



EVALUATION OF ENERGY EFFICIENCY IN FUEL ENERGY COMPLEXES

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<https://doi.org/10.5281/zenodo.11669253>

Annotation: The fuel and energy complex is one of the important sectors of the economy of each country. Energy consumption is increasing day by day, and the amount of energy consumed, produced, transmitted or sold by fuel and energy complexes is also increasing. Today there are 23 fuel and energy complexes in Uzbekistan. It is very important to evaluate its energy efficiency and conduct analysis. There are many energy efficiency software available, but they have several disadvantages. When these shortcomings are eliminated, a system that includes new methods for calculating energy efficiency and functions prepared on the basis of these methods becomes very relevant.

In this dissertation, in addition to demonstrating the relevance of the new system, its operating principles, calculation methods and analysis stages are widely covered.

Keywords: fuel and energy complexes; energy efficiency; enterprises; artificial neural networks; calculation methods; basis; Wednesday; provider; system; management functionality; power consumption; services.

The fuel and energy complex (FEC) is an intersectoral system that includes the extraction, processing of various types of fuel and energy production, their transportation, distribution and consumption.[1]

The fuel and energy complex include the following enterprises:

- main (fuel and energy industries);
- auxiliary (specialized engineering and transport);
- servicing (specialized construction and installation, repair and other enterprises) production, as well as the control system.

Today, there are 23 fuel energy complexes in Uzbekistan, and it is very important to determine, analyze and compare their energy efficiency with other indicators.[2]

Today, several systems determine energy efficiency and have convenient interfaces for preparing reports, but several shortcomings identified in them create the need for a new system. Taking these into account, a new approach was developed.[3] Table 1 shows the failures of the existing programs and how relevant this system is when these shortcomings are filled in the new system.

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No	Deficiencies in existing programs	Filled status in the new system
1	It is not possible to determine the energy efficiency based on the levels [4]	Enterprises belonging to fuel energy complexes are organized as low-, medium-, and high-level enterprises. In the system, all energy efficiency

		indicators can be determined simultaneously in one enterprise and in medium and high-level enterprises. can be selected at the level of existing enterprises
2	There is no functionality to compare performance between multiple enterprises	Functions have been developed based on comparing energy efficiency indicators with other enterprises of the same type and the methods of determining the most efficient enterprise.
3	There is no function of setting organizational measures or advising on possible measures.	The function of determining organizational activities aimed at increasing efficiency and advising on activities that should be organized based on the state of the enterprise was developed based on methods based on artificial intelligence.
4	The methods of determining the energy capacity in the existing systems are based on the conditions in the regions where the system is produced, and the use of these systems is somewhat inconvenient for Uzbekistan.	The preparation methods were developed based on the current working conditions of fuel energy complexes in Uzbekistan.

The determination of energy efficiency was organized based on three levels.

1. Formation of incoming data.
2. Implementation of preliminary account books
3. Primary analysis in the enterprise itself
4. Analyze

The formation of incoming data is organized based on Figure 1, and its operation is organized based on internal and external sources. Internal sources include resources provided by the enterprise itself, and external sources include information obtained from other existing systems based on integration.

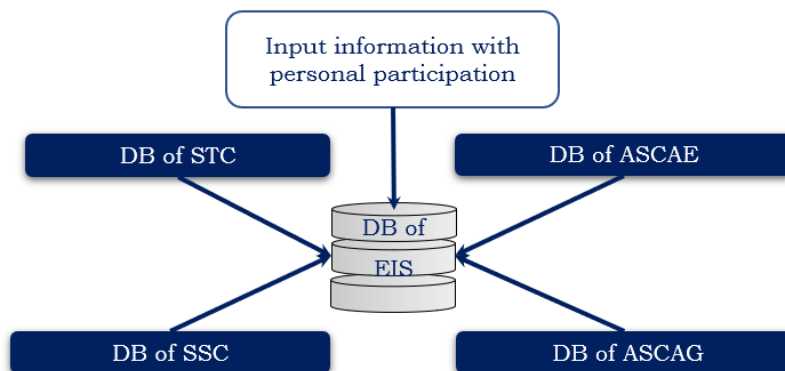


Fig.1. The structure of formation of incoming data



Entered data is used to calculate energy efficiency indicators at the stage of initial calculations. [5] The overall energy efficiency targets for enterprises are calculated as follows:

- enterprise energy efficiency (E) is determined by the formula:

$$E = \frac{TCE}{CMP} \times 100\%$$

where,

- TCE - the total cost of expenses for fuels and lubricants, heat supply, electricity consumption, gas supply, thousand UZS;

- CMP - the cost of manufactured products (works, services), thousand UZS.

• The share of the volume (cost) of the cost of electricity consumption (C), in the total volume of TCE, is determined by the formula that:

$$C = \frac{CEE}{TCE} \times 100\%$$

where,

CEE - the volume of costs for the consumption of electrical energy, thousand UZS.

• the share of the volume (cost) of the cost of fuel consumption (FC) in the total volume of TCE is determined by the formula:

$$FC = \frac{EFC}{TCE} \times 100\%$$

- EFC - the volume of expenses for fuel consumption, thousand UZS.

• the share of the volume (cost) of costs for the consumption of thermal energy (CTE), in the total volume of TCE, is determined by the formula:

$$CTE = \frac{CCTE}{TCE} \times 100\%$$

CCTE - the volume of costs for the consumption of thermal energy, thousand UZS.

Indicators are formed on the chart based on the indicators calculated in the comparison stage. Through this diagram, it is possible to see which part of the enterprise is working in what order, how far it has deviated from the established norm and the level of danger of this deviation. Figure 2 shows the state of the enterprise entered in test mode.

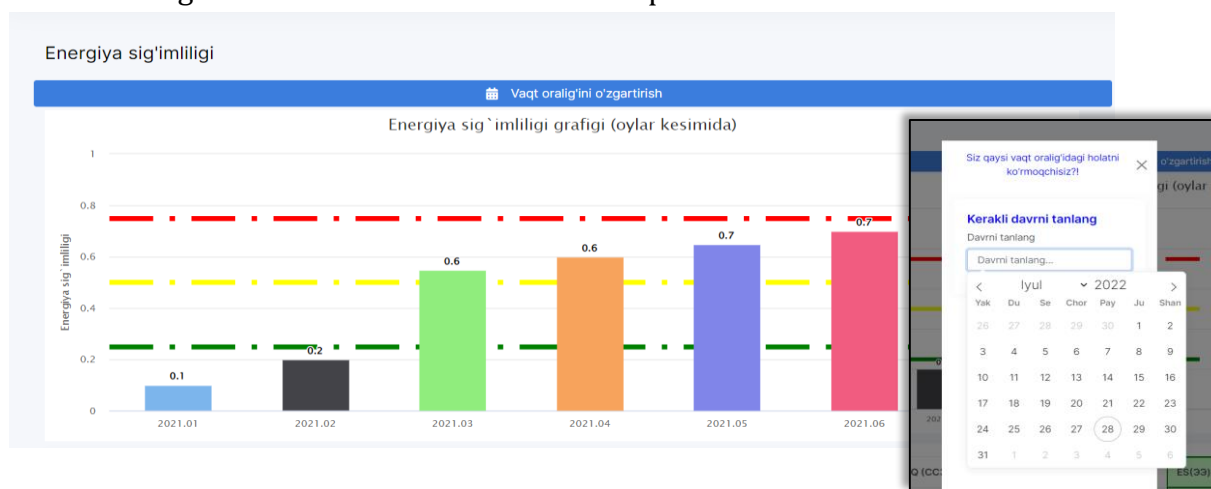


Fig.2. The interface of state of energy efficiency of enterprises in test mode.

By changing the time interval \shown in right side of Figure 2, the energy efficiency indicator can be viewed for the desired interval.

Conclusion

In conclusion, the available energy efficiency software has its drawbacks as well as its convenience. Filling these shortcomings, a new system was developed, through this system it is possible to see and analyze the state of operation of the enterprise at any interval of time. At the same time, it is possible to analyze energy efficiency indicators based on several levels in the case where enterprises make inter-level comparisons.

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. 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.
3. Abdullayevich, Q. N., & Muzaffar o'g'li, N. T. (2023). OPERATING MODES OF HYDROGENERATORS. MODELS AND METHODS FOR INCREASING THE EFFICIENCY OF INNOVATIVE RESEARCH, 2(24), 162-164.
4. Abdullayevich, Q. N., & Muzaffar o'g'li, N. T. (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.
5. 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.
6. Abdullayevich, Q. N. (2023). Ways to Reduce Losses in Power Transformers. Texas Journal of Engineering and Technology, 20, 36-37.
7. 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.
8. Abdullayevich, Q. N., & Elmurodovich, B. O. (2023). ПРОВЕДЕНИЕ ЛАБОРАТОРНЫХ ЗАНЯТИЙ ПО ЭЛЕКТРИЧЕСКИМ СХЕМАМ. Новости образования: исследование в XXI веке, 1(7), 1006-1010.
9. Abdullayevich, Q. N. (2023). CONDUCTING LABORATORY CLASSES ON ELECTRICAL CIRCUITS. Finland International Scientific Journal of Education, Social Science & Humanities, 11(1), 1095-1098.
10. Mahmutxonov, S. J., Qurbonov, N., & Babayev, O. (2022). ELEKTR TARMOQLARIDA SIFAT KO 'RSATKICHLARI VA ISROFLAR. Innovatsion texnologiyalar, 1, 14-15.
11. 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.
12. 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.

13. 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.
14. Abdullayevich, Q. N. (2023). REACTIVE POWER COMPENSATION. *IMRAS*, 6(6), 506-508.
15. 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.
16. Ixtiyorovich, D. S., & Sheramat o'g'li, M. N. (2023). ACCOUNTING FOR THE QUALITY OF ELECTRIC ENERGY WHEN SELECTING AND PLACING MEANS FOR REACTIVE POWER COMPENSATION. *INNOVATIVE DEVELOPMENTS AND RESEARCH IN EDUCATION*, 2(18), 296-299.
17. 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.
18. Ixtiyorovich, D. S., & Sheramat o'g'li, M. N. (2023). ROLLING STOCK WITH ASYNCHRONOUS TRACTION ELECTRIC MOTORS. *SCIENTIFIC APPROACH TO THE MODERN EDUCATION SYSTEM*, 2(15), 235-237.
19. Ixtiyorovich, D. S. (2023). CONDUCTING LABORATORY CLASSES ON ELECTRICAL CIRCUITS. *Научный Фокус*, 1(1), 84-88.
20. Джураев, Ш. И., & Махмудов, Н. Ш. (2023). ДОСТИЖЕНИЕ ЭНЕРГОЭФФЕКТИВНОСТИ МНОГОЭТАЖНЫХ ДОМОВ С ПОМОЩЬЮ ФОТОРЕЛЕ. *European Journal of Interdisciplinary Research and Development*, 15, 55-57.
21. Джураев, Ш. И. (2023). СМЕШАННОЕ СОЕДИНЕНИЕ РЕЗИСТОРОВ. БАЛАНСИРОВКА МОСТА. *Scientific Impulse*, 1(7), 859-861.
22. 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.
23. Ixtiyorovich, S. D., & Olimjon o'g'li, E. J. (2024). АСИНХРОННАЯ МАШИНА С ПЕРЕКЛЮЧЕНИЕМ ПОЛЮСОВ. *Новости образования: исследование в XXI веке*, 2(20), 768-772.
24. 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.
25. 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.
26. Abdullayevich, K. N., & Olimjon o'g'li, E. J. (2024). МАТЕМАТИЧЕСКАЯ МОДЕЛЬ АВТОМАТИЧЕСКОГО РЕГУЛЯТОРА ВОЗБУЖДЕНИЯ АРВ. *THE THEORY OF RECENT SCIENTIFIC RESEARCH IN THE FIELD OF PEDAGOGY*, 2(21), 49-54.
27. Курбонов, Н., Халикова, Х., & Неъматов, Б. (2024). ВОПРОСЫ ПАРАЛЛЕЛЬНЫЕ РАБОТЫ ЭНЕРГОСИСТЕМЫ АФГАНИСТАНА, УЗБЕКИСТАНА И ТАДЖИКИСТАНА С УЧЕТОМ НОВОГО СТРОИТЕЛЬСТВА. *Евразийский журнал академических исследований*, 4(6), 37-41.