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ECC Spot Market Margining

Version 1.13

Contact
European Commodity Clearing AG
CCP Risk Methodology

Internal

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1. Introduction

This document provides the documentation of ECC's spot margin model, including dedicated margining approaches for storable commodities[1]. The current values of calculation parameters, where not specified in this document, can be found in the risk parameter file[2].

The margining for derivatives is documented in a separate document that is published on the ECC website.

Information on margin reports that are available for members can be found here:
https://www.ecc.de/en/member-section/smss-reporting

1.1 Overview of Margin Types

On spot markets, the credit exposure comprises all payment obligations from concluded transactions by a trading participant that have not been settled yet. Depending on the characteristics of the respective market and product, ECC applies different margining approaches to cover exposures arising during the clearing and settlement process.

ECC clears spot markets for commodities on which mainly non-financial trading participants are active. Settlement cycles between the non-financial trading participants and their Clearing Member are usually longer than between ECC and the Clearing Members. On some spot markets (power, natural gas) trading and clearing takes place 24/7 while the settlement of payments from accrued exposures is restricted by the business hours of the payment systems.
For these markets, ECC measures exposure on spot markets near-to-real time using the Current Exposure Spot Market (CESM) as described in Chapter 3 . To avoid frequent margin calls due to collateral shortfalls and to cover exposures that might arise from trading activities outside the business hours of the payment systems, ECC has established the Initial Margin Spot Market (IMSM) as an additional margin component. This IMSM is a buffer and is designed to cover exposure from potential spot transactions in the future until the next settlement time. Details can be found in Chapter 2.

For storable commodities, dedicated margining approaches are applied depending on the respective market and settlement design. These approaches comprise the Pre-Auction Margin (PAMA) and the Certificate Risk Margin (CERM) and are described in Chapter 4.

[1] The Certificate Risk Margin described in Chapter 4.3 also covers outstanding financial settlement and physical delivery obligations resulting from expired derivative contracts.

[2] https://www.ecc.de/ecc-en/risk-management/margining

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Margin requirements on spot markets are adjusted on each ECC business day to adopt to changes in both market conditions and trading behavior, while margins calculated intraday (CESM, CERM) are calculated near-to-real time. ECC performs daily back testing for IMSM. ECC Validation performs an independent annual validation of methods, models, and model assumptions.

The following table gives an overview of the different margin types:

Exposure Type	Margin Type	Description
Current Exposure	**Current Exposure Spot Market (CESM)**	The net exposure (debit payment amount after consideration of margin parameters) of all concluded transactions on the spot markets to be settled the next or second next ECC business day that are not subject to a dedicated margining approach for storable commodities.
	Certificate Risk Margin (CERM)	Covers outstanding financial settlement and physical delivery risks for relevant certificate products and recognizes the value of eligible net long certificate positions as an offset.
	Deferred Payment Margin (DEPA)	Used to cover the net debits from daily payments in case of problems or delays within the payment settlement.
	Additional Margin Curtailment (AMCU)	The expected closeout costs of physical positions in case of a trading participant is curtailed by transmission system operators (TSO).
Potential Future Exposure	**Initial Margin Spot Market (IMSM)**	The IMSM is called for expected spot transactions in the future until the next payment time and serves as a buffer to reduce intraday margin calls.
	Pre-Auction Margin (PAMA)	This margin is a pre-collateralization of the financial pre-trade limit for certain types of spot auction products.

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1.2 Regulatory Requirements

Regulatory Item	ECC Methodology
ESMA[3] Article 24 requires that for the calculation of initial margins the CCP shall at least respect the following confidence intervals: (a) For OTC derivatives, 99.5%; (b) For financial instruments other than OTC derivatives, 99 %.	For the initial spot margin ECC uses 99% confidence level.
ESMA Article 25 requires that a CCP shall ensure that initial margins cover at least with the confidence interval defined the exposures resulting from historical volatility calculated based on data covering at least the latest 12 months. A CCP shall ensure that the data used for calculating historical volatility capture a full range of market conditions, including periods of stress.	ECC uses a one-year lookback period.
ESMA Article 26 requires that the liquidation period shall be at least two business days for financial instruments other than OTC derivatives.	A liquidation period is not relevant for spot products. ECC uses the period between last settlement and the expected termination of a trading participant from the markets as basis for calculating potential future exposure or delivery risk.

[3] Commission Delegated Regulation (EU) No 153/2013 (Regulatory technical standards), p.41ff, Official Journal of the European Union, L 52, 23 February 2013

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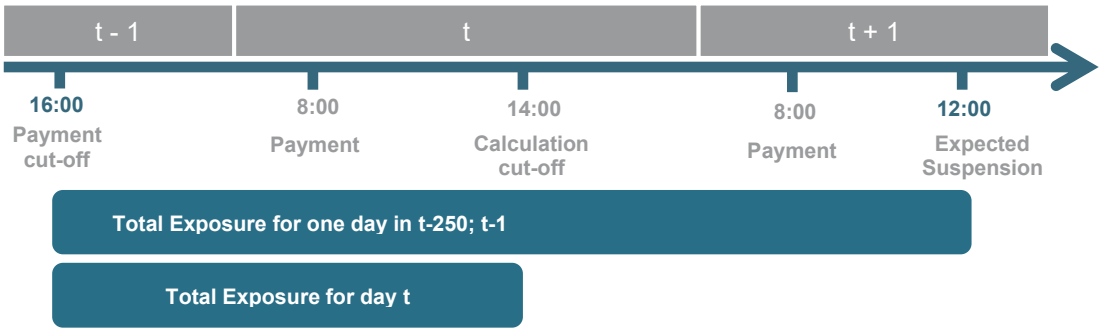
2. Calculation of the Spot Initial Margin

Spot markets for commodities such as power or natural gas are different from derivatives markets for several reasons:

- On power and natural gas spot markets transactions are concluded 24 hours a day, 7 days a week that can result in credit exposures during that time. The credit exposures from those transactions are measured on a near-to-real time basis with the Current Exposure Spot Market (CESM) as described in chapter 3.
- A delivery versus payment (DVP) standard cannot be employed to limit counterparty exposures as delivery of power and natural gas takes place shortly after trading and those commodities are not or only very limited storable.

For these reasons ECC has introduced the concept of Initial Margin Spot Market (IMSM) which is based on an in-house developed model. The IMSM is called for expected transactions i.e. before any transactions are concluded and before any credit exposure has arisen. It serves as a buffer to reduce the number of margin calls during the day and to ensure that credit exposure (measured with the CESM) in times where settlements/margin calls are not possible (e.g. weekends), i.e. the potential exposure from expected transactions, will be covered with a high degree of confidence.

The calculation of IMSM is based on statistics of the history of daily total exposures. The daily total exposure[4] comprises the net payment amount of all spot transactions that have been concluded between the payment cut-off of the previous weekday[5] and the latest point in time where a trading participant in default would be suspended from trading the next weekday. On calculation day, ECC takes the exposure from all concluded and registered trades of the previous exposure day $t-1$ after 16:00 CET until the point in time of exposure calculation (currently 14:00 CET) to improve the forecast of the model. This "incomplete" exposure is often referred to as "t-Exposure" since it includes in particular the trades of the day ahead auction for power of calculation day t. The following graphic gives an overview of the total exposure:



[4] In EUR, used EOD FX rates can be found at https://www.eurex.com/ex-en/data/clearing-files/Haircut-and-adjusted-exchange-rate

[5] Monday to Friday including all holidays on weekdays

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The IMSM model for non-storable commodities for one trading participant is based on his historical daily exposure during a look-back period of 1 year. The history of one year is modelled by using 250 exposure days which are all weekdays. Exposures from different commodities are netted.
The Spot Initial Margin is called with admission of a new trading participant and is only returned when the trading admission is terminated and all pending payments with the trading participant have been settled.

2.1 Initial Margin Spot Market

The calculation of the IMSM is based on the historical daily exposures of the past year. The exposure $E_{i,g,pd}(t)$ for an account i, a product group g and a payment day pd on day t is defined as

$$E_{i,g,pd}(t) = \sum_{s \in S} P_{i,g}(s) Q_{i,g}(s)$$

$P_{i,g}(s)$ is the price[6] paid by trading participant i for the trade of product g at date time s and $Q_{i,g}(s)$ is the corresponding quantity bought $(Q > 0)$ or sold $(Q < 0)$. The exposure is calculated for every exposure day t and the index set S contains trade timestamps[7] for trades with payment due on day pd in the time window for one exposure day as in the graphic above. An example for the exposure aggregation can be found in section 2.4.
The exposure is further adjusted by a specific margin parameter $MP_{g,\,(Buy;\,Sell)}$, which is given for each product g and depends on whether $E_{i,g,pd}(t)$ signals a net buy or sell.

$$E_{i,pd}\,(t) = \sum_{g=1}^{n} E_{i,g,pd}(t)\; MP_{g,\,(Buy;\,Sell)}$$

[6] In case of trades concluded via trade-at-index (TAI) trading functionality, a conservative interim price is used until the final index price is known. This interim price is defined as the sum of an estimated index price and the agreed trade-specific premium, which is fixed at execution. The estimated index price is derived from the corresponding most recent available index price, scaled by a factor of $(1+\text{risk add-on})$ for buy transactions and $(1-\text{risk add-on})$ for sell transactions, to reflect potential adverse price movements until final index publication. Once the final index price is published, it replaces the estimated index price, and the final transaction price (final index price plus premium) is applied for regular exposure calculation and settlement. Information on the applied risk add-on parameters can be found in the ECC Risk Parameters file.

[7] Here, for convenience the timestamp is assumed to be a unique identifier of a trading participants trade, although in ECC's settlement instructions there is a unique primary key for each trade, because, e.g., all trades belonging to an auction are settled simultaneously.

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For standard products and markets the margin parameters $MP_{g,sell}$ and $MP_{g,buy}$ are set to 1 to determine the net payment amount. A list of adjusted margin parameters for affected market areas can be found in the ECC Risk Parameters file.
The final net exposure for day t is then given as:

$$E_{\mathrm{i}}(t) = \max\left(0, \mathrm{E}_{\mathrm{i,t+1}}(\mathrm{t})\right) + \sum_{\mathrm{pd>t+1}} \mathrm{E}_{\mathrm{i,pd}}(\mathrm{t})$$

where $t+1$ refers to the next ECC business day.

Based on the historical exposures the spot margin $M_i(t_0)$ for trading participant i is calculated at ECC business day t_0 and called the following ECC business day via

$$M_i(t_0) = RoundedUp(\max\{M_{stat,i}(t_0)\ ;\ \beta \cdot max_{t' \in T'}\ \{E_i(t')\}\};\ 10{,}000) + M_{\min}$$

Generally, the equation of spot margin consists of three main components:

1. $M_{\min}$ ensures that there is a minimum margin all the time, e.g. when there is no historical data for a new client, the historical and the short-term moving component would not result in a margin. Moreover, $M_{\min}$ is generally an additional buffer to the margin. The latest parameterization of $M_{\min}$ can be found in the ECC Risk Parameters file.

2. A short-term component allowing the IMSM model to react to drastic changes of the trading participants trading behavior or market price movements. The short-term component $\beta \cdot max_{t' \in T'}\ \{E_i(t')\}$ uses a look-back period of the last 30 exposure days with $T' = T'(t_0) = \{t_{29}, \dots, t_0\}$. The latest parameterization of β can be found in the ECC Risk Parameters file.

3. A statistical component using the mean and the empirical weighted standard deviation using the exposures of the past year, in form of the last 250 business days, denoted by the time period $T = T(t_0) = \{t_{250}, \dots, t_1\}$. Hereby, t_1 refers to the previous business day before t_0, the day t_2 refers to the business day before that and so on. For the calculation of the mean and standard deviation, only exposures greater than 0 are considered. Other exposures are replaced by a missing value and are ignored.

   The mean is calculated as follows

$$\mu_i(t_0) = \sum_{k \in \{1,\dots,250\}:\, E_i(t_k) > 0} \frac{\lambda^k \cdot E_i(t_k)}{m},$$

   where m denotes the number of dates in T with exposure greater than zero.

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The standard deviation is calculated using an exponential weighting with weight factor $\lambda = 0.99$ to provide a faster adaptation to recent changes in trading behavior but also to ensure a stable margin calculation. It is given via

$$\sigma_i(t_0) = \sqrt{\sum_{k\in\{1,\dots,250\}:E_i(t_k)>0} \left(E_i(t_k) - \mu_i(t_0)\right)^2 \cdot \frac{\lambda^k}{m}}\,.$$

The core statistical component is now defined as

$$\widehat{M}_{stat,i}(t_0) = \mu_i(t_0) + \alpha \cdot \sigma_i(t_0),$$

where the parameter α is calibrated regularly to ensure sufficient margin levels and adequate backtesting results. The latest parameterization of α can be found in the ECC Risk Parameters file.

To prevent an increase in the statistical component of IMSM even though there is a zero or negative exposure at day t_0, the core statistical component is additionally capped. We use

$$M_{stat,i}(t_0) = \begin{cases} \min\{\widehat{M}_{stat,i}(t_0), M_{stat,i}(t_1)\}, & E_i(t_1) \le 0 \\ \widehat{M}_{stat,i}(t_0), & E_i(t_1) > 0 \end{cases}$$

as the final value of the statistical component of the IMSM model.

2.2 Special Holiday Adjustment

The IMSM is designed to cover potential future exposures between two consecutive payment settlement dates which usually add up to at most 3 days for exposure periods containing weekends where no financial settlement takes place. To cover longer exposure periods due to extra non-settlement days (e.g. Easter or Christmas holidays in which the TARGET2 system for interbank payments is closed), a specific “Holiday Adjustment” is incorporated in the IMSM model.

ECC increases the IMSM by scaling the requirement calculated according to section 2.1 up by the number of hours the settlement period is extended and hence by the time the IMSM needs to provide an additional buffer. The standard exposure periods contain at most 92 hours (from Thursday 16:00 [booking cut] to Monday 12:00 CET). In case of additional non-ECC business days, the number of hours is increased by 24 per day.

The scaling factors are hence as follows:

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Number of extra non-settlement days	Hours that need to be covered	Scaling Factor ($f(t)$)
1	92 + 1 * 24 = 116	$1.3\ (\approx {}^{116}/_{92})$
2	92 + 2 * 24 = 140	$1.6\ (\approx {}^{140}/_{92})$

The IMSM minimum component is not scaled up. Therefore, the holiday adjusted IMSM requirement is given as

$$M_{i,HA}(t_0) = RoundedUp(\ f(t_0) * (M_i(t_0) - M_{\min});\ 10{,}000) + M_{\min}.$$

A list of the days a holiday adjustment will be applied, and the corresponding scaling factor can be found in the ECC Risk Parameters file.

2.3 Consideration of delivery risk in the exposure generation

For markets where ECC faces a delivery risk, i.e. where ECC's physical nomination can be cancelled by the network operator, the delivery risk is included in the exposure generation of the corresponding product groups by taking a relative portion[8] of the financial exposure.

Example:
For the UK market, sellers are facing a curtailment risk by the TSO. To cover the potential payments of imbalances, 30% of the financial exposure is considered.

$$\text{Exposure}_{\text{old}} = -\text{GBP}\ 1{,}000 \qquad \text{Exposure}_{\text{new}} = -\text{GBP}\ 1{,}000 \cdot -0.3 = \text{GBP}\ \ 300$$

2.4 Example for exposure aggregation

ECC's exposures towards the trading participant contain all trades between the last booking cut-off on the previous exposure day at 16:00 CET and the next exposure day at 12:00 noon CET. They are the basis of ECC's Spot Margin.

[8] Can be found in the ECC Risk Parameter File.

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The following example shows how they are derived over one week:

ECC 4pm Booking Cut		Latest possibility for suspension 11:45 am		
Day	**Time**	**Trade Value[9] (k€)**	**Payment Day**	**Exposure**
Mo	22:00	-56.00	Wed	0.00
Tue	12:00			Max(0, 275.00) - 110.00 = 165.00
	12:00	233.00	Wed	
	16:00	98.00	Wed	
	21:00	-110.00	Thu	
Wed	12:00			Max(0, -31.00) + 36.00 = 36.00
	13:00	-29.00	Thu	
	16:00	108.00	Thu	
	20:00	36.00	Fri	
Thu	12:00			Max(0, 182.00) + 44.00 = 226.00
	13:00	13.00	Fri	
	14:00	99.00	Fri	
	16:00	34.00	Fri	
	19:00	44.00	Mo	
Fri	12:00			Max(0, 356.00) + 427.00 = 783.00
	13:00	190.00	Mo	
	16:00	122.00	Mo	
	22:00	346.00	Tue	
Sat	12:00	55.00	Tue	
	14:00	-3.00	Tue	
	21:00	-31.00	Tue	
Sun	13:00	4.00	Tue	
	15:00	86.00	Tue	
	21:00	-30.00	Tue	
Mo	12:00		Tue	Max(0, 647.00) + 90.00 = 737.00
	13:00	192.00	Tue	
	16:00	28.00	Tue	
	21:00	90.00	Wed	
Tue	12 :00			

[9] The trade value is the traded quantity times the price.

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In order to better illustrate the IMSM algorithm and how the exposures are processed by the daily margin calculation ECC provides an IMSM calculator as an excel version. The current version can be downloaded on the ECC website http://www.ecc.de/ecc-en/risk-management/margining.

2.5 Computation of Spot Initial Margin during change of Clearing Member

Considering the ECC booking cut at 16:00 CET on ECC business days and the time of the transfer on the "Transfer Day" (TD) at 12:00 am CET, it must be taken into consideration that the NCM has the possibility to trade in the time between booking cut and time of effective Clearing Member (CM) change while creating additional exposure at the old CM. This exposure is settled the day after the TD and remains as exposure for the old CM until this point in time.

To reduce the possible remaining exposures during that period, the change of the CM is effectively possible only on days not following a weekend or holiday period of relevant currencies. To cover possible exposure of the remaining period at the old CM, the Spot Initial Margin (IMSM) is split between the old and the new CM on the day before the TD. The old CM keeps 20% of IMSM requirement and ECC pledges 80% of IMSM requirement from the new CM until the remaining exposure is settled. The Current Exposure Spot Market (CESM) relevant for transactions between 16:00 pm CET and 12:00 am CET at the TD will be considered for the old CM at that time.

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3. Calculation of the Current Exposure Spot Market

ECC's intraday exposure (also referred to as current exposure) is reflected in the "Current Exposure Spot Market" (CESM). It should be noted that the CESM is not actually paid but rather used to monitor the market participant's trading behaviour.

The CESM reflects the net payment exposure arising from concluded spot transactions that have not yet been financially settled. Transactions subject to one of the dedicated margining approaches for storable commodities described in Chapter 4 are not included in the CESM calculation.
For the remaining spot products, the CESM is determined based on the net payment amount per product group. Depending on the respective market area, the net payment amount may be adjusted by a multiplier to reflect additional delivery or currency risks.

The CESM is calculated in the following way: Firstly, all outstanding payment amounts $PA_{i,g}$ with payment date the next settlement day for account i and product group g are determined with $P_{i,g}$ as the price[10] and $Q_{i,g}$ quantity for Product g (e.g. POWER 50HZ, NATGAS TTF) traded in margin account i:

$$PA_{i,g} = \sum_{s \in S} P_{i,g}(s) \cdot Q_{i,g}(s)$$

The amounts $PA_{i,g}$ are then multiplied by the respective $\mathrm{MP}_g{}^{buy}$ as multiplier in case there is an outstanding payment $(\mathrm{PA}_{i,g} \geq 0)$ and by $\mathrm{MP}_g{}^{sell}$ as multiplier in case there is an outstanding payout $(\mathrm{PA}_{i,g} < 0)$. Thus, the CESM for account i results in:

$$\sum_{g=1}^{n} \begin{cases} \mathrm{PA}_{i,g} \cdot \mathrm{MP}_g{}^{buy} & \text{if } \mathrm{PA}_{i,g} \geq 0 \\ \mathrm{PA}_{i,g} \cdot \mathrm{MP}_g{}^{sell} & \text{if } \mathrm{PA}_{i,g} < 0 \end{cases}$$

For standard products and markets the multipliers $\mathrm{MP}_g{}^{buy}$ and $\mathrm{MP}_g{}^{sell}$ are set to 1. A list of multipliers by market area can be found in the ECC Risk Parameters file.

The CESM is floored at 0, so no credit will be granted to other margin classes. It is calculated intraday every 10 minutes and reported in EUREX's reports so Clearing Members can detect accumulating exposure on the spot market intraday.
The margin will be reduced as soon as the corresponding payments for the next business day have been instructed in the payment system at the end of the business day (currently 18:00 CET). For products not listed in EUR where the financial settlement is deferred (e.g. due to non-TARGET2 holidays), the CESM additionally includes these deferred payments by considering these payments until the second next ECC business day for settlement of non-EUR currencies.

[10] For trades concluded via trade-at-index (TAI) trading functionality, an interim price is applied until final index publication; see footnote 6 in section 2.1 for details on the interim price determination.

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4. Margining Storable Commodities

Transactions in storable commodities[11] may give rise to exposures during the period between trade execution, financial settlement and physical delivery. This applies to spot transactions as well as to outstanding settlement and delivery obligations resulting from expired derivative contracts.

Depending on the specific market and settlement design, ECC applies dedicated margining approaches to cover these exposures. For markets applying a pre-auction mechanism, the relevant risk is fully covered through the Pre-Auction Margin (PAMA). For certificate markets subject to the Certificate Risk Margin framework, outstanding financial settlement and physical delivery risks are covered through the Certificate Risk Margin (CERM). The applicable approach for the respective markets and products is specified in Section 4.1.

PAMA and CERM constitute alternative margining approaches reflecting the respective market and settlement design. Transactions subject to PAMA are therefore not additionally included in the CERM calculation and vice versa.

4.1 Applicable Margining Approach

The margining approach applicable to a storable commodity depends on the respective market and settlement design. The table below provides an overview of the of the currently applicable storable commodities and their respective margining approach.

Commodity	Spot	Derivatives	Margining Approach
EEX EUA4	x	x	CERM
EEX ETS2		x	CERM
EEX EUA4 UK	x	x	CERM
EEX Guarantees of Origin - Wind		x	CERM
EEX Guarantees of Origin - Solar		x	CERM
EEX Guarantees of Origin - Hydro		x	CERM
EEX Guarantees of Origin – Renewable Power		x	CERM
EEX Guarantees of Origin – WHS		x	CERM
EEX Guarantees of Origin – WHS unsupported		x	CERM
EPEX French Capacity Guarantees	x		CERM
EEX French Guarantees of Origin Power	x		PAMA
EEX French Guarantees of Origin Biogas	x		PAMA
EPEX Pan-European Guarantees of Origin	x		PAMA
EEX nEHS Certificates	x		PAMA

[11] For the purpose of this chapter, storable commodities refer to physically deliverable commodities that can be held after delivery and used to fulfil subsequent delivery obligations. Certificate products are storable commodities where ownership is represented and transferred through certificates held in the relevant account infrastructure.

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For derivative contracts subject to CERM, the CERM methodology applies only following expiry and with respect to the resulting outstanding financial settlement and physical delivery obligations. Prior to expiry, the respective derivative contracts remain subject to the derivative margining methodology described in the Derivative Market Margining documentation.

4.2 Pre-Auction Margin

For the markets and products identified in Section 4.1 as subject to the Pre-Auction Margin, PAMA is applied in accordance with the respective pre-auction and settlement process.

PAMA reflects the financial pre-trade limit specified by the Clearing Member for the respective auction and Non-Clearing Member. It applies to auction markets with longer auction cycles and trading systems that support the application of financial pre-trade limits.

$$Limit_{NCM/AM} = PAMA_{NCM}$$

PAMA is released after the payments resulting from the respective auction have been financially settled.

4.3 Certificate Risk Margin

The Certificate Risk Margin (CERM) covers financial settlement and physical delivery risks arising from relevant transactions in physically settled certificate products. CERM considers spot transactions as well as outstanding settlement and delivery obligations resulting from expired derivative contracts. Following expiry of a derivative contract, relevant outstanding financial settlement or physical delivery obligations are included in CERM together with the corresponding spot transactions. For the purpose of CERM, relevant transactions are distinguished according to their settlement status rather than their origin from the spot or derivative market.

CERM consists of a financial risk component, a delivery risk component for uncovered short positions and an offset reflecting the value of eligible net long certificate positions. The margin is calculated separately for each certificate and subsequently aggregated within the applicable netting groups and margin account. CERM is calculated at end of day and recalculated intraday at ten-minute intervals.

For margin account i, certificate $c$and calculation time t, CERM is defined as

$$CERM_i(c,t) = FR_i(c,t) + DR_i(c,t) + OT_i(c,t),$$

where:

- $FR_i(c,t)$denotes the financial risk component;
- $DR_i(c,t)$denotes the delivery risk component; and
- $OT_i(c,t)$denotes the offset from eligible net long positions.

The individual components are described below.

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4.3.1 Relevant Transactions and Certificate Positions

For the purpose of CERM, transactions are distinguished according to their financial and physical settlement status. The applicable settlement process follows a sequential lifecycle in which physical delivery does not take place before financial settlement. Transactions pending financial settlement are therefore also pending physical delivery. Following financial settlement, a transaction may remain outstanding until physical delivery is completed.

Transactions not yet financially settled

Let $\Omega_i^f(c,t)$ denote the set of relevant transactions in certificate c that have not yet been financially settled[12]. The set may comprise spot transactions as well as transactions resulting from expired derivative contracts.

The corresponding net certificate quantity is defined as

$$Q_i^f(c,t) = \sum_{\tau \in \Omega_i^f(c,t)} Q_\tau ,$$

where Q_τ denotes the signed certificate quantity of transaction τ. Buy transactions are represented by positive quantities, while sell transactions are represented by negative quantities.

Transactions not yet physically settled

Let $\Omega_i^d(c,t)$ denote the set of relevant transactions in certificate $c$that have already been financially settled but have not yet been physically settled[13]. As for $\Omega_i^f(c,t)$, the set may comprise spot transactions as well as transactions resulting from expired derivative contracts.
The corresponding net certificate quantity is calculated as

$$Q_i^d(c,t) = \sum_{\tau \in \Omega_i^d(c,t)} Q_\tau .$$

Current and expected certificate balance

In addition to outstanding transactions, CERM considers certificates already held in the relevant ECC internal delivery account. Let $B_i(c,t)$ denote the current certificate balance for certificate c and margin account i at calculation time t.
The expected certificate balance incorporates the current balance as well as certificate movements arising from the relevant outstanding transactions and is defined as

$$B_i^{exp}(c,t) = B_i(c,t) + Q_i^d(c,t) + Q_i^f(c,t).$$

[12] For the intraday calculation, $\Omega_i^f(c,t)$ comprises transactions with a payment date on or after the next business day. For the end-of-day calculation, it comprises transactions with a payment date after the next business day.

[13] For the intraday calculation, $\Omega_i^f(c,t)$ comprises transactions with a delivery date on or before the current business day. For the end-of-day calculation, it comprises transactions with a delivery date on or before the next business day.

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Accordingly, $B_i^{exp}(c,t)$ represents the expected certificate position after considering the outstanding financial and physical settlement transactions included in CERM.

4.3.2 Financial Risk Component

The financial risk component covers the payment exposure arising from transactions that have not yet been financially settled. It is determined based on the relevant transaction amounts of the transactions included in $\Omega_i^f(c,t)$.
For margin account i and certificate c, the financial risk component is calculated as

$$FR_i(c,t) = \sum_{\tau \in \Omega_i^f(c,t)} Q_\tau P_\tau,$$

where P_τ denotes the transaction price and Q_τ the corresponding certificate quantity.

4.3.3 Delivery Risk Component

The delivery risk component covers the risk arising from an insufficient expected certificate balance in the relevant ECC internal account to fulfil outstanding physical delivery obligations. Where the expected certificate balance $B_i^{exp}(c,t)$ is negative, the resulting uncovered short position may require the purchase of certificates in the market in order to complete physical settlement. The corresponding exposure therefore reflects both the current market value of the missing certificates and potential changes in the market value during the remaining settlement period.

For margin account i, certificate c and calculation time t, the delivery risk component is calculated as

$$DR_i(c,t) = -\min\left(0, B_i^{exp}(c,t)\right) \cdot MV(c,t) \cdot \left(1 + PCR(c,t)\right).$$

where $MV(c,t)$ denotes the applicable market value[14] of certificate c at calculation time t, and $PCR(c,t)$ denotes the price change risk parameter[15], which accounts for potential changes in the market value of certificate c during the remaining settlement period.

The term $-\min\left(0, B_i^{exp}(c,t)\right)$ represents the number of certificates by which the expected position falls short of the outstanding delivery requirements. Accordingly, no delivery risk component is calculated where the expected certificate balance is zero or positive. Where the expected certificate balance is negative, the market value of the uncovered position is increased by the applicable price change risk

[14] The market value $MV(c,t)$ is based on the latest available spot market price of certificate c. Where no spot market price is available, the settlement price of the front contract is used.

[15] The price change risk parameter $PCR(c,t)$ will be updated on a monthly basis and published in the ECC Risk Parameter file available on the ECC website.

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parameter to account for a potential increase in the purchase price of the certificates required to fulfil the delivery obligation. The delivery risk component is always non-negative, i.e. $DR_i(c,t) \geq 0$.

4.3.4 Offset from Net Long Positions

For net purchases that have not yet been financially settled, the financial risk component reflects the corresponding outstanding payment obligation. Where these purchases result in certificates that are expected to remain available after consideration of all outstanding settlement and delivery transactions, their economic value is recognized as an offset within CERM. This avoids retaining the full payment exposure without taking into account the value of the corresponding eligible certificate position.
The offset is limited to the lower of the net certificate quantity arising from transactions that have not yet been financially settled and the positive expected certificate balance.

For margin account i, certificate c and calculation time t, the offset is calculated as

$$OT_i(c,t) = -\min\left(\max\left(0, Q_i^f(c,t)\right), \max\left(0, B_i^{exp}(c,t)\right)\right) \cdot MV(c,t) \cdot \left(1 - PCR(c,t)\right),$$

where $MV(c,t)$ denotes the applicable market value of certificate c at calculation time t, and $PCR(c,t)$ denotes the price change risk parameter, which accounts for potential changes in the market value of certificate $c$during the remaining settlement period.

The term $\max\left(0, Q_i^f(c,t)\right)$ limits the offset to the net quantity of certificates arising from purchases that have not yet been financially settled. The term $\max\left(0, B_i^{exp}(c,t)\right)$ further limits the offset to the positive expected certificate balance remaining after consideration of outstanding financial and physical settlement transactions. Consequently, certificates required to cover an existing or expected delivery shortfall cannot simultaneously generate an offset against the financial risk component.

The eligible certificate quantity is valued at the applicable market value $MV(c,t)$, reduced by the price change risk parameter $PCR(c,t)$. This accounts for the risk that the market value of the certificates may decrease before completion of the relevant settlement process. Accordingly, the offset is non-positive by construction, i.e. $OT_i(c,t) \leq 0$.

If there are no net purchases that have not yet been financially settled, or if the expected certificate balance is not positive, no offset is recognized.

4.3.5 Margin Aggregation

The Certificate Risk Margin is initially determined separately for each certificate by combining the financial risk component, the delivery risk component and the offset from eligible net long positions.

For margin aggregation, certificates with sufficiently similar characteristics may be assigned to the same CERM netting group. Before aggregation, certificate-level CERM amounts denominated in currencies other than EUR are converted into EUR using the applicable currency conversion factors.

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Within each CERM netting group, the certificate-level CERM amounts are aggregated, allowing positive and negative amounts to offset each other. The resulting margin requirement is floored at zero at netting-group level. Consequently, a negative amount within one netting group cannot be used to reduce a positive margin requirement arising from another netting group.

The total CERM requirement for a margin account is determined as the sum of the margin requirements across all CERM netting groups assigned to that margin account.

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5. Other Margins related to Spot Markets

The following section provides an overview of additional margins applied within the clearing process of spot products. These margins are primarily technical in nature and do not serve as traditional risk margins focused on estimating price change risks or trading behavior. Instead, they are designed to facilitate the booking and management of outstanding costs associated with specific transactions on the spot market, rather than acting as a buffer against market price fluctuations.

5.1 Deferred Payment Margin

The Deferred Payment Margin (DEPA) is specifically designed for situations in which financial settlement with Clearing Members cannot take place during the standard ECC payment cycle. Such scenarios may arise if daily cash settlement payments cannot be generated due to technical limitations or when there is a delay in the provision of transactions, as seen in cases like the Nordic Fallback.

In such scenarios, DEPA is calculated after 18:00 CET and becomes effective on the next business day. It represents the open net payment amount, specifically debits only, from all spot market transactions that would typically be settled the following business day. The DEPA is only called upon if the amount is not already covered by the Initial Margin Spot Market (IMSM). This generally occurs on specific days, such as Thursday (with DEPA becoming effective on Friday) for settlements scheduled on Monday, or on Friday (effective on Monday) for settlements set for Tuesday.

5.2 Additional Margin Curtailment

The Additional Margin Curtailment (AMCU) is specifically applied in situations where imbalances or deviations occur because of the Transmission System Operator (TSO) suspending balancing group agreements with trading participants. In these instances, ECC is unable to nominate transactions that the trading participant has already concluded to the TSO. Therefore, the AMCU is only triggered after an actual imbalance has taken place.
The purpose of the AMCU is to cover the actual costs associated with closing out positions, including the expected price for balancing energy. This ensures that financial obligations resulting from the imbalance are adequately managed. The margin is maintained and will continue to be called until all open obligations stemming from the imbalance are fully resolved.

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