

STRUCTURE OF HIGH VOLTAGE ELECTRICAL NETWORKS

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Abstract. This article contains information about the structure of low-voltage networks, connection scheme, daily load graph, and specific characteristics.

Key words: distribution networks, low voltage, transformer, load graph, single-phase consumers.

Low-voltage power networks are divided into distribution and supply power networks. The distribution part is 6-10 kV power transmission networks connected to power transformers in step-down substations. 35-110/6-10 kV substations and distribution networks serve as the power source of low-voltage networks. The 6-10 kV distribution network consists of three-wire conductors with a length from hundreds of meters to tens of kilometers, insulated from the ground. They are supplied from 110-35/10-6 kV substations. These networks provide 6-10/0.4 kV transformer points [1, 2].

One or two transformers with a capacity of 25-1000 kVA depending on the power supply reliability category are used at the transformer points. The high and low voltage sides have a connection group of "star-to-star-zero" (Y/Y-0) and "delta-to-star-zero" (D/Y-0).

$U=0,4$ kV

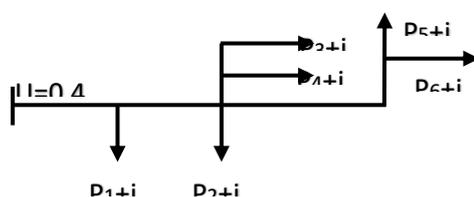
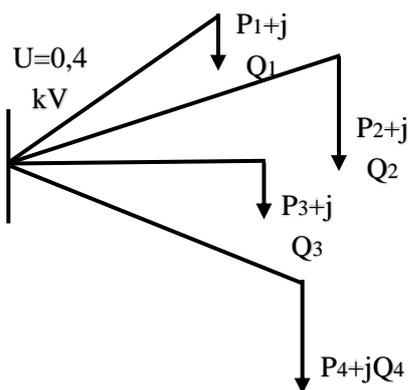
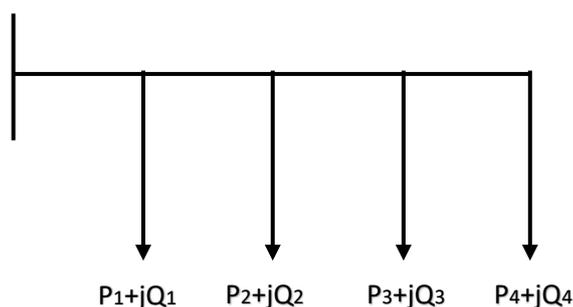


Figure 1.1. Options for building low-voltage power networks:

1. highway; b) radial; c) mixed

Networks with a voltage of 0.4 kV are directly connected to the neutral ground and are carried out with SIP, open cable conductors on reinforced concrete, concrete, wooden supports according to the main, radial or mixed scheme. is increased (Fig. 1.1). It can have four or five wires, where there are three phases, one neutral and a wire for street lights. The neutral wire is connected to the ground after 200-300 meters in the sections of the electric network. The cross-sectional area of the neutral wire in low-voltage electrical networks should be greater than that of the phase wires.

The specific characteristics of low-voltage power networks are their continuous development due to the constant growth of consumption, the variety of household electricity receivers and the appearance of new equipment, as well as the increase in requirements for the quality indicators and reliability of electricity. Currently, according to technical conditions, the power installed by households is set at 3 kW in gasified areas, 4.1 kW in non-gasified areas, depending on the consumer's wishes, the maximum power consumption can be set up to $P = 15$ kW.

Another feature of low-voltage power networks is that the daily load schedule is variable and depends on many factors, living conditions, family work schedule, the level of saturation with electricity receivers, in addition, it depends on the day of the week, also depends on the season (Fig. 2).

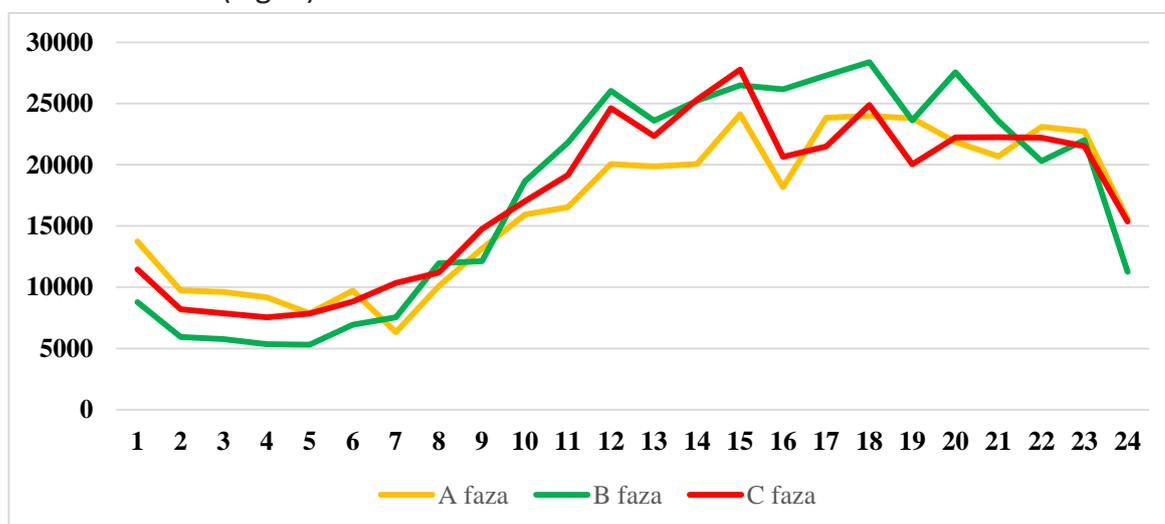


Figure 2. Daily downloads graph.

The specific characteristics of low-voltage power networks include the need to supply a large number of single-phase consumers with electricity distributed over a large area. As a result, low-voltage electrical networks are characterized by a large length and low load density (Fig. 3).

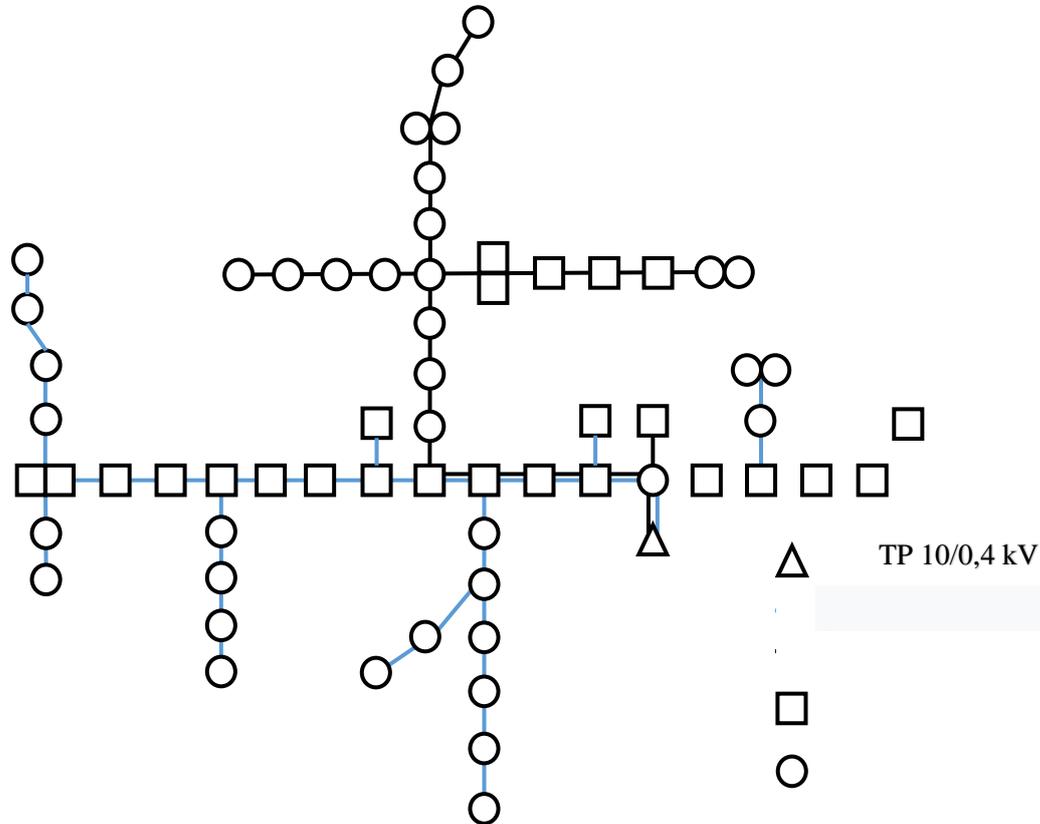


Figure 3. Scheme of the location of supports of low-voltage electrical networks

In short, when designing low-voltage networks, it is necessary to install the transformer point in the load center, taking into account the location of the consumers there, the development, and the objects that can be newly developed. During the study, in many cases, the location of the transformer point was not set to the center of loads (Fig. 3). In the supply of high-quality electricity to consumers, it is important to evenly distribute it among the phases, taking into account the characteristics and capacities of consumers.

LITERATURE:

1. Shouket H. A. et al. Study on industrial applications of papain: A succinct review // IOP Conference Series: Earth and Environmental Science. – IOP Publishing, 2020. – T. 614. – No. 1. – C. 012171.
2. Turdiboyev, A., Aytbaev, N., Mamutov, M., Tursunov, A., Toshev, T., & Kurbonov, N. (2023, March). Study on application of electrohydraulic effect for disinfection and increase of water nutrient content for plants. In *IOP Conference Series: Earth and Environmental Science* (Vol. 1142, No. 1, p. 012027). IOP Publishing.

3. Abdullayevich, Q. N. (2023). EFFICIENCY OF USE OF FREQUENCY CONVERTER WITH SMOOTH CONTROL OF ASYNCHRONOUS MOTOR SPEED. *Galaxy International Interdisciplinary Research Journal*, 11(5), 448-449.
4. Abdullayevich, Q. N. (2023). Ways to Reduce Losses in Power Transformers. *Texas Journal of Engineering and Technology*, 20, 36-37.
5. Abdullayevich, Q. N., & Elmurodovich, B. O. (2023). ПРОВЕДЕНИЕ ЛАБОРАТОРНЫХ ЗАНЯТИЙ ПО ЭЛЕКТРИЧЕСКИМ СХЕМАМ. *Новости образования: исследование в XXI веке*, 1(7), 1006-1010.
6. Abdullayevich, Q. N. (2023). REDUCING ELECTRICITY LOSSES IN ELECTRICAL DISTRIBUTION NETWORKS DUE TO MULTICRITERIA OPTIMIZATION OF LINE SECTIONS. *MODELS AND METHODS FOR INCREASING THE EFFICIENCY OF INNOVATIVE RESEARCH*, 3(28), 275-279.
7. Mahmutxonov, S. J., Qurbonov, N., & Babayev, O. (2022). ELEKTR TARMOQLARIDA SIFAT KO'RSATKICHLARI VA ISROFLAR. *Innovatsion texnologiyalar*, 47, 14-15.
8. Abdullayevich, Q. N. Muzaffar o'g'li, NT (2023). ASSESSMENT OF THE INFLUENCED FACTORS ON THE INDICATORS OF SPECIFIC ELECTRICITY CONSUMPTION AT INDUSTRIAL ENTERPRISES. *FORMATION OF PSYCHOLOGY AND PEDAGOGY AS INTERDISCIPLINARY SCIENCES*, 2(20), 8-10.
9. Abdullayevich, K. N., & Olimjon o'g'li, E. J. (2024). USING CONSUMER-REGULATORS TO EQUALIZATION OF ELECTRICAL ENERGY SYSTEM LOAD SCHEDULE. *JOURNAL OF MULTIDISCIPLINARY BULLETIN*, 7(4), 25-29.
10. Abdullayevich, Q. N. Almardon o'g'li, NA, & Bahodir o'g, QOA (2024). INFLUENCE OF ELECTRICAL ENERGY QUALITY ON ELECTRICAL ENERGY WASTE. *Научный Фокус*, 1(9), 786-789.
11. Abdullayevich, Q. N. (2023). REACTIVE POWER COMPENSATION. *IMRAS*, 6(6), 506-508.
12. Abdullayevich, K. N., & Olimjon o'g'li, E. J. (2024). FUNCTIONS OF FACTS DEVICES WITH INNOVATION TECHNOLOGY IN THE ELECTRICAL ENERGY SYSTEM. *JOURNAL OF ENGINEERING SCIENCES*, 7(5), 12-16.
13. Abdullayevich, K. N., & Olimjon o'g'li, E. J. (2024). МАТЕМАТИЧЕСКАЯ МОДЕЛЬ АВТОМАТИЧЕСКОГО РЕГУЛЯТОРА ВОЗБУЖДЕНИЯ АРВ. *SCIENTIFIC APPROACH TO THE MODERN EDUCATION SYSTEM*, 3(25), 374-379.
14. Abdullayevich, K. N., & Olimjon o'g'li, E. J. (2024). АНАЛИЗ ТЕХНИЧЕСКОГО СОСТОЯНИЯ СИЛОВЫХ АВТОТРАНСФОРМАТОРОВ. *THE THEORY OF RECENT SCIENTIFIC RESEARCH IN THE FIELD OF PEDAGOGY*, 2(21), 45-48.
15. Abdullayevich, K. N., & Olimjon o'g'li, E. J. (2024). АНАЛИЗ ТЕХНИЧЕСКОГО СОСТОЯНИЯ СИЛОВЫХ АВТОТРАНСФОРМАТОРОВ. *THE THEORY OF RECENT SCIENTIFIC RESEARCH IN THE FIELD OF PEDAGOGY*, 2(21), 45-48.

16. Abdullayevich, K. N. (2024). НОРМАТИВНЫЕ ПОТЕРЬ ЭЛЕКТРОЭНЕРГИИ В РАСПРЕДЕЛИТЕЛЬНЫХ СЕТЯХ 10, 6 и 0, 4 кВ. *THE THEORY OF RECENT SCIENTIFIC RESEARCH IN THE FIELD OF PEDAGOGY*, 2(21), 55-60.
17. Abdullayevich, Q. N., Almardon o'g'li, N. A., & Bahodir o'g, Q. O. A. (2024). INFLUENCE OF ELECTRICAL ENERGY QUALITY ON ELECTRICAL ENERGY WASTE. *Научный Фокус*, 1(9), 786-789.
18. Abdullayevich, Q. N., Almardon o'g'li, N. A., & Bahodir o'g, Q. O. A. (2024). ENSURING ELECTRICAL ENERGY QUALITY IN TEXTILE ENTERPRISES. *Научный Фокус*, 1(9), 794-797.
19. Курбонов, Н. А., Халикова, Х. А., & Неъматов, Б. А. О. (2024). ВОПРОСЫ ПАРАЛЛЕЛЬНЫЕ РАБОТЫ ЭНЕРГОСИСТЕМЫ АФГАНИСТАНА, УЗБЕКИСТАНА И ТАДЖИКИСТАНА С УЧЕТОМ НОВОГО СТРОИТЕЛЬСТВА. *Eurasian Journal of Academic Research*, 4(6-1), 37-41.
20. Usmanov, E., Rajabboeva, A., Kurbonov, N., & Kurbanova, K. (2024, June). Operational logic scheme of the sketch base for an educational simulator in the fundamentals of power supply. In *AIP Conference Proceedings* (Vol. 3152, No. 1). AIP Publishing.
21. Abdullayevich, K. N. (2024). ЭНЕРГИЯНИ ТЕЖАШ ВА ЭНЕРГИЯ САМАРАДОРЛИГИ СОҲАСИДА ИННОВАЦИОН ФАОЛИЯТНИ БОШҚАРИШДА ЛОЙИҲА ЁНДАШУВИДАН ФОЙДАЛАНИШ. *THE THEORY OF RECENT SCIENTIFIC RESEARCH IN THE FIELD OF PEDAGOGY*, 2(25), 363-367.
22. Abdullayevich, Q. N., & Muzaffar o'g'li, N. T. (2024). NORMALIZATION MODES OF HYDROGENERATORS. *THE THEORY OF RECENT SCIENTIFIC RESEARCH IN THE FIELD OF PEDAGOGY*, 2(25), 368-371.
23. Abdullayevich, Q. N., & Muzaffar o'g'li, N. T. (2024). FACTORS AFFECTING SPECIFIC ELECTRICITY CONSUMPTION IN INDUSTRIAL ENTERPRISES. *THE THEORY OF RECENT SCIENTIFIC RESEARCH IN THE FIELD OF PEDAGOGY*, 2(25), 372-376.
24. Abdullayevich, K. N. (2024). ЭЛЕКТР ЭНЕРГИЯ СИФАТИНИ ЭЛЕКТР ЭНЕРГИЯ ИСРОФИГА ТАЪСИРИ. *PEDAGOG*, 7(9), 183-188.
25. Abdullayevich, K. N. (2024). ИНТЕЛЛЕКТУАЛЬНЫЙ МОНИТОРИНГ РЕЖИМОВ ЭЛЕКТРИЧЕСКИХ СЕТЕЙ. *Новости образования: исследование в XXI веке*, 3(26), 203-208.
26. Abdullayevich, K. N. (2024). ОЦЕНКА ВЛИЯЮЩИХ ФАКТОРОВ НА ПОКАЗАТЕЛИ УДЕЛЬНОГО РАСХОДА ЭЛЕКТРОЭНЕРГИИ НА ПРОМЫШЛЕННЫХ ПРЕДПРИЯТИИ. *PROSPECTS AND MAIN TRENDS IN MODERN SCIENCE*, 2(13), 531-536.
27. Abdullayevich, K. N. (2024). ANALYSIS AND EVALUATION OF THE EFFECTIVENESS OF ENERGY SAVING IN INDUSTRIAL ENTERPRISES. *SCIENTIFIC APPROACH TO THE MODERN EDUCATION SYSTEM*, 3(28), 75-81.
28. Abdullayevich, Q. N., & Abduzairovna, N. M. (2024). ЭЛЕКТР ТАЪМИНОТИ ТИЗИМИДА РАҚАМЛИ ПОДСТАНЦИЯЛАРДАН ФОЙДАЛАНИШ МАСАЛАЛАРИ. *Eurasian Journal of Academic Research*, 4(9), 71-75.

29. Ixtiyorovich, D. S. (2023). CONDUCTING LABORATORY CLASSES ON ELECTRICAL CIRCUITS. *Научный Фокус*, 1(1), 84-88.
30. Джуряев, Ш. И., & Махмудов, Н. Ш. (2023). ДОСТИЖЕНИЕ ЭНЕРГОЭФФЕКТИВНОСТИ МНОГОЭТАЖНЫХ ДОМОВ С ПОМОЩЬЮ ФОТОРЕЛЕ. *European Journal of Interdisciplinary Research and Development*, 15, 55-57.
31. Джуряев, Ш. И. (2023). СМЕШАННОЕ СОЕДИНЕНИЕ РЕЗИСТОРОВ. БАЛАНСИРОВКА МОСТА. *Scientific Impulse*, 1(7), 859-861.
32. Mamarasulova, F., Bobojonov, Y., Djurayev, S., & Karimova, N. (2023). Stimulating environmental protection activities in the energy sector. In *E3S Web of Conferences* (Vol. 461, p. 01099). EDP Sciences.
33. Ixtiyorovich S. D. et al. АСИНХРОННАЯ МАШИНА С ПЕРЕКЛЮЧЕНИЕМ ПОЛЮСОВ //Новости образования: исследование в XXI веке. – 2024. – Т. 2. – №. 20. – С. 768-772.
34. Makhmutkhanov, S., Akhrom, J., Djurayev, S., & Bozorov, I. (2024, June). Stimulating environmental protection activities in the energy sector. In *AIP Conference Proceedings* (Vol. 3152, No. 1). AIP Publishing.
35. Файзиев, М. М., Ибрагимов, И. И., Джуряев, Ш. И., & Мухаммадиев, А. В. У. (2023). ОПРЕДЕЛЕНИЕ ПАРАМЕТРОВ ЛИНИИ ЭЛЕКТРОПЕРЕДАЧ С ПОМОЩЬЮ ПРОГРАММНОМ ОБЕСПЕЧЕНИИ MATLAB SIMULINK. *Наука, техника и образование*, (2 (90)), 23-27.
36. Ixtiyorovich, D. S., & Abdullayevna, X. X. (2023). ANALYSIS AND EVALUATION OF ENERGY SAVING EFFICIENCY IN COCONOMOTAL INDUSTRIAL ENTERPRISES. *Scientific Impulse*, 1(10), 2144-2149.
37. Ixtiyorovich, D. S. (2023). СТАТИЧЕСКИЕ ОПИСАНИЯ ТРЕХФАЗНОГО ТРАНСФОРМАТОРА С УЧЕТОМ ЧУВСТВИТЕЛЬНЫХ ЭЛЕМЕНТОВ. *Новости образования: исследование в XXI веке*, 2(15), 1183-1189.
38. Ixtiyorovich, D. S., & Abdullayevna, X. X. (2023). STABILIZATION OF SINGLE-PHASE LOAD CURRENT IN THREE-PHASE CIRCUITS. *Scientific Impulse*, 1(10), 1811-1813.
39. Beitullaeva, R., Tukhtaev, B., Norboev, A., Nimatov, K., & Djuraev, S. (2023). Analysis of pump operation in common pressure pipelines using the example of the “Chirchik” pumping station. In *E3S Web of Conferences* (Vol. 460, p. 08015). EDP Sciences.
40. Mamarasulova, F., Bobojonov, Y., Djurayev, S., & Karimova, N. (2023). Stimulating environmental protection activities in the energy sector. In *E3S Web of Conferences* (Vol.461, p. 01099). EDP Sciences.
41. Abdullayevich, K. N., O’G’Li, M. F. A., O’G’Li, E. J. O., & O’G’Li, P. A. B. (2024). MARKOV ZANJIRI USULI VA O ‘LCHANGAN SHAMOL TEZLIKLARIDAN FOYDALANGAN HOLDA YANGI SHAMOL TEZLIKLARINI BASHORAT QILISH. *Eurasian Journal of Academic Research*, 4(11-2), 7-12.
42. Abdullayevich, K. N., & Abdullayevna, X. X. (2024). EFFECTIVENESS OF USING A FREQUENCY CONVERTER WITH SMOOTH SPEED CONTROL OF AN INDUCTION MOTOR. *Новости образования: исследование в XXI веке*, 3(27), 151-154.

43. Abdullayevich, K. N., Shuhrat o'g'li, O. S., & Olimjon o'g'li, E. J. (2024). STRUCTURE OF LOW VOLTAGE ELECTRICAL NETWORKS. *AMERICAN JOURNAL OF MULTIDISCIPLINARY BULLETIN*, 2(5), 112-119.

44. Markaev, N., Abdiraxmonov, I., Davletov, I., & Tukhtaev, B. (2023). Energy characteristics of electrotechnological processing of grape cuttings. In *E3S Web of Conferences* (Vol. 434, p. 01031). EDP Sciences.

45. Yunusov, R. F., Parmanov, A. E., Karimov, I. N., Rajabov, M. N., Tuxtayev, B. B., & Raxmonov, S. S. (2023, August). Methodology for calculating the characteristics of linear induction motors for low-speed process equipment. In *IOP Conference Series: Earth and Environmental Science* (Vol. 1231, No. 1, p. 012059). IOP Publishing.