Basics of risk assessment at development of power consumption prospective prognosis

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Future uncertainty is an objective reality of the present world and that is why no administrative decision is possible without it taken into consideration. Today's view of future uncertainty is an ability to predict the possible variations of the future and choose between the alternative decisions on the bases of cause-effect relationship analyses.

Key words: **Prospective prognosis of power consumption, uncertainty and prognosis risks .**

1. INTRODUCTION

The risks were investigated in the numerous scientific and applied tasks. There are risks in every sphere of human activity. The problem of risk assessment at energy sector development prospective planning is not enough investigated. Much prominence in the report is given to the methods of prognosis risks investigation in energy sector.

- Prognosis risks investigation plan of energy sector development,
- Form and structure of risks information field,
- The methods of risk factors selection.

2. PLAN OF RISKS INVESTIGATION

The logical plan of risks investigation may be organized in the following way: to choose object of investigation, to determine aim of investigation (the purposes of look-ahead calculations) and define problem-solving approaches (Fig. 1.). Proceeding from the aim of investigation to the problem solving is the prognosis development and the best variant selection. Forecast variants can be much that leads to necessity of introduction criteria a choice of the forecast and the risk can be one of criteria.

The field of uncertainty causes search is the determination of search directions and selection of the sphere analyses methods. The source of uncertainty in most cases is the environment of the object. The only way of investigation is experimental methods.

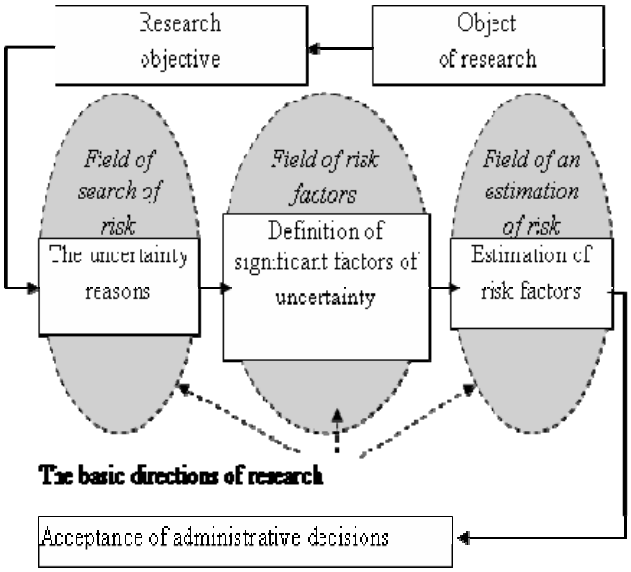

Fig. 2. The scheme of research of a category risk.

The field of risk factor analysis is the determination of uncertainty factors significance with the help of various methods. Methods of significant factors definition are as follows: expert methods or methods of perceptibility.

The field of risk assessment is connected with answering the quiestions:

- What is risk denominator,
- Haw to define limits of risks,
- Haw to make a decision on the bases of risk assessment?

The task of risk assessment could not be formalized to mathematical model, there is always place for expert evaluations of how the future corresponds the past. This is the basis of the factors expert analysis and their assessment defining. The combination of factors and their values gives the field of prognosis development risk depending on forestalling time (Fig. 2.).

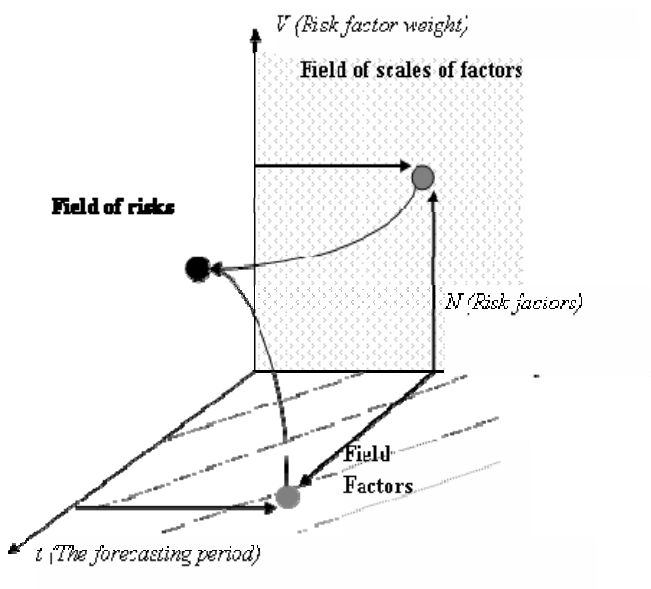

Fig. 2. The scheme of a field of the expert analysis of risks.

For the stated parameters work the following characteristics:

- Change intervals are phased that is the value of the factor may be different for the same risk factor at various intervals.
- The field of risk is the function of variable risk factors and values of each factor:
- Configuration is defined by the conditions of the given task (aims of prognosis).

3. TYPES OF ENERGY SECTOR PROSPECTIVE PROGNOSIS RISKS

In accordance with the given plan the risk analysis of prospective prognosis was carried out. The first step is to choose object of investigation and the object chosen should be the Siberian power system. The second step is to define aim of investigation, which is the company work effectiveness that in many respects depends on correct development prognosis made. The risk structure could be seen as a triangular pyramid in which one of the side presents hierarchic aim cluster of the company, the second side – risks, and the third one presents the quantitative evaluation of the risks.

Depending on time of execution of the forecast the structure of risk and its value varies. It puts forward a problem of definition of "centre of gravity" of time value which should depend on the purposes and forecasting problems (fig. 3).

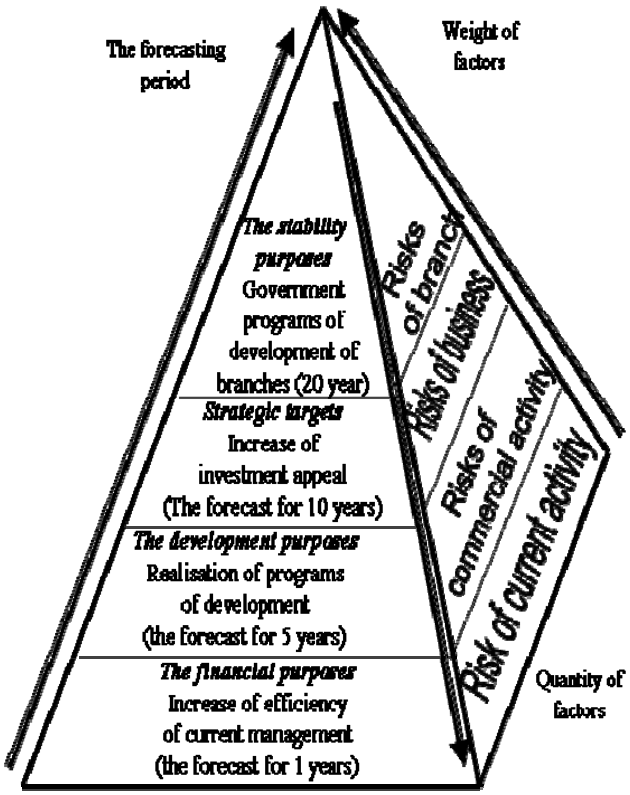

Fig. 3. Kinds of risks by working out of forecasts of development.

Let us investigate risk information field at every time level of progosis.

The most “hard-set” group of risks is the group of operating or current risks because the prognosis period is relatively short – 1 year.

For forecasts for this period the saved up statistics about technical failures, financial losses, non-payments, failures of deliveries (fig. 4) can be used. Risk control function is prevention of possible departures from the plan.

The second risk group is development risks connected with development program realization. On this level all risks are the result of failure to implement the set steps of energy sector development programs. The default reasons can be various – from technical errors in the program to absence of executors of the planned actions (fig. 5). The function of risk control for that kind of prognosis comes to the correction of subsequent plans that is to chain connection of subsequent prognosis.

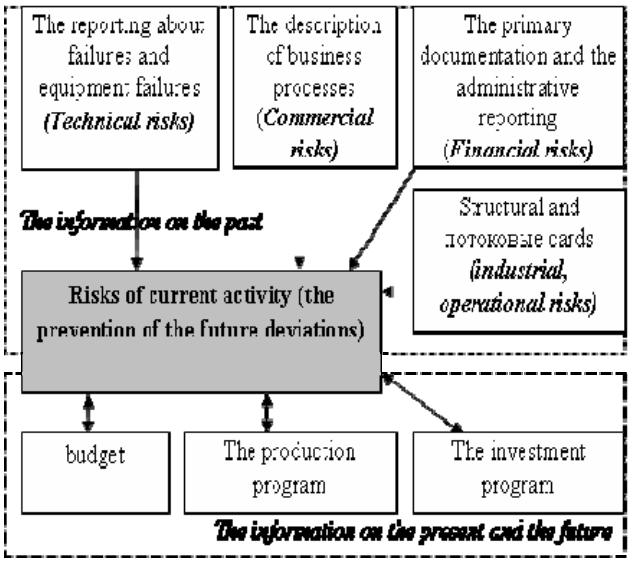

Fig. 4. The scheme of an information field of risks of current activity.

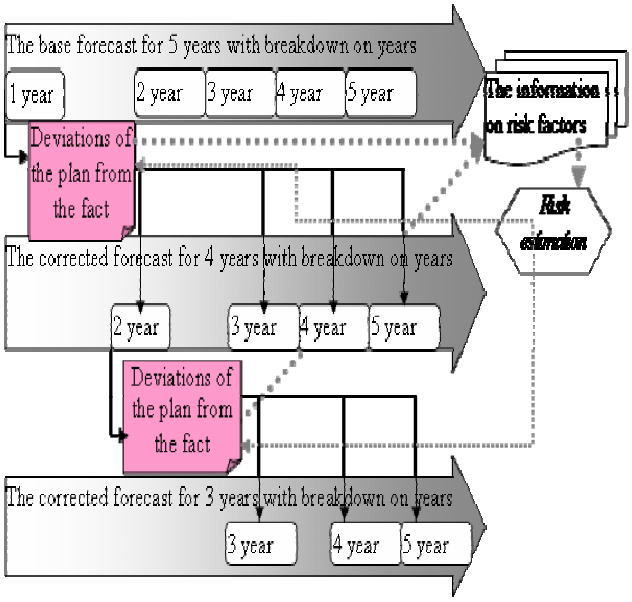

Fig. 5. The scheme of formation of an information field of risks of the forecast for 5 years.

The third group of risks contains the risks of long-range goals or investment attractiveness. Generally speaking the development risk and the electricity consumption prognosis risk are the kind of risks that have different uncertainty nature. The prognosis risk is not equal to development risk but nevertheless in most cases on the bases of prognosis risk a variant of prognosis is accepted that is why it is the one that important to assess. The prognosis risk should have two components: Prognosis model risk and prognosis inaccuracy risk. The more investigated the group is, the more attractive to investors the company will be.

The last group of risks is sectoral risks. One of the most important factors of these risks is the state policy concerning the sector development. A company by itself is not capable of working out a strategy for the period of twenty years, only general trends of development could be made but in no way prognosis or development program.

4. THE METHODS OF PROSPECTIVE PROGNOSIS RISK FACTORS SELECTION.

To investigate the risk factors field methodological approach is needed to reveal the maximal number of risk factors the object of investigation subjected to. Most risk investigators suggest to divide all risk factors into two groups in accordance with instruments used.

- Inner factors,
- Outer factors, existing out of company.

The applied analysis of risk factors should be advisable carried out in the context of the object functioning general description or in the context of process acting. Revelation of outer risk factors could be based on the analysis of different object connection models with the external environment institutions. Marketing methods for short-term prognosis could be used, which reflect nowadays environment and the future should be regarded the same in which case we are more interested in the nature influence on the process elements and the prognosis is carried out for the process with consideration of the nature. The general scheme of formation of the list of risk factors is resulted on fig. 6.

Considering that revelation of risk-forming factors is possible only on the basis of expert analysis, in such case the main source of information is the expert and his opinion, his qualitative and quantitative assessments.

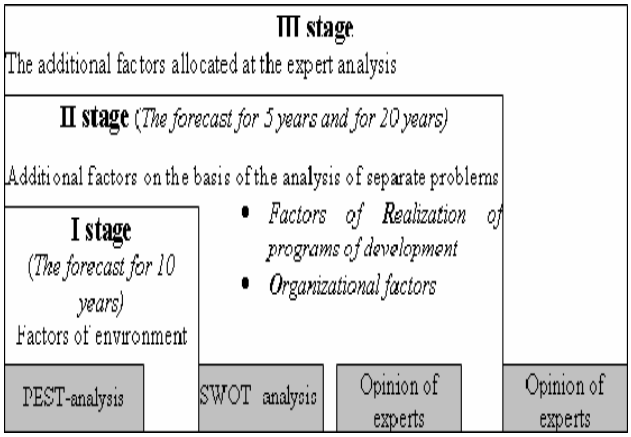

Fig. 6. The scheme of formation of the list of risk factors.

5. EXAMINATION OF RISK FACTORS SELECTION.

In accordance with the plan accepted an examination of selection of energy consumption prospective prognosis risk factors was made. Examination was made on the basis of Delfy method in three stages (3 groups of experts). Forty people were invited as experts.

At the first stage the expert group included five people. List of factors consisting of about 50 factors was made on the basis of organization activities reports as well as on the basis of literary sources. Six sections were included into the questionnaire and each section contained from 1 to 15 factors.

Assessment of expert questioning results was made in several directions:

- Formulation of factors average value and that of group of factors.
- Assessment of experts opinion agreement,
- Selection of the most significant risk factors.

In order to assess the qualification of experts the experts provided personal information which is: family name, first name, middle name, organization, position occupied, length of experience, education, approximate time of questionnaire filling. Assessment of individual experts opinion agreement in comparison with general assessment let us make a description of an expert. It should be a person immediately relevant to prognosis of energy sector development and having more than 5 years experience.

In general good results were registered at experts opinion agreement among all groups of risk factors which is an evidence for this method efficiency (Table 1).

All factors were divided into two groups in accordance with the separate factors assessment results : The significant ones (with general assessment $\geq 4/8$ and agreement rate $\geq 0,7$).

TABLE 1. PARAMETERS OF FACTOR OF THE COORDINATION OF OPINIONS OF EXPERTS ON GROUPS OF FACTORS

№	The name of group of factors	K	rank
1	The political	0,61	0,80
2	Social and economic	0,53	0,97
3	The ecological	0,49	0,48
4	Scientific and technical	0,63	0,82
5	Realisation of programs of development	0,74	1,00
6	The organizational	0,73	0,78

Thirteen factors were sorted into the group of low-significant factors. The threshold value of agreement rate for the factor groups was 0,5 and thereby group of low-significant factors is the ecological risks group. The most significant factors, according to experts, are resulted in table 2.

Speaking about the assessment of factors themselves and group of factors we can find some regularity which prove the stated supposition that ten years risk prognosis are of the most significance (table 3).

6. CONCLUSION

The problem of risk assessment in energy sector still remains not fully invetsigated in respect of methodical development. The present article presents general aspects of risks concerning the energy sector development long-term prognosis. All theoretical propositions about risk types constitute basis for methodical recommendations on risk factors assessment at energy sector development prognosis.

TABLE 2. RISK FACTORS HAVING THE GREATEST VALUE FOR THE DIFFERENT PERIODS OF FORECASTING

Group of factors	5 years	10 years and 20 years
The political	Infringement of contracts from outside the governments	
Social and economic	1. Dynamics of gross national product. 2. Electro capacity of gross national product. 3. Change of demand in sale sphere Production.	
	4. Change of an investment policy, 5. Energy cost.	-
Scientific and technical	1. Input of new consumers, 2. Input of new manufacturers of energy.	
The organizational	1. Quality of the information for performance of the forecast, 2. A technique of performance of the forecast, 3. Experience of predictors.	

TABLE 3. DISORDER OF VALUES OF FACTOR OF THE COORDINATION OF OPINIONS OF EXPERTS ON FORECAST TIME

The forecasting period	estimation		
	max	min	average
5 years	0,78	0,28	0,54
10 years	0,84	0,29	0,56
20 years	0,82	0,32	0,52

7. THE LITERATURE

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8. BIOGRAPHIES

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