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BISTECH Project Phase II Info Session

TAKASBANK

Risk and Collateral Management Service

06/04/2016





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Risk Management



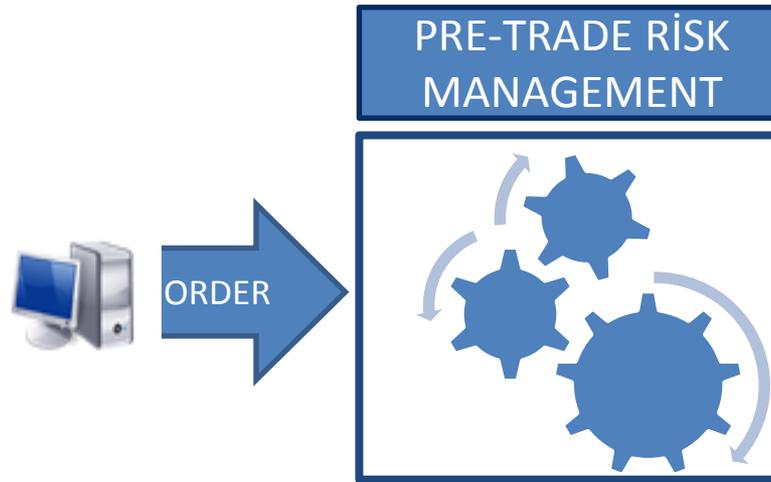
Risk Management System

By the BISTECH system, a three-layered risk management framework shall be established in the Derivatives Market.



Risk Management System

Pre-Trade Risk Management



- Collateral adequacy shall be sought by taking account of the probability of matching of the transmitted order and the unit margin of the contract subject to that order.
- If there is collateral deficiency, the order shall not be transmitted to the trade book.
- In case of any collateral deficiency, no position increasing order can be transmitted.
- In the pre-trade risk management, minimum cash requirement shall not be sought

Risk Management System

Pre-Trade Risk Management

- Unit margin refers to the risk value of a contract. Separate unit margin values can be set for the short and long positions of the contracts.
 - For example; in the pre-trade risk management system, the unit margin for the futures contracts shall be equal to 1 PSR.
 - Such unit margin values can be differentiated by the haircuts to be defined in the system by taking account of the market conditions.
- The unit margin values shall be transferred, at the beginning of each day, from the Real Time Risk Management system to the Pre-Trade Risk Management system. The Pre-Trade Risk Management system shall use these values in the intraday risk calculations.
- The unit margin values shall be updated together with the PSR parameters.

Risk Management System

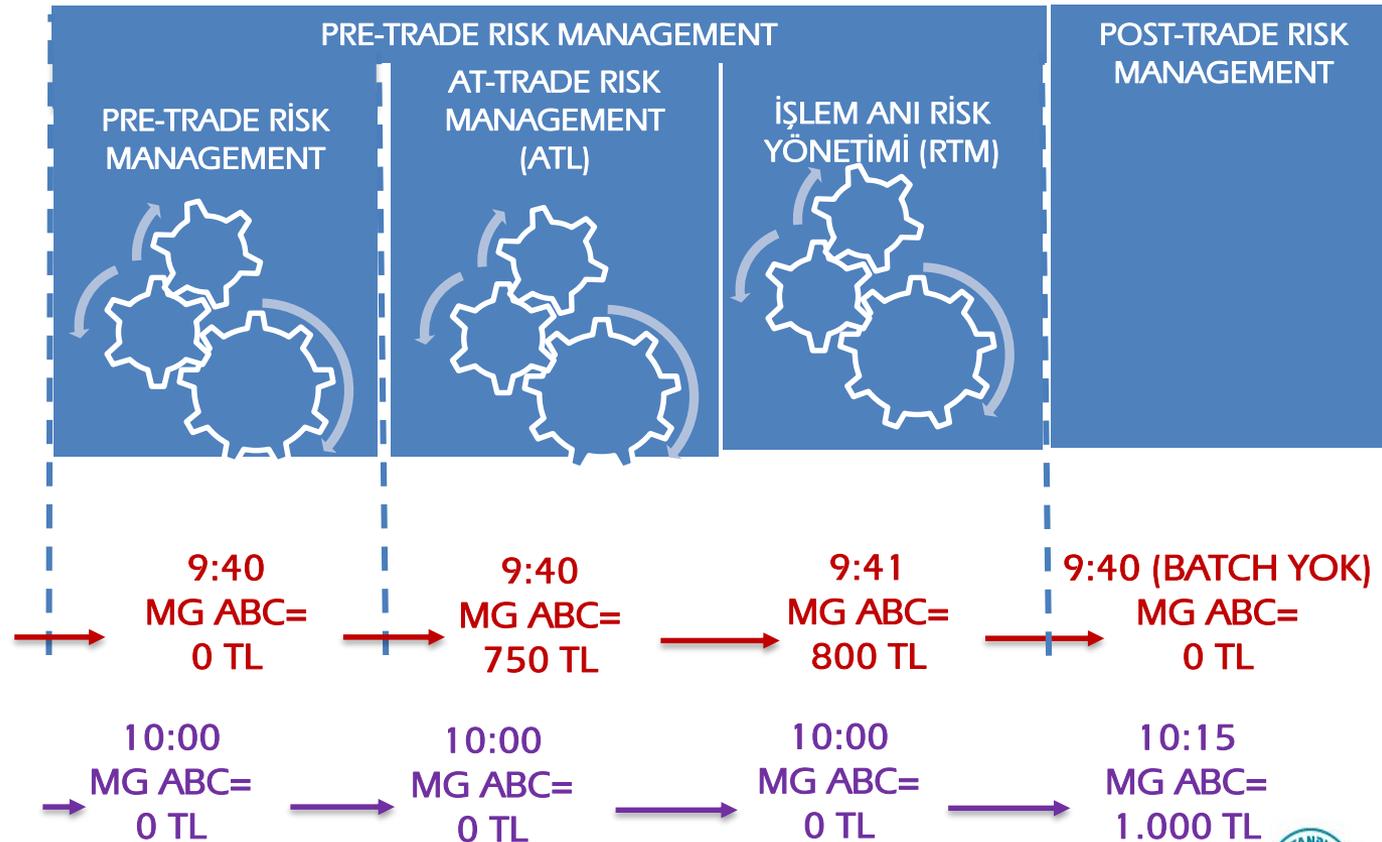
At-Trade Risk Management

- When the order is matched and turned to a transaction, a provisional risk calculation shall be made in the pre-trade risk management layer.
- Simultaneously, a real time portfolio-based margin calculation which exactly replicates the post-trade risk management methodology (SPAN) shall be triggered.

- The value resulting from the calculation shall override the calculation made in the pre-trade risk management layer. (< 1 d)

- The results shall be transferred to the Pre-Trade Risk Management System.

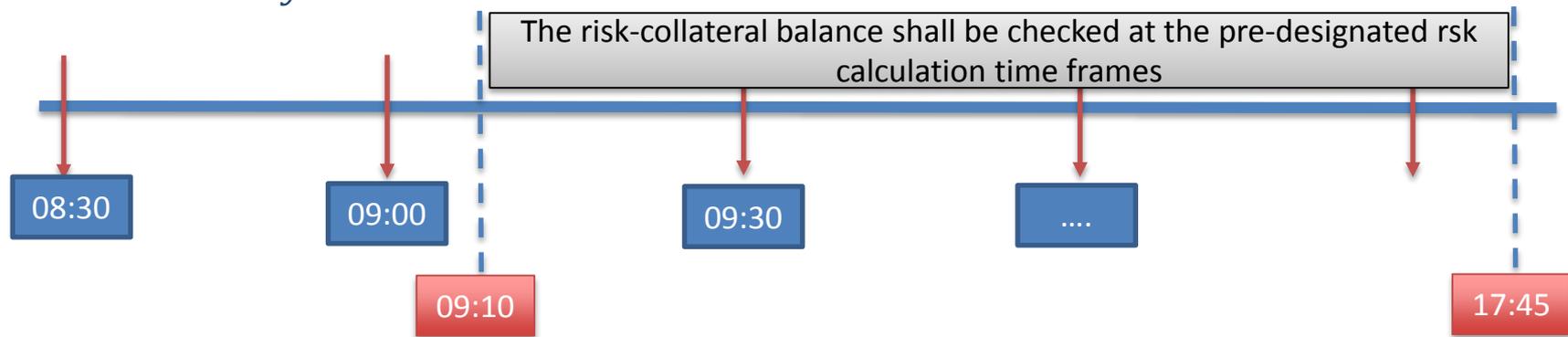
- In case of any collateral deficiency, no position increasing transaction can be conducted.



Risk Management System

Post-Trade Risk Management

- In the post-trade risk management calculations, the total collateral adequacy and minimum cash requirement controls shall be performed at the intraday calculation times.

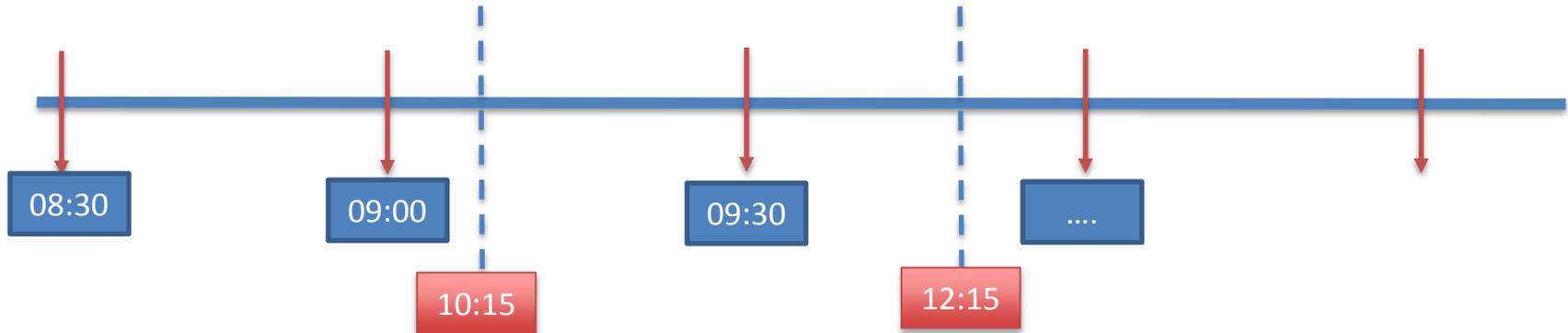


- Post-trade risk management shall be performed by using the Delta Hedge Margin method. Delta Hedge Margin Model and SPAN shall produce the same results.



Risk Management System Post-Trade Risk Management Intraday Margin Call (IDMC)

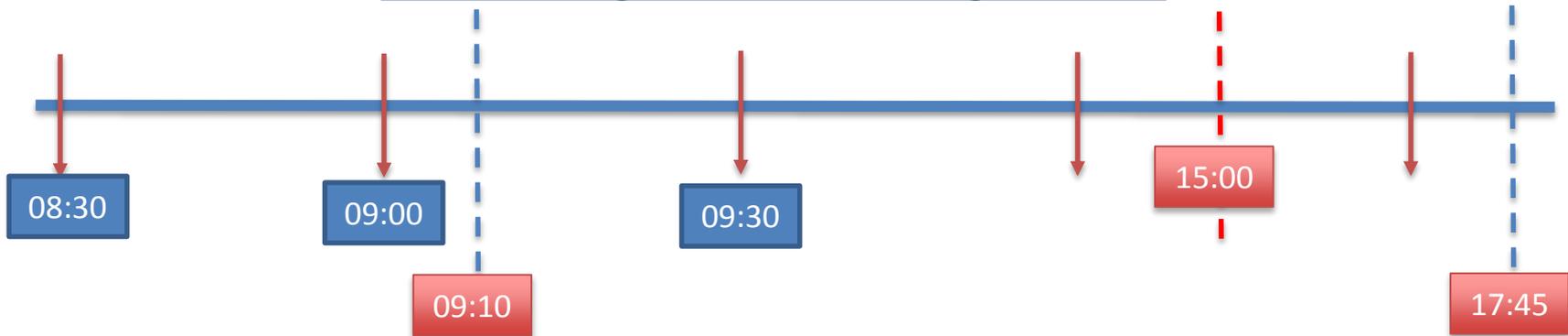
In case of collateral deficiency or failure to cover the minimum cash requirement, an intraday margin/cash call shall be issued.



- For the accounts to which an intraday margin call is issued, the collateral adequacy shall be re-sought after 90 or 120* minutes.

* The business rule is not clear yet

Margin Call Cut-Off Time Discharge from Margin Call



- At 15:00, the end-of-day margin values of the previous day and the amount of outstanding collateral valued by the prices of the previous day shall be compared.
- At 15:00, Collateral (by T-1 price) > Margin (T-1) → Discharge from Margin Call.

In addition, following the position decreasing transaction and/or collateral deposit,

- If the collateral amount by the current prices becomes greater than the margin value at the intraday calculation times (non-negative), the Margin Call shall be discharged.
- If the collateral amount becomes greater than the margin value at the instantaneous risk calculation times (non-negative), the Margin Call shall be discharged.

Risk Management System

Revisions 1

- 1) Delta Hedge Margin Model which is a model similar to SPAN shall be used.
- 2) The maintenance level being applied as 75% shall no longer be used.
- 3) Within the combined commodities, 80% netting rule can be used.
- 4) The provisional profit/loss calculated during the day shall be reflected in the collateral amount available for use at the end of each calculation time.
 - It shall be possible to take position by the provisional profit, whereas, the provisional loss shall reduce the position amount that can be taken.
 - The provisional profits cannot be withdrawn from the system during the day

Risk Management System – Revisions 2

- 5) The prices shall not be updated once every 10 minutes, as it is now, but shall be updated at the calculation times running in the time frames defined in the system.
- 6) The Power Delta Hedge Margin Model shall be used in the electricity contracts.
 - By this method, a PSR% value shall be published for the electricity contracts instead of a fixed PSR value.
 - PSR% value shall also change according to the remaining days to the maturity.
- 7) SPAN file shall be published more than once during the day. A single file shall be used for the Equity Market and the Futures and Options Market.
- 8) The parameters of the contracts such as EURUSD, XAUUSD, etc. shall be published in the foreign currency.

Risk Management System – Revisions 3

9) There will be a change in the risk level calculation.

$$\frac{\text{Maintenance Margin}}{\text{Total Margin Amount} - \text{Provisional Profit/Loss}} \rightarrow \frac{\text{Initial Margin} + / - \text{Provisional Profit/Loss}}{\text{Total Margin Amount}}$$

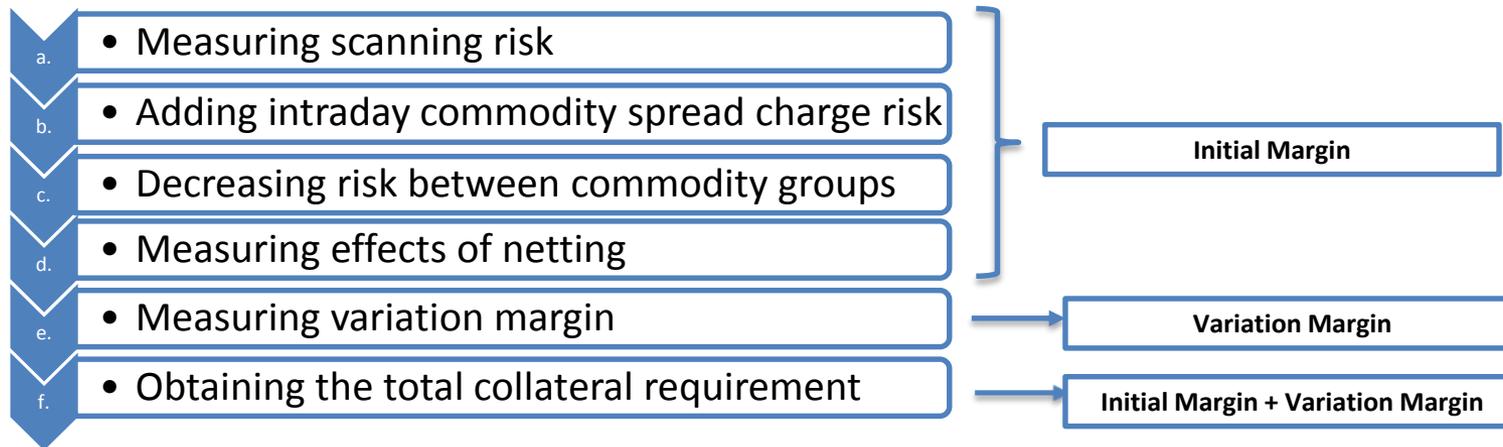
10) The VaR-based risk limits being determined on a market basis shall be set on a member basis.

10) There will be some changes in the Guarantee Fund calculations.

11) In the collateral valuation, the group and sub-group limits shall be calculated over the total deposited collateral.

Risk Management System - Risk Calculations

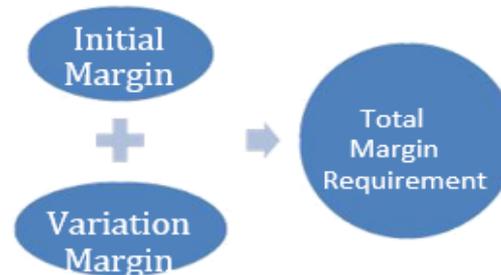
The risk calculations shall be performed by Delta Hedge Margin Model.



The risk calculations shall be continued to be performed as they are, in the manner indicated above.

Risk Management System - Risk Calculations

Total Margin Requirement is composed of two components.



Initial Margin: The collateral value generated as a result of SPAN.

Variation Margin: Profit/loss (+/- option premiums)

If the CCP service is provided for the Physical Delivery products, the position shall be transferred to the relevant market. The underlying assets to which CCP service is not provided shall be continued to be collateralized in the Derivatives Market.

Risk Management System - Risk Calculations

80% rule can be applied as netting effect. Accordingly:

80% of the opposite positions associated to the same combined commodity shall be netted-off, and gross collateralization shall be applied for the remaining 20%.

By this way, the initial margin shall be calculated in the following manner;



Risk Management System – Provisional Settlement Prices

In the initial and variation margin calculations during the day:

For the Futures Contracts, the last traded strike price of the contract shall be used.

For the Options Contracts, the theoretical price shall be calculated by using the underlying asset's spot price of the present day and the volatility of the previous day.

These calculations shall be made together with the periodical instantaneous calculations in which the risk calculations are conducted.

Risk Management System - Guarantee Fund

- TRANS application shall be terminated.
- Minimum GF size shall be continued to be used.
- Guarantee Fund maintenance level shall not be used.
- In the allocation of Guarantee Fund to the members, their average market participations shall be taken as the base (rather than the maximum values).

The calculation shall be made in the following manner for the prescribed periods:



≥Max. (The fund requirement of the member with the largest risk, the fund requirement of the second and third members with the largest risk in case of their joint default)

GF Obligation of the Member:

$$= \text{Max} \left(\text{Min. GF Obligation}, \frac{\text{Average Initial Margin}}{\text{Total Average Initial Margin}} \times \text{GF Size} \right)$$

Risk Management System-Power Delta Hedge Method

- In the Power Delta Hedge algorithm, 16 risk arrays shall be used as in the Delta Hedge Margin Model and the worst case scenario shall be used as scan risk.
- In the Power Delta Hedge calculation, all electronic contracts shall be included in the same combined commodity.
- The positions shall be made subject to correlation by taking account of the adjacency relations in the different time frames.

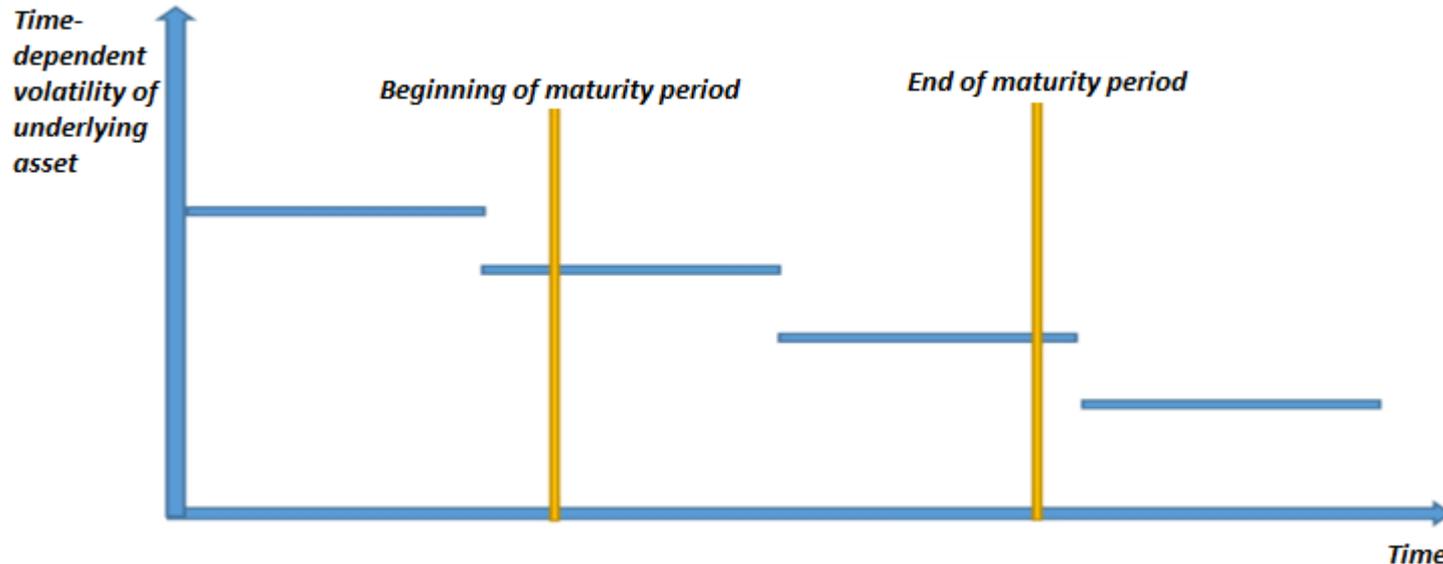
Risk Management System-Power Delta Hedge Method

Calculating Time-Dependent Volatility of Underlying Asset:

The volatility value of the underlying asset is equal to the weighted average of the time-dependent volatility values of the underlying asset throughout the maturity period.

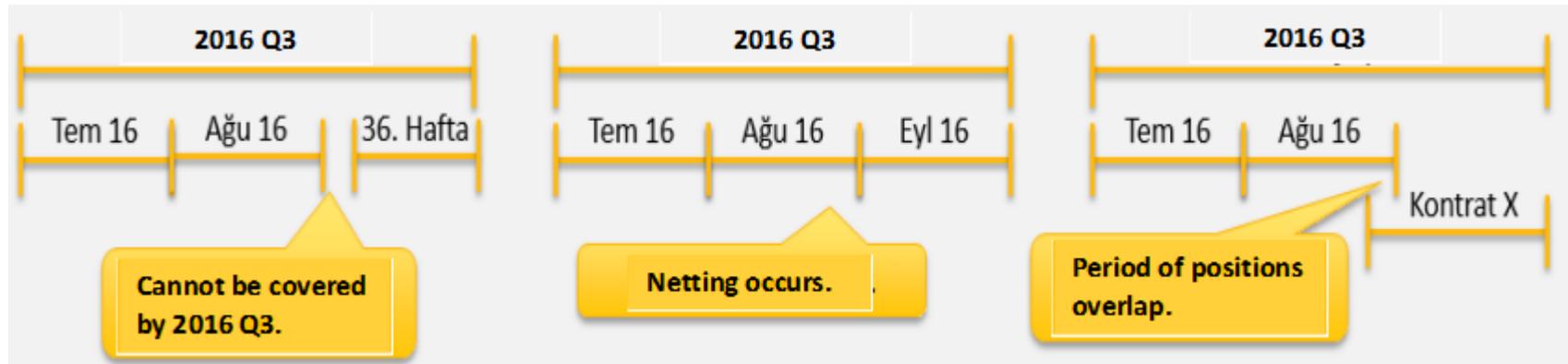
Given the fact that $PSR\% = \text{Time-Dependent Volatility of Underlying Asset}$, the PSR value shall differ according to the time.

The more the expiration date of the contract (expiry of the maturity period) is far away, the lower the volatility value shall be for that contract.



Risk Management System-Power Delta Hedge Method

- There are 3 types of electricity contracts: monthly, quarterly and annual.
- If any opposite position is taken from these contracts in a manner to fully cover each other, these contracts shall be made subject to netting among themselves.

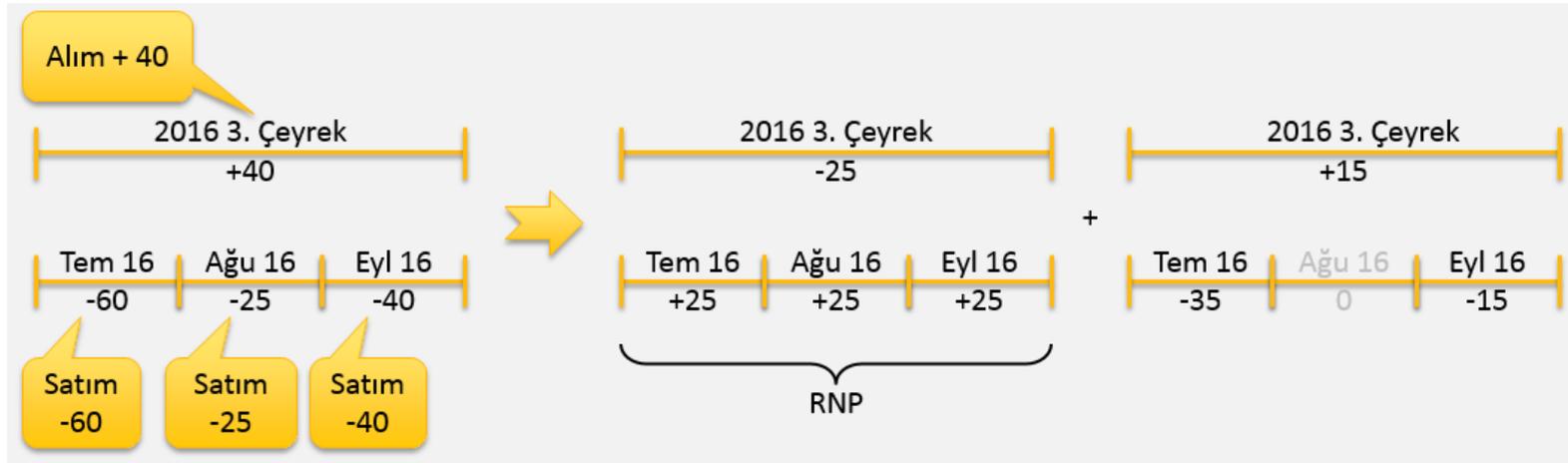


Risk Management System-Power Delta Hedge Method

For example,

When we buy F_ETRBQ316 contract and sell F_ETRBM0716, F_ETRBM0816 and F_ETRBM0916 contracts, these 4 contracts shall be netted-off against each other up to the contract with the lowest position. In calculating the risk value of the portfolio, the post-RNP (Risk Neutral Position) details shall be taken into account.

In order for the contracts to be netted-off, the opposite contracts must fully cover each other time-wise.



Risk Management System- Power Delta Hedge Method

Gün	Günlük Kontrat Miktarı	Kontrat Büyüklüğü	Elektrik Spot Fiyatı	Kontrat Fiyatı TRY/MW	İşlem Fiyatı	Miktar	Mutabakat Miktarı	Net Portföy Pozisyonu	Başlangıç Teminatı	Değişim Teminatı	Toplam Teminat Gereksinimi
1		72	95.00	95.00	100.00	1	-360.00	1	1,026.00	0.00	1,026.00
2		72	94.00	99.00			288.00	1	1,069.20	0.00	1,069.20
3		72	93.00	98.00			-72.00	1	1,058.40	0.00	1,058.40
4		72	92.00	95.00			-216.00	1	1,026.00	0.00	1,026.00
5		72	91.00	97.00			144.00	1	1,047.60	0.00	1,047.60
6	2.4	69.6	90.00	90.00			-16.80	1	939.60	-487.20	1,426.80
7	2.4	67.2	89.00	95.00			-19.20	1	957.60	-134.40	1,092.00
8	2.4	64.8	88.00	80.00			-21.60	1	777.60	-1,101.60	1,879.20
9	2.4	62.4	87.00	70.00			-24.00	1	655.20	-1,684.80	2,340.00
10	2.4	60	86.00	100.00			-26.40	1	900.00	180.00	720.00

Risk Management System-Power Delta Hedge Method

Contract Price Calculation in the Maturity Period:

- Since the electricity contracts shall not be traded in the maturity period, the contract price must be set in order for the risk calculation to be made in this period.
- The contract price of the relevant day in the maturity period shall be calculated by taking the average of the spot electricity price of the relevant day and the price of the relevant day for the next month electricity contract from the maturity period contract.

Example:

Spot electricity price at 05.04.2016 = 125 TL

Price at 05.04.2016 for F_ETRBM0516 contract = 75 TL

Price at 05.04.2016 for F_ETRBM0416 contract = $(125+75)/2=100$ TL



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Collateral Management



Collateral Management – 1

- Collateral management shall be performed by Takasbank.
- Collateral deposit and withdrawal transactions shall be carried out over the new interface (Clearing Workstation).
- The interest amounts to be generated from cash collateral shall be transferred to the margin accounts of the members. No interest shall be distributed to the members who do not want to get any interest.
- Valuation haircut shall be applied to the assets eligible as collateral.
- For the accounts with margin requirement in any currency other than the base money in the collateral valuation, an additional valuation haircut shall be used (If the Margin Requirement is USD but collateral available for use is TL, an additional haircut shall be applied when converting).

Collateral Management – 2

- Composition limits can be imposed on the collateral.
- Depositing a specific portion of the required margin and guarantee fund contributions in cash shall continue.
- A revision has been made in the collateral valuation method. The composition limits shall be calculated over the total appreciated collateral amount being deposited.

Example: Let's assume a margin account with 100.000 TL cash and USD-denominated collateral whose appreciated amount equals to 1.000.000 TL. Given that the upper limit for USD-denominated collateral is 50%, how much will the total appreciated collateral amount be in TL?

Total appreciated collateral amount by the current system: 100.000 TL + 1.000.000 TL = 1.100.000 TL

Total appreciated collateral amount by BISTECH system: 100.000 TL + 550.000 TL = 650.000 TL

1.000.000 TL - 550.000 TL = 450.000 TL shall be excluded from the valuation.



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Thank You



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