Annex 3: Policy on Accounting and Settlement

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INTRODUCTION

This document is part of the Synchronous Area Framework Agreement for the Synchronous Area CE (SA CE).

All times mentioned in this document are related to CET respectively CEST. Additional details of the Accounting and Settlement Process are described in the following documents:

ENTSO-E ACCOUNTING AND FINANCIAL SETTLEMENT OF KF, ACE AND RAMPING PERIOD (FSKAR) IMPLEMENTATION GUIDE

currently published on https://www.entsoe.eu/publications/electronic-data-interchange-edi-library/.

A METHODOLOGIES, CONDITIONS AND VALUES SUBJECT TO ALL REGULATORY AUTHORITIES APPROVAL

The following section includes all methodologies, conditions and values jointly developed by all TSOs from the Synchronous Area CE and which are subject to approval by all regulatory authorities .

A-1 COMMON SETTLEMENT RULES APPLICABLE TO INTENDED EXCHANGES OF ENERGY ACCORDING TO ARTICLE 50(3) EBGL (MANDATORY & NRA APPROVAL)

The SAFA Parties acknowledge that the proposal "All continental European TSOs' proposal for common settlement rules for intended exchanges of energy as a result of the frequency containment process and ramping period in accordance with the Article 50(3) of Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing" that has been approved according to Article 4 EBGL on 09 March 2020 and approved by the competent regulatory authorities in accordance with Article 5(3) EBGL as of 16 June 2020 is accepted by all Parties. The Parties agree to apply this methodology as it is agreed by the TSOs and approved by the NRAs.

Amendment Proposals that will be developed on the basis of a Request for Amendments by the relevant regulatory authorities according to Article 6 of the EB GL will be processed by applying the regular amendment rules according to Article 14 of the SAFA.

A-2 COMMON SETTLEMENT RULES APPLICABLE TO ALL UNINTENDED EXCHANGES OF ENERGY ACCORDING TO ARTICLE 51(1) EBGL (MANDATORY & NRA APPROVAL)

The SAFA-Parties acknowledge that the document "All continental European TSOs' proposal for common settlement rules for all unintended exchanges of energy in accordance with Article 51(1) of Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing" that has been approved according to Article 4 EBGL on 09 March 2020 and approved by the competent regulatory authorities in accordance with Article 5(3) EBGL as of 16 June 2020 is accepted by all Parties. The Parties agree to apply this methodology as it is agreed by the TSOs and approved by the NRAs.

Amendment Proposals that will be developed on the basis of a Request for Amendments by the relevant regulatory authorities according to Article 6 of the EB GL will be processed by applying the regular amendment rules according to Article 14 of the SAFA.

B METHODOLOGIES, CONDITIONS AND VALUES SUBJECT TO APPROVAL BY ALL TSOS

The Parties acknowledge that at the moment of entry into force of the Agreement there is no obligation arising from the applicable legislation according to Article 2.1 of the SAFA to include Part B within the subject scope of the Policy on Accounting and Settlement.

C METHODOLOGIES, CONDITIONS AND VALUES AGREED AMONG THE MEMBERS OF RGCE

The following section includes all methodologies, conditions and values which are jointly developed and agreed among the SAFA parties.

C-1 DEFINITIONS

C-1-1 ACCOUNTING PROCESS

The Accounting Process is the validation of the metered data (usually located at an interconnecting Tie-Line of a TSO) and of the resulting Accounting Data. The purpose of the daily accounting is to provide a validated set of Accounting Data to the Co-ordination Centres (CCs) in order to calculate every day the actual state of the Account of Unintentional Deviation.

The purpose of the accounting process is the calculation of the volumes of intended exchanges of energy as a result of the frequency containment process (FCP energy), the ramping period energy (RP energy) and Unintended Exchanges (UE energy), for each TSO-TSO settlement period.

C-1-2 SETTLEMENT PROCESS

The purpose of the Settlement Process is the determination of the settlement prices for the intended exchanges of energy as a result of the frequency containment process (FCP energy), the ramping period energy (RP energy) and Unintended Exchanges (UE energy), for each TSO-TSO settlement period and the final monetary values for each LFC area/block and settlement period. The Settlement Process concludes with the distribution of results through the Settlement Reports

C-1-3 CROSS-BORDER ENERGY EXCHANGES

The cross-border energy exchange consists of the following:

$$E_{ex} = E_{sch} + E_{VTL} + E_{FCP} + E_{RP} + E_{ue}$$

Cross-border flows E_{ex}

The sum of the cross-border Tie-Line flows on a border between two TSOs / LFC Areas / LFC Blocks, as taken from the Accounting Data.

Aggregated netted external schedules E_{sch}

This means the cross-border energy exchange through Aggregated Netted External Schedules (ANES) according to SOGL. This includes the cross-border energy exchanged as Replacement Reserves and Emergency Assistance as well.

Virtual tie-line exchanges E_{VTL}

Virtual Tie-Line is defined in SOGL. The energy exchanged through Virtual Tie-Lines can be manual Frequency Restoration Reserves, automatic Frequency Restoration Reserves and Imbalance Netting. Moreover, there might be other processes that use Virtual Tie-Lines for the exchange of energy. Virtual tie-line exchanges are established within the Accounting Data.

Frequency Containment Process Energy or FCP Energy E_{FCP}

E_{FCP} refers to the intended exchanges of energy as a result of frequency containment process. It is equal to the product of the notified K-factor with the average frequency deviation for each TSO-TSO settlement period and each LFC area.

K-factor. K-factor represents the assumed reaction of a LFC area/block to a frequency deviation. Defined in the SOGL as a value expressed in Megawatts per Hertz ('MW/Hz'), which is as close as practical to, or greater than the sum of the auto-control of generation, self-regulation of load and of the contribution of frequency containment reserve relative to the maximum steady-state frequency deviation. The K-factors are provided by each TSO for its own LFC area/block.

Δ*f* (frequency deviation). The Δ*f* represents the average value of the secondly frequency deviations relative to the nominal system frequency in the Synchronous Area per TSO-TSO settlement period. The value of Δ*f* is expressed in mHz.

$$\Delta f = f_{measured} - f_{set}$$

Where $f_{measured}$ is the average measured value of the frequency per TSO-TSO settlement period in the Laufenburg node of the Synchronous Area.

Ramping Period Energy or RP Energy E_{RP}

Energy exchanged as a result of ramping between different ANES values (ANES n-1 and ANES n , where n and n-1 refer to adjacent TSO-TSO settlement periods). The RP energy is the difference between a step change and a ramped change, where the ramp is linear starting 5 minutes before the change and ending 5 minutes after the change.

Unintended Energy Exchange or UE Energy E_{ue}

This means the unintended cross-border exchange of energy according to EBGL. E_{ue} is equal to the remaining energy exchanges, which are not included due to the verified ANES, the virtual tie-line exchanges, the delivery of FCR (FCP energy) or the realization of ramps in the control programs (RP energy).

C-1-4 METER MEASUREMENT DATA

The physical energy exchange is registered per Tie-Line, by meter devices installed at substations, which are located at each end of the Tie-Line. There must be at least one main meter device and up to "n" back up meter devices per Tie-Line on each end of the Tie-Line.

C-1-5 ACCOUNTING POINT

The Accounting Point is the agreed energy delivery point between two TSOs. The Accounting Point can be placed anywhere on the Tie-Line in accordance with the agreement between two TSOs. Based on the position of Accounting Point, Accounting Data for this Accounting Point is calculated. There must be only a single Accounting Point per Tie-Line.

In case of a Virtual Tie-Line, the location of the Accounting Point is agreed bilaterally between adjacent TSOs. The power flows of the TSOs can also be based on values which are agreed upon between the involved TSOs and are considered in the Accounting Process.

C-1-6 ACCOUNTING DATA

Accounting Data for each Tie-Line is the result of an agreement between two TSOs. One TSO proposes the values using the rules described in C-5-2, and the second TSO confirms the proposed values.

Accounting data is derived from validated metered data in one of the following ways (as agreed upon between TSOs sharing a Tie-Line):

- one to one copy of the meter measurement data (located at the accounting point),
- a calculation using a given formula, and either one or more meter measurement data (e.g. in order to consider line losses).

Accounting data is considered as a value per Tie-Line.

Virtual Tie-Lines are included in the Accounting Data and must be considered as shown in Figure 1. The physical energy exchange between LFC Area 1 and LFC Area 2 is measured by M1+M2 and includes the physical flow measured by M3. The measurement M3 is used as an offset to the set-point of the LFC Controller. Additionally, it must be subtracted from the Accounting Data for accounting.

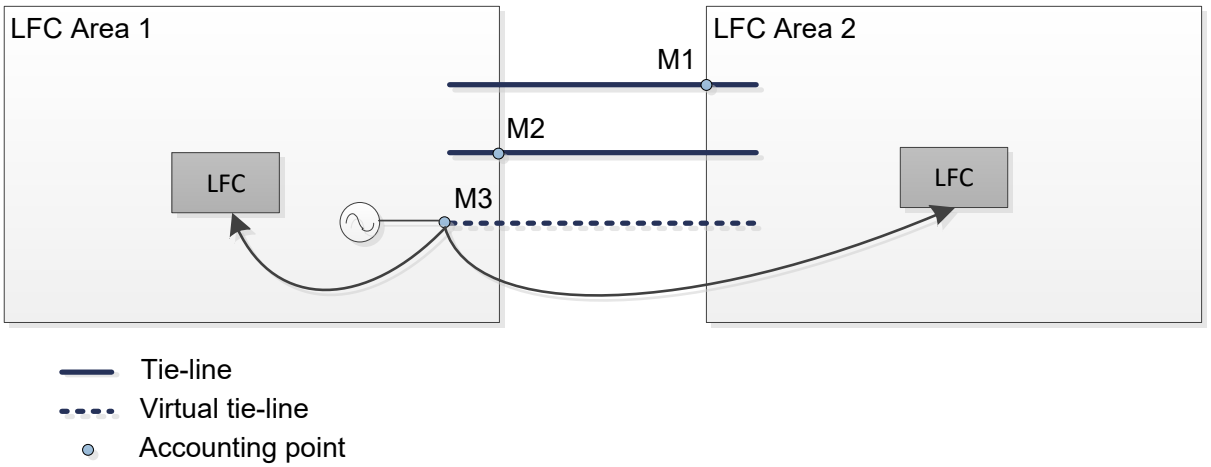

Figure 1: The consideration of virtual tie-line

C-1-7 WORKING DAY

The Working Day is the calendar day except Saturdays, Sundays and 4 holidays: Christmas day (25th of December), New Year's day (1st of January), Easter Monday and Ascension Day.

C-1-8 FINANCIAL SETTLEMENT

Process established among RG CE TSOs in order to financially compensate the intended exchanges of energy resulting from the frequency containment process and ramping periods, as well as unintended exchanges of energy. The process is the scope of this Policy on Accounting and Settlement.

C-1-9 TSO-TSO SETTLEMENT PERIOD

The TSO-TSO Settlement Period is the resolution or time period for which the Settlement Process is performed. The TSO-TSO Settlement Period corresponds to 15 min.

C-1-10 SETTLEMENT PRICE

The Settlement Price is the price for E_{RP}, FCP Energy and UE used for settling financially the volumes of E_{RP}, FCP Energy and UE for each TSO-TSO settlement period. This is an uniform price for the Synchronous Area with the only exception of the FCP Energy and UE between two LFC Area connected only by HVDC cable for which the price may be different.

The Settlement Price of E_{RP} is 0€/MWh.

C-1-11 SETTLEMENT RESULTS

The Settlement Results consist of volumes, prices and monetary values (equivalent to the multiplication of volumes and corresponding prices) for each of E_{FCP}, E_{RP} and E_{ue}.

C-1-12 SETTLEMENT REPORTS

The results of the accounting and settlement processes are summarized into three different reports, which are sent by the Co-ordination Centres (CCs) to the TSOs. These reports are the Daily Settlement Report (DSR), the Daily Settlement Prices Report (DSPR) and the Monthly Settlement Process (MSR). The following table gives an overview about the contents of the individual reports.

Table 1: Content of the settlement reports

	Daily Settlement Report (DSR)	**Daily Settlement Prices Report (DSPR)**	**Monthly Settlement Report (MSR)**
Timeframe:	1 day	1 day	1 month
Scheduled energy exchanges (ANES) [1] - MWh	x		
Intended Exchanges (Virtual Tie-Lines) – MWh	x		
Accounting Tie-line flows - MWh	x		
K-factors – MW/Hz	x		
Frequency Deviation – mHz	x		
Volumes of FCP Energy – MWh	x	x	x
Volumes of RP Energy – MWh	x	x	x
Volumes of UE Energy – MWh	x	x	x
Day-Ahead Market Price (DAMP) - €/MWh	-	x	-
Price for FCPE - €/MWh		x	x
Price for RPE - €/MWh		x	x
Price for UE - €/MWh		x	x
Monetary values for FCPE - €	-	x	x
Monetary values for RPE - €	-	x	x
Monetary values for UE - €	-	x	x

[1] The scheduled energy exchanges will additionally include the compensation program for the transition phase, see C-10.

C-1-13 CO-ORDINATION CENTRE

The Co-ordination Centres (CCs) are the entity assigned by RG CE Plenary according to the SAFA Article 15 decision making process (see C-8). The Co-ordination Centres are responsible within the financial settlement for:

- Receiving Accounting Data from TSOs to perform the Accounting Process
- Perform the Accounting Process and Settlement Process as described in this Policy
- Calculating the Settlement Results as reflected in the DSR, DSPR and MSR, submitted to the TSOs
- Submitting the monthly Settlement Results to the Invoicing Entity for invoicing

C-1-14 INVOICING ENTITY

The Invoicing Entity is an external party, assigned by RG CE Plenary in accordance with the RG CE Terms of References and SAFA Article 15 decision making process, to invoice TSOs according to the results of the Financial Settlement.

C-2 STANDARDS – GENERAL PROCESS OVERVIEW

C-2-1 OVERVIEW

In the SA CE the energy volumes corresponding to Frequency Containment Process (FCP) Energy, Ramping Period (RP) Energy, and Unintended Exchange (UE)) are compensated financially between TSOs.

C-2-2 WORKFLOW FOR THE ACCOUNTING AND SETTLEMENT PROCESS

Accounting process

The Accounting Process begins with the validation of the metered data by TSOs (usually located at an interconnecting Tie-Line of a TSO) and of the resulting Accounting Data. The purpose of the daily accounting is to provide a validated set of Accounting Data to the Co-ordination Centres in order to perform the settlement process every day.

Accounting process by the TSOs: TSOs have to finish the daily accounting process on the first working day after energy delivery, except in cases of unavailability of accounting offices (see C-3-3) or data mismatch (see C-3-8 or C-5-2-4). It starts with the initial exchange of metered data for each Tie-Line between neighbouring TSOs, continues with the establishment of the Accounting Data for each Tie-Line, and the transmission of the resulting Accounting Data up to the Co-ordination Centres.

Accounting process by the Co-ordination Centres: Upon reception of the Accounting Data (including VTL), the frequency deviations from Swissgrid and the K-factors from the TSOs, the Co-ordination Centres perform the determination of energy volumes corresponding to Frequency Containment Process (FCP) Energy, Ramping Period (RP) Energy, and Unintended Exchange (UE) by comparison with the sum of the LFC areas schedules (ANES) and application of the corresponding formulas. Afterwards, a Daily Settlement Report (DSR) is sent to each TSO. The TSOs have the opportunity, to review the reported settlement results within a given deadline according to the ACCOUNTING AND FINANCIAL SETTLEMENT OF KF, ACE AND RAMPING PERIOD (FSKAR) IMPLEMENTATION GUIDE. The expiration of

the deadline concludes the Accounting Process and the daily settlement volumes are considered final.

Settlement process

The daily settlement starts after the daily Accounting Process for all TSOs has been concluded and the Co-ordination Centres(CCs) have received all Day-Ahead Market Prices (DAMPs). The Co-ordination Centres perform the calculation of the Settlement Price for FCP Energy, RP Energy and UE. Following this, the Daily Settlement Prices Report (DSPR) is consolidated and distributed among the TSOs. The TSOs have the opportunity to review the reported settlement results within a given deadline according to the ACCOUNTING AND FINANCIAL SETTLEMENT OF KF, ACE AND RAMPING PERIOD (FSKAR) IMPLEMENTATION GUIDE. After expiration of this deadline, the Daily Settlement Process is concluded and the daily settlement prices are considered final.

The monthly Settlement Process is performed after the Daily Settlement Process is concluded for each day of the calendar month. It covers the correction of daily settlement (if any) and consolidation of the results of all the DSPR. Co-ordination Centres send the consolidated results to each TSO through the Monthly Settlement Report (MSR). The TSOs shall confirm the MSR according to the ACCOUNTING AND FINANCIAL SETTLEMENT OF KF, ACE AND RAMPING PERIOD (FSKAR) IMPLEMENTATION GUIDE. After receiving all confirmations from the TSOs, the Settlement Process is concluded and the monthly results are considered final.

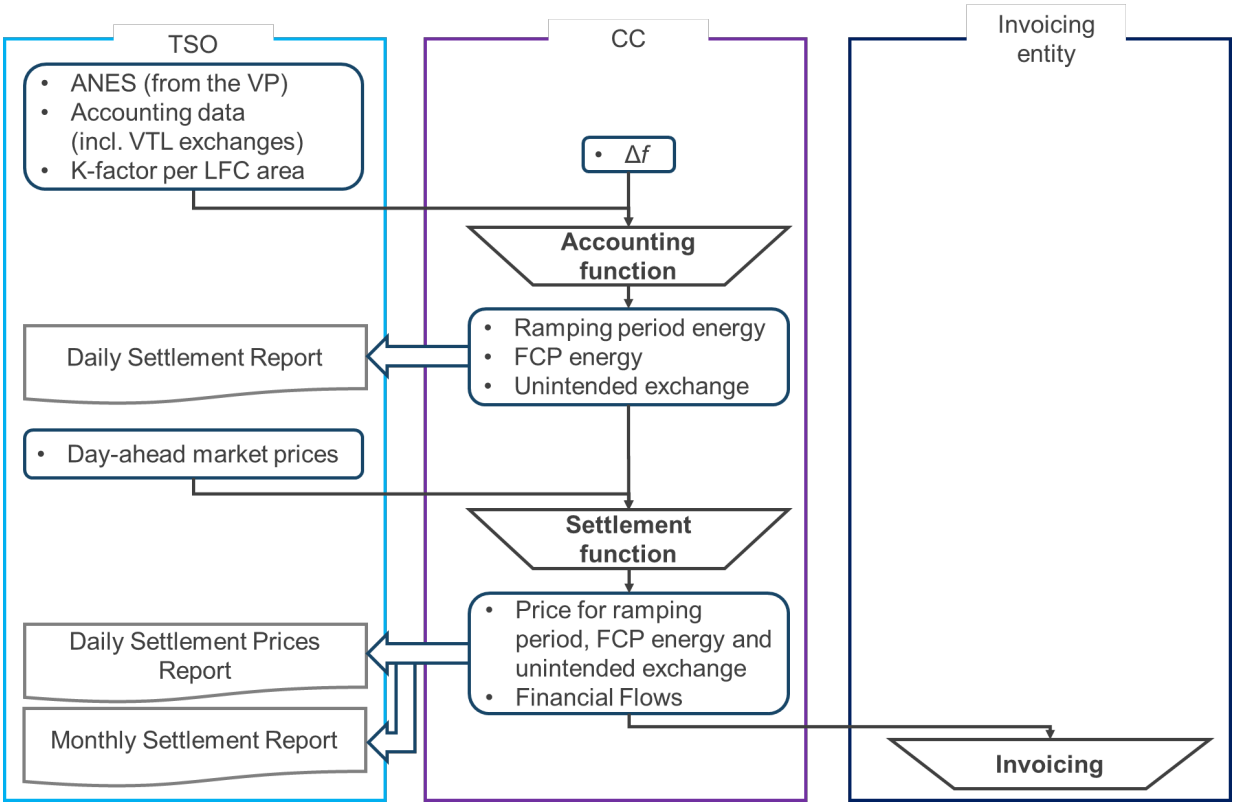

Figure 2. Workflow of the accounting and settlement process

C-2-3 CONSIDERATION OF TIME SHIFT CET - CEST

For the day with a duration of 23 hours, the period from 02:00 to 03:00 shall not be considered.

For the day with a duration period of 25 hours, the period from 02:00 to 03:00 shall be considered to be extended to two hours for the calculation.

C-2-4 AREA CONSIDERATION

Per default, the Accounting and Settlement Process shall be performed on LFC area level. This requires that each LFC Area Operator shall send the relevant data for performing the process to the Co-ordination Centres.

Alternatively, LFC blocks may agree on performing Accounting and Settlement Process on LFC Block level, for which the LFC Block Operator shall send the relevant data aggregated for the LFC Block to the Co-ordination Centres, if all LFC areas of the LFC Block jointly agree on this. The list of LFC Blocks performing Accounting and Settlement Process on LFC Block level is included in C-10-4.

The Day-Ahead Market Prices (DAMPs) are determined per LFC Block as detailed in Chapter C-6-1.

C-3 STANDARDS - GENERAL RULES

C-3-1 ACCOUNTING AND SETTLEMENT PERIOD

The daily accounting and settlement is done for the day “D” on the next Working Day.

The monthly settlement is done for the calendar month.

C-3-2 AVAILABILITY

Accounting offices have to be available on working days from 08:00 to 11:30 and 13:30 to 16:00 CET respectively CEST.

C-3-3 LOCAL EXCEPTIONS

In case of unavailability of an accounting office, e.g. system maintenance, local holidays, the office in question must inform the Co-ordination Centre and other affected TSOs at least 4 days before. In case of unexpected unavailabilities, as soon as possible.

C-3-4 CONSIDERATION OF DC-LINKS

DC links between CE LFC areas will be considered in the SA CE Accounting and Settlement process, only if they are considered by both connecting TSOs in the exchange programs and in the LFC Controller.

DC links between synchronous areas cannot be considered in the SA CE accounting and settlement process.

C-3-5 MODIFICATION OF THE ACCOUNTING PROCESS AND RELATED DATA

The SAFA parties must provide the complete and correct information about all issues affecting the Accounting Process e.g. new or changes of tie lines (including DC-links and virtual tie-lines), etc.

In case of changes the requesting TSO must inform the affected TSO and Co-ordination Centre at least 30 calendar days in advance by means of the registration form in C-10-2.

C-3-6 ROUNDING RULES

Generally, the data exchanged is in MWh with 3 decimal places (kWh precision).

The following rounding rules will be considered in the calculations by Co-ordination Centres:

- For input data:
    - Energy volumes (MWh) with 3 decimal places
    - K-factors (MW/Hz) with 3 decimal places.
    - DAMP (Eur/MWh) with 2 decimal places (cent precision)
    - Frequency deviation (mHz) with 3 decimal places
- Calculation steps:

- Calculation of RP energy: MWh with 3 decimal places (kWh precision), rounded commercially. Rounding differences are taken into account by the Co-ordination Centres respectively, to ensure the sum of RP energy is zero.
- Calculation of FCP energy: MWh with 3 decimal places (kWh precision), rounded commercially.
- Calculation of UE energy: MWh with 3 decimal places (kWh precision), rounded commercially. Rounding differences are taken into account by the Co-ordination Centres respectively, to ensure the sum of UE and FCP energy is zero.
- Calculation of price for FCP energy and UE energy: Euro with 2 decimal places, rounded commercially
- Monetary values (settlement volumes multiplied the prices): Euro with 2 decimal places, rounded commercially. Rounding differences are taken into account by the Co-ordination Centres respectively, to ensure the sum is zero.

- For sake of clarity:
  - 24,0005 rounds to 24,001;
  - -24,0005 rounds to -24,001
  - and 24,00049 rounds to 24,000

C-3-7 ELECTRONIC DATA EXCHANGE

Electronic data exchange for accounting and settlement is required using e-mail via EH. If the e-mail via EH is disturbed, an electronic back-up must be agreed such as e-mail via internet . If electronic communication is generally disturbed, fax or phone must be used as last back-up.

C-3-8 TROUBLESHOOTING

If the Accounting and Settlement Process cannot be performed like described, the affected TSO must inform immediately the affected TSO and the related Co-ordination Centre. The Co-ordination Centres then inform all SA CE affected TSOs immediately. Both Co-ordination Centres will agree on a solution and inform the related TSOs immediately.

C-4 STANDARDS - BILATERAL AGREEMENT FOR THE ACCOUNTING/SETTLEMENT PROCESS

In order to perform the Accounting and Settlement Process in a correct manner the partners of a common border have to agree bilaterally on accounting metering data with respect to the following document: ENTSO-E Guide for Agreement on Data Exchange Process for Accounting of Unintentional Deviation and including the following items:

C-4-1 LIST OF TIE-LINES, METER MEASUREMENT AND ACCOUNTING DATA

TSOs have to agree bilaterally upon the list of Tie-Lines and Virtual Tie-Lines to be included in the SA CE Accounting Process according to the ENTSO-E Guide for Agreement on Data Exchange Process for Accounting of Unintentional Deviation. This list also has to provide information about meter measurement and Accounting Data. It must provide:

- Names of both involved TSOs
- Name of Tie-Lines
- Name and related TSO of substations Tie-Line is connecting
- List of measurement data to be used to derive the accounting value
- List of measurement data to be exchanged
- EIC for each meter measurement data to be exchanged
- EIC of accounting point
- If line losses to be considered, agreement on formula to calculate Accounting Data

This agreed list must be transmitted towards the related Co-ordination Centres for SA CE publication. The data from the Accounting Point must be used by all SA CE bodies involved as unique representation of the physical energy exchange concerning the Tie-Line.

C-4-2 DATA FORMAT

The SAFA parties have to use the data exchange format for metering, accounting and settlement:

- SOMA: System Operator Meter Alignment
- SOVM: System Operator Validated Measurements
- SOAM: System Operator Accounting Data Matching
- SOVA: System Operator Validated Accounting data
- DSR: Daily Settlement Report
- DSPR: Daily Settlement Prices Report
- MSR: Monthly Settlement Report
- K-factors
- DAMP
- Frequency Deviation

according to the bilateral agreement and the ACCOUNTING AND FINANCIAL SETTLEMENT OF KF, ACE AND RAMPING PERIOD (FSKAR) IMPLEMENTATION GUIDE.

C-4-3 TROUBLE SHOOTING

In order to be prepared in case of problems, TSOs have to agree bilaterally on the rules how to deal in case of trouble shooting (missing meter measurement data, inconsistent data,

unavailable data, ...) In this case TSOs have to agree bilaterally on a substitute value for every time unit in question and inform their related Co-ordination Centres or/and LFC Block immediately (see C-7-1). Substitute values are to be submitted within the deadlines defined for submission of Accounting Data (see C-10-2)

C-4-4 RESOLUTION

TSOs must agree on the resolution for the validation of the energy exchange on their common border. The resolution for the exchange of meter measurement and Accounting Data is by default the integer value of MWh for the time frame ¼ h. If bilaterally agreed Accounting Data can also be in MWh with 3 decimal digits.

C-4-5 CONSIDERATION OF LINE LOSSES

TSOs have to agree on the way to consider line losses. This can be done by agreement defining the Accounting Point e.g. on the basis of the Accounting Data.

C-5 STANDARDS - ACCOUNTING PROCESS

C-5-1 OVERVIEW

In the framework of the Accounting Process, Co-ordination Centres (CCs) calculate:

- The volumes of FCP energy and RP energy for each TSO-TSO settlement period. The inputs needed for these calculations shall be:
  - The K-factor per LFC area or LFC block;
  - The average of the frequency deviation over each TSO-TSO settlement period;
  - The aggregated external schedules (ANES)
- The volumes of UE energy for each TSO-TSO settlement period. The inputs needed for these calculations shall be:
  - The Accounting Data per TSO-TSO settlement period and per LFC area or LFC Block of SA CE, including exchanges of energy accounted through a virtual tie-line;
  - All aggregated netted external schedules (ANES);
  - The volumes of FCP Energy and UE Energy

C-5-2 ACCOUNTING DATA EXCHANGE BETWEEN TSOS IN THE SA CE

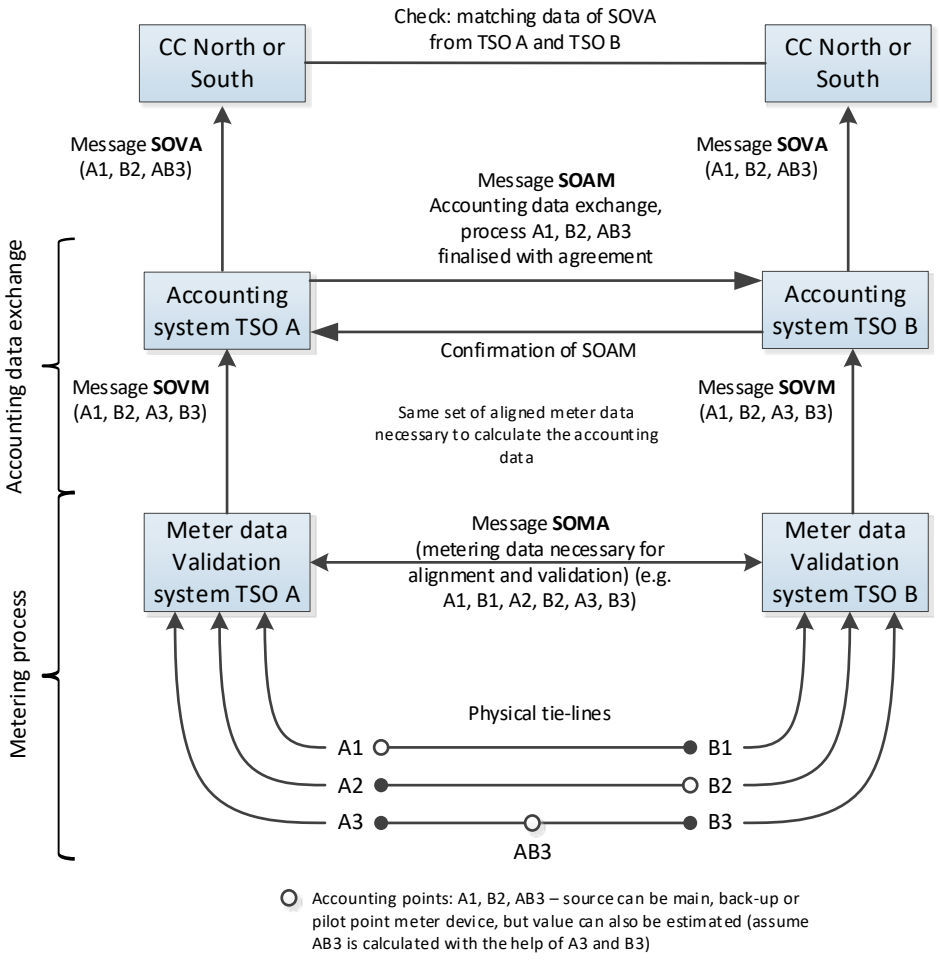

Figure 3: Overview of the Data Exchange Process between TSOs

Principles of meter measurement data exchange

Each TSO assembles and sends his meter measurement data document “System Operator Meter Alignment” (SOMA) to his adjacent TSO (see C-4-1, C-1-7 and Figure 3). Every TSO validates the contents of the SOMA document. The TSOs inform each other about the result of validation.

In case of successful validation, the meter measurement data document “System Operator Validated Measurements” (SOVM) is assembled and sent to the accounting data system of the TSO in order to calculate the accounting data (e.g. consideration of losses).

Principles of accounting data exchange between TSO

The calculated Accounting Data is assembled into a document “System Operator Accounting Data Matching” (SOAM) and must be exchanged between involved TSOs. One TSO sends the values that have been calculated and that will serve as the accounting point data. If the receiving TSO agrees to the values, then a positive acknowledgement is sent. If, however, the receiving TSO does not agree, then a negative acknowledgement is sent. Both TSOs send the SOAM after successful matching (SOVA) to the related Co-ordination Centres. If Accounting Data is based on substitute meter measurement data, the two involved TSO have time to adjust the data during the Accounting Process. If data is not adjusted by the TSO and data received in SOVA matches, this data is considered as final on the dedicated SA CE border. If data does not match, the accounting mismatch rules (see 25C-7-1) will be applied by the dedicated SA CE level (see Table 2).

C-5-2-1 Metering requirements

The following metering requirements must be fulfilled by the metering devices on both ends of the Tie-Line by both connecting TSOs.

Voltage and current transformer

Voltage and current transformers have to be operated at each metering point which data is used as source for the determination of an Accounting Point. Voltage and current transformers at the Accounting Points must have an accuracy class rating of 0.2. Current transformers must have 2 cores for measurement purposes.

Electricity metering

On the basis of the current and voltage values measured by the transformers, the electricity meters determine the active energy flow in both directions related to a given time frame. The electricity meters at the accounting points must have an accuracy class rating of 0.2.

Redundancy

Metering points must be equipped with main and check meters at each Tie-Line. Main and check meter must be connected each to a separate core of the current transformer. Equivalent solution to this is allowed.

Transformer cables

Due to the accuracy of the whole metering, voltage transformer cables must be designed in such a way that a voltage drop is reduced to 0.1% or less of the nominal voltage.

Telecounter

The task of a telecounter is the acquisition of metered values from the electricity meters at the metering point and the teletransmission of this data to the central accounting office of every partner concerned (remote meter reading). The counters at a metering point must be doubled.

C-5-2-2 Availability and timing for meter measurement data exchange process

The SAFA parties must follow the deadlines outlined in C-10-2.

C-5-2-3 Availability and timing of accounting data exchange process

The SAFA parties must follow the deadlines outlined in C-10-2.

C-5-2-4 Troubleshooting procedure

The TSOs have to apply bilaterally the agreed rules for troubleshooting (see C-7-1).

The TSO are obliged to send their available or substitute Accounting Data even if values do not match at deadline (see C-10-2).

C-5-3 WORKFLOW OF ACCOUNTING PROCESS

The workflow of the Accounting Process is described in the ACCOUNTING AND FINANCIAL SETTLEMENT OF KF, ACE AND RAMPING PERIOD (FSKAR) IMPLEMENTATION GUIDE.

C-5-3-1 Inputs

The Verification Platform provides the scheduled exchanges (ANES) to the Co-ordination Centres.

TSOs with yearly K-factors send them to the Co-ordination Centres once per year. TSOs participating in the FCR cooperation update these K-factors on a daily basis with 4h-resolution, therefore they are required to additionally send the updated K-factors to the Co-ordination Centres. System Operator Swissgrid sends the Δf to the Co-ordination Centres.

The submission deadline of these data is the first working day after energy delivery as detailed in the Table 2: Timetable for daily accounting and settlement process.

C-5-3-2 Outputs

The energy exchanges are calculated as follows:

FCP Energy, for each LFC area or LFC block, using the corresponding K-factor, the frequency deviation Δ*f*:

$$E_{FCP} = -k * \Delta f * \frac{1}{4} h$$

RP Energy for the quarter hour n referring to the scheduled ANES (MW) in quarter-hours n-1 and n+1 (previous and following quarter hours):

$$E_{RP} = \frac{(ANES_{n-1} - ANES_n)/2}{2} * \frac{5}{60}h + \frac{(ANES_{n+1} - ANES_n)/2}{2} * \frac{5}{60}h$$

UE Energy:

$$E_{ue} = E_{ex} - E_{sch} - E_{VTL} - E_{FCP} - E_{RP}$$

The parameters in the calculations refer to the cross-border energy exchange that is intended (E_{ie}), done through virtual tie lines (E_{VTL}), a result of FCP (E_{FCP}) and ramping period processes (E_{RP}) or unintended (E_{ue}).

The outputs of the accounting function are E_{FCP}, E_{RP} and E_{UE}.

C-5-3-3 Daily Settlement Report

As a result of the Accounting Process, the TSOs receive for their corresponding LFC area the following results through the Daily Settlement Report (DSR), for each TSO-TSO settlement period of the day:

- Scheduled energy exchanges for each border (ANES) – individual schedules will be reported
- The scheduled energy exchanges will include the compensation program, for the transition phase (from compensation programs to financial settlement)
- Intended energy exchange for each Virtual Tie-Line (as reported in SOVA files) – individual tie-line exchanges will be reported
- Metered Tie-Line flows for each Tie-Line (as reported in SOVA files) –per individual Tie-Line
- K-factors
- Frequency Deviation
- Volumes of FCP Energy for each TSO
- Volumes of RP Energy for each TSO
- Volumes of UE Energy for each TSO

The TSOs have 4 Working Days to review the DSR for each day. In case of needed corrections, TSOs shall inform the Co-ordination Centres immediately and align bilaterally to correct the data. After corrections, Co-ordination Centres shall send a corrected DSR to the TSOs. This concludes the Accounting Process.

C-6 STANDARDS - SETTLEMENT PROCESS

C-6-1 OVERVIEW

The daily Settlement Process starts after the finalisation of the daily Accounting Process for all TSOs as well as the reception of DAMP from all TSOs.

In the framework of the Settlement Process, the Co-ordination Centres determine:

- Settlement Prices for FCP Energy, RP Energy and UE for each TSO-TSO Settlement Period
- Monetary Values for FCP Energy, RP Energy and UE for each TSO-TSO Settlement Period, equivalent to the multiplication of volumes and prices.

The inputs needed for these calculations shall be:

- Results of the Accounting Process: volumes of FCP Energy, RP Energy and Unintended Exchange for each LFC Area or Block
- Day-Ahead Market Prices (DAMPs) per LFC Block

C-6-2 WORKFLOW OF SETTLEMENT PROCESS

C-6-2-1 Inputs

All LFC operators send their **DAMP** (Day-Ahead Market Prices (DAMPs)) per LFC area or block to their Co-ordination Centres which are responsible for the determination of DAMP for individual LFC blocks according to the following rules:

LFC block	DAMP determination method
AT, BE, BG, CH, CZ, ES, FR, GR, HU, NL, PT, RO, SK	The corresponding bidding zone DAMP is used.
DE-LU-DKW	$DAMP_{DE-DKW} = \frac{k_{DE} * DAMP_{DE} + k_{DK} * DAMP_{DKW}}{k_{DE} + k_{DKW}}$ Under the assumption that DK-West is an LFC area by the time of FSkar introduction. Otherwise, DK-West is not considered in the FSkar settlement.
SMM	Only the DAMP from bidding zone RS (Serbia - EMS) is considered.
Polish LFC Block (PL+UA (Burshtyn TPP Island))	$DAMP_{PL-UABEI} = \frac{k_{PL} * DAMP_{PL} + k_{UABEI} * DAMP_{UABEI}}{k_{PL} + k_{UABEI}}$
SHB	$DAMP_{SHB} = \frac{k_{SI} * DAMP_{SI} + k_{HR} * DAMP_{HR}}{k_{SI} + k_{HR}}$
AL	Imbalance settlement price of the LFC Block is used instead of a Day-Ahead Market Price (DAMP).
IT	The DAMP of the BZ bordering with the rest of the SA is used. This means IT-North

C-6-2-2 Outputs

Settlement prices

The calculation of settlement prices for FCP Energy and UE Energy is carried out by the Co-ordination Centres.

The price for RP energy is 0 €/MWh.

The price for FCP Energy and UE Energy are the same and calculated as follows:

- Frequency – independent component is calculated as a weighted average of the DAMP across CE, with weighting performed according to the absolute value of the volumes of FCP Energy and UE Energy, as follows, where m is an index running over all LFC blocks

$$Price_{ref}(t) = \frac{\sum_m DAMP_m(t) * (|E_{ue} + E_{FCP}|)_m(t)}{\sum_m (|E_{ue} + E_{FCP}|)_m(t)}$$

- Frequency – dependent component calculated as follows:

$$Price_{UE,FCP}(t) = \begin{cases} Price_{ref}(t) - 2\ €/mHz\ * (-100\ mHz + 20\ mHz) & \Delta f(t) < -100\ mHz \\ Price_{ref}(t) - 2\ €/mHz * (\Delta f(t) + 20\ mHz) & -100\ mHz \leq \Delta f(t) < -20\ mHz \\ Price_{ref}(t) & -20\ mHz \leq \Delta f(t) \leq 20\ mHz \\ Price_{ref}(t) - 2\ €/mHz * (\Delta f(t) - 20\ mHz) & 20\ mHz < \Delta f(t) \leq 100\ mHz \\ Price_{ref}(t) - 2\ €/mHz * (100\ mHz - 20\ mHz) & \Delta f(t) > 100\ mHz \end{cases}$$

The uniform price for Unintended Exchange and FCP Energy corresponds to $Price_{UE,FCP}(t)$

The frequency dependant component may be not considered on the UE and FCP Energy between two LFC Areas connected only by HVDC cable. In such case the reference price could correspond to $Price_{ref}(t)$.

Monetary values

Based on settlement volumes and the settlement prices the Monetary Values are calculated.

C-6-2-3 Daily Settlement Prices Report and Monthly Settlement Reports

For the Settlement Process the following reports are generated: Daily Settlement Prices reports (DSPR), Monthly Settlement Reports (MSR). The Daily Settlement Prices Report are generated daily, the Monthly Settlement Report is generated monthly. The resolution is in both cases per TSO-TSO Settlement Period.

The reports contain the following information:

- Volume of FCPE for each TSO (as calculated in the accounting process)
- Volume of RPE for each TSO (as calculated in the accounting process)
- Volume of UE for each TSO (as calculated in the accounting process)
- Day-Ahead Market Price (DAMP) for each LFC block, as used in the settlement process.

- Day-Ahead Market Price (DAMP) for each LFC area, for LFC blocks with multiple LFC areas.
- Price for FCPE for the SA CE (as calculated in the settlement process)
- Price for RPE for the SA CE: 0 €/MWh
- Price for UE for the SA CE (as calculated in the settlement process)
- Monetary values for FCPE for each TSO (as calculated in the settlement process)
- Monetary values for RPE for each TSO (as calculated in the settlement process)
- Monetary values for UE for each TSO (as calculated in the settlement process)

As a result of the daily Settlement Process, Co-ordination Centres send the DSPR to the TSOs. The TSOs have 4 Working Days to review the DSPR for each day. In case of needed corrections, TSOs shall inform the Co-ordination Centre immediately and align bilaterally within the deadline to correct the data. After corrections, Co-ordination Centres shall send a corrected DSPR to the TSOs. This concludes the daily Settlement Process.

After the daily Settlement Process for each day of the calendar month has been concluded, Co-ordination Centres send the MSR to the TSOs. The TSOs must review the MSR and send Confirmation Document for the MSR within 4 working days.

Once all the MSR have been validated, Co-ordination Centres send the monthly settlement results (validated settlement volumes, prices end values) to invoicing entity. If confirmations are not received, invoicing is not possible. Invoicing entity send invoices to all TSO. This concludes the Settlement Process

C-6-3 EXTRAORDINARY MEASURES

Extraordinary measures may be proposed and implemented by the Co-ordination Centres after approval by RGCE Plenary, especially in cases of violations of this Policy. Extraordinary measures should not affect the accounting process. Extraordinary measures can also be possible in case of large frequency deviations, when some TSOs intentionally enter into deviation to help restore the frequency, to ensure that these TSOs are not penalized for such a behaviour.

C-7 GUIDELINES

C-7-1 TROUBLESHOOTING FOR THE ACCOUNTING PROCESS.

In case of unavailability of meter measurement data or available data but not agreed on time (the limit is 4 working days after the scheduling day), the following procedure is recommended in the following sequence:

- If available, use the check meter values from the Accounting Point substation.
- If available, use the main meter values from the adjacent substation.
- If available, use the check meter values from the adjacent substation.
- If available, use the integrated measurement values from the on-line observation
- Otherwise, the partners involved agree on the methodology to determine substitutes.
- In any case, more flexible procedure for troubleshooting can be agreed in a bilateral way among the affected TSOs, insuring the normal operation of the accounting process.

In case two SA CE bodies are sending mismatching Accounting Data to the Co-ordination Centre (and LFC Block where applicable) as part of the daily Accounting Process the Co-ordination Centre (and LFC Block where applicable) should immediately prepare a substitution of values in the following sequence:

- If both TSOs are sending accounting values having “small” mismatch (mismatch as a percentage of the average value, calculated as 2[(A1-B1)/(A1+B1)], up to 10%) to the Co-ordination Centre (and LFC Block where applicable), the Co-ordination Centre (and LFC Block where applicable) should use the average of both values as substitute value, where A1 = Accounting Data send for line 1 by TSO A and B1 = Accounting Data send for line 1 by TSO B.
- If both TSOs are sending accounting values having „large“ mismatches or do not sent accounting values at all and telemeasurements of the tie-lines are available to the Co-ordination Centre (and LFC Block where applicable), the Co-ordination Centre (and LFC Block where applicable) should use telemeasurements as substitute value.
- If both TSOs are sending accounting values having „large“ mismatches or do not send accounting values at all and telemeasurements are NOT available to Co-ordination Centre (and LFC Block where applicable), the Co-ordination Centre shall communicate with the affected TSOs to determine the cause of the missing data and find a solution. In case a solution cannot be found, the Co-ordination Centre shall set the accounting value to zero.

C-7-2 TIMEFRAME FOR CHANGING THE ACCOUNTING DATA

All substituted values and/or all already matched values can be changed until the end of the deadline of the daily Accounting Process (see C-5-2). After the end of the monthly Settlement Process, the Accounting Data cannot be changed anymore.

C-7-3 TIMEFRAME FOR CHANGING THE VERIFIED ANES

The verified ANES can be changed by the concerned LFC Areas until the end of the deadline of the daily Accounting Process (see C-5-2). In such cases, the concerned LFC Areas shall firstly inform the respective Co-ordination Centre and then send their updated ANES to the Verification Platform. The respective Co-ordination Centre will then manually export the updated and verified ANES, recalculate the Unintentional Deviations of the concerned LFC Blocks and resend the updated daily settlement report(s). After the end of the monthly Accounting Process, the verified ANES cannot be changed anymore.

C-7-4 TIMEFRAME FOR CHANGING OTHER INPUTS

K-factors, frequency deviation and Day-Ahead Market Prices (DAMPs) can be changed until the end of the deadline of the daily Accounting Process. After the end of the monthly Settlement Process, these data cannot be changed anymore.

In case a TSO verifies a mismatch of its DAMP, the TSO immediately informs the Co-ordination Centre and submits a new DAMP document within the given deadline of 4 working days. After the validation of the monthly settlement report, the DAMP cannot be changed anymore.

C-8 ENTITIES

The accounting and settlement entities for the Financial Settlement will be assigned by RGCE in accordance with the SAFA Article 15 decision making process in execution of the Annexes to the Agreement.

There will be an entity assigned for accounting of the southern block of SA CE and one entity for accounting of the northern block of SA CE (see C-1-13). For settlement tasks, both entities will share the tasks according to the Implementation Guide.

PERFORMANCE OF SERVICES THROUGH CO-ORDINATION CENTRES

The performance of services through the Co-ordination Centres with corresponding service levels and service fees shall be regulated in a separate Service Level Agreement with the Co-ordination Centres.

C-8-2 PERFORMANCE OF SERVICES THROUGH INVOICING ENTITY

The performance of services through the Invoicing Entity with corresponding service levels and service fees shall be regulated in a separate Agreement with the appointed Invoicing Entity.

C-9 TRANSITORY PROVISION

Transition from Compensation Program to Financial Settlement

RG CE Plenary must decide on the date for the go-live of the financial settlement, meaning the first day where the procedures as described in this Policy will be used. The go-live date must correspond to a day at the end of the recording periods of the compensation calendar. Until go-live of the Financial Settlement, the compensation of unintentional exchange shall be performed according to the current procedures as agreed in Annex 3 of the SAFA dated 14.04.2019. At the go-live of the financial settlement, a compensation program based on the final accounts of the Unintentional Deviations will be calculated. This will result in a separate final compensation program for summer and winter period, which shall be compensated within the corresponding compensation periods as reflected in the compensation calendar. These compensation programs will be added to the energy exchange schedule for the relevant periods.

The unintentional exchange on the final accounts of Unintentional Deviations will not be fully compensated through the realization of the final compensation programs in the transition period. In order to settle the remaining, not compensated energy, the realized control programs used as an input for financial settlement process shall contain the compensation programs in accuracy of 1 kWh.

After termination of both final compensation programs, for the summer and the winter period, and the settlement of energy remaining on the final accounts of Unintentional Deviations in line with the Financial Settlement, the transition from the compensation program to the financial settlement is considered as completed.

Unintended exchanges, which occur during the transition period, shall be settled financially according to the method described in this document.

C-10 APPENDIX

C-10-1 EQUATION TERMS

E_{ex} Sum of cross-border Tie-Line flows between two TSOs/LFC Areas/LFC Blocks/Co-ordination Centres

E_{VTL} Intended cross-border exchanges through VTL

E_{sch} Cross-border energy exchange through ANES

E_{FCP} FCP Energy

E_{RP} RP Energy

E_{UE} Unintended exchange

ΔP Power control error. Defined in SOGL.

$k_{LFC\ Area}$ K-factor of the LFC area

C-10-2 TIMETABLES FOR DAILY ACCOUNTING AND SETTLEMENT PROCESS

Note: the following timing (if not expressed different) is valid for the next workday

Timing of daily data delivery exchange	data only for one day		Data for more than one Day (e.g. after weekend, holidays etc.)	
Action	Gate closure	Cut Off time (Agreement deatline)	Gate closure	Cut Off time (Agreement deatline)
Meter data delivery (SOMA) to neighbouring TSO	10:00 AM	1:00 PM	10:00 AM	1:00 PM
Delivery of ANES from VP to Co-ordination Centre		12:00 PM		
Accounting data delivery (SOAM) to neighbouring TSO	1:30 PM	2:00 PM	1:30 PM	4:00 PM
Delivery of agreed Accounting Data (SOVA) by TSO to LFC Area. Note: if disagreement: available data have to be sent		2:00 PM		4:00 PM
Delivery of agreed Accounting Data (SOVA) to LFC Block		2:00 PM		4:00 PM
Delivery of agreed Accounting Data (SOVA) to Co-ordination Centre		2:00 PM		4:00 PM
Accounting Data delivery to neighbouring Co-ordination Centre		3:15 PM		5:15 PM
Delivery of K-factors to Co-ordination Centre		2:00 PM		2:00 PM
Delivery of DAMP to Co-ordination Centre		2:00 PM		2:00 PM

Table 2: Timetable for daily accounting and settlement process

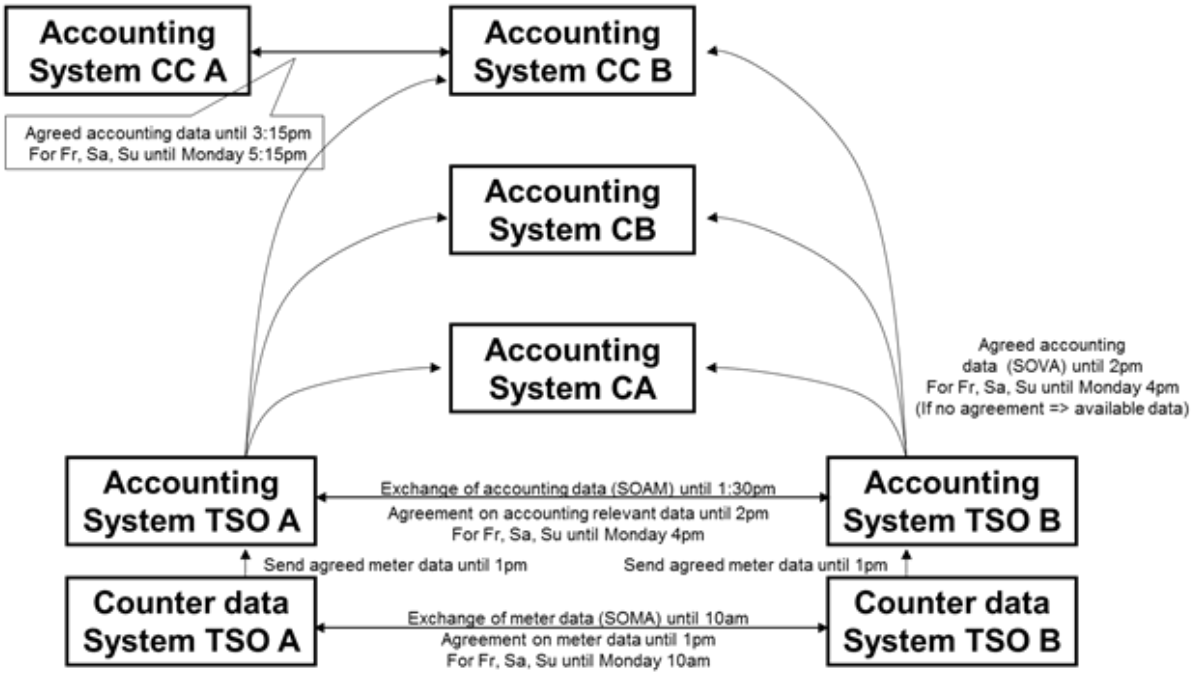

Figure 4. Timing of daily Accounting Data exchange

C-10-3 REGISTRATION FORM FOR ACCOUNTING PROCESS INCLUDING TIE-LINES

UCTE registration form for accounting process including tie-lines

Requesting TSO A:		Requesting TSO B:	
Responsible person:		Responsible person:	
Phone number :		Phone number :	
Email:		Email:	
Responsible CA:		Responsible CA:	
Responsible CB:		Responsible CB:	
Responsible CC:		Responsible CC:	

- ▫ New Tie line
- ▫ Mutation of the existing Tie line

Requested implementation date:	
Tie-line name and (if available) EIC T Code	
Tie-line topology:	▫ single tie-line ▫ T-tie-line ▫ virtual tie-line
Accounting point location:	▫ at TSO A ▫ at TSO B ▫ on the border (losses considered)
Name of Substations:	Substation 1 _____ located at TSO _____ Substation 2 _____ located at TSO _____ If T- Tie-line Substation 3 _____ located at TSO _____
Voltage level:	▫ 750 KV ▫ 110 KV ▫ 380 KV ▫ 63 KV ▫ 220 KV ▫ ≤ 63 KV
Resolution of data	▫ MWh ▫ kWh
Connection Type:	▫ AC ▫ DC
Time interval of time series resolution:	▫ 1/4h

- ▫ Changes in the accounting process

Requested implementation date	
Unit of account of unintentional deviation:	▫ MWh ▫ kWh
Time resolution of account of unintentional deviation:	▫ 1/4h

Additional information:

TSO A: Responsible person Date, Signature_____

TSO B: Responsible person: Date, Signature_____

C-10-4 LIST OF LFC BLOCKS PERFORMING ACCOUNTING AND SETTLEMENT PROCESS ON LFC BLOCK LEVEL

The Parties acknowledge that at the moment of entry into force of the Agreement there is no LFC Block performing the Accounting and Settlement Process on LFC Block level.

D EXEMPTIONS AND DEROGATIONS

The following section includes all Exemptions and Derogations to the Policy on Accounting and Settlement acknowledged by the Parties.

(1) Swissgrid (Swissgrid AG), Switzerland

a. Exemptions

Article(s) subject to Exemption	Description of Exemption	Justification
Future methodology	Where methodologies are only available in draft format, Swissgrid agrees to comply with such methodologies according to the draft status at the date of the signature taking into account any needed exemptions or derogations in those draft methodologies. Swissgrid exempts from any changes made to the draft methodologies after the date of the signature. Swissgrid will re-assess and repeal any such exemptions where possible, after the final version of a respective methodology is available.	This is requested by our NRA.