



**ФАН ВА ТЕХНОЛОГИЯЛАР
ТАРАҚҚИЁТИ**
**РАЗВИТИЕ НАУКИ И
ТЕХНОЛОГИЙ**

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**ФАН ВА ТЕХНОЛОГИЯЛАР
ТАРАҚҚИЁТИ**

ИЛМИЙ – ТЕХНИКАВИЙ ЖУРНАЛ

**РАЗВИТИЕ НАУКИ И
ТЕХНОЛОГИЙ**

НАУЧНО – ТЕХНИЧЕСКИЙ ЖУРНАЛ

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Ушбу журналда чоп этилган материаллар таҳририятнинг ёзма рухсатисиз тўлиқ ёки қисман чоп этилиши мумкин эмас. Таҳририятнинг фикри муаллифлар фикри билан ҳар доим ҳам мос тушмаслиги мумкин. Журналда ёритилган материалларнинг ҳаққонийлиги учун мақолаларнинг муаллифлари ва реклама берувчилар масъулдирлар.

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REDUCING POWER LOSS USING MODERN METHODS OF SQUIRREL-CAGE INDUCTION MOTORS

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Annotation. This article discusses the issues of monitoring and controlling energy consumption from renewable energy sources, as well as the study of the starting torque and reactive power-providing elements of asynchronous motors consuming reactive power due to a rotating magnetic field. In addition, problems associated with capacitive and inductive elements providing reactive power in single-phase and three-phase systems are analyzed, and ways to increase efficiency are indicated.

Keywords: solar energy source, wind energy, efficiency improvement, asynchronous motor, battery, energy supply, model, technological process.

ISTE'MOLCHILARNI QAYTA TIKLANADIGAN ENERGIYA MANBALARI BILAN TA'MINLASHNI TAKOMILLASHTIRISH

Annotatsiya. Mazkur maqolada qayta tiklanadigan energiya manbalaridan hosil bo'lgan energiya iste'molini nazorat qilish va boshqarish masalalari, shuningdek, aylanma magnit maydon sababli reaktiv quvvat sarflovchi asinxron motorlarning ishga tushirish momentini va reaktiv quvvatni ta'minlovchi elementlarni tadqiq qilish masalalari yoritilgan. Bundan tashqari, bir fazali va uch fazali tizimlarda reaktiv quvvatni ta'minlaydigan sig'im va induktiv elementlar bilan bog'liq muammolar ham tahlil qilingan hamda samaradorlikni oshirish yo'llari ko'rsatib o'tilgan.

Kalit so'zlar: quyosh energiyasi manbai, shamol energiyasi, samaradorlikni oshirish, asinxron motor, akkumulyator, energiya ta'minoti, model, texnologik jarayon.

СНИЖЕНИЕ ПОТЕРЬ МОЩНОСТИ С ИСПОЛЬЗОВАНИЕМ СОВРЕМЕННЫХ МЕТОДОВ АСИНХРОННЫХ ДВИГАТЕЛЕЙ С КОРОТКОЗАМКНУТЫМ РОТОРОМ

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Аннотация. В данной статье рассматриваются вопросы контроля и управления потреблением энергии от возобновляемых источников энергии, а также исследование пускового момента и реактивной мощности элементов асинхронных двигателей, потребляющих реактивную мощность за счёт вращающегося магнитного поля. Кроме того, анализируются проблемы, связанные с ёмкостными и индуктивными элементами, обеспечивающими реактивную мощность в однофазных и трёхфазных системах, и указываются пути повышения эффективности.

Ключевые слова: солнечный источник электропитания, ветроэнергетика, повышение эффективности, асинхронный двигатель, аккумулятор, энергоснабжение, модель, технологический процесс.

Introduction: when supplying industrial and household consumers with electricity from a supply system based on the combined use of solar and wind energy, the consumer, renewable energy sources of energy equipment and elements of the supply system can be connected by various schemes. Consumers of energy supply based on the use of renewable energy (QTE) can be used as single-phase and three-phase depending on the condition of energy supply and may be connected to different connection and supply systems. an asynchronous motor that converts into mechanical energy is considered. This type of motors can be connected to a single and three-phase network.

This process requires consideration of the impact of the electrophysical processes occurring in the capacitive and inductive characteristic elements on the asynchronous motor device.

In table 1 below, we can see the formula and unit for finding the power of the asynchronous motor, which is the main energy consumer, it is known that the main consumer of the generated electricity is the asynchronous motors, and at the same time, the losses in the motors are more than other types of consumers. A number of scientists are conducting research to overcome these problems, including our proposed method. In combined energy supply, energy sources can work separately or together.

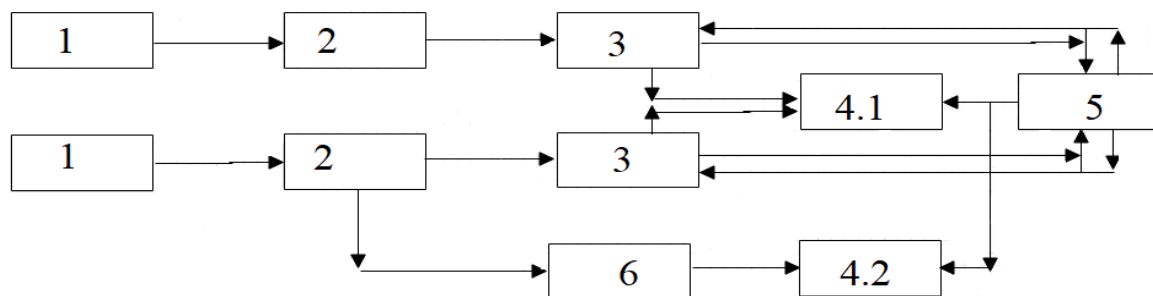
Recommended method if solar energy equipment (EQ) and wind energy equipment (WE) are used together according to a separate connection scheme, each energy equipment has its own

Table 1

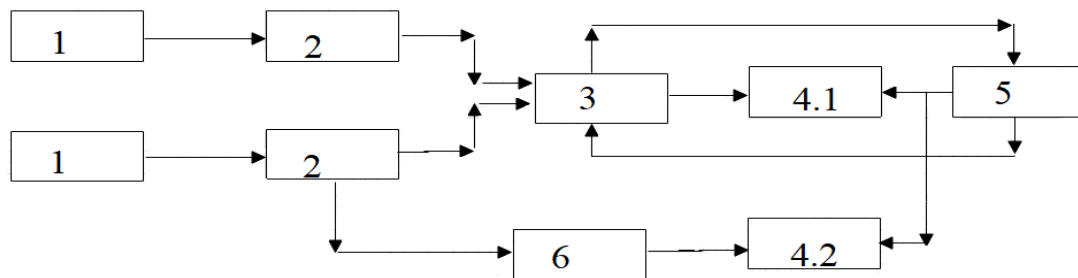
Analysis of reactive power consumption in consumers supplied by renewable energy sources.

1.	The name of the formula	Writing the formula	unit
2.	Alternative energy expression of the reactive power consumed by the source induction motor	$Q_A = 3I_1^2 X_1 + 3I_0^2 X_0 + 3(I_2')^2 \cdot X_2'$	VAr
3.	Alternative energy source asynchronous motor load factor	$\beta = R/R_{nominal}$	%
4.	Alternative energy Based on the passport data, the nominal power of the source asynchronous motor is determined as follows.	$Q_{nom} = \frac{P_{nom}}{\eta_{nom}} = tg\varphi_{nom}$	VAr
5.	Alternative energy source asynchronous motor reactive power dissipation is found as follows	$Q_0 = \sqrt{3}I_0 U_{nom} = \cos\varphi_{nom} \frac{I_0}{I_{nom} \cos\varphi_{nom}}$ $= \frac{P_{nom}}{\eta_{nom}} = I_0 / I_{nom} \cos\varphi_{nom}$	
6.	Determination of three-phase reactive power	$Q_0 \approx \sqrt{3} I_0 U_{nom}$	VAr

collects excess heat energy in a personal tank-accumulator. With such a scheme, excessive energy waste in the operation of solar and wind energy devices will increase sharply, and the efficiency of the use of solar and wind energy devices will decrease. As a result, the funds spent on creating a combined energy device may not pay for itself. Heat energy produced during parallel operation of SE and WE is collected in a common tank-accumulator. In such a situation, the influence of energy sources on each other's work can be observed. The simultaneous introduction of solar and wind energy also allows the AE battery to accumulate enough energy for a short time.



1-picture



1.1-picture

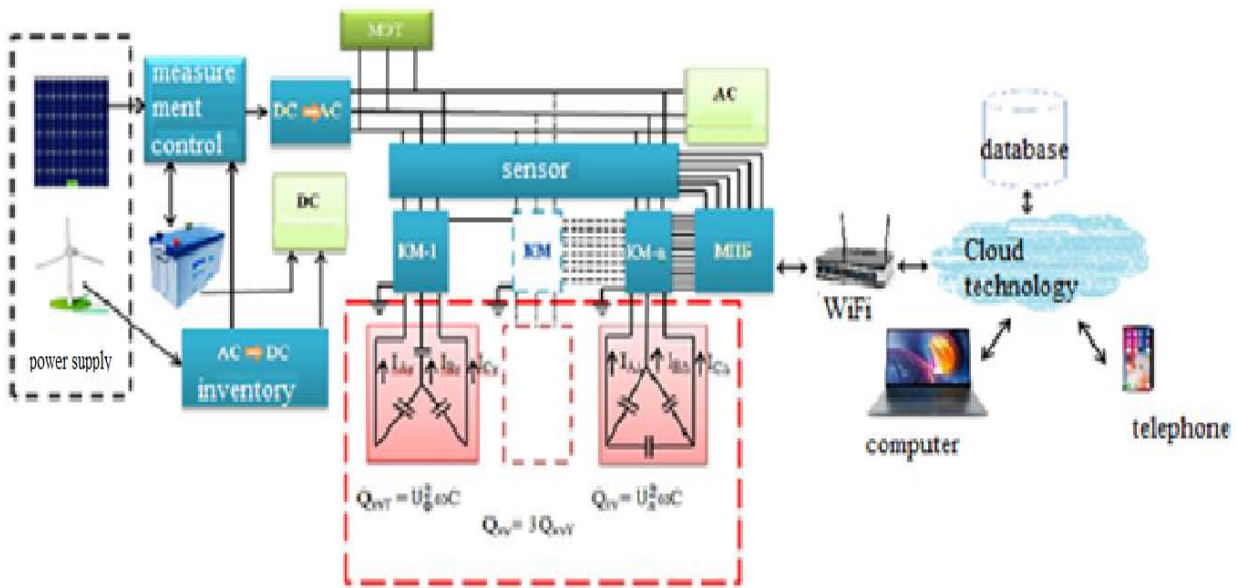
In Figure 1, energy consumers based on the combined use of solar and wind energy; 1) separate operation of QTE; 1.1) parallel operation of QET; 1st QET source; 2nd consumer motor; 3-heat energy accumulator; 4.1 and 4.2 electricity consumers; 5th traditional source; 6-electric energy accumulator.

In this case, there is also a situation where solar and wind energies are not fully used and the efficiency of combined solar and wind power plants is reduced.

From the above, it can be concluded that the efficiency of using wind and solar energy depends on the mode of accumulation of the produced energy. To store excess thermal energy, the

In the heat supply scheme based on SE sources, the thermal energy accumulator plays an important role and is considered a coordinating element between the energy source and the consumer.

In this way, solar and wind energy can be used according to a pre-coordinated scheme for effective energy supply to agricultural consumers, which differ in the mode of energy consumption. In such a case, the SOE can produce electricity for the general energy system together with traditional energy sources.



For this, it is necessary to develop indicators that allow to determine the general characteristics of the SE system elements and evaluate the operating conditions. Indicators of use of SE. In order to determine the effectiveness of the considered options, it is necessary to know the condition of energy supply from SEM according to the daily indicator. The power supply option provides for a power device with specific parameters. To evaluate the conditions of energy supply during the day, we use the indicator called energy supply coefficient from SE:

$$K_{ob.i} = \frac{Q_{nol.sut.i}}{Q_{n.sut.i}(Q_{ak.sut.i})} \leq 1$$

The useful energy developed in QEU's or SHEU's corresponds to the required energy provided. Useful energy is defined as follows.

$$Q_{nol} = \begin{cases} Q_{a.ud}A \text{ yoki } Q_n > Q_n \\ Q_u \text{ yoki } Q_n \leq Q_b \end{cases} Q_b = Q_{a.ud}A$$

Exceeding the energy production needs leads to the release of energy into the environment. and causes it to be released into the environment. Energy supply conditions for the parameters of solar and wind energy devices: helioenergetic device - solar collector (JV of GEQ) wind blade of wind energy device (ShEQ of ShP). In this case, the power that can be developed is linearly related to the surface area of the JV or ShP. But the main thing depends on the compatibility of GEQ and SHEQ with the generated energy and its need, and whether excess energy is not produced, which in itself leads to useless waste to the external environment. Therefore, the usefulness or usability of the GEQ or ShEQ with the proposed JV or ShP surface area is evaluated. GEQ or ShEQ utilization coefficient is used to evaluate the utilization conditions of the installed area of solar collectors (SQ) or wind collectors (ShK).

$$K_{u.i} = Q_{n.i}/Q_{nol.i} \leq 1$$

The useful energy used is according to the above condition. When the generated energy is less than the required one, the installed surface areas of the JV or SHPs and the energy generated with their help are fully used, and the coefficient $K_n=1$. Otherwise, the energy device will not be fully used and energy will be wasted on the environment. The proposed criterion allows to evaluate the condition of daily energy supply in different months of the calculation period, as well as allows to evaluate the condition of use of one or another capacity of the SC or ShP. Logically, an increase in the energy supply coefficient will lead to a decrease in the installed power utilization coefficient of SK or WP.

When the values of the proposed indicators are known, it is possible to determine the useful energy developed in one day of a month.

$$Q_{nol.i} = Q_{n.i}K_{ob.i} = Q_{b.i}K_{u.i}$$

in this case

$$K_{ob.i} = \frac{Q_{b.i}}{Q_{u.i}} K_{u.i} = K_{u.i} Q_{b.ud.i}/Q_{n.i} A_{(ok)i}$$

Or

$$K_{u.i} = \frac{Q_{n.i}}{Q_{a.i}} K_{ob.i} = K_{ob.i} Q_{n.i}/Q_{a.y.d.i} A_{ck.(bk)i}$$

Due to the fact that the operation of technological processes and the modes of delivery of renewable energy are not related to each other, the energy produced during the year is not constant, and it is difficult to determine the law of any of its changes or the supply and consumption of energy.

Conclusion: The average value of the supply factor (K_{ob}) can be used to assess the condition of energy supply during the accounting period. But this indicator will not be an objective indicator, as it has a random character during the month or year. Thus, energy supply based on the use of QTE depends on the condition of energy supply to consumers. However, the energy supply coefficient determined by the daily indicator of produced and consumed energy does not fully reflect the conditions of long-term energy supply.

We believe that an integral indicator should be entered for the accounting period. This indicator should represent the share of energy demand in the calculation period (season, year, month) filled in the SE calculation. If we emphasize that renewable energy has a random nature, it means that the possibility of replacing the energy supply to the consumer and traditional energy resources is also random and should be taken into account. In conclusion, we can see the system and model of asynchronous motors, which are consumers of renewable energy sources, ecologically clean, without consuming any fuel, a continuous and economical source of energy for modern electricity consumers. contributes the same.

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KOMBINATSIYALASHGAN QUYOSH-SHAMOL ENERGETIK QURILMALARINING SAMARADORLIGINI OSHIRISH BO‘YICHA OLIB BORILGAN ILMIY TADQIQOTLAR TAHLILI

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Buxoro davlat texnika universiteti.

Annotatsiya. Maqolada markazlashgan energiya ta‘minoti tizimidan uzoqda joylashgan elektr iste‘molchilar uchun kombinatsiyalashgan quyosh-shamol energetik qurilmalarini ishlab chiqish va samaradorligini oshirish bo‘yicha jahonda va O‘zbekistonda olib borilgan ilmiy tadqiqot ishlari tahlil qilingan. Tadqiqot natijasida kuchsiz shamol oqimlari va keskin kontinental iqlim sharoitlarida samarador ishlaydigan kombinatsiyalashgan quyosh-shamol energetik qurilmasining takomillashtirilgan yangi konstruksiyasini yaratish muhim ahamiyatga ega ekanligi asoslangan.

Tayanch so‘zlar: kombinatsiyalashgan quyosh-shamol energetik qurilmasi; shamol parraklari; elektr energiyasi; konstruksiyasining murakkabligi; tannarxining qimmatligi; ishlash samaradorligi pastligi.