

Research on the Use of Renewable Energy in the Automation of Electric Generators

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Abstract: Currently, in order to meet the rapidly growing energy needs in the Republic of Uzbekistan, it is necessary to use all energy sources. Renewable energy is unlimited and efficient, and it gives us the results we expect. However, its main disadvantage is in renewable energy sources. To solve this problem of control and management of a hybrid renewable energy system, it will consist of multiplying renewable electricity sources built by combining several separate energy sources. Energy economy, reliability and due to their flexibility, these hybrid systems will be able to exceed the limits of individual energy production technologies. Republic of Uzbekistan In 2021-2023, it created several incentives for the use of renewable electricity. This means the use of solar energy, that is, the program of obtaining energy with the help of solar panels and self-sufficiency in electricity. Optimal solar panel sizing, control, and power management strategies are discussed in detail to exploit its potential. Electricity Several research studies have been conducted on the implementation of measurement, control, power management and optimization processes. The article presents a critical analysis and shortcomings and control of existing electricity systems in the selection of optimization parameters and several processes for designing power control schemes are reviewed. Furthermore, the study was able to highlight various challenges/barriers. Wind and Solar energy highlight the possible future possibilities and the results of studies on increasing the power of the electrical system in the field of control, power management, optimization and optimal measurements were studied.

Keywords: Electric energy control, energy management system, hybrid energy system, determination of optimal dimensions of energy, energy optimization methods, renewable energy.

Introduction

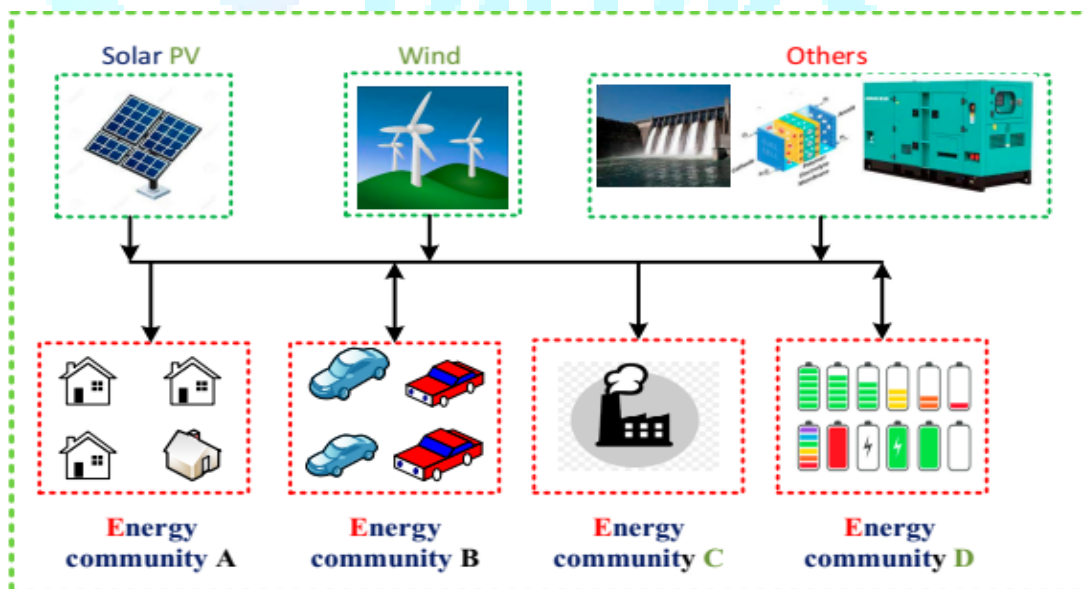
The main reason for the development of alternative energy based on renewable energy sources in the Republic of Uzbekistan its large size and the fact that many regions of the country are not available for centralized power supply are recognized as the main reasons. In the Republic of Uzbekistan, the area of districts not covered by centralized electricity supply is more than 85% of it. In such areas, in most cases, it is necessary to attract renewable energy sources for them. Power optimization methods are distinguished by their high productivity and efficiency, ability to solve complex problems, and the ability and possibilities to apply many objective functions. However, the most common drawback of all power system optimization methods is that they take too long and covers complex technological processes. Conventional approaches to the improvement of renewable electricity are the most effective methods for economic optimization. But the optimization parameters will have a limited value. Due to the complex procedure and applied codes, artificial techniques require high hardware performance and functions. The advantages of this method are its excellent efficiency, speed and accuracy. This is a technological system the combination of classical and artificial methods shows a strategy that is characterized by great speed and durability, but requires complex design and complex code. This technological system is the most convenient option for the future generation. Electricity in technological

processes three main types of optimization techniques should be considered. Classic techniques characterized by speed and efficiency in techno-economic evaluation, with a downside the limited optimization space is very important. Artificial methods are the most commonly used method, is the most convenient method of optimization methods due to its efficiency, high accuracy and durability. However, the disadvantage of this approach is that it requires complexity will consist of improving the renewable energy program. That is, renewable energy sources should be considered as autonomous energy sources, is the basis of a new, rapidly developing trend - distributed generation. At the same time time, it should be noted that there are no fundamental obstacles to the operation of renewable energy and sources are recognized as part of centralized energy systems. Currently, it is also possible to sell renewable energy to the state in excess of its own needs. We can say that this is one of the benefits created to increase people's interest in renewable energy. Methods of electrification of the territories of the Republic of Uzbekistan, they are not covered a centralized power supply network can be:

Construction of power transmission lines from a centralized power supply network characterized by electricity and with negative features such as high maintenance costs related equipment, as well as the risk of failure of power lines and their dependence on length lack of transmitted power is causing major problems in power lines reaching long distances

Establishment of local autonomous energy production centers using electricity and heat generators that use energy classic fuels (thermal power plants, diesel and gas generators), which we describe as follows: Energy is compared differently to imported fuel, which often significantly increases the cost of heat and electricity.

It will be possible to manage the electricity supply system using renewable energy sources. It has such positive features as universality in energy development application (based on a system where any energy carrier is always available), no need for long construction power transmission lines, ecological cleanliness and technical, high perspectives of electricity supply we will be able to follow the economic improvements and achieve effective results.



Picture 1. Use of alternative electricity from different sources as renewable energy

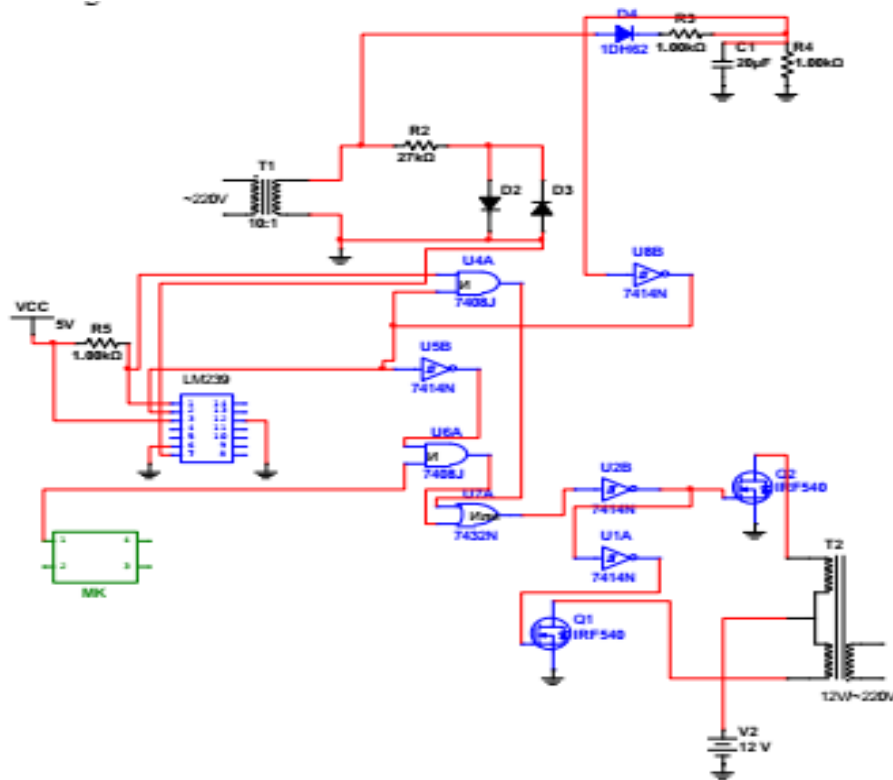
An increase in the number of energy-generating equipment based on renewable energy sources and reduce the requirements of the accepted electricity consumers, which led to the need to combine generating sources,

consumers and control units are being researched as processes of connection to electric power systems. The main obstacles in the development of such systems First, the power plants with renewable energy sources are underdeveloped and the electricity generator lack of resources is one of the main reasons for the lack of electricity, as well as uneven external factors and conditions for obtaining energy (wind, sunlight, heat radiation, etc.). In this regard, one of the main priorities of providing renewable energy sources with traditional energy resources is the saving of electricity. Creation of autonomous electric power systems in a technological system based on renewable energy sources It is necessary to reduce the number of problems according to the characteristics.

- We need to create a large number of independent energy generating units in the supply of renewable electricity.
- Based on different principles of renewable electricity production and different parameters of the received flow, it is necessary to increase the energy efficiency index when increasing the electric power.
- Remoteness of renewable energy production facilities from consumers and large areas will occupy the area of production facilities or the upper part of the building.
- The need to ensure stable energy production capacity of generated and transmitted power based on renewable energy sources.
- Storage and saving of generated energy will help us to extend power lines to longer distances.

The main technological process of organizing energy consumption reduction in autonomous systems renewable energy sources need to be flexible by switching on and off in different ways of powering developing a system of creation or connecting them in a hybrid mode, that is, in the mode of sharing traditional resources and methods based on long-distance transmission of energy from renewable energy sources will have to be used. From the point of view of the organization of electricity supply, the hybrid mode of operation is the most common in the management of technological processes creates challenges and problems for the electricity system: renewable energy is used when energy production is insufficient and energy sources can also be used during peak load situations in the power supply system. Short-term growth consumption occurs, for example, during the start-up of powerful electric motors or may be the cause it was also observed that a certain technological process does not produce effective results in short periods of time. The process of generating electricity from renewable energy sources has long been considered the first step and studies have been conducted to increase electricity capacity by eliminating the link between the end-user energy supply chain. After receiving electricity from renewable energy sources, it will need to be converted for further storage and storage. Creating an autonomous hybrid power supply system includes the technological processes of working together with alternators, (e.g. diesel generators) and AC renewable energy sources (e.g. wind turbines) and direct current (eg energy generated from solar panels). To solve this problem, a microcontroller is installed in the device, which sends the control and if there is no voltage in the reference network, it is transferred to the program for receiving signals for inverting. In this case, the frequency and the phase shift angle is generated by the signals generated by the microcontroller. In the practical organization of electricity supply from several sources of electricity production it will be possible not only to work in parallel at load, but also to work separately through low load and in technological situations, and it will be possible to connect to the lecture line of the control of the technological process at sufficient power of one of the sources. In this case, it will need to be replaced automatically and we need to use an inverter mode of operation. When operating the inverter, the signal from the reference network takes priority, because in this case it will be necessary to ensure the coordination and operation of parallel generators considered as a common network for common load. A signal from the microcontroller is a system signal to

the network that should operate if the signal is received the reference network disappears, in this case, the phase shift angle does not play a role, because the generator is the only source connected to the power supply. Switching between signals must be provided by the device's own logic, must be obtained from the microcontroller to increase the reliability of the device. In this regard, an automated inverter scheme at the Nukus Mining Institute under the Navoi State University of Mining and Technology mode switching between inverse control signals has been developed and is planned to be tested. A solar panel is currently being installed on top of the Nukus Mining Institute building. A diagram of such technological management control processes inverter is shown in Picture 2.



Picture 2. Processes of automatic switching between the communication of inverting control signals in an electric circuit.

Conclusions

O'telbayev Azizbek, a student of the Nukus Mining Institute under the Navoi State University of Mining and Technology, is currently conducting research on the construction of a power transmission scheme in mining enterprises. Another meaning of these studies is that the equipment in mining enterprises, mining machines are driven by electricity supply, we need to distribute the power grid in the border area of the mine with equal power, only then we will be able to achieve the desired effective results. Azizbek's interest in mining enterprises is very high. Azizbek has many articles about his activities in mining enterprises. Most of them are based on mining technologies. Mining enterprises require a lot of electricity. for example, in providing light, working on a computer, most of the technologies are adapted to electricity. That's why I think we need to increase renewable energy supply sources.

References

1. Kulmuratova Aliya Janabay qizi. (2023). IN THE MANAGEMENT OF TECHNOLOGICAL PROCESSES A PROCESS MODEL THAT SUPPORTS DESIGN AUTOMATION. INTERNATIONAL BULLETIN OF ENGINEERING AND TECHNOLOGY, 3(3), 213–223. <https://doi.org/10.5281/zenodo.7794553>
2. Janabay qizi, K. A., Jumabay o'g'li, U. A., & Nuratdinovna, E. A. (2023). Application and Technological Description of Microprocessors in Technological Measuring Devices. *Miasto Przyszłości*, 33, 89–96. Retrieved from <https://miastoprzyszlosci.com.pl/index.php/mp/article/view/1192>
3. qizi, Y. H. B. . (2023). Stages of Modern Technological Development of Automation of Robotization Processes. *Miasto Przyszłości*, 33, 284–293. Retrieved from <https://miastoprzyszlosci.com.pl/index.php/mp/article/view/1233>
4. Yo'ldoshova Hilola Baxtiyor qizi. (2023). PRODUCTION PLANNING IN TECHNOLOGICAL PROCESSES AND ROBOTIC PROCESS AUTOMATION PROGRAMS. *European Scholar Journal*, 4(3), 137-143. Retrieved from <https://www.scholarzest.com/index.php/esj/article/view/3332>
5. Yo'ldoshova Hilola Baxtiyor qizi. (2023). MANAGEMENT OF THE SYSTEM SCHEME OF AUTOMATION OF ROBOTIZATION PROCESSES. INTERNATIONAL BULLETIN OF ENGINEERING AND TECHNOLOGY, 3(3), 183–193. <https://doi.org/10.5281/zenodo.7776593>
6. Kulmuratova Aliya Janabay qizi. (2023). ARTIFICIAL INTELLIGENCE AUTOMATION WELDING PROCESS SYSTEM TECHNOLOGY RESEARCH. INTERNATIONAL BULLETIN OF APPLIED SCIENCE AND TECHNOLOGY, 3(3), 611–621. <https://doi.org/10.5281/zenodo.7794534>
7. Yo'ldoshova Hilola Baxtiyor qizi. (2023). AUTOMATION OF WORK WITH E-MAIL AND ROBOTICS SYSTEM CONTROL SYSTEM. INTERNATIONAL BULLETIN OF APPLIED SCIENCE AND TECHNOLOGY, 3(3), 394–404. <https://doi.org/10.5281/zenodo.7776607>
8. Janabay Qizi, K. A. . (2023). Application of Automation Tasks and Management of Technological Processes. *Pioneer : Journal of Advanced Research and Scientific Progress*, 2(3), 13–19. Retrieved from <https://innosci.org/jarsp/article/view/940>
9. Yo'ldoshova Hilola Baxtiyor qizi. (2023). Use of energy-saving operational technological systems in automation processes. *The Peerian Journal*, 16, 60–70. Retrieved from <https://www.peerianjournal.com/index.php/tpj/article/view/515>
10. Kulmuratova Aliya Janabay qizi. (2023). Automation Technique Design Classification of Technological Objects. *International Journal of Scientific Trends*, 2(2), 128–136. Retrieved from <https://scientifictrends.org/index.php/ijst/article/view/66>
11. Mirzabek qizi, A. M., & Orinbay qizi, K. S. (2023). Application of Modern Microprocessors in Technological Measuring Devices and Principles of their Use. *Miasto Przyszłości*, 32, 320–326. Retrieved from <https://miastoprzyszlosci.com.pl/index.php/mp/article/view/1158>
12. Kulmuratova Aliya Janabay qizi. (2023). AUTOMATION AND MONITORING OF PRODUCTION TECHNOLOGICAL PROCESSES USING IOT. <https://doi.org/10.5281/zenodo.7693583>
13. Kulmuratova Aliya Janabay qizi, Uzaqbergenov Aytbay Jumabay o'g'li, & Erejepova Altingul Nuratdinovna. (2023). ABOUT THE AUTOMATION AND ROBOTIZATION OF THE

- TECHNOLOGICAL PROCESS OF SOFTWARE. *European Scholar Journal*, 4(2), 106-110. Retrieved from <https://scholarzest.com/index.php/esj/article/view/3252>
14. Kulmuratova Aliya Janabay qizi. (2023). RESEARCH ON CREATING A WIRELESS MACHINE CONTROL SYSTEM THROUGH ROBOTIZATION AND AUTOMATION OF TECHNOLOGICAL PROCESSES. *Neo Scientific Peer Reviewed Journal*, 9, 52–63. Retrieved from <https://neojournals.com/index.php/nspj/article/view/168>
 15. Qizi, Y. H. B. . (2023). Setting the Time Mode in the Process of Automating Robots. *Pioneer : Journal of Advanced Research and Scientific Progress*, 2(4), 37–46. Retrieved from <https://innosci.org/jarsp/article/view/1133>
 16. Qizi, Y. H. B. (2023). Use of Wireless Technologies in the Automation of Technological Processes. *International Journal on Orange Technologies*, 5(4), 7-16. Retrieved from <https://journals.researchparks.org/index.php/IJOT/article/view/4256>
 17. Kulmuratova Aliya Janabay qizi. (2023). Development of automated power supply management system software. *Eurasian Journal of Engineering and Technology*, 17, 114–120. Retrieved from <https://geniusjournals.org/index.php/ejet/article/view/4061>
 18. Yeshmuratova A. TECHNOLOGICAL METHODS OF ENSURING INFORMATION SECURITY IN TECHNICAL SYSTEMS //Евразийский журнал академических исследований. – 2023. – Т. 2. – №. 4. – С. 188-192.
 19. Yeshmuratova A. et al. ENSURING COMPUTER DATA AND MANAGEMENT SYSTEM SECURITY //International Bulletin of Applied Science and Technology. – 2023. – Т. 3. – №. 4. – С. 282-287.
 20. Eshmuratova A. A. MATCAD DASTURIDAN FOYDALANIB IKKI VA UCH OLCHOVLI GRAFIKLARNI QURISH //Journal of Integrated Education and Research. – 2022. – Т. 1. – №. 5. – С. 534-539.
 21. Утемисов А. О., Юлдашова Х. Б. К. СИСТЕМЫ АВТОМАТИЧЕСКОГО УПРАВЛЕНИЯ //Universum: технические науки. – 2022. – №. 5-2 (98). – С. 45-47.
 22. Kaipbergenov A. T., Utemisov A. O., Yuldashova H. B. K. STEADY OF AUTOMATIC CONTROL SYSTEMS //Academic research in educational sciences. – 2022. – Т. 3. – №. 6. – С. 918-921.
 23. O'telbayeva Muhayyo Alisherovna. (2023). CHEMICAL ENGINEERING, CHEMICAL PROCESSES FOR PRODUCTION. *EURASIAN JOURNAL OF ACADEMIC RESEARCH*, 3(5), 138–142. <https://doi.org/10.5281/zenodo.7902045>
 24. Najimova N., Utepbaeva G., Urazbayeva A. WATER ELECTROLYSIS STUDIES AND CHEMICAL TECHNOLOGICAL DESCRIPTION //International Bulletin of Applied Science and Technology. – 2023. – Т. 3. – №. 4. – С. 509-513.
 25. Najimova N. GENERAL INFORMATION ABOUT CHEMICAL PROCESSES AND REACTORS //Евразийский журнал академических исследований. – 2023. – Т. 3. – №. 3 Part 3. – С. 28-37.
 26. Saparov A. B. et al. Analysis Of the Effect of The Physical Properties of Liquids on External Forces (Factors) //Texas Journal of Multidisciplinary Studies. – 2022. – Т. 5. – С. 111-114.
 27. Xolmatov O. M. et al. MURUNTAU KONI OLTINLI RUDALARINI UYUMDA TANLAB ERITISH USULIDA O'ZLASHTIRISHNING GEOTEXNOLOGIK SHAROITLARINI O'RGANISH //Eurasian Journal of Academic Research. – 2022. – Т. 2. – №. 11. – С. 790-797.

28. Саидова Л. Ш. и др. АНАЛИЗ ИССЛЕДОВАНИЙ ПО ПОДЪЕМУ ГОРНОЙ МАССЫ ИЗ ГЛУБОКИХ КАРЬЕРОВ И ВЫБОР ГОРНОТРАНСПОРТНОГО ОБОРУДОВАНИЯ ДЛЯ ОТКРЫТЫХ ГОРНЫХ РАБОТ //Eurasian Journal of Academic Research. – 2022. – Т. 2. – №. 11. – С. 811-816.
29. Kaipbergenov, A., & Jumamuratov, R. (2019). The methodology of teaching chemistry based on the use of computer programs.
30. Bekturganova, Z., & Jumamuratov, R. (2017). МЕТОДЫ ОБУЧЕНИЯ САМОСТОЯТЕЛЬНОЙ РАБОТЕ УЧАЩИХСЯ НА УРОКЕ ХИМИИ.
31. Aynazarova S. KIMYONI O'QITISH VOSITALARI TIZIMI VA UNING DIDAKTIK IMKONIYATLARINI O'RGANISH //Scienceweb academic papers collection. – 2021.
32. Ravshanov Z. et al. EVALUATION OF THE STRENGTH OF ROCKS IN OPEN MINING PROCESSES IN MINING ENTERPRISES //Science and innovation. – 2023. – Т. 2. – №. A4. – С. 96-100.
33. Ravshanov Z. et al. METHODS OF DETERMINING THE SAFETY AND ENVIRONMENTAL IMPACT OF DUST AND EXPLOSION PROCESSES IN MINING ENTERPRISES //International Bulletin of Applied Science and Technology. – 2023. – Т. 3. – №. 4. – С. 415-423.
34. Jumabayeva G., Allanazarov B., Joldasbayeva A. STAGES OF OPEN PIT MINING. MINING METHODS AND THEIR PROCESSES //Science and innovation. – 2023. – Т. 2. – №. A1. – С. 236-240.
35. Allanazarov B. GEODETIC DIMENSIONING STUDIES AND POINT-DIMENSION LOCATION COORDINATE SCHEME CREATION PROCESSES //Евразийский журнал академических исследований. – 2023. – Т. 2. – №. 4 Part 2. – С. 21-25.
36. Artikbayevna, Yeshmuratova Amangul, and Amanbaev Nursultan Salamat o'g'li. "O'telbayev Azizbek Alisher o'g'li.(2023). ENSURING COMPUTER DATA AND MANAGEMENT SYSTEM SECURITY. INTERNATIONAL BULLETIN OF APPLIED SCIENCE AND TECHNOLOGY, 3 (4), 282–287."
37. Paxratdinov , A. D., & Abdiramanova , Z. U. (2023). ELEKTR ENERGIYA SAPASIN ELEKTR ENERGIYA ISIRAPINA TÁSIRIN ÚYRENIW HÁM HARAКTERISTIKALAW. Educational Research in Universal Sciences, 2(1 SPECIAL), 233–236. Retrieved from <http://erus.uz/index.php/er/article/view/1793>
38. Yo'ldoshova Hilola Baxtiyor qizi. (2023). AUTOMATION OF TECHNOLOGICAL PROCESSES AND THE IMPORTANCE OF THE TECHNOLOGICAL SYSTEM IN THE FUTURE OF INDUSTRIAL ENTERPRISES. Innovative Technologica: Methodical Research Journal, 4(05), 16–23. <https://doi.org/10.17605/OSF.IO/4BHNU>