European Network of
Transmission System Operators
for Electricity

REDISPATCH & COUNTERTRADE COST SHARING IMPLEMENTATION GUIDE

2022-09-21

SOC APPROVED
VERSION 1.0

Copyright notice:

This document is maintained by the ENTSO-E CIM EG. Comments or remarks are to be provided at cim@entsoe.eu

NOTE CONCERNING WORDING USED IN THIS DOCUMENT

The force of the following words is modified by the requirement level of the document in which they are used.

- SHALL: This word, or the terms “REQUIRED” or “MUST”, means that the definition is an absolute requirement of the specification.
- SHALL NOT: This phrase, or the phrase “MUST NOT”, means that the definition is an absolute prohibition of the specification.
- SHOULD: This word, or the adjective “RECOMMENDED”, means that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.
- SHOULD NOT: This phrase, or the phrase “NOT RECOMMENDED”, means that there may exist valid reasons in particular circumstances when the particular behaviour is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behaviour described with this label.
- MAY: This word, or the adjective “OPTIONAL”, means that an item is truly optional.

32

Revision History

Version	Release	Date	Paragraph	Comments
0	1	2022-01-24		First draft of the RD & CT cost sharing implementation guide.
0	2	2022-03-04		Additions made to reflect the needs of different CCRs
0	3	2022-05-16		Additions made to reflect the new wording of costs categories and tables of the settlement attachment.
0	4	2022-05-30		Finalization and validation of the document
1	0	2022-09-21		Approved by SOC.

CONTENTS

List of figures

List of tables

1. Scope

Article 74(7) of the CACM Regulation (Capacity Allocation and Congestion Management) requests all TSOs of each capacity calculation region (CCR) to *"further harmonise as far as possible between the regions the redispatching and countertrading (RDCT) cost sharing methodologies"*. In the TSOs Proposal for guidance on harmonisation of Cost Sharing regional Methodologies for redispatching and countertrading in accordance with Article 74(7), the topic of data input and output formats was considered as a potentially harmonizable topic. Hence for the data that will finally be harmonized, TSOs shall apply standardised data formats for certain processes of information exchange. To do so, TSOs shall agree on a reference document describing the standards data formats for such relevant data. This reference document has to cover the specificities of all regional cost sharing approaches. This reference document shall be subject to regular revision to meet the latest IT-standards.

This implementation guide is to be understood as the reference document from the ENTSO-E proposal.

The objective of this Redispatch & Countertrade cost sharing implementation guide is to make it possible for IT developers to develop an IT application for System Operators to exchange relevant data input/output of the cost sharing process subject to harmonization. The content of this document is directly related to the scope of Inter-TSO Cost-Sharing methodology (RCC Support).

The implementation guide is one of the building blocks for using UML (Unified Modelling Language) based techniques in defining processes and messages for interchange between actors in the electrical industry in Europe.

This guide provides a standard for enabling a uniform layout for the redispatch and countertrade cost sharing process. The implementation guide is developed for the harmonisation of the underlying data exchange process.

2. References

2.1. Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

- IEC 61970-301:2021 Energy management system application program interface (EMS-API) - Part 301: Common information model (CIM) base;
- IEC 61970-600-1:2021 Energy management system application program interface (EMS-API) - Part 600-1: Common Grid Model Exchange Standard (CGMES) - Structure and rules;
- IEC 61970-600-2:2021 Energy management system application program interface (EMS-API) - Part 600-2: Common Grid Model Exchange Standard (CGMES) - Exchange profiles specification;
- IEC TS 61970-600-1:2017 Energy management system application program interface (EMS-API) - Part 600-1: Common Grid Model Exchange Specification (CGMES) - Structure and rules;
- IEC TS 61970-600-2:2017 Energy management system application program interface (EMS-API) - Part 600-2: Common Grid Model Exchange Specification (CGMES) - Exchange profiles specification;
- IEC 62325-351:2016, Framework for energy market communications – Part 351: CIM European market model exchange profile
- IEC 62325-450:2013, Framework for energy market communications – Part 450: Profile and context modelling rules
- IEC 62325-451-1:2017, Framework for energy market communications – Part 451-1: Acknowledgement business process and contextual model for CIM European market
- IEC 62325-451-2:2014. Framework for energy market communications – Part 451-2: Scheduling business process and contextual model for CIM European market

2.2. Specification documents references

The following specification documents, in whole or in part, are referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

- ENTSO-E Remedial action schedule profile specification;
- ENTSO-E Metadata and Header profile specification;

2.3. Other references

- The Harmonised Electricity Market Role Model;
- Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management (CACM).

3. Terms and definitions

Bidding Zone (BZ): The largest geographical area within which market participants are able to exchange energy without capacity allocation. [Source: Commission Regulation (EU) 543/2013 of 14 June 2013]

Capacity Calculation Region (CCR): The Capacity Calculation Region is the geographic area in which coordinated capacity calculation is applied.. [Source: CACM]

Central Settlement Entity (CSE): The "Central Settlement Entity" (CSE) oversees the financial part of the cost sharing process (invoicing and payment execution), if TSOs request applying Inter-TSO Settlement methodology related to Redispatching and Countertrading after having requested its support. CSE receives the validated monthly costs/revenues assigned to a bidding zone and/or TSO. Its main responsibilities are:

- Preparation and sending of invoicing documents
- Financial clearing of the amounts relating to the cost sharing process

Countertrade: It means a cross-zonal exchange initiated by system operators between two bidding zones to relieve physical congestion. [Source: Commission Regulation (EU) 543/2013 of 14 June 2013]

Redispatching: It means a measure activated by one or several system operators by altering the generation and/or load pattern in order to change physical flows in the transmission system and relieve a physical congestion. [Source: Article 2(26) of the Transparency Regulation]

Regional Coordination Centre (RCC): Regional Coordination Centres perform tasks of regional relevance in the system operation region (SOR) where they are established, such as, in particular: coordinated capacity calculation, coordinated security analysis or creating common grid models. Note: Regional Coordination Centres were also known as Regional Security Coordinators (RSC) [Source: Commission Regulation (EU) 2019/943]

Remedial Action (RA): Remedial action means any measure applied by a TSO or several TSOs, manually or automatically, in order to maintain operational security. [Source: CACM art.2.13]

Transmission System Operator (TSO): The role of System Operator (SO) is performed by the TSO.

.

4. The Redispatch & Countertrade Cost Sharing Business Process

For the execution of the cost sharing processes defined in the regional methodologies for the cost sharing of redispatching and countertrading measures TSOs can request the support of RCCs, but they are not obliged to.

If TSOs of a CCR jointly decide to request the support of RCC(s) according to Article 37(1)(l) of the Electricity Regulation (Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market), the Methodology for the Optimisation of Inter-Transmission System Operators Settlements related to redispatching and countertrading (hereafter referred to as inter-TSO settlements methodology) applies.

If TSOs see no need of the support of RCC(s), the cost sharing process is not defined by the above-mentioned methodology and the process steps are defined by the relevant regional methodology according to Art. 74(1) CACM GL.

5. Cost Sharing principles

Currently, the regional RDCT cost sharing methodologies allow several possibilities for establishing a cost sharing principle, or certain combinations of them. These are listed below and their application is dependent of the methodology of each CCR.

- **Requester pays principle (RPP):** TSO(s) calling for action bear(s) all costs and benefits from the participating generator(s), without being compensated by other TSOs.
- **Owner pays principle (OPP):** The costs of remedial actions are shared among the TSOs owning the congested network element and are shared according to their ownership share.
- **Polluter pays principle (PPP):** The costs of remedial actions are shared between several parties according to their share in causing the congestion.
- **Socialization principle (SP):** The costs of remedial actions are split according to the weight of the TSOs/bidding zones for a given parameter such as responsibility on congestion, load, congestion income or any other.
    - **Congestion income based principle**[1] **(CIBP):** The costs of remedial actions are taken from a common fund, e.g. cost sharing keys are defined with the share of congestion income from the previous year.
- **Specific standard cost sharing key (i.e. 50-50):** It aims to distribute the responsibility to bear the associated costs to solve the identified congestion, by establishing some ex-ante cost sharing keys (agreed by TSOs).

Hence, because of the regional differences existing between the CCRs, one aimed characteristic of the described data formats in this document is to be able to be used by all CCRs.

5.1. General Introduction of the cost sharing process based on the inter-TSO settlements methodology

Independent of the cost sharing principle in place in a CCR the process steps of the cost sharing process are explained on the following graphic. The distinction between the two parts (technical

[1] The CIBP is applied in the interim methodology of IN.

and financial) of the RD&CT cost sharing process is illustrated. The sub process steps are explained in a detailed manner below.

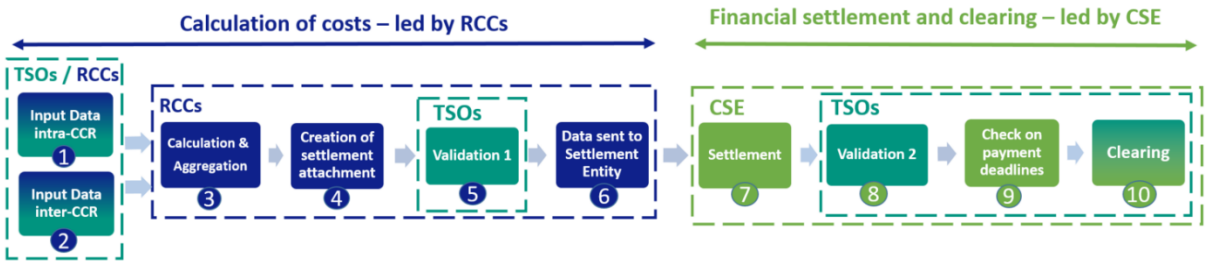


Figure 1 - Full cost sharing process

5.1.1. Calculation of costs: “technical" part of cost sharing (=assessment/calculation)

With “assessment/calculation” the process is meant, where the costs and revenues resulting from redispatching and countertrading are calculated per bidding zone and/or TSO. Under the assumption that the TSOs jointly requested the CCR support, this process can be led by the regional RCC(s). This process consists of the following sub-parts:

- input data gathering,
- calculation of the cost sharing key and
- aggregation of the monthly total costs per bidding zone and/or TSO.

5.1.2. Financial settlement and clearing: "financial" part of cost sharing (=invoicing/payment)

With “invoicing/payment” the process is meant, where the costs and revenues assigned to a bidding zone and/or a TSO are invoiced and paid. After the costs and revenues resulting from RD&CT are aggregated and validated for each bidding zone and/or TSO, the financial part starts with the two main aspects being:

- invoicing and
- payment execution.

If jointly requested by the TSOs of a CCR, this process should be led by the Central Settlement Entity (CSE).

5.2. Detailed Process Description of the cost sharing process based on the inter-TSO settlements methodology- Technical part of cost sharing, calculation of costs assigned to BZs/TSOs

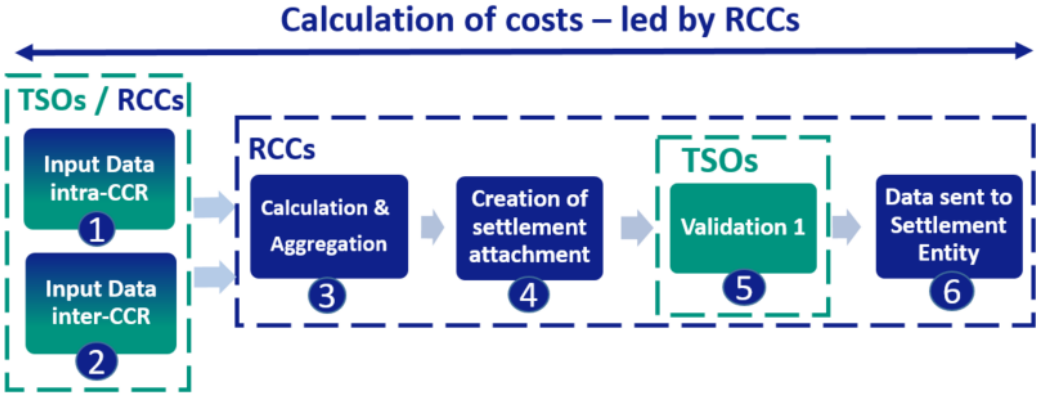


Figure 2 - Technical part of cost sharing, calculation of costs assigned to BZs/TSOs

The calculation of the costs assigned to the BZs/TSOs resulting from redispatching and countertrading might be strongly linked to the network characteristics of the CCRs. Nevertheless, the basic scheme is the same. TSOs define costs eligible for the regional cost sharing processes. These costs are aggregated and shared among the relevant parties.

Performing this task can be relatively easy, if the cost sharing key calculation is based on simple principles, for example the requester pays principle (RPP). CCRs applying the polluter pays principle (PPP) face a significantly higher effort for the cost sharing key calculation. RCCs can support these calculations by taking over central tasks, if requested by the TSOs.

5.2.1. Input Data-intra CCR

The input data gathering is the starting point of the redispatching and countertrading cost sharing process. Currently, the amount and type of input data is strongly dependent on the cost sharing calculation methodology applied in one CCR. On one side, the input data consists of information like network models and activated (costly) remedial actions. On the other hand, the information regarding the costs and volumes of the activated costly remedial actions are (usually) provided by the TSOs within a certain deadline. This input data can be provided from various sources:

- from other IT-Platforms (e.g. ROSC regional platform),
- from RCCs (e.g. grid models) or,
- from TSOs (e.g. provider costs).

Depending on the CCRs cost sharing processes and on who will be in charge of the calculation process, the data will be sent either to RCCs or to other TSOs.

5.2.2. Input Data-inter CCR

Cross-regional cost sharing keys reflecting redispatching and countertrading costs of overlapping XRAs (according to CSAm Art. 27.13-17) for TSOs are passed on as an input for the regional cost sharing process of each CCR. The inter CCR part will be covered in a second stage and is not the primary scope of this document, it was mentioned only here as placeholder for the sake of completeness.

5.2.3. Calculation and Aggregation

The description of the two different Inter-CCR and intra-CCR cost sharing is out of scope of the data formats definition. This is described below for the reader to have a full view on the existing and future cost sharing process.

After the input data gathering is finished, the cost sharing calculation chain starts. For relevant CCRs, this is a hierarchical process, where the cross-regional costs are mapped to regions first. Then, together with regional costs, the cross-regional costs are mapped to TSOs according to regional methodologies (reference CSAm 27.13-17).

5.2.4. Cross-regional costs: Inter-CCR cost sharing

Costs coming from redispatching and countertrading are used to address residual violations in the cross-regional part of the coordinated operational security analysis (CSA) must be first attributed to regions according to their regional keys.

5.2.5. Regional costs: Intra-CCR cost sharing

After the regional keys from the cross-regional process are determined, they must be shared with the TSOs - together with the costs of remedial actions used for solving regional violations. Pending on the cost sharing principle applied, this can be a simple calculation or a challenging chain of several sub-calculations, e.g. for PPP.

5.2.6. Creation of the settlement attachment

The creation of the Settlement Attachment report is only applicable to those TSOs applying the inter-TSO settlements methodology. The cost sharing calculation tool of each CCR used by RCCs, will create the necessary input data (i.e. the Settlement Attachment) for the further steps of the cost sharing process (the TSO-validation and the financial part of the cost sharing process). The Settlement Attachment is the result of the cost sharing calculation between BZs/TSOs, where costs and revenues per TSOs/BZs are specified. The Settlement Attachment – once validated by TSOs, see next section – is the basis for the financial settlement and clearing.

5.2.7. Validation 1 – Validation of the calculation results

In the case TSOs of a CCR are requesting the RCCs to perform the calculation, the final validation of the results still remains the responsibility of TSOs though. To be able to meet the process deadlines, TSOs must validate the costs and revenues assigned to them within a predefined timeframe. Otherwise “deemed acceptance” is applied if no other solution was agreed at the specific CCR. The validation period can be individual for CCRs, corresponding to the complexity of the cost sharing calculation process. RCCs should support TSOs during this validation phase by acting as a moderator if issues are detected.

5.2.8. Data sent to Central Settlement Entity

In the case TSOs of a CCR are requesting to the CSE to be in charge of the settlement, as a last step, the validated results are submitted to the CSE responsible for the financial part. This task should be executed by RCCs to be able to provide the data bundled and on time. When the results of the cost sharing calculations are sent to the CSE, the technical part of the cost sharing process is finalized.

5.3. Detailed Process Description of the cost sharing process based on the inter-TSO settlements methodology: Financial part of cost sharing, invoicing and payment execution

The Central Settlement Entity (CSE) is defined within the inter-TSO settlement methodology as a centralised, single counterparty for the financial flows of TSOs related to the cost sharing of redispatching and countertrading, illustrated on the following graphic:

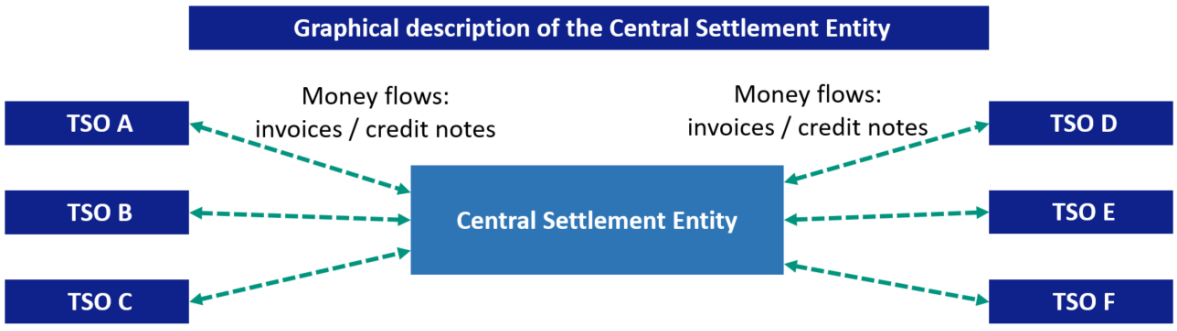


Figure 3 - Illustration of the Central Settlement Entity

The largest benefit of this approach is the reduction of costs and efforts for TSOs with the support of a CSE. Mostly TSOs present in different CCRs will have significant advantages by using a standardised process. Additionally, it would guarantee efficiency and effectiveness for involved parties by avoiding parallel developments for tooling and processes and therefore limiting the costs for all.

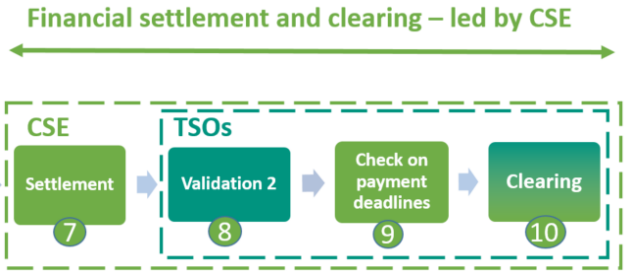


Figure 4 - Financial part of the Inter-TSO settlement process

Please find below a description of the sub-steps of the financial settlement and clearing, as described in figure above.

5.3.1. Financial Settlement

"Financial Settlement" describes the process, where the costs and revenues assigned to a Bidding Zone or TSO are invoiced. This process is performed by the CSE, in the case that the TSOs of a CCR a requesting the support of RCCs for this task. The required input for this step is the Settlement Attachment, sent from the RCCs and validated by the TSOs beforehand. There can be several invoicing documents issued during one invoicing process: invoices, self-billings and credit statements.
Credit statements are not fiscal but only information documents and can be requested by the TSOs not accepting self-billings. All invoicing documents are prepared in line with the general accounting and fiscal principles of the CSE. Financial Settlement is performed on the agreed Working Day of each month.

5.3.2. Validation process 2

This step is only a formal validation by the TSOs of the received invoicing documents sent by the Central Settlement Entity. This validation refers to the quality of data outputs (content of the invoice such as address, bank account or delivery period). The amounts to be invoiced were already validated in the calculation of the costs lead by RCCs during the step number 5 "Validation 1".

5.3.3. Check payment deadlines

The CSE is monitoring and supervising that debit payments (incoming payments from the TSOs) and credit payments (outgoing payments to the TSOs) are happening according to the agreed schedule. As a part of the monitoring there is a dunning process available upon the TSOs` request. The dunning process is linked to the single invoicing process and provides the option of 3-level reminders that can be sent before and after the due date to ensure the collection of debit payments.

5.3.4. Financial Clearing

Money flows (debit payments/credit payments or netted amounts) are settled according to the Settlement Attachment values. The amounts received by the CSE (debit payments) are equal to the amounts paid out by the CSE (credit payments) unless there are missing payments (one or more TSO(s) pay(s) late). In this case, partial payment can be applied. The CSE will communicate which TSO paid late and its share of credit payments based on the financial volume. Each TSO that paid on time receives a share of the amount based on the financial volume. Once all missing payments are received, the CSE performs the rest of the credit payments. Partial payment is a request to avoid the complete blocking of financial flows if one (or more) TSO(s) cannot meet the payment deadline.

5.4. Use cases

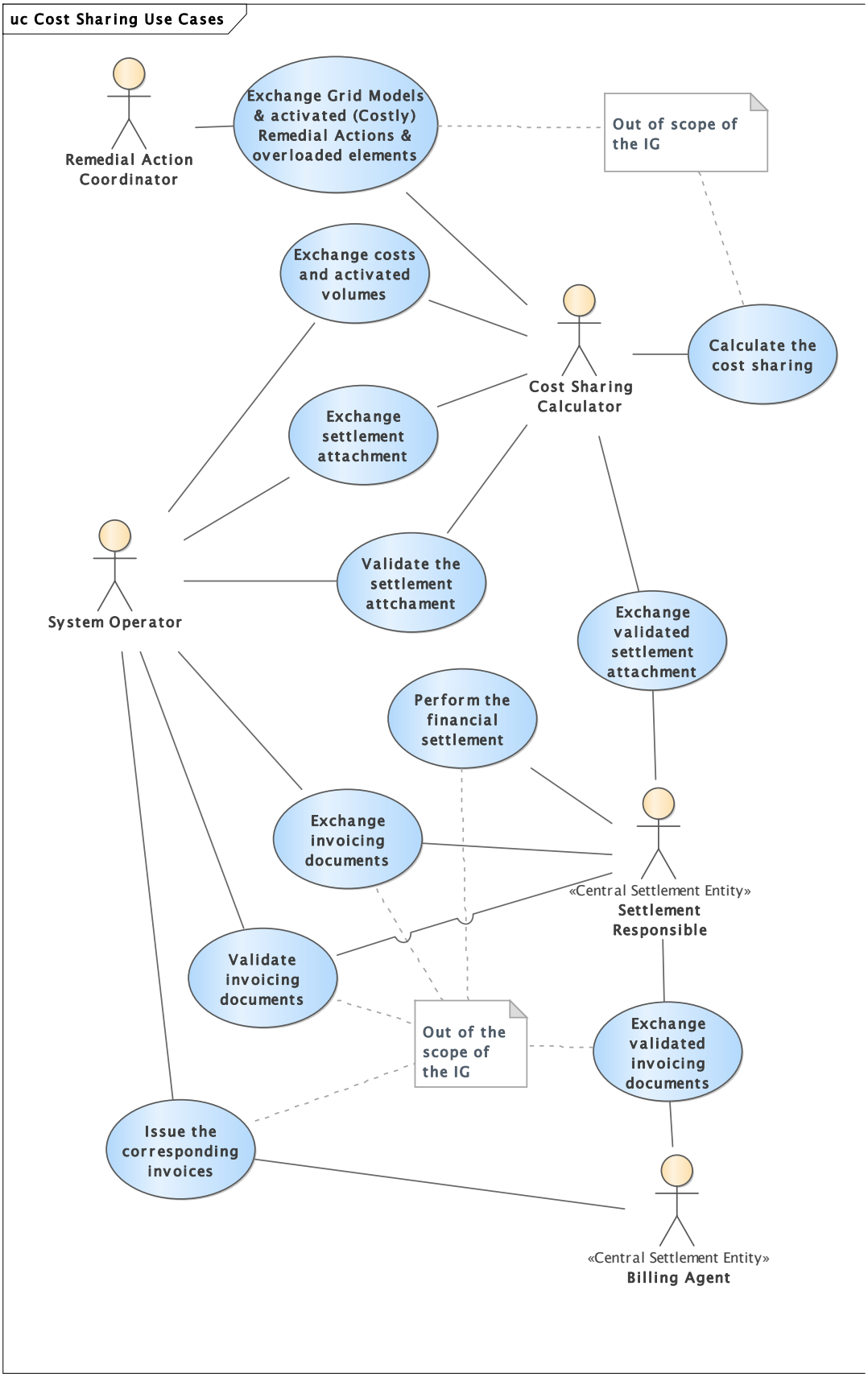


Figure 5 - Use Case diagram

Table 1 gives a list of roles involved in the RD & CT cost sharing business process.

Table 1 - Role labels and descriptions

Role Label	Role Description
Remedial Action Coordinator (RAC)	In the context of the Coordinated Security Analysis, the Remedial Action Coordinator main task is to review unresolved relevant identified constraints (on assessed elements), discuss/find possible follow-up activities by SOs and deliver the conclusions of the validation.
System Operator (SO)	SO provides most of the needed inputs to perform the cost sharing. This role also participates in the validation of the settlement attachment and invoicing documents.
Cost Sharing Calculator (CSC)	Cost sharing calculator is in charge of the calculation of regional costs within the regional processes of each CCR.
Settlement Responsible (SR)	Settlement Responsible acts as a centralised, single counterparty for the financial flows of SOs related to the cost sharing of redispatching and countertrading.
Billing Agent (BA)	Billing Agent is responsible for invoicing the concerned SOs.

Table 2 gives a list of use cases for the RD & CT cost sharing process.

Table 2 - RD & CT cost sharing use cases

Use case label	Roles involved	Action descriptions and assertions
Exchange Grid Models & activated (Costly) Remedial Actions & overloaded elements	RAC, CSC	One of the inputs for the redispatching and countertrading cost sharing process is the exchange of grid models, activated (costly) RAs and overloaded elements between the RAC and CSC. This use case is out of scope as is handled in the context of the SOGL Art.76 (Regional Methodology).
Exchange costs and activated volumes	SO, CSC	The second input for the process, it is the information regarding the costs and volumes of the activated costly remedial actions. This information is exchanged between the SO and the CSC. In the Core region, costs will have first the status of provisional and later on final after specific deadlines.
Calculate the cost sharing	CSC	This use case is performed by the CSC once the input data gathering is finished. This is a hierarchical process, where the cross-regional costs are mapped to regions first. Then, together with regional costs, the cross-regional costs are mapped to TSOs according to regional methodologies. This use case is out of scope of this IG and should be detailed in the cost sharing methodology.
Exchange settlement attachment	SO, CSC	The Settlement Attachment is the result of the cost sharing calculation between BZs/TSOs, where costs and revenues per TSOs/BZs are specified. The CSC exchanges the settlement attachment with the SO.
Validate the settlement attachment	SO, CSC	The final validation of the results remains the responsibility of SOs. To be able to meet the process deadlines, TSOs must validate the costs and revenues assigned to them within a predefined timeframe. If the results are correct, CSC should support SOs during this validation phase by acting as a moderator if issues are detected.

Use case label	Roles involved	Action descriptions and assertions
Exchange validated settlement attachment	CSC, SR	Once the settlement attachment is validated, then it is submitted to the BA so they can start the financial settlement process. When the results of the cost sharing calculations are sent to the BA, the technical part of the cost sharing process is finalized.
Perform the financial settlement	SR	SR performs the financial settlement which describes the process, where the costs and revenues assigned to a Bidding Zone or SO are invoiced. This use case is out of scope of this IG and should be detailed in the cost sharing methodology.
Exchange invoicing documents	SR, SO	SR provides the invoicing documents, which are the output of the financial settlement to the SO. This use case is out of scope as it is not expected to use any CIM message for it.
Validate invoicing documents	SR, SO	SO performs a formal validation of the received invoicing documents sent by the BA. This validation refers to the quality of data outputs (e.g. content of the invoice such as address, bank account or delivery period). This use case is out of scope as it is not expected to use any CIM message for it.
Exchange validated invoicing documents	SR, BA	Once that the invoicing documents are validated, SR exchange them with BA so it can start the billing process.
Issue the corresponding invoices	BA, SO	Billing agent issues the invoices to the corresponding SOs. This use case is out of scope as it is not expected to use any CIM message for it.

412
413

5.5. Activity diagram

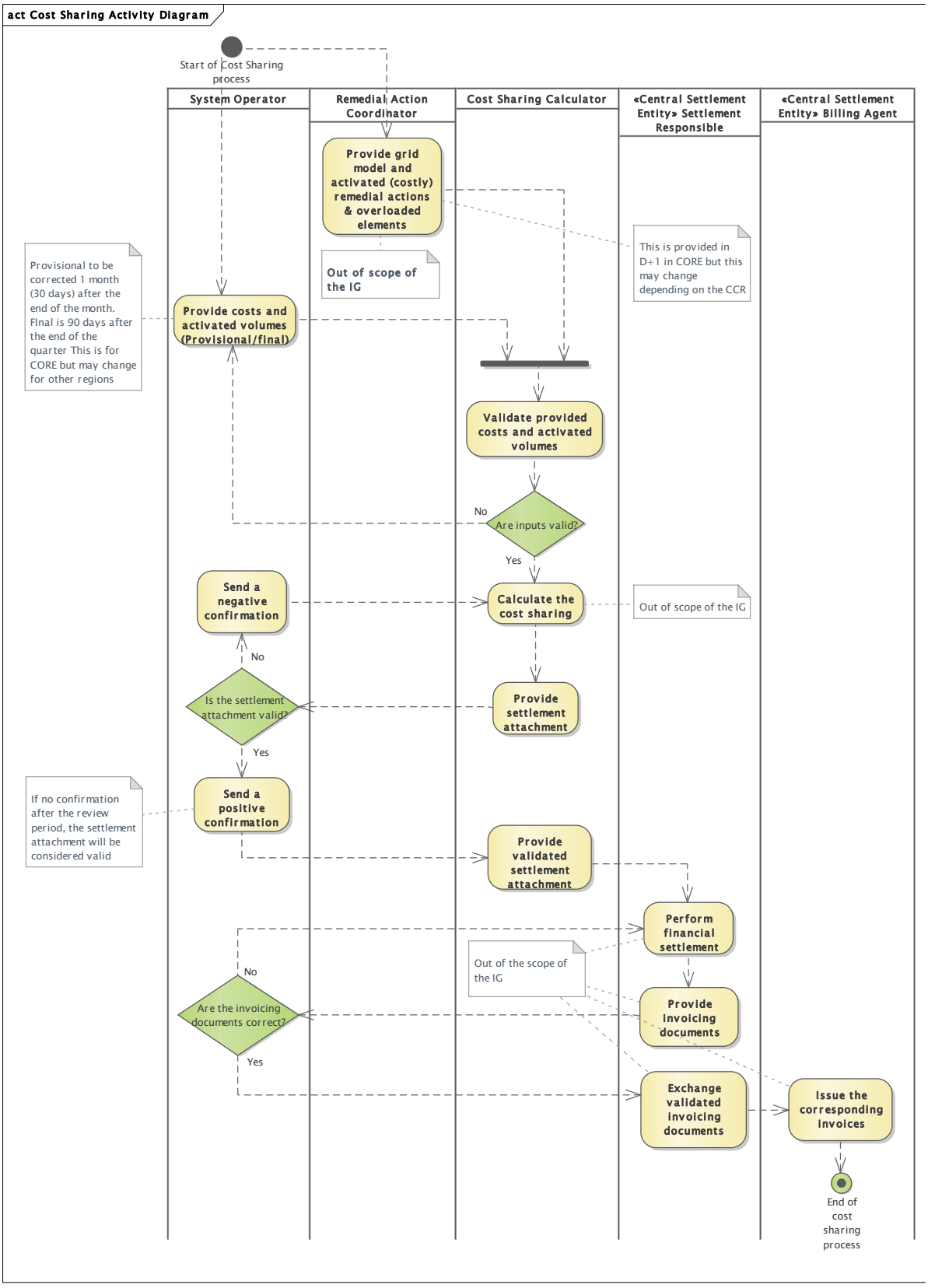


Figure 6 - Activity diagram

The process starts with the provision of the grid model, activated (costly) remedial actions and the overloaded elements from RAC to CSC. This is provided in D+1 in CORE but this may change depending on the CCR. On top of this, SO also provides to CSC the cost and activated volumes (Provisional and final). Provisional costs can be corrected until one month (30 days). Cost is considered final 90 days after the end of the quarter. Those deadlines are for CORE and may change for other regions. Once received, CSC performs a first validation on the inputs. In the case that these inputs are not valid, they have to be resubmitted again. Once the inputs are validated, CSC calculates the cost-sharing which generates the settlement attachment as an output. This settlement attachment is sent to the SO for validation, if the settlement attachment is not validated, SO shall send a negative confirmation to the CSC who shall calculate the cost sharing again. On the other hand if the settlement attachment is valid, SO will send a positive confirmation to the CSC. In case that no confirmation is provided after the review period, the settlement attachment is considered valid by the SO. Once that CSC has the positive confirmation from the SO, then he provides the validated settlement attachment to the SR.

After that the SR performs the financial settlement which produces as an outcome the invoicing documents. These invoicing documents have to be checked by the SO. In case that the invoicing document are not correct, SO should communicate it via email or phone to the SR which shall perform again the financial settlement. If the invoicing documents are valid, then SR will provide them to the Billing Agent which will issue the corresponding invoices to the SO.

5.6. Document exchange processes

5.6.1. General overview

Next figure shows a general sequence diagram of the document exchange processes.

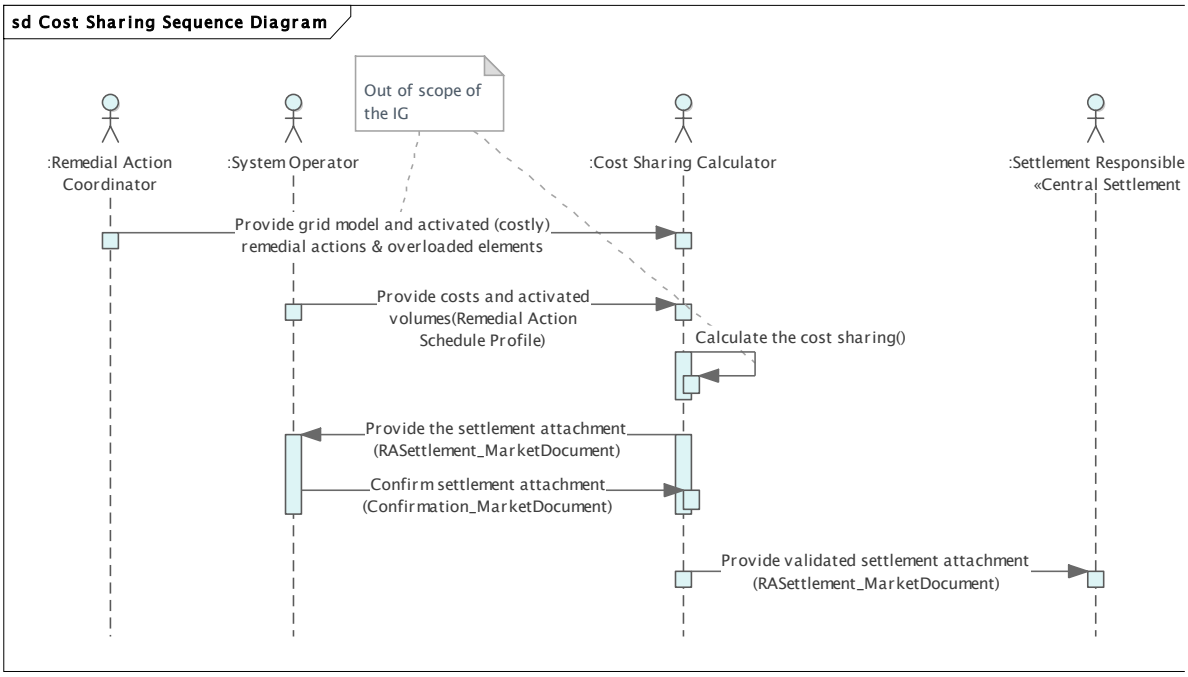


Figure 7 - Sequence diagram

The use cases are supported by the following document exchanges:

5.6.1.1. Acknowledgement – Acknowledgement_MarketDocument

All received profiles except Remedial Action Schedule must be acknowledged with an acknowledgment document, IEC 62325-451-1, in a syntactic and business/semantic way by the different parties.

5.6.1.2. Costs and activated volumes – Remedial Action Schedule profile

SO provides the cost and activated volumes (Provisional and final) to the CSC. These costs and activated volumes are mainly related to redispatch and countertrade remedial actions which use to be the costly ones.

5.6.1.3. Settlement Attachment – RASettlement_MarketDocument

The settlement attachment is composed of the Remedial Action Costs Summary (€) which contains the summary of costs / revenues associated to the remedial actions provided by the providers connected to the BZ. It also contains the Cost Sharing Settlement Result (€) which is the result of cost sharing including the already provided costs/revenues from the Remedial Action Costs Summary and potential additional costs due to the cost sharing principles of the CCR (for ex. polluter pays principle in Core).

Settlement attachment is provided by CSC to SOs for validation. Once that it is valid, then it is forwarded to the SR so the settlement can be performed.

5.6.1.4. Confirmation of RASettlement – Confirmation_MarketDocument

The settlement attachment has to be validated by the SO and therefore has to provide a positive confirmation in case of agreement. On the other hand SO has to provide a negative confirmation in case of disagreement. In case that no confirmation is provided by the SO during the review period, the settlement attachment will be considered positive confirmed.

5.7. Documents overview

The document exchange processes of RD & CT cost sharing process described in the previous chapter require sending and receiving different CIM profiles

- IEC 61970 based profiles:
  - Remedial Action Schedule profile v2.1
- IEC 62325-351 based profiles:
  - Acknowledgement_MarketDocument v8.1 based on IEC 62325-451-1:2017 Ed2;
  - Confirmation_MarketDocument v5.3 based on IEC 62325-451-2:2014
  - RASettlement_MarketDocument v1.0

5.8. Remedial Action Schedule profile

Following table shows a description of the main attributes in RemedialActionSchedule profile v2.1 to be used in this business process.

Item	Description	CIM profile	Class	Attribute	Association
Sender	The TSO providing the incurred cost and activated volume information. This is the TSO operating the control area in which the remedial action is activated.	Header	prov:Entity	wasAttributedTo	
Target Date	This is the day on which the remedial action was activated.	Remedial Action Schedule	BaseSchedule	Start time	
RA Schedule Identifier	This is the identifier that allows you to make the link with the remedial actions decided by the ROSC process (i.e. required in the Core region to correct the deviation between activated and ordered volumes).	Remedial Action Schedule	RemedialActionSchedule		Through the association with RemedialAction it is possible to know the remedial action identifier (mRID).

Item	Description	CIM profile	Class	Attribute	Association
Status of cost info	The status of the cost. It can be either provisional or final	Remedial Action Schedule	Remedial Action Schedule	Kind (e.g. provisional or final)	
Friendly name of asset	This is a free text field where TSOs can provide a human readable name for the remedial action asset on which the remedial action is taking place (which is easier to understand than the ROSC identifier).	Remedial Action Schedule	RemedialActionSchedule		Through the association with RemedialAction class it is possible to know assets which are part of the grid state alterations in the RA. (e.g. RemedialActionSchedule→RemedialAction→GridStateAlteration)
Type	This attribute is used to make distinction between the different types of costly remedial actions. There are two options for this field, Redispatching or Countertrading.	Remedial Action Schedule	RedispatchRemedialAction & CountertradeRemedialAction		
Mode	This attribute is used to indicate if the remedial action was activated preventively or curatively. There are two options, either preventive or curative	Remedial Action	RemedialAction	kind (e.g. curative, Preventive or curativeAndPreventive)	

Item	Description	CIM profile	Class	Attribute	Association
Associated Contingency	This is the contingency identifier associated with the curative remedial action that was activated. Optional depending on CCR approach.	Remedial Action Schedule	RemedialActionSchedule		Through the association with RemedialAction class it is possible to know the contingencies which are associated with a RA. (e.g. RemedialActionSchedule→RemedialAction→ContingencyWithRemedialAction→Contingency)
Start-up cost	This attribute allows the TSO to specify the fixed start-up cost that was paid for starting the associated asset, expressed in [€].	Remedial Action Schedule	RemedialActionCost	startupCost	
Shutdown cost	This attribute allows the TSO to specify the fixed shutdown cost that was paid for stopping the associated asset, expressed in [€].	Remedial Action Schedule	RemedialActionCost	shutdownCost	
Saved fuel cost	Costs/revenues associated to fuels savings due to the activation of the remedial action in [€]. Optional depending on CCR approach.	Remedial Action Schedule	RemedialActionCost	savedFuelCost	

Item	Description	CIM profile	Class	Attribute	Association
Opportunity cost	Costs associated to a loss of an opportunity for the remedial action provider (such as prices on intraday markets). I.e. what would have been the revenues/costs for the provider, if it had not provided the (mandatory) remedial action in [€]. Optional depending on CCR approach.	Remedial Action Schedule	RemedialActionCost	opportunityCost	
Operational cost	Costs associated to changes of technical parameters of the remedial action's provider in [€]. Optional depending on CCR approach.	Remedial Action Schedule	RemedialActionCost	operationalCost	
Other fixed cost	This attribute allows the TSO to specify other fixed activation costs linked to the remedial action, expressed in [€]. Optional depending on CCR approach.	Remedial Action Schedule	RemedialActionCost	otherCost	

Item	Description	CIM profile	Class	Attribute	Association
Variable incurred cost	This is the hourly variable cost incurred by the TSO for the activation of the remedial action, expressed in [€/MWh].	Remedial Action Schedule	RedispatchAction	energyPrice	
Activated volume	This is the hourly activated volume (active power) of the remedial action, expressed in [MW].	Remedial Action Schedule	Redispatch RemedialAction & CountertradeRemedialAction	energy	
Activating TSO	This attribute can be used to specify which TSO activated the remedial action. Optional depending on CCR approach.	Remedial Action	RemedialAction & SystemOperator		Through association between RemedialAction and SystemOperator (ConnectingSystemOperator)
Requesting TSO	This attribute can be used to specify which TSO requested the activation of the remedial action. Optional depending on CCR approach.	Remedial Action Schedule	RemedialActionSchedule & SystemOperator		Through association between RemedialAction Schedule and SystemOperator or Security Coordinator. (ProposingEntity)
Overloaded network element	This attribute can be used to specifiy the network element for which the remedial action was activated. Optional depending on CCR approach.	Assessed Element	AssessedElement & (Conducting Equipment OR Terminal OR PowerTransferCorridor)		Through association between AssessedElement and (ConductingEquipment OR Terminal OR PowerTransferCorridor))

5.9. Acknowledgement_MarketDocument

Following table shows a description of the different attributes in Acknowledgement_MarketDocument v8.1 to be used in this business process.

Table 8 - Acknowledgement_MarketDocument Dependency Table

Acknowledgement_MarketDocument		
Class	**Attribute**	**Values**
Acknowledgement_MarketDocument	mRID	Used. ID of the document
	createdDateTime	Used. The date and time of the creation of the document.
	sender_MarketParticipant.mRID	EIC code of the SO or Cost Sharing Calculator Coding Scheme: A01
	sender_MarketParticipant.marketRole.type	A04: System Operator A53: Cost Sharing Calculator
	receiver_MarketParticipant.mRID	EIC code of the SO or Cost Sharing Calculator Coding Scheme: A01
	receiver_MarketParticipant.marketRole.type	A04: System Operator A53: Cost Sharing Calculator
	received_MarketDocument.mRID	Used. Acknowledged document mRID
	received_MarketDocument.revisionNumber	Used. Acknowledged document revision number
	received_MarketDocument.type	Not used
	received_MarketDocument.process.processType	Not used
	received_MarketDocument.title	Not used
	received_MarketDocument.createdDateTime	Not used
Reason (Linked to Acknowledgement_MarketDocument)	code	A01 if message was accepted. A02 if message was rejected.
	text	Optional (Textual explanation corresponding to the reason code).

5.10. Confirmation_MarketDocument

Following table shows a description of the different attributes in Confirmation_MarketDocument v5.3 to be used in this business process.

Table 8 - Confirmation_MarketDocument Dependency Table

Confirmation_MarketDocument		
Class	**Attribute**	**Values**
Confirmation_MarketDocument	mRID	Used. ID of the document
	type	A18: Confirmation Report
	createdDateTime	Used. The date and time of the creation of the document.
	sender_MarketParticipant.mRID	EIC code of the SO Coding Scheme: A01
	sender_MarketParticipant.marketRole.type	A04: System Operator
	receiver_MarketParticipant.mRID	EIC code of the Cost Sharing Calculator Coding Scheme: A01
	receiver_MarketParticipant.marketRole.type	A53: Cost Sharing Calculator

Confirmation_MarketDocument		
Class	**Attribute**	**Values**
	schedule_Period.timeInterval	Monthly period
	confirmed_MarketDocument.mRID	Used. Confirmed document mRID
	confirmed_MarketDocument.revisionNumber	Used. Confirmed document revision number
	related_MarketDocument.mRID	Not used
	related_MarketDocument.revisionNumber	Not used
	domain.mRID	EIC code of the Capacity Calculation Region. Coding Scheme: A01
	subject_MarketParticipant.mRID	Not used
	subject_MarketParticipant.marketRole.type	Not used
	process.processType	Not used
Reason (Linked to Confirmation_MarketDocument)	code	A01 if the SO agrees the settlement attachment. A02 if the SO disagrees the settlement attachment.
	text	Optional (Textual explanation corresponding to the reason code).
Confirmed_TimeSeries	Not used	
Imposed_TimeSeries	Not used	

5.11. RASettlement_MarketDocument

Following table shows a description of the different attributes in RASettlement_MarketDocument v1.0 to be used in this business process.

Table 8 - RASettlement_MarketDocument Dependency Table

RASettlement_MarketDocument		
Class	**Attribute**	**Values**
RASettlement_MarketDocument	mRID	Used. ID of the document
	revisionNumber	Used. Revision number
	type	B38: Settlement document
	process.processType	A66: Cost Sharing
	sender_MarketParticipant.mRID	EIC code of the Cost Sharing Calculator Coding Scheme: A01
	sender_MarketParticipant.marketRole.type	A53: Cost Sharing Calculator
	receiver_MarketParticipant.mRID	EIC code of the SO Or EIC code of the SR Coding Scheme: A01
	receiver_MarketParticipant.marketRole.type	A04: System Operator Or A54: Settlement Responsible
	createdDateTime	Used. The date and time of the creation of the document.
	period.timeInterval	Used. Period covered by the whole document.
Timeseries	mRID	Used. ID of the TimeSeries
	businessType	C86: Remedial Action Cost Summary C87: Cost Sharing Settlement Result

RASettlement_MarketDocument		
Class	**Attribute**	**Values**
	curveType	A01: Sequential fixed size block
	marketObjectStatus.status	A02:Final A35:Preliminary A73: Delta
	currency_Unit.name	EUR=EURO
	marketParticipant.mRID	EIC code of the SO Coding Scheme: A01
	marketParticipant.marketRole.type	A04: System Operator
Series_Period	timeInterval	Monthly time interval
	resolution	P1M
Point	position	Position in the series
	price.amount	Credit: Negative Price Debit: Positive Price

507
508
509

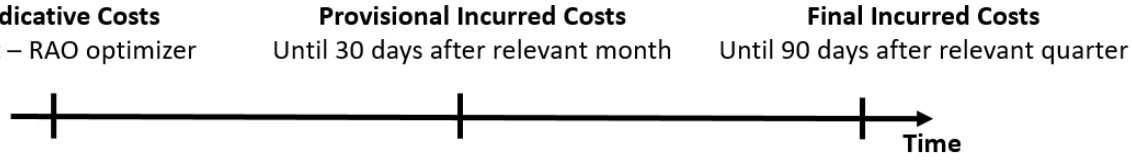
1. Annex

5.12. Data Input: Provider costs & activated volumes

According to Inter-TSO Settlement, each individual TSO will provide its incurred costs and activated volumes per remedial action to the RCC performing the regional Cost-Sharing process.

Depending on the regional Cost-Sharing process agreed upon, distinction can be made between provisional incurred costs and final incurred costs.

[Core CCR] In the Core region for instance there is a distinction between provisional settlement and final settlement. The provisional settlement covers the main money flows while the final settlement aims at performing the final corrections. The provisional incurred costs have to be delivered by 30 days after the end of the month while the final incurred costs have to be delivered by 90 days after the end of the quarter. This is illustrated in the graph below.



The remedial actions to be included for this data input are **all costly remedial actions which are subject to the regional Cost-Sharing process**. The two relevant types of costly remedial actions are Redispatching and Countertrading.

[Core CCR] In the Core region for instance each TSO needs to provide the incurred costs for the following remedial actions:

1. Type 1 = costly Ordered Remedial Actions (ORA) from Core ROSC that belong to the control area of the TSO

2. Type 2 = costly Fast Activation Process (FAP) activations that belong to the control area of the TSO and which are subject to cost-sharing (meaning they replaced an ORA from Core ROSC due to unexpected technical unavailability)

The graph below gives an example of the information to be included in the data input file (the example is for one specific remedial action). The granularity of the input data needs to be agreed per CCR i.e. CCRs will be able to define the time resolution they will be using e.g. 15 min, 1 hour, etc. (The CIM data formats are technically flexible).

Sender	ELIA
Target date	17/05/2022

RA schedule identifier	Status of cost info	Asset - friendly name	Asset – MRID	Type	Mode
20220517_DA_CROSA_ORA_12	Provisional	Name of power plant A	_82292538-4dac-4da3-91db-517ecde9f840	Redispatching	Curative

Associated contingency - friendly name	Associated contingency - MRID	Overloaded network element - friendly name	Overloaded network element - MRID	Activating TSO	Requesting TSO
Name of line A	_87572538-4dac-4da3-91db-517ecde9f831	Name of line B	_33292511-4dac-4da3-91db-326ecde9f155	ELIA	N.A.

Startup cost [€]	Shutdown cost [€]	Saved fuel cost [€]	Opportunity cost [€]	Operational cost [€]	Other fixed cost [€]
5000	0	0	0	0	0

Variable incurred cost [€/MWh]																							
00:00	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
0	0	0	0	0	0	0	0	0	0	0	0	0	55	55	55	55	55	0	0	0	0	0	0

Activated volume [MW]																							
00:00	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
0	0	0	0	0	0	0	0	0	0	0	0	0	150	150	150	150	150	0	0	0	0	0	0

Below there are further clarifications about the different attributes. It is up to each region to specify which attributes are obligatory and which are optional. Also some attributes might not be relevant for specific regions.

- **Sender**: The TSO providing the incurred cost and activated volume information. This is the TSO operating the control area in which the remedial action is activated.
- **Target date**: This is the day on which the remedial action was activated.
- **Variable incurred cost**: This is the hourly variable cost incurred by the TSO for the activation of the remedial action, expressed in [€/MWh].
- **Activated volume**: This is the hourly activated volume (active power) of the remedial action, expressed in [MW].
- **ORA identifier from ROSC**: This is the identifier that allows you to make the link with the remedial actions decided by the ROSC process (i.e. required in the Core region to correct the deviation between activated and ordered volumes).
- **Status of cost info**: This attribute indicates if the information is final or not. There are two options for this field:
  - Provisional
  - Final
- **Friendly name of asset**: This is a free text field where TSOs can provide a human readable name for the asset on which the remedial action is taking place.
- **Type**: This attribute is used to make distinction between the different types of costly remedial actions. There are two options for this field:
  - Redispatching
  - Countertrading
- **Mode**: This attribute is used to indicate if the remedial action was activated preventively or curatively. There are two options:
  - Preventive
  - Curative
- **Associated contingency**: This is the contingency identifier associated with the curative remedial action that was activated.
- **Start up cost**: This attribute allows the TSO to specify the fixed start-up cost that was paid for starting the associated asset, expressed in [€].
- **Shutdown cost**: This attribute allows the TSO to specify the fixed shutdown cost that was paid for stopping the associated asset, expressed in [€].
- **Saved Fuel cost:** costs/revenues associated to fuels savings due to the activation of the remedial action in [€].
- **Opportunity cost**: costs associated to a loss of an opportunity for the remedial action provider (such as prices on intraday markets). I.e. what would have been the revenues/costs for the provider, if it had not provided the (mandatory) remedial action in [€].
- **Operational cost:** costs associated to changes of technical parameters of the remedial actions' provider in [€].

- **Other fixed cost**: This attribute allows the TSO to specify other fixed activation costs linked to the remedial action, expressed in [€].

- **Activating TSO**: this is the TSO responsible for the control area where the RA is located or connected. In case of an interconnector, the TSO executing the topological change shall be considered as RA connecting TSO;

- **Requesting TSO**: This attribute can be used to specify which TSO requested the activation of the remedial action.

When a remedial action subject to the Cost-Sharing process was not activated in reality it is important that the TSO provides an activated volume of zero and an incurred cost of zero. Not sending any cost and volume information for this remedial action would cause failed cross-checks in the regional process (an input is expected for every remedial action subject to cost-sharing).

It is up to each region to define if they will work with a data input file for each day individually or if they prefer to work with one file per month. In any case the files are versioned to allow for the delivery of updates until the relevant deadline.

Potential business checks for the file validation process, if any, need to be specified at regional level.

5.13. Data Output: Settlement attachment

The settlement attachment is composed of two tables:

- **Remedial Action Costs Summary (€)**

  Summary of costs / revenues associated to the remedial actions provided by the providers connected to the BZ.

- **Cost Sharing Settlement Result (€)**

  Result of cost sharing including the already provided costs/revenues from the Remedial Action Costs Summary and potential additional costs due to the cost sharing principles of the CCR (for ex. polluter pays principle in Core).

1. For each settlement (provisional or final), there will be one single overview of monthly credit and debit positions hereinafter referred to as “settlement attachment”, according to Inter-TSO Settlement. The settlement attachment requires the following aspects: The settlement attachment will be the same for TSOs receiving both a credit note and invoice
2. the settlement attachment contains a reference number to which the invoice or credit note will refer.
3. The settlement attachment lists the monthly total costs and revenues of all Core TSOs
4. Costs will be settled by an invoice (debit) and revenues by a credit note (credit).
5. For the final settlement the settlement attachment also displays the delta amounts resulting from the difference between provisional and final total costs/revenues

5.14. Provisional settlement attachment

As a result of the aggregation the provisional settlement attachment will list the monthly, provisional total costs and revenues for each TSOs-

Reference Number: YYYY/MM/PRO/01

	Remedial Action Costs Summary (€)			
	TSO A	TSO B	TSO C	TOTAL
Credit	-2300	0	-700	-3000
Debit	0	200	0	200

	Cost Sharing Settlement Result (€)			
	TSO A	TSO B	TSO C	TOTAL
Credit	0	0	0	0
Debit	1000	1200	600	2800

5.15. Final settlement attachment

This process will take place only once every quarter. As a result of the aggregation the final settlement attachment will list the final total costs and revenues for each TSO on a monthly basis. In addition, the difference between the provisional and final costs/revenues (delta amounts) is listed:

Reference Number: YYYY/MM/FIN/01
Delta amounts:

	Remedial Action Costs Summary (€)			
	TSO A	TSO B	TSO C	TOTAL
Credit	0	-300	0	-300
Debit	100	0	100	200

	Cost Sharing Settlement Result (€)			
	TSO A	TSO B	TSO C	TOTAL
Credit	-37	0	0	-37
Debit	0	91	46	137

Final monthly total costs and revenues

	Remedial Action Costs Summary (€)			
	TSO A	TSO B	TSO C	TOTAL
Credit	-2200	-100	-600	-2900
Debit	0	0	0	0

	Cost Sharing Settlement Result (€)			
	TSO A	TSO B	TSO C	TOTAL
Credit	0	0	0	0
Debit	963	1291	646	2900

Provisional monthly total costs and revenues

	Remedial Action Costs Summary (€)			
	TSO A	TSO B	TSO C	TOTAL
Credit	-2300	0	-700	-3000
Debit	0	200	0	200

	Cost Sharing Settlement Result (€)			
	TSO A	TSO B	TSO C	TOTAL
Credit	0	0	0	0
Debit	1000	1200	600	2800