GALAXY INTERNATIONAL INTERDISCIPLINARY RESEARCH JOURNAL (GIIRJ)
ISSN (E): 2347-6915
Vol. 9, Issue 12, Dec. (2021)

APPLICATION OF RENEWABLE ENERGY SOURCES IN BUILDINGS

Sh. P. Mansurova

ANNOTATION

The article discusses the use of alternative energy source in order to reduce energy consumption and save resources in buildings under construction and reconstruction. In particular, examples of the application of technologies using solar collectors and heat pumps are given.

Keywords: energy efficiency, energy resources, alternative sources, solar collectors, heat pumps, heat exchanger, photovoltaic batteries, air heating, heat supply, heat source, traditional energy resources.

INTRODUCTION

In the context of the predicted natural reduction in the reserves of traditional hydrocarbon raw materials and the corresponding increase in prices for traditional energy resources, ensuring efficient energy consumption is an important task of increasing the competitiveness of the economy for all countries. Given that the amount of energy consumed may increase, comprehensive measures to improve energy efficiency are required. Having a relatively high level of energy intensity of the economy in comparison with other countries, Uzbekistan also has large reserves for a radical reduction in energy consumption and energy savings, primarily in the housing sector and in the operation of buildings.

In the context of a stable rise in prices for traditional energy resources and a threatening scale of environmental pollution, the most promising areas for the development of the energy industry in terms of energy conservation and environmental protection are solar energy, wind energy and geothermal energy.

Alternative or renewable energy sources show significant promise in reducing the amount of toxins that are by-products of energy use. Not only do they protect against harmful by-products, but many of the natural resources that we currently use as energy sources are conserved by using alternative energy sources.

The use of renewable energy sources in low-rise residential buildings is directly related to the problem of energy conservation in housing construction.

High technical and economic indicators of the use of renewable energy sources, stable operating parameters of power equipment and stable energy supply to consumers are achieved with the combined generation of heat and electricity, its complex accumulation, and with a combination of various types of renewable energy sources, both among themselves and with traditional technologies. energy.

World practice shows that the introduction of mandatory requirements for energy conservation in buildings under construction and renovation is one of the most cost-effective ways to increase the energy efficiency of buildings.

To date, the potential of renewable energy sources is used in modest amounts, including in the construction industry, both in our country and around the world. This topic becomes even more urgent in connection with the outbreak of the global financial crisis, which forced many to reconsider their views and plans on energy supply issues.

The widespread use of renewable energy sources in buildings seems reasonable: solar collectors and heat pumps.

According to long-term observations at the network of actinometric stations in Uzbekistan, the duration of sunshine for various regions of the Republic varies from 2410 to 3090 hours a year, with a duration of 11 hours in summer and 4 hours in winter, the difference in the amount of solar radiation received is 27 MJ/m^2 per day in summer and about 7 MJ/m^2 in winter.

Solar collectors use energy from the sun for heating and hot water supply. The basic principle of operation of solar collectors is that the collector absorbs solar radiation and converts it into heat, which, with the help of a heat-transfer fluid, is transferred through a heat exchanger to water, which is already used for household needs. This direction provides for the modernization of existing heat supply systems by integrating solar installations for preheating water into existing centralized heat sources.

The use of this technology will make it possible to reduce emissions of harmful substances from thermal power plants and local boilers and will save significant volumes of natural gas. In particular, a solar heat source makes it possible to save up to 200 m^3 of natural gas with specific indicators of 0.12-0.15 tons of standard fuel per 1 m^2 of solar collector. At the same time, the required volume of capital investments, taking into account the necessary equipment and the cost of construction and installation work, will be from \$ 450 per m^2 of the area of solar collectors. The payback period for installing solar collectors will be about 10 years. This indicator will provide a return on investment for the allotted service life of energy-saving equipment.

For effective work, it is necessary to provide a number of factors during installation and operation. Solar collectors are installed on the roof of buildings at an angle to the horizon equal to the geographical latitude of the area. The optimum tilt angle is 60° in winter and 30° in summer. Second the parameter is the azimuth, which must not deviate from 0° (south direction). Since there are architectural and planning restrictions, a deviation from the south direction up to 45° is allowed.

Despite the significant payback period, the introduction of installations using solar energy has its positive aspects. This type of installation allows you to reduce the environmental burden on the environment. The use of solar energy in individual residential buildings can also be justified, as it reduces dependence on centralized energy systems.

Of interest is the implementation of power supply to buildings based on the use of heat pumps, as well as photovoltaic batteries. The installation of heat pumps implies a transition from a radiator heating system to a more efficient and economical ring heating system. The heat is supplied to the pumping unit, which transports the heat energy to the end consumer with the help of an annular circuit. When the required heating level is reached, the heat supply automatically stops and resumes again when the heat indicators in the network decrease.

Modern equipment and technologies make it possible to heat private houses located in any region (not necessarily in areas with hot seismic springs) using this method. A small temperature difference (only a few degrees between the temperature on the surface of the earth and at a shallow depth) allows you to get thermal energy, which is quite enough for heating a house.

The heat pump is designed based on the conditions for its effective operation. It practically does not affect the architectural and volumetric solution of the house and the development of the site. When designing the layout of the house, it will be necessary to take into account the fact that the house must have equipment for a heat pump, take into account its dimensions, additional electrical power (and what is the source of this additional power), the presence of a storage tank.

The main advantage of a heat pump is its high efficiency compared to all types of boiler houses. Taking into account the efficiency of electricity generation at a combined heat and power plant, it is obvious that the use of a heat pump is 1.2-2.5 times more profitable than the most efficient (gas) boiler houses. Based on the prevailing prices for electricity and heat, the cost of heat generated by a heat pump will be lower than the cost of heat from district heating. In addition, the cost of heat generated by a heat pump is 2-3 times lower than the cost of heat generated in coal and fuel oil boilers of average power. A heat station with a capacity of 1 Gcal/h (1.16 MWt) saves 2,100 tons of coal per year.

Heat pumping units, using renewable low-potential energy of the environment and increasing its potential to the level required for heat supply, consume 3–7 times less primary energy than when burning fuel. As world experience shows, in general, due to savings on utilities, the cost per square meter in a building equipped with renewable energy systems is about 30–40% lower than in an ordinary house.

The average roof area of a typical apartment building is 1200m^2. If half of this area is covered with solar panels, then you can get 60 thousand kWh of energy per year in each house, even if they have an efficiency of only 10%. Excess energy can be accumulated over the summer in a special battery located under the house and used in winter. In this case, the payback period, taking into account the cost of saving electricity and heat, will be 6.5 years.

In an optimal heating system, you can simply combine the heating pump with solar collectors and thus benefit from both systems. The heat pump, partly using electricity, will provide heating, air conditioning, and also provide a discharge excess heat energy from solar collectors in summer, storing heat in the ground to restore balance and then use heat in winter for heating. Solar collectors will give free hot water and help heating, through the buffer tank increasing the efficiency of the heat pump.

Given the climatic features of Uzbekistan, it should be noted that it is advisable to organize the production of solar hot water supply systems and related equipment (solar collectors, pumps, water heaters, automation elements), also using advanced European technologies. The use of these systems will significantly reduce energy consumption for the needs of hot water supply. The introduction of the production of solar installations with low efficiency (often hidden by a foreign manufacturer) leads to the use of low-efficiency technologies, and practically discredits the idea of using renewable energy sources.

LIST OF USED LITERATURE

1. Vilkova A.S., Petulko K.A. Energy efficient technologies in construction. Young scientist. - 2016. - No. 8. - S. 1268-1271.
2. Алибекова Н.Н. (2020). Сувдан фойдаланиш жараёнларида ахборот тизимларини қўллаш. Scien ceand Education, 1(3).
3. Султанов, А.О. (2019). Информационная система водных ресурсов сельского хозяйства. проблемы научно-практической деятельности. перспективы внедрения, 197.
4. Такабоев, К.У., Мусаев, Ш.М., &Хожиматова, М.М. (2019). Загрязнение атмосферы вредными веществами и мероприятие их сокращение. Экология: вчера, сегодня, завтра, 450-455.
5. Тошматов Н.У., Мансурова Ш.П. Возможности использование сточных вод заводов по переработки плодоовощных продуктов для орошения сельскохозяйственных полей //Me′ morchilikvaqurilishmuammolari. – 2019. – С. 44.
6. Alibekova, N.N. (2020). Useofin formation systemsin water use processes. Scienceand Education, 1 (3).
7. Арипов, Н.Ю. (2020). Транспортировка бытовых отходов с применением гидравлических систем. Science and Education, 1(6).
8. Арипов, Н.Ю. (2020). Совершенствование технологии обслуживания низконапрежённых трансформаторов и дорожных знаков путем установки гидросистем на минитрактор. In Теория и практика современной науки (pp. 27-29).
9. Арипов, Н.Ю. (2021). Важнейшие задачи улучшения экологический среды. Science and Education, 2(4), 70-76.
10. Арипов, Н. Ю. (2021). Хизмат кўрсатишни такомиллаштириш орқали иқтисодий самарадорликка эришиш. Science and Education, 2(10), 707-713.
11. Арипов, Н., & Пирназаров, И. (2020). Условия приема производственных сточных вод в коммунальную канализационную сеть городов и других населенных пунктов. Электронный сетевой политематический журнал" Научные труды КубГТУ", (8), 438-443.
12. Арипов, Н. Ю. (2020). Транспортировка бытовых отходов. In Арктика: современные подходы к производственной и экологической безопасности в нефтегазовом секторе (pp. 29-32).
13. Yusupovich, A.N. (2021). Environmental Sustainability is a Time Requirement. International Journal of Innovative Analyses and Emerging Technology, 1(5), 142-144.
14. Тошматов Н.У., Мансурова Ш.П. Возможности использование сточных вод заводов по переработки плодоовощных продуктов для орошения сельскохозяйственных полей //Me′ morchilik va qurilish muammolari. – 2019. – С. 44.
15. Усмонкулов А., Ташматов Н.У., Мансурова М.Ш. Некоторые аспекты автоматического регулирования теплового режима многоэтажных зданий, оборудованных системой вытяжной вентиляции помещения //Scienceand Education. – 2020. – Т. 1. – №. 8.

16. Obidovich S.A. The use of Modern Automated Information Systems as the Most Important Mechanism for the use of Water Resources in the Region //Test Engineering and Management. – 2020. – Т. 83. – С. 1897-1901.
17. Султонов А.О. Методы рационального использования воды в орошении сельскохозяйственных культур //Современная экономика: актуальные вопросы, достижения и инновации. – 2019. – С. 207-209.
18. Султонов А.О. Применения информационных систем по использования водных ресурсов в Узбекистане //Научные исследования-основа современной инновационной системы. Международной научно-практической конференции Стерлитамак. – 2019. – С. 141-144.
19. Султанов А.О. Информационная система водных ресурсов сельского хозяйства //Проблемы научно-практической деятельности. Перспективы внедрения. – 2019. – С. 197.
20. Sultonov A.O. Problems of optimal use of water resources for crop irrigation //Journal of Central Asian Social Studies. – 2020. – Т. 1. – №. 01. – С. 26-33.
21. Sultonov A. Water use planning: a functional diagram of a decision-making system and its mathematical model //International Finance and Accounting. – 2019. – Т. 2019. – №. 5. – С. 19.
22. Karimovich T.M., Obidovich S.A. To increase the effectiveness of the use of Information Systems in the use of water //Development issues of innovative economy in the agricultural sector. – 2021. – С. 222-225.
23. Турдубеков У.Б., Жолболдуева Д.Ш., Султонов А.О. Синергетическая интерпретация эффективности управления государственными финансами
24. Такабоев К.У., Мусаев Ш.М., Хожиматова М.М. Загрязнение атмосферы вредными веществами и мероприятие их сокращение //Экология: вчера, сегодня, завтра. – 2019. – С. 450-455.
25. Мансурова Ш.П. Особенности влажного воздуха при обработке сорбентами //Высокие технологии, наука и образование: актуальные вопросы, достижения и инновации. – 2020. – С. 82-84.
26. Saydullaev, S.R. (2020). Decision-making system for the rational use of water resources. Journal of Central Asian Social Studies, 1(01), 56-65.
27. Каримович М.Т., Рахматуллаевич С.С. Некоторые вопросы состава и оценки состояний промышленных газовых выбросов и их компонентов //ScienceandEducation. – 2020. – Т. 1. – №. 8.
28. Устемиров Ш.Р.У. Анализ систем оборотного водоснабжения и проблем качества воды промышленных предприятий //Europeanscience. – 2020. – №. 2-2 (51).
29. Турсунов М.К. и др. Новые инновационные методы повышения экономической эффективности при дефиците воды в регионе //Science and Education. – 2020. – Т. 1. – №. 4. – С. 78-83.
30. Ташматов Н. У., Мансурова Ш. П. Изучение характеристики шумозащиты ограждающих конструкций в зданиях повышенной этажности //Проблемы научно-

практической деятельности. Поиск и выбор инновационных решений. – 2021. – С. 51-54.

31. Мансурова Ш.П. Децентрализация-один из способов энергоэффективности теплоснабжения //Академическая публицистика. – С. 30.
32. Такабоев К.У. Оценка и прогнозирование фоновых загрязнений города джизака //Экология: вчера, сегодня, завтра. – 2019. – С. 443-445.
33. Такабоев Қ.Ў. Сув тақчиллиги муаммолари ва уларни бартараф этиш чора-тадбирлари тўғрисида //Science and Education. – 2021. – Т. 2. – №. 4. – С. 89-99.
34. Kenjabayev A., Sultonov A. The issues of using information systems for evaluating the efficiency of using water //International Finance and Accounting. – 2018. – Т. 2018. – №. 3. – С. 2.
35. Sultonov A.O. Metodi ratsionalnogo ispolzovaniya void v oroshenii selskoxozyastvennix kultur //sovremennaya ekonomika: Aktualniye voprosi, dostijeniya i.–2019.–S. – 2019. – С. 207-209.
36. Sultonov A. et al. Pollutant Standards for Mining Enterprises. – EasyChair, 2021. – №. 5134.
37. Хажиматова М.М., Саттаров А. Экологик таълимни ривожлантиришда инновация жараёнлари //Me' morchilik va qurilish muammolari. – 2019. – С. 48.
38. Xajimatova M.M., Sattarov A. Innovation processes in the development of environmental education //Problems of architecture and construction. – 2019. – С. 48.
39. Хажиматова М. М. Сооружение для забора подземных вод //Символ науки: международный научный журнал. – 2021. – №. 4. – С. 21-24.
40. Хажиматова М.М. Некоторые гидродинамические эффекты, проявляемые при пузырьковом и снарядном режимах течения газожидкостной смеси //Science and Education. – 2021. – Т. 2. – №. 4. – С. 257-264.
41. Такабоев Қ.Ў., Хажиматова М. М. Хўжалик чиқинди сувлари, улардан фойдаланиш самарадорлигини ошириш чора-тадбирлари тўғрисида //Science and Education. – 2021. – Т. 2. – №. 6. – С. 325-336.
42. Ugli U.S.R. Reagent Water Softening in Illuminators //International Journal of Innovative Analyses and Emerging Technology. – 2021. – Т. 1. – №. 5. – С. 18-23.
43. Мусаев Ш. М., Саттаров А. Умягчение состав воды с помощью реагентов //Me' morchilik va qurilish muammolari. – 2019. – Т. 23.
44. Мусаев Ш. М. Мероприятие сокращение загрязнение атмосферы вредными веществами //Me' morchilik va qurilish muammolari. – 2020. – С. 45.
45. Мусаев Ш. М. и др. Насос агрегатларини ҳосил бўладиган гидравлик зарблардан ҳимоялаш усуллари тадкиқ этиш //Science and Education. – 2021. – Т. 2. – №. 3. – С. 211-220.
46. Алибекова Н. Н. Сувдан фойдаланиш жараёнларида ахборот тизимларини қўллаш //Science and Education. – 2020. – Т. 1. – №. 3.
47. Nazarovna A. N. Reliability and cost-effectiveness of polymer pipes //Euro-Asia Conferences. – 2021. – Т. 4. – №. 1. – С. 7-11.

48. Алибекова Н. Н. и др. Зонирование водопроводных сетей //Science and Education. – 2020. – Т. 1. – №. 9. – С. 228-233.
49. Устемиров Ш. Р. У. Анализ систем оборотного водоснабжения и проблем качества воды промышленных предприятий //European science. – 2020. – №. 2-2 (51). – С. 39-41.
50. Ustemirov S.R.U. Solar hot water supply equipment with the help of solar energy //Science and Education. – 2021. – Т. 2. – №. 4. – С. 245-249.