ISNN 3030-3907

2026
JUNE
ISSUE - 6
VOLUME -8

DEVELOPMENT OF SCIENCE

scientific journal



Development of science

Ilmiy jurnal

IYUN 2026
Issue - 6, VOLUME – 8

ISSN 3030 -3907

Ilmiy jurnal OAK rayosatining 2024 yil 27 sentabrdagi 361-son qaroriga asosan 02.00.00 kimyo fanlari hamda 2025 yil 12 fevral 367- son qaroriga asosan 05.00.00 texnika fanlari bo‘yicha falsafa doktori (PhD) va fan doktori (DSc) ilmiy darajasiga talabgorlarning dissertatsiya ishlari yuzasidan dissertatsiyalari asosiy ilmiy natijalarini chop etish tavsiya etilgan milliy ilmiy nashrlar ro‘yxatiga kiritilgan.

BOSH MUHARRIR:
Temirov Alisher Hoshim o‘g‘li – texnika fanlari falsafa doktori (PhD),Dotsent.
TAHRIRIYAT KENGASH RAISI:
Fozilov Sadriddin Fayzullayevich – texnika fanlari doktori, professor
TAHRIRIYAT KENGASH A’ZOLARI

TEXNIKA FANLARI/ TECHNICAL SCIENCES/ ТЕХНИЧЕСКИЕ НАУКИ

Bozorov G‘ayrat Rashidovich
Buxoro Davlat Texnika Universiteti, professor
Abdurahmonov Olim Rustamovich
Buxoro Davlat Texnika Universiteti, professor
Adizov Bobur Zamirovich
O‘zbekiston Respublikasi Fanlar akademiyasi Umumiy va noorganik kimyo instituti, professor
Hayitov Ruslan Rustamjonovich
Buxoro Davlat Texnika Universiteti, professor
Jumayev Qayum Karimovich
Buxoro Davlat Texnika Universiteti, professor.
Berdiyev Dorob Murodovich
Islom Karimov nomidagi Toshkent Davlat Texnika Universiteti, professor
Maxmudov Rafiq Amonovich
Buxoro Davlat Texnika Universiteti, professor.
Tilloyev Lochin Ismatilloyevich
Buxoro Davlat Texnika Universiteti, dotsent.
Raxmonov Qahramon Sanakulovich
Buxoro Davlat Texnika Universiteti, dotsent.
Barakayev Nusratullo Rajabovich
Islom Karimov nomidagi Toshkent Davlat Texnika Universiteti, professor.
Jo‘rayev Xayrullo Fayziyevich
Buxoro Davlat Texnika Universiteti, professor.
Panoyev Erali Rajabboyevich
Buxoro Davlat Texnika Universiteti, dotsent.
Ataullayev Sherzod Nabiullyevich
Buxoro Davlat Texnika Universiteti, dotsent.
Murodov Malik Negmurodovich
Buxoro Davlat Texnika Universiteti, dotsent.
Axmedova Ozoda Bahronovna
Islom Karimov nomidagi Toshkent Davlat Texnika Universiteti.
Safarov Bahri Jumayevich
Buxoro Davlat Texnika Universiteti, dotsent.
Xaydarov Axtam Amonovich
Buxoro Davlat Texnika Universiteti, dotsent.
Safarov Jasur Alijon o‘g‘li
Buxoro Davlat Texnika Universiteti, dotsent.

KIMYO FANLARI/ CHEMICAL SCIENCES/ ХИМИЧЕСКИЕ НАУКИ

Axmedov Voxid Nizomovich
Buxoro Davlat Texnika Universiteti, professor
Umarov Baqo Bafoyevich
Buxoro Davlat Universiteti, professor
Kodirov Abduaxad Abduraximovich
Qarshi davlat Universiteti, professor
Qurbonov Mingniqul Jumagulovich
Qarshi davlat Universiteti, dotsent
Turemuratov Sharibay Naurizbaevich
O‘zbekiston Respublikasi Fanlar akademiyasi Qoraqalpog‘iston bo‘limi Bosh ilmiy kotibi, professor
Tursunov Kaxor Shonazarovich
Qarshi davlat Universiteti, professor
Do‘stov Hamro
Buxoro Davlat Texnika Universiteti, professor
Panoyev Nodir Shavkatovich
Buxoro Davlat Texnika Universiteti, dotsent.
Olimov Bobur Bahodir o‘g‘li
Buxoro Davlat Texnika Universiteti, dotsent.
Kasimov Sherzod Abduazimovich
Termiz Davlat Universiteti, professor.
Aliqulov Rustam Valiyevich
Termiz Davlat Universiteti, professor
Tropov Xamza Tursunovich
Samarqand Davlat Universiteti, professor

IQTISODIYOT FANLARI/ ECONOMICS/ ЭКОНОМИЧЕСКИЕ НАУКИ

Nizamov Aslitdin Badreddinovich
Buxoro Davlat Texnika Universiteti, professor.
Boboyev Akmal Choriyevich
Buxoro Davlat Texnika Universiteti, professor.
Ergashxojayeva Shaxnoza Djasurovna
Toshkent davlat iqtisodiyot universiteti, professor
Saidaxmedova Nodira Ilxomovna
Toshkent davlat iqtisodiyot universiteti, professor
Muxsinov Bekzod Toxirovich
Buxoro Davlat Texnika Universiteti, dotsent.
Shakarov Qulmat Ashirovich
Renessans ta'lim universiteti,dotsent.
Jumaeva Zulfiya Qayumovna
Buxoro Davlat Texnika Universiteti, dotsent.
Norova Salomat Yusupovna
Buxoro Davlat Texnika Universiteti, dotsent.
Avezova Shaxnoza Maxmudjonovna
Buxoro Davlat Texnika Universiteti, dotsent.
Jalilov Jamshid G‘anijonovich
Toshkent davlat iqtisodiyot universiteti, dotsent
Xasanova Gulruh Djumanazarovna
Buxoro Davlat Texnika Universiteti, dotsent.

PEDAGOGIKA FANLARI/ PEDAGOGICAL SCIENCES / ПЕДАГОГИЧЕСКИЕ НАУКИ

Siddiqova Sadoqat G‘afforovna
Buxoro Davlat Texnika Universiteti, dotsent.
Zoyirov Erkin Xalilovich
Buxoro Davlat Texnika Universiteti, DSc, professor
Gaffarov Feruz Hasanovich
Puchon Universiteti, *professor*
Ruziyev Davron Yuldashevich
Buxoro Davlat Universiteti, professor
Muradova Firuza Rashidovna
Buxoro Davlat Texnika Universiteti, professor.
Yunusova Gulandon Samiyevna
Buxoro Davlat Texnika Universiteti, professor.
To‘xtayeva Zebo Sharifovna
Buxoro Davlat Texnika Universiteti, professor.
Navro‘zova Gulchixra Nigmatovna
Buxoro Davlat Texnika Universiteti, dotsent.
Uzoqova Laylo Polvonovna
Buxoro muhandislik – texnologiya instituti, dotsent.
To‘raqulova Marjona Qiyom qizi
Buxoro Davlat Texnika Universiteti, dotsent.
Muradova Zarina Rashidovna
Buxoro Davlat Texnika Universiteti, dotsent.
Murodov Sanjar Aslonovich
Buxoro Davlat Texnika Universiteti, dotsent.
Shodiyev Jahongir Jo‘raqulovich
Buxoro Davlat Texnika Universiteti, dotsent
Gaffarov Laziz Hasanovich
Buxoro muhandislik – texnologiya instituti, dotsent.

Tahririyat a’zolarning to‘liq ro‘yxati jurnalning www.devos.uz saytida keltirilgan.

Tahririyat hay’ati a’zolarining tarkibini o‘zgartirish hamda qo‘shimcha kiritish yoki tahririyat a’zoligidan chiqarish bosh muharrir tomonidan amalga oshiriladi.

ISSN 3030-3907

Development of science ilmiy jurnali 2024 yil 15 aprel kuni №256445 sonli guvohnoma bilan Davlat ro‘yxatidan o‘tgan.

To‘plam elektron ko‘rinishda (pdf formatida) mualliflarga taqdim etiladi. To‘plamga kiritiladigan maqolalarning mazmuni, ulardagi statistik ma’lumotlar va me’yoriy hujjatlarning to‘g‘riligiga hamda har qanday fikr - mulohazalarga mualliflarning o‘zlari mas’ul hisoblanadilar. Talablarga javob bermaydigan maqolalar to‘plamga kiritilmaydi. Tashkiliy qo‘mita maqola matnini qisqartirish, qisman tuzatish kiritish, seksiyalarga joylashtirish huquqiga ega.

ISSN 3030-3907

ANALYSIS OF MODELS FOR ORGANIZING MARKET RELATIONS IN ELECTRIC POWER SYSTEMS

O‘rolov Dilshod Baxriddin o‘g‘li
Karshi State Technical University student

Abstract. This article analyzes the main models for organizing market relations in the electric power industry. The interactions among electricity market participants, the role of power networks in market operation, and the mechanisms for creating a competitive environment are examined. In addition, monopoly market, single-buyer, wholesale competition, and retail competition models are compared, and their advantages and disadvantages are evaluated. The research findings are of practical significance for improving the electricity market and selecting the most effective market model.

Keywords: electric power industry, electricity market, market relations, competition model, single buyer, wholesale market, retail market, power networks, power system, tariff policy.

Аннотация. В данной статье проведён анализ основных моделей организации рыночных отношений в электроэнергетической системе. Рассмотрены взаимоотношения участников рынка электроэнергии, роль электрических сетей в функционировании рынка, а также механизмы формирования конкурентной среды. Кроме того, выполнено сравнение моделей монопольного рынка, единого покупателя, а также конкурентных моделей оптового и розничного рынков, дана оценка их преимуществ и недостатков. Результаты исследования имеют практическое значение для совершенствования рынка электроэнергии и выбора наиболее эффективной модели его организации.

Ключевые слова: электроэнергетика, рынок электроэнергии, рыночные отношения, модель конкуренции, единый покупатель, оптовый рынок, розничный рынок, электрические сети, энергетическая система, тарифная политика.

Annotatsiya. Ushbu maqolada elektr energetika tizimida bozor munosabatlarini tashkil etishning asosiy modellari tahlil qilingan. Elektr energiyasi bozori ishtirokchilarining o‘zaro munosabatlari, elektr tarmoqlarining bozordagi o‘rni hamda raqobat muhitini shakllantirish mexanizmlari yoritilgan. Shuningdek, monopol bozor, yagona xaridor, ulgurji va chakana bozorlarda raqobat modellari solishtirilib, ularning afzalliklari va kamchiliklari baholangan. Tadqiqot natijalari elektr energetika bozorini takomillashtirish va samarali bozor modelini tanlashda amaliy ahamiyatga ega.

Kalit so‘zlar: elektr energetikasi, elektr energiyasi bozori, bozor munosabatlari, raqobat modeli, yagona xaridor, ulgurji bozor, chakana bozor, elektr tarmoqlari, energetika tizimi, tarif siyosati.

INTRODUCTION.

ISSN 3030-3907

If the service of electricity delivery is separated from the product itself, electricity can be regarded as a commodity that may be bought, sold, and transferred from one location to another, similar to any other product. Even if electricity transmission remains a natural monopoly, a market for electricity can be said to exist provided that each consumer is free to choose the producer from whom they purchase electricity through the network.

The existence of markets for commodities (active and reactive electrical energy) and services (transmission, frequency regulation, voltage control, etc.) implies the presence of the following participants (Figure 1):

• Producers of goods and services – generation companies (power systems and power plants) and network companies (individual transmission lines or network systems);

• Consumers of goods and services – industrial, municipal, agricultural, and other categories of electricity consumers.

Electrical energy, as a commodity, possesses several distinctive characteristics: the simultaneity of generation and consumption, the impracticality of economically storing large quantities, the influence of every producer and consumer on the overall quality of the product, and the necessity of complying with strict quality standards, among others. Furthermore, there is only one practical method for transmitting electrical energy on an industrial scale. These characteristics determine the role of a coordinating authority in the interactions among the aforementioned entities, whose function is to coordinate the operating conditions of market participants and ensure the reliable operation of the entire electric power system through dispatch control. This entity ensures the operation of the power system under optimal operating conditions without directly considering the economic interests of individual participants. More precisely, it is assumed that the damage resulting from unacceptable deviations in system operation is significantly greater than the losses associated with suboptimal control decisions. Thus, it also performs an economic function by protecting market participants from potential losses.

Special attention should be paid to the role of the electrical network in the organization and operation of the electricity market. The network remains the only means of transmitting electrical energy on a large scale and is therefore often regarded as the marketplace in which market transactions take place. To ensure fair competition among producers and consumers, the network must provide equal access and non-discriminatory conditions for all participants. If network resources are limited, market participants must compete for the right to utilize these resources on equal and non-discriminatory terms. The fewer the capacity-related constraints associated with interconnections in transferring electricity and services from one

ISSN 3030-3907

market entity to another, and the lower the losses in these interconnections, the more fully market mechanisms can be implemented and the greater the potential for improving economic efficiency.

Tariff regulation refers to the overall level and structure of tariffs determined based on consumer demand for electricity. The need for investment control is mainly explained by the fact that investments determine the future price of electricity. In this regard, such control represents an active form of tariff forecasting. This type of regulation enables state authorities to actively develop and implement their energy policy, and given the fundamental importance of energy supply, all countries, to varying degrees, make use of this opportunity. Antitrust regulation consists of sanctions imposed for the abuse of a dominant market position, allowing competition authorities to take measures against utilities for unjustified price increases and the imposition of arbitrary requirements on consumers.

When energy companies operate jointly, it is necessary to establish coordinated control of their combined operation to ensure reliable and economical electricity supply to consumers.

Coordination of operational activities includes:

- economic load sharing among generating units;
- optimal selection of the composition of operating units;
- optimal scheduling of maintenance plans.

Reliability coordination includes:

- defining overall reliability criteria;
- automatic frequency regulation;
- coordination of reserve capacities;
- ensuring data exchange for reliability analysis;
- exchange of information for planning maintenance of generating equipment, substation equipment, and transmission lines.

In order to improve the efficiency of electricity supply to consumers, competition is also important alongside coordination. Competition among energy companies and fuel suppliers has existed for a long time. For a long period, there has also been competition between energy utilities and large industrial enterprises with their own generation capacities in the production and in the sale and purchase of electrical energy.

Competition may take various forms and can include a wide range of activities, typically involving the following opportunities:

- construction, ownership, and operation of power plants;
- construction, ownership, and operation of transmission lines;

ISSN 3030-3907

- redistribution of energy to other consumers both within and outside the power system;
- purchasing electricity from different producers;
- purchasing electricity from different power systems;
- selling electricity to different power systems;
- selling electricity to different consumers.

Competition within a country, as well as between countries or regions, is influenced by government policy, including:

- permits for the construction of certain types of generating facilities;
- taxation policies;
- electricity import and export policies;
- environmental protection legislation.

Investment activity, which determines the development of the electric power sector, is carried out on a competitive basis in almost all developed foreign countries. At the same time, integration within the electricity industry is increasing: large energy companies in industrialized countries are acquiring power plants and entire energy companies in other countries. Alongside traditional methods of addressing capacity shortages through the construction of new power plants, load management practices, as well as long-term purchasing or leasing of generating capacity, are increasingly being applied.

From a competitive perspective, there are four main models of electricity sector structures.

Model 1. Monopoly in all structures. Electricity producers do not compete with each other, and no enterprise has the right to choose its electricity supplier. A single company holds a monopoly over electricity generation and its transmission through the network, either to distribution companies or directly to end consumers, depending on whether distribution companies exist or not.

In the monopoly model, all end consumers are supplied by a single energy company to which this responsibility is entrusted. This form of vertically integrated organization has, over time, enabled the development of large-scale transmission systems and the construction of large power plants. These economic advantages have, for many years, served the interests of such a monopolistic enterprise. A complete monopoly also enables the government to address public policy objectives, such as providing subsidies to low-income regions, implementing rural electrification programs, and promoting the use of local energy resources.

Model 2. Single buyer. There is a single buyer— a purchasing agency that selects electricity producers through competition among them. The single buyer holds a monopoly over the transmission network and the sale of electricity to distribution networks and end consumers.

ISSN 3030-3907

This model also enables the government to address public policy objectives. At the same time, it helps avoid a number of costs typical of deregulated systems, such as wholesale market management costs, transmission network access costs, and the increase in capital costs due to higher technological risks. The single-buyer system requires the establishment of long-term contracts between consumers and independent power producers. In this framework, independent producers are protected from market risk. Contracts are based on the cost of electricity generation. Independent producers compete in terms of their participation level in operating a particular power system, while their revenues are guaranteed during the operation of the power plant. With this guarantee, they are able to participate in financing highly capital-intensive power plants. Market and technological risks are transferred to consumers through a single buyer. By separating power plant owners from direct market relations, Model 2 reduces the dynamic benefits of competition and leaves many decisions about when and where to build new capacity in the hands of central planners.

Model 3. Competition in the wholesale market. Distribution companies purchase electricity directly from generators in the retail market and deliver it to consumers through the transmission network. Distribution companies still retain a monopoly over supplying electricity to end consumers. However, open access to the transmission network is provided for both electricity generators and distribution companies.

In this model, competition can be further expanded, allowing all producers to sell electricity to a large number of consumers. A greater number of buyers makes the market more competitive and dynamic. The advantages of competition in electricity generation are strengthened as market and technological risks are transferred back to the producers. Power plant owners are subject to more effective regulation and are better able to evaluate the benefits of new technologies, becoming more attentive in making investment decisions. At the same time, the increased level of risk for power plant owners leads to higher transaction costs and requires additional market and network agreements. This model also reduces the government's ability to guide the selection of new electricity generation technologies through mechanisms other than direct subsidies and policy directives.

Model 4. Competition in retail electricity markets or direct access. In this case, all consumers have the right to choose their electricity supplier. They have open access to transmission and distribution networks.

Recent fundamental changes in the electricity sector in various countries around the world have been mainly associated with the implementation of the last two models.

ISSN 3030-3907

In international practice (particularly in the United States), the following classification of electricity markets is adopted:

1.Electricity market

- Spot market – energy supply contracts are concluded for a short term (up to one day) and are mainly of an exchange-based nature;
- Long-term market – energy supply over extended periods (from several days to several years). In this segment, direct bilateral contracts between producers and consumers are possible;
- Ancillary services market, including reserves (spinning, non-spinning, etc.);
- Frequency regulation;
- Voltage regulation.

REFERENCES:

1. Shouket, H. A., Ameen, I., Tursunov, O., Kholikova, K., Pirimov, O., Kurbonov, N., ... & Mukimov, B. (2020, December). Study on industrial applications of papain: A succinct review. In IOP Conference Series: Earth and Environmental Science (Vol. 614, No. 1, p. 012171). IOP Publishing.
2. 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, p. 050029). AIP Publishing LLC.
3. 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.
4. Saidkhodjaev, A., Kasimova, G., Akbarkhodjaev, S., & Kurbonov, N. (2025, November). Structure and principles for selecting a rational urban power supply schemes. In AIP Conference Proceedings (Vol. 3331, No. 1). AIP Publishing.
5. Abdullayevich, Q. N. Muzaffar o‘g‘li, NT (2024). NORMALIZATION MODES OF HYDROGENERATORS. THE THEORY OF RECENT SCIENTIFIC RESEARCH IN THE FIELD OF PEDAGOGY, 2(25), 368-371.
6. Abdullayevich, Q. N. (2023). REACTIVE POWER COMPENSATION. IMRAS, 6(6), 506-508.
7. 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.
8. Abdullayevich, K. N. (2024). ЭНЕРГИЯНИ ТЕЖАШ ВА ЭНЕРГИЯ САМАРАДОРЛИГИ СОҲАСИДА ИННОВАЦИОН ФАОЛИЯТНИ

ISSN 3030-3907

БОШҚАРИШДА ЛОЙИҲА ЁНДАШУВИДАН ФОЙДАЛАНИШ. THE THEORY OF RECENT SCIENTIFIC RESEARCH IN THE FIELD OF PEDAGOGY, 2(25), 363-367.
9. Abdullayevich, Q. N., & Qizi, Q. M. S. (2023). Ways to Reduce Losses in Power Transformers. Texas Journal of Engineering and Technology, 20, 36-37.
10. Mahmutxonov, S. J., Qurbonov, N., & Babayev, O. (2022). ELEKTR TARMOQLARIDA SIFAT KO ‘RSATKICHLARI VA ISROFLAR. Innovatsion texnologiyalar, 47, 14-15.
11. Abdullayevich, K. N. (2024). ЭЛЕКТР ЭНЕРГИЯ СИФАТИНИ ЭЛЕКТР ЭНЕРГИЯ ИСРОФИГА ТАЪСИРИ. PEDAGOG, 7(9), 183-188.
12. 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.
13. 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.
14. 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.
15. Abdullayevich, Q. N., & Elmurodovich, B. O. (2023). ПРОВЕДЕНИЕ ЛАБОРАТОРНЫХ ЗАНЯТИЙ ПО ЭЛЕКТРИЧЕСКИМ СХЕМАМ. Новости образования: исследование в XXI веке, 1(7), 1006-1010.
16. 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.
17. 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.
18. Abdullayevich, K. N. (2024). ИНТЕЛЛЕКТУАЛЬНЫЙ МОНИТОРИНГ РЕЖИМОВ ЭЛЕКТРИЧЕСКИХ СЕТЕЙ. Новости образования: исследование в XXI веке, 3(26), 203-208.
19. Abdullayevich, K. N., & Abduzairovna, N. M. (2024). ЭЛЕКТР ТАЪМИНОТИ ТИЗИМИДА РАҚАМЛИ ПОДСТАНЦИЯЛАРДАН ФОЙДАЛАНИШ МАСАЛАЛАРИ. Eurasian Journal of Social Sciences, Philosophy and Culture, 4(9), 71-75.

ISSN 3030-3907

20. 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.
21. Abdullayevich, Q. N., & Ikrom o‘g, T. A. A. (2023). Efficiency OF Use OF Frequency Converter with Smooth Control OF Asynchronous Motor Speed. Galaxy International Interdisciplinary Research Journal, 11(5), 448-449.
22. 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.
23. Abdullayevich, K. N., Akrom o‘g, N. M. B., & 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.
24. 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.
25. Abdullayevich, K. N. Shuhrat o‘g‘li, OS, & Olimjon o‘g‘li, EJ (2024). STRUCTURE OF LOW VOLTAGE ELECTRICAL NETWORKS. AMERICAN JOURNAL OF MULTIDISCIPLINARY BULLETIN, 2(5), 112-119.
26. Abdullayevich K. N., Tulqin o‘g‘li X. M., Mansur o‘g‘li C. D. УМЕНЬШЕНИЕ ПОТЕРЬ ЭЛЕКТРОЭНЕРГИИ В РАСПРЕДЕЛИТЕЛЬНЫХ ЭЛЕКТРИЧЕСКИХ СЕТЯХ ЗА СЧЕТ МНОГОКРИТЕРИАЛЬНОЙ ОПТИМИЗАЦИИ СЕЧЕНИЙ ЛИНИЙ //IMRAS. – 2025. – Т. 8. – №. 3. – С. 35-43.
27. Shouket, H. A., Ameen, I., Tursunov, O., Kholikova, K., Pirimov, O., & Kurbonov, N. & Mukimov, B.(2020, December). Study on industrial applications of papain: A succinct review. In IOP Conference Series: Earth and Environmental Science (Vol. 614, No. 1, p. 012171).
28. Abdullayevich K. N. et al. ВОПРОСЫ ПАРАЛЛЕЛЬНЫЕ РАБОТЫ ЭНЕРГОСИСТЕМЫ АФГАНИСТАНА, УЗБЕКИСТАНА И ТАДЖИКИСТАНА С УЧЕТОМ НОВОГО СТРОИТЕЛЬСТВА //Eurasian Journal of Academic Research. – 2024. – Т. 4. – №. 6-2. – С. 19-23.
29. Abdullayevich Q. N. CONDUCTING LABORATORY CLASSES ON ELECTRICAL CIRCUITS. Finland International Scientific Journal of Education //Social Science & Humanities. – 2023. – Т. 11. – №. 1. – С. 1095-1098.

ISSN 3030-3907

30. Abdullayevich K. N., Mansur o‘g‘li C. D. МЕТОДЫ И МЕРЫ ЭНЕРГОСНАБЖЕНИЯ В СИСТЕМЕ НАРУЖНОГО ОСВЕЩЕНИЯ ГОРОДА //INNOVATIVE DEVELOPMENTS AND RESEARCH IN EDUCATION. – 2025.
31. Abdullayevich K. N., Shuhrat o‘g‘li O. S., Olimjon o‘g‘li E. J. STRUCTURE OF LOW VOLTAGE ELECTRICAL NETWORKS //AMERICAN JOURNAL OF MULTIDISCIPLINARY BULLETIN. – 2024. – Т. 2. – №. 5. – С. 112-119.
32. Muminov, A., Yusupov, D., Kutbidinov, O., Mukhammadjonov, M., Norboev, A., Zaynieva, O., ... & Radjabov, S. (2026, May). Development and analysis of a health index-based multi-criteria assessment model for power transformer condition monitoring. In AIP Conference Proceedings (Vol. 3447, No. 1, p. 040011). AIP Publishing LLC.

ISSN 3030-3907