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# Statistical Analysis of power losses in 6-35 kv Overhead Transmissions Lines

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ABSTRACT. Power transmission Network- This is a combination of viring installation structures for supports,insulators,and more. Power lines are the connecting elements in power systems. For example, it is a means of connecting a substation with a station, consumers with a substation,and more. Loss of electricity in the networks reduces losses during long-distance transmission. High voltage is associated with a variety of losses. The crown destarge near high voltage wires is accompanied by unusual noise and noise. The bending often causes corrosion of the wires.

**KEY WORDS**: Electricity transmission, power supply, power transmission line, power system management, active power, reactive power.

## I. INTRODUCTION

One of the main indicators of the efficiency and economic efficiency of electric networks is the loss of electricity in the technical design and operation of electrical equipment and devices.

| Voltage (kv) | Transmitted Power (kw) | Distance (km) |
|---|---|---|
| 0.38 | 0.05-0.1 | 0.5-1.0 |
| 6 | 2.0-3.0 | 10-15 |
| 10 | 5-10 | 30-50 |
| 35 | 25-50 | 50-150 |
| 110 | 40-70 | 100-200 |
| 220 | 100-200 | 150-250 |
| 330 | 200-300 | 300-400 |
| 500 | 700-900 | 800-1200 |
| 1150 | 1800-2200 | 1000-1500 |
| 1500 | 4000-6000 | 2000-3000 |

Such wastes are generally manifasted as active power vastage, reactive power losses, and energy wastage. Reactive power loss, active power loss, energy loss have a suffisiently negative and signifiquant impact on linear parametrs.

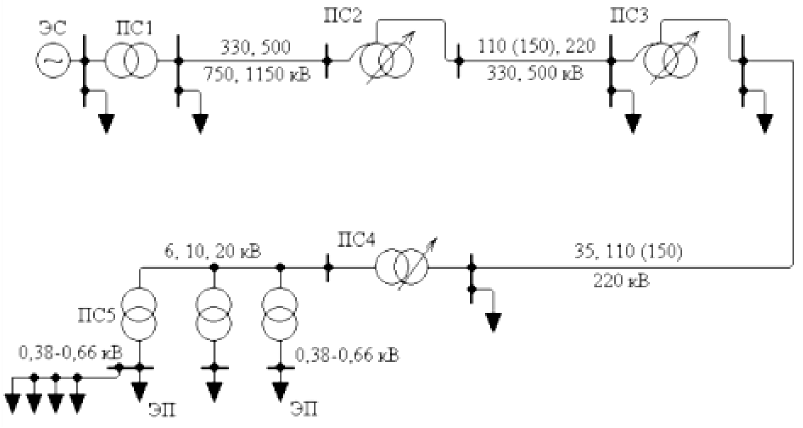


**Fig.1.1** *Conditional* **scheme of alternating current transmission and distribution system.**

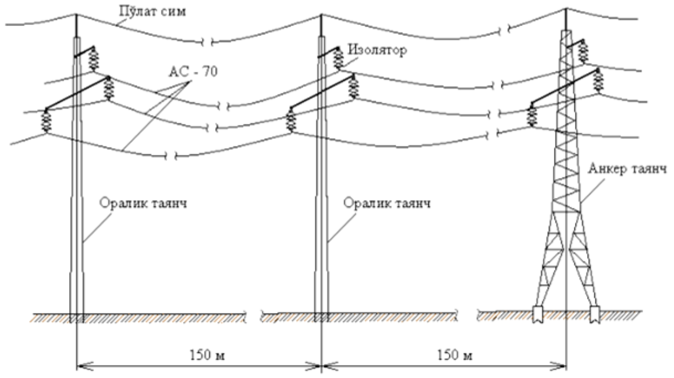


**Fig.1.2. Schematic diagram of the power transmission line.**

Network elements load:

$$I = \frac{\sqrt{\mathrm{P}^2 + (Q + \Delta Q)^2}}{\sqrt{3}\ U}$$

When delivering electricity to consumers, it must be uninterrupted,reliable and qualityю. But lately this process is not enough at present , measures are being developed to minimize the possible solution to this problem. Operation of the mains is mainle taken into account for active and reactive power losses and losses in the grid. [1,2]

Network power loss:

$$\Delta \mathrm{P}_{л} = \frac{\mathrm{P}^2 + Q^2}{U\mathrm{н}^2} * R$$

Network reactive power supply:

$$\Delta Q_{л} = \frac{\mathrm{P}^2 + Q^2}{U\mathrm{н}^2} * X$$

Energy loss:

$$\Delta \mathrm{A}_{л} = \Delta \mathrm{P}_{Л} * \tau$$

Where τ is the maximum annual working time of consumers.

Basically,it is possible to reduce vastage by doing the following sequence of work.

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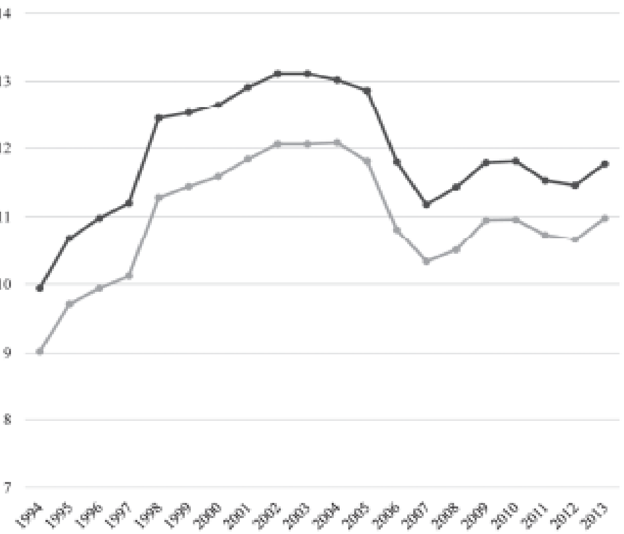


**Fig.1.3. Diagram of electricity wastage.**

1. The power grid is the basis of the system approach, which includes evaluating the effects of reactive power losses and providing efficient,quality, and uninterrupted power supply:
2. To give a mathematical explanation of existing power (Active and reactive) parameters of a transmission line;
3. Development of statistical methodologies for structural analysis of power and energy losses;
4. Reduce the impact of reactive power loss measures on the feasibility and feasibility of their implementation (Transmission lines)

In order to insure reliable operation of the power grid,our main goal in reducing waste is to analyse the losses associated with the emergence of the crown line in our conture, as well as to develop up-to-date universal recommendations for reducing power losses for each crown.

Reduction of flexible and active capacities will have a direct impact on consumers operating modes. If there is stability,then energy losses will be reduced,and electricity consumption and transport costs will also decrease. It is necessary to analyze tge state of electrical circuits to determine the sources of wastage in the reactive energy.

Configuration of the electrical network and its structural elements,as well as listing modest effect the degree of power loss.

By configuration,and structure.Subsequent assessments are made under each system. The effect of the power losses on the transmission lines in the subsystems isolated by the electricity network configuration is evaluated.

Energy losses,both naturally and in terms of production,distribution and consumption,are not the same as those used for energy consumption.Because their costs are includes in higher costs and annual maintenance costs.

Any technical measures to reduce losses are costly.Losses are always lowered,and vise versa,with smaller funds available.It is possible to know all the measures to reduce losses to 2 groups. Organizational and technical.Organizational arrangements do not require overtime,or over-budgeting.

Organizational measures include:

1.Incrase voltage depending on available tools and devices.

2.Ettension of service life and improvement of power supple equipment repair.

3.Matching annual and daile load schedules with the same power consumption and so on.

Technical measures require large additional costs. To calculate loss reduction,this these measures are summarized as follows.

## II. RESULTS AND DISCUSSIONS.

1.Switching the network to high rated voltage: *U*

2.Using wires with cross-sectional surfaces.

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3.Redlaciment overloaded transformers.
4. Installation of compensation devices.
5. Technicsl measures to reduce losses.

It is advisable to be based on the relevant economic calculations. [1,3] To determine the cause of electrical losses,a sample of control measurements and monthly calculations of power meters over a period of 4 to 6 years.

Technical losses are,in turn,devidet into reactive losses and losses in power lines. Later, no other indicators of reactive energy loss are required. At the same time, the structural analysis of energy losses taces into account the strength of the lines this affects the energy lost along the line.

Structural analysis is performed in the following sequence. [5]

1. The ratio of technical losses to uninterrupted over supply to the network is determined by the nominal voltage classes.
2. It analyzes the proportion of jet losses in transmission lines.
3. The dynamics of loading and contingent constant losses are studied.
4. Factors for loading of reactive power coefficients and power transformes are analyzed.
5.The sources and causes of loss of electricity are indentified.

The ratio of technical losses of reactive electricity in elements of electrical networks to total technical losses of reactive electricity will alov us to determine in detail the future loss of elements. An analysis of this ratio for 10 kv power lines shows that most of the reactive energy losses are due to power transmissions.

At the same time there is an in crease in jet energy transmitted over the network .Therefore, the interconnection between the passage and charge of reactive energy the disparity between the constituent is the cause of this disparity.

This is to compensate for the reactive power and eliminate the couses of improper calculation of reactive energy. It is necessary to optimize the mode by compensating the jet power and reducing the voltage in the nodes to reduce the loss of reactive energy.

**Table of power dissipation in 6-10kV overhead power transmission lines.**

SS Power loss on L-Dehkanabad-10 and L-Azizabad-10 lines from Zarmetan by 2020.

| Average power consumption by 2020 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Line name | brand of wire | length, km | line active resistance , Ohm | line reactiv e resistan ce, Om | line volta ge, kV | line load, A | line full power, kW | line active power, kW | line reactiv e power, kVAr | active power dissipatio n in the line, kW | % | reactiv e power dissipat ion in the line, kVAr | % |
| L-Dehqonobod-10 | AC-35 | 32,0 | 6,7 | 11,3 | 10,4 | 22,1 | 395,8 | 356,2 | 172,5 | 9,9 | 2,8 | 16,7 | 9,6 |
| L-Azizobod-10 | AC-35 | 2,1 | 0,4 | 0,7 | 10,4 | 11,9 | 213,5 | 192,2 | 93,1 | 0,2 | 0,1 | 0,3 | 0,3 |
| Total capacity loss by 2020 | | | | | | | | | | | | | |
| L-Dehqonobod-10 | AC-35 | 32,0 | 6,7 | 11,3 | 10,3 | 194 970,8 | 3 466 913,1 | 3 120 221,8 | 1 511 192,4 | 86 638,3 | 2,8 | 146 047,4 | 9,7 |
| L-Azizobod-10 | AC-35 | 2,1 | 0,4 | 0,7 | 10,3 | 104 329,2 | 1 870 481,2 | 1 683 433,1 | 815 323,8 | 1 667,8 | 0,1 | 2 811,5 | 0,3 |

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Special to protect the power line from damage devices are used. Lightning ropes to protect them, lightning reflectors, tubular dischargers, and earthing devices. Substations are the main link in the power grid system. Depending on their location in the electricity system, the city, district electricity also as a branch substation or an industrial enterprise substation referred to. The district substation mainly consumes energy from the district power grid and energy to industry, agriculture and other consumers provides. The primary voltage of district substations is 220, 110 kV the secondary voltage will be 35, 20, 10 or 6 kV.

Power dissipation load on any element of the electrical network depends on its nature and its change during the construction process. It does not change operating with load, $\Delta P$ for a period of time in with active power dissipation.The wasted energy is determined as follows:

$$\Delta W = \Delta P \cdot t$$

## III. CONCLUSION

Wey cam conclude that in some substations, an active energy fossil can be reduced to 16,8% with a reactive energy loss of up to 20%. Based on the results of the study, wey can draw the following conic lusions.

1.Loss of jet energy has a significant impact on the efficiency and releability of the power grid, and their over lapping levels lead to a decrease in the profits of the tsclot network .

2.A method of analizing the circuits in the case of the current state of the elektrikcal network, which alows to determini the in fluencle of thous ands of reactive energy losses, has be in propossed.

3.He has dveloped a statiscal method for the structural analysis of reactive power losses in the operating conditions of the data used to edentifienergy losses.

4.This method alouwis us to identifiy ased lossws and identifiy their high values and causes.

5.Active energy loss reduction is also reflected in the distribution coplehes.

In 35 kV networks, 35% of electricity is wasted, the rest 65% fall on 0.22, 6, 10 kV power grids. 0.22,6,10 kV li construction of these networks despite the fact that a lot of electricity is wasted in the networks 17 for non-ferrous metal 35 kV and higher voltage networks 4 times more is spent. This shows that reducing energy waste to reduce the length of the lines to 1000 V.

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