ORGANIZATION OF MULTI-STAGE ENHAT FOR MEDIUM AND LARGE POWER INDUSTRIES OR ENERGY SYSTEM

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Introduction. In the ever-evolving landscape of energy production and consumption, the need for efficient and reliable power generation technologies has become increasingly apparent. Industries and energy systems, particularly those operating at medium and large scales, require sophisticated solutions to meet the growing demand for electricity while minimizing environmental impact. One such solution that has gained significant attention is the organization of Multi-Stage Enhat (Energy Harvesting and Transformation) systems.

Keywords. Multi-Stage Enhat,Energy systems, Power industries,Energy harvesting, Energy conversion

The main part of the counters is permanently connected with the first-level data collection center through proper communication channels and given as in the third method of ENHAT organization. Surveys are conducted in them according to the schedule. Some meters may not have a permanent connection between the first-level data collection center, which can perform ENHAT using a mobile computer, as in the second method of organization.

Primary data from the counters are entered into MOs of the first-level data collection centers, where data processing is also carried out. Additional consolidation and systematization of information is carried out in second-level data collection centers and their inclusion in MOs of second-level data collection centers. It is recommended to use ORACLE8.X MOBT as MO in this method of ENHAT configuration. The basic configuration of the Alfa MARKAZ software package allows for parallel data collection on 4, 8, 16, 32 communication channels. It is necessary to use a separate EHM as a communication server on 16, 32 channels. Communication channels can be isolated, switched, and properly connected. The parameters of each channel can be adjusted individually depending on the type of line and its characteristics.

Several communication servers can work in parallel in the system. In this case, the description of all parameters of the data collection system, the description of all electrical and calculation schemes of objects, as well as all primary and calculation data are stored only on the MO server and data collection center applications. 38 The data collection center only collects and processes data. Users AIJ their local network will be connected according to When the number of meters in the facility is not very large, the first level data collection center can perform the AIJ function. Tier 1 data collection centers are linked to tier 2 data collection centers. Communication channels

can be separated by local network, switched, directly connected. The server of the second-level data collection center automatically requests the necessary information from the first-level data collection center MO according to the established schedule.

The establishment of a multi-level ENHAT for a regionally distributed medium and large enterprise or energy system allows solving the following issues:

• accurate measurement of transmission/consumption parameters;

• drawing up contracts and payment documents for electricity calculation;

• carrying out regulatory information;

• data processing and reporting on electricity accounting and EESK control;

• record changes (deviations) of controlled parameters of energy resources, evaluate them in absolute and relative units to analyze both energy consumption and production processes;

• analysis of data completeness;

• system analysis.

Different suppliers offering minimum prices and different technical solutions can be used in the construction of ENHAT for different stages of the system. Such a system is called a non-homogeneous system. These systems are really cheap, but it's worth considering before rushing into this option.

Using such a system would be complicated and expensive. These considerations are confirmed by the following facts:

• the need to constantly use many software tools to work with different types of devices;

• the need to have many forms of electronic elements for current supply and service;

• the complexity of training and professional development of an employee, because professional development takes place in different organizations;

• the development and construction of these systems takes a lot of time;

• during the construction and operation of systems, obtaining advice and troubleshooting depend on the involvement of a large number of specialists.

Saving money at the initial stage leads to financial losses during the use of these systems. In this case, it is preferable to use technical solutions that allow to build ENHAT as a one-of-a-kind system, that is, to implement the same system based on the same type of devices and software tools in each accounting object. This provides the possibility of step-by-step automation of business processes related to the accounting of electricity and control of its parameters, the possibility of step-by-step construction and introduction of ENHAT into production. And this reduces the cost of construction and commissioning of the system by 40%. Because the software runs concurrently and begins to provide the required information, many enterprises that have built and use ENHAT systems prefer to design their systems as one-of-a-kind systems.

According to the management procedure, some kind of management quality criterion can be formed in the management of the object. This criterion is expressed as a problem of optimization of a number of parameters that have a price expression or whose values are directly affected by the control system (where the values of the parameters are somehow related to the price assessment).

The control object must be capable of manual control. But a person can accept non-optimal solutions from the point of view of the criterion of managing the object. If it allows you to significantly improve the quality of automatic control, then its use will be appropriate. The customer will only need to weigh the cost of automation against the gains (taking into account payback periods) in monetary terms from improving the quality of management. If, as a result of this comparison, he determines an economic gain from automation, then human participation in the control system is partially or fully automated and must be replaced. Now one of the main issues is to determine what level of automation should be chosen when building ENHAT systems. In order to solve this problem, it is necessary to remember that the main functions of ENHAT are to collect data on energy consumption (accounting), as well as to analyze and manage the enterprise's energy supply 43 processes.

Accounting depends on the collection and processing of large volumes of data, where EHM has clear advantages over humans. Therefore, accounting can be made almost completely automatic. However, the management of the energy supply of the enterprise cannot be done without the participation of a person. It is impossible (or too complicated) to put all the fine details of the requirements of technological processes into the EHM program, it is difficult to algorithmically describe one or another damage of automation. In this case, EHM is assigned the task of helping a person to perform the management function (preparing data in a convenient form for the operator to analyze, identifying low-accuracy data and predicting changes in individual parameters, recording the correctness of the operators' actions reach and control). Thus, the optimal level of automation, the optimal combination of human-operator and EHM participation in the management of the enterprise's energy supply should be found.

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