



# FUSION

WP4: USEF Process Implementation  
Platform Communication & Procurement  
Specification



#### About Report

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### Important Notice & Disclaimer

1. This document must be read in its entirety. This document may contain detailed technical data which is intended for use only by persons possessing requisite expertise in its subject matter.
2. This document has been produced from information relating to dates and periods referred to in this document. This document does not imply that any information is not subject to change.
3. This document forms part of the deliverables set out in the Project FUSION Directions.
4. This document can be cross-referenced with our publications USEF Due Diligence Report, USEF Consultation Report, FUSION USEF Implementation Plan and the FUSION Communications Protocol on the FUSION Webpage.



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## Overview of Project FUSION

Project FUSION is funded under Ofgem's 2017 Network Innovation Competition (NIC), to be delivered by SP Energy Networks in partnership with seven project partners: DNV GL, Origami Energy, PassivSystems, Imperial College London (academic partner), SAC Consulting, The University of St. Andrews, and Fife Council.

Project FUSION represents a key element of SP Energy Network's transition to becoming a Distribution System Operator (DSO), taking a step towards a **clean, smart and efficient energy system**. As the electricity system changes from a centralised to decentralised model, it enables a smarter and more flexible network to function. Project FUSION is trialling the use of commoditised local demand-side flexibility through a structured and competitive market, based on a **universal, standardised market-based framework; the Universal Smart Energy Framework (USEF)**. USEF provides a standardised framework that defines products, market roles, processes and agreements, as well as specifying data exchange, interfaces and control features. The purpose of USEF is to accelerate the transition to a smart, flexible energy system to maximise benefits for current and future customers. Subsequent sections provide a brief overview of USEF.

Project FUSION will also inform wider policy development around flexibility markets and the DNO-DSO transition through the development and testing of standardised industry specifications, processes, and requirements for transparent information exchange between market participants accessing market-based flexibility services. Ultimately, Project FUSION will contribute to Distribution Network Operators and all market actors unlocking the potential and value of local network flexibility in a competitive and transparent manner. In doing so, Project FUSION aims to contribute to addressing the energy trilemma by making the energy system more secure, more affordable and more sustainable.



## USEF Overview

The USEF framework aims to facilitate effective coordination across all the different actors involved in the electricity market by providing a common standardised roles model and market design while describing communication requirements and interactions between market roles. USEF turns flexible energy use into a tradeable commodity available for all energy market participants, separated from (but in coordination with) the traditional electricity supply chain, to optimise the use of resources. USEF focuses on explicit demand-side flexibility, in which prosumers are contracted by the aggregator to provide specific flexibility services using Active Demand and Supply (ADS) assets. USEF acknowledges but does not provide detailed considerations for implicit demand-side flexibility or peer-to-peer energy trading.

To facilitate the transition towards a cost-effective and scalable model, the framework provides the essential tools and mechanisms which redefine existing energy market roles, add new roles and specify interactions and communications between them. In addition, the USEF standard ensures that all technologies and projects will be compatible and connectable to the energy system, facilitating project interconnection, hence fostering innovation and accelerating the smart energy transition. By delivering a common standard to build on, USEF connects people, technologies, projects and energy markets in a cost-effective manner. Its market-based mechanism defines the rules required to optimise the whole system, ensuring that energy is produced, delivered and managed at lowest cost for the whole system and effectively for the end-user.

The USEF framework provides:

- a **standardised common framework** designed to be implemented on top of current energy markets such as wholesale, retail and capacity markets.
- a description of the **flexibility value chain (FVC)** involving new and existing market players and giving a central role to the aggregator in facilitating flexibility transactions.
- a **roles model** and an **interaction model** to enable the implementation of different business models and interactions between actors.
- a market design described by the **Market Coordination Mechanism (MCM)** which sets out the phases and interaction requirements for flexibility transactions. The MCM provides all stakeholders with equal access to a smart energy system. To this end, it facilitates the delivery of value propositions (i.e. marketable services) to various market parties without imposing limitations on the diversity and customisation of those propositions.
- detailed **communication and market access requirements** taking into consideration privacy and cybersecurity issues.



## Introduction to the USEF Communications Protocol

The USEF Communication Protocol, formally referred to as the USEF Flex Trading Protocol (UFTP), describes the interactions and communication exchange between USEF roles resolve grid constraints at distribution level. The UFTP covers all phases in the USEF Market Coordination Mechanism (contract, plan, validate, operate and settle) and is designed to be used as a stand-alone protocol for flexibility forecasting, offering, ordering and settlement processes.

The UFTP Specifications<sup>1</sup> describe:

- The detailed communication exchange between DSO, Aggregator and Common References Operator (CRO) as well as UFTP use cases<sup>2</sup> descriptions derived from the MCM;
- The USEF message descriptions, defining the attributes contained in each Extensible Markup Language (XML) message; and
- The USEF message transport mechanism.

To complement the UFTP Specifications, the USEF Foundation has made available a GitHub page containing the UFTP XSD (XML Schema Definition) files.<sup>3</sup>

## Purpose of this Document

This document sets out the roles and functional requirements for the FUSION Flexibility Platform (FFP) that will deliver the USEF trial for FUSION. This document should be read in conjunction with the FUSION USEF Implementation Plan document, published on the [FUSION website](#), which provides a more detailed description of USEF elements deployed in the FUSION trial. The current document:

- sets out USEF roles and market participants and their relation to the FUSION trial;
- describes the detailed information flow between DSO, Common Reference Operator CRO and aggregators according to the UFTP;
- sets out the specific requirements for the FUSION Flexibility Platform (FFP) that will deliver the USEF trial for FUSION.

The following sections, highlight the functional requirements specified as part of the procurement of the FUSION Flexibility Platform (FFP), implementing USEF and UFTP. A substantial amount of work was completed by SPEN to define non-functional requirements, that will be unique to each DSO seeking to implement a platform of this type. As these are business specific requirements, they have not been included in this document.

<sup>1</sup> [https://www.usef.energy/download-the-framework/#popup\\_overlay1](https://www.usef.energy/download-the-framework/#popup_overlay1)

<sup>2</sup> The use cases are separate activities that require interaction between DSO and Aggregator, each containing multiple messages in both directions. These are derived from the Market Coordination Mechanism phases.

<sup>3</sup> <https://github.com/USEF-Foundation/UFTP>



## FUSION Functional Requirements – Platform Communication & Procurement Specification

SPEN, in collaboration with our Partners, have developed a series of functional requirements based on the FFP completing both the DSO and CRO roles within USEF. Below is a series of diagrams that describe the stages and processes required to facilitate the DSO and CRO roles within given timeframes. An extensive suite of non-functional requirements was also developed in collaboration with our internal departments, covering topics from testing to cyber security. These are organisation specific and as such have not been included in this document.

Project FUSION partners agreed the FUSION USEF implementation Plan, covering the flexibility services and the USEF roles that the trial will seek to test that are relevant to the FFP and implementation of the USEF based market. Table 1 summarises the roles to be included in the trial and the market party that will perform them.

*Table 1: USEF roles in UFTP and in the FUSION trial*

USEF Role	Inclusion in FUSION Trial	Performed by	Comments
<b>Distribution System Operator (DSO)</b>	YES	SPEN	n/a
<b>Electricity System Operator (ESO)</b>	NO	n/a	n/a
<b>Active Demand Supply (ADS)</b>	YES	To be determined by participating Aggregators	n/a
<b>Aggregator</b>	YES	Flexibility providers	Through industry engagement and tendering process
<b>Supplier</b>	NO	n/a	n/a
<b>Capacity Service Provider (CSP)</b>	NO	n/a	The Aggregator can also be active in the capacity market, but the trial will not trial the interactions with this role
<b>Constraint Management Service Provider (CMSP)</b>	YES	Flexibility providers	Through industry engagement and tendering process
<b>Balancing Services Provider (BSP)</b>	NO	n/a	The Aggregator can also be active in balancing products, but the Project will not trial the interactions with this role
<b>Balance Responsible Party (BRP)</b>	NO	n/a	The Aggregator can also be active in wholesale trading, but the Project will not trial the interactions with this role
<b>Common Reference Operator (CRO)</b>	YES	SPEN	n/a
<b>Meter Data Company (MDC)</b>	YES	SPEN	SPEN will take this role by default, subject to change during the preparation of the trial
<b>Allocation Responsible Party (ARP)</b>	NO	n/a	Wholesale settlement out of scope



Figure 1 below shows the flexibility chain in the FUSION trial expressed in USEF roles. While the Aggregator is responsible for managing the flexibility from their portfolio, the CMSP is facing the market and offers the flexibility to the DSO. Although the roles of Aggregator and CMSP are most likely to be combined under the same market party, they can also be carried out by different actors. For the latter, the interactions between Aggregator and CMSP are out of the scope of USEF and the UFTP.

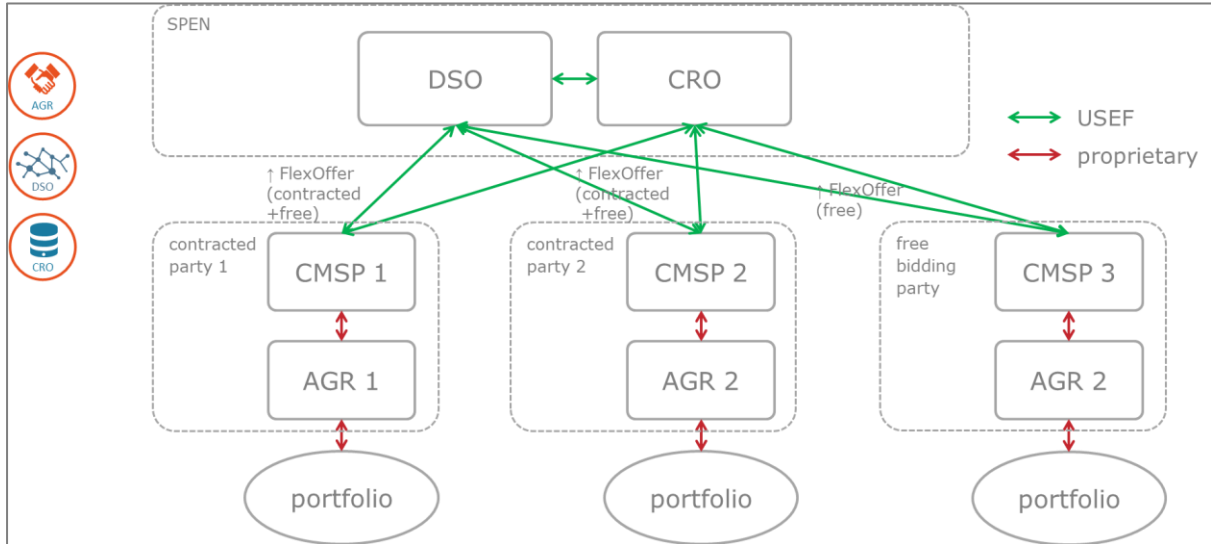


Figure 1: FUSION Market Structure and responsibilities

## Market Coordination Mechanism Phases & Functional Requirements

The Market Coordination Mechanism (MCM) is designed to facilitate and standardise the interactions of market participants; and to enable the optimisation of power, capacity and flexibility transactions from contract to settlement (see Figure 2). This section describes the information exchange between DSO and Aggregator during the 5 phases of the USEF MCM. For each phase, we present the information flow and which interactions are done via the UFTP.

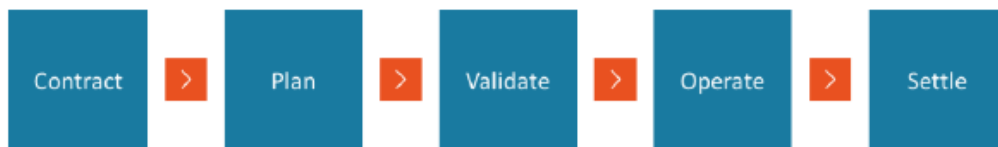


Figure 2: USEF Market Coordination Mechanism phases

Following the reasoning from the previous section, the interactions should be between DSO and CMSP. However, we use the term Aggregator (AGR) to encompass both the roles of, Aggregator and any intermediate CMSP.



## General Functional Requirements

Table 2 - General Functional Requirements

ID	Phase	Module	Type	Requirement
FR01	General	All	General	The FFP shall be constructed in a modular fashion, where the DSO role and the CRO role shall be implemented in separate modules. This implies: <ol style="list-style-type: none"> <li>(1) Interaction between these modules happens always through UFTP-compliant messaging, unless the specific interaction is not supported by the UFTP.</li> <li>(2) The functionality of one module is not affected when the functionality of another module is transferred outside the FFP</li> </ol>
FR02	General	All	General	The FFP shall be fully UFTP-compliant, this applies both to the DSO role, which shall be fully supported by the DSO module, as for the CRO role, which shall be fully supported by the CRO module. All messages defined for these roles shall be supported.
FR03	General	All	General	In case of inconsistencies between this document and the UFTP document ( <a href="https://www.usef.energy/download-the-framework/">https://www.usef.energy/download-the-framework/</a> ), the latter shall be leading.
FR04	General	All	General	The FFP shall store all data in an RDBMS. The data model shall be published, and SPEN shall have the ability to extract data from the RDBMS (production or mirror) for the purpose of data analysis and management reports.



Contract Phase Functional Requirements

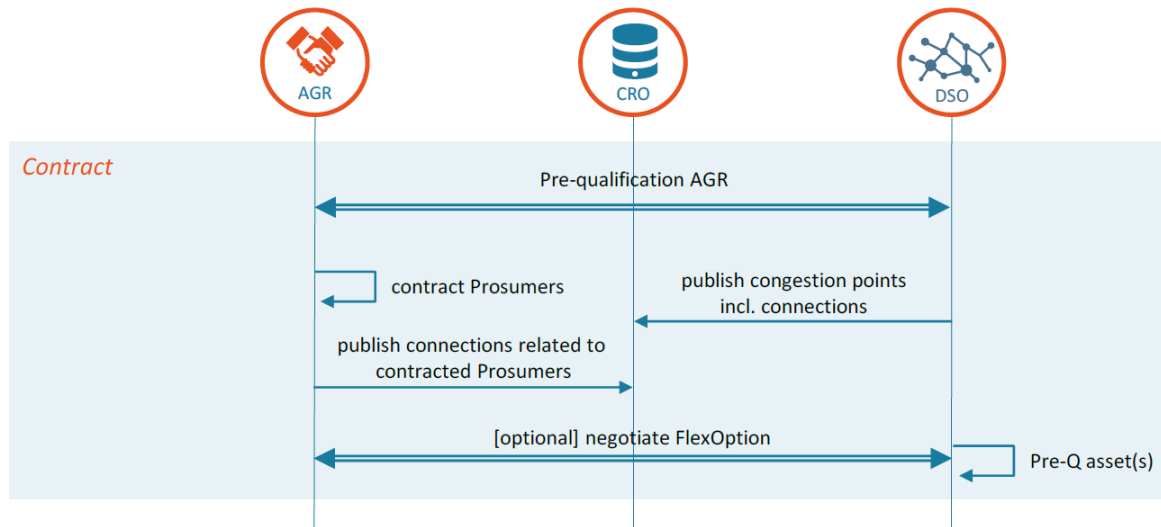


Figure 3: Contract Phase Overview

Table 3- Contract Phase Functional Requirements

ID	Phase	Module	Type	Requirement
FR05	Contract	DSO	Screen	The DSO shall be able to register and modify a <i>congestion point</i> including its standard attributes and its name.
FR06	Contract	DSO	Screen	The FFP shall allow an operator to register and modify an <i>Aggregator</i> including its <i>Domain</i> and its name.
FR07	Contract	DSO	Screen	The FFP shall allow an operator to register and modify availability contracts ( <i>FlexOptions</i> ) per <i>Aggregator</i> including their attributes.
FR08	Contract	DSO	Import / export	The FFP shall be able to import a list of <i>connections</i> per <i>congestion point</i> and send this list to the CRO. Connections that have not yet been associated with this CP shall be sent to the CRO with start date, connections that were associated with the CP before the import, but are no longer associated, should be sent to the CRO with end date.
FR09	Contract	CRO	Screen	The FFP shall allow an operator to register and modify a DSO, including the <i>Domain</i> and the name.
FR10	Contract	CRO	Import	The FFP shall be able to receive and store/update a list of <i>connections</i> per <i>congestion point</i> from the DSO. <i>Connections</i> cannot be linked to several <i>congestion points</i> at the same time, attempts to do so shall trigger an error "connection conflict".
FR11	Contract	CRO	Screen	The FFP shall allow an operator to register and modify an <i>Aggregator</i> , including the <i>Domain</i> and the name.
FR12	Contract	CRO	Input	The FFP shall be able to receive and store a list of <i>connections</i> from the <i>Aggregator</i> , representing the <i>connections</i> that it has flex contracts with. <i>Connections</i> previously included, but not present in the updated list, should be detached from the <i>Aggregator</i> by setting the end date.
FR13	Contract	CRO	Input	The FFP shall ensure consistency of the CRO. This means that <i>connections</i> can only be connected to one <i>Aggregator</i> at the same time. An <i>AGRPortfolioUpdate</i> that would lead to inconsistency, shall be refused.



Plan Phase Functional Requirements

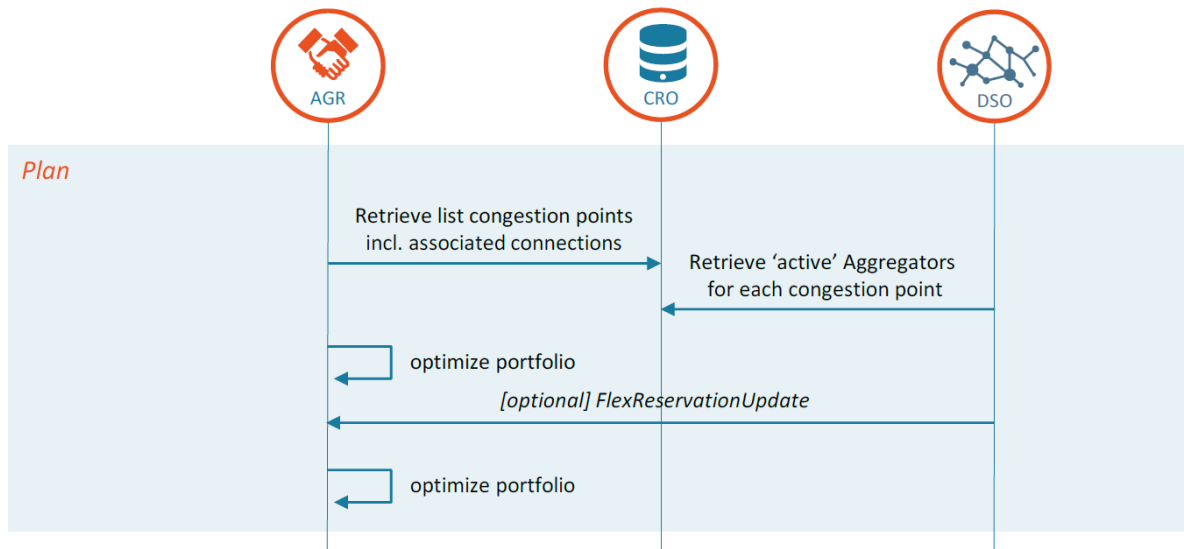


Figure 4: Plan Phase Overview

Table 4- Plan Phase Functional Requirements

ID	Phase	Module	Type	Requirement
FR14	Plan	CRO	Export	Upon receiving an <i>AGRPortfolioQuery</i> , from an <i>Aggregator</i> , the FFP shall be able to issue a list of all <i>congestion points</i> from all <i>DSOs</i> , including all associated <i>connections</i> for that <i>Aggregator</i>
FR15	Plan	CRO	Export	Upon receiving a <i>DSOPortfolioQuery</i> from a <i>DSO</i> , the FFP shall be able to issue a list of <i>congestion points</i> for that <i>DSO</i> , listing all <i>Aggregators</i> that operate associated <i>connections</i> per <i>congestion point</i> .
FR16	Plan Validate	DSO	Screen	The FFP shall provide functionality to solicit and store all <i>Aggregators</i> that operate <i>connections</i> associated for each <i>congestion point</i> .
FR17	Plan Validate	DSO	Screen	The FFP shall provide functionality to allow the Operator, after selecting a <i>congestion point</i> and a date (or a range of dates) to retrieve and show the <i>Aggregators</i> with whom the <i>DSO</i> has availability contracts ( <i>FlexOptions</i> ) for that <i>congestion point</i> and the selected (range of) date(s).
FR18	Plan Validate	DSO	Output	Upon selection of one or more of these <i>aggregators</i> by the operator, the FFP shall provide functionality to send a <i>FlexReservationUpdate</i> to the selected <i>Aggregators</i> , removing their obligation to send a <i>flex offer</i> upon the reception of a <i>flex request</i> , for that <i>congestion point</i> , for that date / those dates. Each <i>FlexReservationUpdate</i> shall be stored.
FR19	Plan	DSO	Screen	The FFP shall inform the Operator, after selecting a <i>congestion point</i> and a date (or a range of dates), which <i>Aggregators</i> have already been relieved from their obligation previously for that <i>congestion point</i> and any of the dates.



## Validate Phase Functional Requirements

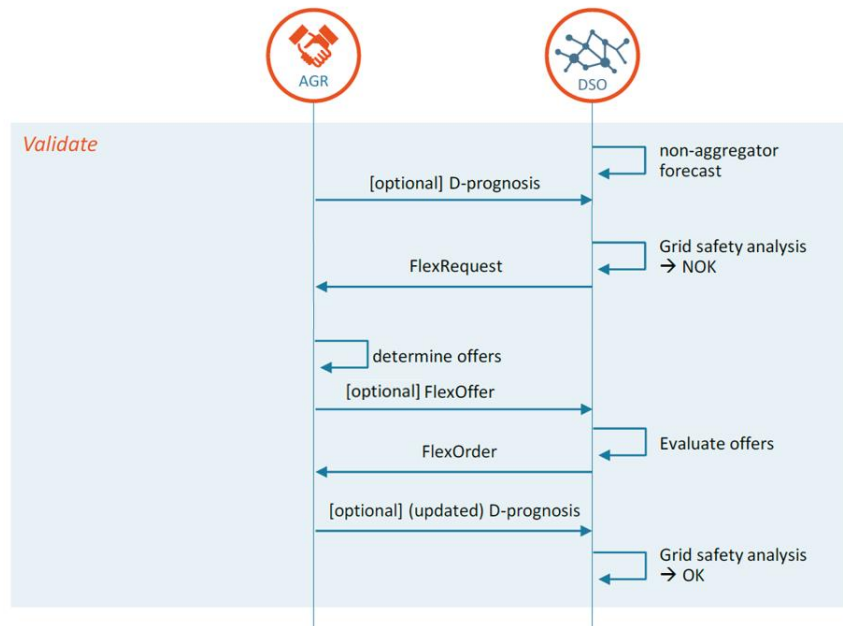


Figure 5: Validate Phase Overview

Table 5- Validate Phase Functional Requirements

ID	Phase	Module	Type	Requirement
FR20	Validate	DSO	Input	The FFP shall be able to import and store the <i>non-aggregator forecast</i> per <i>congestion point</i> for the specified day.
FR21	Validate	DSO	Input	The FFP shall be able to import and store the <i>maximum power</i> per <i>congestion point</i> per day.
FR22	Validate	DSO	Input	The FFP shall be able to import and store the <i>D-prognosis</i> per <i>Aggregator</i> per day.
FR23	Validate	DSO	Export	The FFP shall be able to export the <i>D-prognosis</i> per <i>Aggregator</i> per day, including the active <i>connections</i> per <i>Aggregator</i> .
FR24	Validate	DSO	Screen	The FFP shall provide an overview per day per <i>congestion point</i> , showing if all active <i>aggregators</i> on that <i>congestion point</i> have submitted a <i>D-prognosis</i> for that day. It shall also show whether the associated <i>maximum power</i> profile has been imported.
FR25	Validate	DSO	Screen	Upon selection of the <i>congestion point</i> and date (default tomorrow) by the operator, the FFP shall provide visualization of the <i>non-aggregator forecast</i> relative to the <i>maximum load</i> . It should calculate and visualise the <i>deficiency/availability profile</i> . Upon selection of the operator (in screen or configuration parameter), all <i>D-programs</i> relative to that <i>congestion point</i> should be added to the <i>non-aggregator forecast</i> , yielding a different <i>deficiency/availability profile</i> .
FR26	Validate	DSO	Screen	After selection of the <i>congestion point</i> and the inclusion (y/n) of the <i>D-prognoses</i> , provided the resulting <i>deficiency/availability profile</i> shows any deficiencies, the Operator has the option to generate <i>flex requests</i> .
FR27	Validate	DSO	Export	The <i>flex request</i> shall be sent to all <i>Aggregators</i> that operate <i>connections</i> behind the <i>congestion point</i> , and that have already sent a <i>D-prognosis</i> for the specific day and <i>congestion point</i> . Both the needed flexibility ( <i>deficiency</i> )



				and the available room (availability) shall be specified. The <i>flex request</i> shall be stored.
<b>FR28</b>	Validate	DSO	Import	The FFP shall be able to receive and store <i>flex offers</i> from <i>Aggregators</i> .
<b>FR29</b>	Validate	DSO	Screen	The FFP shall provide an overview of all <i>flex offers</i> , showing the relevant attributes, together with the associated <i>flex request</i> . Only relevant <i>flex offers</i> (not yet expired nor revoked) should be shown. <i>Flex offers</i> shall be visualised, relative to the needed flexibility (within the congestion time frame) and against the available room outside the congestion time frame. It shall show all <i>Aggregators</i> that have received a <i>flex request</i> , also those that have not (yet) submitted a <i>flex offer</i> . It shall mark any <i>Aggregator</i> that has not met the obligation of its <i>FlexOption</i> . It shall allow the operator to select one or more offers.
<b>FR30</b>	Validate	DSO	Export	Upon confirmation from the Operator, the FFP shall send <i>flex orders</i> to the <i>Aggregators</i> whose <i>flex offers</i> have been selected by the operator. These <i>flex orders</i> shall be stored, with a reference to the most recent <i>D-prognosis</i> of that <i>Aggregator</i> .
<b>FR31</b>	Validate	DSO	Import	The FFP shall be able to receive and store the updated <i>D-prognoses</i> , triggered by the <i>flex order</i> . The updated <i>D-prognosis</i> shall have a reference to the <i>flex order</i> . The FFP shall validate whether the updated <i>D-prognosis</i> equals the previous <i>D-prognosis</i> minus the <i>flex order</i> . If the validation fails, the updated <i>D-prognosis</i> shall be rejected ( <i>power value rejection</i> ).
<b>FR32</b>	Validate	DSO	Import	The FFP shall be able to receive and store updated <i>D-prognoses</i> , not triggered by <i>flex orders</i> , both for <i>Aggregators</i> that have received <i>flex orders</i> , or who haven't.
<b>FR33</b>	Validate	DSO	General	The FFP shall allow several iterations of the Validate process, this implies that the flex trading can occur several times per day per congestion point. All data exchanged should be stored separately (e.g. <i>D-prognoses</i> should not be overwritten).



Operate Phase Functional Requirements

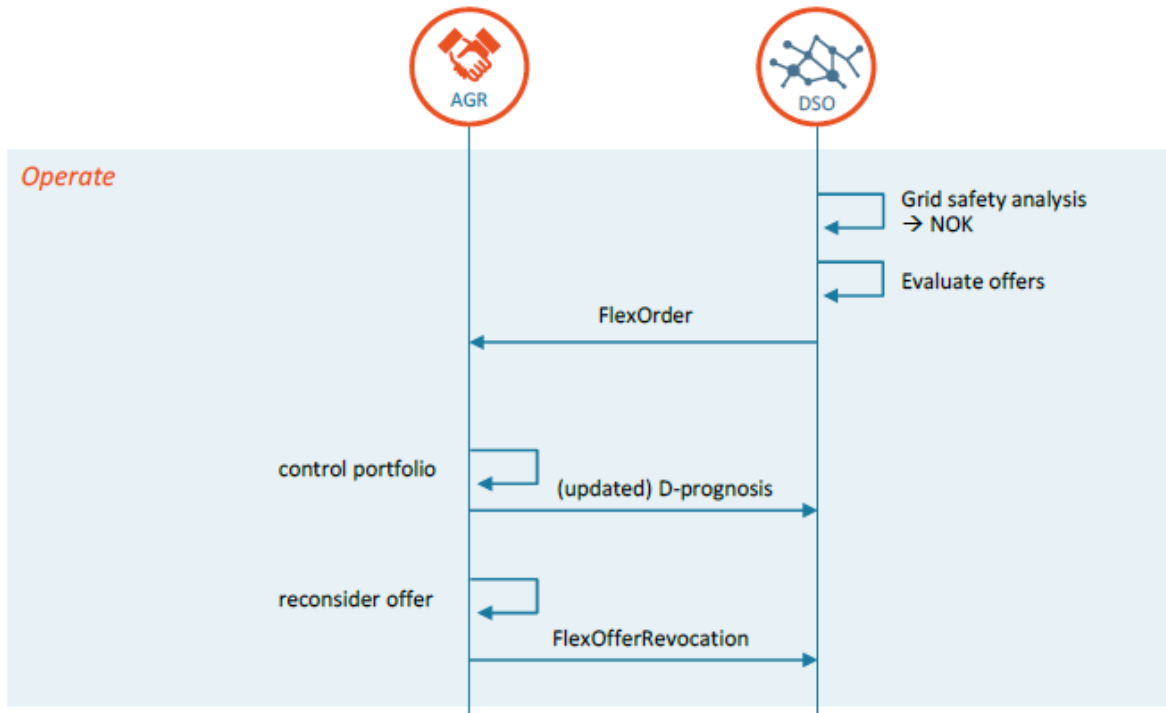


Figure 6: Operate Phase Overview

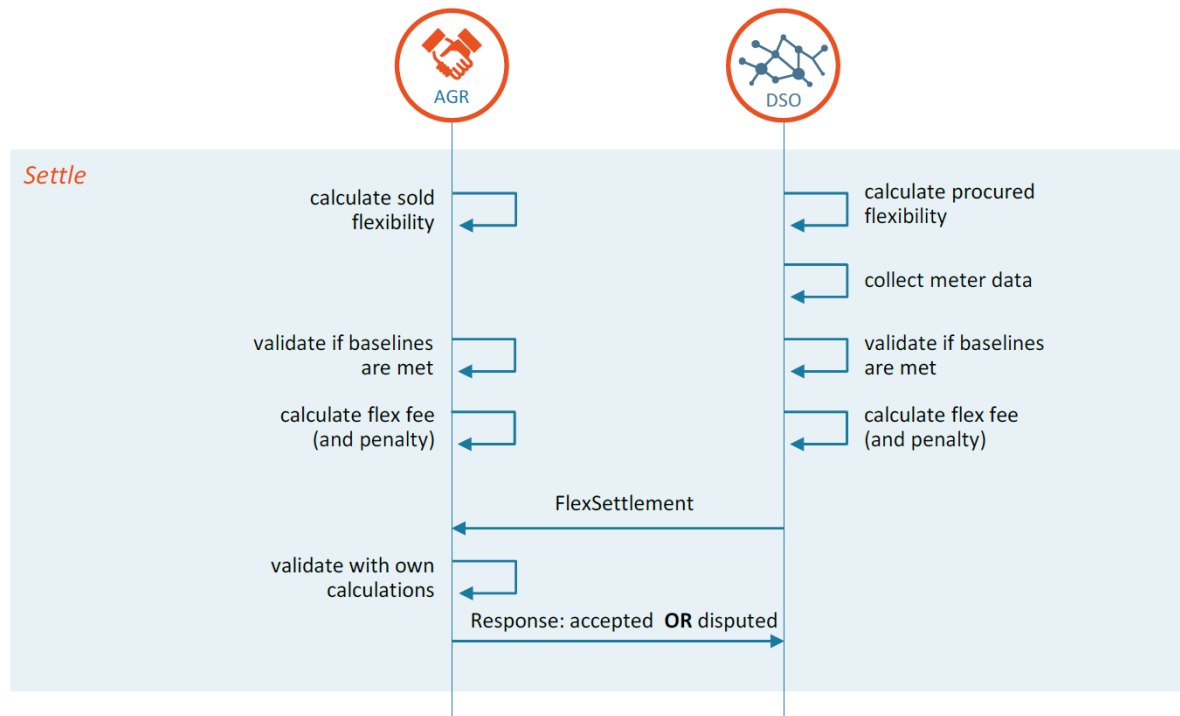
Table 6- Operate Phase Functional Requirements

ID	Phase	Module	Type	Requirement
FR34	Operate	DSO	Input	The FFP shall be able to import and store the <i>non-aggregator forecast per congestion point</i> for the current day (starting with the current HH).
FR35	Operate	DSO	Screen	Upon selection of the <i>congestion point</i> by the operator, the FFP shall provide visualization of the <i>non-aggregator forecast</i> relative to the <i>maximum load</i> . It should calculate the <i>deficiency/availability profile</i> . Upon selection of the operator, all <i>D-programs</i> relative to that <i>congestion point</i> should be added to the <i>non-aggregator forecast</i> , yielding a different <i>deficiency/availability profile</i> .
FR36	Operate	DSO	Screen	In the same screen, the FFP shall provide an overview of all <i>flex offers</i> , for the <i>congestion point</i> , for the remainder of the current day, showing the relevant attributes. Only active <i>flex F47offers</i> (not yet activated nor expired nor revoked) should be shown. It shall allow the operator to select one or more offers.
FR37	Operate	DSO	Export	Upon confirmation from the operator, the FFP shall send <i>flex orders</i> to the <i>Aggregators</i> whose <i>flex offers</i> have been selected by the operator. These <i>flex orders</i> shall be stored, with a reference to the most recent <i>D-prognosis</i> of that <i>Aggregator</i> .
FR38	Operate	DSO	Import	The FFP shall be able to receive and store the updated <i>D-prognoses</i> , triggered by the <i>flex order</i> . The updated <i>D-prognosis</i> shall have a reference to the <i>flex order</i> . The FFP shall validate whether the updated <i>D-prognosis</i> equals the previous <i>D-prognosis</i> minus the <i>flex order</i> , starting at the



				next ISP <sup>4</sup> . If the validation fails, the updated <i>D-prognosis</i> shall be rejected ( <i>power value rejection</i> ).
FR39	Validate Operate	DSO	Import	The FFP shall be able to receive and store <i>FlexOfferRevocations</i> . Revocations of <i>flex offers</i> that have already been accepted, shall be denied.

## Settle Phase Functional Requirements



**Figure 7: Settle Phase Overview**

Table 7- Settle Phase Functional Requirements

ID	Phase	Module	Type	Requirement
FR40	Settle	DSO	Input	The FFP shall be able to import and store <i>measurement data</i> per <i>connection point</i> per day. The data will be provided by the <i>Aggregator</i> . Although not included in the UFTP, data transfer will follow the UFTP messaging method, exact message description will be provided by the USEF foundation.
FR41	Settle	DSO	Screen	The FFP shall be able to calculate the delivered flexibility for each <i>flex order</i> by subtracting the summed measurements of all active <i>connections</i> in the <i>Aggregator's</i> portfolio from the baseline (equalling the most recent <i>D-prognosis</i> prior to the <i>flex offer</i> ), according to the UFTP specification (limited to settlement components 1 and 2 – see section 2.6.2).
FR42	Settle	DSO	Screen	The FFP shall be able to calculate the delivered flexibility for each <i>flex order</i> according to the USEF 2015 specification, in case multiple <i>flex orders</i> have been issued per <i>Aggregator</i> per ISP.
FR43	Settle	DSO	Screen	The validation of <i>flex orders</i> that have been issued in the operate phase, shall be limited to the period starting the first ISP after the <i>flex order</i> issue, until the end of the <i>flex order</i> period.

<sup>4</sup> Imbalance Settlement Period, i.e. half-hour period.



<b>FR44</b>	Settle	DSO	Screen	Upon selection of the <i>congestion point</i> , the <i>Aggregator</i> and the date by the operator, the FFP shall provide visualization of the (cumulative) <i>flex orders</i> per <i>aggregator</i> , relative to the (cumulative) delivered flexibility.
<b>FR45</b>	Settle	DSO	Screen	Upon selection of the <i>congestion point</i> and the date by the operator, the FFP shall provide visualization if the flexibility activations have reduced the actual load below the <i>maximum load</i> of the congestion point. It should clearly show the cumulative delivered flexibility, also outside the time window for which flexibility has been ordered, showing where the rebound took place.
<b>FR46</b>	Settle	DSO	Export	The FFP shall be able to calculate the fee for the delivered flexibility (based on the price in the accepted <i>flex offer</i> ), as well as the penalty for the non-delivered flexibility (based on the penalty fee in the <i>FlexOption</i> ), relative to each <i>flex order</i> .
<b>FR47</b>	Settle	DSO	Screen	Upon selection of the <i>congestion point</i> and the calendar month by the operator, The FFP shall be able to generate a monthly settlement report, showing for the selected <i>Aggregator</i> and calendar month the number of <i>flex orders</i> , total volume, total delivered flexibility, total fees, total non-delivered flexibility and total penalties. It shall also show if a <i>FlexSettlement</i> report has already been generated, and if the <i>FlexSettlement</i> has been approved or rejected by the <i>Aggregator</i> . It should include detailed information per <i>flex order</i> .
<b>FR48</b>	Settle	DSO	Export	This screen shall provide functionality for the selected <i>Aggregator</i> and calendar month to export detailed settlement information for all associated <i>flex orders</i> to CSV/XLS format.
<b>FR49</b>	Settle	DSO	Export	Upon selection of the <i>congestion point</i> and the calendar month by the operator, the FFP shall be able to send <i>FlexSettlement</i> reports to all <i>Aggregators</i> that have received <i>flex orders</i> for that <i>congestion point</i> and calendar month. This report shall be stored.
<b>FR50</b>	Settle	DSO	Export	The FFP shall allow the operator to send an updated <i>FlexSettlement</i> report (e.g. after the previous version has been rejected and/or measurement data is updated), this version shall be stored and shall not override the previous version.
<b>FR51</b>	Settle	DSO	Input	The FFP shall be able to process and store a <i>FlexSettlementResponse</i> .
<b>FR52</b>	Settle	DSO	Screen	Upon selection of the congestion point, <i>Aggregator</i> (with availability contract / <i>FlexOption</i> ) and calendar month, the FFP shall be able to visualize if the <i>Aggregator</i> has met his obligations for offering flexibility upon request, taking into account the attributes of the <i>FlexOption</i> , <i>flex requests</i> and <i>flex offers</i> , <i>FlexOfferRevocations</i> and <i>FlexOfferUpdates</i> .





## Data model

UFTP does not provide an explicit data model, however for most entities the structure can be extracted from the message definition. The table below includes references to the UFTP document where these messages are defined. Also, the minimum attributes for entities that have no direct UFTP message associated, are listed in the table below.

Table 8- Data model

Entity	Minimum attributes
Aggregator	Name, AGR-Domain
<b>AGR portfolio</b>	See UFTP section 4.2.6 + 4.2.8
Congestion Point	Name, EntityAddress
Connection	EntityAddress
Deficiency/availability profile	Equal to D-prognosis, including ISP-duration, TimeZone and TimeStamp (creation)
D-prognosis	See UFTP section 4.2.16
DSO	Name, DSO-Domain
<b>DSO Portfolio</b>	See UFTP section 4.2.12
Flex offer	See UFTP section 4.2.20
<b>Flex offer revocation</b>	See UFTP section 4.2.22
Flex option	See UFTP section 2.2.2
Flex order	See UFTP section 4.2.24
Flex request	See UFTP section 4.2.18
<b>Flex reservation update</b>	See UFTP section 4.2.14
<b>Flex settlement</b>	See UFTP section 4.2.26
<b>Flex settlement response</b>	See UFTP section 4.2.27
Maximum power	Equal to D-prognosis, including ISP-duration, TimeZone and TimeStamp (creation)
<b>Measurement data</b>	Similar to D-prognosis, replacing Power by Energy (Wh), for all connections behind the congestion point (cascading), including Aggregator, ISP-duration, TimeZone and TimeStamp (creation).
Non-aggregator forecast	Equal to D-prognosis, including ISP-duration, TimeZone and TimeStamp (creation)




## Glossary of Terms

Abbreviation	Definition
<b>Aggregator (AGR)</b>	A service provider that contracts, monitors, aggregates, dispatches and remunerates flexible assets at the customer side. (USEF terminology)
<b>Common Reference (or congestion point repository)</b>	USEF defines the Common Reference as a repository which contains information about connections and congestions points in the network.
<b>Common Reference Operator (CRO)</b>	In USEF, the CRO is responsible for operating the Common Reference. The CRO's role is to ensure the publication of both the DSO flexibility requirements and the associated flexibility assets in each congested point as well as the standardisation of this publication for all distribution areas.
<b>Congestion Management</b>	The avoidance of the thermal overload of system components by reducing peak loads. The conventional solution to thermal overload is grid reinforcement (e.g. cables, transformers). Congestion management may defer or even avoid the necessity of grid investments.
<b>Constraint Management Service Provider (CMSP)</b>	A provider of constraint management services to a DSO or the TSO. This is a USEF role and is not currently used in GB. This role takes on specific responsibilities in communicating and coordinating flexibility transactions with the ESO and DSOs, to ensure effective deployment of flexibility as well as effective management of network constraints. Responsibilities also involve ensuring efficient dispatch of flexibility to maintain the safety and reliability of the networks.
<b>D-prognosis</b>	Aggregator forecast of the amount of energy to be consumed or produced at a given congestion point.
<b>D-programmes</b>	Aggregator forecasts of planned activations of flexibility (day-ahead and intraday) to be shared with DSOs in congested distribution network areas.
<b>Distribution System Operator (DSO)</b>	As defined in DIRECTIVE 2009/72/EC: A natural or legal entity responsible for operating, ensuring the maintenance of and, if necessary, developing the distribution system in a given area and, where applicable, its interconnections with other systems and for ensuring the long-term ability of the system to meet reasonable demands for the distribution of electricity.
<b>Flexibility</b>	Ability of an asset or a site to purposely deviate from a planned or normal generation or consumption pattern.
<b>Market Coordination Mechanism (MCM)</b>	The Market Coordination Mechanism in USEF includes all the steps of the flexibility trading process, from contractual arrangements to the settlement of flexibility. USEF splits the flexibility trading process in five phases and describes the interactions between market participants and information exchange requirements in each phase of the MCM.
<b>Prosumer</b>	This role refers to end-users who only consume energy, end-users who both consume and produce energy, as well as end-users that only generate (including on-site storage). (USEF terminology)
<b>Post-fault products</b>	Flexibility products under which the DSO procures, ahead of time, the ability of a Service Provider to deliver an agreed change in output following a network fault.
<b>Settlement Period</b>	The time unit for which imbalance of the balance responsible parties is calculated. In GB is 30 minutes.
<b>Supplier</b>	The role of the Supplier is to source and supply energy to end-users, to manage (hedge) delivery and imbalance risks, and to invoice its customers for energy.
<b>USEF Flexibility Trading Protocol (UFTP)</b>	A protocol that describes the interactions for the exchange of flexibility between Aggregators (or other flexibility service providers) and DSOs.





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