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Research Article

THE IMPORTANCE OF WIND ENERGY AND ITS REASONABLE USAGE

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Fakhriddin Shamsiddinovich Khusniddinov
Assistant, Tashkent State Transport University, Uzbekistan

Dilshodbek Ravshanbek O'g'li Xusanov
Student, Tashkent State Transport University, Uzbekistan

Fazliddin Xusanboy O'g'li Ashuraliyev
Student, Tashkent State Transport University, Uzbekistan

ABSTRACT

Due to the great power of the wind, the generation of electricity using ecologically clean technology is of great importance at present. Pictures taken from space show that the air ocean of the territory of the independent commonwealth states is constantly affected by the wind. Using it as an energy source, the idea of creating various wind power plants is appropriate. For this purpose, it is necessary to select suitable locations for wind use and collect relevant data for their description. For wind power plants, it will not be necessary to build new railways, extract fuel and transport it, etc.

KEYWORDS

Wind energy, future engineering, physics, solar energy.

INTRODUCTION

Windmills were first mentioned in the 12th century. These mills gradually spread to all countries of the world. Initially, they were built in groups. Such mills were later improved.

If, instead of wind mills existing in the Russian Federation at the beginning of our century, large energy aggregates of this density are installed, the energy produced by them will be 8 times more than the current energy supply standard of the most developed country with a population of 500 million. 'would have been enough to provide.

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It is acceptable to develop wind energy, first of all, where there is constant wind. For example, in our Republic, it is possible to place wind power plants near the cities of Yaipan and Bekobad in the Fergana region of Uzbekistan, etc.

The experience of Denmark in the production of electricity using wind energy is particularly noteworthy. In 1990 alone, 4 billion kilowatt-hours of electricity was produced in this country at the expense of wind power plants.

Currently, even countries that have sufficient organic fuel resources at their disposal and have large reserves of power plants (United States of America, Great Britain, Japan, Canada, Germany, Norway, Sweden, etc.) to develop wind energy consider it appropriate to allocate more funds. Because the technology of wind power plants is environmentally friendly, economically useful and takes up little space.

There are 20,000 wind turbines operating in Southern California, USA. The electricity produced by them is almost equal to the electricity produced by 2 nuclear power plants. The future of wind farms is bright. Currently, the cost of 1 kilowatt hour of energy produced in wind power plants has been reduced by 0.07 dollars in the United States of America (USA). Installation of wind power plants in places with a wind speed of 20 kilometers per hour gives good results. In such cases, the cost of 1 kilowatt hour of electricity does not exceed $0.05.

Wind energy is inexhaustible. Therefore, today it is a part of world energy, and its importance will undoubtedly grow in the future.

There is a simple riddle that we all learned from childhood: "Doors open without arms and legs." If you ask the little girl what it is, she will immediately say the wind. In fact, as a result of heat, cold and other effects,

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we call the manifestation of air movement at different speeds and conditions with this general name. You know well that the wind can be strong and weak, pleasant and unpleasant, harmful and destructive. They are also named differently according to their characteristics: wind, hurricane, storm are characteristic of poetic speech, means light, peaceful wind. Sabo is a gentle breeze that blows only in the morning. A hurricane is a very strong wind, which does more harm than good: sometimes it not only breaks trees, but also uproots them, and blows off the roofs of buildings. There are also types of storms that bring great destruction. And the second one is the unpleasant type of bitter cold on frosty days, which makes your whole body stiff, and brings cold like a camel through the eye of a needle.

Indeed, the wind is an unbridled force, a huge source of natural energy. This resource is constantly updated from time to time, so it is inexhaustible. Mechanical, electrical, and thermal energy can be generated from it. The operation of windmills built in many countries in ancient times is based on mechanical energy.

Advances in science and technology have made it possible to obtain electricity from wind power. Although the work in this regard was started in the last century, the world is paying more attention to the construction of wind power plants. Wind power is currently being produced in 55 countries. In this regard, the work carried out in European countries is particularly noteworthy. The use of wind energy has already become an important branch of the energy industry. Among the CIS countries, measures are being taken to increase the production of electricity from wind power in the Republic of Belarus.

It should be said that even if the production of wind electricity is low-cost, ecologically safe, and has bright prospects, it is absolutely impossible to meet the demand and needs with the energy obtained only in this way. This source of alternative energy allows to produce additional electricity and thermal energy.

Because there is not always wind. In addition, the wind speed in many places does not meet the requirements. For this reason, experts suggest using wind power plants in turn with other alternative plants.

A certain level of research is being conducted in our country on the use of wind energy among alternative energy sources. Wind power equipment created by some representatives of our talented youth can be a proof of this opinion.

So, it would not be bad if small wind power plants were installed in the places where the wind blows a lot, even if only as an experiment, to see how effective they are. If such equipment passes the test successfully, it can become a reserve energy source and serve to save electricity produced in the traditional way.

Wind energy and methods of its transformation. In many developed countries, due to the energy crisis, targeted programs for the development of non-traditional energy resources, in particular wind energy, have been adopted and are being implemented. Wind is a random, uncontrollable natural process caused by the influence of the sun and the earth's rotation. As a source of energy, the characteristic of wind is primarily its non-constant nature, which is mainly determined by the large variability of speed. This causes a change in the kinetic energy of the wind flow within relatively small intervals of time.

In different regions, the direction and strength of the wind varies depending on the height above the earth's surface. For example, in the northern hemisphere, the average speed is 7-9 m/s in places close to the earth's surface (10...50 m). A wind speed exceeding 25-30 m/s can cause serious damage to the national economy, so

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it is effective to convert wind energy into mechanical or electrical energy when the wind speed is 3-25 m/s.

The energy of the cross-sectional air flow F is equal to:

$$E = \frac{mv^2}{2} \qquad (1)$$

F through υ the mass per second of the air flowing at the speed m is equal to the following:

$$m = p \cdot F \cdot v \qquad (2)$$

in that case

$$E = \frac{p \cdot v^3 \cdot F}{2} \qquad (3)$$

where p is the density of air, under normal conditions (t=15 0C, 760 millimeter of mercury) it is equal to 1.23 kg/m3.

Thus, wind energy changes proportionally to the cube of its speed. A windmill can only convert a certain amount of energy into useful work, which is estimated by the coefficient of wind energy utilization. Modern wind turbines (SHD) convert no more than 45-48% of their kinetic energy into mechanical energy through the wind during normal operation.

For the ideal case according to the theory of I.E. Zhukovsky

$$\varepsilon = \frac{E_{Sh.d}}{E} \qquad \varepsilon = 0{,}593 \qquad (4)$$

that is, a part of the full energy flow received by the wind wheel is converted into mechanical energy by the wind engine.

At t_o=15 °C and r=1.3 kPa in a cross-sectional flow of 1 m², the specific power (energy per second) is:

Wind speed, m/s	4	6	8	10	14	18	22
Flow capacity, kW/m²	0,04	0,13	0,31	0,61	1,67	3,6	6,25

The work per second or power generated by a windmill is determined by the following formula:

$$E = \frac{p \cdot v^3 \cdot F \cdot \varepsilon}{2} \qquad (5)$$

Wind energy devices. Both air flow and any moving body have kinetic energy. This kinetic energy is converted into mechanical energy using a windmill or other working body.

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According to the function of wind turbines, mechanical energy can be converted into electrical, thermal, mechanical, and compressed air energy using executive mechanisms (generators, compressors, electrolyzes, etc.). Different types of wind engines can be used to convert the kinetic energy of air flow into mechanical energy. For example, "Whisper", "Acro-Cruft" type wind energy devices are used to convert the kinetic energy of air flow into electrical energy.

The main mechanism that converts wind energy into electricity is a wind turbine. It has more details than other turbines. The wind rotates the blades attached to the bushing and they rotate together. Thus, the blades and bushing together form the rotor. There are also contacts that rotate and stop the blades of the turbine. The generator rotates and produces electricity. The generator, controller and other devices are placed in a box behind the wings. The anemometer detects the wind speed and transmits this information to the controller.

When the wind speed reaches 15-23 km/h, the wind turbine starts rotating, when the speed increases to 100 km/h, they stop automatically to protect the mechanism from damage. Some models of wind turbines rotate at a constant speed regardless of wind strength. The speed of some new models turns with the wind. Some newer models change speed with wind speed, making them more efficient.

Wind turbines usually have 2 or 3 blades. Small turbines produce up to 100 kW of electricity. They can be used with photovoltaic panels. The blades of such a "house wind generator" have a size of 2-8 m and are placed at a height of about 40 m, and it can provide electricity to a small enterprise.

From large wind turbines, turbines from 750 kW to 2 MW are common, and they are also placed in wind power plants.

Large-capacity megawatt turbines have large dimensions, and their new models are capable of producing electricity from 2 to 5 MW. They are usually placed in the water close to the shore so that they can be turned by strong sea winds. Such wind turbines are currently used in Great Britain, Germany, Denmark and other countries.

REFERENCES

1. Касимов, О. Т., Турсунов, Ш. Э., Мамаев, Ш. И., & Хусниддинов, Ф. Ш. (2022). АНАЛИЗ ПРИЧИН ОТКАЗОВ ТОРМОЗНОГО ОБОРУДОВАНИЯ ЛОКОМОТИВОВ В УСЛОВИЯХ АО «ЎЗБЕКИСТОН ТЕМИР ЙЎЛЛАРИ». Главный редактор: Ахметов Сайранбек Махсутович, д-р техн. наук; Заместитель главного редактора: Ахмеднабиев Расул Магомедович, канд. техн. наук; Члены редакционной коллегии, 38.
2. Касимов, О. Т., Турсунов, Ш. Э., Мамаев, Ш. И., Хусниддинов, Ф. Ш., & Эркинов, Б. Х. Ў. (2022). АНАЛИЗ ПРИЧИН ОТКАЗОВ ТОРМОЗНОГО ОБОРУДОВАНИЯ ЛОКОМОТИВОВ В УСЛОВИЯХ АО «ЎЗБЕКИСТОН ТЕМИР ЙЎЛЛАРИ». Universum: технические науки, (6-3 (99)), 38-42.
3. Shovkat S., Faxriddin X. APPLICATION OF MAGNETIC MATERIALS IN TECHNICS //Universum: технические науки. – 2022. – №. 3-6 (96). – С. 50-52.
4. Хусниддинов Ф. Ш. УПРУГИЕ СИЛЫ. ИСПОЛЬЗОВАНИЕ ИНТЕРАКТИВНЫХ МЕТОДОВ В ПРЕПОДАВАНИИ ТЕМЫ «ЗАКОН ГУКА» //64-я Международная научная конференция Астраханского государственного технического университета, посвященная 90-летнему

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юбилею со дня образования Астраханского государственного технического университета. – 2020. – С. 188-188.

5. Хусниддинов Ф. Ш. МЕТАПРЕДМЕТНЫЙ ПОДХОД В ПРЕПОДАВАНИИ ФИЗИКИ В ВУЗАХ ТЕХНИЧЕСКОГО НАПРАВЛЕНИЯ //64-я Международная научная конференция Астраханского государственного технического университета, посвященная 90-летнему юбилею со дня образования Астраханского государственного технического университета. – 2020. – С. 127-127.

6. Хусниддинов Ф. Ш. ИСПОЛЬЗОВАНИЕ ДИАГРАММ КЛАСТЕРА И ВЕННА В ПРЕПОДАВАНИИ «ПРИОРИТЕТЫ И ПЕРСПЕКТИВЫ ФИЗИКИ МАТЕРИАЛОВЕДЕНИЯ» //Гуманитарный трактат. – 2020. – №. 81. – С. 4-7.

7. Хусниддинов Ф. Ш. ИСПОЛЬЗОВАНИЕ ИНТЕРАКТИВНЫХ МЕТОДОВ В ПРЕПОДАВАНИИ ТЕМЫ «СИЛЫ УПРУГОСТИ. ЗАКОН ГУКА» //Гуманитарный трактат. – 2020. – №. 85. – С. 7-8.

8. Хусниддинов Ф. Ш., Хамидов Ш. Р., Узоқов А. А. ВОЗОБНОВЛЯЕМЫЕ ИСТОЧНИКИ ЭНЕРГИИ В РЕСПУБЛИКЕ УЗБЕКИСТАН //64-я Международная научная конференция Астраханского государственного технического университета, посвященная 90-летнему юбилею со дня образования Астраханского государственного технического университета. – 2020. – С. 189-189.

9. Касимов О. Т., Хусниддинов Ф. Ш. ОРГАНИЗАЦИЯ РЕМОНТА КОЛЕСНО-МОТОРНОГО БЛОКА ЭЛЕКТРОВОЗА «O'ZBEKISTON» ПРИ ТЕКУЩЕМ РЕМОНТЕ ТР-3 //64-я Международная научная конференция Астраханского государственного технического университета, посвященная 90-летнему юбилею со дня образования Астраханского государственного технического университета. – 2020. – С. 275-275.

10. Сайтджанов Ш. Н., Хусниддинов Ф. Ш. РОЛЬ ЛАБОРАТОРНОЙ РАБОТЫ В ИЗУЧЕНИИ ЗАКОНОВ ТЕРМОДИНАМИКИ //Точная наука. – 2020. – №. 80. – С. 10-12.

11. Хусниддинов Ф. Ш. ЗНАЧЕНИЕ УПРАВЛЯЕМЫХ ЯДЕРНЫХ РЕАКЦИЙ В СТРОИТЕЛЬСТВЕ ЯДЕРНЫХ ЭЛЕКТРОСТАНЦИЙ //Точная наука. – 2020. – №. 81. – С. 31-32.

12. Muminovich M. R., Kutlimuratovich D. D., Gulam ogli D. B. NANOMATERIALS IN THE AEROSPACE INDUSTRY HOLDING POSITION //Galaxy International Interdisciplinary Research Journal. – 2023. – Т. 11. – №. 4. – С. 113-116.

13. Muminovich M. R., Kutlimuratovich D. D., Samikovna S. S. NANOTEXNOLOGIYANI YO ‘L QURILISH MUHANDISLIGI VA TRANSPORT SOHASIDA QO ‘LLANISHI //ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ. – 2023. – Т. 18. – №. 8. – С. 11-14.

14. Худойберганов С. Б., Мирсаатов Р. М., Джумабаев Д. К. ОЦЕНКА НЕОПРЕДЕЛЕННОСТИ РЕЗУЛЬТАТОВ ЭКСПЕРИМЕНТАЛЬНЫХ ИССЛЕДОВАНИЙ ПРИ ОПРЕДЕЛЕНИИ ПАРАМЕТРОВ

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ШЕЛКОВИЧНЫХ КОКОНОВ //Universum: технические науки. – 2022. – №. 4-3 (97). – С. 47-51.

15. Джумабаев Д., Валиханов Н. К. РЕНТГЕНОФОТОЭЛЕКТРОННЫЙ СПЕКТРОСКОПИЧЕСКИЙ АНАЛИЗ СЛОИСТЫХ КОМПОЗИЦИЙ НА ОСНОВЕ CU2ZNSNS (SE) 4 //O'ZBEKISTONDA FANLARARO INNOVATSIYALAR VA ILMIY TADQIQOTLAR JURNALI. – 2023. – Т. 2. – №. 16. – С. 189-192.
16. Valikhanov N. K., Sultanxodjayeva G. S., Xusniddinov F. S. EFFICIENCY OF THERMOELECTRIC GENERATORS MODULE METHODS OF INCREASE. – 2023.
17. Дустмуродов Э. Э. и др. ОБРАЗОВАНИЕ ЧАСТИЦ ПРИ РЕЛЯТИВИСТСКОМ СТОЛКНОВЕНИИ ТЯЖЕЛЫХ ЯДЕР НА LHC (С ПОМОЩЬЮ GEANT4) //Science and Education. – 2020. – Т. 1. – №. 9. – С. 59-65.
18. Safaev M. M. et al. RECOVERY CARBON-HYDROCARBON ENERGY FROM SECONDARY RAW MATERIAL RESOURCES //ПЕРСПЕКТИВНОЕ РАЗВИТИЕ НАУКИ, ТЕХНИКИ И ТЕХНОЛОГИЙ. – 2014. – С. 16-18.
19. Safaev, M. M., Rizaev, T. R., Mamedov, Z. G., Kurbanov, D. A., & Valikhanov, N. K. (2014). EFFECT OF CHEMICAL COMPOSITION OF FUEL IS USED IN THE INTERNAL COMBUSTION ENGINE ON CHEMICAL COMPOSITION. In ПЕРСПЕКТИВНОЕ РАЗВИТИЕ НАУКИ, ТЕХНИКИ И ТЕХНОЛОГИЙ (pp. 13-16).
20. Makhamadzahidovich S. M. et al. RECOVERY CARBON-HYDROCARBON ENERGY FROM SECONDARY RAW MATERIAL RESOURCES //ББК Ж. я431 (0) П27 МТО-18 Председатель организационного комитета. – 2014. – С. 16.
21. Kamilov, S. X., Kasimova, G., Yavkacheva, Z., & Valikhonov, N. (2023). "NANOTECHNOLOGIES AND THEIR SIGNIFICANCE IN ENVIRONMENTAL PROTECTION". Евразийский журнал академических исследований, 2(4 Part 2), 147–152. извлечено от https://in-academy.uz/index.php/ejar/article/view/12443