

Manage flexibility activations

Based on IEC 62559-2 edition 1
Generated from UML Use Case Repository with Modsarus® (EDF R&D Tool)

1. Description of the use case

1.1. Name of use case

Use case identification		
ID	Area(s)/Domain(s)/Zone(s)	Name of use case
	Market for flexibilities, Operational planning and forecasting, Services related to end customers	Manage flexibility activations

1.2. Version management

Version management				
Version No.	Date	Name of author(s)	Changes	Approval status
1	2018-04-17	Olivia Alonso Garcia (REE)		
2	2018-06-22	Ricardo Jover (EDF), Eric Suignard (EDF)		
3	2018-07-30	Eric Suignard (EDF)		
4	2018-08-02	Eric Suignard (EDF)		
5	2018-09-21	Eric Suignard (EDF), Ricardo Jover (EDF)	Remarks from Innogy and EirGrid.	
6	2018-10-04	Eric Suignard (EDF)	Version post WP5&9 physical meeting in Tallinn	
7	2018-10-17	Eric Suignard (EDF)	Version reviewed by WP5&9 partners	
8	2018-10-30	Eric Suignard (EDF)	Description of Grid data	
9	2019-05-07	Eric Suignard (EDF)	WP6-7-8 demos alignment and miscellaneous changes	
10	2019-06-05	Ricardo Jover (EDF), Eric Suignard (EDF)	Changes following WP5&9 workshop in Chatou	
11	2019-06-13	Eric Suignard (EDF)	Elering review	
12	2019-08-22	Eric Suignard (EDF), Wiebke Albers (innogy)	Partial convergence on Grid Validation System usage	
13	2020-06-16	Eric Suignard (EDF)	innogy's and Elering's review	

1.3. Scope and objectives of use case

Scope and objectives of use case	
Scope	Developing generic case describing the data exchange for the process of flexibility activation.
Objective(s)	Make data exchange for activation of flexibilities effective and reliable.
Related business case(s)	

1.4. Narrative of Use Case

Narrative of use case
Short description

Description of the needed data exchange for the selection (taking into account any grid limitations) and initiation of activation of flexibilities bids that previously have been sent to the Flexibility Platform. Delivery of notification of activation requests to the Flexibility Service Providers (FSPs), in a reliable and timely manner according to the relevant terms and conditions applicable to FSPs.

According to EU-SysFlex WP3 suggestion, the function of grid impact assessment and hosting of Grid Validation System could be taken over by Optimisation Operator role from the Primary and Secondary System Operator roles.

Complete description

Summary of use case

- Manage flexibility activation

Description:

- Request flexibility activation
Description: Primary System Operator initiates flexibility activation on Flexibility Platform which selects bids considering the amounts of energy/capacity needed, maximum price and grid impact analysis results from SO - limitation and sensitivities where applicable (e.g. congestion management call for tender)
- Forward request for flexibility activation
Description: DEP forwards request to FP.
- Register request for flexibility activation
Description: FP registers the request.
- Send necessary information for grid impact assessment
Description: Flexibility Platform sends required level of information necessary for grid impact assessment to Secondary System Operators concerned via DEP. This concerns bids to be activated.
- Forward necessary information for grid impact assessment
Description: DEP forwards information to Secondary System Operator
- Assess secondary grid impact
Description: Secondary System Operator assesses the impact of flexibility activations in its grid in order to avoid congestions due to these activations.
Secondary System Operator provides the results of grid impact assessment to the Flexibility Platform setting restrictions – if necessary - on the activation of flexibilities which would cause congestion in other grids.
- Forward results of secondary grid impact assessment
Description: DEP forwards results to Flexibility Platform
- Collect the result of the grid impact assessment of SSO
Description: Flexibility Platform collects the results of grid impact assessment to see if activations would cause further imbalance or congestions and therefore counter actions would be needed. Counter actions are an inherent part of this step (frequency products do not need counteractions, redispatch is per definition an energy balance neutral measure - the increased and decreased energy of a measure is always equal).
- Select next set of bids based on the merit order principle
Description:
- Forward request for counter action
Description:

- Take a counter action
Description: The flexibility service in the opposite direction should be activated to balance the system. As TSO is responsible for balancing, we can assume it is TSO's responsibility to initiate the counteraction (it is assumed that TSO is the Primary System Operator in this use case). In case a counter action is not possible (e.g. due to lack of time if it is happening close to real-time), emergency plan (not defined yet) is activated. Alternatively, this activity could be automatic action in the Flexibility Platform without direct involvement of System Operator, but only after the check of the technical limits of the network involved.
- Forward request for activation
Description:
- Register request for activation
Description:
- Activate bids (Operational)
Description:
- Forward activation confirmation
Description:
- Register activation confirmation
Description: Flexibility Platform receives and registers confirmations from Flexibility Service Providers in order to make sure that they actually received the requests for activation. This step does not include the verifications aspects of activations (see "Verify and settle activated flexibilities" SUC for activation verification).

1.5. Key performance indicators (KPI)

1.6. Use case conditions

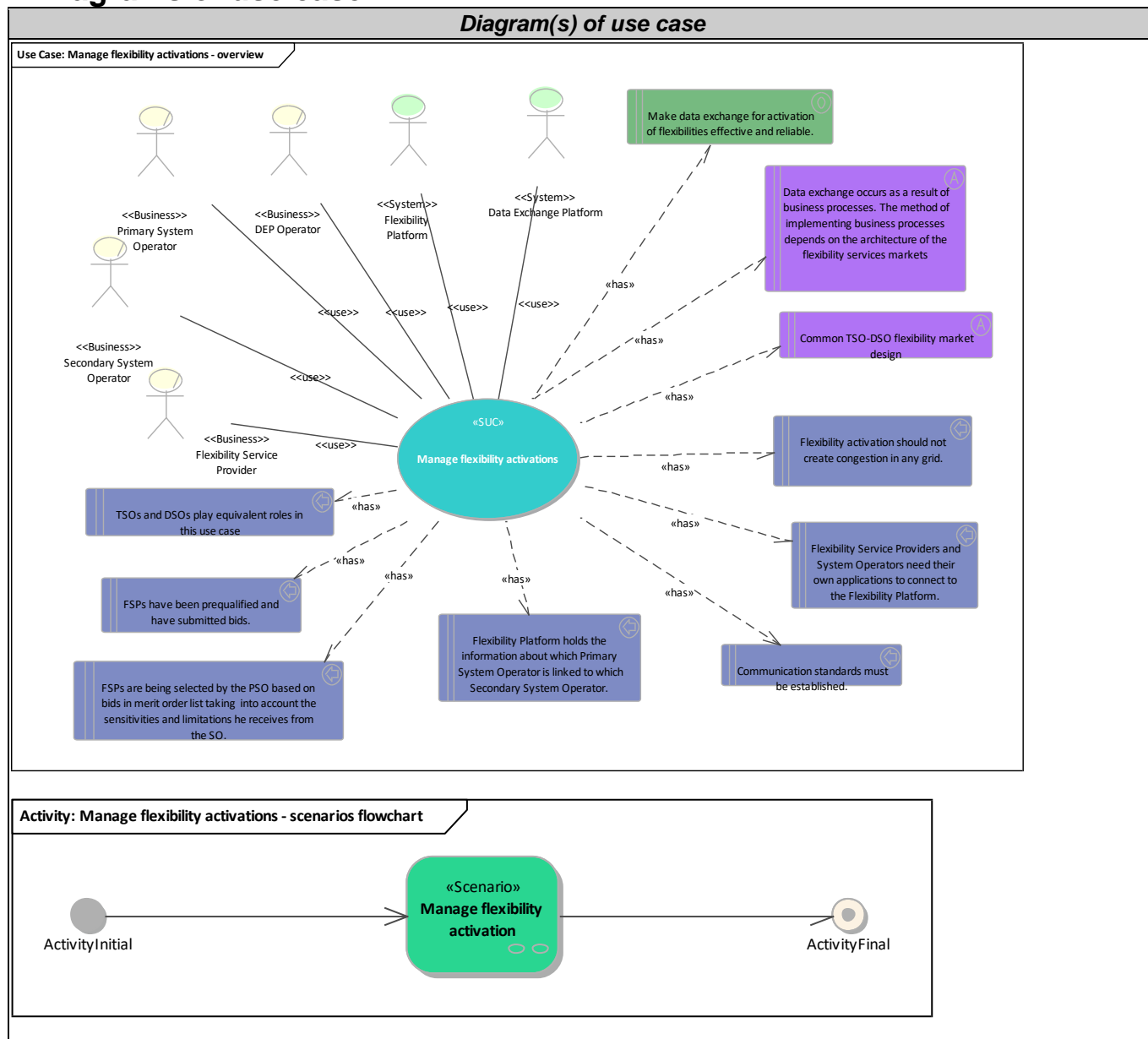
Use case conditions	
Assumptions	
1	Data exchange occurs as a result of business processes. The method of implementing business processes depends on the architecture of the flexibility services markets
2	Common TSO-DSO flexibility market design: The use case assumes a single market place operated by a Flexibility Platform. 'Single' stands for concept where different flexibility buyers and sellers can trade, see also definition in section 3.1. In case of time-critical very fast products, the flexibility units must react as direct response to the deviations in the system – for this specific case and step, the Flexibility Platform and the Data Exchange Platform cannot be used.
Prerequisites	
1	FSPs have been prequalified and have submitted bids.
2	TSOs and DSOs play equivalent roles in this use case: TSOs and DSOs request and initiate activation of flexibilities for their own needs regardless in whose network the flexibility is located. The validation of the flexibility initiation is always done by the SO where the flexibility is connected and whose grid is impacted. Flexibilities can be activated in real time (e.g. FCR) or not (e.g. FRR).
3	FSPs are being selected by the PSO based on bids in merit order list taking into account the sensitivities and limitations he receives from the SO.
4	Flexibility activation should not create congestion in any grid.
5	Flexibility Service Providers and System Operators need their own applications to connect to the Flexibility Platform.
6	Communication standards must be established.
7	Flexibility Platform holds the information about which Primary System Operator is linked to which Secondary System Operator.

1.7. Further information to the use case for classification/mapping

Classification information
Relation to other use cases
Level of depth
Prioritisation
Generic, regional or national relation
Nature of the use case
SUC
Further keywords for classification

1.8. General remarks

2. Diagrams of use case



3. Technical details

3.1. Actors

Actors			
Grouping (e.g. domains, zones)		Group description	
Actor name	Actor type	Actor description	Further information specific to this use case
Secondary System Operator	Business	Operates the power grid on which a flexibility service unit is connected or this unit may otherwise impact its grid. Assesses the impact on its network of the flexibility to be procured because the activation of such flexibility may potentially cause congestion in its grid.	
Flexibility Service Provider	Business	Can be a Distribution Network Flexibility Provider or a Transmission Network Flexibility Provider (cf. definitions in T3.3 deliverable). Similar to Flexibility Aggregator. Can be both aggregator and individual consumer/generator. Type of Energy Service Provider.	
Primary System Operator	Business	Initiates the call for tenders and initiates the activation of a flexibility. It also can operate the power grid on which a flexibility service unit is connected or this unit may otherwise impact its grid. In this case, it assesses the impact on its network of the flexibility to be procured because the activation of such flexibility may potentially cause congestion in its grid.	
Data Exchange Platform	System	Data exchange platform (DEP) is a communication platform the basic functionality of which is to secure data transfer (routing) from data providers (e.g. data hubs, flexibility service providers, TSOs, DSOs) to the data users (e.g. TSOs, DSOs, consumers, suppliers, energy service providers). DEP stores data related to its services (e.g. cryptographic hash of the data requested). The DEP does not store core energy data (e.g. meter data, grid data, market data) while these data can be stored by data hubs. Several DEPs may exist in different countries and inside one country.	
Flexibility Platform	System	Flexibility Platform (FP) for System Operators and Flexibility Service Providers that enables the trading of different flexibility products and services. A FP is operated by a Market Operator. Available to System Operators and Flexibility Services Providers. It is used to support the prequalification, the bidding, the activation and the verification processes, ensuring coordination between activities undertaken by several operators using the same flexible resources. Several national and regional FPs may exist.	
Grid Validation System	System	System hosted by Optimisation Operators and used for the power grid congestion assessment, including grid validation if activation will cause congestion.	
Optimisation Operator	Business	Optimise and select the bids, where relevant in combination with switching measures; clear the market for auctions or select individual bids in the order book organised by the MO taking into account the grid data (constraints and sensitivities/topology if needed) provided by DS_O and TS_O ; communicate results (rewarded offers and prices) to the MO. The OO role can be carried out by a system operator, market operator or a third party. (cf. definition in T3.2 deliverable)	
DEP Operator	Business	Data exchange platform operator owns and operates a communication system which basic functionality is data transfer.	

3.2. References

4. Step by step analysis of use case

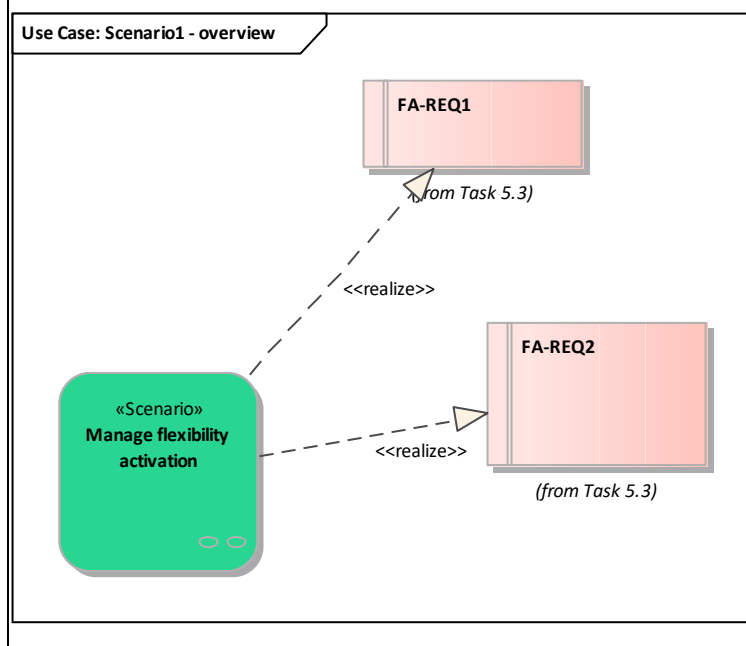
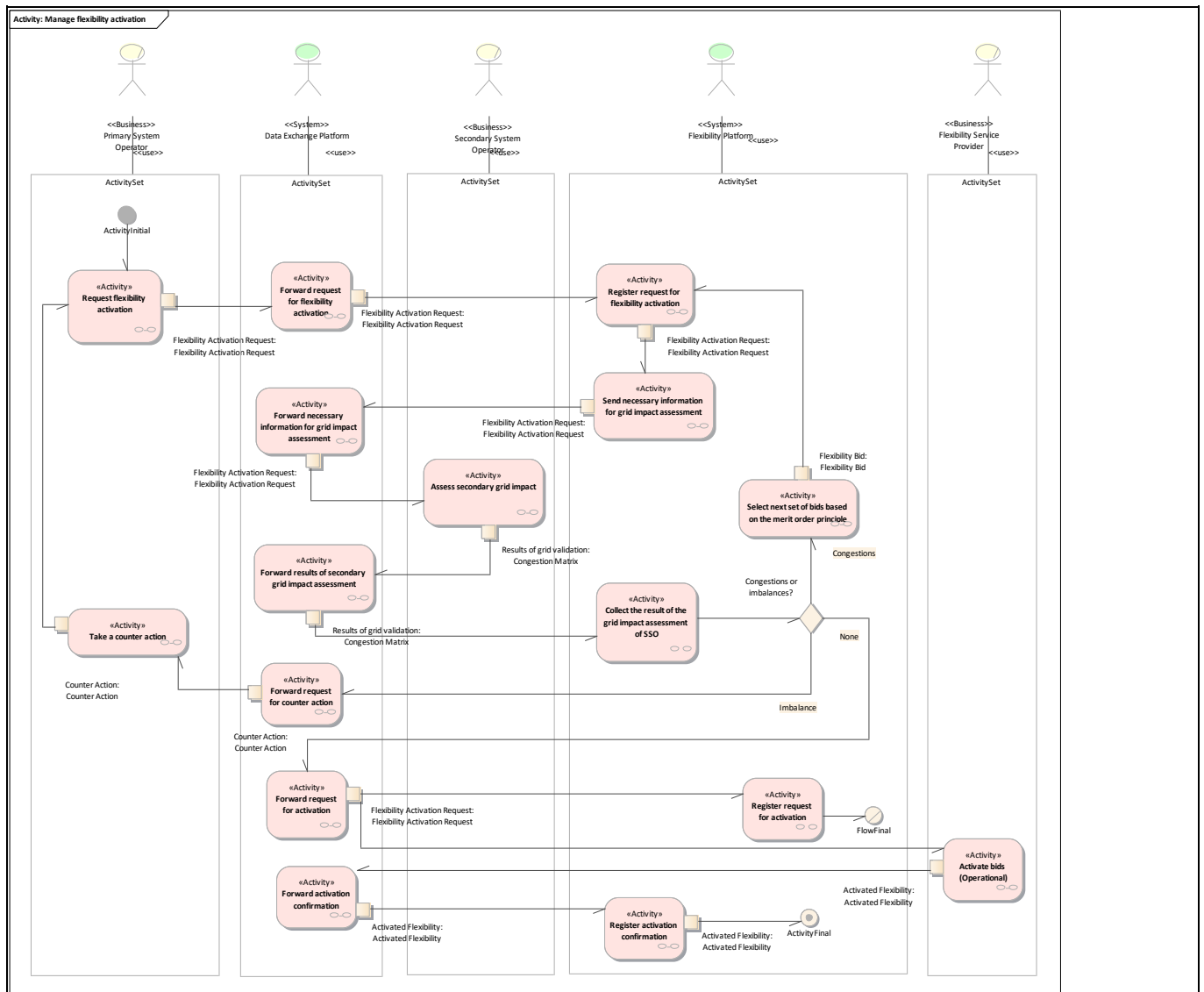
4.1. Overview of scenarios

Scenario conditions						
No.	Scenario name	Scenario description	Primary actor	Triggering event	Pre-condition	Post-condition
1	Manage flexibility activation					

4.2. Steps - Scenarios

4.2.1. Manage flexibility activation

Requirement list (refer to "Requirement" section for more information)	
Requirement R-ID	Requirement name
Cat1.Reg1	FA-REQ2
Cat1.Reg2	FA-REQ1



Scenario step by step analysis

Scenario								
Scenario name		Manage flexibility activation						
Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
1.1		Request flexibility activation	Primary System Operator initiates flexibility activation on Flexibility Platform which selects bids considering the amounts of energy/capacity needed, maximum price and grid impact analysis results from SO - limitation and sensitivities where applicable (e.g. congestion management call for tender)		<u>Primary System Operator</u>	<u>Data Exchange Platform</u>	Info1-Flexibility Activation Request	
1.2		Forward request for flexibility activation	DEP forwards request to FP.		<u>Data Exchange Platform</u>	<u>Flexibility Platform</u>	Info1-Flexibility Activation Request	
1.3		Register request for flexibility activation	FP registers the request.		<u>Flexibility Platform</u>	<u>Flexibility Platform</u>	Info1-Flexibility Activation Request	
1.4		Send necessary information for grid impact assessment	Flexibility Platform sends required level of information necessary for grid impact assessment to Secondary System Operators concerned via DEP. This concerns bids to be activated.		<u>Flexibility Platform</u>	<u>Data Exchange Platform</u>	Info1-Flexibility Activation Request	
1.5		Forward necessary information for grid impact assessment	DEP forwards information to Secondary System Operator		<u>Data Exchange Platform</u>	<u>Secondary System Operator</u>	Info1-Flexibility Activation Request	
1.6		Assess secondary grid impact	Secondary System Operator assesses the impact of flexibility activations in its grid in order to avoid congestions due to these activations. Secondary System Operator provides the		<u>Secondary System Operator</u>	<u>Data Exchange Platform</u>	Info3-Congestion Matrix	

			results of grid impact assessment to the Flexibility Platform setting restrictions – if necessary - on the activation of flexibilities which would cause congestion in other grids.					
1.7		Forward results of secondary grid impact assessment	DEP forwards results to Flexibility Platform		<u>Data Exchange Platform</u>	<u>Flexibility Platform</u>	<u>Info3-Congestion Matrix</u>	
1.8		Collect the result of the grid impact assessment of SSO	Flexibility Platform collects the results of grid impact assessment to see if activations would cause further imbalance or congestions and therefore counter actions would be needed. Counter actions are an inherent part of this step (frequency products do not need counteractions, redispatch is per definition an energy balance neutral measure - the increased and decreased energy of a measure is always equal).		<u>Flexibility Platform</u>			<u>Cat2.Reg3</u>
1.9		Select next set of bids based on the merit order principle			<u>Flexibility Platform</u>	<u>Flexibility Platform</u>	Info4-Flexibility Bid	<u>Cat2.Reg3, Cat2.Reg4</u>
1.10		Forward request for counter action			<u>Data Exchange Platform</u>	<u>Primary System Operator</u>	Info5-Counter Action	
1.11		Take a counter action	The flexibility service in the opposite direction should be activated to balance the system. As TSO is responsible for balancing, we can assume it is TSO's responsibility to initiate the counteraction (it is assumed that TSO is the Primary System		<u>Primary System Operator</u>	<u>Primary System Operator</u>	Info5-Counter Action	

			Operator in this use case). In case a counter action is not possible (e.g. due to lack of time if it is happening close to real-time), emergency plan (not defined yet) is activated. Alternatively, this activity could be automatic action in the Flexibility Platform without direct involvement of System Operator, but only after the check of the technical limits of the network involved.					
1.12		Forward request for activation			<u>Data Exchange Platform</u>	<u>Flexibility Platform, Flexibility Service Provider</u>	Info1-Flexibility Activation Request	
1.13		Register request for activation			<u>Flexibility Platform</u>			
1.14		Activate bids (Operational)			<u>Flexibility Service Provider</u>	<u>Data Exchange Platform</u>	Info6-Activated Flexibility	
1.15		Forward activation confirmation			<u>Data Exchange Platform</u>	<u>Flexibility Platform</u>	Info6-Activated Flexibility	
1.16		Register activation confirmation	Flexibility Platform receives and registers confirmations from Flexibility Service Providers in order to make sure that they actually received the requests for activation. This step does not include the verifications aspects of activations (see "Verify and settle activated flexibilities" SUC for activation verification).		<u>Flexibility Platform</u>	<u>Flexibility Platform</u>	Info6-Activated Flexibility	

- 1.1. Request flexibility activation

Business section: Manage flexibility activation/Request flexibility activation

Primary System Operator initiates flexibility activation on Flexibility Platform which selects bids considering the amounts of energy/capacity needed, maximum price and grid impact analysis results from SO - limitation and sensitivities where applicable (e.g. congestion management call for tender)

Information sent:

Business object	Instance name	Instance description
<u>Flexibility Activation Request</u>	Flexibility Activation Request	

- 1.2. Request flexibility activation

Business section: Manage flexibility activation/Request flexibility activation

Primary System Operator initiates flexibility activation on Flexibility Platform which selects bids considering the amounts of energy/capacity needed, maximum price and grid impact analysis results from SO - limitation and sensitivities where applicable (e.g. congestion management call for tender)

Information sent:

Business object	Instance name	Instance description
<u>Flexibility Activation Request</u>	Flexibility Activation Request	

- 1.3. Forward request for flexibility activation

Business section: Manage flexibility activation/Forward request for flexibility activation

DEP forwards request to FP.

Information sent:

Business object	Instance name	Instance description
<u>Flexibility Activation Request</u>	Flexibility Activation Request	

- 1.4. Register request for flexibility activation

Business section: Manage flexibility activation/Register request for flexibility activation

FP registers the request.

Information sent:

Business object	Instance name	Instance description
<u>Flexibility Activation Request</u>	Flexibility Activation Request	

- 1.5. Send necessary information for grid impact assessment

Business section: Manage flexibility activation/Send necessary information for grid impact assessment

Flexibility Platform sends required level of information necessary for grid impact assessment to System Operators concerned via DEP. This concerns bids to be activated.

Information sent:

Business object	Instance name	Instance description
<u>Flexibility Activation Request</u>	Flexibility Activation Request	

- 1.6. Forward necessary information for grid impact assessment

Business section: Manage flexibility activation/Forward necessary information for grid impact assessment

DEP forwards information to Secondary System Operator

Information sent:

Business object	Instance name	Instance description
<u>Flexibility Activation Request</u>	Flexibility Activation Request	

- 1.7. Assess secondary grid impact

Business section: Manage flexibility activation/Assess secondary grid impact

Secondary System Operator assesses the impact of flexibility activations in its grid in order to avoid congestions due to these activations.

Secondary System Operator provides the results of grid impact assessment to the Flexibility Platform setting restrictions – if necessary - on the activation of flexibilities which would cause congestion in its grids.

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Congestion Matrix	Results of grid validation	

- 1.8. Forward results of secondary grid impact assessment

Business section: Manage flexibility activation/Forward results of secondary grid impact assessment

DEP forwards results to Flexibility Platform

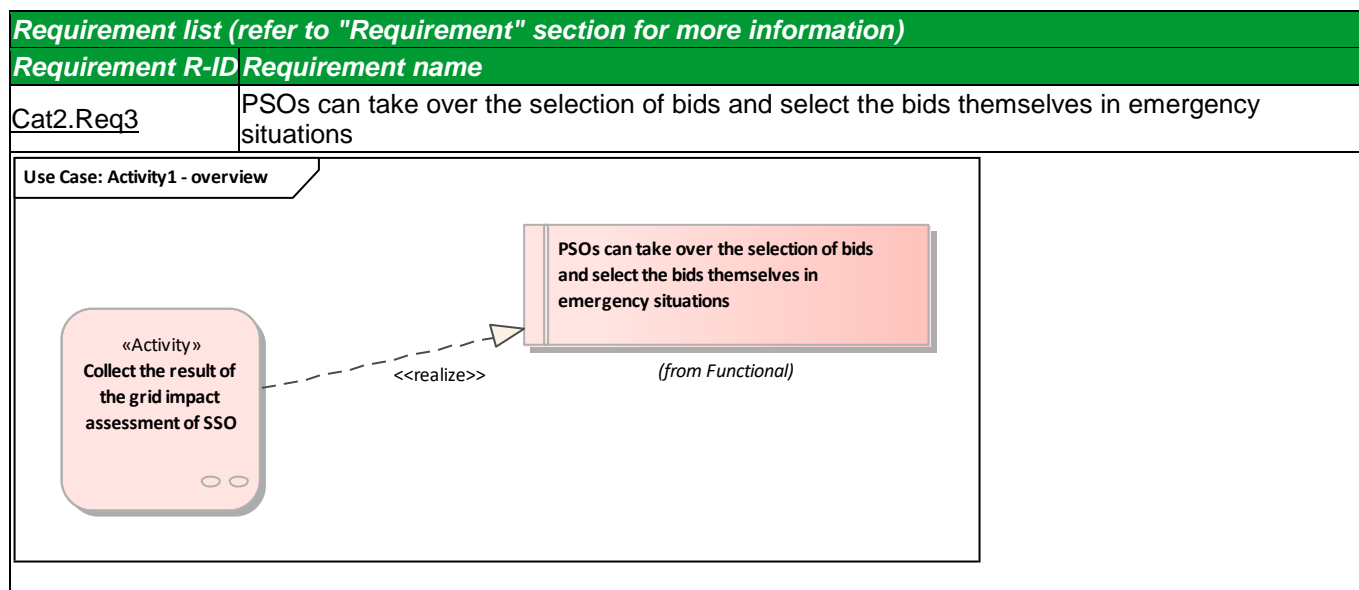
Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Congestion Matrix	Results of grid validation	

- 1.9. Collect the result of the grid impact assessment of SSO

Business section: Manage flexibility activation/Collect the result of the grid impact assessment of SSO

Flexibility Platform collects the results of grid impact assessment to see if activations would cause further imbalance or congestions and therefore counter actions would be needed. Counter actions are an inherent part of this step (frequency products do not need counteractions, redispatch is per definition an energy balance neutral measure - the increased and decreased energy of a measure is always equal).

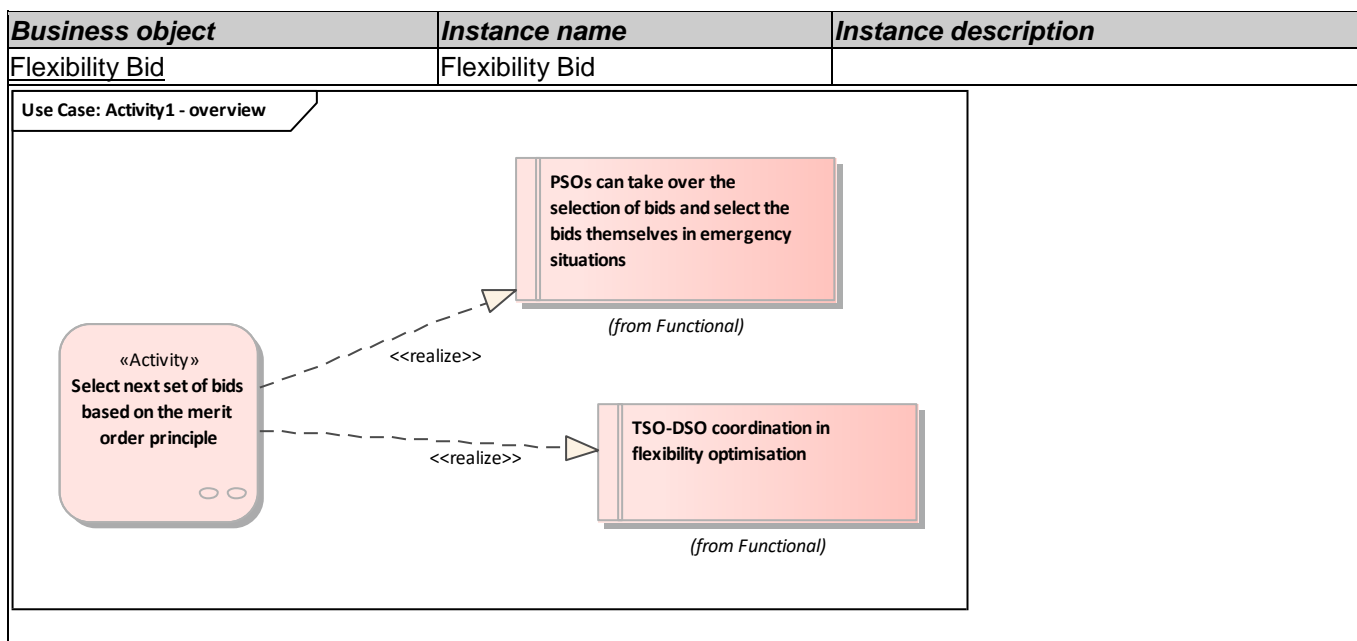


- 1.10. Select next set of bids based on the merit order principle

Business section: Manage flexibility activation/Select next set of bids based on the merit order principle

Requirement list (refer to "Requirement" section for more information)	
Requirement R-ID	Requirement name
Cat2.Reg3	PSOs can take over the selection of bids and select the bids themselves in emergency situations
Cat2.Reg4	TSO-DSO coordination in flexibility optimisation

Information sent:



- 1.11. Forward request for counter action

Business section: Manage flexibility activation/Forward request for counter action

Information sent:

Business object	Instance name	Instance description
Counter Action	Counter Action	

- 1.12. Take a counter action

Business section: Manage flexibility activation/Take a counter action

The flexibility service in the opposite direction should be activated to balance the system. As TSO is responsible for balancing, we can assume it is TSO's responsibility to initiate the counteraction (it is assumed that TSO is the Primary System Operator in this use case). In case a counter action is not possible (e.g. due to lack of time if it is happening close to real-time), emergency plan (not defined yet) is activated. Alternatively, this activity could be automatic action in the Flexibility Platform without direct involvement of System Operator, but only after the check of the technical limits of the network involved.

Information sent:

Business object	Instance name	Instance description
Counter Action	Counter Action	

- 1.13. Forward request for activation

Business section: Manage flexibility activation/Forward request for activation

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Flexibility Activation Request	Flexibility Activation Request	

- 1.15. Activate bids (Operational)

Business section: Manage flexibility activation/Activate bids (Operational)

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Activated Flexibility	Activated Flexibility	

- 1.16. Activate bids (Operational)

Business section: Manage flexibility activation/Activate bids (Operational)

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Activated Flexibility	Activated Flexibility	

- 1.17. Forward activation confirmation

Business section: Manage flexibility activation/Forward activation confirmation

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Activated Flexibility	Activated Flexibility	

- 1.18. Register activation confirmation

Business section: Manage flexibility activation/Register activation confirmation

Flexibility Platform receives and registers confirmations from Flexibility Service Providers in order to make sure that they actually received the requests for activation. This step does not include the verifications aspects of activations (see "Verify and settle activated flexibilities" SUC for activation verification).

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Activated Flexibility	Activated Flexibility	

5. Information exchanged

<i>Information exchanged</i>			
<i>Information exchanged, ID</i>	<i>Name of information</i>	<i>Description of information exchanged</i>	<i>Requirement, R-IDs</i>

Info1	Flexibility Activation Request		
Info2	Congestion Matrix	Congestion matrices are provided by System Operators and stored in Flexibility Platforms. It consists in a matrix based on grid models. Flexibility bids are inserted into the matrix, in order to check whether congestions would occur.	
Info3	Flexibility Bid		
Info4	Counter Action		
Info5	Activated Flexibility		

6. Requirements (optional)

<i>Requirements (optional)</i>		
<i>Categories ID</i>	<i>Category name for requirements</i>	<i>Category description</i>
Cat1	Task 5.3	Requirements integrated from Task 5.3.
<i>Requirement R-ID</i>	<i>Requirement name</i>	<i>Requirement description</i>
Req1	FA-REQ2	Exchange of activation requests through DEP and flexibility platform
Req2	FA-REQ1	Automated activation of devices is possible
<i>Requirements (optional)</i>		
<i>Categories ID</i>	<i>Category name for requirements</i>	<i>Category description</i>
Cat2	Functional	Functional requirements
<i>Requirement R-ID</i>	<i>Requirement name</i>	<i>Requirement description</i>
Req3	PSOs can take over the selection of bids and select the bids themselves in emergency situations	Flexibility bids are selected by Flexibility Platforms on a merit order basis and with several criteria. Different criteria should be considered (e.g. price, social economic value, location). However, in some cases, this may not be feasible. This situation can occur for congestion management or frequency control, when flexibility needs are too close to real time (emergency situations).
Req4	TSO-DSO coordination in flexibility optimisation	Flexibilities must be studied and validated by TSOs and DSOs in a coordinated manner before activation requests can be submitted to Flexibility Service Providers.

7. Common terms and definitions

8. Custom information (optional)