Research on Key Risk Source Identification of Asset Management in Power Grid Enterprise

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Abstract. Asset management uses a process analysis and identification method for various risk sources to identify a series of flowcharts in the form of several sub-modules in accordance with the steps or stages of grid asset management, demonstrate events or states that cause the risk to be generated by identifying various potential risk factors or risk events at each stage. Combined with the goal-oriented identification method to analyze and diagnose the risk indicator, list the detailed risk list, accurately record and manage the common risks existing in the enterprise, and use the reverse push down method, when the asset-related risks are identified, at the same time, record it in a manner that is appropriate to the type of asset or asset system.

Introduction

The risk of grid planning can be represented by the probability of occurrence of the risk event and the loss of the risk event. Consider the risk of grid planning from the perspective of grid life planning, including the possibility of various uncertainties in the planning period, the feasibility study design period, the construction period and the operation period, and the extent of the loss, it has objectivity, uncertainty, and measurable characteristics.

Risk Sources of Policy

Government departments on the power grid company planning and construction support is not enough, it will make the grid companies are facing some policy procedures on the fetters, as well as government restrictions. For example, the environmental policy of substation noise, electromagnetic environment, technical requirements, and the tightening of land policy makes the grid company to build the dilemma.

Risk Sources of Planning

In the grid planning, some planning technology also affect the planning to carry out, in the planning program design, planning technology makes the planning of the grid facing a variety of risks. For example, the risk of power supply reliability of N-1 security and the degree of user's electricity consumption, as well as the grid structure wiring pattern has rationality, adaptability and scalability risks in the power grid.

Risk Sources of Planning Environment

In the grid planning, the surrounding environment, including the geographical environment, climatic conditions, will have an impact on the details of the plan. For example, in 2008 the frozen natural disasters in the southern region of the power grid, the damage of transmission towers and other grid device is very large. This requires us to consider the surrounding environments, to solve the transmission tower overload, power tower layout is unreasonable and other issues, in order to minimize the similar disasters caused by transmission towers and other transmission equipment loss.
Risk Sources of Asset Budget
The budget management goal of the power grid enterprise needs to be adjusted according to the adjustment of the power grid enterprise’s strategy, if the target is not adjusted in time, which will affect the reasonable allocation of resources. If the relevant responsible departments in the budget management responsibility is not clear, it’s easy to cause a deviation in the budget. Therefore, we need to pay special attention to the budget risk of power grid enterprises, and try to grasp the connotation and characteristics of budget risk in order to reduce the possibility of budget failure and promote the realization of budget target.

Risk Sources of Investment Plan’s Implementation
In order to make investment plan decision of the grid company more scientific, the project optimization model based on the decision analysis technology should be established according to the objectives and risks of the project. Through the project optimization sorting model, to provide decision support for asset planning.

The investment plan and execute link integration processes Grid Corporation project has begun to promote the convergence of conduct, timely access to relevant information on progress of the project, such as engineering models, using the available data analysis and comparison of the actual project funds usage and investment plans, effective supervision on the implementation of the annual investment plan. Between the investment planning management and other asset planning management departments, we should establish a normal communication of the working mechanism to improve the investment plan and asset planning consistency.

Risk Sources of Design Work Management System
The design work management system is the whole system management of the engineering design stage, including the contents of the design specification, design drawings, design task book, investment estimation and winning bid plan, etc., it should be based on the research and design of basic data based on professional preparation, and the design of the program need to modify and strengthen, make the design more perfect.

Risk Sources of Construction’s Procurement Stage
Process of procurement and construction including the tender procurement process and construction process. Bidding is a competitive way in the commodity economy and it is usually applied to bulk transactions. In the bidding process, the unexpected situation at any time may lead to the actual results of the tender procurement and expectations are different, the difference will bring losses to the enterprise, this difference is the risk of tender procurement.

The risk of enterprise bidding and purchasing has some characters such as objective, universality, necessity, identifiability, controllability, loss, uncertainty and sociality. From the practice of enterprise bidding and procurement, it mainly including the enterprise bidding and bidding bidders risk sources and subject matter risk sources.

Risk Sources of Bidders
First, if the bidders take unbalanced quotation, in the tender list of materials, they will increase margins which have large amount, high profit, and make the less commonly used, low profit margins offer lower, so they can get more lower business offer, get a higher business points and winning the offer, but after this success, bidders can not perform completely. Second, the bidders may collude with each other; it will cause circumscribed mark or string standard behavior.

Risk Sources of Subject Matter
Power grid companies need many types of goods, all kinds of materials, product attributes, value, supply and demand and other factors vary, these factors are likely to bring different degrees of risk to
the tender procurement. The bidder in the performance process may provide the products’ quality and
tender commitments are inconsistent, or products does not meet the tender documents promised
quality standards, it will lead damage to the user caused in the economy, technology, personal safety,
equipment safety and other aspects.

**Risk Sources of Construction Preparation**

Construction preparation is an important part and it’s closely related with the civil construction; it’s
also an important factor affecting the progress of the project. Construction preparation refers to a
series of preparatory work which should be completed before the construction of civil construction.
The main contents include: land acquisition and house demolition, building protection, pipeline
protection / demolition / change, traffic relief and other projects or affairs.

**Risk Sources of Construction**

Power construction of civil engineering construction pit excavation, substation construction, line
construction and other aspects of the content, coupled with the uncertainty of geological conditions
and the complexity of the surrounding environment and other reasons, so there is a great risk in civil
construction. Key node engineering risk refers to its own many potential risk accidents, and interact
with the "service" of the project, most likely encounter great risks and they are difficult to foresee, in
the event of an accident, not only will lead to significant economic losses and casualties, but also
indirectly cause social impact.

**Risk Sources of Operation and Maintenance Stage**

Operation and maintenance of power system has a certain degree of risks, so the process of power
operation and maintenance must establish a corresponding risk management system, and improve it in
a continuous way, where the risk management system is attached much significance to the safety
management of the equipment, of course, also includes personnel safety management.

**Risk Sources of Equipment Operating**

Equipment operation and management is an important part of the life cycle management of the assets.
Suitable power supply, send points and electricity, to ensure safety, and reliable power supply, sectors
must be unified planning and work together. Equipment operation management is the equipment
running in the table code, line loss, voltage pass rate, reactive power compensation capacitor
collection, summary, statistics, analysis, making a thorough, accurate and scientific production and
management plan to ensure that the equipment life cycle range Within the coherence of the
development and implementation of the most valuable equipment to use operational decisions.
Therefore, the reasonable equipment operation and management is safe and reliable security, it is the
core of the total business to prevent the operation of the equipment is not safe to the user.

Grid operators divide power grid risk management into normal and dynamic risk management.
Normal risk control is the main part and distribution network on a regular basis to implement the
safety analysis and evaluation of the work, develop and implement effective remediation measures:
dynamic risk control is the main and distribution network production and operation of the scheduling
order, plant operation, site construction and other aspects, From the power grid, equipment, personnel,
users and the environment these five aspects of dynamic risk analysis, combined with identified
security risks from the normal risk analysis to development and implement effective control
measures.

**Risk Sources of Line Maintenance**

Line maintenance is to ensure the safety performance of the grid, at the same time, it is a minimum
costs way in the grid company's life cycle management. In the spring and autumn before the grid
maintenance, according to the line operation, the team need to develop detailed, practical
maintenance plan, reported to the higher authorities for approval.
In line maintenance, we should, on the basis of the basic information and defects of the line, the workers who in charge of the site survey to see the scope of the need for overhaul operations on the field, to retain the live parts and operating conditions, environmental and other dangerous points, and the preparation of "Site work instructions" or construction program, and the specific content to inform all members of the work class. There are other units involved in line maintenance, the person in charge should inform them the line status, dangerous point and safe measures.

In the process of line maintenance, if anybody not fulfill the "Power line first work ticket" to confirm the procedures, or there is no clear security measures, mistakenly towing tower, high-altitude fall, object damage, etc, all of these situations will cause the risk of maintenance personnel. After maintenance, items left behind will affect the power transmission.

Risk Sources of Reserve Facilities

The storage facilities are the equipment and places where the grid company reserves the material inventory. The operation and construction of these facilities need to pay attention to its economy, concealment, safety, and the convenience of material entry and exit. Construction of power grid enterprise reserve facilities, the primary task is to improve the planning and site selection and related technology research, fully prepared for the preparatory work, in the course of operation, to improve the safety of facilities inspection, and to improve the implementation of management personnel safety awareness, these measures will ensure that the storage of goods intact.

Risk Sources for Decommissioning

Natural environment, technical environment, national policy, equipment and material suppliers and other factors on the grid assets decommissioning disposal process risk impact is relatively large.

Risk Sources of Technical Feasibility Study

The feasibility study of technological transformation refers to a feasibility study report on the content of technological transformation. The basic contents and depth of the feasibility study report of the technological transformation project include the general situation of the project (including the name of the project, the research organization, the research summary, etc.), the conditions of the project, the basic profile of the enterprise, the equipment situation, the overall transformation plan, the environmental protection measures, investment estimates, economic and social benefits analysis and feasibility study recommendations. The risk source is mainly through the feasibility study preparation points to reflect, including the following:

1) Demonstrate pre-design of the technical transformation program, design research programs in order to clear the object.

2) Technical Rendering Feasibility study report the contents of the report and the data reflected in the situation, it must be absolutely true and reliable, and no deviation or error is allowed. Which the use of information, data, have to go through repeated verification to ensure the authenticity of the content.

Risk Sources of Technical Compatibility

A major form of transformation is to achieve connotation expanded reproduction. It usually refers to the premise of technological progress, the modern scientific and technological achievements applied to the existing production of all aspects of the high level of technology instead of the lower level of existing technology, with advanced technology and equipment to achieve improved service level of energy conservation, reduce material consumption, and comprehensively improve the comprehensive economic benefits of the purpose of the community.

Technical compatibility’s risk source is the use of advanced technology in the technological transformation of the existing enterprise machinery and equipment and production processes to reform, in the process it may cause other equipment for such new technology is not compatible, or the
unskilled application of such new technologies leads to the work accidents, which is one of the sources of operational risk for enterprise equipment.

**Risk Sources of Retreat Equipment Status Assessment**

Assessment refers to the specialized agencies or specialized assessment staff, with reference to a certain point in time on the value of the disposal of waste materials, the value of the retirement of equipment to assess and determine the value of the behavior of the disposal.

The grid company should combine the equipment status assessment and risk assessment to carry out the comprehensive decision of the technical and economic development of the power transmission and transformation assets, and exceed the equipment of the use period. On the basis of considering the full life cycle safety, efficiency and cost index of the equipment, strategy to improve the efficiency of the equipment’s use in order to determine the disposal of decommissioned assets.

New technologies, such as smart grid technology, UHV technology, operation and maintenance of new technologies, electric vehicle technology to promote the use of the grid company had to purchase the installation of the corresponding matching equipment and parts, accordingly, some new technology does not meet the equipment and parts will be scrapped in advance, it will prompt the grid assets to accelerate the progress of depreciation, and increase the cost in grid equipment decommissioning stage.

**Risk Sources of Disposal of Decommissioned Assets**

Disposal of decommissioned assets is divided into three types of bidding, auction and entry (property rights trading) transactions. Branch material department responsible for the preparation of disposal programs, and in accordance with the approved disposal plan and disposal of the reserve price to carry out disposal work. The undeclared value of the decommissioned assets by the use of materials management department or project management department to explain the reasons and the disposal of the way, the financial department to verify the amount of loss, the relevant departments will be signed after the leadership approval of the disposal.

Out of the stock is the material sector in accordance with the bid notice or transaction confirmation, and the buyer signed a contract for the sale of decommissioning assets, using "pay first, library after that" approach to complete the work of retirement. Decommissioning assets out of the stock, the material departments should take measures to do the supervision, the buyer should ship out decommissioned assets in the time specified in the contract. The financial department in strict accordance with the relevant provisions of the income disposal, transfer losses and other financial treatment. The risk comes from the contract’s performance, the bidding process, the disposal of decommissioned assets and the process of delivery, as well as the material sector, the risk of financial sector’s supervision.

**References**


