



**Business Requirements
for
Quantification and
settlement of
flexibility services**

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A. Preface/introduction

This Business Requirement Specification (BRS) describes the processes and the exchange of information related to quantification and settlement of flexibility services.

Based on validated measured data from a Metered Data Administrator and a reference line, the Flexibility Settlement Responsible determines and distributes the flexibility volumes. The reference line (also called baseline) is established by the Reference Line Responsible. After the volumes have been determined the Flexibility Settlement Responsible settles the delivered volumes of the flexibility services between the Flexibility Service Provider and the Buyer of Flexibility, determines and distributes non-delivered supply volumes and handles the compensation of imbalances and supply volumes.

The BRS is made in an ebIX® project with members and representatives of TSOs (related to ENTSO-E) and of DSOs. The reason for ebIX® to start modelling flexibility services was induced by the quickly growing interest in flexibility energy services and the increasing number of flexibility implementations, all be it most of them still experimentally. We tried to use as much experience as possible in the project in setting up this BRS by using the work of the “ebIX® Overview of energy flexibility services” [7] and the good work already done by other groups, such as USEF and Horizon 2020 projects, and using the experience from the project members.

One of the challenges of the project was, while discussing all details of different kinds of flexibility services, keeping the document at such an abstract level that in principle it covers all kind of different flexibility services and applications, ranging from balancing services, congestion services to services for portfolio optimisation.

A complete overview of all elaborated UseCases, including relations between them, is shown in Appendix B.

B. About this document

This document is a business requirements specification for exchange of information related to settlement of flexibility services as part of the “energy flexibility services process” within the European energy market. These processes will ease the access for the Flexibility Service Providers to the flexibility energy market and help System Operators and other market roles to allow flexibility actors in existing and new products.

As a general introduction ebIX® has published a separate document “Introduction to ebIX® Business Requirements and Business Information Models” [3]. The introduction also includes the generic model elements that are not specific for a particular business process.

In line with UN/CEFACT Modelling Methodology version 2 (UMM-2) ebIX® defines the business requirements as the first step in modelling energy market processes and data exchange. This document specifies an UMM Business Requirements View, which consist of the three sub views: Business Domain View, Business Partner View and Business Entity View.

The Business Information Model is in turn the basis for the creation of XML schema’s and is the basis for the specification of web services. The Business Information Model and the syntax specific structures are specified by the “ebIX® Technical Committee” (ETC).

Since the ebIX® model is open for national customisation, some attributes are added as optional for usage for regional/national customisation. If used, these attributes must be specified nationally.

B.1. Comments to the ebIX® model

If you have comments or suggestions to the requirements, please contact the ebIX® secretary (secretary@ebix.org).

B.2. References

B.2.1. Standards

- [1] UML Profile for UN/CEFACT’s Modelling Methodology (UMM), Base Module 2.0, (http://www.unece.org/cefact/umm/umm_index.html)
- [2] The Harmonized Role Model (for the Electricity Market) by ebIX®, ENTSO-E, and EFET (www.ebix.org)

B.2.2. ebIX® Documents

- [3] Introduction to ebIX® Business Requirements and Business Information Models (www.ebix.org)
- [4] Recommended Identification Schemes for the European Energy Market (www.ebix.org)
- [5] ebIX® code lists (www.ebix.org)

[6] ebIX® Business Requirements Specifications (www.ebix.org)

[7] ebIX® Overview of energy flexibility services (www.ebix.org)

B.2.3. Energy flexibility services work by other groups

[8] USEF (<https://www.usef.energy/>)

[9] Horizon 2020 projects (EU-SysFlex, INTERFACE and OneNet)
(<https://ec.europa.eu/programmes/horizon2020/en/home>)

[10] Equigy project (<https://equigy.com/>)

[11] CEDEC, E.DSO for Smart Grids, Eurelectric, GEODE and ENTSO-E; [A toolbox for TSOs and DSOs to make use of new system and grid services](#)

B.3. Participants in the project

These Business Requirements, as part of the ebIX® Model for the European Energy Market (see [3]), are prepared by the ebIX Flexibility project phase II, consisting of representatives from ebIX (and their countries), ENTSO-E, DSO's and TSO's.

B.4. Main changes since last version

Old	New	Clarification	Date
Version 1.0			
	v1r0A	First draft for ebIX® Forum approval.	20230203

1. Business Requirements View: Quantification and settlement of flexibility services

1.1. Definitions

An **activation window** is a period of time agreed between the Buyer of Flexibility and the Flexibility Service Provider to activate the flexibility service in question. The activation window begins when the Buyer of Flexibility requires the activation and includes the time for ramping up and down, as opposite to a “delivery period” that only includes the period of time where the Resource or Pool of Resources delivers the full effect.

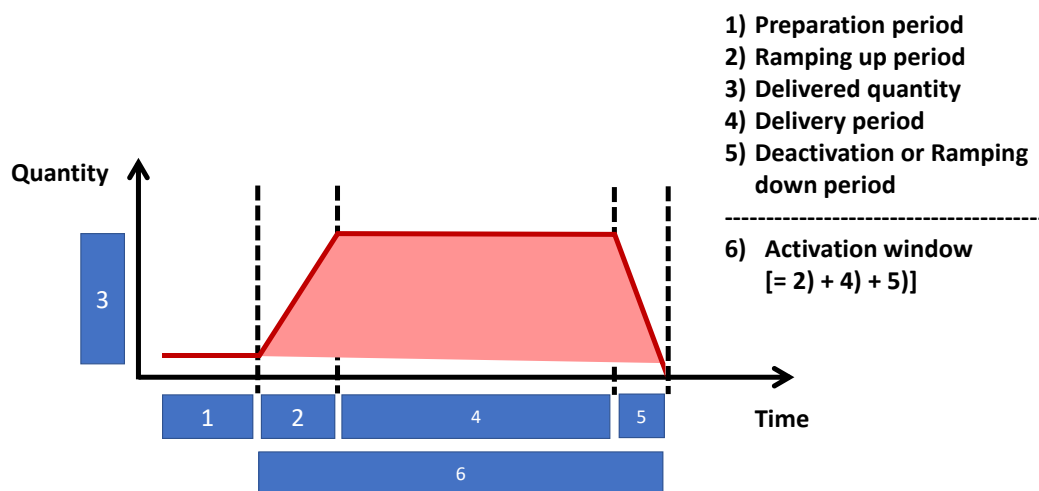


Figure 1 What is an activation window?

Flexibility is defined as the capability to modify generation injection and/or consumption patterns in the energy system¹ (like electricity or gas) - on an individual Resource, Accounting Point or aggregated level - on external request.

The **flexibility volume** is the quantity of energy or capacity delivered as a flexibility service.

Flexibility services are energy services offered, where flexibility is used to meet the needs of energy market participants or System Operators on existing or new energy or capacity markets. Examples are defined as balancing services, non-frequency ancillary services, congestion management services, etc.

Flexibility Service Provider is a party that offers flexibility services to the energy and/or capacity market(s) based on acquired (aggregated) capabilities².

¹ An energy system is a system primarily designed to supply energy-services to end-users, see [Energy system \(Wikipedia\)](#)

² The “Aggregator” (including the “Independent aggregator”) often corresponds to the Flexibility Service Provider role.

The new role **Flexibility Settlement Responsible** (FSR)³ is introduced in this document, defined as a party that is responsible for the quantification and settlement of the energy volume and of the volume compensation (positive or negative) of the supplied energy or capacity for the delivered flexibility service by a Flexibility Service Provider.

A **flexibility product** is a certain capacity or volume of energy that a Flexibility Service Provider makes available for a flexibility service.

Grid constraints are technical requirements, such as thermal limit of a network element and/or voltage limits for a grid section, part of operational security limits of an operational grid that need to be observed to meet security requirements defined in Article 18 of the EU System Operation Guideline⁴.”

A **pool** is a collection of one or more Resources that is used by a Flexibility Service Provider to offer one or more flexibility products to the market.

A **reference line** (also called baseline) is the best approximation of the normal load or generation curve for an Accounting Point or Resource (group) without flexibility services being invoked. In this way the flexibility services that are delivered can be quantified (as the difference between reference line and measurements of operation) and non-delivered supply volumes can be determined. The reference line can be estimated based on schedules or based on actual production/consumption measurements. The method of calculating the reference line is agreed between the Buyer of Flexibility and the Flexibility Service Provider, or defined in the product specification, governed by national rules or regulations.

The reference line can be ex-ante (equals the schedules) and ex-post (based on actual production/consumption measurements), dependent on the product specification:

1. Ex-ante: the predicted and confirmed (but not necessarily validated) energy consumption/production measurements, latest just before operational time, per time interval, normally on an aggregated level, but may depending on the service be “drilled down” to an individual Accounting Point or Resource.
2. Ex-post: a reference line can be calculated based on actual production/consumption measurements.

We introduce the **Reference Line Responsible** role for the party that is responsible for establishing and distributing the reference line for the flexibility services for a (set of) Resource(s). The reference line is determined either by calculation or by using measured data. The role may be performed by the Flexibility Service Provider, the Buyer of Flexibility or a third-party.

A **Resource** delivers the capability to modify generation injection and/or consumption patterns in the energy system (like electricity or gas). It is a market representation of an asset, or a group of assets having this capability. A Resource represents for example grid assets, energy generating units, energy consuming units, energy storing units or a virtual power plant.

³ The term Flexibility Settlement Responsible is an intermediate term that may be changed in the future.

⁴ Article 18 COMMISSION REGULATION (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation.

The **resolution** (attribute used in several documents in the Business Entity View, see chapter 4) is the time between two observations, leading to the number of observations in this timeseries (calculated from the observation period divided by the Resolution).

The observation period must contain a whole number of observations as derived from the resolution.

The resolution is expressed in compliance with ISO 8601 in the following format:

PnYnMnDTnHnMnS.

For example **PT15M** for 15 minutes resolution.

1.2. Basic principles and assumptions

- When defining the UseCases in this Business Requirement Specifications (BRS), the electricity sector has been the focus area. However, it should be possible to also use the UseCases as a basis for other energy sources, such as gas or heat/cold.
- “The happy flow principle” is used in the UseCase descriptions, i.e., the focus is the expected outcome of a process and exceptions on this outcome (rejections, etc.) are described in the “exception row”.
- It is not differentiated between flexibility (trades) used by a System Operator (DSO or TSO) and other market parties. The model should be applicable for all kinds of applications of flexibility and all kind or parties that can buy flexibility services, i.e. the Buyer of Flexibility.
- We realise that not all market rules and regulations, roles, domains and processes are finally defined in the energy and/or capacity market(s) yet.
- It is assumed that (near) real-time measured data are non-validated. These measured data are directly sent by the Metered Data Collector⁵.
- All non-real-time measured data are assumed to be validated by the Metered Data Responsible and to be distributed by the Metered Data Administrator⁶.
- It this BRS it is assumed that parties that are involved in the process are implicitly consented, i.e. consented by law or regulation, to receive relevant data. Other parties who are interested in receiving these data may get them under the condition that they are explicitly consented by the Customer. These parties are called Consented Parties.
- Settlement can be done for both activation and availability of both energy and capacity. In this BRS we split into settlement of the availability of flexibility and settlement of the consequences of activation of flexibility.
- For activated energy and capacity for flexibility services, a determined reference line and actual energy- or capacity-measurements are needed.

⁵ We assume it is the Metered Data Collector that provides (near) real-time measured data to the Flexibility Settlement Responsible. The Metered Data Collector can for instance be the same organisation that also has the role of Flexibility Service Provider, Resource Provider or an Energy Service Company.

⁶ The company assuming the role of Flexibility Service Provider may, based on national rules, also act in the role(s) as Metered Data Responsible and/or Metered Data Administrator.

- Both (near) real-time measured data and validated measured data may be used for the determining the reference line and for the settlement of flexibility services.
- The Flexibility Settlement Responsible receives the reference line from the Reference Line Responsible and validated measurements from the Metered Data Administrator or non-validated real-time measured data directly from the Metered Data Collector as basis for the settlement. We assume that the Flexibility Settlement Responsible only settles the volume, hence doesn't calculate any prices nor amounts of money.
- The role System Operator used in this BRS covers the system operator part of both DSOs and TSOs.
- There can only be one Flexibility Service Provider (FSP) responsible for a Resource for a delivery period, but a Flexibility Service Provider may have many Resources at the same time.
- We use Accounting Point as the object where energy (transfer) is measured for market purposes and where market players assume certain responsibilities in well-defined roles. An Accounting Point is a type of Metering Point. The administration of the characteristics for the Accounting Points, including the different responsible roles, is the Metering Point administration, performed by the Metering Point Administrator.
- Each Accounting Point is associated with a physical connection to the grid (sometimes referred to as connection point or similar). This Grid connection is identified with the "Grid connection ID" (*Definition: "The unique identification of the grid connection the Accounting Point is connected to"*). Each Accounting Point is connected to one Grid connection (ID), although there are rare cases where an Accounting Point can have more than one physical Grid connection to the grid. A Grid connection ID has one or more Accounting Points linked to it, as is the case for sub-Accounting Points (see below).

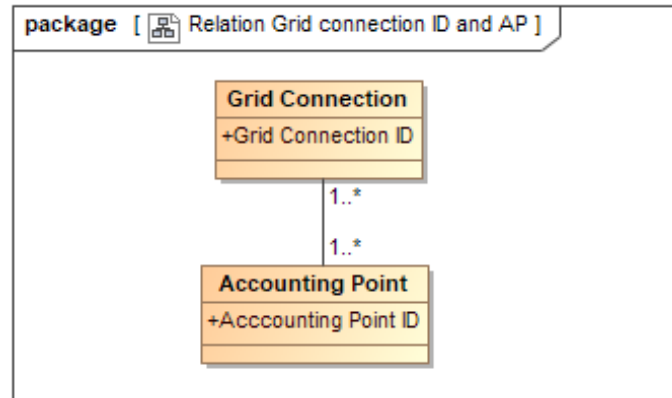


Figure 2 Relation between Grid connection ID and Accounting Point

- An Accounting Point consists of one or more Installation(s), which contains one or more Assets that consume or produce energy. At the connection of an Installation to the grid, the energy transfer usually is measured with one or more Meter(s).

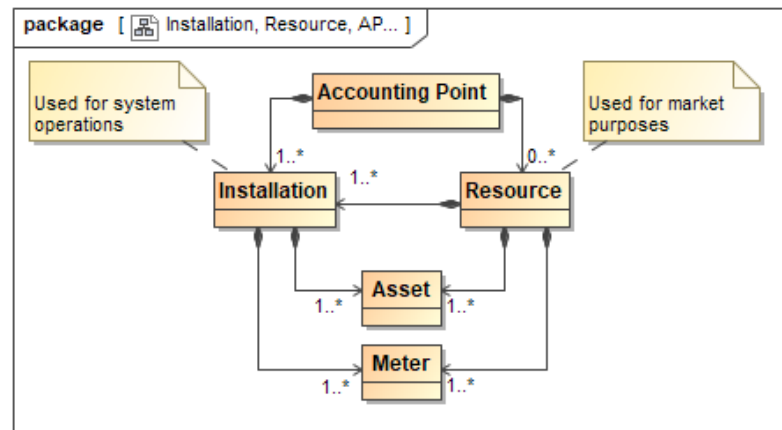


Figure 3 What is an Accounting Point?

Further, an Accounting Point can have zero or more Resources. A Resource is built up of one or more Assets of one or more Installations at the Accounting Point, but not all Assets from an Installation nor all Installations at an Accounting Point need to be part of a Resource. The Resource may be used for offering a certain energy and/or capacity (service) to the market. A Resource can be measured separately or using the meter(s) of the installation(s) of the Accounting Point. The Resource is through the Accounting Point also linked to the same Grid connection and has the same Grid connection ID as the Accounting Point it is part of.

Since this BRS concerns (flexibility) market processes, we use the Resource. The Installation is not used in the rest of the BRS.

- From each Accounting Point it may be split off one or more sub-Accounting Point(s) (linked to the same Grid connection ID), which is measured. A sub-Accounting Point can have zero or more Resources. Sometimes a Resource can for market reasons be split off into a sub-Accounting Point.
- The sub-Accounting Points (SAPs) must be treated as normal Accounting Points (APs) in the market processes. For the flexibility processes, measurements can come from Accounting Point-, sub-Accounting Point- or Resource level. Where we write in this document Accounting Point it applies as well for a sub-Accounting Point; we do not (need to) distinguish between main and sub-Accounting Points.
- The reference line is at the same level as the measured data, i.e. on Accounting Point level, Resource level or both.
- The effect of a Resource for a flexibility service is determined based on actual measured data or calculated/profiled data. This can be done on Accounting Point or Resource level. Based on national rules these measured data are made available to the Flexibility Settlement Responsible and to other entitled roles, however these individual data, based on measured or calculated data at Resource level, are not necessarily made available via a Metered Data Responsible and/or Metered Data Administrator.

2. Business Domain View: Quantify and settle flexibility services (Business Process UseCase)

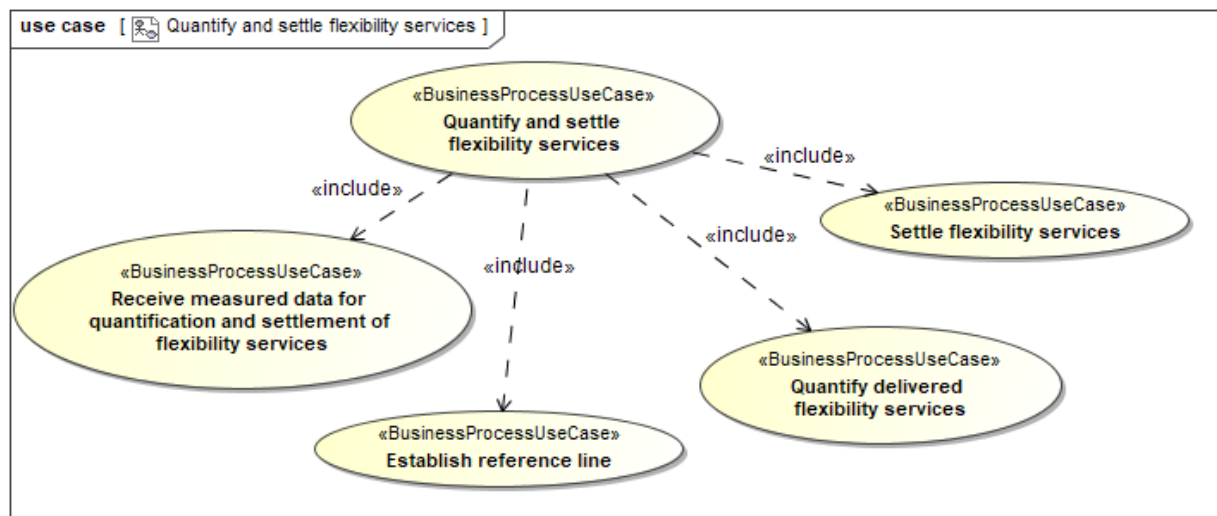


Figure 4 Business Process UseCase: Quantify and settle of flexibility services

2.1. Description

UseCase description: Quantify and settle flexibility services	
definition	<p><i>This is an overview uses case.</i></p> <p>In this process the Flexibility Settlement Responsible quantifies and settles volumes of flexibility services and communicates the result to the Entitled Roles.</p> <p>Therefore the process includes the Flexibility Settlement Responsible receiving or requesting measured data for quantification and settlement of flexibility services, either from the Metered Data Administrator or the Metered Data Collector. Also he receives the reference line from the Reference Line Responsible, who determines the reference line, either based on schedules or based on actual production/consumption measurements.</p> <p>Delivered (and not delivered) quantities are quantified based on measured data, the established reference line and requested activation signals before the determined flexibility volume is sent from the Flexibility Settlement Responsible to the Flexibility Service Provider and other Entitled Roles.</p> <p>For contracted available capacity, the agreement is the basis for the settlement.</p> <p>Thereafter the agreed flexibility services (delivered services and, if applicable, contractual conditions) are settled between the Flexibility Service Provider and the Buyer of Flexibility and if needed (dependent on</p>

	market rules and the used services) compensation of the Energy Supplier for the energy volume and/or compensation of the imbalances between the Balance Responsible Parties involved.
beginsWhen	When the activation window for the flexibility service has ended.
preCondition	The Resources that contributed to the energy or capacity of the flexibility service for the activation window, are identified.
endsWhen	All involved roles have received the settlement information.
postCondition	The effects of the flexibility services transaction(s) between the Flexibility Service Provider and the Buyer of Flexibility as well as potential compensations are determined and exchanged, and the settlement is ready to be billed between the respective parties.
exceptions	None.
actions	Not applicable at this level.

2.2. Receive measured data for quantification and settlement of flexibility services (Business Process UseCase)

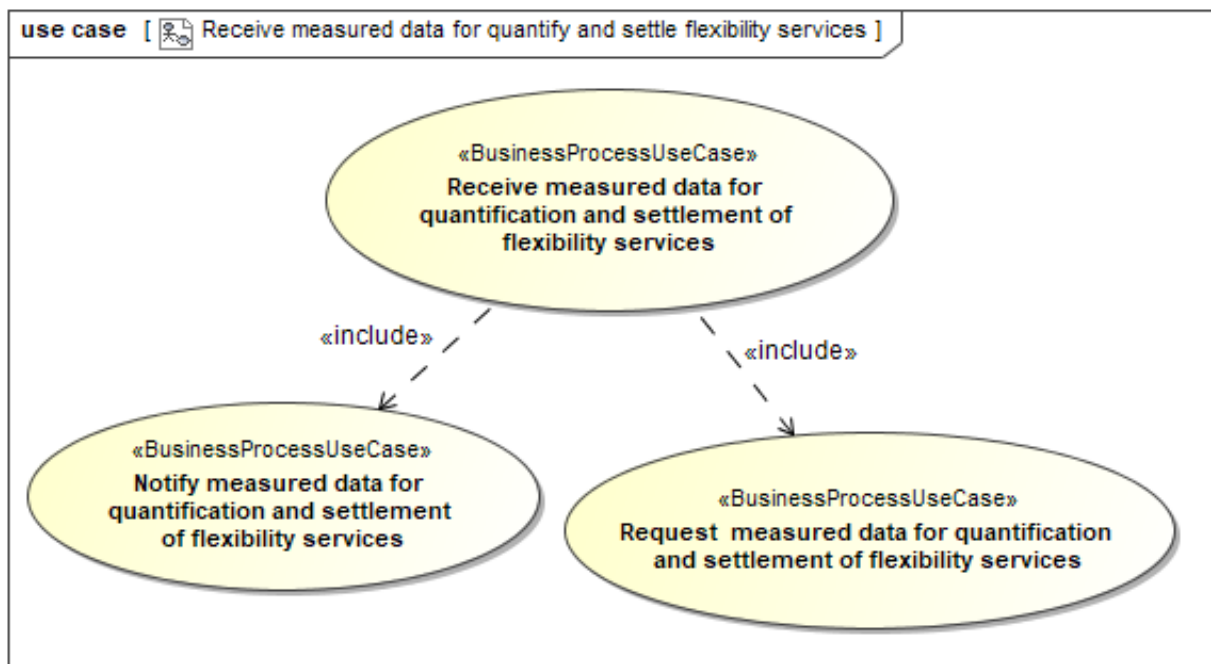


Figure 5 Business Process UseCase: Receive measured data for quantification and settlement of

2.2.1. Description

UseCase description: Receive measured data for quantification and settlement of flexibility services	
definition	<p>In this process, the Flexibility Settlement Responsible and the Reference Line Responsible receive the measured data for quantification and settlement of the flexibility service, for the activation window(s), by receiving measured data of the Resources involved in one of two ways:</p> <ol style="list-style-type: none"> 1. As validated measured data for quantification and settlement of flexibility services from the Metered Data Administrator or 2. As real-time measured data for quantification and settlement of flexibility services from the Metered Data Collector. <p>In addition the Flexibility Settlement Responsible or the Reference Line Responsible can request measured data for quantification and settlement of flexibility services from either the Metered Data Administrator or the Metered Data Collector.</p>
beginsWhen	When the activation window for the flexibility service has ended or when requested.
preCondition	The Resources for the activation window are identified.

endsWhen	When the measured data for the flexibility quantification and settlement have been received by the Flexibility Settlement Responsible and the Reference Line Responsible.
postCondition	The Flexibility Settlement Responsible and the Reference Line Responsible have the measured data for quantification and settlement of flexibility services, for the activation window.
exceptions	None.
actions	Not relevant at this level.

2.2.2. Notify measured data for quantification and settlement of flexibility services (Business Process UseCase)

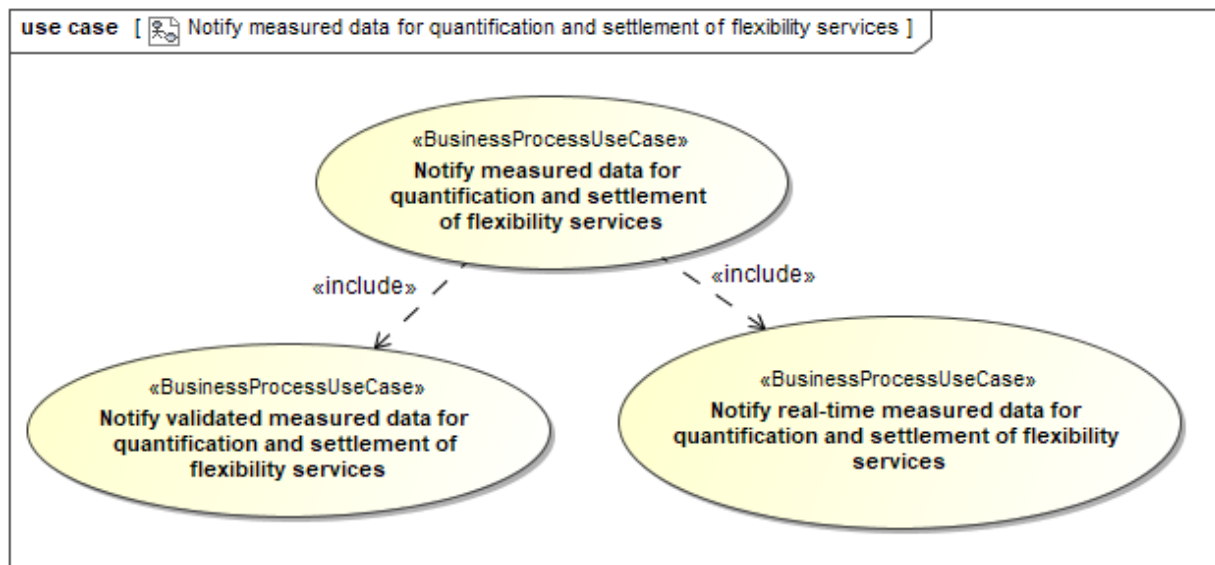


Figure 6 Business Process UseCase: Notify measured data for quantification and settlement of flexibility services

2.2.2.1. Description

UseCase description: Notify measured data for quantification and settlement of flexibility services	
definition	In this process, the Metered Data Administrator (for validated measured data for quantification and settlement of flexibility services) or the Metered Data Collector (for real-time measured data for quantification and settlement of flexibility services) sends validated- or real-time measured data for quantification and settlement of flexibility services, for the activation window(s), for the Resources involved, to the Flexibility Settlement Responsible and the Reference Line Responsible.
beginsWhen	After the activation window has ended (if validated measured data for quantification and settlement of flexibility services) or in (near) real-time after the activation window has started (if real-time measured data for quantification and settlement of flexibility services).
preCondition	Validated- or real-time measured data for quantification and settlement of flexibility services, for the relevant activation window, is available. The Flexibility Settlement Responsible and the Reference Line Responsible are known to the Metered Data Administrator and/or the Metered Data Collector.

endsWhen	When the validated- and/or real-time measured data for quantification and settlement of flexibility services has been received by the Flexibility Settlement Responsible and the Reference Line Responsible.
postCondition	The Flexibility Settlement Responsible and Reference Line Responsible have the measured data for quantification and settlement of flexibility services and can start their respective processes.
exceptions	None.
actions	Not relevant.

2.2.2.2. Notify validated measured data for quantification and settlement of flexibility services (Business Process UseCase)

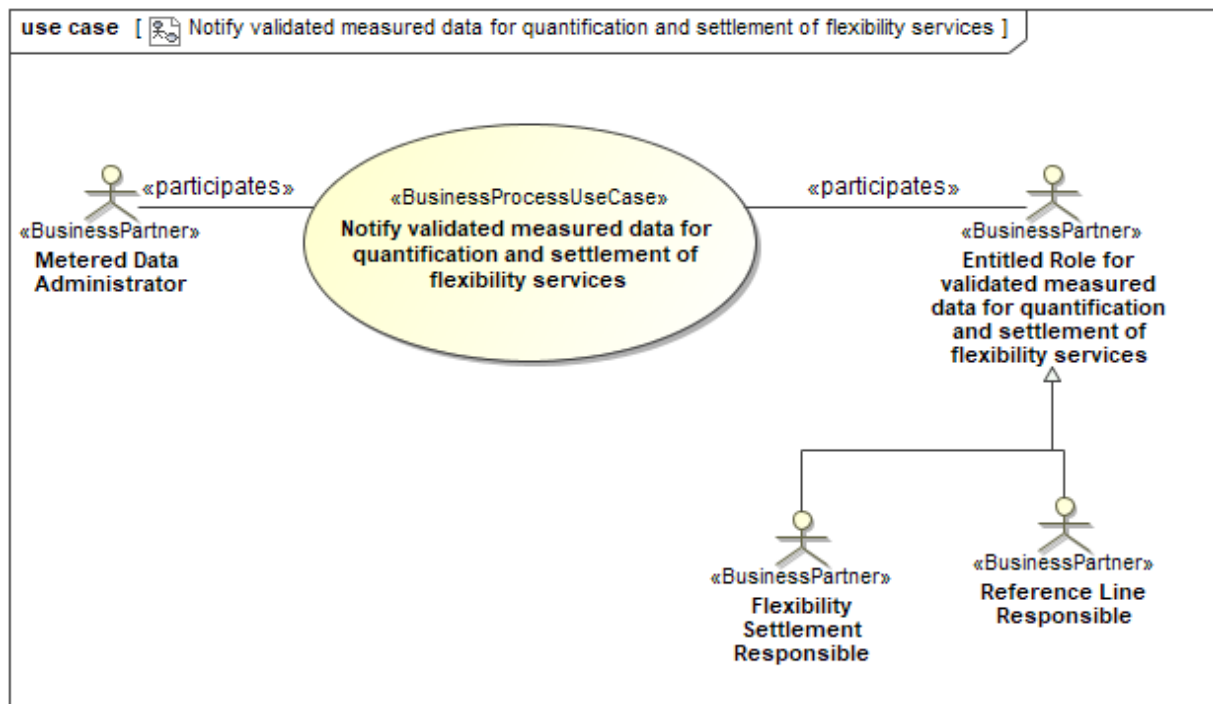


Figure 7 Business Process UseCase: Notify validated measured data for quantification and settlement of flexibility services

2.2.2.2.1. Description

UseCase description: Notify validated measured data for quantification and settlement of flexibility services	
definition	In this process the Metered Data Administrator notifies the Entitled Role for validated measured data for quantification and settlement of flexibility services, i.e. the Flexibility Settlement Responsible and the Reference Line Responsible, of the validated measured data for quantification and settlement of flexibility services, for the relevant activation window(s), for the Resources involved.
beginsWhen	When the activation window has ended or there have been changes to the previously distributed validated measured data for quantification and settlement of flexibility services.
preCondition	The activation window for the flexibility service, the validated measured data for quantification and settlement of flexibility services are for, has ended.

endsWhen	When the Entitled Role for validated measured data for quantification and settlement of flexibility services has received the validated measured data for quantification and settlement of flexibility services.
postCondition	The Entitled Role for validated measured data for quantification and settlement of flexibility services has the validated measured data for quantification and settlement of flexibility services, for Resources involved, for the activation window(s) available.
exceptions	None.
actions	See 2.2.2.2.2

2.2.2.2.2. Business Process

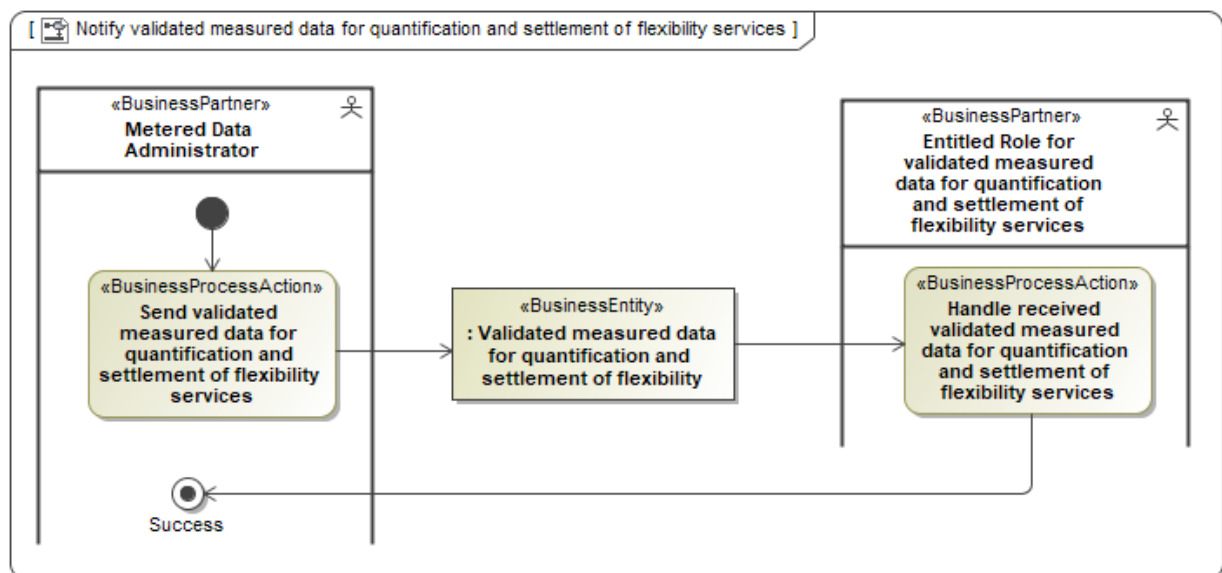


Figure 8 Business Process: Notify validated measured data for quantification and settlement of flexibility services

The data content of the «Business entity» (Square box between the swim lanes) is found at “4.1 Validated measured data for quantification and settlement of flexibility (Class Diagram)”.

2.2.2.3. Notify real-time measured data for quantification and settlement of flexibility services (Business Process UseCase)

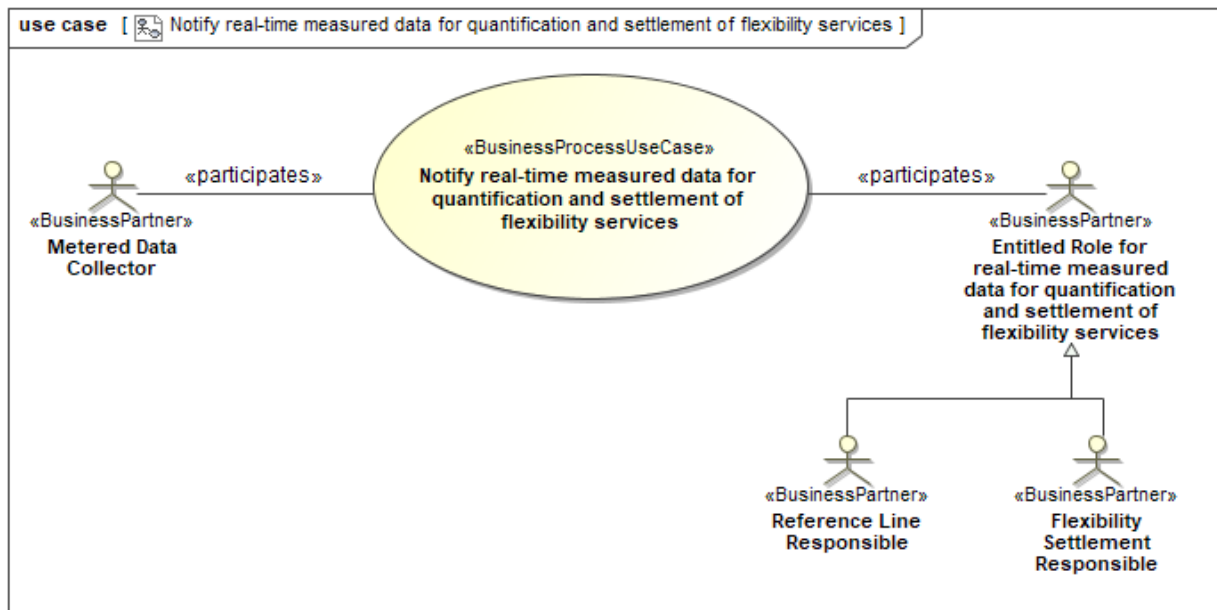


Figure 9 Business Process UseCase: Notify real-time measured data for quantification and settlement of flexibility services

2.2.2.3.1. Description

UseCase description: Notify real-time measured data for quantification and settlement of flexibility services	
definition	In this process the Metered Data Collector ⁷ notifies the Entitled Role(s) with real-time measured data for quantification and settlement of flexibility services, i.e. the Flexibility Settlement Responsible and the Reference Line Responsible, receives real-time measured data from the Resources involved for quantification and settlement of flexibility services, for the activation window(s).
beginsWhen	When measurements for the activation window become available.
preCondition	The flexibility services are measured (near) real-time. The activation window has started.
endsWhen	When all measurements, for the Resources involved, for the activation window(s), have been received by the Entitled Role for real-time measured data for quantification and settlement of flexibility services.

⁷ The real-time measured data may be notified directly from a Resource (or Accounting Point).

postCondition	The Entitled Role for real-time measured data for quantification and settlement of flexibility services have the real-time measured data for quantification and settlement of flexibility services, for the Resources involved, for the activation window(s) available.
exceptions	None.
actions	See 2.2.2.3.2

2.2.2.3.2. Business Process

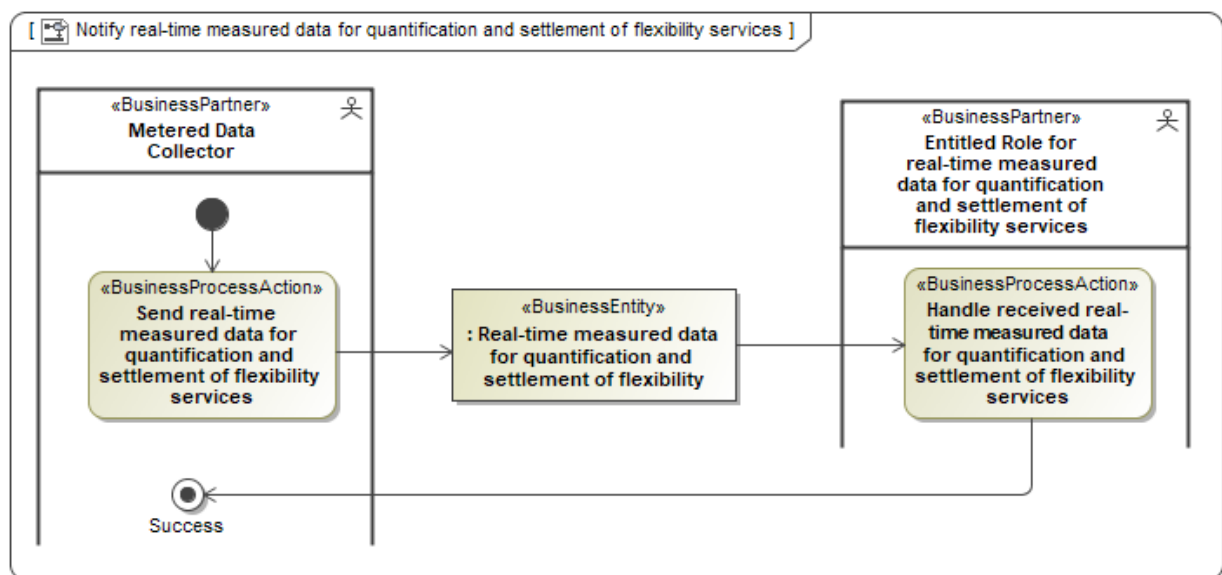


Figure 10 Business Process: Notify real-time measured data for quantification and settlement of flexibility services

The data content of the «Business entity» (Square box between the swim lanes) is found at “4.4 Real-time measured data for quantification and settlement of flexibility (Class Diagram)”.

2.2.3. Request measured data for quantification and settlement of flexibility services (Business Process UseCase)

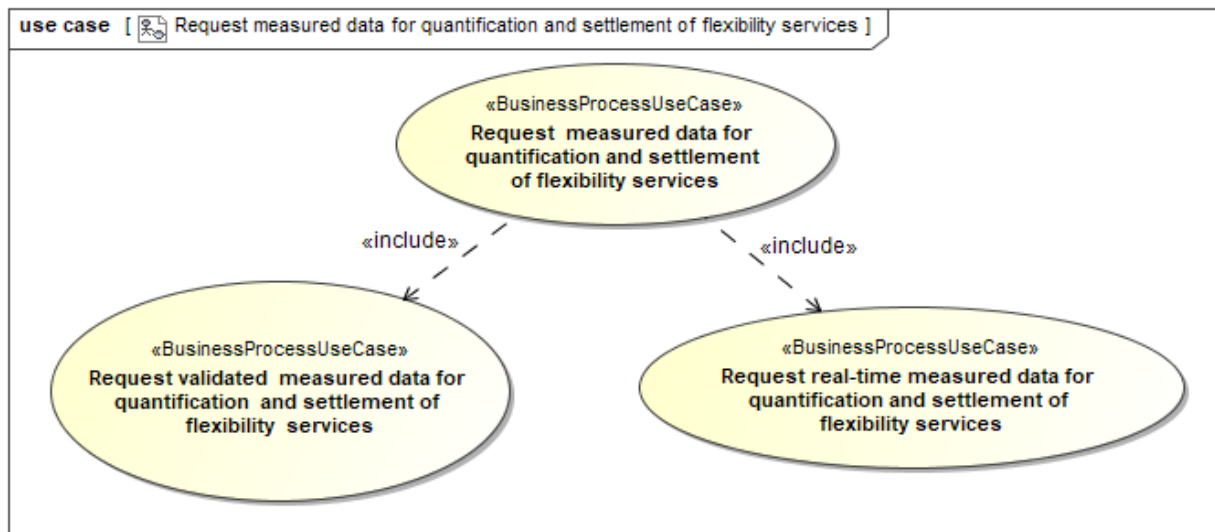


Figure 11 Business Process UseCase: Request measured data for quantification and settlement of flexibility services

2.2.3.1. Description

UseCase description: Request measured data for quantification and settlement of flexibility services	
definition	In this process the Entitled Role for measured data for quantification and settlement of flexibility services, i.e. the Flexibility Settlement Responsible or Reference Line Responsible requests validated or real-time measured data for quantification and settlement of flexibility services, for the Resources involved, for the activation window(s), from the Metered Data Administrator (for validated measured data) or from the Metered Data Collector (for real-time measured data).
beginsWhen	The Entitled Role for measured data for quantification and settlement of flexibility services, has a need for the measured data for quantification and settlement of flexibility services (either validated or real-time).
preCondition	The Metered Data Administrator (for validated measured data) or the Metered Data Collector (for real-time measured data) knows to which data and Resources the Flexibility Settlement Responsible or the Reference Line Responsible are entitled. The activation window for the intended flexibility service has ended.
endsWhen	The Metered Data Administrator (for validated measured data) or the Metered Data Collector (for real-time measured data) has sent the measured data for quantification and settlement of flexibility services to the Entitled Role for measured data for quantification and settlement of

	flexibility services, i.e. the Flexibility Settlement Responsible or to the Reference Line Responsible.
postCondition	The Entitled Role for measured data for quantification and settlement of flexibility services, i.e. Flexibility Settlement Responsible or the Reference Line Responsible, has the requested measured data, for Resources involved, for the activation window(s) available.
exceptions	The request has been rejected (e.g. no data available).
actions	Not applicable at this level.

2.2.3.2. Request validated measured data for quantification and settlement of flexibility services (Business Process UseCase)

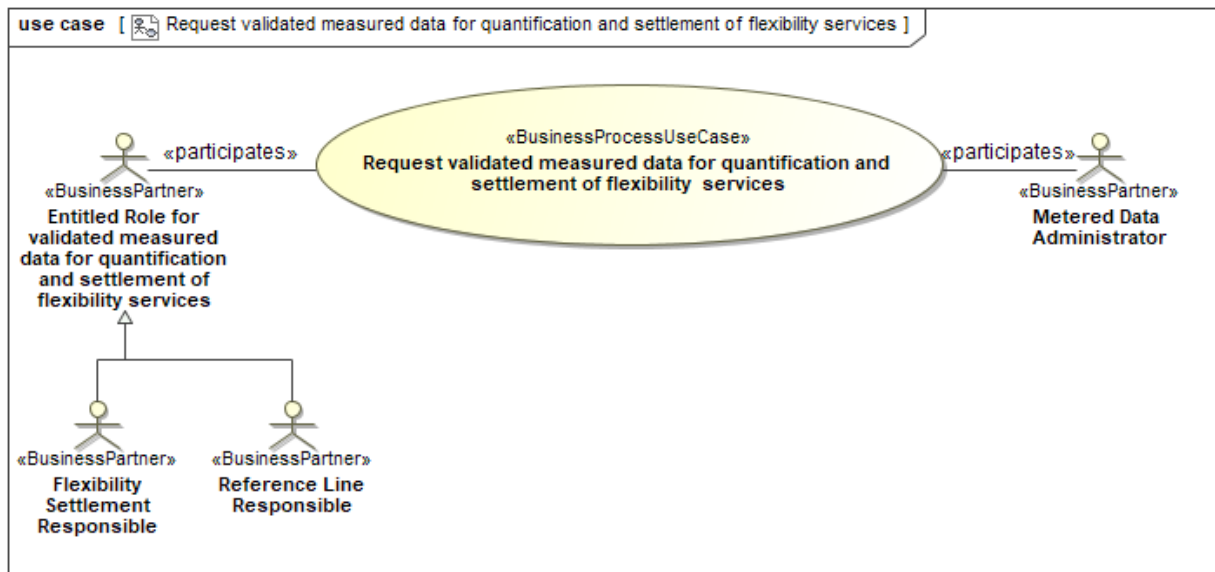


Figure 12 Business Process UseCase: Request validated measured data for quantification and settlement of flexibility services

2.2.3.2.1. Description

UseCase description: Request validated measured data for quantification and settlement of flexibility services	
definition	In this process the Entitled Role for validated measured data for quantification and settlement of flexibility services, i.e. the Flexibility Settlement Responsible or the Reference Line Responsible, requests validated measured data for quantification and settlement of flexibility services, for the Resources involved, for the activation window(s), from the Metered Data Administrator.
beginsWhen	The Entitled Role for validated measured data for quantification and settlement of flexibility services has a need for the validated measured data for quantification and settlement of flexibility services for the activation window.
preCondition	The Metered Data Administrator knows to which data the Entitled Role for validated measured data for quantification and settlement of flexibility services (Flexibility Settlement Responsible or the Reference Line Responsible) is entitled. The activation window of the intended flexibility service has ended.
endsWhen	The Metered Data Administrator has sent the validated measured data for quantification and settlement of flexibility services to the Entitled Role for validated measured data for quantification and settlement of flexibility services.

postCondition	The Entitled Role for validated measured data for quantification and settlement of flexibility services, i.e. the Flexibility Settlement Responsible or the Reference Line Responsible, has the requested validated measured data available for quantification and settlement of flexibility services, for the Resources involved, for the activation window(s).
exceptions	The request has been rejected (e.g. no data available).
actions	See 2.2.3.2.2

2.2.3.2.2. Business Process

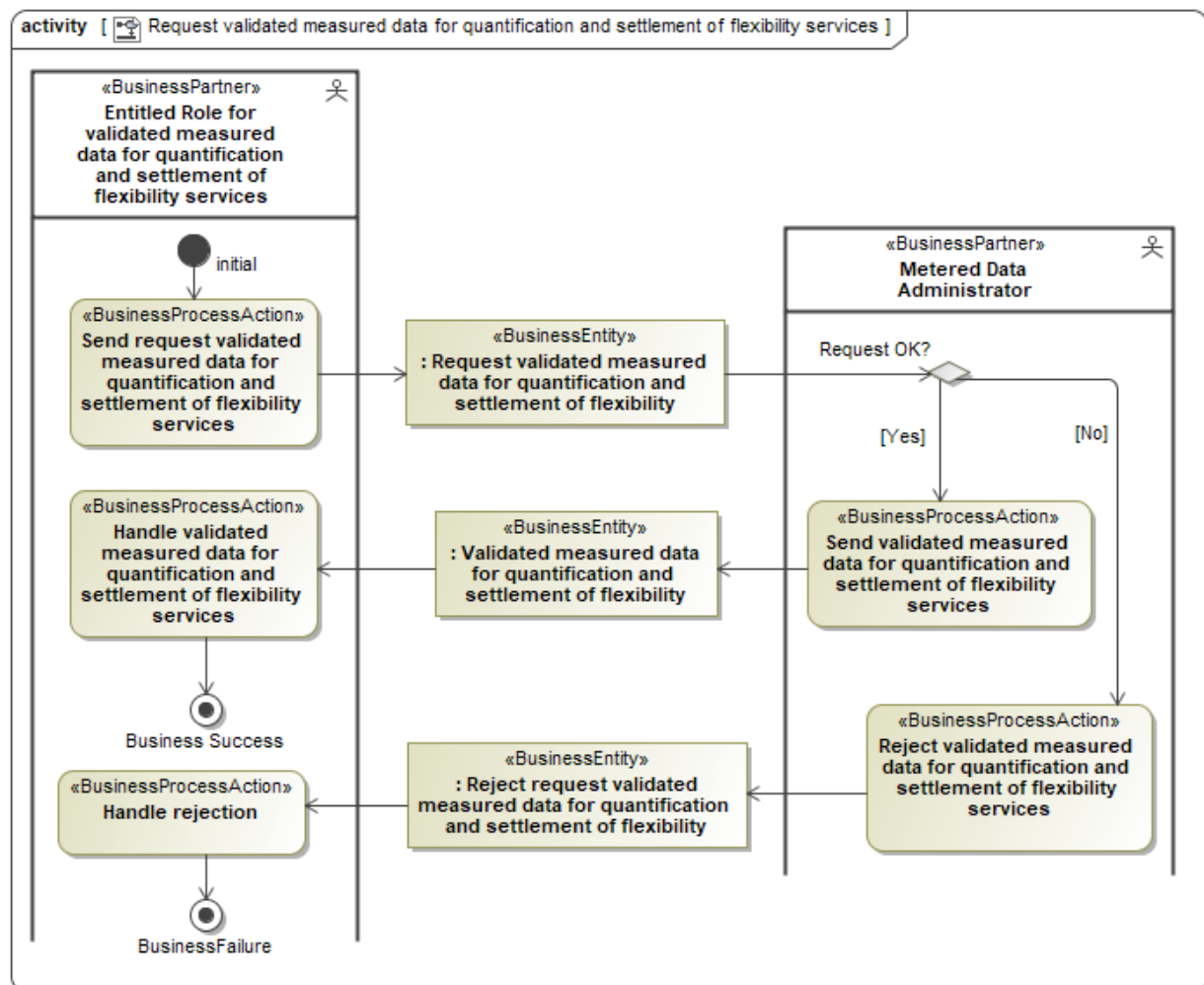


Figure 13 Business Process: Request validated measured data for billing flexibility

The data content of the three «Business entity» (Square boxes between the swim lanes) are found at:

- 4.2 Request validated measured data for quantification and settlement of flexibility (Class Diagram).
- 4.1 Validated measured data for quantification and settlement of flexibility (Class Diagram).
- 4.3 Reject request validated measured data for quantification and settlement of flexibility (Class Diagram).

2.2.3.3. Request real-time measured data for quantification and settlement of flexibility services (Business Process UseCase)

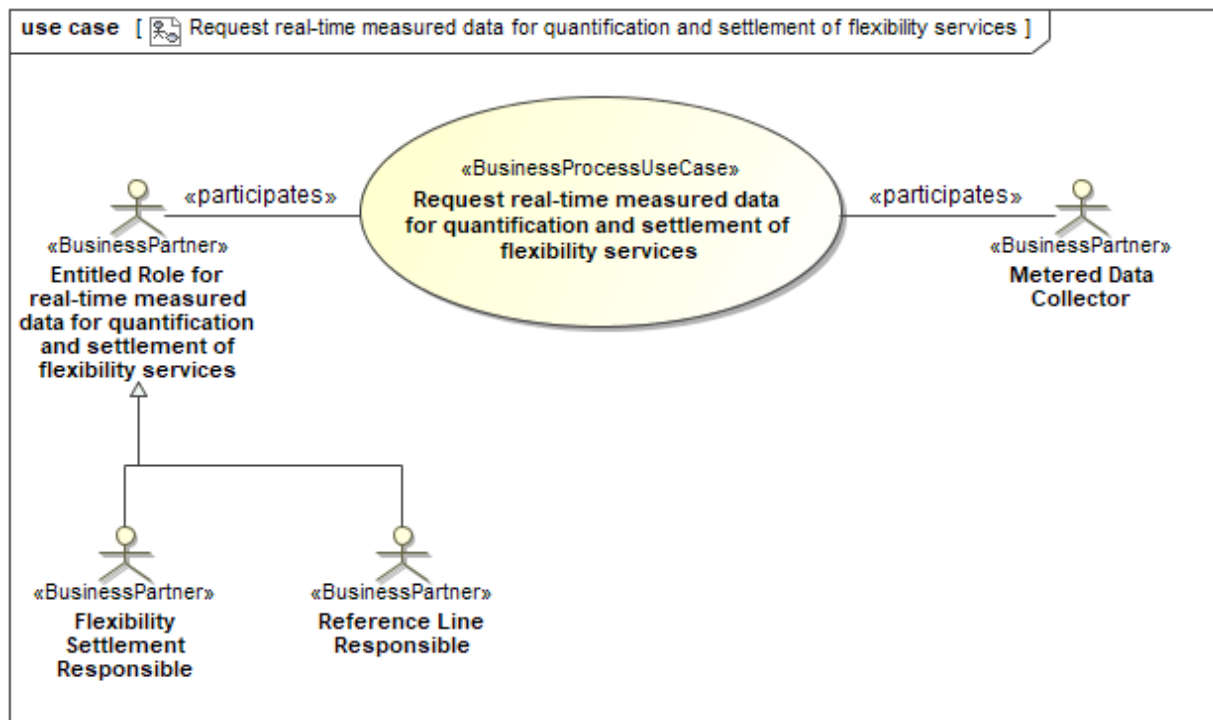


Figure 14 Business Process UseCase: Request real-time measured data for quantification and settlement of flexibility services

2.2.3.3.1. Description

UseCase description: Request real-time measured data for quantification and settlement of flexibility services	
definition	In the process the Entitled Role for real-time measured data for quantification and settlement of flexibility services, i.e. the Flexibility Settlement Responsible or the Reference Line Responsible, requests real-time (historical) measured data for quantification and settlement of flexibility services, for Resources involved, for the activation window(s), from the Metered Data Collector.
beginsWhen	The Entitled Role for real-time measured data for quantification and settlement of flexibility services has a need for the real-time measured data for quantification and settlement of flexibility services, for the Resources involved, for the activation window(s).
preCondition	The Metered Data Collector knows to which data the Entitled Role for real-time measured data for quantification and settlement of flexibility services is entitled. The activation window for the intended flexibility service has started.
endsWhen	The Metered Data Collector has sent the real-time measured data for quantification and settlement of flexibility services to the Entitled Role for real-time measured data for quantification and settlement of flexibility services.

postCondition	The Entitled Role for real-time measured data for quantification and settlement of flexibility services has the requested real-time measured data available for quantification and settlement of flexibility services, for the Resources involved, for the activation window(s).
exceptions	The request has been rejected (e.g. no data available).
actions	See 2.2.3.3.2

2.2.3.3.2. Business Process

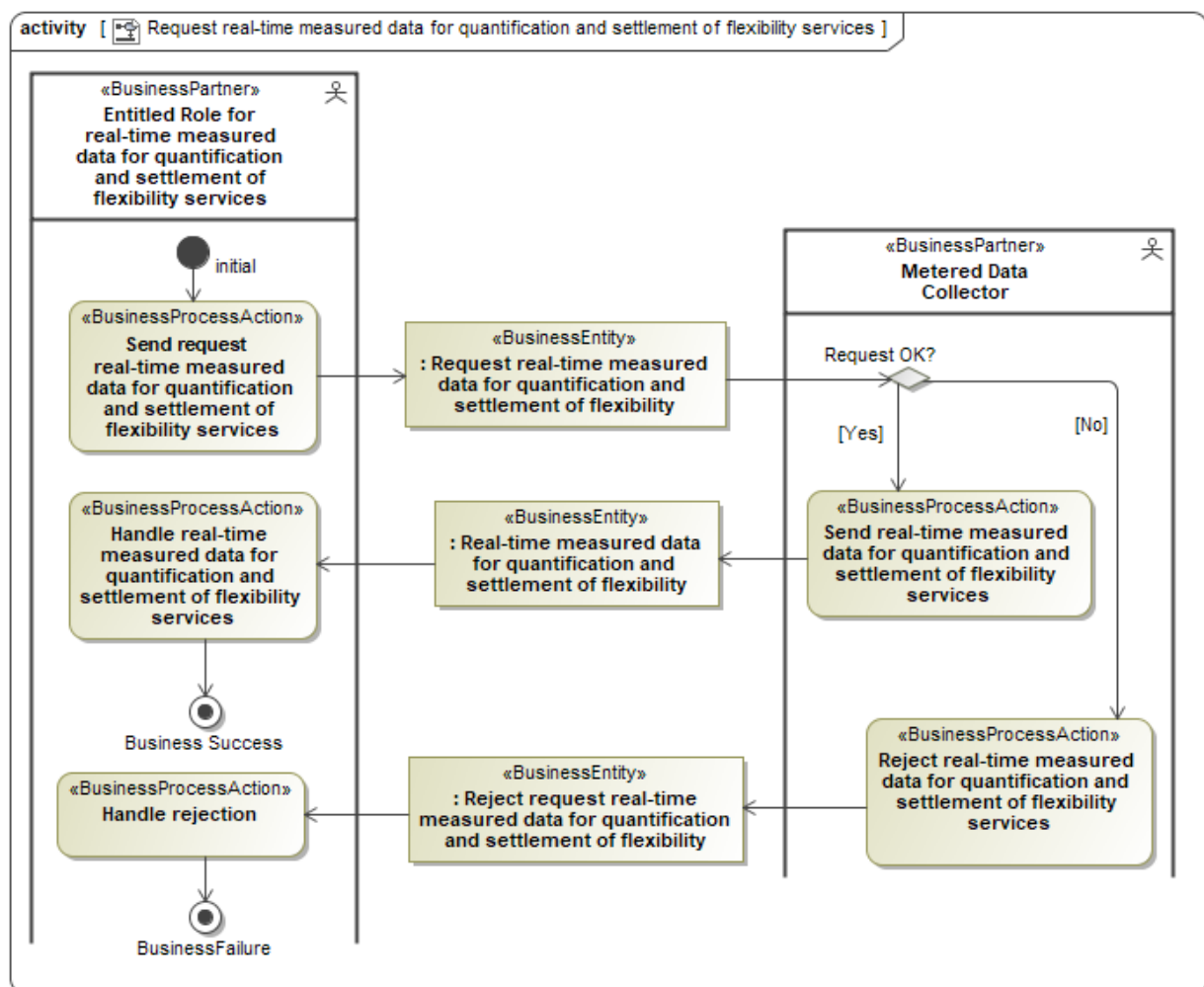


Figure 15 Business Process: Request real-time measured data for quantification and settlement of flexibility services

The data content of the three «Business entity» (Square boxes between the swim lanes) are found at:

- 4.5 Request real-time measured data for quantification and settlement of flexibility (Class Diagram);
- 4.4 Real-time measured data for quantification and settlement of flexibility (Class Diagram);
- 4.6 Reject request real-time measured data for quantification and settlement of flexibility (Class Diagram).

2.3. Establish reference line (Business Process UseCase)

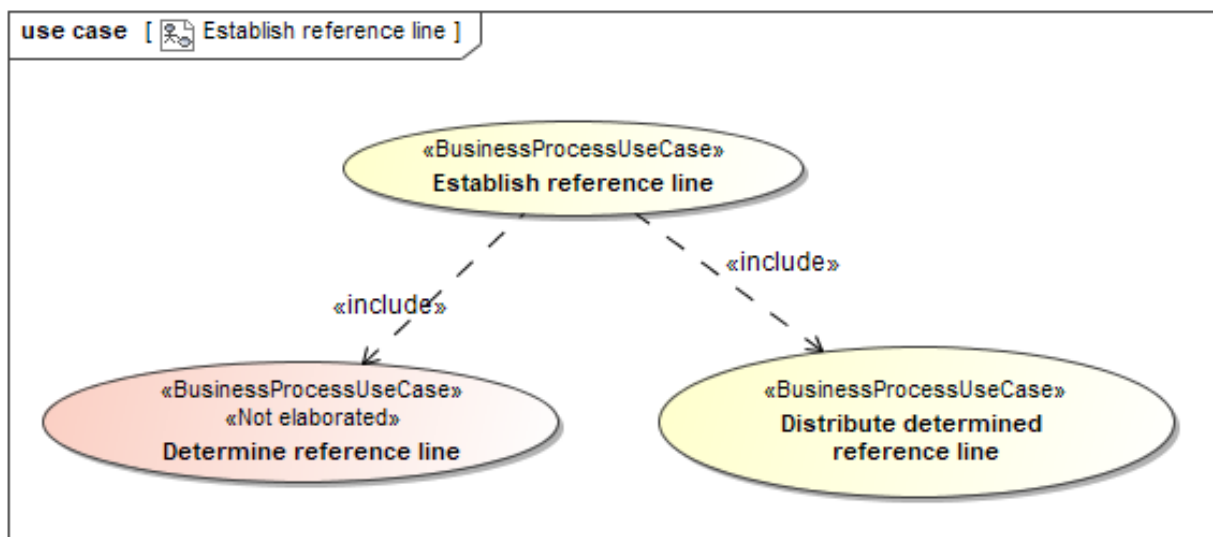


Figure 16 Business Process UseCase: Establish reference line

2.3.1. Description

UseCase description: Establish reference line	
definition	<p>In this process the Reference Line Responsible determines the reference line (see 1.1 Definitions) for the activation window for flexibility services of the Resource and thereafter communicates it to the Entitled Roles.</p> <p>The reference line is established based on measured data or agreed based on schedules⁸.</p>
beginsWhen	Dependent on the method (see precondition below), before or after the activation has been completed.
preCondition	The method of determination of the reference line is agreed between the Buyer of Flexibility and the Flexibility Service Provider or defined in the product specification or governed by national rules or regulations.
endsWhen	The reference line has been distributed to Entitled Roles.
postCondition	The reference line for the activation window for the flexibility services of the Resource has been determined, all Entitled Roles have received it and quantification can be executed.

⁸ Agreed means ex-ante, while established means ex-post.

Exceptions	It is assumed that the reference line calculations are based on measured volume. There are other methods for calculations, however not elaborated in this UseCase.
Actions	See 2.3.2

2.3.2. Business process

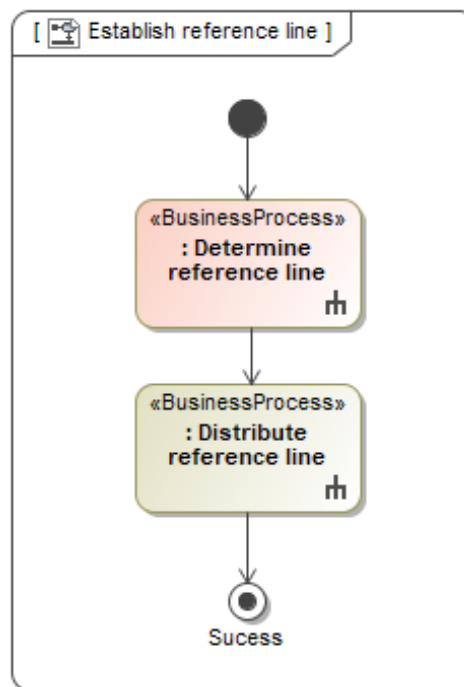


Figure 17 Business Process: Establish reference line

2.3.3. Determine reference line (Business Process UseCase)

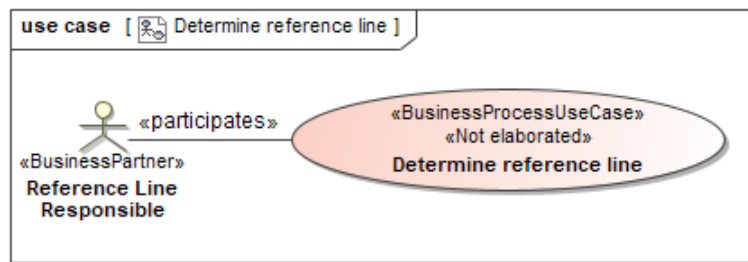


Figure 18 Business Process UseCase: Determine reference line

2.3.3.1.1. Description

UseCase description: Determine reference line	
definition	<p>In this process the Reference Line Responsible determines the reference line (see 1.1 Definitions) for the activation period for the flexibility services of the Resource.</p> <p>If the determination of the reference line is based on schedules (ex-ante), then the reference line equals the schedules, and no measured data is needed.</p>
beginsWhen	Dependent on the method (ex-ante or ex-post), before or after the activation window for the flexibility services of the Resource has been completed.
preCondition	<p>The method of determination of the reference line has been decided.</p> <p>The Reference Line Responsible has received the basic input needed for determination of the reference line, such as measured data for the Resource.</p>
endsWhen	The reference line has been determined.
postCondition	The reference line has been determined and is ready for distribution to relevant parties.
Exceptions	None.
Actions	This process is not further elaborated.

2.3.4. Distribute determined reference line (Business Process UseCase)

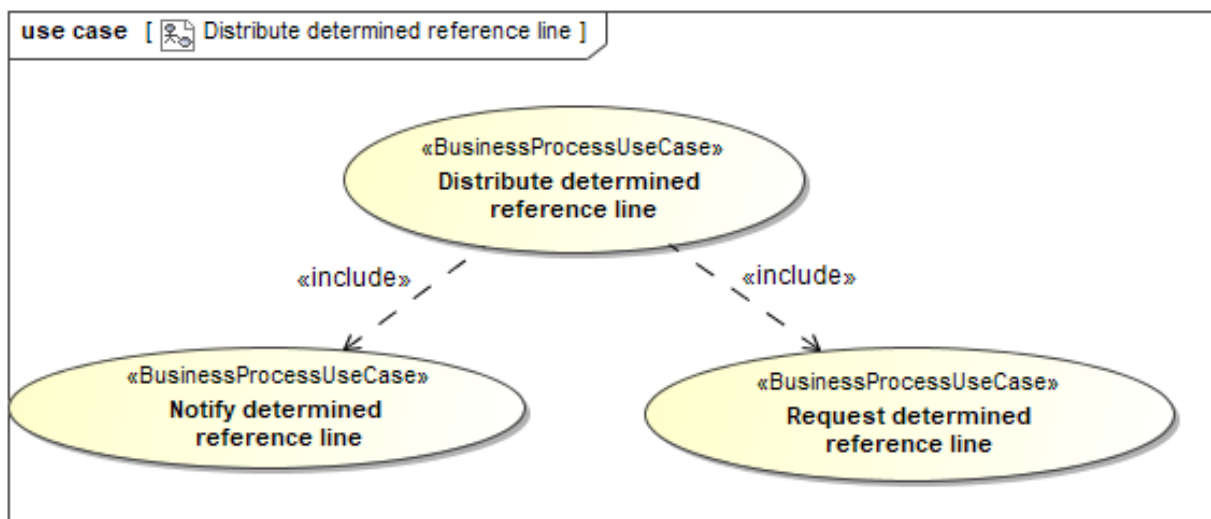


Figure 19 Business Process UseCase: Distribute determined reference line

2.3.4.1. Description

UseCase description: Distribute determined reference line	
definition	In this process the Reference Line Responsible distributes the determined reference line for the activation window for the flexibility services of the Resource to the Entitled Roles, e.g. (based on national rules) the Balance Responsible Party (BRP) for the Flexibility Service Provider (FSP), the Buyer of Flexibility, the Flexibility Service Provider, the Flexibility Settlement Responsible and/or Consented Party(s) (on request).
beginsWhen	When the Reference Line Responsible has determined the reference line for the activation window for the flexibility services of the Resource or on request.
preCondition	The reference line for the activation window for the flexibility services of the Resource has been determined.
endsWhen	The determined reference line has been distributed to the Entitled Roles.
postCondition	The Entitled Roles have received the determined reference line for the activation window for the flexibility services of the Resource.
Exceptions	None.
Actions	Not relevant at this level.

2.3.4.2. Notify determined reference line (Business Process UseCase)

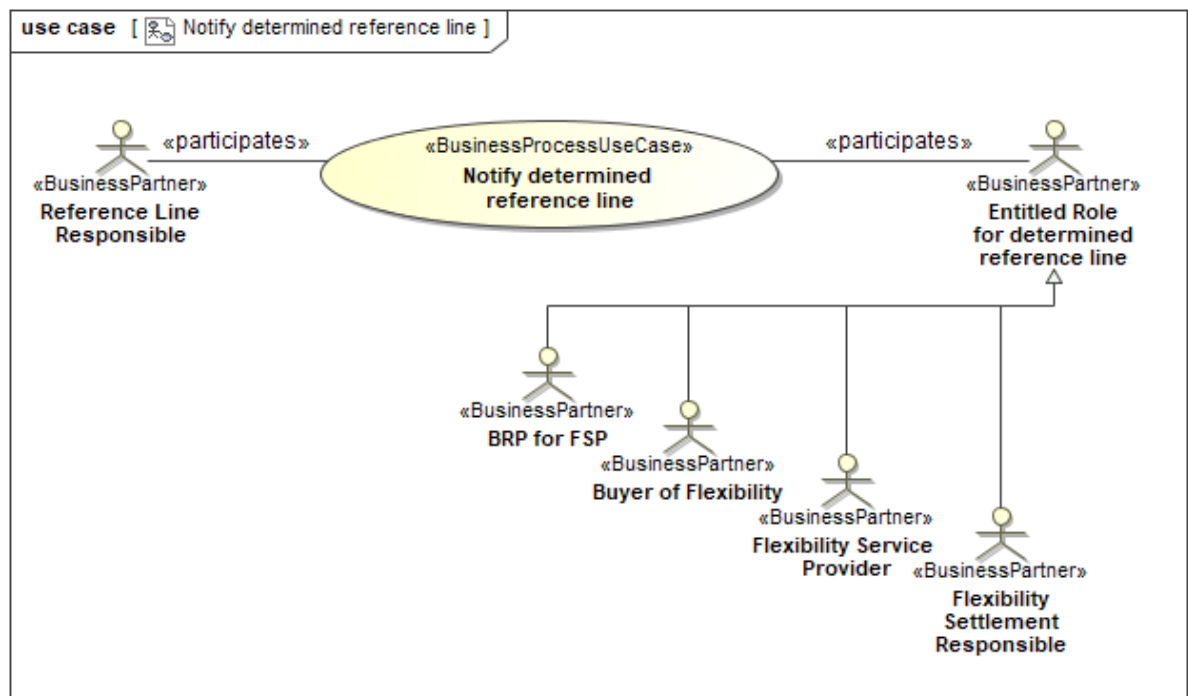


Figure 20 Business Process UseCase: Notify determined reference line

2.3.4.2.1. Description

UseCase description: Notify determined reference line	
definition	In this process the Reference Line Responsible notifies the reference line for the activation window for the flexibility services of the Resource he has determined to the Entitled Roles for determined reference line, e.g. (based on national rules) the Balance Responsible Party (BRP) for the Flexibility Service Provider (FSP), the Buyer of Flexibility, the Flexibility Service Provider and/or the Flexibility Settlement Responsible.
beginsWhen	When the flexibility volume for the activation period for the flexibility service of the Resource has been determined.
preCondition	The Reference Line Responsible knows the Entitled Roles.
endsWhen	The determined flexibility volume has been notified to the Entitled Roles.
postCondition	The Entitled Roles have the determined flexibility volume for the activation window for the flexibility service of the Resource available.

⁹ Based on national rules, the determined reference line may also be sent to the Energy Supplier and/or his Balance Responsible Party for control purposes.

Exceptions	None.
Actions	See 2.3.4.2.2

2.3.4.2.2. Business Process

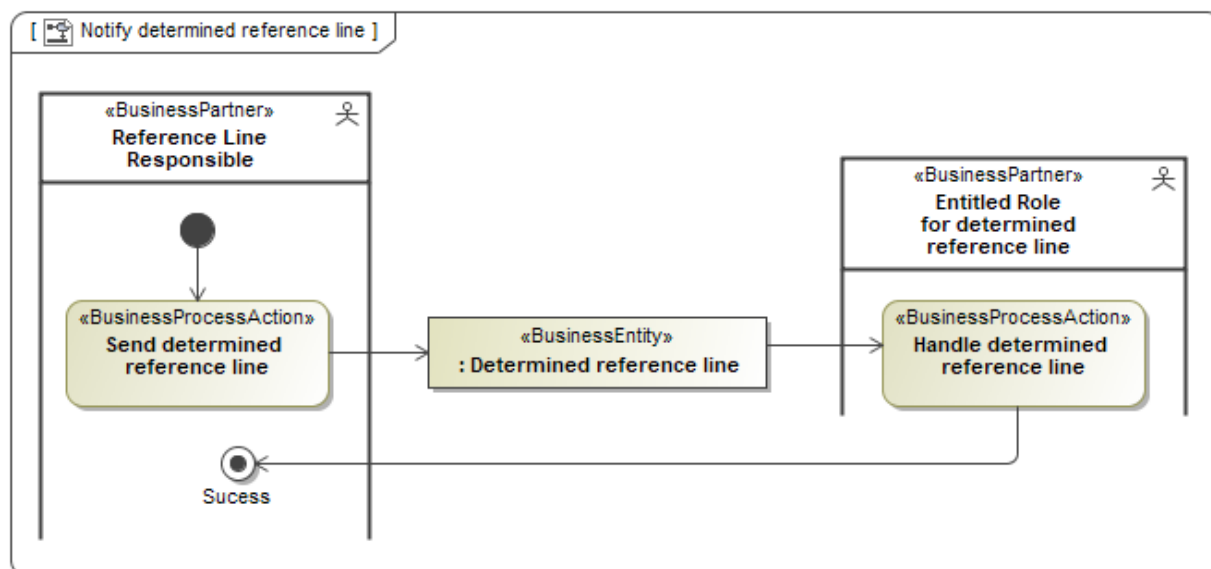
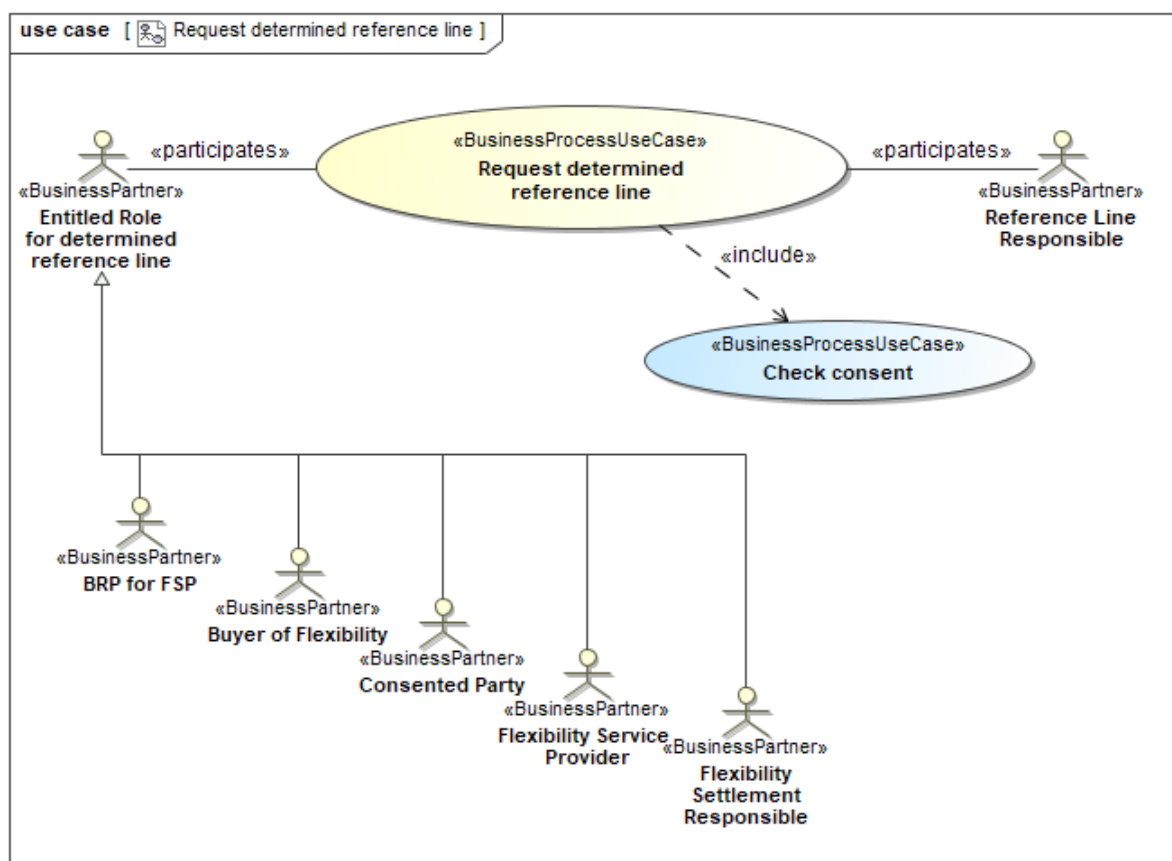


Figure 21 Business Process: Notify determined reference line

The data content of the «Business entity» (Square box between the swim lanes) is found at “4.7 Determined reference line (Class Diagram)”.

2.3.4.3. Request determined reference line (Business Process UseCase)



10

Figure 22 Business Process UseCase: Request determined reference line

2.3.4.3.1. Description

UseCase description: Request determined reference line	
definition	<p>In this process the Entitled Role for determined reference line, e.g. (based on national rules) the Balance Responsible Party (BRP) for the Flexibility Service Provider (FSP), the Buyer of Flexibility, the Flexibility Service Provider, the Flexibility Settlement Responsible or a Consented Party, requests the determined reference line for the activation window for the flexibility service of the Resource from the Reference Line Responsible.</p> <p>When applicable, the Reference Line Responsible will check the consent of the Entitled Role for determined reference line before sending the reference line data.</p>
beginsWhen	The Entitled Role for determined reference line has a need for the determined reference line.

¹⁰ Based on national rules, the determined reference line may also be requested by the Energy Supplier and/or his Balance Responsible Party for control purposes.

preCondition	The Reference Line Responsible knows the Entitled Role for determined reference line.
endsWhen	The requester has received the determined reference line from the Reference Line Responsible.
postCondition	The Entitled Role for determined reference line has the requested determined reference line for the activation window for the flexibility services of the Resource available.
exceptions	The request has been rejected (e.g. no data available).
actions	See 2.4.3.3.2

2.3.4.3.2. Business Process

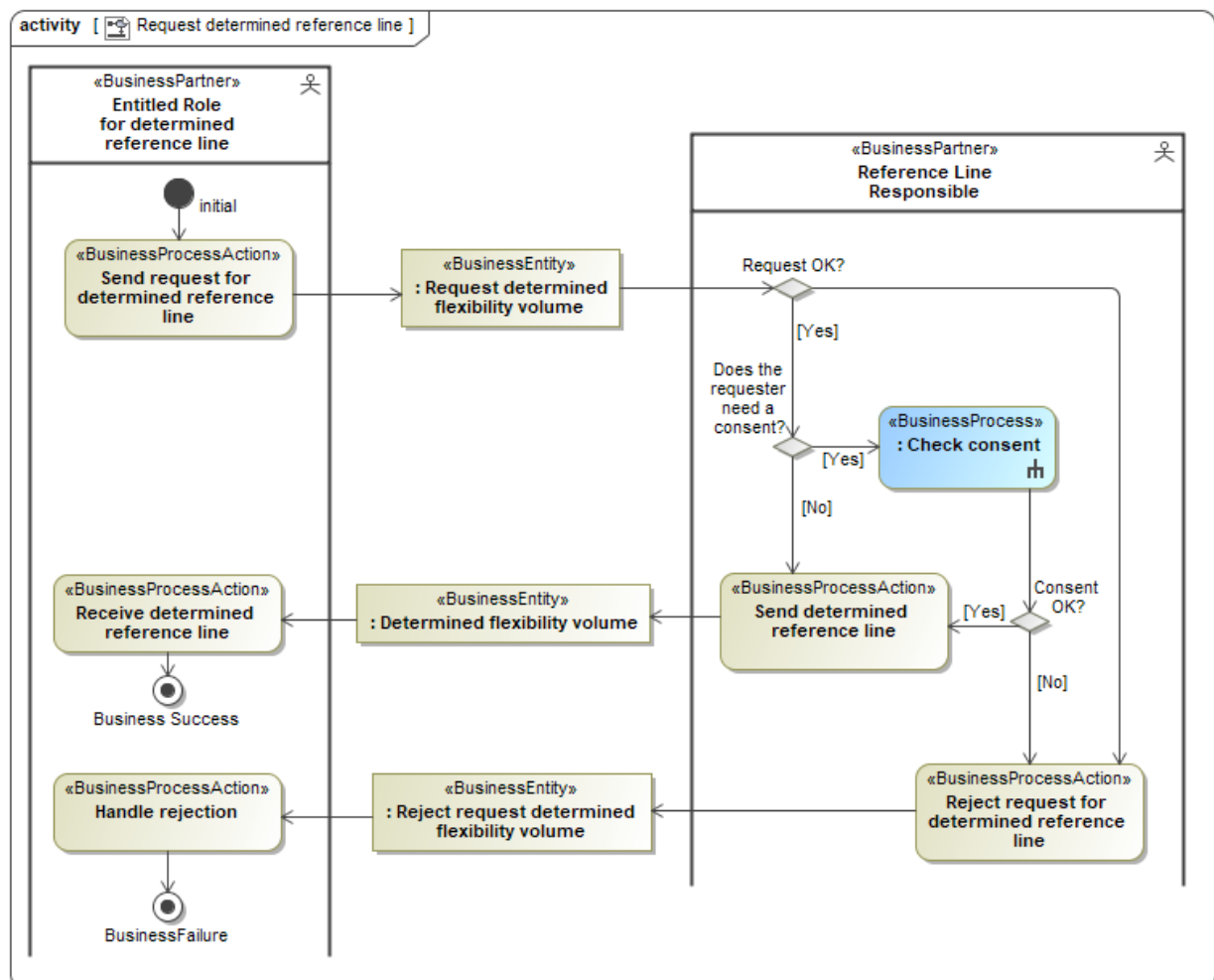


Figure 23 Business Process: Request determined reference line

The data content of the three «Business entity» (Square boxes between the swim lanes) are found at:

- 4.8 Element definitions: Request determined reference line

- b) 4.7 Determined reference line (Class Diagram)
- c) 4.9 Reject request determined reference line (Class Diagram)

2.4. Quantify delivered flexibility services (Business Process UseCase)

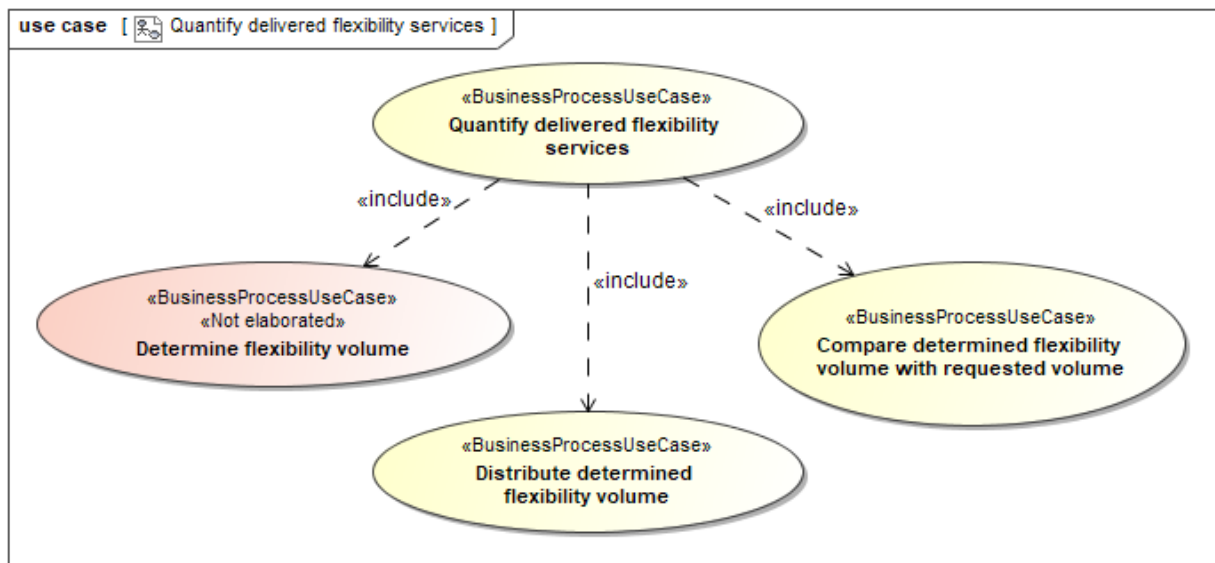


Figure 24 Business Process UseCase: Quantify delivered flexibility services

2.4.1. Description

UseCase description: Quantify delivered flexibility services	
definition	<p>In this process the Flexibility Settlement Responsible determines the flexibility volume for the flexibility service and distributes it to the Entitled Roles, i.e., the Balance Responsible Party (BRP) for the Flexibility Service Provider (FSP), the Buyer of Flexibility and/or the Flexibility Service Provider.</p> <p>Further the Flexibility Settlement Responsible compares the determined flexibility volume with the ordered volume from the Buyer of Flexibility and distributes the result.</p>
beginsWhen	When the activation window of the flexibility service has ended.
preCondition	The Flexibility Settlement Responsible has received the measured data for quantification and settlement and the reference line.
endsWhen	When the difference between the determined flexibility volume and the ordered volume for the flexibility service has been distributed.
postCondition	All Entitled Roles have available the determined flexibility volume and the difference between the determined flexibility volume and the ordered volume for the flexibility service.

exceptions	When another way than using the reference line as basis for the settlement, a comparison of the determined flexibility volume with the ordered volume may not be needed.
actions	Not applicable at this level.

2.4.2. Determine flexibility volume (Business Process UseCase)

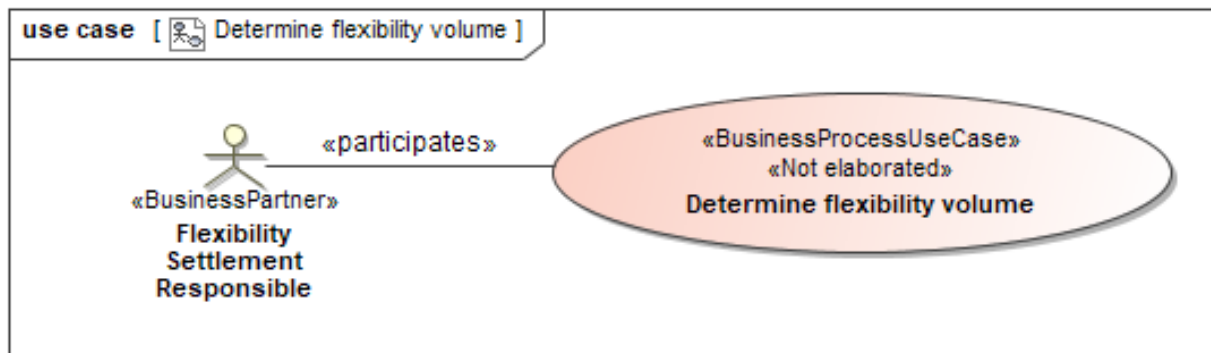


Figure 25 Business Process UseCase: Determine flexibility volume

2.4.2.1. Description

UseCase description: Determine flexibility volume	
definition	<p>In this process the Flexibility Settlement Responsible determines the flexibility volume for the flexibility service based on measured data and the reference line.</p> <p>In case of value stacking¹¹ (multiple services), the volume determined for the other flexibility service(s) must be considered in the determination.</p>
beginsWhen	When the activation window of the flexibility service has ended.
preCondition	The Flexibility Settlement Responsible has received measured data for the flexibility service from the relevant Resource(s) and the related reference line.
endsWhen	When the Flexibility Settlement Responsible has determined the flexibility volume for the flexibility service.
postCondition	The flexibility volume for the flexibility service has been determined and is ready for distribution.
exceptions	None.
actions	This is an internal process within the Flexibility Settlement Responsible, hence not further elaborated.

¹¹ See USEF whitepaper value stacking.

2.4.3. Distribute determined flexibility volume (Business Process UseCase)

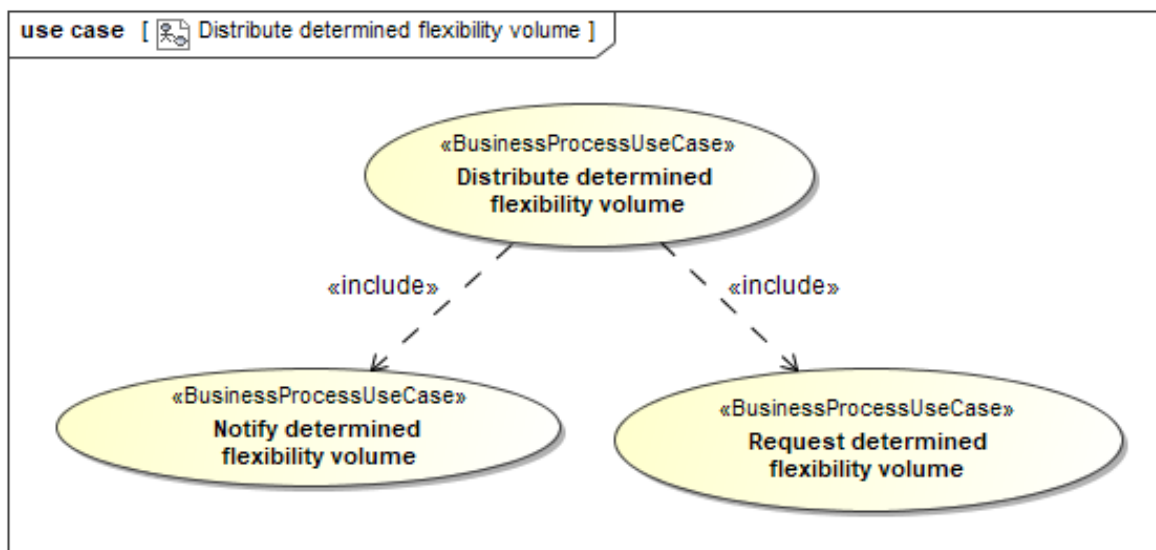


Figure 26 Business Process UseCase: Distribute determined flexibility volume

2.4.3.1. Description

UseCase description: Distribute determined flexibility volume	
definition	In this process the Flexibility Settlement Responsible distributes the determined flexibility volume to the Entitled Roles, e.g., (based on national rules): the Balance Responsible Party (BRP) for the Flexibility Service Provider (FSP), the Buyer of Flexibility and/or the Flexibility Service Provider ¹² .
beginsWhen	When the Flexibility Settlement Responsible has determined the flexibility volume or when requested.
preCondition	The Flexibility Settlement Responsible knows the Entitled Roles related to the (activated) flexibility services for receiving determined flexibility volume.
endsWhen	The Entitled Role(s) has/have received the determined flexibility volume for the flexibility volume.
postCondition	The Entitled Role(s) has/have the determined flexibility volume for the flexibility volume available.
exceptions	None.
actions	Not relevant at this level.

¹² There may be a need for “proof of delivery” for the Buyer of Flexibility.

2.4.3.2. Notify determined flexibility volume (Business Process UseCase)

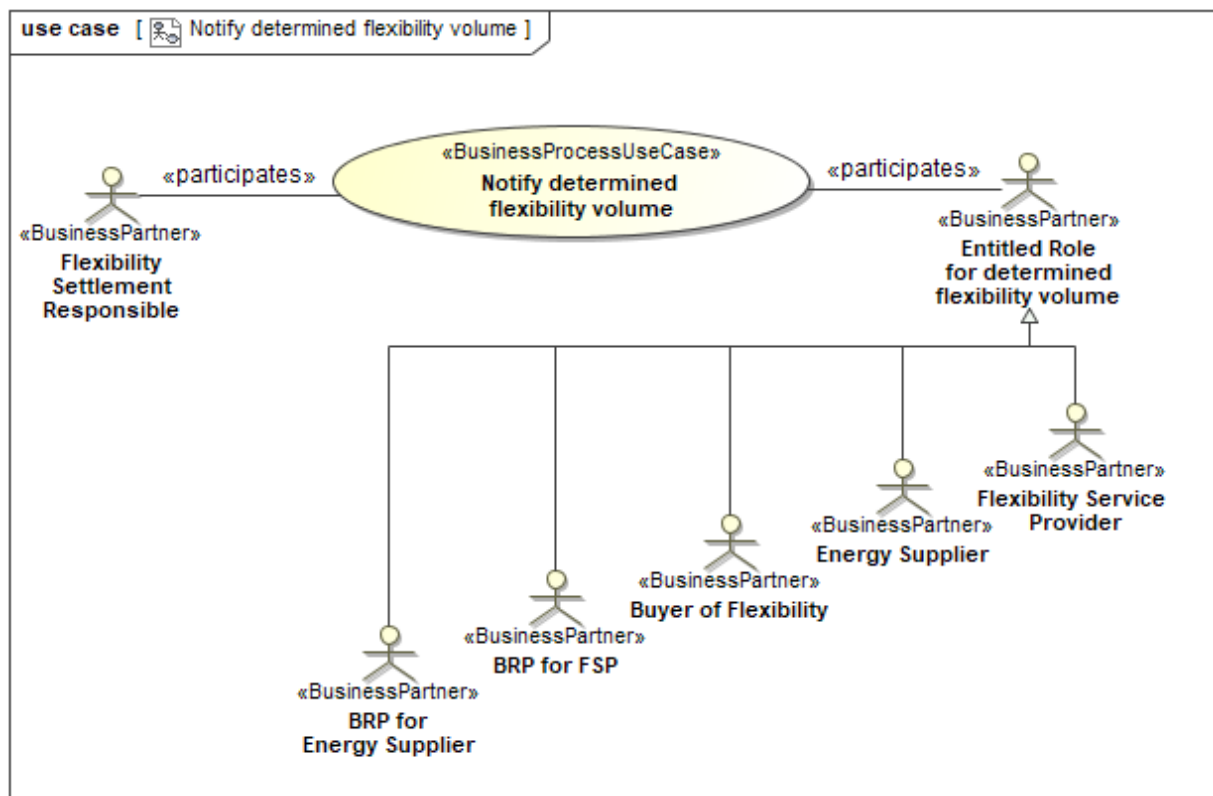


Figure 27 Business Process UseCase: Notify determined flexibility volume

2.4.3.2.1. Description

UseCase description: Notify determined flexibility volume	
definition	In this process the Flexibility Settlement Responsible notifies the determined flexibility volume for the flexibility service for the activation window to the Entitled Roles, e.g. (based on national rules) the Balance Responsible Party (BRP) for the Energy Supplier, Balance Responsible Party (BRP) for the Flexibility Service Provider (FSP), the Energy Supplier, the Buyer of Flexibility and the Flexibility Service Provider.
beginsWhen	When the Flexibility Settlement Responsible has determined the flexibility volume.
preCondition	The Flexibility Settlement Responsible knows the Entitled Roles for receiving the determined flexibility volume.
endsWhen	The determined flexibility volume has been notified to the Entitled Roles.
postCondition	The Entitled Roles have the determined flexibility volume for the flexibility service available.

exceptions	None.
actions	See 2.4.3.2.2

2.4.3.2.2. Business Process

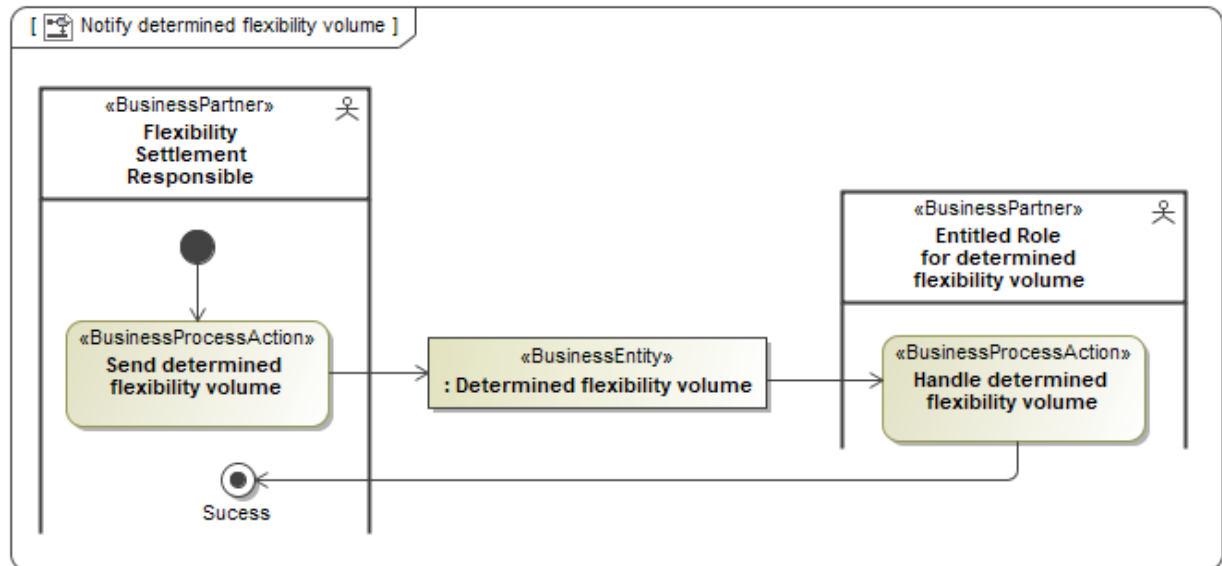


Figure 28 Business Process: Notify determined flexibility volume

The data content of the «Business entity» (Square box between the swim lanes) is found at "4.10 Determined flexibility volume (Class Diagram)".

2.4.3.3. Request determined flexibility volume (Business Process UseCase)

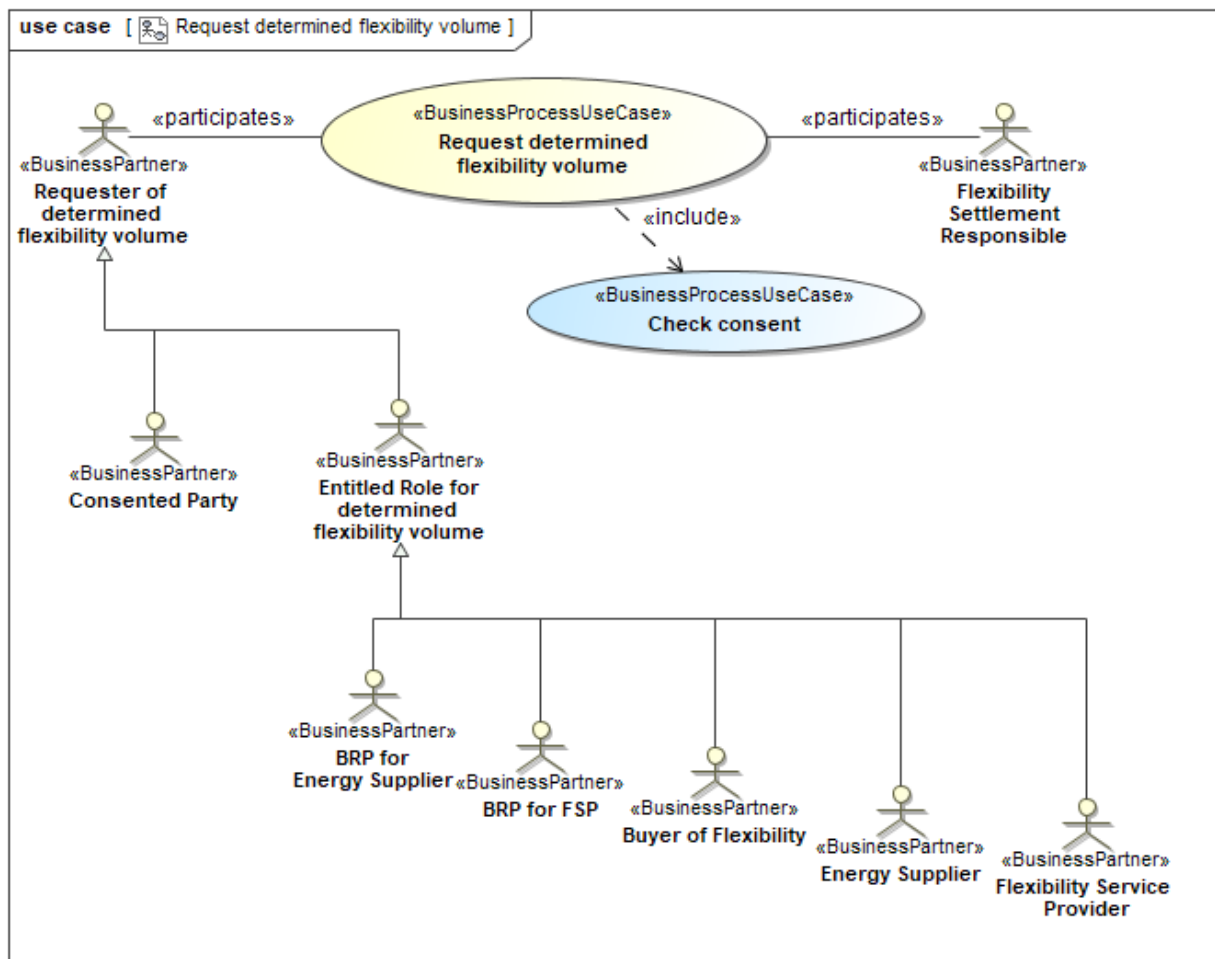


Figure 29 Business Process UseCase: Request determined flexibility volume

2.4.3.3.1. Description

UseCase description: Request determined flexibility volume	
definition	<p>In this process a Requester of determined flexibility volume, either a Consented Party or the Entitled Role for determined flexibility volume, e.g., (based on national rules) the Balance Responsible Party (BRP) for the Energy Supplier, the Balance Responsible Party (BRP) for the Flexibility Service Provider (FSP), the Buyer of Flexibility, the Energy Supplier, the Flexibility Service Provider, requests the determined flexibility volume for the flexibility service for the activation window from the Flexibility Settlement Responsible.</p> <p>When applicable the Flexibility Settlement Responsible will check the consent of the Requester of determined flexibility volume.</p>
beginsWhen	The Requester of determined flexibility volume has a need for the determined flexibility volume.

preCondition	<p>The Flexibility Settlement Responsible knows the Requester of determined flexibility volume.</p> <p>The Flexibility Settlement Responsible can validate the consent of the Consented Party.</p>
endsWhen	The Requester of determined flexibility volume has received the determined flexibility volume from the Flexibility Settlement Responsible.
postCondition	The Requester of determined flexibility volume has the requested determined flexibility volume for the flexibility service available.
exceptions	The request has been rejected (e.g. no data available).
actions	See 2.4.3.3.2

2.4.3.3.2. Business Process

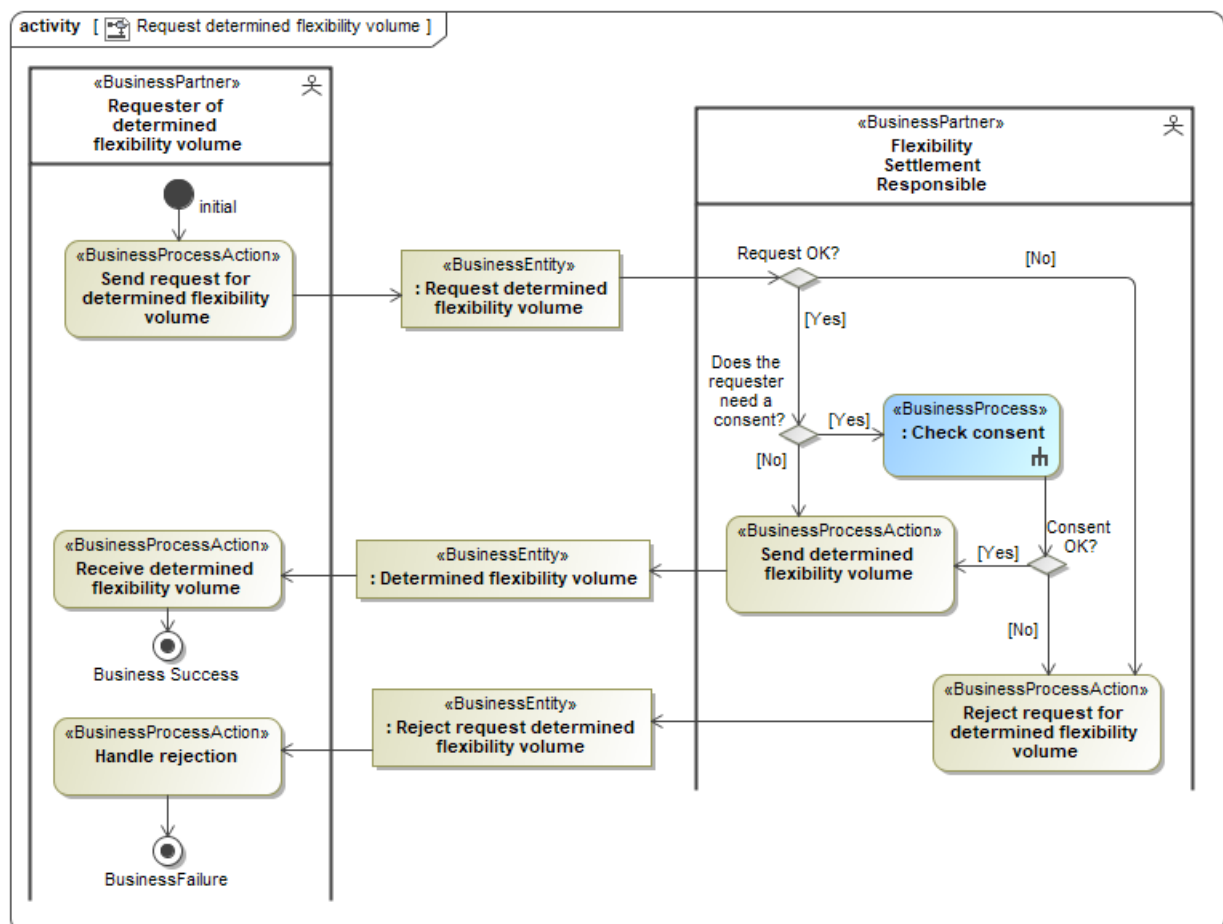


Figure 30 Business Process: Request determined flexibility volume

The data content of the three «Business entity» (Square boxes between the swim lanes) are found at:

- 4.11 Request determined flexibility volume (Class Diagram)
- 4.10 Determined flexibility volume (Class Diagram)
- 4.12 Reject request determined flexibility volume (Class Diagram)

2.4.4. Compare determined flexibility volume with ordered volume (Business Process UseCase)

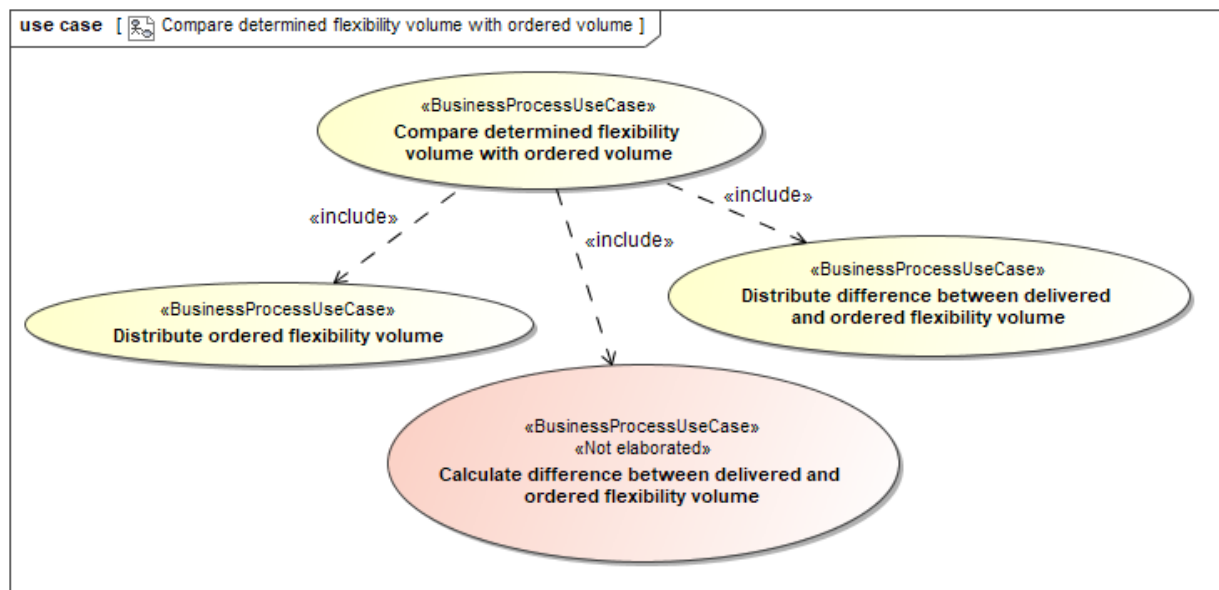


Figure 31 Business Process UseCase: Compare determined flexibility volume with ordered volume

2.4.4.1. Description

UseCase description: Compare determined flexibility volume with ordered volume	
definition	In this process the Flexibility Settlement Responsible receives the flexibility volume that was ordered by the Buyer of Flexibility from the Buyer of Flexibility, thereafter the Flexibility Settlement Responsible calculates the difference between delivered and ordered flexibility volume and finally distributes it to the Entitled Roles, i.e., the Flexibility Service Provider and the Buyer of Flexibility.
beginsWhen	When the activation window has ended.
preCondition	The flexibility volume has been determined.
endsWhen	When the difference between delivered and ordered flexibility volume has been distributed.
postCondition	All Entitled Roles have the difference between delivered and ordered flexibility volume available.
exceptions	None.
actions	Not applicable at this level.

2.4.4.2. Distribute ordered flexibility volume (Business Process UseCase)

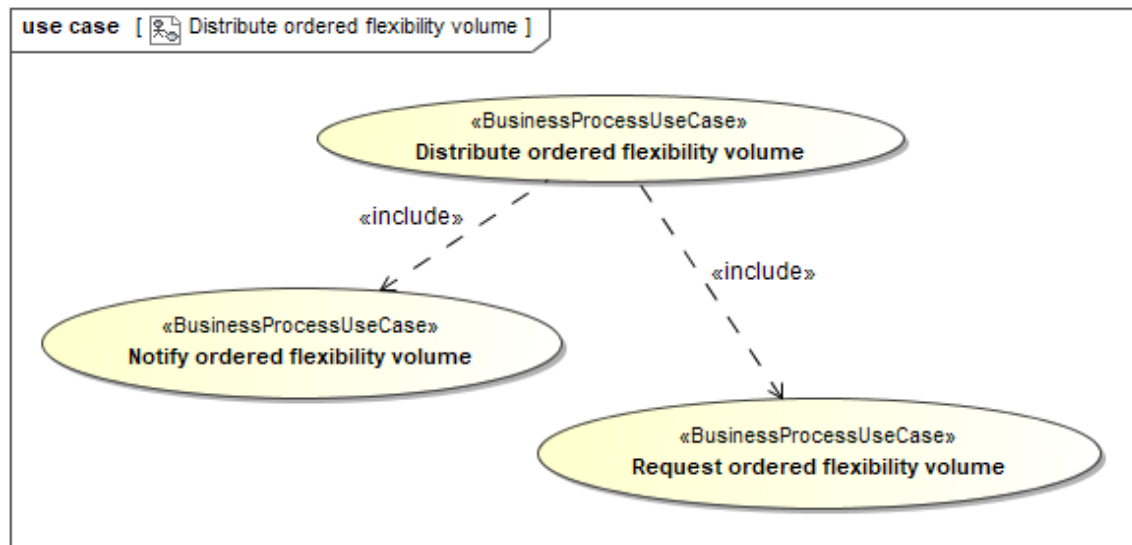


Figure 32 Business Process UseCase: Distribute ordered flexibility volume

2.4.4.2.1. Description

UseCase description: Distribute ordered flexibility volume	
definition	<p>In this process the Buyer of Flexibility distributes the ordered flexibility volume to the Flexibility Settlement Responsible.</p> <p>If needed, the Flexibility Service Provider can request the ordered flexibility volume from the Buyer of Flexibility.</p>
beginsWhen	When the activation window has ended.
preCondition	The Buyer of Flexibility has ordered the flexibility volume.
endsWhen	The Flexibility Settlement Responsible has received the ordered flexibility volume from the Buyer of Flexibility.
postCondition	The Flexibility Settlement Responsible has the ordered flexibility volume for the flexibility service available.
exceptions	In this BRS we assume that all trades are bilateral trades, it is possible to trade via markets and in that case the flexibility volume that was ordered by the Buyer of Flexibility may be sent from the Market Operator.
actions	Not relevant at this level.

2.4.4.2.2. Notify ordered flexibility volume (Business Process UseCase)

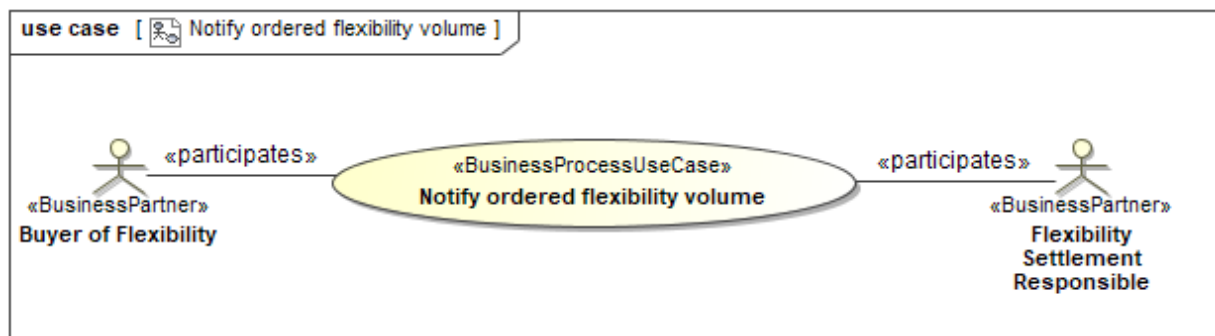


Figure 33 Business Process UseCase: Notify ordered flexibility volume

2.4.4.2.2.1. Description

UseCase description: Notify ordered flexibility volume	
definition	In this process the Buyer of Flexibility notifies the flexibility volume, which was ordered by the Buyer of Flexibility for the activation window to the Flexibility Settlement Responsible.
beginsWhen	When the activation window has ended.
preCondition	The Buyer of Flexibility has ordered the flexibility volume.
endsWhen	The Flexibility Settlement Responsible has received the ordered flexibility volume.
postCondition	The Flexibility Settlement Responsible has the ordered flexibility volume available.
exceptions	Dependent on the market rules, the flexibility volume that was ordered by the Buyer of Flexibility may be sent from the Market Operator.
actions	See 2.4.4.2.2.2

2.4.4.2.2. Business Process

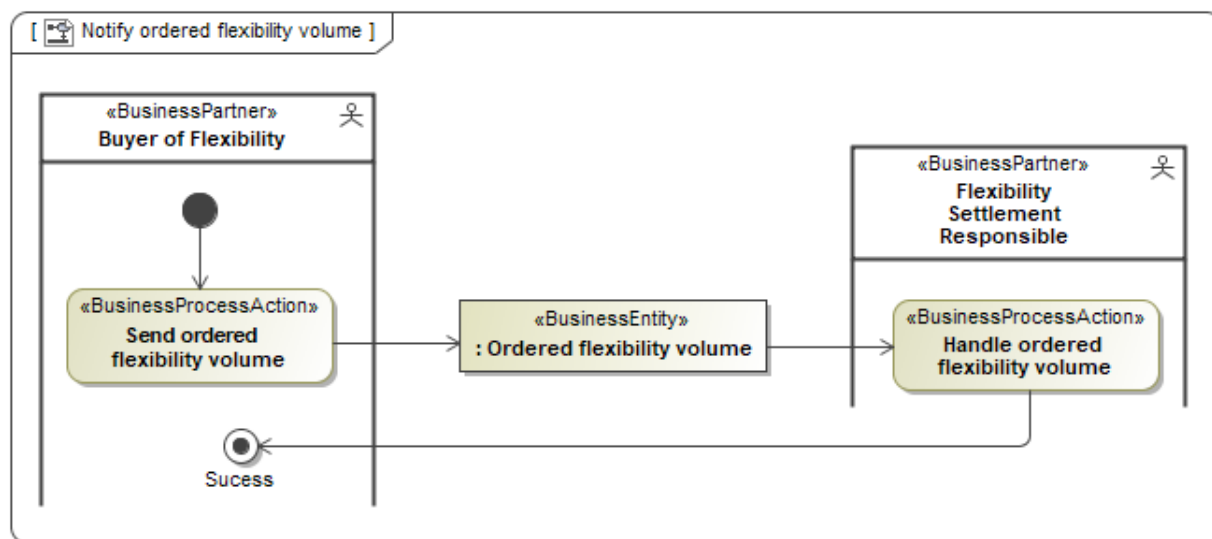


Figure 34 Business Process: Notify ordered flexibility volume

The data content of the «Business entity» (Square box between the swim lanes) is found at "4.12.1 Element definitions: Reject request determined flexibility volume".

2.4.4.2.3. Request ordered flexibility volume (Business Process UseCase)

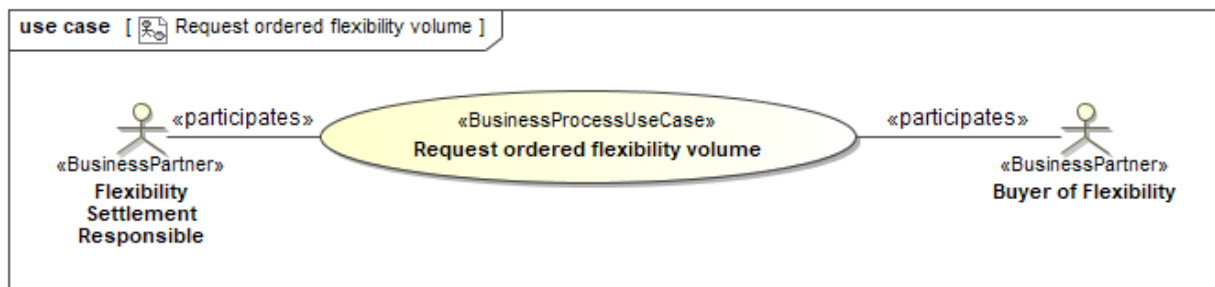


Figure 35 Business Process UseCase: Request ordered flexibility volume

2.4.4.2.3.1. Description

UseCase description: Request ordered flexibility volume	
definition	In this process the Flexibility Settlement Responsible requests the ordered flexibility volume for the flexibility service from the Buyer of Flexibility.
beginsWhen	The Flexibility Settlement Responsible has a need for the ordered flexibility volume.
preCondition	The Buyer of Flexibility has ordered the flexibility services from the Flexibility Service Provider for the activation window in question.
endsWhen	The Flexibility Settlement Responsible has received the ordered flexibility volume from the Buyer of Flexibility.
postCondition	The Flexibility Settlement Responsible has the ordered flexibility volume for the flexibility service available.
exceptions	Dependent on the market rules, the flexibility volume that was ordered by the Buyer of Flexibility may be requested from the Market Operator. The request has been rejected (e.g. no data available).
actions	See 2.4.4.2.3.2

2.4.4.2.3.2. Business Process

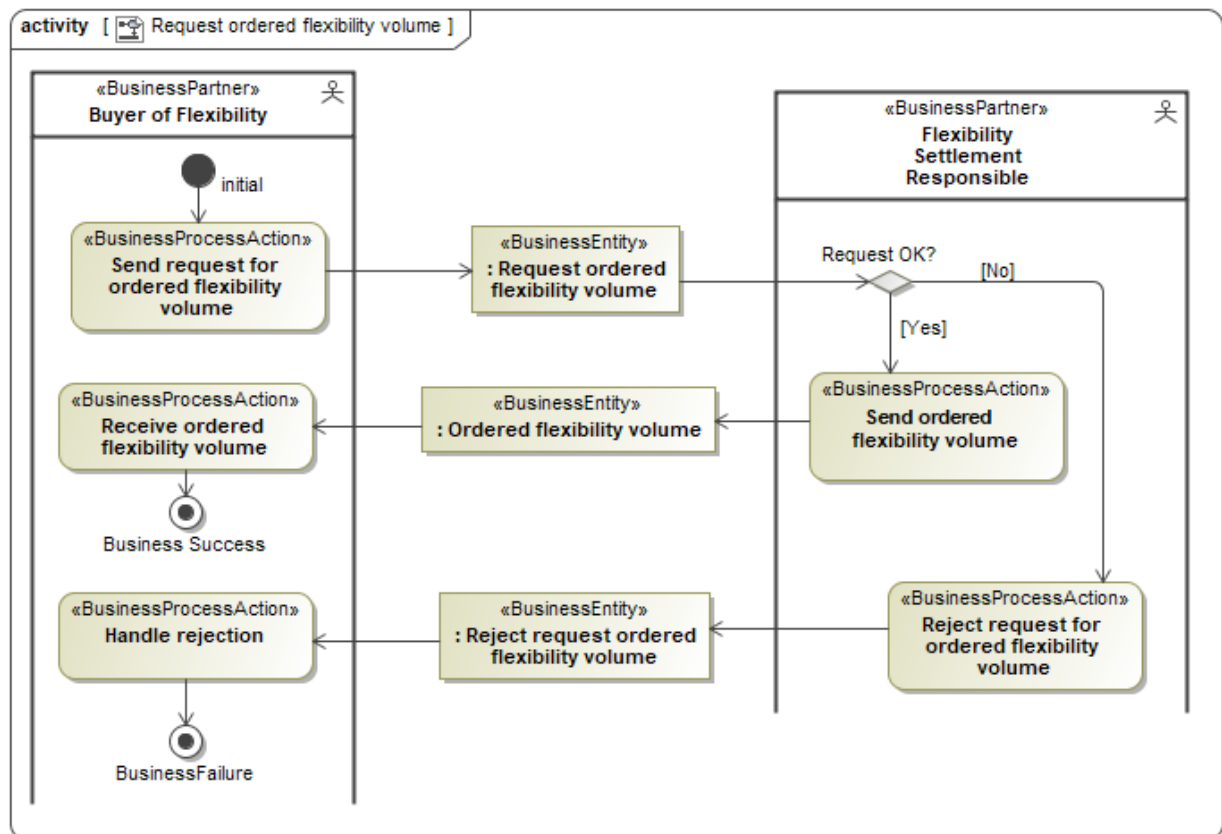


Figure 36 Business Process: Request **ordered** flexibility volume

The data content of the three «Business entity» (Square boxes between the swim lanes) are found at:

- 4.14 Request ordered flexibility volume (Class Diagram)
- 4.13 Ordered flexibility volume (Class Diagram)
- 4.15 Reject request ordered flexibility volume (Class Diagram)

2.4.4.3. Calculate difference between delivered and ordered flexibility volume (Business Process UseCase)

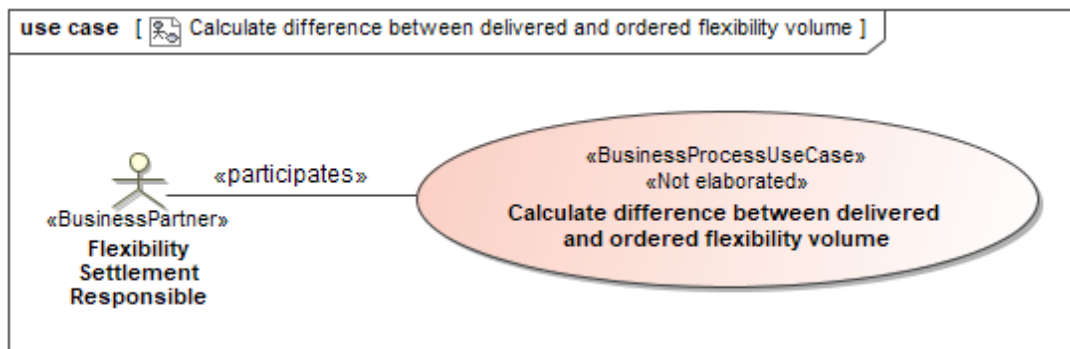


Figure 37 Business Process UseCase: Calculate difference between delivered and ordered flexibility volume

2.4.4.3.1. Description

UseCase description: Calculate difference between delivered and ordered flexibility volume	
definition	In this process the Flexibility Settlement Responsible calculates the difference between the delivered and the ordered flexibility volume for the flexibility services in the activation window.
beginsWhen	When the Flexibility Settlement Responsible has determined the flexibility volume.
preCondition	The Flexibility Settlement Responsible has received the flexibility volume that was ordered by the Buyer of Flexibility.
endsWhen	When the Flexibility Settlement Responsible has calculated the difference between the delivered and the ordered flexibility volume.
postCondition	The difference between the ordered and delivered flexibility volume has been determined and is ready for distribution.
exceptions	None.
actions	This is an internal process within the Flexibility Settlement Responsible, hence not further elaborated.

2.4.4.4. Distribute difference between delivered and ordered flexibility volume (Business Process UseCase)

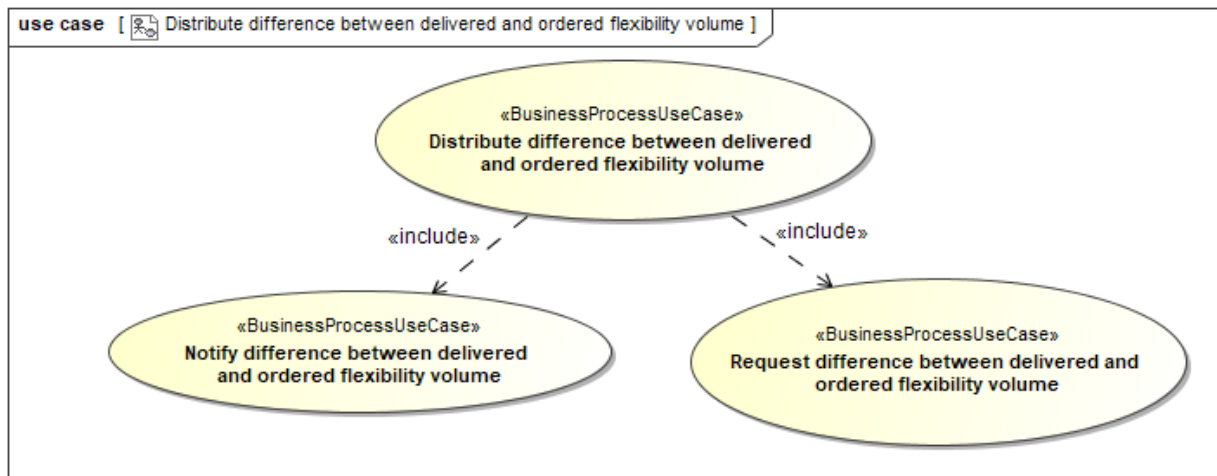


Figure 38 Business Process UseCase: Distribute difference between delivered and ordered flexibility volume

2.4.4.4.1. Description

UseCase description: Distribute difference between delivered and ordered flexibility volume	
definition	In this process the Flexibility Settlement Responsible distributes the difference between delivered and ordered flexibility volume for the flexibility services for the activation window to the Entitled Roles for difference between delivered and ordered flexibility volume, e.g., (based on national rules): the Flexibility Service Provider (FSP) and/or the Buyer of Flexibility.
beginsWhen	When the Flexibility Settlement Responsible has determined the difference between delivered and ordered flexibility volume or when by an Entitled Role.
preCondition	The difference between delivered and ordered flexibility volume has been calculated.
endsWhen	The Entitled Roles have received the difference between delivered and ordered flexibility volume.
postCondition	The Entitled Roles have the difference between the ordered and delivered flexibility volume for the activation window available.
exceptions	None.
actions	Not relevant at this level.

2.4.4.4.2. Notify difference between delivered and ordered flexibility volume (Business Process UseCase)

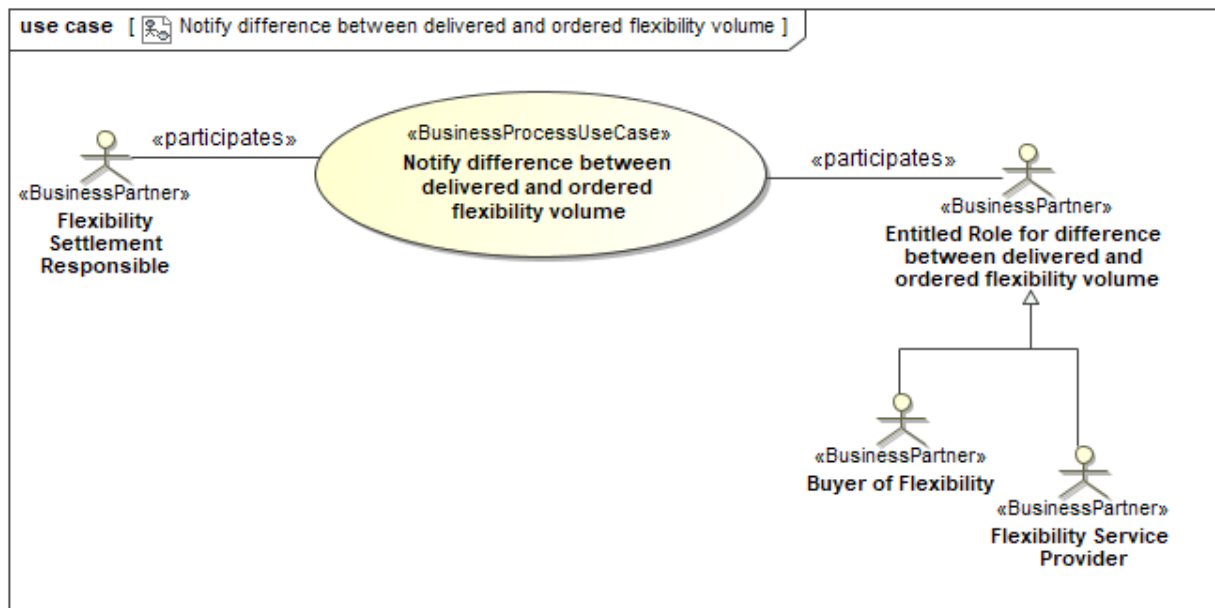


Figure 39 Business Process UseCase: Notify difference between delivered and ordered flexibility volume

2.4.4.4.2.1. Description

UseCase description: Notify difference between delivered and ordered flexibility volume	
definition	In this process the Flexibility Settlement Responsible notifies the difference between delivered and ordered flexibility volume to the Entitled Roles, e.g. (based on national rules) the Flexibility Service Provider (FSP) and/or the Buyer of Flexibility.
beginsWhen	When the Flexibility Settlement Responsible has calculated the difference between delivered and ordered flexibility volume.
preCondition	The difference between delivered and ordered flexibility volume has been calculated.
endsWhen	The Entitled Roles have received the difference between delivered and ordered flexibility volume.
postCondition	The Entitled Roles have the difference between the ordered and delivered flexibility volume for the activation window available.
exceptions	None.
actions	See 2.4.4.4.2.2

2.4.4.4.2. Business Process

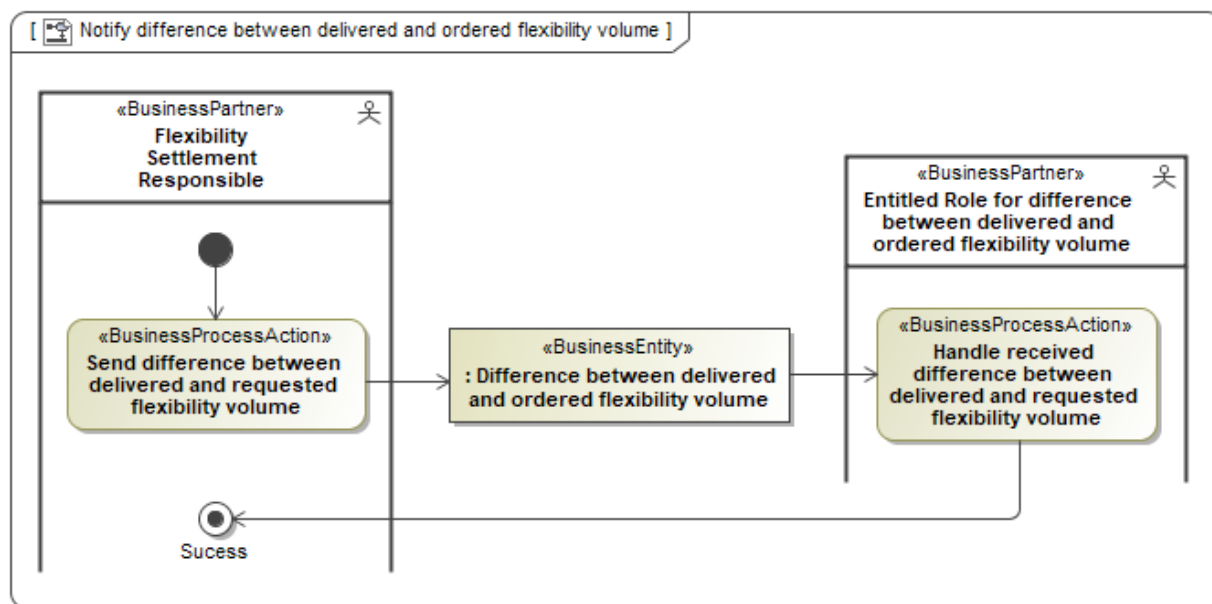


Figure 40 Business Process: Notify difference between delivered and ordered flexibility volume

The data content of the «Business entity» (Square box between the swim lanes) is found at “4.16 Difference between delivered and ordered flexibility volume (Class Diagram)”.

2.4.4.4.3. Request difference between delivered and ordered flexibility volume (Business Process UseCase)

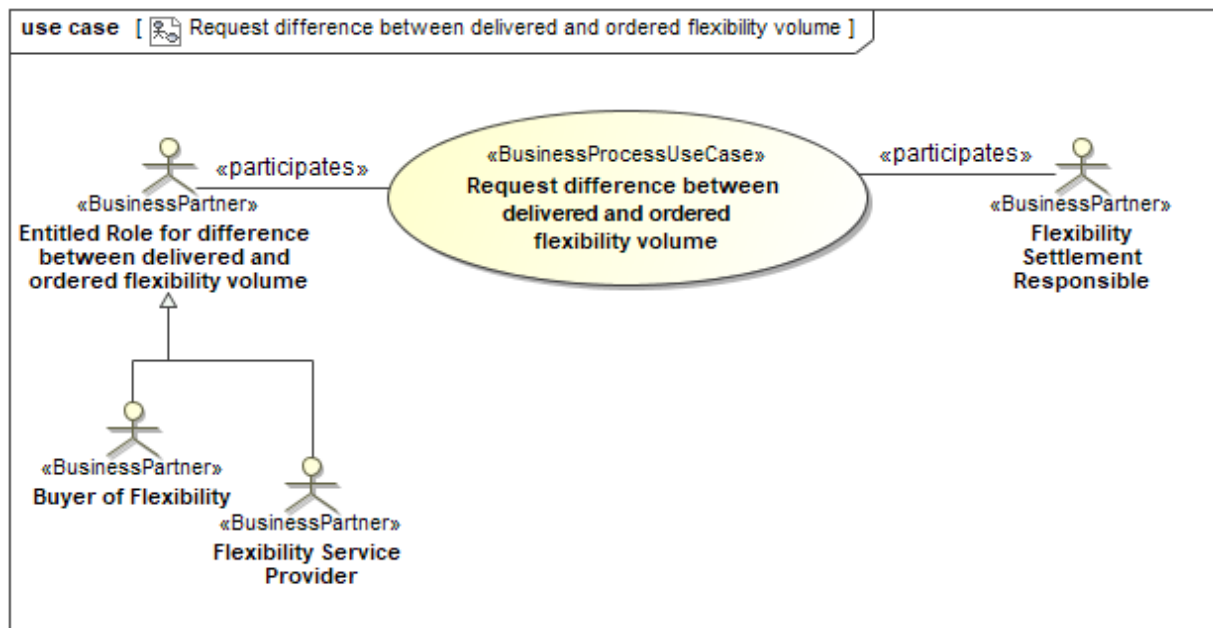


Figure 41 Business Process UseCase: Request difference between delivered and ordered flexibility volume

2.4.4.4.3.1. Description

UseCase description: Request difference between delivered and ordered flexibility volume	
definition	In this process an Entitled Role for difference between delivered and ordered flexibility volume, e.g., (based on national rules) the Flexibility Service Provider (FSP) and/or the Buyer of Flexibility requests the difference between delivered and ordered flexibility volume from the Flexibility Settlement Responsible.
beginsWhen	The Entitled Role for difference between delivered and ordered flexibility volume has a need for the determined difference in flexibility volume.
preCondition	The Entitled Roles for difference between delivered and ordered flexibility volume is involved in the flexibility service where the difference between the ordered and delivered flexibility volume is requested for.
endsWhen	The requester has received the difference between delivered and ordered flexibility volume from the Flexibility Settlement Responsible.
postCondition	The Entitled Role for difference between delivered and ordered flexibility volume has the requested difference between delivered and ordered flexibility volume for the flexibility services for the activation window available.
exceptions	The request has been rejected (e.g. no data available).
actions	See 2.4.4.4.3.2

2.4.4.4.3.2. Business Process

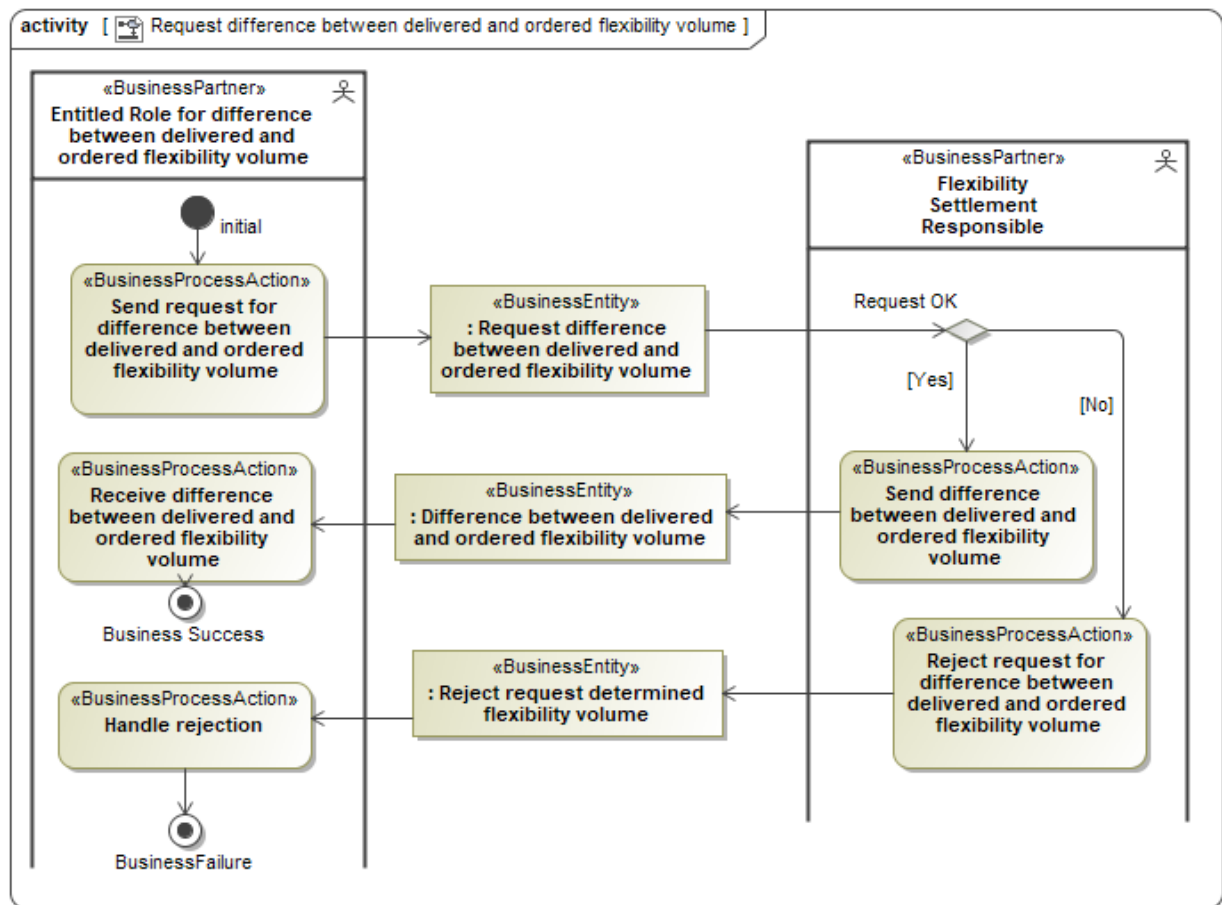


Figure 42 Business Process: Request difference between delivered and ordered flexibility volume

The data content of the three «Business entity» (Square boxes between the swim lanes) are found at:

- 4.17 Request difference between delivered and ordered flexibility volume (Class Diagram)
- 4.16 Difference between delivered and ordered flexibility volume (Class Diagram)
- 4.18 Reject request difference between delivered and ordered flexibility volume (Class Diagram)

2.5. Settle flexibility services (Business Process UseCase)

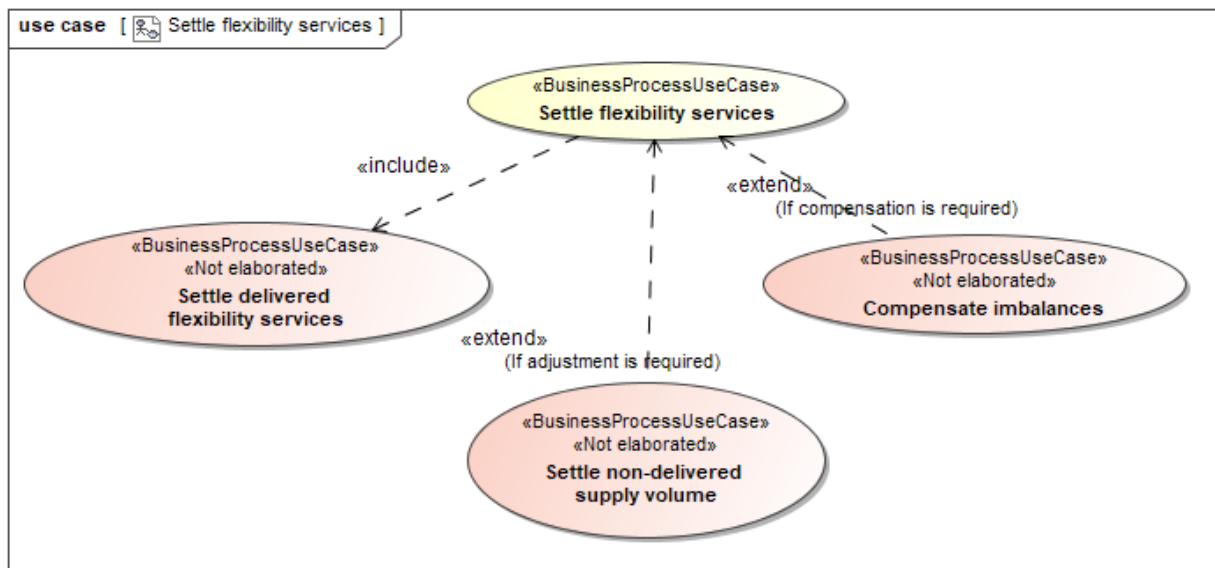


Figure 43 Business Process UseCase: Settle flexibility services

2.5.1. Description

UseCase description: Settle flexibility services	
definition	<p><i>This is an overview use case.</i></p> <p>In this process the agreed flexibility services (delivered services and, if applicable, contractual conditions) are settled between the Flexibility Service Provider and the Buyer of Flexibility and if needed (dependent on market rules and the used services) compensation of the Energy Supplier for the energy volume and/or compensation of the imbalances between the Balance Responsible Parties involved.</p>
beginsWhen	When the flexibility volume for the flexibility services for the activation window has been determined and distributed and/or the activation window has expired.
preCondition	All involved roles have received the respective flexibility volumes and/or compensation volume.
endsWhen	All involved roles have agreed the settlement and if applicable the compensation.
postCondition	The effects of the flexibility services transaction(s) between all involved roles are determined, and the settlement is agreed and ready for billing.

	The influence of the flexibility services transaction(s) on the portfolios (offerings)/positions, of all other involved roles, is known/assigned for compensation and ready to be billed.
exceptions	None.
actions	Not applicable.

2.5.2. Settle delivered flexibility services (Business Process UseCase)

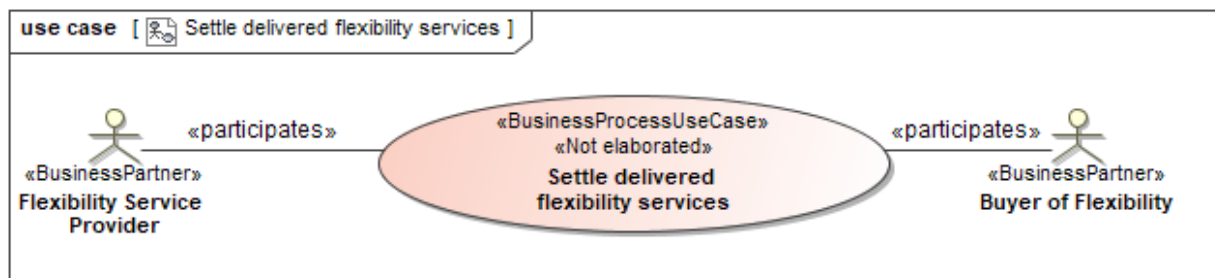


Figure 44 Business Process UseCase: Settle delivered flexibility services

2.5.2.1. Description

UseCase description: Settle delivered flexibility services	
definition	In this process the delivered flexibilities are settled between the Flexibility Service Provider and the Buyer of Flexibility.
beginsWhen	When the flexibility volume for the flexibility services for the activation window has been determined and distributed and/or the activation window has expired.
preCondition	The Flexibility Service Provider and the Buyer of Flexibility have received the determined delivered flexibility volume for the flexibility services for the activation window.
endsWhen	Delivered flexibilities for the flexibility services for the activation window have been agreed between the Flexibility Service Provider and the Buyer of Flexibility.
postCondition	The delivered flexibility services for the flexibility services for the activation window transaction(s) between Flexibility Service Provider and Buyer of Flexibility are settled and are ready for billing and payment.
exceptions	None.
actions	This is not further elaborated, as it is for the time being expected to be a bilateral, diverse process.

2.5.3. Settle non-delivered supply volume (Business Process UseCase)

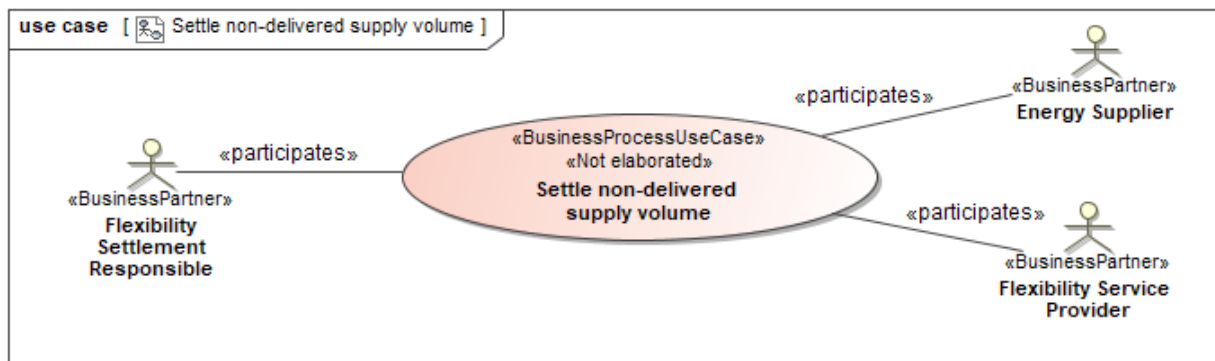


Figure 45 Business Process UseCase: Settle non-delivered supply volume

2.5.3.1.1. Description

UseCase description: Settle non-delivered supply volume	
definition	In this process the non-delivered supply volume is settled between the Flexibility Service Provider and the affected Energy Supplier(s). However, since these processes are not mature, the determination of the non-delivered supply volume is not specified.
beginsWhen	When the settlement process has started, and compensation of the non-delivered supply volume is agreed.
preCondition	The Flexibility Service Provider and the affected Energy Supplier(s) have agreed to determine and settle the non-delivered supply volume or the settlement is based on national or market rules.
endsWhen	The non-delivered supply volume per Energy Supplier has been agreed.
postCondition	The non-delivered supply volume(s) for the flexibility services for the activation window for the affected Energy Supplier(s) is/are determined and settled.
exceptions	None.
actions	None.

2.5.4. Compensate imbalances (Business Process UseCase)

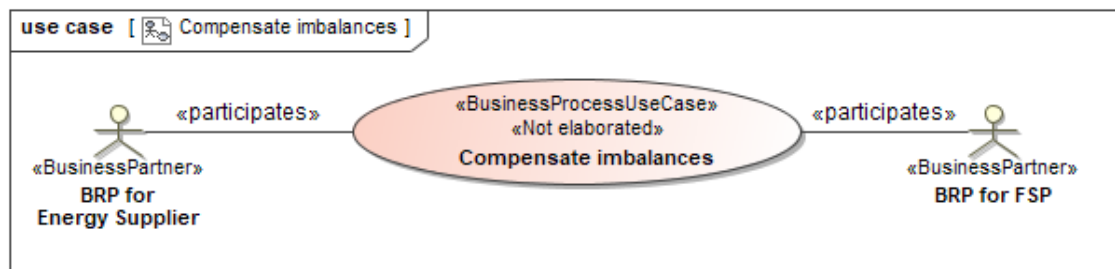


Figure 46 Business Process UseCase: Compensate imbalances

2.5.4.1.1. Description

UseCase description: Compensate imbalances	
definition	<p>In this process the imbalances caused by activation of the flexibility service(s) in the activation window by the Flexibility Service Provider are compensated between the involved Balance Responsible Parties.</p> <p>Since these processes are not mature, the determination of the imbalance consequences between the involved Balance Responsible Parties is not specified.</p>
beginsWhen	When there is a need for compensation between the involved Balance Responsible Parties.
preCondition	<p>The two involved Balance Responsible Parties have received the determined flexibility volume.</p> <p>The imbalance settlement process has started.</p>
endsWhen	The imbalance is compensated.
postCondition	The imbalance consequences have been determined and agreed between the involved Balance Responsible Parties.
exceptions	None.
actions	This is not further elaborated, as it is for the time being expected to be a bilateral, diverse process.

3. Business Partner View: Quantification and settlement of flexibility services

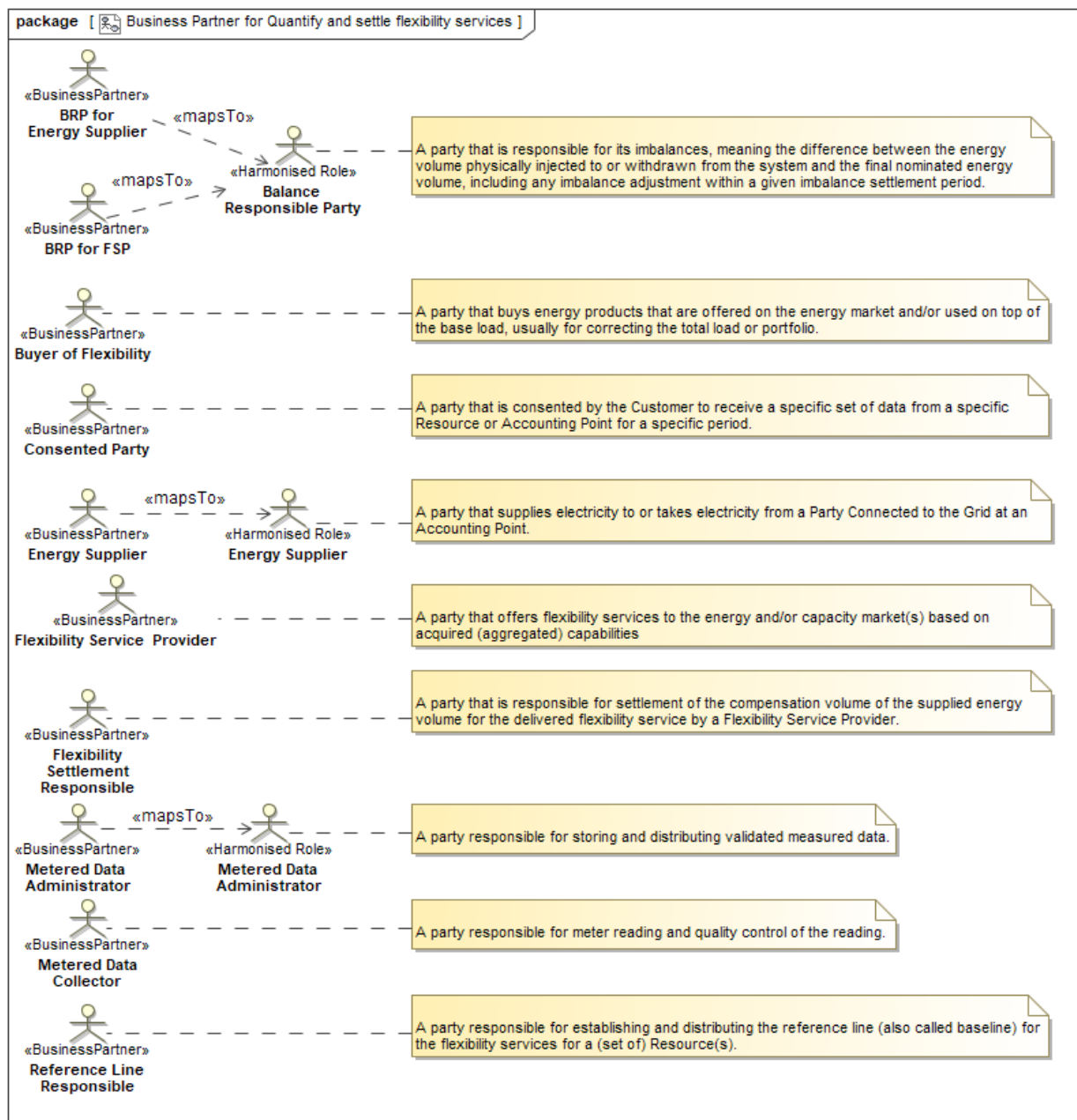


Figure 47 Business Partners related to “Quantification and settlement of flexibility services”

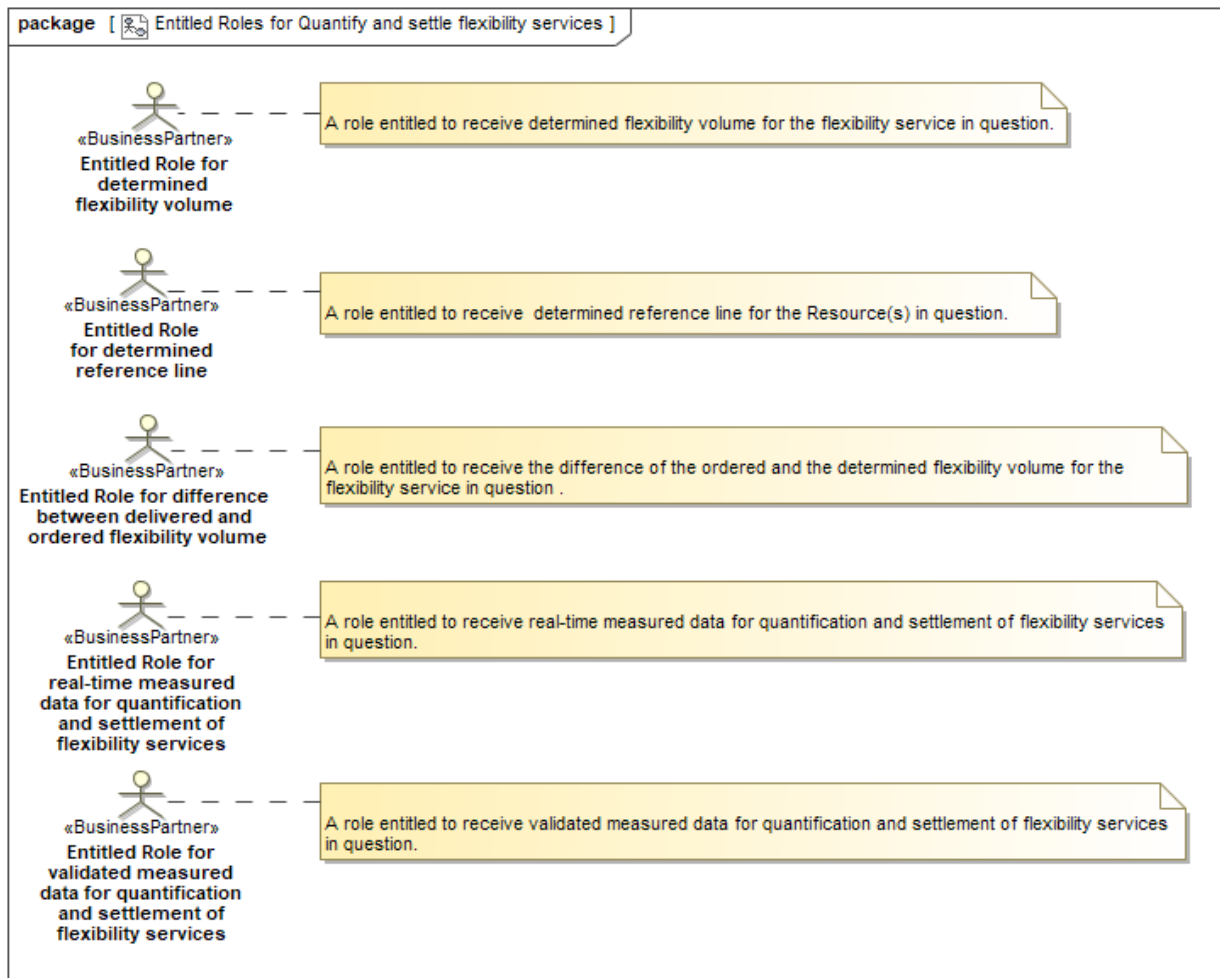


Figure 48 Entitled Roles related to “Provide flexibility services”

4. Business Entity View

A general introduction to the Business Entity View can be found in the Introduction to ebIX® Business Requirements and Business Information Models (www.ebix.org) [3].

4.1. Validated measured data for quantification and settlement of flexibility (Class Diagram)

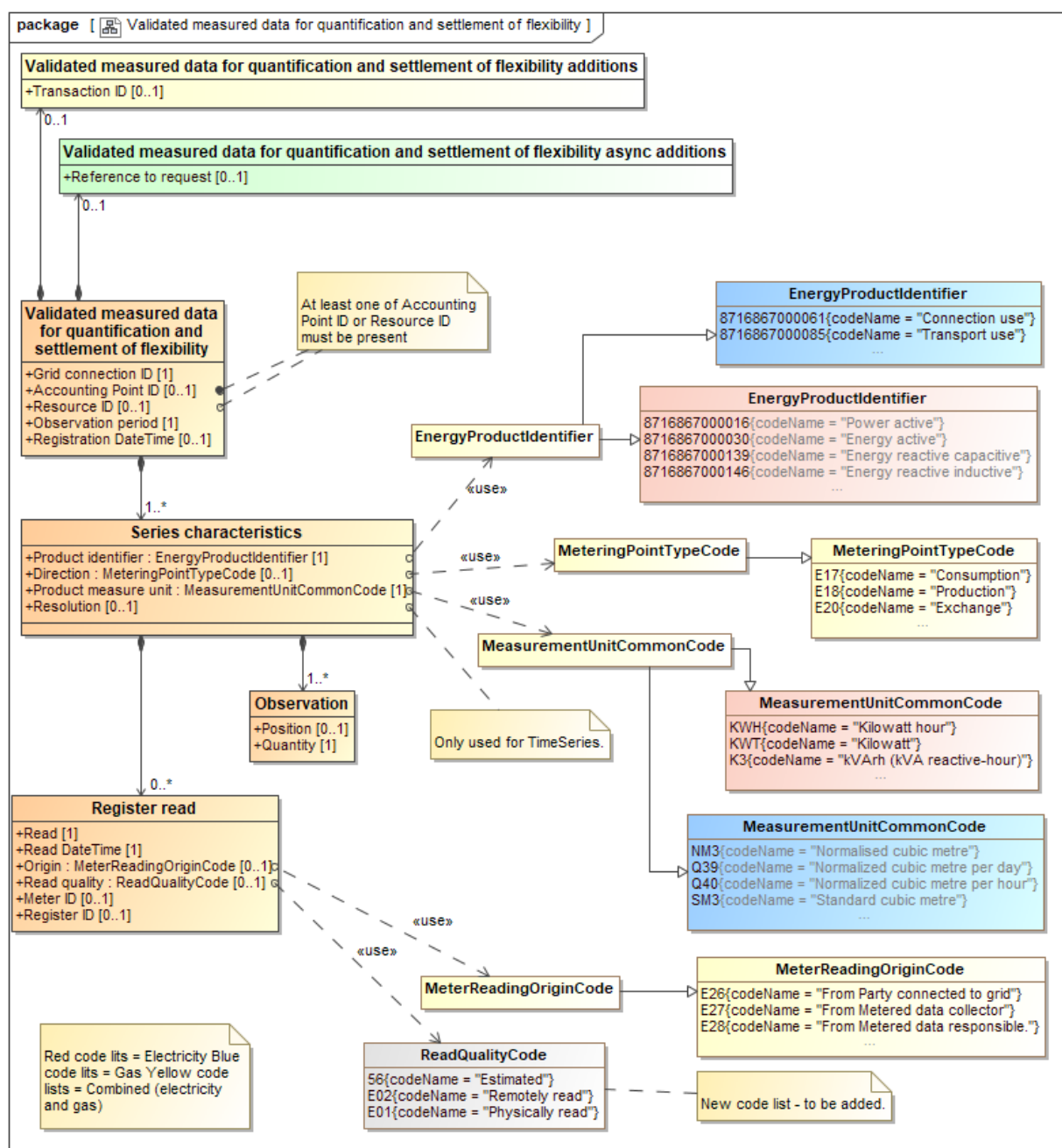


Figure 49 Class diagram: Validated measured data for quantification and settlement of flexibility

Remarks for billing flexibility services:

- In the class “Validated measured data for quantification and settlement of flexibility”, the Registration date/time reflects the moment of validation and registration of the measured data (timeseries) into the database of the Metered Data Responsible after validation; this information can be used for “versioning” of the measured data.

- In the class Register read, the Read DateTime reflects the moment of registration of the meter read from the register as added to this by the Metered Data Collector or as defined by national rules; this information is used as a timestamp for data collection.

4.1.1. Element definitions: Validated measured data for quantification and settlement of flexibility

Attribute	Sector ¹³	Definition
Validated measured data for quantification and settlement of flexibility		The information set sent by a Metered Data Administrator, responsible for the distribution of validated measured data for quantification and settlement of flexibility for a Resource, to the Entitled Roles for validated measured data for quantification and settlement of flexibility services, i.e. the Flexibility Settlement Responsible and the Reference Line Responsible.
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Accounting Point ID		The unique identification of the Accounting Point to which the validated measured data for quantification and settlement of flexibility is attributed.
Resource ID		The unique identification of the Resource to which the validated measured data for quantification and settlement of flexibility are attributed.
Observation period		The specific period of time the validated measured data for quantification and settlement have been measured, calculated or estimated for.
Registration DateTime		The date and time of the validation and registration of this set of validated measured data for quantification and settlement of flexibility by the Metered Data Responsible.
Series characteristics		The characteristics of this set of validated measured data for quantification and settlement of flexibility, i.e., the product and flow direction.
Product identifier		A code specifying the energy and/or capacity product for the reads and/or the quantities in this set of validated measured data for quantification and settlement of flexibility.

¹³ It is assumed that Accounting Points are uniquely dedicated to either electricity or to gas.

Direction		A code specifying the direction of the flow of the energy measured in this observation period.
Product measure unit		The unit of measure used for the quantities in this set of validated measured data for quantification and settlement of flexibility.
Resolution		The resolution of each observation in this dataset.
Register read		A read from the register of the Meter of this Accounting Point and/or Resource and characteristics of the read. The read date/time must be within the observation period.
Read ¹⁴		The value as read from or calculated for the register, for this observation period.
Read DateTime		The timestamp of the moment in time when the value was registered in the Register of the Meter, or the value was calculated for.
Origin		A code specifying the role of the party delivering the Read.
Read quality		A quality indication of this read, such as estimated, remotely read or physically read.
Meter ID		The unique identification of the Meter, linked to the Accounting Point and/or Resource, which contains this register that has been read.
Register ID		The unique identification of the Register within the Meter, where this data has been read from or is estimated for.
Observation		One validated measured value within a timeseries of this observation period.
Position		The ordinal position of this Observation in this observation period for this set of validated measured data for quantification and settlement of flexibility.
Quantity		The validated quantity of energy or capacity for this Observation.
Validated measured data for quantification and settlement of flexibility additions		Additional information, related to validated measured data for quantification and settlement of flexibility, the use of which may be agreed on a national level.

¹⁴ If the Register read was missing from the “collected data”, a replacement value shall be sent, where Origin shall be “**E28** From Metered Data Responsible” and Read Quality shall be “**56** Estimated”.

Transaction ID		The unique identification of this set of information as given by the Metered Data Administrator.
Validated measured data for quantification and settlement of flexibility async additions		Additional information, related to these validated measured data for billing flexibility, needed when using asynchronous communication.
Reference to request		Information about the request for this set of validated measured data for quantification and settlement of flexibility, which uniquely identifies it.

4.2. Request validated measured data for quantification and settlement of flexibility (Class Diagram)

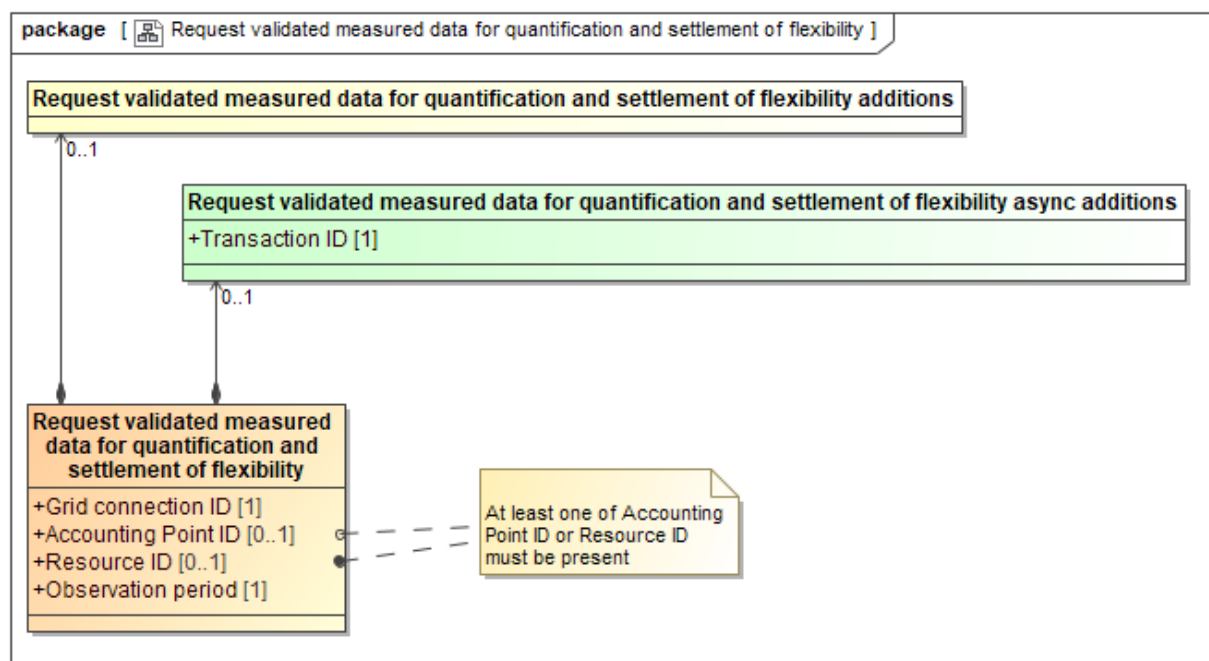


Figure 50 Class diagram: Request validated measured data for quantification and settlement of flexibility

4.2.1. Element definitions: Request validated measured data for quantification and settlement of flexibility

Attribute	Sector ¹⁵	Definition
Request validated measured data for quantification and settlement of flexibility		The information set to be sent by an Entitled Role for validated measured data for quantification and settlement of flexibility services, i.e. the Flexibility Settlement Responsible and the Reference Line Responsible, to the Metered Data Administrator when requesting validated measured data for quantification and settlement of flexibility for a Resource.
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Accounting Point ID		The unique identification of the Accounting Point from which the validated measured data for quantification and settlement of flexibility is requested.
Resource ID		The unique identification of the Resource from which the validated measured data for quantification and settlement of flexibility is requested.

¹⁵ It is assumed that Accounting Points are uniquely dedicated to either electricity or to gas.

Observation period		A specific period of time describing the duration of the requested set of validated measured data.
Request validated measured data for quantification and settlement of flexibility additions		Additional information related to the request for validated measured data for quantification and settlement of flexibility, the use of which may be agreed on a national level.
none		
Request validated measured data for quantification and settlement of flexibility async additions		Additional information, related to Request validated measured data for billing flexibility, needed when using asynchronous communication.
Transaction ID		The unique identification of this set of information as given by the Entitled Role for validated measured data for billing flexibility.

4.3. Reject request validated measured data for quantification and settlement of flexibility (Class Diagram)

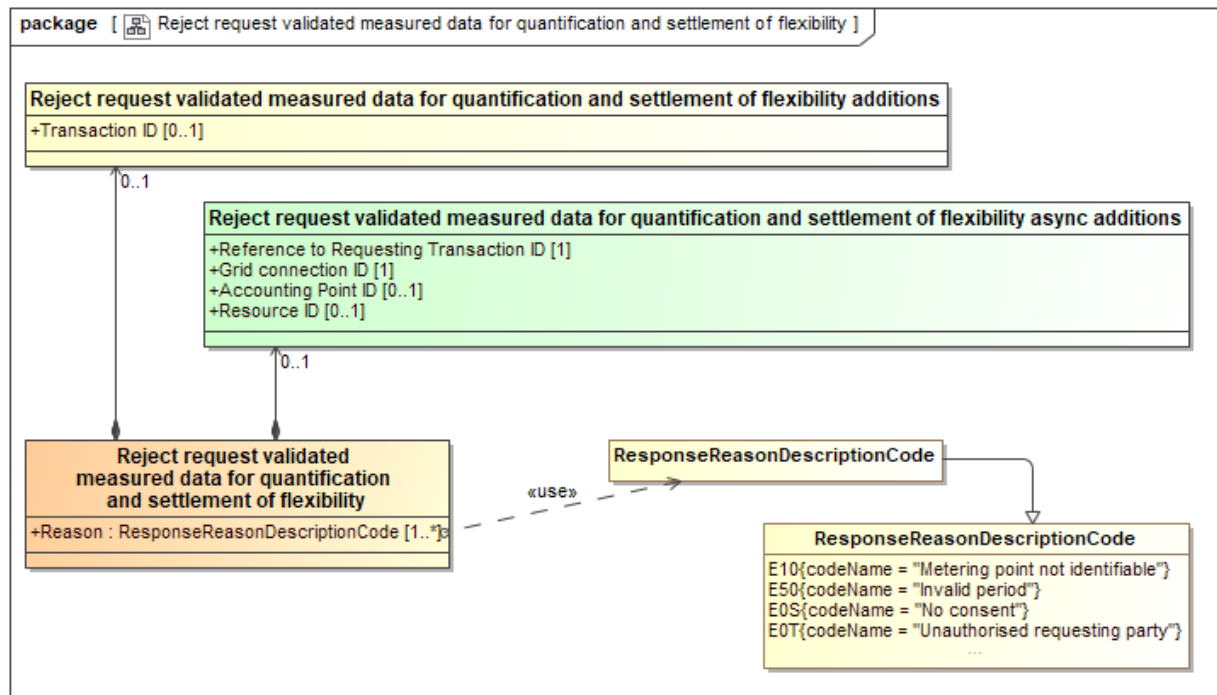


Figure 51 Class diagram: Reject request validated measured data for quantification and settlement of flexibility

4.3.1. Element definitions: Reject request validated measured data for quantification and settlement of flexibility

Attribute	Sector ¹⁶	Definition
Reject request validated measured data for quantification and settlement of flexibility		The information set to be sent by a Metered Data Administrator to the Entitled Role for validated measured data for quantification and settlement of flexibility services, i.e. the Flexibility Settlement Responsible and the Reference Line Responsible, when rejecting a request validated measured data for quantification and settlement of flexibility.
Reason		A code specifying (one of) the reason(s) for the rejection of the request for validated measured data for quantification and settlement of flexibility.

¹⁶ It is assumed that Accounting Points are uniquely dedicated to either electricity or to gas.

Reject request validated measured data for quantification and settlement of flexibility additions		Additional information related to the request for validated measured data for quantification and settlement of flexibility the use of which may be agreed on a national level.
Transaction ID		The unique identification of this rejection of request for validated measured data for quantification and settlement of flexibility.
Reject request validated measured data for quantification and settlement of flexibility async additions		Additional information, related to the rejection of the request for validated measured data for quantification and settlement of flexibility, needed when using asynchronous communication.
Reference to Requesting Transaction ID		The unique identification of the rejected request for validated measured data for quantification and settlement of flexibility as given by the requesting business partner.
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Accounting Point ID		The unique identification of the Accounting Point from which the validated measured data for quantification and settlement of flexibility were requested.
Resource ID		The unique identification of the Resource from which the validated measured data for quantification and settlement of flexibility were requested.

4.4.1. Element definitions: Real-time measured data for quantification and settlement of flexibility

Attribute	Sector ¹⁷	Definition
Real-time measured data for quantification and settlement of flexibility		The information set sent by a Metered Data Collector, responsible for the distribution of real-time measured data for quantification and settlement of flexibility for a Resource, to the Entitled Role for real-time measured data for quantification and settlement of flexibility services, i.e. the Flexibility Settlement Responsible and the Reference Line Responsible.
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Accounting Point ID		The unique identification of the Accounting Point to which the real-time measured data for quantification and settlement of flexibility are attributed.
Resource ID		The unique identification of the Resource to which the real-time measured data for quantification and settlement of flexibility are attributed.
Observation period		The specific period in time the real-time measured data for quantification and settlement have been measured, calculated or estimated for.
Series characteristics		The characteristics of this set of real-time measured data for billing flexibility, i.e., the product and flow direction.
Product identifier		A code specifying the energy or capacity product for the reads and/or the quantities in this set of real-time measured data for billing flexibility.
Direction		A code specifying the direction of the flow of the energy measured in this observation period.
Product measure unit		The unit of measure used for the quantities in this set of real-time measured data for quantification and settlement of flexibility.
Resolution		The resolution of each observation in this dataset.

¹⁷ It is assumed that Accounting Points are uniquely dedicated to either electricity or to gas.

Observation		One real-time measured value within a timeseries.
Position		The ordinal position of this Observation in this observation period for this set of real-time measured data for billing flexibility.
Quantity		The real-time measured quantity of energy or capacity for this Observation.
Real-time measured data for quantification and settlement of flexibility additions		Additional information, related to real-time measured data for quantification and settlement of flexibility, the use of which may be agreed on a national level.
Transaction ID		The unique identification of this set of information as given by the Metered Data Administrator.
Real-time measured data for quantification and settlement of flexibility async additions		Additional information, related to these real-time measured data for quantification and settlement of flexibility, needed when using asynchronous communication.
Reference to request		Information about the request for this set of real-time measured data for quantification and settlement of flexibility, which uniquely identifies it.

4.5. Request real-time measured data for quantification and settlement of flexibility (Class Diagram)

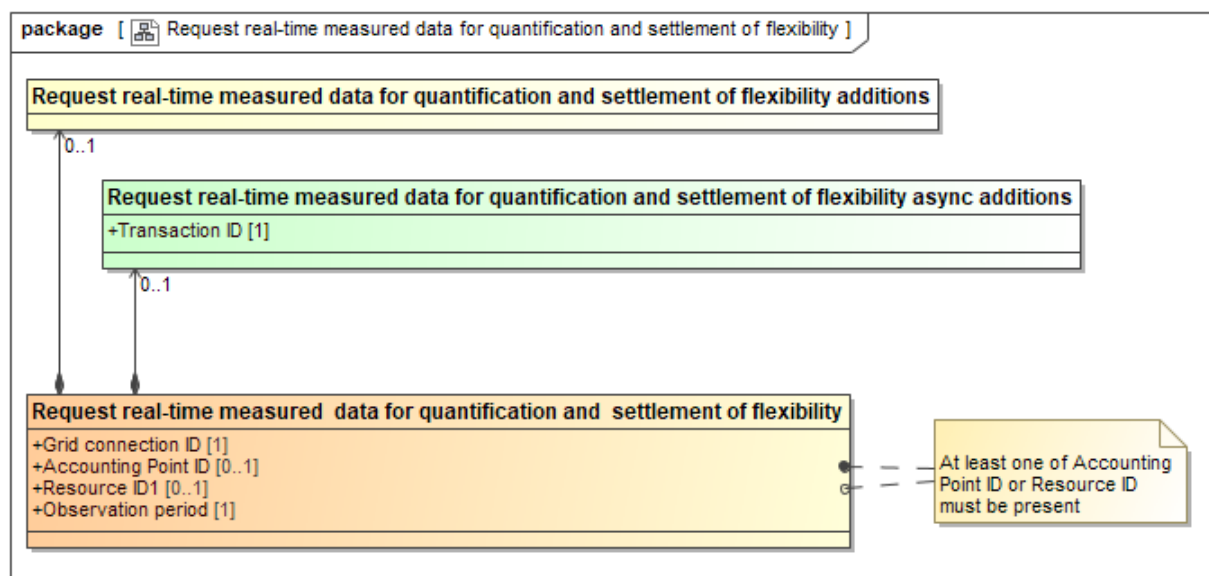


Figure 53 Class diagram: Request real-time measured data for quantification and settlement of flexibility

4.5.1. Element definitions: Request real-time measured data for quantification and settlement of flexibility

Attribute	Sector ¹⁸	Definition
Request real-time measured data for quantification and settlement of flexibility		The information set to be sent by an Entitled Role for real-time measured data for quantification and settlement of flexibility services, i.e. the Flexibility Settlement Responsible and the Reference Line Responsible when requesting real-time measured data for quantification and settlement of flexibility for a Resource from the Metered Data Collector.
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Accounting Point ID		The unique identification of the Accounting Point from which the real-time measured data for quantification and settlement of flexibility are requested.
Resource ID		The unique identification of the Resource from which the real-time measured data for quantification and settlement of flexibility are requested.
Observation period		A specific period in time describing the point in time and the duration of the requested set of real-time measured data.

¹⁸ It is assumed that Accounting Points are uniquely dedicated to either electricity or to gas.

Request real-time measured data for quantification and settlement of flexibility additions		Additional information related to the request for real-time measured data for quantification and settlement of flexibility, the use of which may be agreed on a national level.
none		
Request real-time measured data for quantification and settlement of flexibility async additions		Additional information, related to Request real-time measured data for billing flexibility, needed when using asynchronous communication.
Transaction ID		The unique identification of this set of information as given by the Entitled Role for real-time measured data for quantification and settlement of flexibility.

4.6. Reject request real-time measured data for quantification and settlement of flexibility (Class Diagram)

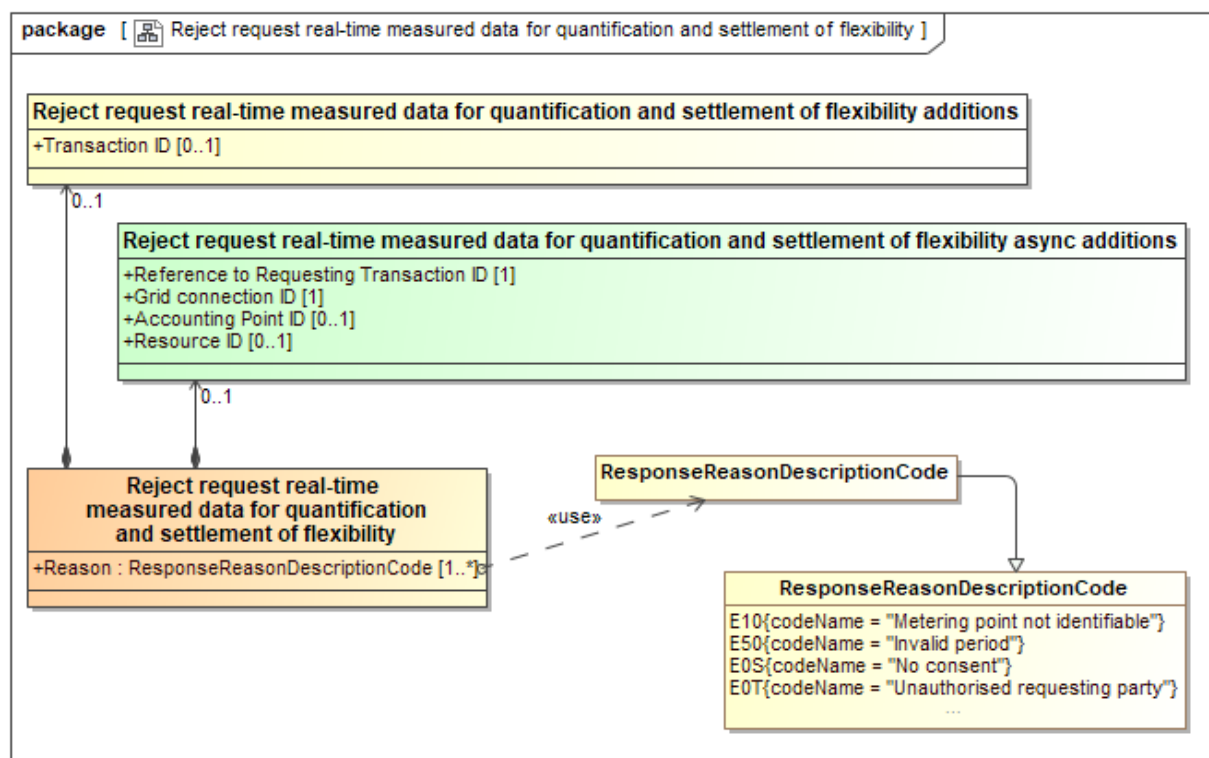


Figure 54 Class diagram: Reject request real-time measured data for quantification and settlement of flexibility

4.6.1. Element definitions: Reject request real-time measured data for quantification and settlement of flexibility

Attribute	Sector ¹⁹	Definition
Reject request real-time measured data for quantification and settlement of flexibility		The information set to be sent by the Metered Data Collector to the Entitled Role for real-time measured data for quantification and settlement of flexibility services, i.e. the Flexibility Settlement Responsible and the Reference Line Responsible, when rejecting a request real-time measured data for quantification and settlement of flexibility.
Reason		A code specifying (one of) the reason(s) for the rejection of the request for real-time measured data for quantification and settlement of flexibility.

¹⁹ It is assumed that Accounting Points are uniquely dedicated to either electricity or to gas.

Reject request real-time measured data for quantification and settlement of flexibility additions		Additional information related to the request for real-time measured data for quantification and settlement of flexibility the use of which may be agreed on a national level.
Transaction ID		The unique identification of this rejection of request for real-time measured data for quantification and settlement of flexibility.
Reject request real-time measured data for quantification and settlement of flexibility async additions		Additional information, related to the rejection of the request for real-time measured data for quantification and settlement of flexibility, needed when using asynchronous communication.
Reference to Requesting Transaction ID		The unique identification of the rejected request for real-time measured data for quantification and settlement of flexibility as given by the requesting business partner.
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Accounting Point ID		The unique identification of the Accounting Point from which the real-time measured data for quantification and settlement of flexibility were requested.
Resource ID		The unique identification of the Resource from which the real-time measured data for quantification and settlement of flexibility were requested.

4.7. Determined reference line (Class Diagram)

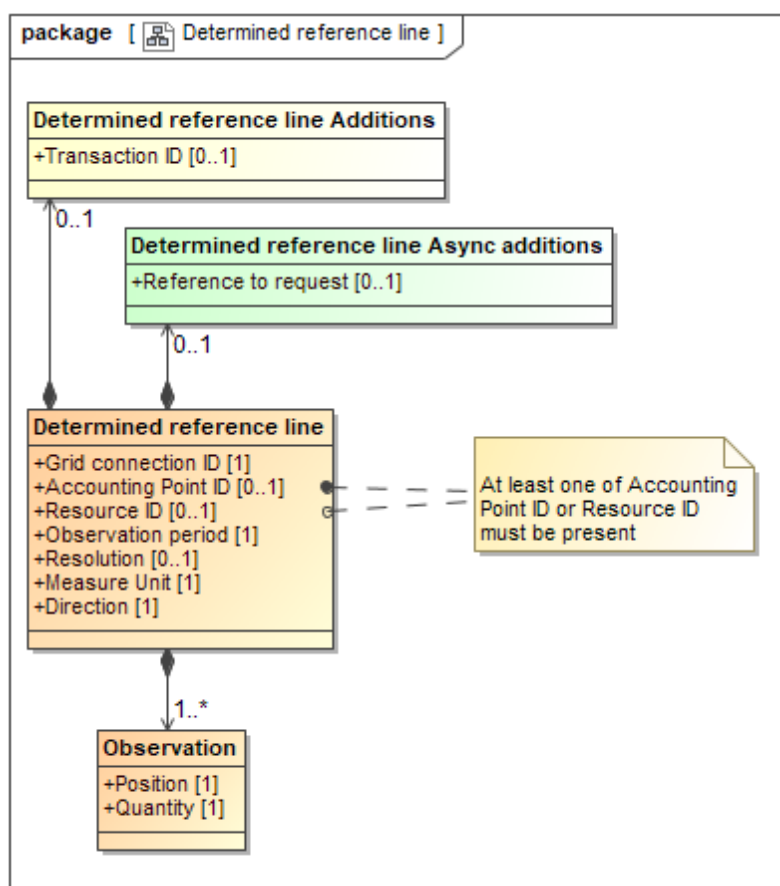


Figure 55 Class diagram: Determined reference line

4.7.1. Element definitions: Determined reference line

Class/attribute	Sector ²⁰	Description
Determined reference line		The information set to be sent by the Reference Line Responsible to the Entitled Roles, e.g. (based on national rules) the Balance Responsible Party (BRP) for the Energy Supplier, Balance Responsible Party (BRP) for the Flexibility Service Provider (FSP), the Energy Supplier, the Buyer of Flexibility and the Flexibility Service Provider.
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Accounting Point ID		The unique identification of the Accounting Point this reference line is determined for.
Resource ID		The unique identification of the Resource this reference line is determined for.

²⁰ It is assumed that Accounting Points are uniquely dedicated to either electricity or to gas.

Class/attribute	Sector ²⁰	Description
Observation period		The specific period in time describing the position in time and the duration of this determined reference line.
Resolution		The resolution of each observation in this dataset.
Measure Unit		The unit of measure associated with the quantity in the observation, coded according to UN/ECE Recommendation 20.
Observation		The determined quantity for one observation in the determined reference line observation period.
Position		The ordinal position of this observation in the observation period
Quantity		The quantity of energy or capacity determined for the reference line for this position in the observation period.
Determined reference line Additions		Additional information needed for technical reasons or to be agreed on a national level.
Transaction ID		The unique identification of this set of information given by the sender of the document.
Determined reference line Async Additions		Additional information needed when using asynchronous communication.
Reference to request		Information about the request for this set of determined reference line, which uniquely identifies it.

4.8. Request determined reference line (Class Diagram)

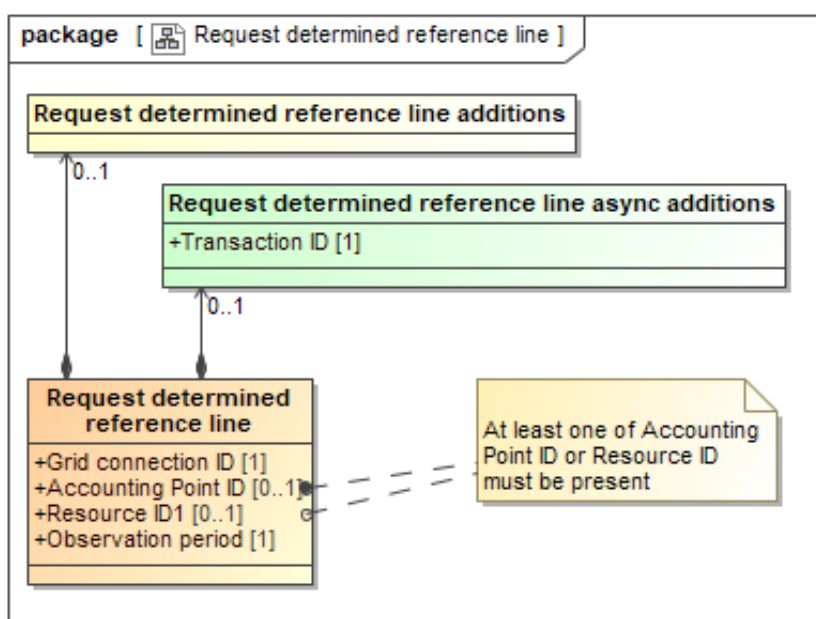


Figure 56 Class diagram: Request determined reference line

4.8.1. Element definitions: Request determined reference line

Attribute	Sector ²¹	Definition
Request determined reference line		The information set to be sent by an Entitled Role for determined reference line, e.g. (based on national rules) the Balance Responsible Party (BRP) for the Flexibility Service Provider (FSP), the Buyer of Flexibility, the Flexibility Service Provider, the Flexibility Settlement Responsible or a Consented Party, when requesting a determined reference line for an Accounting Point and/or a Resource for a specific period.
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Accounting Point ID		The unique identification of the Accounting Point from which the determined reference line is requested.
Resource ID		The unique identification of the Resource from which the determined reference line is requested.
Observation period		A specific period in time describing the point in time and the duration for the requested determined reference line.

²¹ It is assumed that Accounting Points are uniquely dedicated to either electricity or to gas.

Request determined reference line additions		Additional information related to the request for determined reference line, the use of which may be agreed on a national level.
none		
Request determined reference line async additions		Additional information, related to request for determined reference line, needed when using asynchronous communication.
Transaction ID		The unique identification of this set of information as given by the requester.

4.9. Reject request determined reference line (Class Diagram)

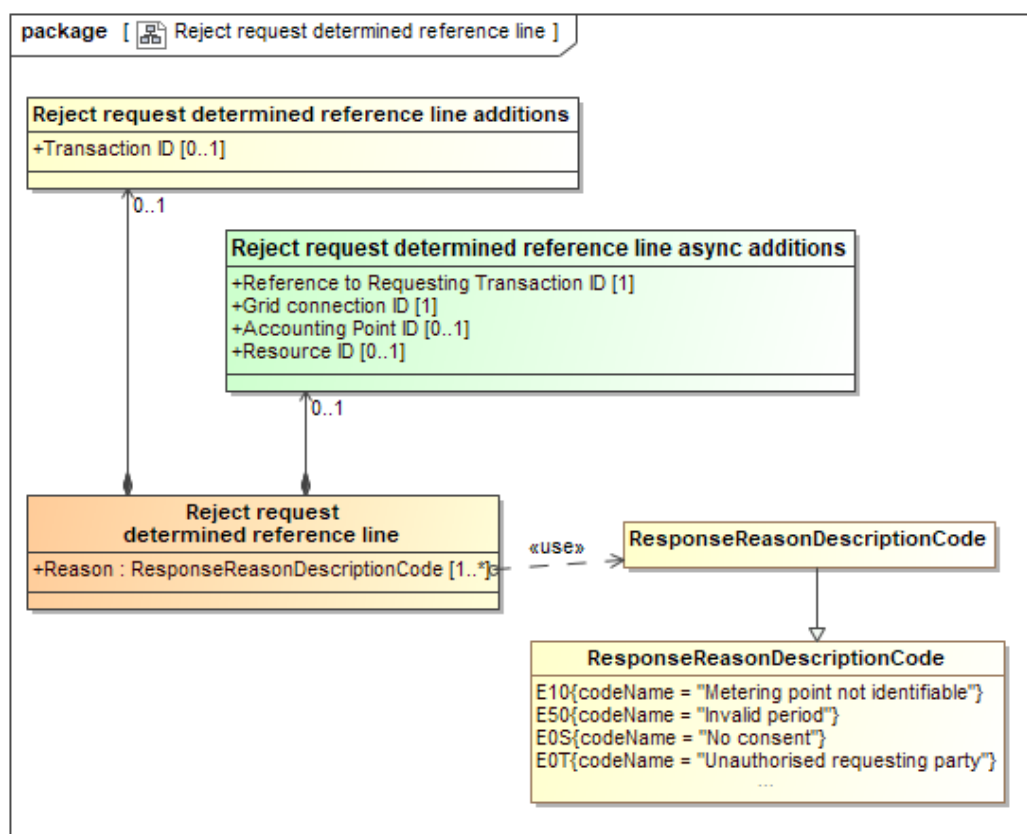


Figure 57 Class diagram: Reject request determined reference line

4.9.1. Element definitions: Reject request determined reference line

Attribute	Sector ²²	Definition
Reject request determined reference line		The information set to be sent by the Reference Line Responsible to the requesting Entitled Role for determined reference line, e.g. (based on national rules) the Balance Responsible Party (BRP) for the Flexibility Service Provider (FSP), the Buyer of Flexibility, the Flexibility Service Provider, the Flexibility Settlement Responsible or a Consented Party, when rejecting a request for determined reference line.
Reason		A code specifying (one of) the reason(s) for the rejection of the request for determined reference line.
Reject request determined reference line additions		Additional information related to the request for determined reference line, the use of which may be agreed on a national level.

²² It is assumed that Accounting Points are uniquely dedicated to either electricity or to gas.

Transaction ID		The unique identification of this rejection of request for determined reference line.
Reject request determined reference line additions		Additional information, related to the rejection of the request for determined reference line, needed when using asynchronous communication.
Reference to Requesting Transaction ID		The unique identification of the original request for determined reference line as given by the requesting business partner.
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Accounting Point ID		The unique identification of the Accounting Point from which the determined reference line was requested.
Resource ID		The unique identification of the Resource from which the determined reference line was requested.

4.10. Determined flexibility volume (Class Diagram)

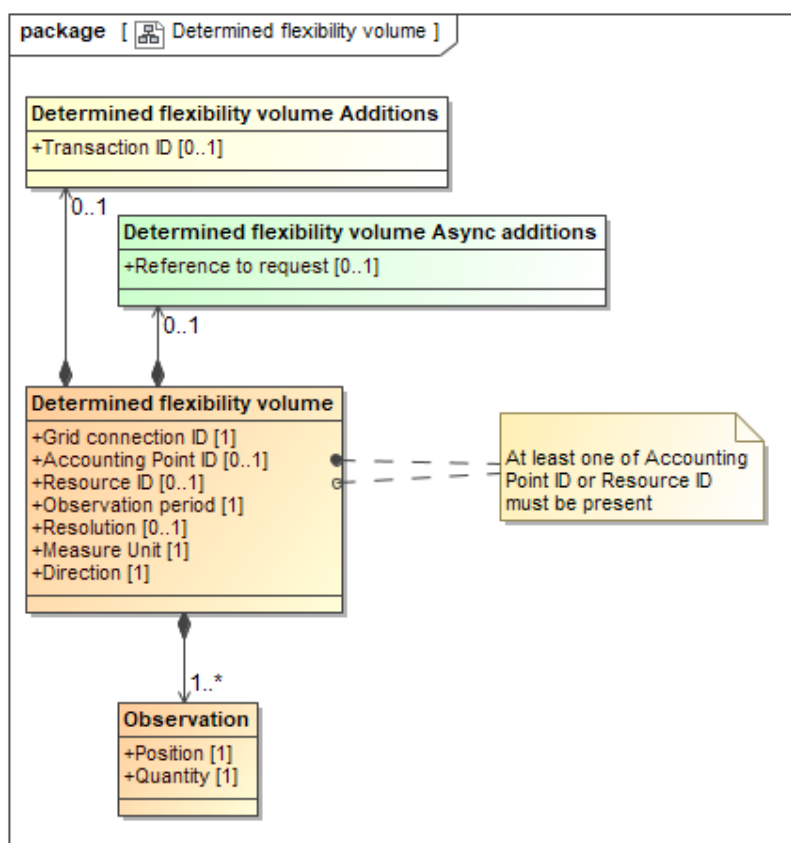


Figure 58 Class diagram: Determined flexibility volume

4.10.1. Element definitions: Determined flexibility volume

Class/attribute	Sector ²³	Description
Determined flexibility volume		The information set for the determined flexibility volume for (a part of) an activation window to be sent by a Flexibility Settlement Responsible to the Entitled Roles, e.g. (based on national rules) the Balance Responsible Party (BRP) for the Energy Supplier, Balance Responsible Party (BRP) for the Flexibility Service Provider (FSP), the Energy Supplier, the Buyer of Flexibility and the Flexibility Service Provider.
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Accounting Point ID		The unique identification of the Accounting Point this flexibility volume is determined for.

²³ It is assumed that Accounting Points are uniquely dedicated to either electricity or to gas.

Class/attribute	Sector ²³	Description
Resource ID		The unique identification of the Resource this flexibility volume is determined for.
Observation period		The specific period in time describing the point in time and the duration of this set of determined flexibility volumes. This usually corresponds with the activation window.
Resolution		The resolution of each observation in this dataset.
Measure Unit		The unit of measure associated with all the quantities in the observation(s), coded according to UN/ECE Recommendation 20.
Observation		One validated value. This value is part of the set of data for the observation period for this Resource and/or Accounting Point.
Position		The ordinal position of this observation in the observation period.
Quantity		The quantity of energy or capacity for this position in the observation period of the determined flexibility volume.
Determined flexibility volume Additions		Additional information needed for technical reasons or to be agreed on a national level.
Transaction ID		The unique identification of this set of information given by the sender of the document.
Determined flexibility volume Async Additions		Additional information needed when using asynchronous communication.
Reference to request		Information about the request for this set of determined flexibility volume, which uniquely identifies it.

4.11. Request determined flexibility volume (Class Diagram)

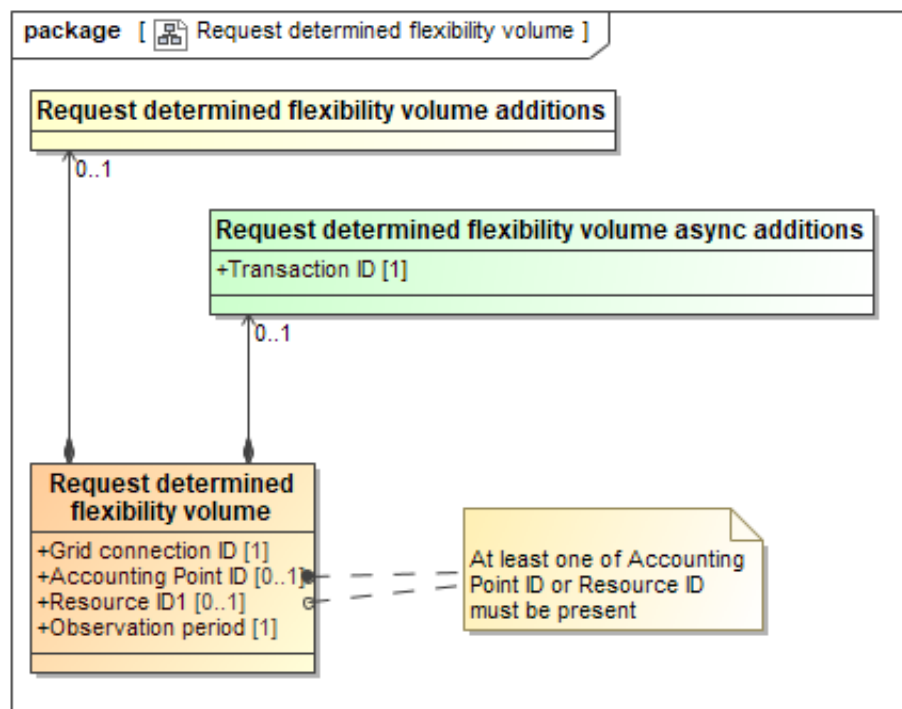


Figure 59 Class diagram: Request determined flexibility volume

4.11.1. Element definitions: Request determined flexibility volume

Attribute	Sector ²⁴	Definition
Request determined flexibility volume		The information set to be sent by the Entitled Role for determined flexibility volume, e.g., (based on national rules) the Balance Responsible Party (BRP) for the Energy Supplier, the Balance Responsible Party (BRP) for the Flexibility Service Provider (FSP), the Buyer of Flexibility, the Energy Supplier, the Flexibility Service Provider or Consented Party(s) to the Flexibility Settlement Responsible, when requesting the determined flexibility volume for a Resource at an Accounting Point for (a part of) the activation window.
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Accounting Point ID		The unique identification of the Accounting Point from which the determined flexibility volume is requested.
Resource ID		The unique identification of the Resource from which the determined flexibility volume is requested.

²⁴ It is assumed that Accounting Points are uniquely dedicated to either electricity or to gas.

Observation period		The specific period of time describing the moment in time and the duration of the requested set of determined flexibility volume.
Request determined flexibility volume additions		Additional information related to the request for requesting determined flexibility volume, the use of which may be agreed on a national level.
none		
Request determined flexibility volume async additions		Additional information, related to request for determined flexibility volume, needed when using asynchronous communication.
Transaction ID		The unique identification of this set of information as given by the requester.

4.12. Reject request determined flexibility volume (Class Diagram)

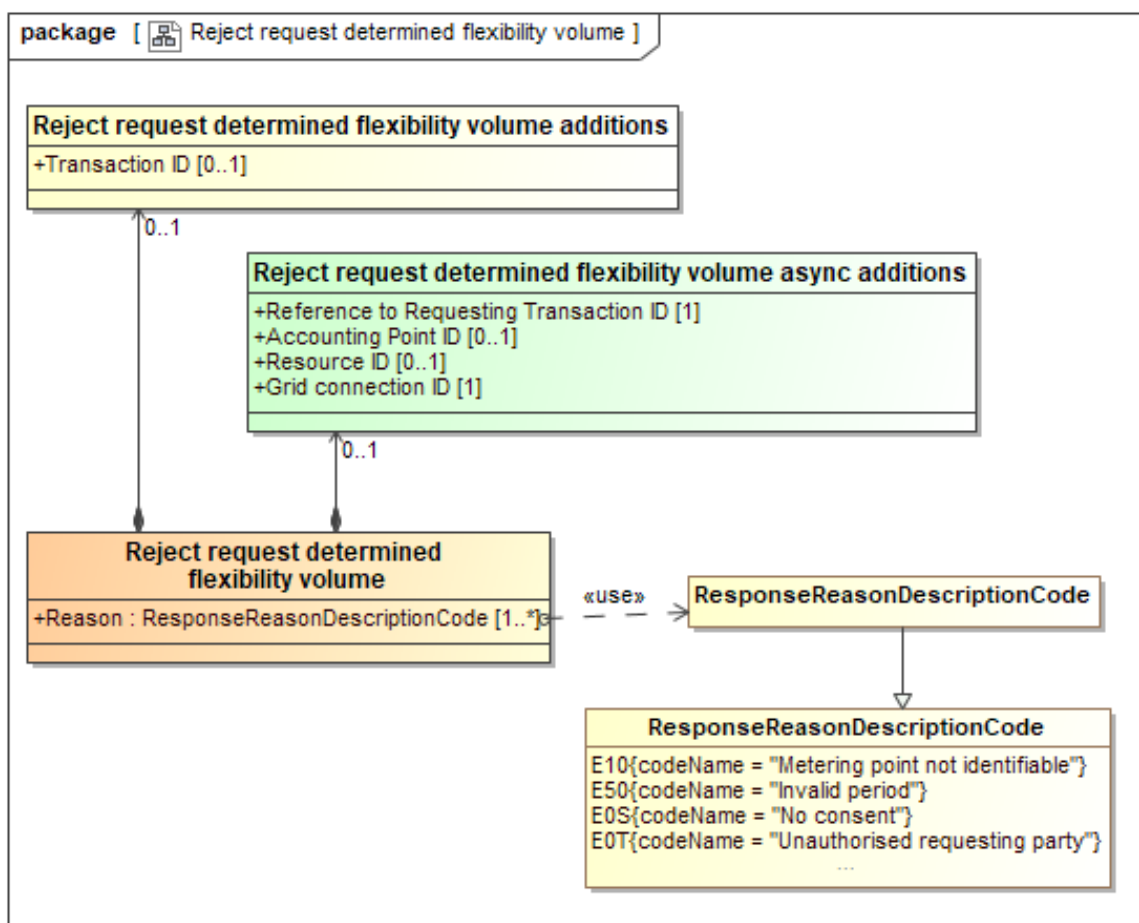


Figure 60 Class diagram: Reject request determined flexibility volume

4.12.1. Element definitions: Reject request determined flexibility volume

Attribute	Sector ²⁵	Definition
Reject request determined flexibility volume		The information set to be sent by the Flexibility Settlement Responsible when rejecting a request for determined flexibility volume to the requesting Entitled Role for determined flexibility volume, e.g., (based on national rules) the Balance Responsible Party (BRP) for the Energy Supplier, the Balance Responsible Party (BRP) for the Flexibility Service Provider (FSP), the Buyer of Flexibility, the Energy Supplier, the Flexibility Service Provider and/or Consented Party(s).
Reason		A code specifying (one of) the reason(s) for the rejection of the request for determined flexibility volume.

²⁵ It is assumed that Accounting Points are uniquely dedicated to either electricity or to gas.

Reject request determined flexibility volume additions		Additional information related to the request for requesting determined flexibility volume, the use of which may be agreed on a national level.
Transaction ID		The unique identification of this rejection of the request for determined flexibility volume.
Reject request determined flexibility volume async additions		Additional information, related to the rejection of the request for determined flexibility volume, needed when using asynchronous communication.
Reference to Requesting Transaction ID		The unique identification, given by the requester, of the request for determined flexibility volume that is rejected.
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Accounting Point ID		The unique identification of the Accounting Point from which the determined flexibility volume was requested.
Resource ID		The unique identification of the Resource from which the determined flexibility volume was requested.

4.13. Ordered flexibility volume (Class Diagram)

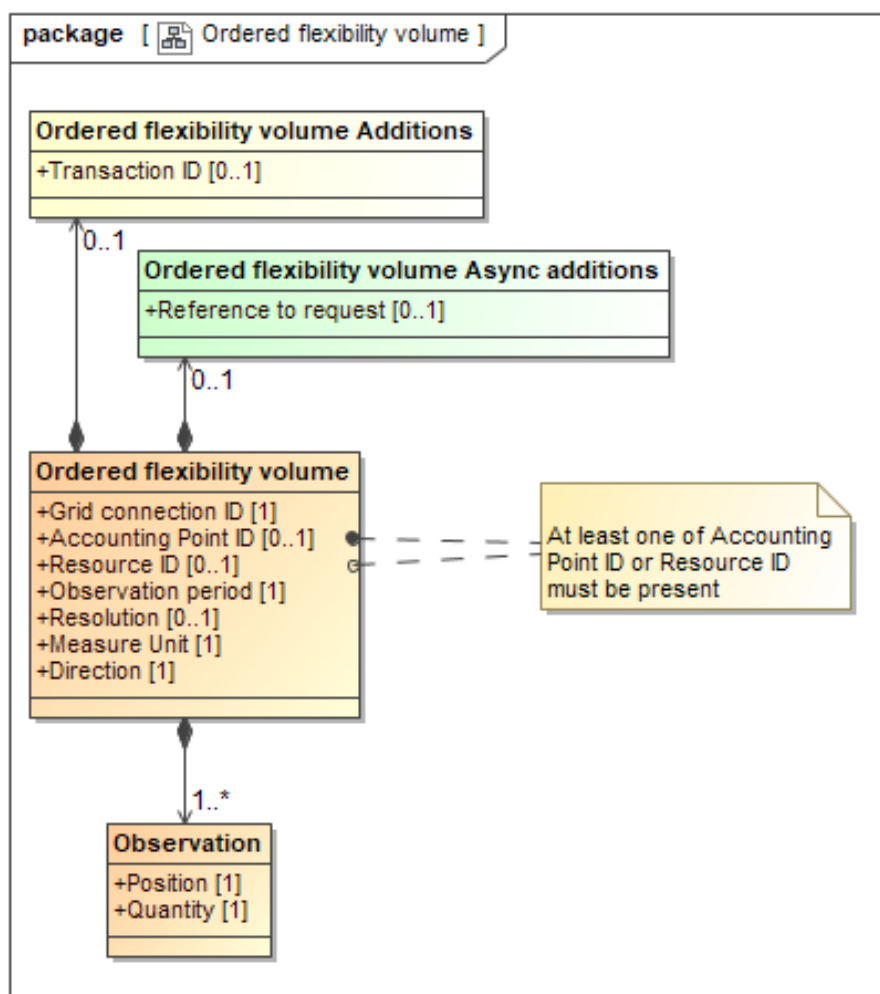


Figure 61 Class diagram: Ordered flexibility volume

4.13.1. Element definitions: Ordered flexibility volume

Class/attribute	Sector ²⁶	Description
Ordered flexibility volume		The information set for the ordered flexibility volume for (part of) an activation window for a Resource and/or Accounting Point to be sent by a Buyer of Flexibility to the Flexibility Settlement Responsible.
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Accounting Point ID		The unique identification of the Accounting Point this flexibility volume was ordered for.
Resource ID		The unique identification of the Resource this flexibility volume was ordered for.

²⁶ It is assumed that Accounting Points are uniquely dedicated to either electricity or to gas.

Class/attribute	Sector ²⁶	Description
Observation period		The specific period of time describing the moment in time and the duration of this (data set of the) ordered flexibility volume.
Resolution		The resolution of each observation in this dataset.
Measure Unit		The unit of measure associated with the quantities in the observation for the ordered flexibility volume, coded according to UN/ECE Recommendation 20.
Observation		One validated value as part of a set of data for the ordered flexibility volume.
Position		The ordinal position of this observation in the observation period
Quantity		The quantity of energy or capacity for this position.
Ordered flexibility volume Additions		Additional information needed for technical reasons or to be agreed on a national level.
Transaction ID		The unique identification of this set of information given by the sender of the document.
Ordered flexibility volume Async Additions		Additional information needed when using asynchronous communication.
Reference to request		Information about the request for this set of ordered flexibility volume, which uniquely identifies it.

4.14. Request ordered flexibility volume (Class Diagram)

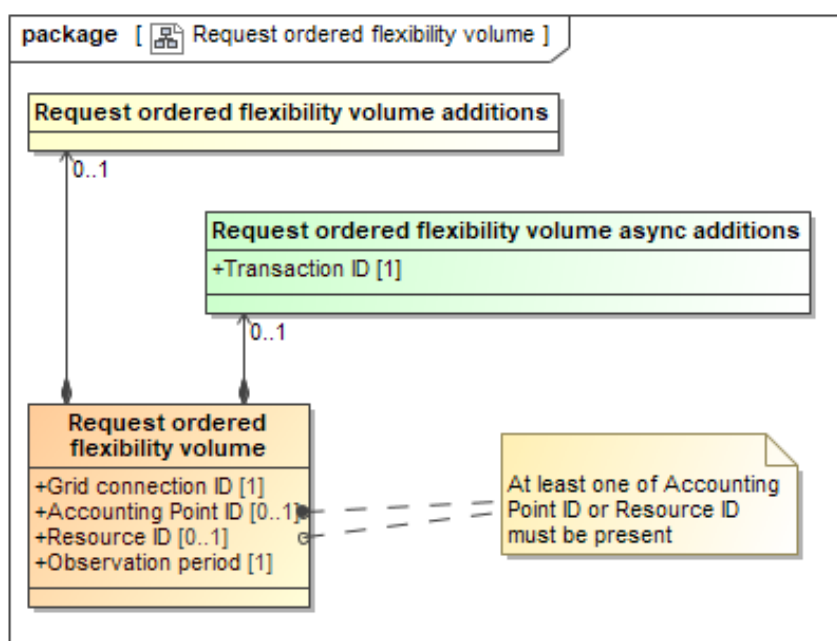


Figure 62 Class diagram: Request ordered flexibility volume

4.14.1. Element definitions: Request ordered flexibility volume

Attribute	Sector ²⁷	Definition
Request ordered flexibility volume		The information set to be sent by the Flexibility Settlement Responsible to the Buyer of Flexibility when requesting the ordered flexibility volume for an observation period for a Resource.
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Accounting Point ID		The unique identification of the Accounting Point from which the ordered flexibility volume for this observation period is requested.
Resource ID		The unique identification of the Resource from which the ordered volume for this observation period is requested.
Observation period		The specific period of time, describing the moment in time and duration, for the requested ordered flexibility volume.
Request ordered flexibility volume additions		Additional information related to the request for ordered flexibility volume, the use of which may be agreed on a national level.
none		

²⁷ It is assumed that Accounting Points are uniquely dedicated to either electricity or to gas.

Request ordered flexibility volume async additions		Additional information, related to request for ordered flexibility volume, needed when using asynchronous communication.
Transaction ID		The unique identification of this set of information as given by the requester.

4.15. Reject request ordered flexibility volume (Class Diagram)

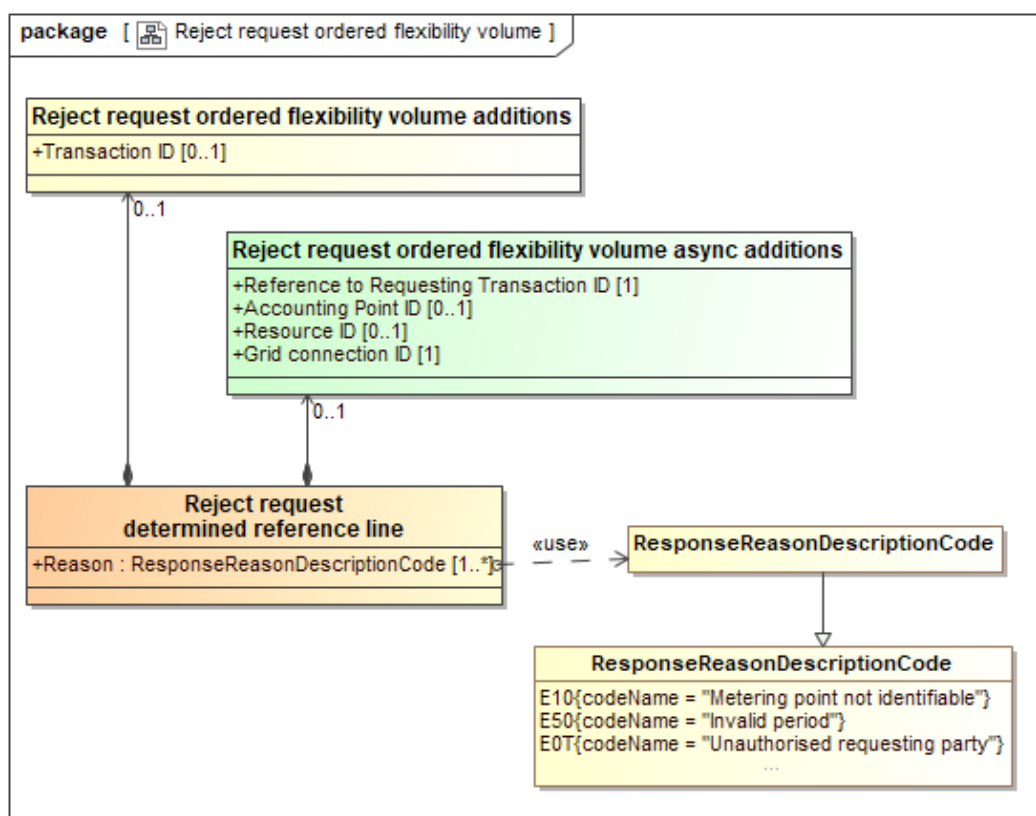


Figure 63 Class diagram: Reject request **ordered** flexibility volume

4.15.1. Element definitions: Reject request ordered flexibility volume

Attribute	Sector ²⁸	Definition
Reject request ordered flexibility volume		The information set to be sent by the Buyer of Flexibility when rejecting a request for ordered flexibility volume for an observation period.
Reason		A code specifying (one of) the reason(s) for the rejection of the request for the ordered flexibility volume.
Reject request ordered flexibility volume additions		Additional information related to the request for ordered flexibility volume, the use of which may be agreed on a national level.
Transaction ID		The unique identification of this rejection of the request for determined flexibility volume.
Reject request ordered flexibility volume async additions		Additional information, related to the rejection of the request for ordered flexibility volume, needed when using asynchronous communication.

²⁸ It is assumed that Accounting Points are uniquely dedicated to either electricity or to gas.

Reference to Requesting Transaction ID		The unique identification, given by the requester, of the request for ordered flexibility volume that is rejected.
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Accounting Point ID		The unique identification of the Accounting Point from which the ordered flexibility volume for the observation period was requested.
Resource ID		The unique identification of the Resource from which the ordered flexibility volume for the observation period was requested.

4.16. Difference between delivered and ordered flexibility volume (Class Diagram)

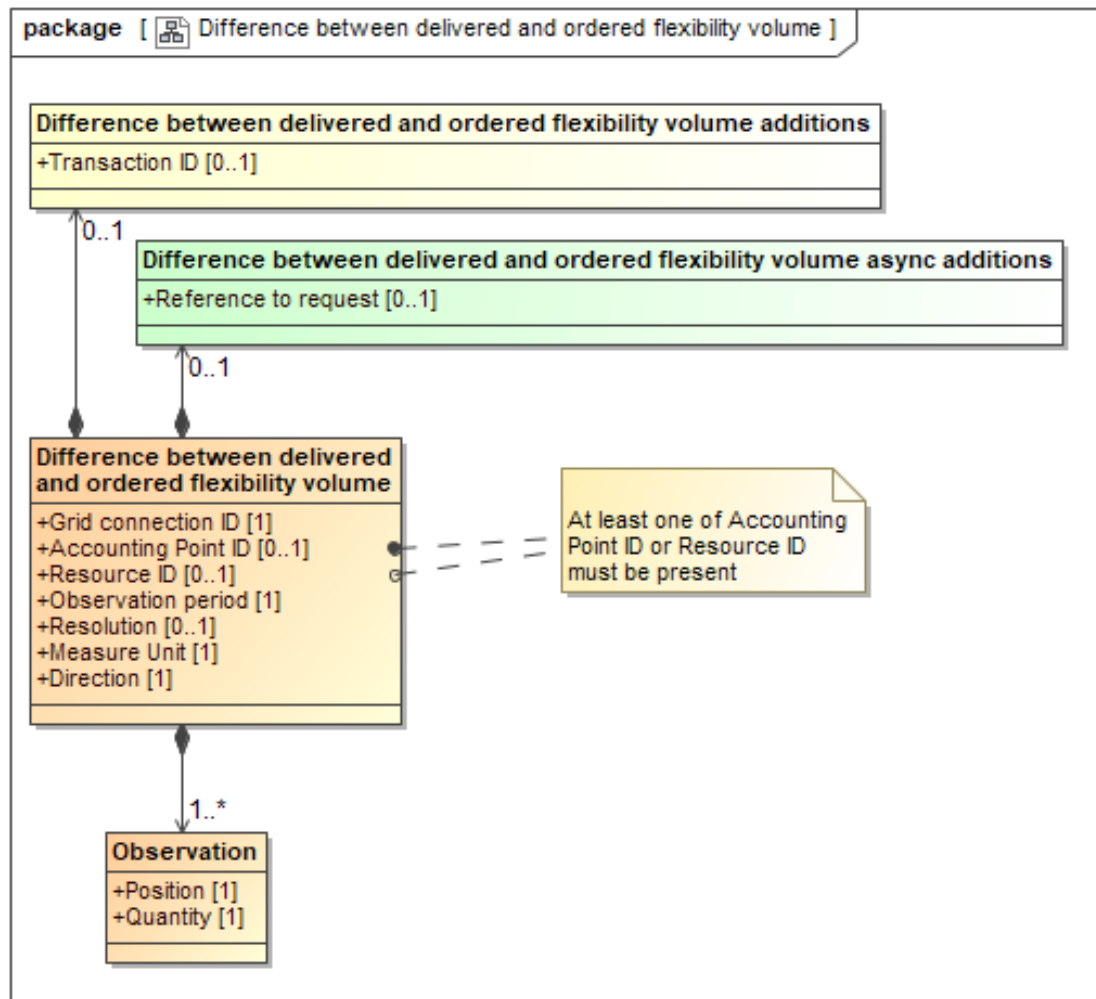


Figure 64 Class diagram: Difference between delivered and ordered flexibility volume

4.16.1. Element definitions: Difference between delivered and ordered flexibility volume

Class/attribute	Sector ²⁹	Description
Difference between delivered and ordered flexibility volume		The information set to be sent by a Flexibility Settlement Responsible to the Entitled Roles, e.g. (based on national rules) the Flexibility Service Provider (FSP) and/or the Buyer of Flexibility, when sending the difference between delivered and ordered flexibility volume.
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.

²⁹ It is assumed that Accounting Points are uniquely dedicated to either electricity or to gas.

Class/attribute	Sector ²⁹	Description
Accounting Point ID		The unique identification of the Accounting Point for which this difference between delivered and ordered flexibility volume for the observation period has been calculated.
Resource ID		The unique identification of the Resource for which this difference between delivered and ordered flexibility volume for the observation period has been calculated.
Observation period		The specific period of time describing the moment in time and the duration of this calculated difference between delivered and ordered flexibility volume.
Resolution		The resolution of each observation in this dataset.
Measure Unit		The unit of measure associated with the quantities in the observation, coded according to UN/ECE Recommendation 20.
Observation		One validated value as part of a set of data for the calculated difference volume.
Position		The ordinal position of this observation in the observation period
Quantity		The quantity of energy or capacity for this observation.
Difference between delivered and ordered flexibility volume additions		Additional information needed for technical reasons or to be agreed on a national level.
Transaction ID		The unique identification of this set of information given by the sender of the document.
Difference between delivered and ordered flexibility volume async additions		Additional information needed when using asynchronous communication.
Reference to request		Information about the request for this set of difference between delivered and ordered flexibility volume, which uniquely identifies it.

4.17. Request difference between delivered and ordered flexibility volume (Class Diagram)

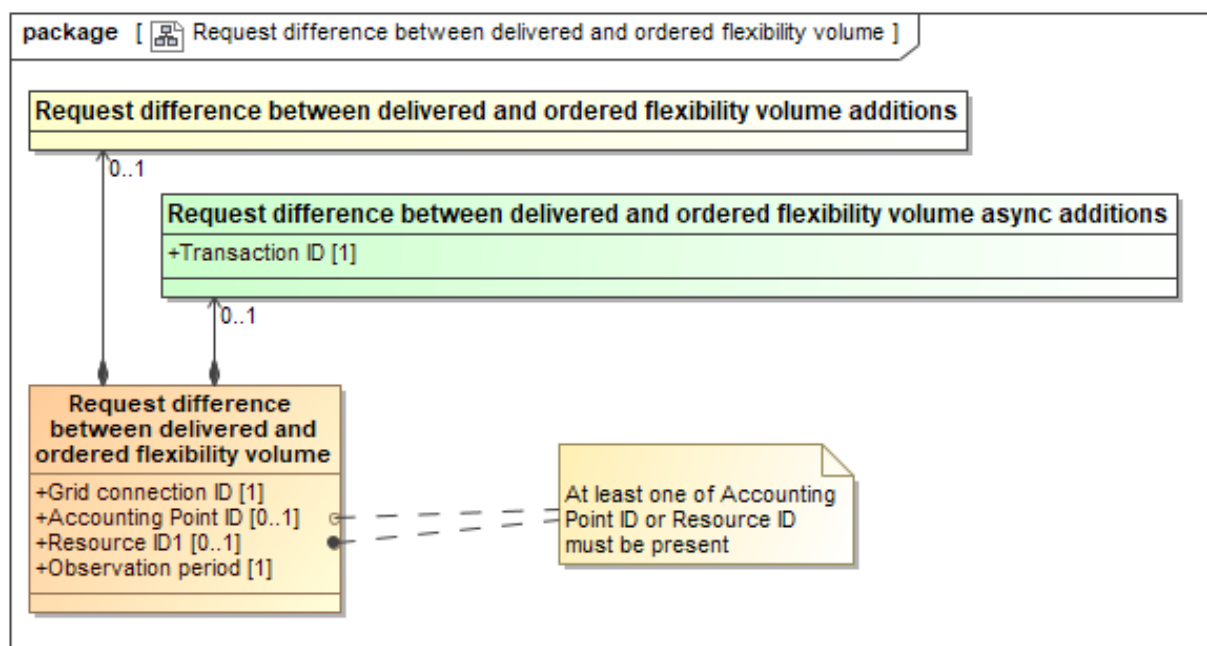


Figure 65 Class diagram: Request difference between delivered and ordered flexibility volume

4.17.1. Element definitions: Request difference between delivered and ordered flexibility volume

Attribute	Sector ³⁰	Definition
Request difference between delivered and ordered flexibility volume		The information set to be sent by the Entitled Role, e.g. (based on national rules) the Flexibility Service Provider (FSP) and/or the Buyer of Flexibility to the Flexibility Settlement Responsible, when requesting the difference between delivered and ordered flexibility volume for a Resource and/or Accounting Point for (part of) an activation window.
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Accounting Point ID		The unique identification of the Accounting Point from which the calculated difference between delivered and ordered flexibility volume for this observation period is requested.
Resource ID		The unique identification of the Resource from which the calculated difference between delivered and ordered flexibility volume for this observation period is requested.

³⁰ It is assumed that Accounting Points are uniquely dedicated to either electricity or to gas.

Observation period		The specific period of time, describing the moment in time and duration of the requested calculated difference volume.
Request difference between delivered and ordered flexibility volume additions		Additional information related to the request for difference between delivered and ordered flexibility volume, the use of which may be agreed on a national level.
none		
Request difference between delivered and ordered flexibility volume async additions		Additional information, related to request for difference between delivered and ordered flexibility volume, needed when using asynchronous communication.
Transaction ID		The unique identification of this set of information as given by the requester.

4.18. Reject request difference between delivered and ordered flexibility volume (Class Diagram)

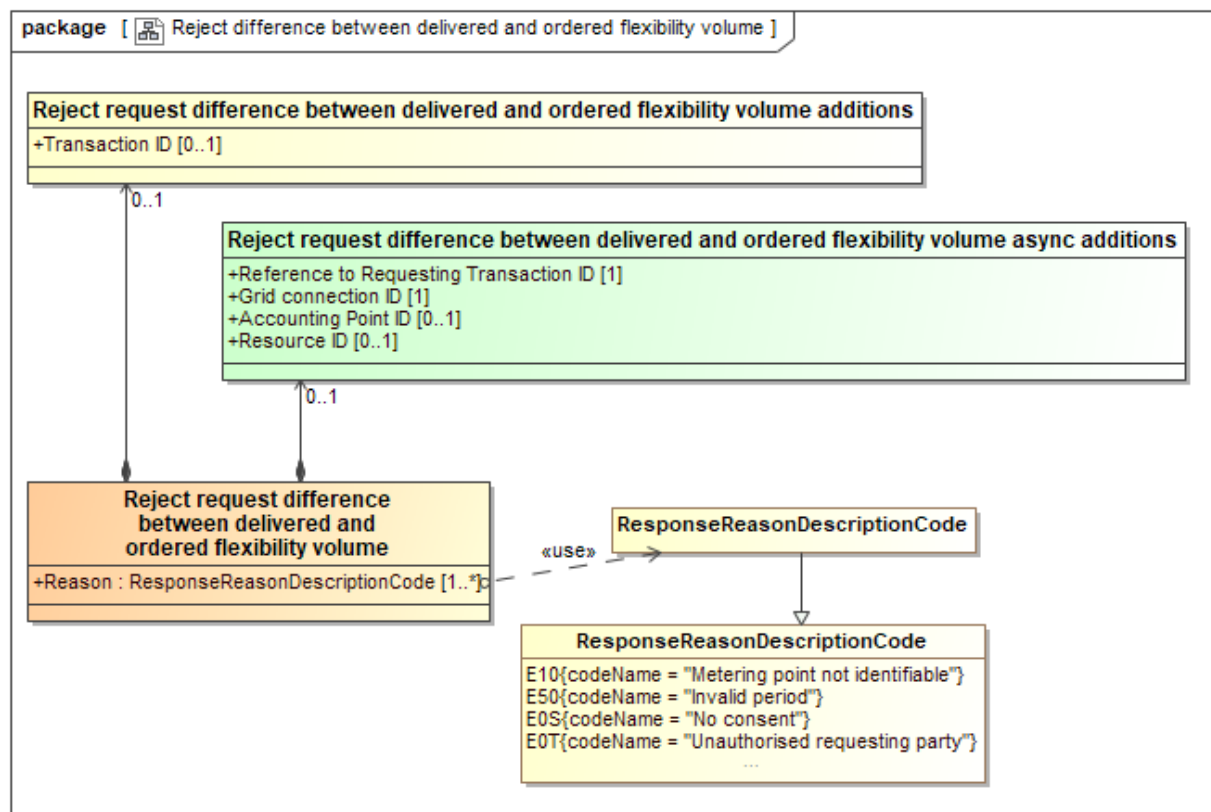


Figure 66 Class diagram: Reject request difference between delivered and ordered flexibility volume

4.18.1. Element definitions: Reject request difference between delivered and ordered flexibility volume

Attribute	Sector ³¹	Definition
Reject request difference between delivered and ordered flexibility volume		The information set to be sent by the Flexibility Settlement Responsible to the requesting Entitled Role, e.g. (based on national rules) the Flexibility Service Provider (FSP) or the Buyer of Flexibility when rejecting a request for difference between delivered and ordered flexibility volume.
Reason		A code specifying (one of) the reason(s) for the rejection of the request for the difference between the delivered and the ordered flexibility volume for the observation period.

³¹ It is assumed that Accounting Points are uniquely dedicated to either electricity or to gas.

Reject request difference between delivered and ordered flexibility volume additions		Additional information related to the request for difference between delivered and ordered flexibility volume, the use of which may be agreed on a national level.
Transaction ID		The unique identification of this rejection of request requesting determined flexibility volume.
Reject request difference between delivered and ordered flexibility volume async additions		Additional information, related to the rejection of the request for difference between delivered and ordered flexibility volume, needed when using asynchronous communication.
Reference to Requesting Transaction ID		The unique identification, as given by the requester, of the request for the difference between delivered and ordered flexibility volume for the observation period that is rejected.
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Accounting Point ID		The unique identification of the Accounting Point from which the difference between the delivered and the ordered flexibility volume for the observation period was requested.
Resource ID		The unique identification of the Resource from which the difference between the delivered and the ordered flexibility volume for the observation period was requested.

Appendix A. Header and context information for the class diagrams

This appendix shows the header and context information to be used when transferring documents through an electronic network. The information is on a technical level and meant for those who implements electronic documents in EDI-software.

A.1. Header and context information attributes definitions

Class/attribute	Sector ³²	Description
Header and Context Information		The set of information specifying the information to be added to this payload to enable the exchange as a document.
Document type		A code representing the document type used for the exchange of this set of information.
Business reason		A code representing the business reason for the exchange of this set of information.
Ancillary business process role		A code representing the market role taking part in this exchange together with the Responsible Role, responsible for the process/this exchange.

A.2. Validated measured data for quantification and settlement of flexibility

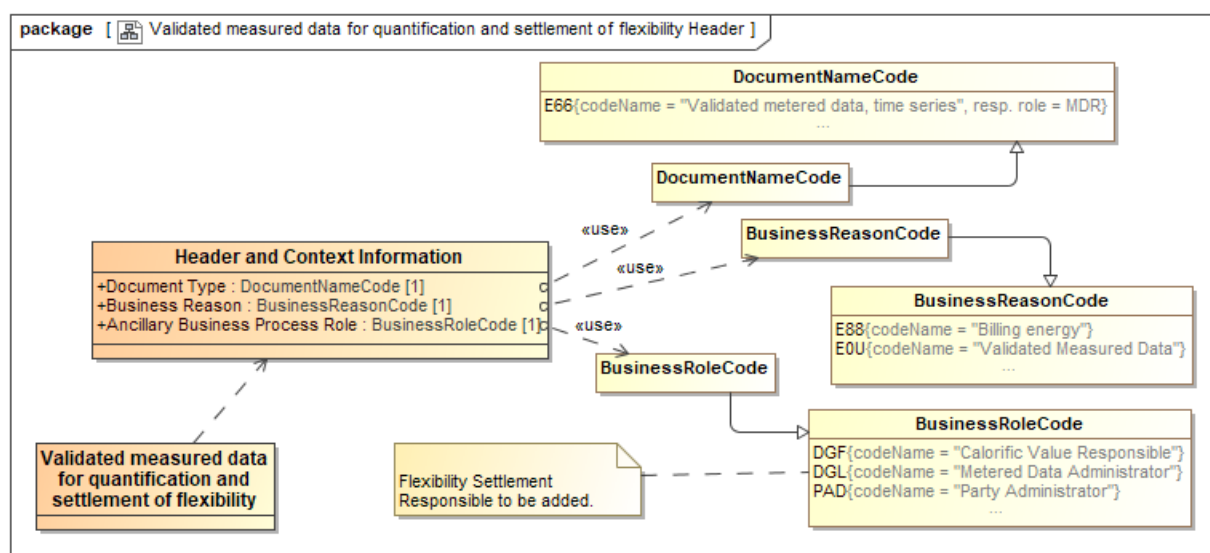


Figure 67 Class diagram: Header and context information: Validated measured data for quantification and settlement of flexibility

³² It is assumed that Accounting Points are uniquely dedicated to either electricity or to gas.

A.3. Request validated measured data for quantification and settlement of flexibility

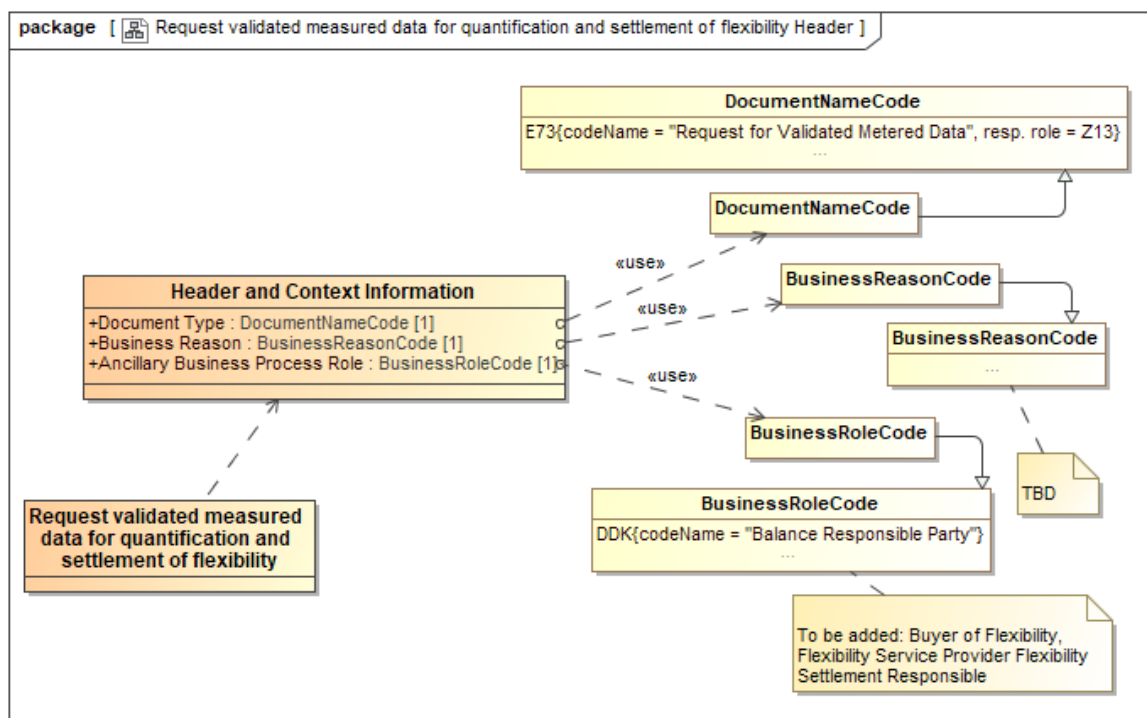


Figure 68 Class diagram: Header and context information: Request validated measured data for quantification and settlement of flexibility

A.4. Reject request validated measured data for quantification and settlement of flexibility

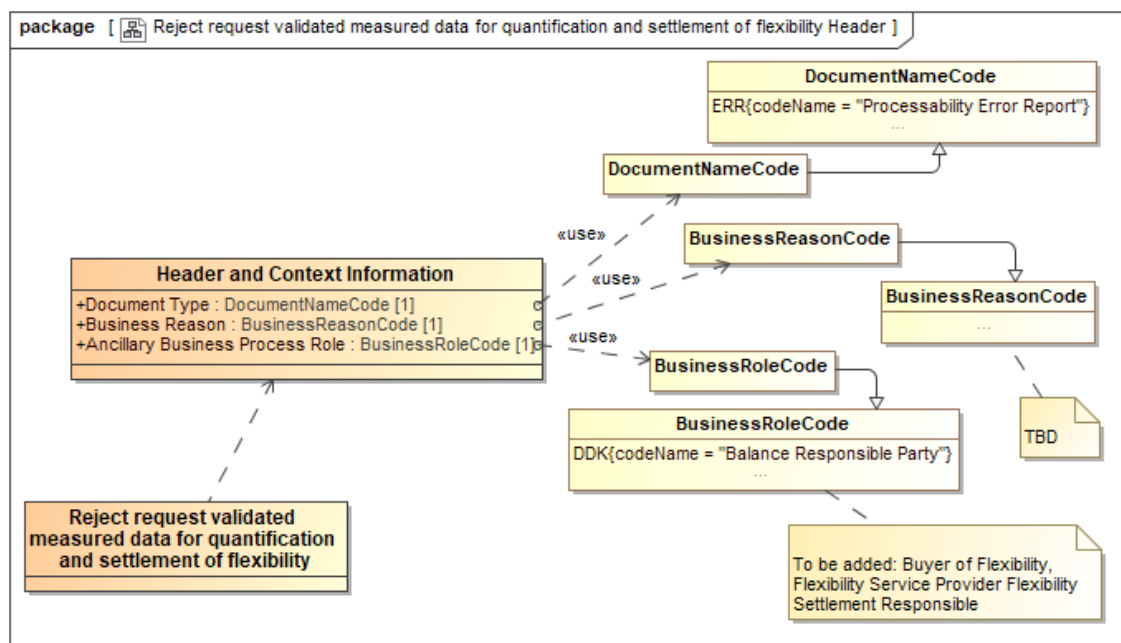


Figure 69 Class diagram: Header and context information: Reject request validated measured data for quantification and settlement of flexibility

A.5. Real-time measured data for quantification and settlement of flexibility

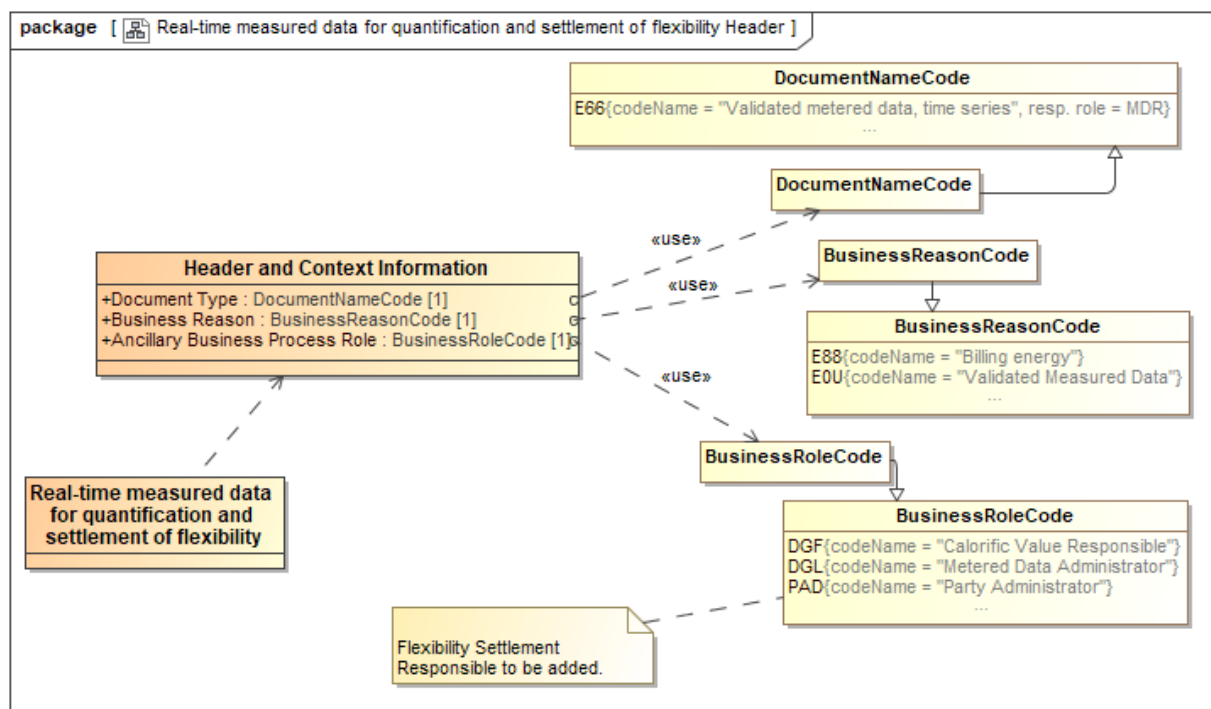


Figure 70 Class diagram: Header and context information: Real-time measured data for quantification and settlement of flexibility

A.6. Request real-time measured data for quantification and settlement of flexibility

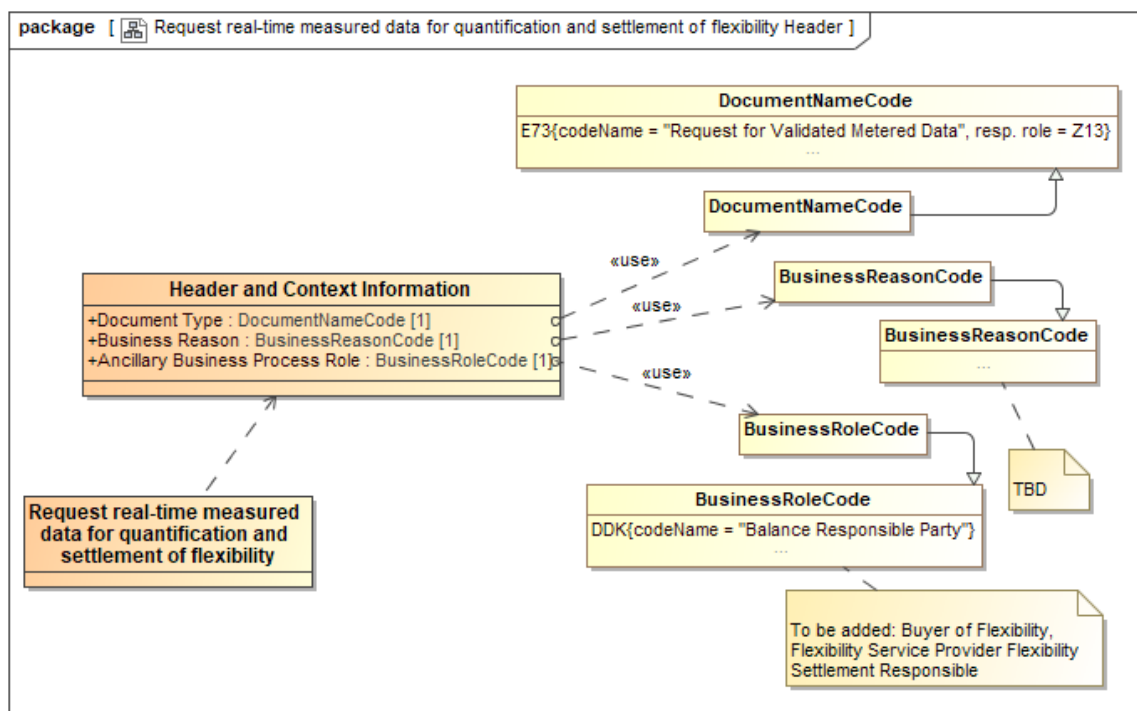


Figure 71 Class diagram: Header and context information: Request real-time measured data for quantification and settlement of flexibility

A.7. Reject request real-time measured data for quantification and settlement of flexibility

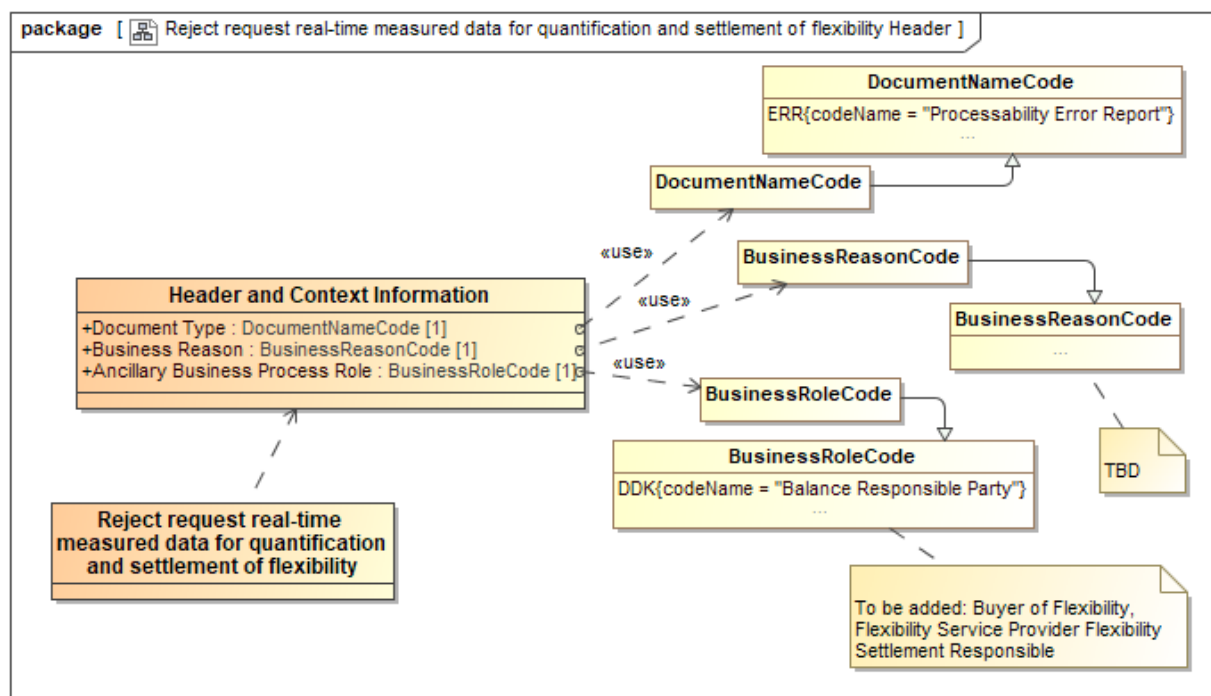


Figure 72 Class diagram: Header and context information: Reject request real-time measured data for quantification and settlement of flexibility

A.8. Determined reference line

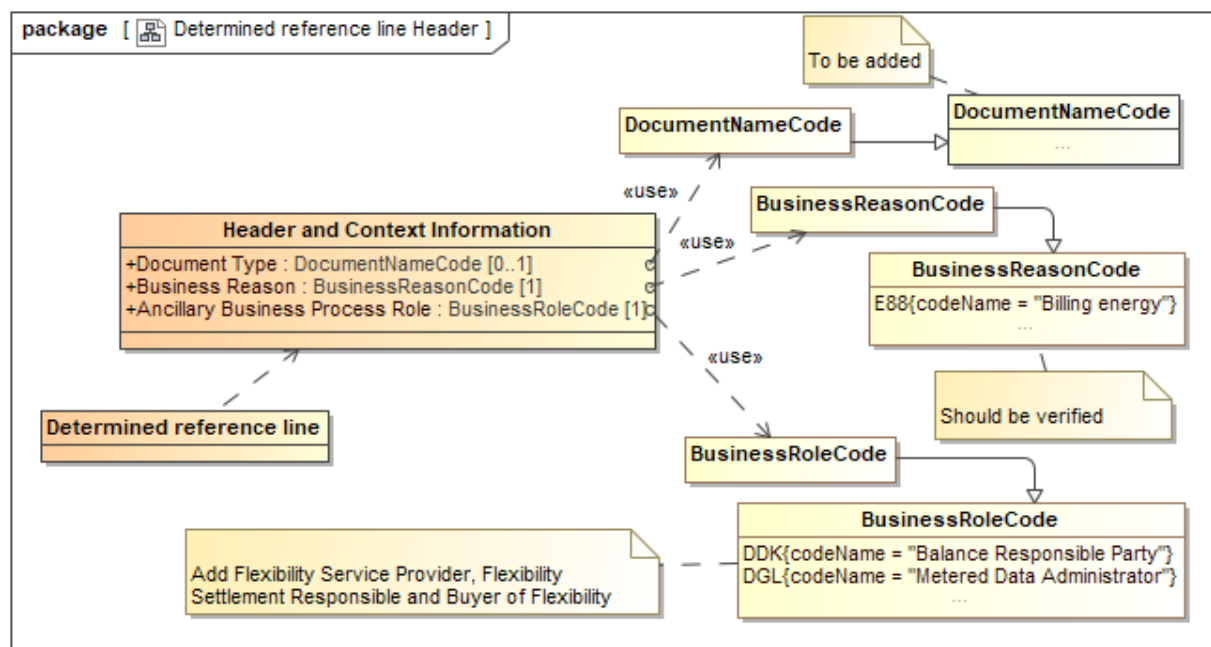


Figure 73 Class diagram: Header and context information: Determined reference line

A.9. Request determined reference line

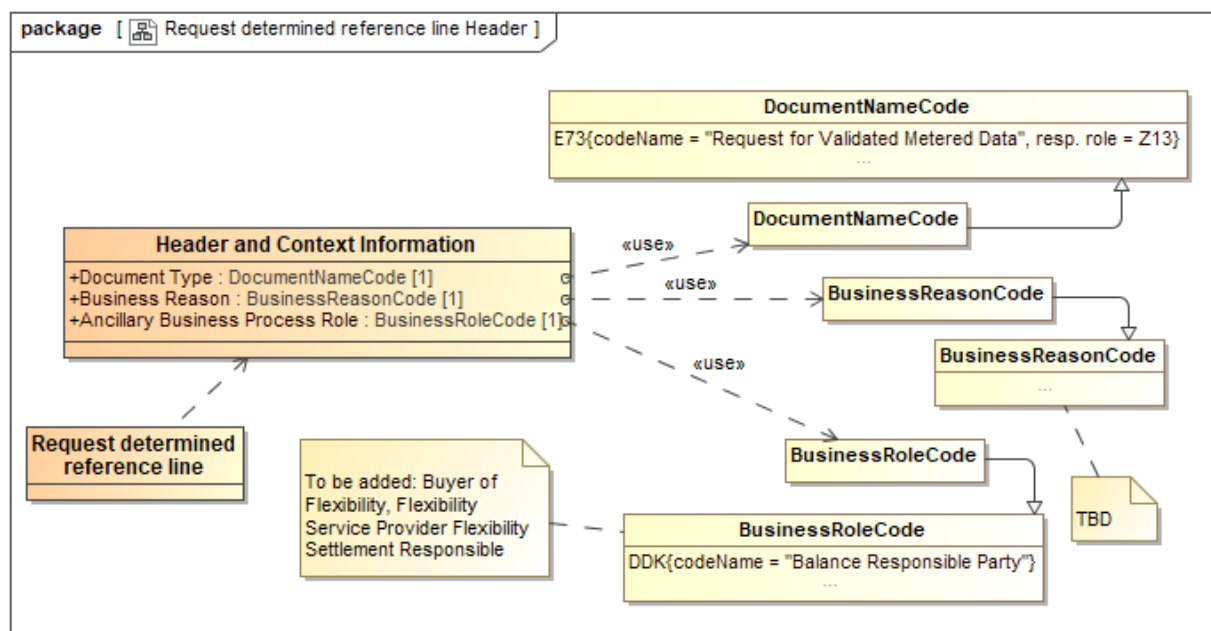


Figure 74 Class diagram: Header and context information: Request determined reference line

A.10. Reject request determined reference line

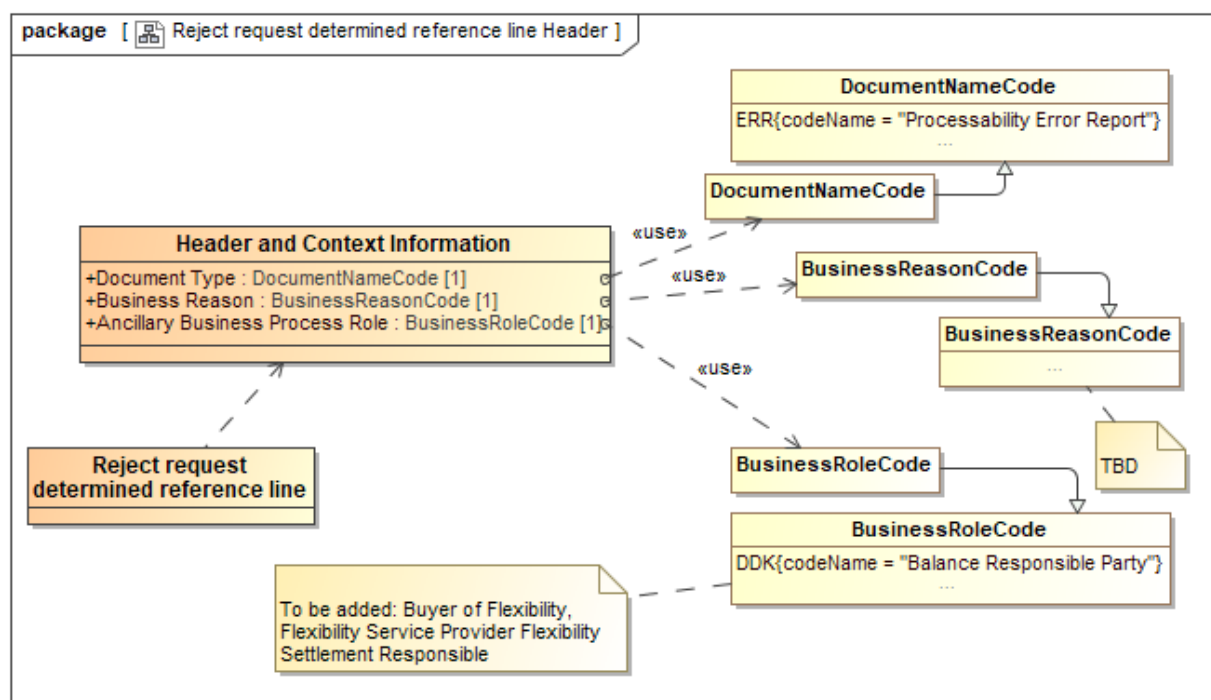


Figure 75 Class diagram: Header and context information: Reject request determined reference line

A.11. Determined flexibility volume

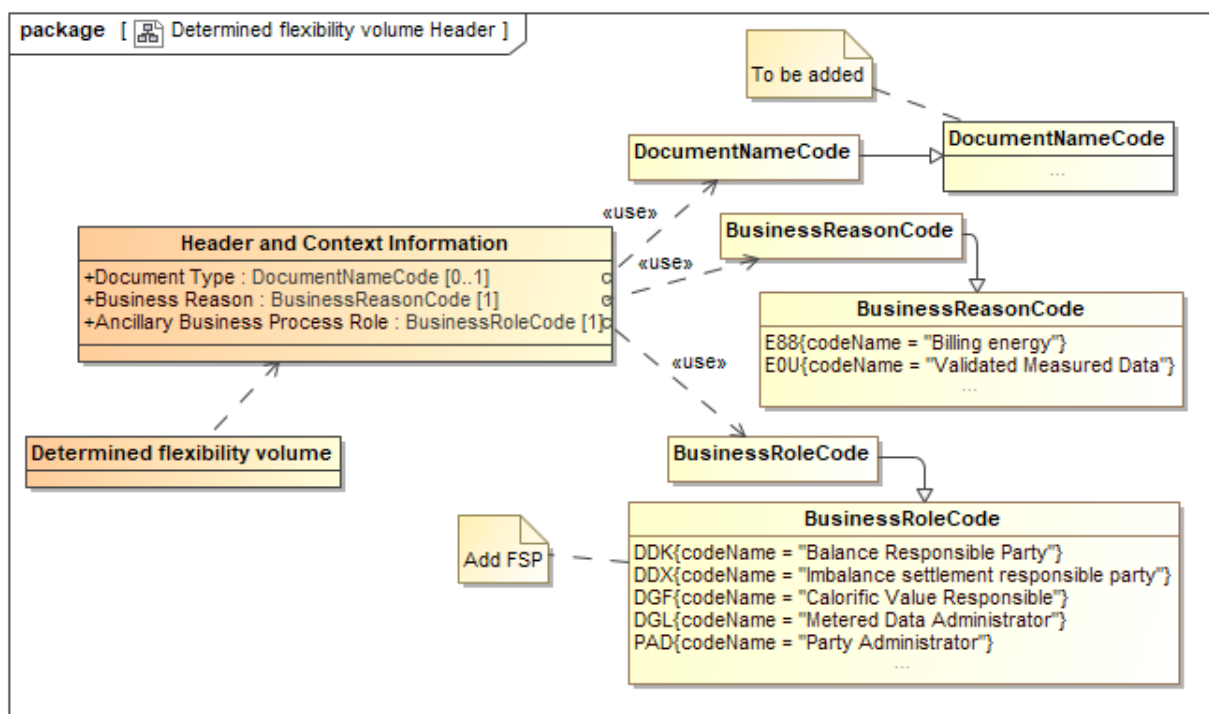


Figure 76 Class diagram: Header and context information: Determined flexibility volume

A.12. Request determined flexibility volume

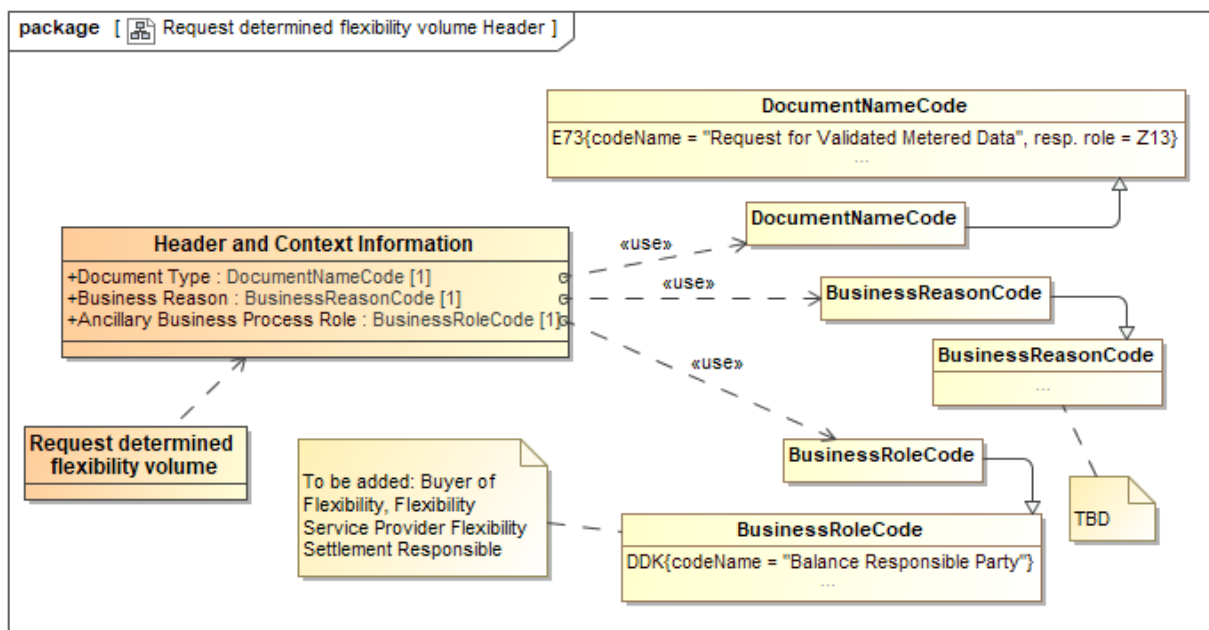


Figure 77 Class diagram: Header and context information: Request determined flexibility volume

A.13. Reject request determined flexibility volume

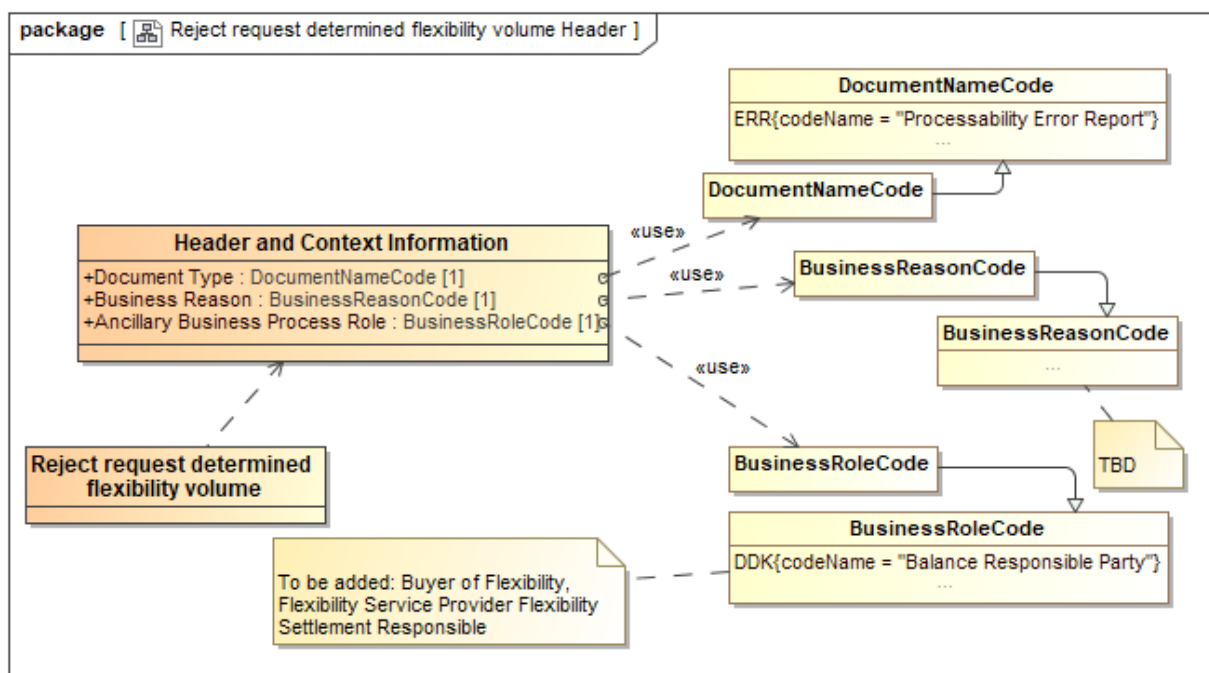


Figure 78 Class diagram: Header and context information: Reject request determined flexibility volume

A.14. Ordered flexibility volume

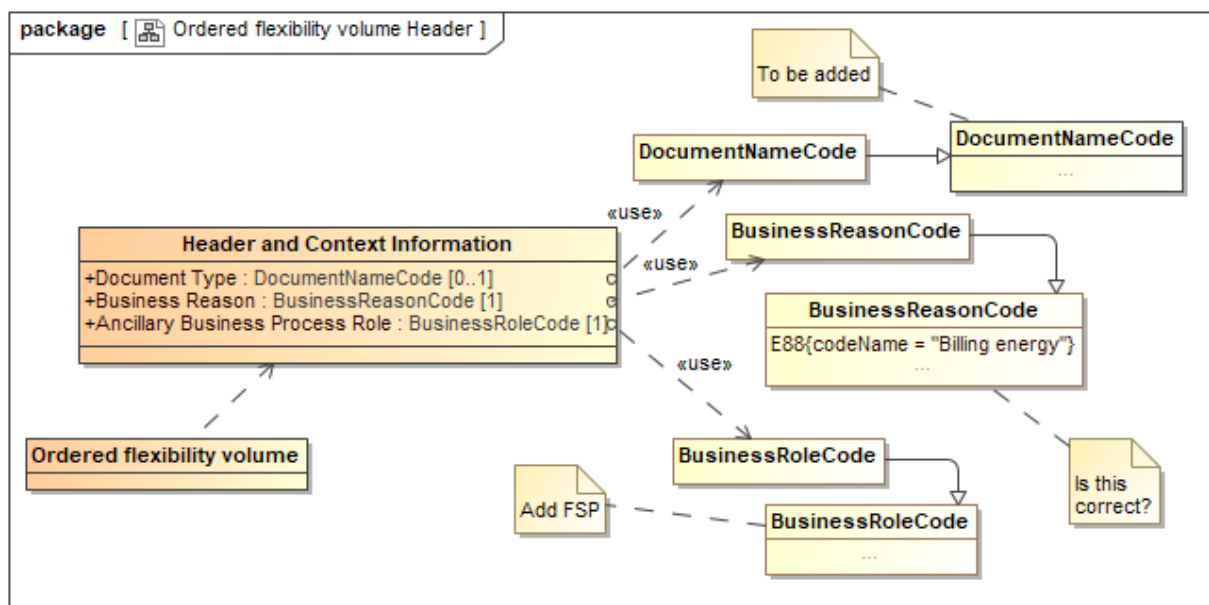


Figure 79 Class diagram: Header and context information: Ordered flexibility volume

A.15. Request ordered flexibility volume

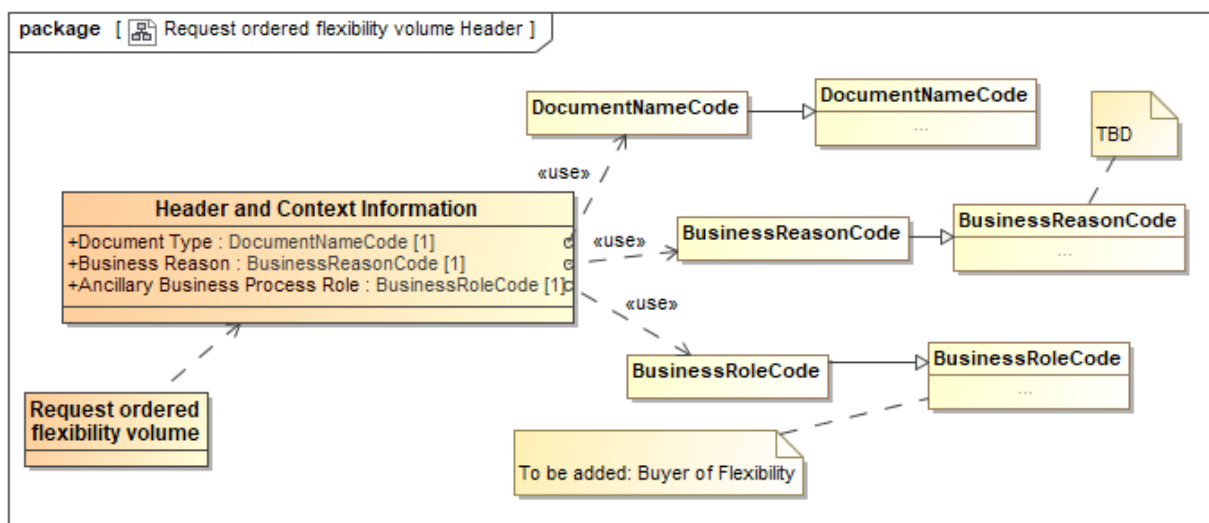


Figure 80 Class diagram: Header and context information: Request **ordered** flexibility volume

A.16. Reject request ordered flexibility volume

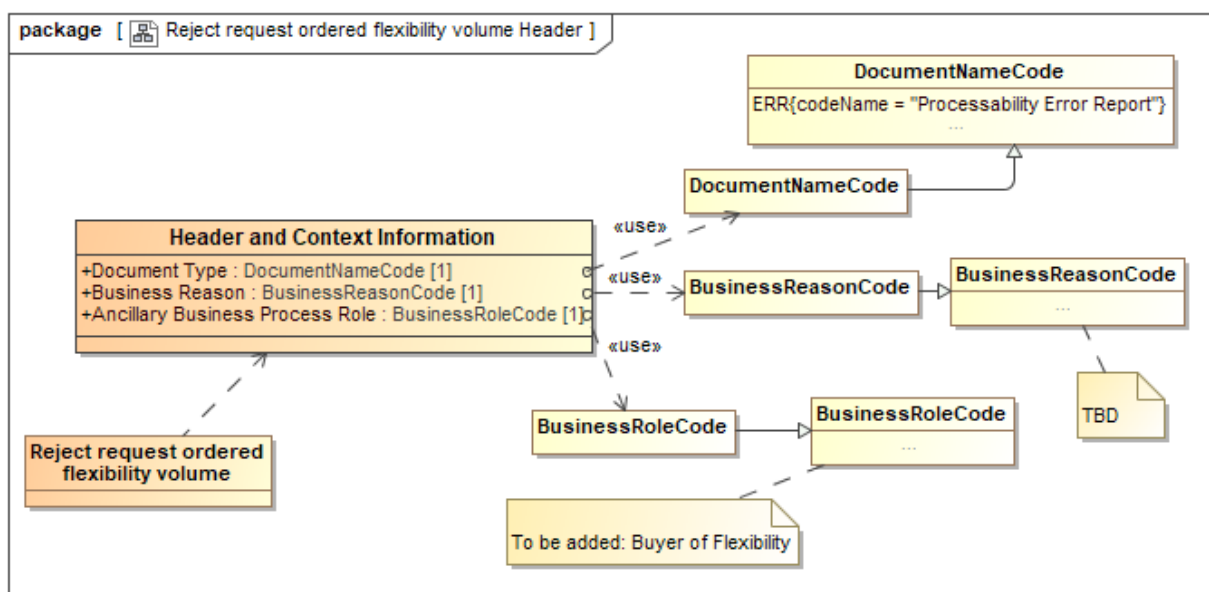


Figure 81 Class diagram: Header and context information: Reject request **ordered** flexibility volume

A.17. Difference between delivered and ordered flexibility volume

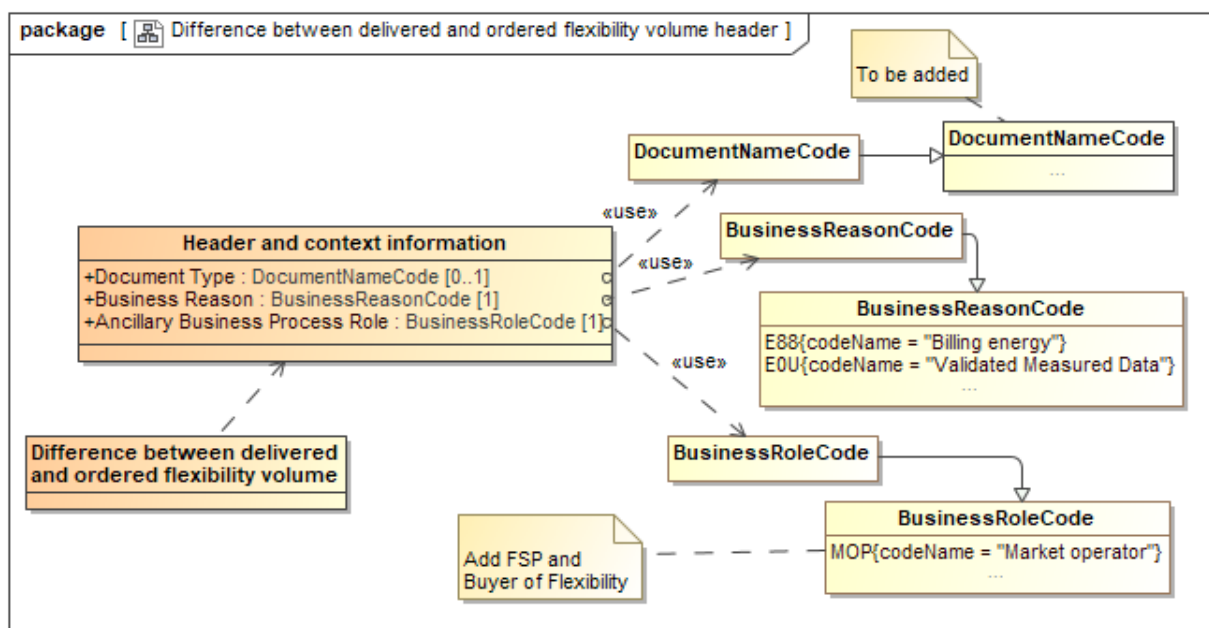


Figure 82 Class diagram: Header and context information: Difference between delivered and ordered flexibility volume

A.18. Request difference between delivered and ordered flexibility volume

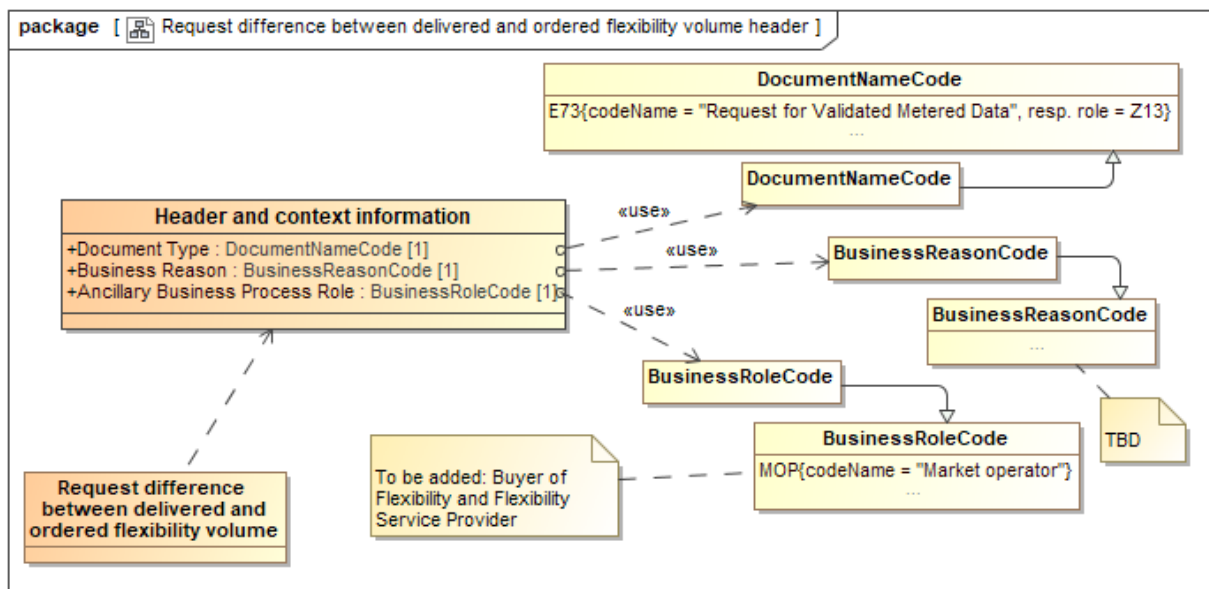


Figure 83 Class diagram: Header and context information: Request difference between delivered and ordered flexibility volume

A.19. Reject request difference between delivered and ordered flexibility volume

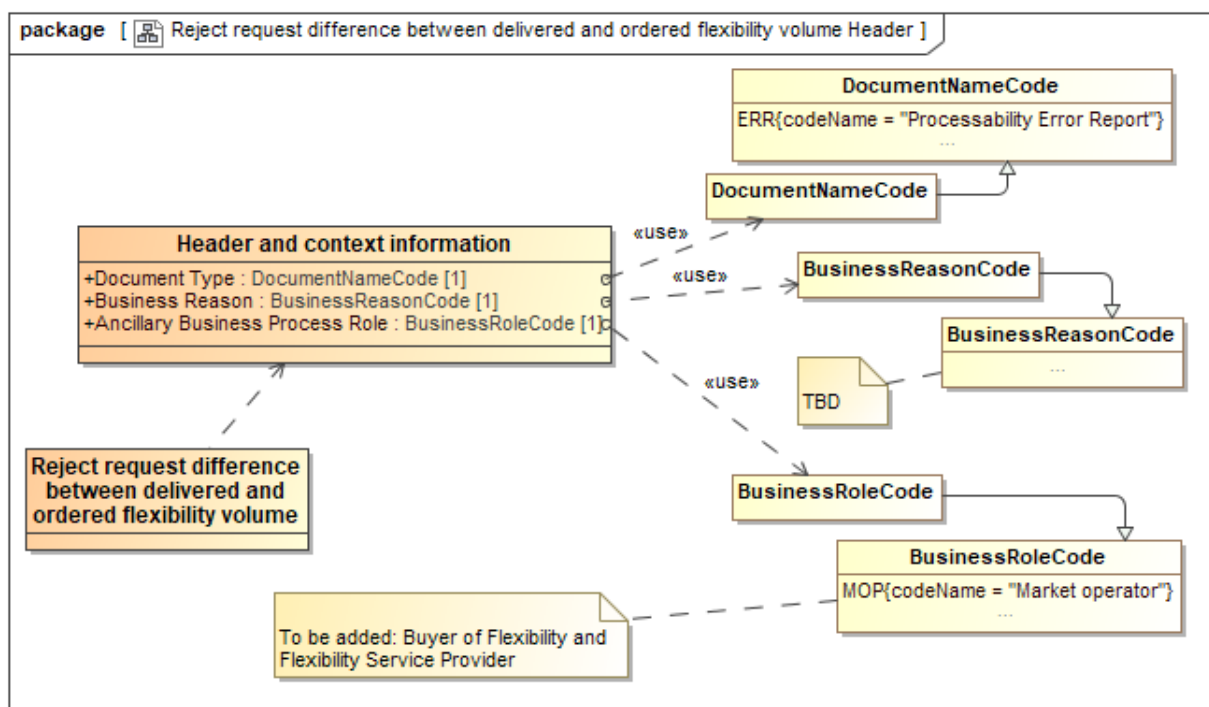


Figure 84 Class diagram: Header and context information: Reject request difference between delivered and ordered flexibility volume

Appendix B. Overview of UseCases elaborated in BRS for Quantification and settlement of flexibility services

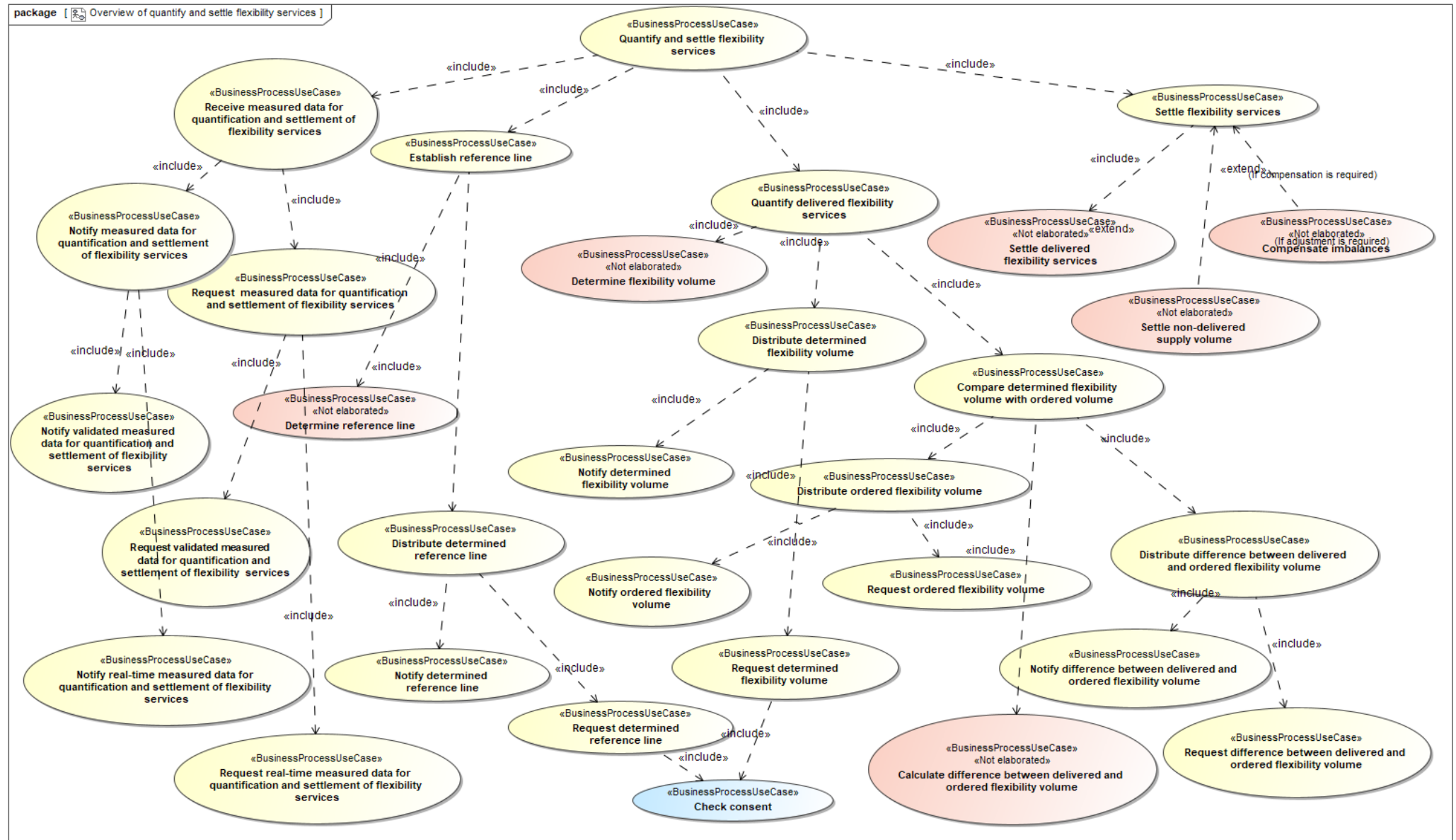


Figure 85 Overview of UseCases elaborated in this BRS for Quantification and settlement of flexibility services