General principles of RM of OTE

1. Definition of financial risks of the market operator

The definition of financial risks is based on the arrangement of processes and responsibilities for financial settlement of imbalances, the short-term market and fees for the activities of the market operator. The market operator enters this financial settlement as the credit counterparty of registered market participants (RUT) and this means that all obligations of RUT's are settled as obligations towards the market operator while all their claims from these contracts are settled at the market operator's expenses. Besides obligations that are defined in the concluded contracts these business relationships are also subject to standard accounting and tax regulations. Through this arrangement the market operator has accepted full responsibility for payments of all claims of the RUT's (subjects of settlement and PpS providers) within proper time schedules.

With regard to this obligation the main financial risks of the market operator can be defined as the risk of insufficient liquidity and risk of losses resulting from unpaid debts of RUT's. On the basis of this identification the methodology of RM (Risk Management) of OTE (Electricity Market Operator) has specified two basic goals, namely creating sufficient reserves of liquidity ensuring presence of financial funds in settlement accounts in case one of the RUT's does not pay its obligation within the proper time schedule (risk of insufficient liquidity) and checking and controlling the open credit position in the sense of securing future claims of the market operator towards RUT's (risk of losses due to permanent insolvency of a RUT). The management methodologies of both these financial risks are based on four basic principles:

- Principle of settled balance at each hour of every business day
- Principle of controlling financial risks on the basis of individual approach to particular subjects of settlement (SZ)
- Principle of 100% security of future and current obligations of subjects of settlement towards the market operator
- Principle of managing financial risks through the IS of OTE

1.1 Principle of settled balance

The whole system and status of the market operator is based on balanced income and expense financial flows, copying the profit and loss statement from the organization of the short-term market, evaluation of imbalances and activation of supporting services. If on the part of the market operator the income side of financial settlement is secured both against possible defaults of SZ's and in the sense of payment within due schedules, the course of everyday financial settlement cannot be disturbed due to shortage of financial funds in accounts of the market operator.

In practice, this principle is secured through debit payments being delayed as compared to credit payments from the point of view of the market operator. To put it simply, the market operator first receives its claims, completes the volume of money and subsequently, it redistributes to money with a delay in the form of payment of its obligations towards the SZ's and providers of PpS. This delay of payments also has great significance for the creation of financial reserves to manage liquidity risks.

1.2 Principle of individual approach

It is mainly in the sphere of credit risk that the current methodology of RM of OTE is based on the principle of individual security of particular RUT's. For the time being there are no reserve funds or other systems of collective security that the market operator could use to cover its losses resulting from permanent insolvency of one of the market participants in such a way to be able to fill the income part of the balance with the required amount. So this absence of a reserve fund forces the market operator to guarantee its open positions through provided financial security of the particular SZ on the basis of the individual approach.

Incorporation of at least partial collective security in the current methodology of RM of OTE remains one of the priorities of further development of the market operator in the sphere of risk management.

1.3 Principle of 100% security of obligations

In case of collective security of the whole market it would be the credibility of individual subjects of settlement that would represent the base for determination of probability and amount of possible losses of the market operator, which would determine the size of the reserve fund. However, if an unpaid obligation of an SZ towards the market operator can only be covered from the security of this SZ, then partial security of obligations based on financial credibility would mean the duty of the market operator to cover a possible loss from this incomplete security in case of default of this SZ from the operator's own resources.

The market operator would have to create reserves for these losses. The operator would mainly generate these reserves from fees, which means in another way, but again from all market participants. Another reason for using the principle of 100% security of obligations is a conservative approach of the market operator to the management of its financial risks at the beginning of its operation. Possible insolvency (temporary or permanent) of a SZ would seriously jeopardize functioning of the whole system of financial settlement and this way it would also question credibility of the market operator as the guarantor of the electricity market in the Czech Republic.

1.4 Principle of managing financial risks through the IS

This way the market operator mainly wants to minimize the risk of failure of the human factor both on the part of the subjects of settlements and on its own part. The aim was to create a system that would make it possible to dynamically measure and secure the current risk of all SZ's in the same way to help SZ's optimize the amount of their financial security or the related costs.

2. Risk management process in the IS of OTE

This process can be briefly described as a trade limit system where the amount of the limit is equal to the amount of the deposited financial security at the beginning. This trading limit or in other words available financial security is blocked in the course of trading depending on the amount of predicted as well as actual obligations of the SZ towards the market operator. Predicted obligations are determined with the use of defined algorithms on the basis of registered commands and valid deals. Blocking of the financial security is released at the moment of processing of the bank readout documenting payment of the obligation from the particular registration. If a command is not matched in the case of organized short-term market or if there is no imbalance with regard to the particular SZ, the security of the predicted obligation is cancelled and the blocking is released after the settlement of the given trading day.

After every event that has an impact on the amount of the blocked limit, the IS of OTE will recalculate the current balance of the available financial security. If this balance is negative, the particular ST will be "locked". In the course of trading the amount of available financial security may be optimized e.g. depending on seasonal changes in trading volumes, but also in such a way to secure all actual obligations or obligations expected on the basis of registrations. In the IS of OTE this blocking process is also called the utilization system of financial security.

3. Credit risk management

The current credit risk of the market operation, also referred to as its open credit position with regard to the particular SZ can be defined as the sum of expected or actual and for the time being unpaid obligations of the SZ towards the market operator.

Credit risk of the market operator may only arise in connection with items that can generate a claim for the market operator, i.e. items or types of deals that are financially settled through OTE. The performance of bilateral contracts, foreign deals and fixed diagrams are not financially settled through the market operator, but they are only registered for settlement of deviations. This is why these deals need not be secured financially and therefore it is not e.g. true that the market operator secures bilateral contracts. The market operator does not secure these deals, but it only uses information about these contracts to be able to predict expected obligations resulting from the settlement of imbalances.

The following table summarizes settled types of deals in which the market operator faces credit risk and which are secured. There is a rule that the RM methodology of OTE must be based on set processes of

financial settlement and this is why it is necessary for this overview to respect three versions of financial settlement (items that enter the utilization system of the trading limit are marked in the table – see below):

Settlement version / deal type	DEV	OKO	VVT	ACT	POP
	(DE+ and DE-)			*(AC+ and AC-)*	
Daily advance (0)	**X**	**X**	**X**		
Monthly invoicing (1)	**X**	**X**	**X**		**X**
Final monthly (2)	**X**	**X**	**X**		**X**

3.1 Security of imbalance settlement

Similarly to the organized short-term market (OKO) in the case of settlement of caused imbalances the blocking cycle of the available financial security can divided into two stages. In the first stage the obligation is predicted and the trading limit is blocked up to the amount of this obligation; subsequently, in the second stage this prediction is corrected to the actual amount of the obligation. For the determination of predicted obligations the market operator distinguishes two regimes that are tentatively called “Security for the higher position” and “Security for imbalance”.

3.2 Security for the higher position

In both the cases the determination of the amount of the predicted obligation is based on monitoring of the trading position of the SZ. In the case of “Security for the higher position” this position is determined as the sum of the higher ones of the positions of purchases and deliveries in MWh in each hour for 4 trading days ahead. On the basis of this position two predicted coefficients are used to appraise the future possible obligation towards the market operator for the caused imbalance. The predicted coefficients are the parameter price expressing the expected unit price of the imbalance and the coefficient of predicted imbalance determining the expected possible imbalance of the SZ. The parameter price is a system coefficient that is valid for all SZ’s and at present its value is 1645 CZK/MWh. The coefficient of predicted imbalance results from classification of the particular SZ into the particular business-technological rating group (see below).

Then, the amount of required security of the expected obligation for produced imbalances is calculated as the product of the current trading position, the parameter price and the coefficient of predicted imbalance.

Besides the security of imbalances from this trading position the available financial security is also blocked on the registration of orders (demands and offers) in the organized short-term market (OKO, VDT) in the amount equal to the product of the demanded or offered quantity in the order, the parameter price and the coefficient of predicted imbalance. After matching this blocking is released and the trading position for which the SZ will be newly secured is changed to the actually matched amount of electricity from demands (purchase) or offers (delivery).

After evaluation of imbalances for the particular trading day the blocked part of the limit is recalculated in accordance with the actual obligation of the SZ for imbalances. Payment of this obligation means complete release of the blocked part of the available financial security.

3.3 Security for imbalance

This regime may only be used by subjects of settlement that only cause imbalances of the trading type (so-called “pure traders”). In the case of these subjects the market operator is always able to precisely monitor the actual amount of the future imbalance on the basis of currently valid contractual values, fixed diagrams and information about foreign trade. Unlike the “Security for the higher position” regime in this regime the market operator is able to precisely follow the actual future imbalance of the SZ in MWh, which must only be appraised with the estimated price – parameter price. Besides the actual amount the direction of the

future imbalance is also known, i.e. whether the imbalance will be positive or negative and this is why the market operator distinguishes the parameter price of negative imbalance, which is the same as in the "Security for the higher position" regime, i.e. 1645 CZK/MWh, and the parameter price of positive imbalance, which amounts to 920 CZK/MWh.

So the amount of the required security of the expected obligation for produced imbalances is calculated as the product of the current trading position and the parameter price, where the trading position is determined as the sum of the difference between purchases and deliveries in MWh in each hour for 4 trading days ahead.

Parallel security of commands for the short-term day-ahead market (OKO, VDT) before their matching or acceptance and securing of the actual obligation is organized in the same way as in the "Security for the higher position" regime.

3.4 Security of financial settlement of the organized short-term day-ahead market (OKO, VDT)

On the basis of the agreement on access to the short-term market in 2003 the market operator organized and financially settled only one type of deals – OKO. Since January 2004 there has been another type – trading in the intra-day market. In the case of security of financial settlement of OKO it is just the demand commands that must be secured (successful offers are always settled for the benefit of the SZ). At the moment of registration of a demand the available financial security is blocked up to the product of the demanded quantity and the price specified in the command increased by VAT. After matching of OKO the second stage follows, when the blocked amount is recalculated to the product of the actually purchased quantity and the marginal price determined by the market increased by VAT.

In the case of financial settlement of the intra-day market (VTD) all commands are secured that may generate an obligation towards the market operator after matching (negative prices are possible). At the moment of registration of a demand or offer at the VDT centre the available financial security is blocked up to the sum of product of the demanded or offered quantity and price specified in the command increased by VAT. After matching the blocked amount is recalculated to the product of the matched quantity and specified priced increased by VAT again.

After accounting of these types of deals the IS of OTE generates a collection command and when the command has been paid, the blocked part of the available financial security is released.

3.5 Credit risk management tools

At present an SZ may secure its future and existing obligations towards OTE (available financial security) with the use of three basic methods:

- by depositing financial funds to the account of the marked operator;
- with a bank guarantee;
- with a blocked account with an overdraft framework

The original RM methodology of OTE only defined the first two of the three above mentioned tools. Their selection was based on the effort to create one tool for basic security – bank guarantee and the other for operative additional guarantee. Current account with an overdraft framework as another security instrument was only accepted later on the basis of cooperation with the SZ's.

4. Liquidity risk management

Besides the available financial security, which creates the trading limit for the system of its blocking in the IS of OTE, the operator also requires cash security amounting to 5 million CZK. This type of security is only accepted in the form of depositing financial funds to the account of OTE and besides the generation of a certain reserve to cover credit risk it is also important for the liquidity management of the market operator.

The market operator mainly manages the liquidity risk by creating a sufficient reserve of cash through the combination of contracted overdraft loans in its settlement accounts, the requirement of the 5-million cash security deposited to the account of the market operator and the process of delaying debit payments as compared to credit ones for the period of at least two days.

From the point of view of stability the overdraft loans, which are always fixed for the period of one year, represent the most secure tool. Also, the available financial security deposited to the account of OTE can be considered as relatively stable. On the other hand, the last item – liquidity reserve resulting from delayed payments is very volatile and changeable even within one day.

The price of these instruments is indirectly proportional to their stability. In the case of the deposited available financial security OTE has undertaken to pay a regular increase the size of which results from the development of market rates. It means that for the use of this reserve OTE bears expenses amounting to the sum of these increases. The cheapest instrument is the payment delay cushion, which brings increases in case of trouble-free payment morale of the SZ's while these increases compensate costs incurred in case of temporary payment problems of one of the SZ's on other days.

Besides the above mentioned tools the management instruments of financial risks (liquidity and credit risk) also include the authorization to draw money from accounts of SZ's (credit payments from the point of view of the market operator have the form of collection), the right to suspend payments and the right to unilaterally set off obligations against claims in case of insolvency of the SZ. Of course, the authorization to draw money from an account cannot eliminate the risk of deliberate or unavoidable insolvency of the SZ, but in connection with information technology, which generates collection commands automatically, it represent a significant decrease of the risk of failure of the human factor. The right to suspend payments, which OTE may only use in case of negative balances of the available financial security, should prevent financial settlement for the benefit of an SZ that is already "locked". The instrument of payment suspension is logically accompanied by the right of unilateral set-off.

5. System of Business-technological Rating of OTE

Checking the current value of utilization of the trading limit provides a very precise and dynamic model of securing the open position of the market operator with regard to the SZ. In the first predicted stage of securing claims from the settlement of imbalances in the "Security for the higher position" regime the exactness of security depends on correct definition of predicted coefficients, mainly the coefficient of predicted imbalance (KPO), determining the possible imbalance of the SZ. This definition is only applied in the "Security for the higher position" regime. In the other regime – "Security for imbalance" the imbalance is only determined as the current imbalance and the predicted security for imbalances is only determined by the predicted price.

For the purpose of determination of the coefficient of predicted imbalances OTE has created the system of business-technological rating to define that risk rate of individual SZ's in the sense of causing imbalances. This tool must first of all protect the market operator so that it can securely fulfil its mission, but at the same time it must be sufficiently precise so that unnecessary over-security should not create a barrier to the market entrance.

Historical data represent the basic and decisive factor for classification of SZ's into rating groups. The algorithm of evaluation of these data mirrors defined processes of security of imbalances in the IS of OTE. It is necessary to realize that the main aim of the RM of OTE is not to secure the absolute amount of imbalances in MWh, but the obligations resulting from expected imbalances in CZK. For this reason further analyses are based on the total daily obligations for caused imbalances that can be divided into individual obligations resulting from measured imbalances (ZAV_DEV).

This algorithm distinguishes between imbalances that meant an obligation for the SZ on the basis of the financial equipment from imbalances that were financially settled for the benefit of the SZ. You can imagine a situation when one SZ achieves high imbalances in MWh with financial settlement for delivered electricity for the benefit of this SZ and another SZ with equally high imbalances in MWh with financial settlement at its expense. In the sense of security of obligations from financial settlement it is perfectly in order if this fact is taken in consideration for the purpose of dividing these SZ's into rating groups.

The daily relative imbalance (deviation) from the trading position (DEV) is calculated in accordance with the formula: $DEV_d = (ZAV\_DEV_d)/(ParC * PO_d)$,

where ParC is the parametric price expressing the expected unit price of the imbalance and PO is the final trading position of the SZ on the particular day (the higher one of the total registered delivery and total registered purchase).

Daily deviations determined this way are subject to statistic analyses for the previous monitored period. The first classification is made of the basis of the value (X) of normal distribution at the probability of 95 %:
X = NORMROZ (DEV_d ; 0,95)

This value, which results from the normal distribution of historical data, is used to classify the SZ into the first rating group in such a way that the coefficient of predicted imbalance in this rating group should be the first following after the value calculated from historical imbalances. OTE may modify this classification on the basis of further indicators of market behaviour of the SZ, as e.g.:

- The average imbalance of the ten highest daily imbalances after disregarding the five highest ones and its trend;
- Structure of the actual diagram in the monitored period;
- Stress test for seven highest daily obligations for imbalance and its trend;
- Stress test for seven higher daily obligations after balancing and its trend;
- Failures in the monitored period;
- Changes of technical parameters of internal production/consumption;
- The fact whether the evaluated SZ trades with foreign countries;
- The fact whether the evaluated SZ is a provider of PpS, etc.

6. Business-technological Rating Groups of OTE

A+	KPO	1,25%	C-	KPO	12,50%
	JKFZO	20,6		JKFZO	205,6
A	KPO	2,50%	D+	KPO	15%
	JKFZO	41,1		JKFZO	246,8
A-	KPO	3,75%	D	KPO	20%
	JKFZO	61,7		JKFZO	329
B+	KPO	5%	D-	KPO	25%
	JKFZO	82,3		JKFZO	411,3
B	KPO	6,25%	E+	KPO	30%
	JKFZO	102,8		JKFZO	493,5
B-	KPO	7,50%	E	KPO	40%
	JKFZO	123,4		JKFZO	658
C+	KPO	8,75%	E-	KPO	50%
	JKFZO	143,9		JKFZO	822,5
C	KPO	10%	Z	KPO	100%
	JKFZO	164,5		JKFZO	1645