Offer data], | X | | X | | |

| IER ID | IER Name | BUC – NMF Sends to actor | BUC – NMF Receives from actor | Data | Required for Legal Contracts | Required for Industry Code Compliance | Commercially Sensitive | Personally Sensitive | Sensitive to Security of Electricity Networks |
|--------|---------------------------------------|--------------------------|-------------------------------|-------------------------------------|------------------------------|---------------------------------------|------------------------|----------------------|---|
| | | | | [Offer – Non-Commercial Data] | | | | | |
| 03.29 | Request to publish NMF Bid | | BUC21 | [Offer – full], [Bid – full] | X | | If from IA | | If from DSO or ESO |
| 03.30 | Request to withdraw NMF Bid | | BUC21 | [Request – full], [Offer – full] | | | If from IA | | If from DSO or ESO |
| 03.31 | NMF Bid published | | BUC21 | [Offer – full], [Bid – full] | | | If from IA | | If from DSO or ESO |
| 03.32 | NMF Bid withdrawn | | BUC21 | [Offer – full], [Bid – full] | | | If from IA | | If from DSO or ESO |
| 03.33 | NMF Offer selection approval request | | BUC23 | [Offer – full], [Bid – full] | | | If from IA | | If from DSO or ESO |
| 03.34 | NMF Offer selection approval granted | | BUC23 | [Offer – full], [Bid – full] | | | If from IA | | If from DSO or ESO |
| 03.35 | NMF Offer selection approval withheld | | BUC23 | [Offer – full], [Bid – full] | | | If from IA | | If from DSO or ESO |
| 03.36 | NMF Offer auction outcome | BUC23 | | [Offer – full], [Bid – full] | | | If from IA | | If from DSO or ESO |
| 03.37 | Intent to Dispatch notice | | BUC31 | [Energy resource – dispatch data], | | | X | | X |

| IER ID | IER Name | BUC – NMF Sends to actor | BUC – NMF Receives from actor | Data | Required for Legal Contracts | Required for Industry Code Compliance | Commercially Sensitive | Personally Sensitive | Sensitive to Security of Electricity Networks |
|--------|-------------------------------------|--------------------------|-------------------------------|---|------------------------------|---------------------------------------|------------------------|----------------------|---|
| | | | | [Dispatch] | | | | | |
| 03.38 | Proof of Dispatch | | BUC30 | [Energy resource – dispatch data], [Dispatch] | X | | X | | X |
| 03.39 | Bilateral Contract approval request | | BUC71 | [Offer – visible information of bilateral contract], [Energy resource – dispatch data] | X | | X | | X |
| 03.40 | ESO/DSO fiat instruction | | BUC34 | [Energy resource – dispatch data], [Dispatch] | X | | | | X |
| 04.01 | Auto Request received | | BUC16 | [Request – full] | X | | | X | X |
| 04.02 | Auto Request successful | BUC16 | | [Request – full] acknowledgement | X | | | X | X |
| 05 | Intent to Dispatch details | | BUC31 | [Energy resource – dispatch data], [Dispatch – Instruction Data] | X | | | X | X |
| 06.01 | Constraint Estimate request | | BUC58 | [Request – full] | X | | X | | X |
| 06.02 | Constraint Estimate | BUC58 | | [Offer – full] | X | | X | | X |

| IER ID | IER Name | BUC – NMF Sends to actor | BUC – NMF Receives from actor | Data | Required for Legal Contracts | Required for Industry Code Compliance | Commercially Sensitive | Personally Sensitive | Sensitive to Security of Electricity Networks |
|--------|-----------------------------------|--------------------------|-------------------------------|---|------------------------------|---------------------------------------|------------------------|----------------------|---|
| | request | | | acknowledgement | | | | | |
| 07 | Proof of Dispatch details | | BUC30 | [Energy resource – dispatch data], [Dispatch – Outcome data] | X | | | X | X |
| 08 | Export of list and/or report data | BUC60 | | Report | X | | X | X | |

Table 4 Characteristics of Information Exchanges

3.4. Use of Data by User and System Actor Roles

This section shows what types of data items are made available by the NMF to which user roles and (where applicable) to system actor roles.

Where subsets of data entities have been identified, as described in section 2.2, the subsets are referenced here. Individual data items within data subsets will be listed in future elaborations of the requirements and design.

This table is derived from information about individual information exchanges (IERs) from the NMF requirements document set, summarised by data entity & data subsets.

| Data Entity | Data Subset | Base User Rights | Registration Requestor | Request Manager | Request Authoriser | Request Officer | Offer Manager | Offer Authoriser | Offer Officer | Bid Manager | Bid Authoriser | Bid Officer | Dispatch Instructor | Dispatch Manager | DSO WSC System | ESO WSC System | Reporter | Auditor |
|-------------|--------------|------------------|------------------------|-----------------|--------------------|-----------------|---------------|------------------|---------------|-------------|----------------|-------------|---------------------|------------------|----------------|----------------|----------|---------|
| User | Account Data | | Send | | | | | | | | | | | | | | TBD | Receive |



Use of Data by Roles and Organisations

| Data Entity | Data Subset | Base User Rights | Registration Requestor | Request Manager | Request Authoriser | Request Officer | Offer Manager | Offer Authoriser | Offer Officer | Bid Manager | Bid Authoriser | Bid Officer | Dispatch Instructor | Dispatch Manager | DSO WSC System | ESO WSC System | Reporter | Auditor |
|-----------------|---------------------|------------------|------------------------|-----------------|--------------------|-----------------|---------------|------------------|---------------|-------------|----------------|-------------|---------------------|------------------|----------------|----------------|----------|---------|
| | | | Receive | | | | | | | | | | | | | | | |
| User | Viewable Data | Send on request | Receive | | | | | | | | | | | | | | TBD | Receive |
| Industry Actor | Registration Data | | Send Receive | | | | | | | | | | | | | | TBD | Receive |
| Industry Actor | Viewable Data | Send on request | Receive | | | | | | | | | | | | | | TBD | Receive |
| Energy Resource | Registration Data | | Send Receive | | | | | | | | | | | | | | TBD | Receive |
| Energy Resource | Offer Data | Send on request | Send | Receive | Receive | Receive | | | | | | | | | | | TBD | Receive |
| Energy Resource | Dispatch Data | | | | | | | | | | | | | | | | TBD | Receive |
| Market Category | N/A | Send on request | | | | | | | | | | | | | | | TBD | Receive |
| Request | N/A | | | Receive | Receive | | | | | | | | | | | | TBD | Receive |
| Offer | Full | | | | | | Receive | Receive | | | | | | | | | TBD | Receive |
| Offer | Non-Commercial Data | | | | | Send | | | Send | | | Send | | | | | TBD | Receive |
| Bid | N/A | | | | | | Receive | Receive | | Receive | Receive | | | | | | TBD | Receive |
| Dispatch | Instruction Data | | | | | | | | | | | | Receive | Send | Send | Send | TBD | Receive |
| Dispatch | Outcome Data | | | | | | | | | | | | Receive | Send | Send | Send | TBD | Receive |

Table 5 Data Entity Use by User Role

3.5. Use of Data by Type of Organisation

This maps individual information exchanges to organisations, based on the information in section 3.4 that shows which roles use which data entities (or subsets of data entities), and the information in section 3.2 that shows which organisations use which roles.

See section 5 (particularly 5.5) for information about data governance.

| Data Entity | Data Subset | DSO WSC | ESO WSC | Industry Actor - Buyer | Industry Actor - Seller | Industry Actor - BRP Informed |
|-----------------|-------------------|-----------------|-----------------|------------------------|-------------------------|-------------------------------|
| User | Account Data | Receive | Receive | Receive | Receive | Receive |
| User | Viewable Data | Send on request | Send on request | Send on request | Send on request | Send on request |
| Industry Actor | Registration Data | Receive | Receive | Receive | Receive | Receive |
| Industry Actor | Viewable Data | Send on request | Send on request | Send on request | Send on request | Send on request |
| Energy Resource | Registration Data | Send | Send | | Receive | |
| Energy Resource | Offer Data | Send on request | Send on request | Send on request | Send on request | Send on request |
| Energy Resource | Dispatch Data | Send | Send | Send | | |



| | | | | | | |
|-----------------|---------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Market Category | N/A | Send on request |
| Request | N/A | Receive | Receive | Send | Send | |
| Offer | Full | Send | Send | | Receive | |
| Offer | Non-Commercial Data | Send on request |
| Bid | N/A | Send | Send | Receive | | ? |
| Dispatch | Instruction Data | Send | ? | Receive | Send | Send |
| Dispatch | Outcome Data | Send | Send | Receive | Send | Send |

Table 6 Data Entity Use by Type of Organisation

4. Data Exchange Mechanisms

This section is concerned with data exchange formats and standards.

4.1. Approaches to Data Exchange

The NMF requirements specification implies a variety of methods of data exchange:

- Manual interaction via web browser, e.g. by typing or file upload or download;
- manual interaction by personal contact e.g. phone calls;
- email interaction; this could be completely manual or enable some automation;
- system-to-system interfaces.

The current assumption is that due to the parties likely to be involved in data exchange for the TRANSITION trials, and the relatively short-term nature of the trials, it is likely to be preferable in many cases to use more manual processes such as phone, email, Excel spreadsheets or CSV files intended for use with Excel, rather than system-to-system interfaces such as XML.

Currently the only expected circumstances for system-to-system data exchange in TRANSITION trials is

4.2. System-to-System Interfaces

In the current version of the NMF requirements specification (version REQ01-05) the following are proposed as system-to-system interfaces:

- BUC16 Automated requests;
- BUC30 Intent to Dispatch;
- BUC31 Dispatch Instruction;
- BUC32 Proof of Dispatch.

The specification is still developing and more may emerge as the TRANSITION project develops.

4.3. Pros and Cons of Automated Interfaces

Advantages:

- increased throughput compared to manual interaction;
- opportunity to build in security measures such as in-flight encryption or digital signatures;
- more representative of a larger-scale market in future;
- increased data quality and integrity through system validation (avoiding human error);
- use of a common messaging model.

Disadvantages:

- requires Industry Actors to implement system interfaces;
- may increase risk profile and availability requirements of the NMF.

4.4. Potential Types of Data Format for Data Exchange

Some options are laid out below.

Follow models from existing industry standards such as:

- Use CIM standards and IEC standards building on CIM such as IEC 62325 for electricity market data, IEC 61968 (distribution) and/or IEC 61970 (transmission) for network topology data, including use of CIM data standards to exchange data using CIM-compliant XML;

- build on National Grid standards for transmission and T/D data exchange e.g. EDL (CSV formats) or CIM-compliant XML used in some areas such as ENTSO-E data exchange; note that National Grid aim to use XML in new interfaces, including in interaction with DNOs, so should be receptive to this;
- use lower-level formats such as used in DERMS (Distributed Energy Resource Management Systems), though note that low-level communications protocols are assumed to be out of scope for NMF, as it is intended that NMF should not have direct access to turning power on or off for reasons such as risk and security;
- cooperate with formats associated with energy flexibility emerging from Ofgem innovation projects such as Fusion, EFFS or Power Potential.

Bespoke data exchange formats following patterns established elsewhere in the industry such as:

- DUIS XML schema (the interface for smart metering via DCC);
- Electralink's DTS/DTN standards (CSV & can include XML) or their emerging Energy Market Data Hub (EMDH).

Bespoke generic interface approaches such as:

- REST style interfaces;
- SOAP web services;
- use of file formats such as JSON.

Many approaches other than low-level control protocols are built on either CSV or XML technology. Generally speaking, CSV is commonly used in older standards such as National Grid's EDL and Electralink's DTN, while newer formats are more often XML, including in both Electralink and National Grid.

Pros and cons of CSV include:

- Compact format;
- efficient processing at large volumes;
- not easily human-readable;
- more vulnerable to changes in data formats making version control harder to achieve.

Pros and cons of XML include:

- XML is compatible with many current processing tools and viewers;
- XML schema validation provides an immediate result for catching many issues with badly-formed messages, whereas errors in CSV formats are harder to detect;
- XML files are human-readable unlike CSV files;
- although processing of large XML files and large numbers of messages can be relatively slow, the message volumes used in the NMF are unlikely to be large enough for this to be significant;
- there are tools for exporting CIM-compatible data storage in XML format.

JSON is an alternative, and used in some of the WPD initiatives:

- It is a simpler format than XML, providing some of the human readability of XML with less structure;
- the simpler structure and lower emphasis on strong typing can make it less suitable for complex data;
- there are less well-established tools for JSON compared to XML, e.g. for schema validation.

CGI's current recommendation is to produce a bespoke XML schema for automated interfaces for TRANSITION, with some alignment to CIM standards but not guaranteeing 100% CIM alignment (e.g. there may not be CIM types for all of the data needed, and although it is possible to add types to CIM it takes time). Feedback and discussion with TRANSITION partners will be taken into account in determining the eventual approach.

Note that ENA Open Networks Project Workstream 1 includes planned work in 2019 on products for data exchange between ESO and DSO, which will be highly relevant to TRANSITION.

4.5. Determining Data Needed for Data Exchanges

For each type of data interaction that will be required for the NMF, several considerations will be needed, including:

- Data suggested by the use case descriptions from the NMF requirements specification, as illustrated in the context diagram from that document, and data items identified by further elaboration of NMF requirements and design;

- discussion with other Ofgem innovation projects such as Power Potential, EFFS and Fusion;
- reference to relevant standards such as CIM and National Grid. Note that CIM standards can be extended if agreed with the appropriate standards committees;
- security requirements, e.g. whether digital signatures are needed and whether any of the content needs to be encrypted in the message itself (independently of whether encrypted in transit);
- whether all senders and recipients of a specific type of message always use all of the data in that message type, or whether some data items are not relevant to some user roles (e.g. DSO (buyer), DSO (informed), ESO (buyer), ESO (informed), Industry Actor (buyer), Industry Actor (seller), Balance Responsible Party (informed)). Differences in data appropriate to different user types could determine whether there are different message types specified for different roles, or message types are more broadly applicable. Subsets of NMF conceptual data entities are identified in this document to highlight these choices.

4.6. Communications networks

No decisions have been made so far regarding communications networks for NMF traffic, e.g. different ways of securing traffic over the public internet, or an existing private network such as provided by ElectraLink or DCC, but the costs of private networks may be prohibitive for the TRANSITION trials.

5. Data Governance

This section covers issues such as:

- Who owns and manages the master version of NMF data as whole?
- From where are updates received for individual data entities/items?
- Are any data entities or data items mastered elsewhere (e.g. industry IDs for Industry Actors such as MPIDs or Sec Party IDs)
- How are updates propagated to users?
- What is the latency of updates?
- What mechanisms are used to ensure other copies don't diverge from the master?
- How is the data quality managed? If a user identifies a data quality issue in the dataset, what is the remediation process?

5.1. Governance of NMF Standing Data

“Standing data” in this context is expected to refer to the following:

- Data about individual human users of the NMF
- Data about system actors which are users of the NMF
- Data about Industry Actor organisations
- Data about flexible energy resources

Principles:

1. NMF administrators and auditors can see all data (subject to personal security clearance checks etc)
2. Full registration data can only be seen by the user/organisation or owner of the resource

3. Updates to and viewing of NMF standing data will be managed according to the defined requirements, i.e. covered by data exchanges
4. There will be data items of Industry Actor data and energy resource data that will be viewable to all active registered NMF users. These will be made available via the NMF according to functionality defined in the NMF requirements
5. Identifiers from external data sets such as postcodes, MPANs etc, they will be verified manually during TRANSITION trials and not synchronised automatically.

5.2. Governance of NMF Operational Data

Operational data is expected to include Requests, Offers and Bids (Orders) for use of flexible energy resources.

Principles:

1. NMF auditors and admin people can see all data (subject to personal security clearance checks etc)
2. Users in Industry Actor organisations which have appropriate roles will be able to see the Requests, Offers and Bids (Orders) involving their own organisation
3. There will be subsets of Request, Offer and Bid data that will be viewable to all active registered NMF users. These will be made available via the NMF according to functionality defined in the NMF requirements

5.3. General Data Governance Principles for NMF Data

1. There will not be any automatic synchronisation of data other than for system backup and archiving purposes and any replication of data that is required to ensure continuity of service of the NMF (e.g. to enable service to continue from a standby system)
2. Security analysis will be required to enable judgements to be made about data which is sensitive for privacy reasons, ensuring GDPR compliance, or for wider security issues such as to protect misuse of electricity distribution networks
3. The NMF will provide logging capabilities to enable information to be stored to support fault-finding and service management, and logging of security issues if required; these will be subject to security recommendations
4. At the time of writing this document, reporting for NMF data has not been defined
5. Security analysis will need to determine whether it is necessary for any NMF to be stored in an encrypted form while at rest and/or encrypted during transmission across communications networks and systems

5.4. References to External Data Sets & Identifiers

This section describes sets of data relevant to data items listed in the NMF requirements spec, particularly where there may be relevant data sets in the DSO/DNO or industry.

| Data items or groups of data items | Purpose | Approach for TRANSITION trial systems | Data sets potentially available for an NMF in the long term |
|--|---|--|---|
| Identification information for an energy resource that is a single asset | Uniquely identify an energy resource which can be the subject of offers and can be dispatched | Unique energy resource identifier created for use in the NMF. MPAN and location information (<i>see separate entry</i>) will also be non-unique attributes, but note that several energy resource assets may share an MPAN | Likely to be the same in the long term, unless a national standard defined |
| ID of an energy resource that is a group of assets | Named ID of a group of assets e.g. a demand response service provided across multiple locations | Use energy resource ID created for the NMF (note that presupposes that resource IDs are not shared between different markets; otherwise a common system may be needed) | Likely to be the same in the long term, unless a national standard defined |
| Location used for energy resource assets | Location of an energy resource | Postcode and/or other geographic information e.g. UPRN. | GIS system reference, Ordnance Survey grid reference, circuit information (<i>see Location used in Request entry</i>) |

| | | | |
|---|---|--|--|
| Location used in Request | Specify a location e.g. for a network constraint. Potentially multiple energy resources may be able to meet the request | Geographic area e.g. postcode, UPRN, OS grid reference (note that identifying whether an offered energy resource is a match to a Request location is expected to be a service provided by the DSO) | Potentially the request could identify a circuit e.g. 11kV or 33kV; however, note that there is no national system for this, and the circuit that an asset is on could change dynamically due to network configuration |
| MPAN & associated import or export supplier | Identifier of a metering point and the energy supplier for billing purposes | Use MPAN & supplier information with no automated verification or update process | Could build synchronisation to DNO-based registration data, DCC or forthcoming national system |
| IDs for Industry Actors & suppliers | Identify an individual organisation e.g. generator or supplier | Create a system of IDs for the limited set of participants in TRANSITION trials | Could adopt a national system such as Elexon's Market Domain Data for MPIDs or DCC for SEC Party signifiers/SEC user IDs |

Table 7 Use of External Data Sets

5.5. Data Governance by Data Entity

This section provides governance information for each data entity, and subsets of data entities where applicable.

For further information regarding access by individual user roles see section 3.4 and for use of data by individual types of organisation see section 3.5.

| Data Entity | Data Subset | Owner | Additional update rights | How Updated | Latency of Making Updates | Propagation of Updates | Privacy Issues |
|-----------------|-------------------|---|--------------------------|--|---------------------------|--------------------------------------|-------------------|
| User | Account Data | User's organisation | NMF admin user | IERs for registration and account management | On demand | ? | Needs GDPR review |
| User | Viewable Data | User's organisation | NMF admin user | IERs for registration and account management | On demand | On demand | Needs GDPR review |
| Industry Actor | Registration Data | Industry Actor's organisation | NMF admin user | IERs for registration and account management | On demand | ? | Needs GDPR review |
| Industry Actor | Viewable Data | Industry Actor's organisation | NMF admin user | IERs for registration and account management | On demand | On demand | Needs GDPR review |
| Energy Resource | Registration Data | Energy resource owner or manager's organisation | NMF admin user | IERs for registration and account management | On demand | On demand | Needs GDPR review |
| Energy Resource | Offer Data | IA Seller | NMF admin user | IERs for operation of the market | On demand | On demand | Needs GDPR review |
| Energy Resource | Dispatch Data | Energy resource owner or | NMF admin user | IERs for managing | On demand | Propagate to parties associated with | Needs GDPR |

| | | | | | | | |
|-----------------|---------------------|---|----------------|----------------------------------|----------------------|-----------------------------------|-------------------|
| | | manager's organisation | | dispatch | | outstanding Offers or Bids (how?) | review |
| Market Category | N/A | NMF | | Configuration | Software maintenance | | Needs GDPR review |
| Request | N/A | Request issuer | | IERs for operation of the market | On demand | On demand | Needs GDPR review |
| Offer | Full | Offer issuer | | IERs for operation of the market | On demand | On demand | Needs GDPR review |
| Offer | Non-Commercial Data | Offer issuer | | IERs for operation of the market | On demand | On demand | Needs GDPR review |
| Bid | N/A | Bid issuer | Request issuer | IERs for operation of the market | On demand | On demand | Needs GDPR review |
| Dispatch | Instruction Data | Bid issuer | | IERs for managing dispatch | On demand | On demand | Needs GDPR review |
| Dispatch | Outcome Data | Energy resource owner or manager's organisation | | IERs for operation of the market | On demand | On demand | Needs GDPR review |

Table 8 Data Entity and Subset Data Governance Characteristics



Appendices

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The information in this discussion paper is submitted on 17 May 2019 - v1.2 on behalf of CGI by the following authorised representative:

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