International Journal of Progressive Sciences and Technologies (IJPSAT)
ISSN: 2509-0119.

http://ijpsat.ijsht-journals.org
Vol. 23 No. 2 November 2020, pp. 450-454

Optimization of Ways to Reduce Waste of Energy Efficiency Intellectual Control Devices

Siddikov Husniddin Zayniddinovich,

PhD doctoral student of Tashkent State Technical University named after Islam Karimov

Abstract – The article presents the waste generated in electrical networks today and the problems of their elimination. Equipping the electricity networks in the regions with modern, improved devices, power losses in power transmission lines were determined, network modes and processes were analyzed in depth. Types of calculation of technical waste of electricity and their solutions were known and conclusions were made. Accordingly, when reducing the waste of electrical energy, the installation of static capacitors, in this way the waste in the network is reduced by 20-25%. If we change some networks from 6 kv to 10 kv in the case of intellectual management of energy efficiency, the compatibility of replacing the power transformer is determined, if the reduction of the power consumption is 15-20%, maybe 30% and less.

Keywords – Energy Efficiency, Electricity Waste, Technical Waste, Organizational Waste, Commercial Waste, Operational Calculations, Technical and Accounting Electricity Waste, Intellectual Control Devices.

I. INTRODUCTION

Electricity plays an important role in the development of the economy of each country, having a huge potential of saving energy.

The current trend of the decline in the performance efficiency of the electric power industry is due to the fact that due to a sharp deterioration in the material-technical and financial supply of electrical power equipment, the quality of maintenance and repair measures from disruption of equipment and equipment is low, and from its depreciation, this is due to a significant deterioration [1].

The decline in the efficiency of the operation of technological equipment is exacerbated by the fact that the price of the fuel increases and the low definitions of the energy supplied do not correspond, which prevents the development of the sector, which leads to an adequate reinvestment of production revenues.

In the context of qualitative satisfaction of the increasing demands on electricity, in view of the opportunities for the production of electricity, in the conditions of the expected growth of the indicators of the country's economy, one of the main ways in the future is the adoption of measures that will not be delayed in all areas of the economy, including in the According to preliminary estimates, the potential for energy savings in the field can be up to 30% of the energy savings potential in the Republic.

The main indicator of efficiency in the production of electricity is the comparative consumption of fuel-increased significantly over the past decade. Due to the excessive loading of electricity transmitting networks on account of their physical attainment, the technological costs of energy transmission and the total waste on the system as a whole have increased due to the lack of improvement of accounting instruments.

Corresponding Author: Siddikov Husniddin Zayniddinovich

Therefore, consumers of power waste types in electrical networks will need active and reactive power for normal operation [2]. Reactive power is spent to form a magnetic field and does not require a burnout. But the transmission of it through the lines is associated with certain asset consumption in the network elements. Reactive power is also spent on these elements, which requires the production of reactive power. Therefore, reducing reactive power consumption will save active energy, reduce power waste and voltage loss.

Power waste is of two types: load-bearing, load-dependent and salt work-bearing, load-dependent. On the other hand, waste can be divided into technical, organizational and commercial waste.

II. METHODS AND RESULTS

Technical waste-provides for measures to reconstruct the network, replace equipment or install additional equipment.

These include:

- Installation of compensatory equipment;

- Replacement of wires with large cross-section surface wires;

- Multi-load and low-load Transformers;

- Installation of adjusting equipment (RPN and PBV Transformers, voltage coupling Transformers, punched reactors, etc.));

- Automation of transformation coefficients;

- Automatic adjusts the capacity of capacitive batteries;

- Installation of power flow rectifier equipment in closed networks of high and extremely high voltage (for example, rectifier Transformers, RT);

- Network high voltage switching;

- Improved relay protection, automatics, telemechanics, communication.

Organizational waste-provides for measures to optimize network schemes and work modes to improve service delivery.

These include:

- Optimization of the installed mode of operation of the network by reactive power (optimal adjustment of the KU and transformational coefficient laws);

- 6-35 kv network disruption locations;

- Synchronous capacitors mode of generators when there is a reactive power shortage in the system;

- Voltage control in the supply centers of radial networks;

- Low loading of transformers in operations;

- Equal loads in network phases;

- Reduce repair and maintenance time and improve quality;

- Development and implementation of new ways to reduce power consumption;

- Encourage service personnel and so on.

Commercial waste-is envisaged to improve the provision of services and carries out energy control at the time of settlement with consumers.

This includes:

- Installation of energy meter instruments in which the accuracy class is small;

- Fight against theft;

- Improvement of control system and others [3].

When the network load increases, the waste increases. Changes in the active and reactive loads of consumers lead to a change in the flow of active vary active forces in the energy system, as well as waste in it. Therefore, it is necessary to constantly monitor the level of waste, because they determine the cost-effective operation of the entire network. A systematic approach to the problem of wasteful level management is a complex issue, and only with the help of modern economic - mathematical models and exposures can it be solved. The main difficulty in this is the collection and processing of messages about network modes, because they are constantly changing with the change of downloads.

In order to take into account the effect of loading and discharging changes in internal power supply networks on the waste in the energy system networks, generalized coefficients are used: in consumer networks, in the case of changing the active power in the energy system networks, the coefficient of increasing the active power consumption is Kp; in the case of changing the reactive power, the –Ke. Ke coefficient is called the economic equivalent of the reactive power. If, for example, Ke = 0,05 this means that if the reactive power in the industrial enterprise network increases by 100 kVar, the wasted energy system employee in the energy system network determines for the characteristic regimes using exposure[4].

Technological waste of electricity is the amount necessary for its transmission, taking into account the errors of the measuring system, as well as for its distribution in electrical networks.

Technical waste consists of the cost of substations for their own needs, the cost of batteries of synchronous compensators and static capacitors, as well as the electrical energy nobility associated with the allowable errors of the calculation of electricity.

The calculation of technical waste of electricity is divided into three types:

* Retrospective
* Quick
* Future

Retrospective calculations-determines the technical waste of electricity in the last period interval (month, quarter, year) and serves for:

-To determine the structure of technical waste of electricity;

-Identify a group of network elements with increased waste of electricity;

- Evaluation of commercial waste.

Operational calculations-determine the technical waste of electricity in the current period interval and serve for:

- Control over the current cost of technical waste of electricity;

-Quick correction of the current regime in order to reduce the technical waste of electricity;

-Formation of a retrospective database to clarify the content of technical waste of electricity by groups of electrical network elements.

Prospective calculations-determine the planned amount of technical waste of electricity in the coming period and serve as the basis for normalization.

In terms of features of schemes and modes of electrical networks of the energy system, as well as information supply, it is divided into four groups of networks, in which technical wastages are calculated in different ways:

-220-500 kv power grid;
-35-110 kv power lines;
-6-10 kv power lines;
-0,4 kv power grid;

Share network waste reduction activities for indoor businesses into the following groups:

* Linkage of capital funds to increase the transferability of networks, taking into account the growth of loads with the expansion of electric power train.

• Manage the working condition of the network, may be capital expenditure or not be.

• Customers working regime change.

The expansion of the enterprise network is characterized by:

- With growth of 6-10 / 0.4 kv and 35/10 kv consumers;

- BPP (head reducer p/st) with positioning relay;

- With transformer power in BPP;

- EUL (LEP) wires with cross-sectional surface;

- Through other parameters of the network configuration (for example, cases that are close to the optimal value can not be corrected to the optimal state with a load change).

During network processing, it should be noted that if the voltage exceeds its nominal value, it is an effective condition in the reduction of waste on the line and transformer [5]. If we change the network from 6 kv to 10 kv, then it is also worthwhile to replace the power transformer, reducing the waste of electricity by 15-20%, but by 30% and less.

An effective way to reduce the waste of electrical energy is as follows: installation of static capacitors, with which the waste is reduced by 20-25%. Condenser in such cases

The place of installation of batteries should be in the 0.4 kv section of the network. Cables cuts surface and reduces the waste of electrical energy in the distribution network. The difference between a high – voltage and low – voltage condenser is that the voltage is 6-10 kv-15%; the voltage is 0.4 kv-35%. As a result of this, it is possible to reduce the waste of electricity by 350-400 kW*h in 1 year to an average of 1 kW reactive power compensation.

Energy from history has not been relatively expensive. The autonomy of the control system in the effective use of electricity was secondary, therefore constructive and architecture was not considered in the framework. The fact that energy is not expensive, and the widespread popularity has led to sharp economic growth, but the costs and the impact on the environment have gone: the costs of coal fuels, the negative impact on the environment, etc.

Laws concerning energy independence and costly appreciation papers have led to the achievement and modernization of electricity networks in the United States as

smart networks [6]. Approximately from 2005 year, an interest intellectual system has greatly increased. Recognizing that information and communication technologies create great opportunities for the modernization of the use of electrical networks, it was assured that decarburization in the energy sector would be carried out at realistic prices and effective control. In addition, a number of more reasons have been clarified to make sure that it is necessary to stimulate the immune system.

- Evaluation of the service period and the tightening of the capabilities of the chain-in many parts of the countries of the world, the energy system have expanded dramatically since the 1950s, and since the transmission and equipment launched at that time have now passed the service periods of the memory, they are required to be replaced. In addition to the fact that the individual replacement of energy equipment in such a procedure requires a large capital investment, at sometimes there are questions whether they are produced at the same time or, in general, there are specialists for its production. In many states, the power flowing through the chains of Air Lines increases with an increase in load capacity or with an increase in regenerative genera. For that, cannot transmit additional power through some of the lines that are running within their power transmission limits, or connect a reversible generational to them. To overcome such difficulties, the intellectual system, which provides for the use of a reserve line for power transmission without increasing the transmitting power on the operating lines at the limit of such loading, is of particular importance.

- Limits on heating-limits on the existing transmission and lines and equipment on heating are determined by the greatest possible capacity of transmission in them for an unlimited period of time. When the current passing through the energy unit becomes larger than the current detected due to its heating, it heats up immensely and its insulation dries sharply [7]. This shortens the working period of the equipment and increases the risk of injury. Where the distance between the bases of the power transmission line in the air is large, the increase in the coolant of the conductors as a result of such heating can cause them to be confused or reduce the distance between them and the ground to a dangerous level.

- Limit conditions of use-any electrical power system operates in the permissible state parameters, including the allowable voltage and frequency. The fact that the parameters go beyond the limits can lead to a sharp reduction in the duration of electrical heating, their performance, a sharp increase in the waste in the network, and similar undesirable phenomena. In the prevention or elimination of such cases, intellectual system occupies a special place.

- Lack of supply (continuity)-modern society requires a power supply that is highly reliable. The traditional method of increasing reliability requires the launch of additional devices and, accordingly, a large amount of capital investment [8]. Intellectual system, however, automatically eliminates such additional funds on account of optimal selection and maintenance of the scheme of the electrical network.

- National proposals-in many countries it is considered that their introduction into intellectual systems opens up important economic and commercial opportunities for the production of new products and the organization of services.

III. Conclusion

Measures were taken to reduce the waste of electricity in electrical networks and to apply the above methods in practice and implement them. According to the calculations, if we change the power supply from 6 kv to 10 kv, the reduction of electricity energy consumption is achieved by 15-20%, with the installation of static capacitors by 20-25%, the reduction of waste.

REFERENCES

[1] Khashimov A.A.Imamnazarov A.T. "Energy saving in electromechanical systems" Tashkent 2005

[2] Mantserova, T. F. Main approaches to energy saving at energy enterprises / T. F. Mantserova, E. P. Korsak // Management in social and economic systems: proceedings of the XXVIII international scientific and practical conference, Minsk, may 16, 2019 / editorial: N. V. Susha (Pres.) and others. ; Minsk innovation University-Minsk: Minsk Innovation University, 2019, Pp. 44-45.

[3] Khoshimov. The F.The A., Taslimov A.D. ” Energy saving basics " Tashkent. 2014 y

[4] Khoshimov O.The A.Imamnazarov A.The T. “Energy saving in electromechanical systems " Tashkent 2005

[5] Khoshimov F.A., Taslimav A.D., Rakhmonov I.He Power supply

[6] Energy control and accounting in the system. - T.: 2015.

[7] Kuznetsov E. P., the Economics and management of energy saving: studies'. Manual / E. P. Kuznetsov, O. V. Novikova, A. S. Dyachenko – - 3rd ed., ISPR. and additional – SPb. : Publishing house of Polytechnical

Institute. UN-TA, 2018 – - 600 p

[8] R. Allaev, I. I. Sidibe VA box. Station VA postannealing electric. SR OMT – T: Clon of NMI, 2016.304 p.

[9] Bakanaev A. A., Gorbachev B. V.,Zakharov, M. F., et al. Power supply of telecommunication devices and systems (lecture notes) - Moscow: MTUCI. 2004, 129 p

[10] Available [Online] at : http://electricalschool.info/main/elsnabg/1176-metodika-opredelenija-poter.

[11] Available [Online] at : http://220blog.ru/pro-raschet/programma-dlya-rascheta-poter-elektroenergii-v-setyah-6-10-kv.