

## SYSTEMS OF MEASURING AND CONTROL OF THE LOAD OF ENERGY DEVICES ON THE BASIS OF MODERN TECHNOLOGIES

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### ABSTRACT

The dissertation shows the study and design of energy equipment load measurement and control systems using modern technologies. Ways to achieve effective control of energy equipment by using appropriate measurement and control methods and measurement tools such as power monitors it is demonstrated that control methods such as load management and time-of-use can be used to regulate energy consumption. Using these methods can improve energy efficiency and reduce environmental impact.

### АННОТАЦИЯ

В диссертации показано исследование и проектирование систем измерения и контроля нагрузки энергетического оборудования с использованием современных технологий. Пути достижения эффективного управления энергетическим оборудованием с использованием соответствующих методов измерения и контроля и средств измерения, таких как мониторы мощности. Показано, что такие методы управления, как нагрузка управление и время использования можно использовать для регулирования энергопотребления. Использование этих методов может повысить энергоэффективность и снизить воздействие на окружающую среду.

### ABSTRACT

The dissertation shows the study and design of energy equipment load measurement and control systems using modern technologies. Ways to achieve effective control of energy equipment by using appropriate measurement and control methods and measurement tools such as power monitors it is demonstrated that control methods such as load management and time-of-use can be used to regulate energy consumption. Using these methods can improve energy efficiency and reduce environmental impact.

### Introduction

Today, the problems of improving the efficiency of energy consumption are of particular importance. This is the rapid decline in oil and gases, which will significantly deteriorate the global and gastric function, and other reasons. If the increase in energy consumption is not immediately obtained, the global environmental crisis can lead to

an ecological activity on the otherx. Electricity is achieved due to the effective use of fuel resources (land), to increase energy efficiency. Energy management depends on energy management, which determines the level of electricity, energy resources. Application of management to the management of the energy resources process, forms special energy management. Energy management means not only technical, balcintosh, motorable, information, marketing and investment aspects. At the same time, it is necessary to know how to apply the consumption of energy resources, which will increase its heat and electricity-efficiency. Currently, according to scientists in 2030, according to scientists around the world, it is noted that scientizing scientists have doubled. The reason for this is the formation of modern techniques and technologies in our country, for example, we can cite free energy consumed energy for the population, for the needs of the population. Therefore, it is a wide range of modern electricity consumption in our country to establish the living standards of the population using the non-traditional energy sources using the efficient electricity sources. Compared to the countries of the world, Uzbekistan ranks 87th out of 147 energy economy, efficiency.[1]

The purpose of this article is to achieve energy savings by managing the load of energy devices in real time. The main consumer of electricity in Uzbekistan is industry, which accounts for 50% of the total level of electricity consumption in the country. . The main consumer of heat energy in Uzbekistan is housing and communal services. Its share is 57% of the consumed thermal energy. Natural gas is the main fuel for the production of electricity in the energy system of Uzbekistan, and its share is 80%.

In order to effectively manage the economy and increase the welfare of the people, a mechanism of financial and economic management of energy saving has been developed in our country. Economical and rational use of the material resources created in this direction is becoming more and more important. Well-being cannot be imagined without electricity. Electricity is our priceless wealth, which drives economic system enterprises, lights up our homes, and eases our problems. Therefore, it is necessary to save and rationally use electricity in every community and every household. Both our state and people benefit from a rational attitude towards electricity. More than 51 million cubic meters of natural gas and more than 20,000 tons of coal are burned in electricity generating stations in order to supply the national economy and residents with electricity. A person who imagines the scale of such expenses will understand how necessary savings are. In addition, saving is the best option for eliminating overloading modes in power grids. Unfortunately, there are many cases of inefficient use of electricity or direct waste.[2]

Proper management of energy devices is essential to achieve energy efficiency and reduce environmental impact. One of the effective ways to manage these devices is through appropriate measurement and control methods. Metering devices such as

watt meters and power monitors can accurately measure energy consumption, allowing you to identify energy consumption patterns. From this information, specific measures can be taken to reduce the energy consumption of energy devices. Controls such as load shedding and time-of-use can also be used to further regulate energy use. Load shedding works by cutting off power to non-essential devices during peak hours, reducing the overall load on the power grid. Meanwhile, time-of-use pricing encourages the use of energy-intensive devices during off-peak hours and charges higher rates during peak hours. Using these techniques, energy devices can be effectively managed to improve energy efficiency and reduce environmental impact.

The implementation of appropriate measurement and control methods is crucial for effective load management of energy installations. Accurate measurement of the energy consumption of devices can be achieved by using measurement tools such as watt meters and power monitors. The information obtained helps to determine energy consumption, which can be analyzed to reduce energy consumption. Control methods such as load shedding and time of use can also be used to regulate energy consumption. Load shedding reduces the overall load on the power grid by cutting off power to non-essential devices during peak hours. Time-of-use pricing, on the other hand, helps encourage consumers to use energy-intensive devices during off-peak hours, charging higher rates during peak hours and lower rates during off-peak hours. Implementing effective measurement and control methods can help improve energy efficiency, reduce energy waste and ultimately the impact on the environment.

**Structural diagram of the proposed system for single-phase consumers (fig.1)**

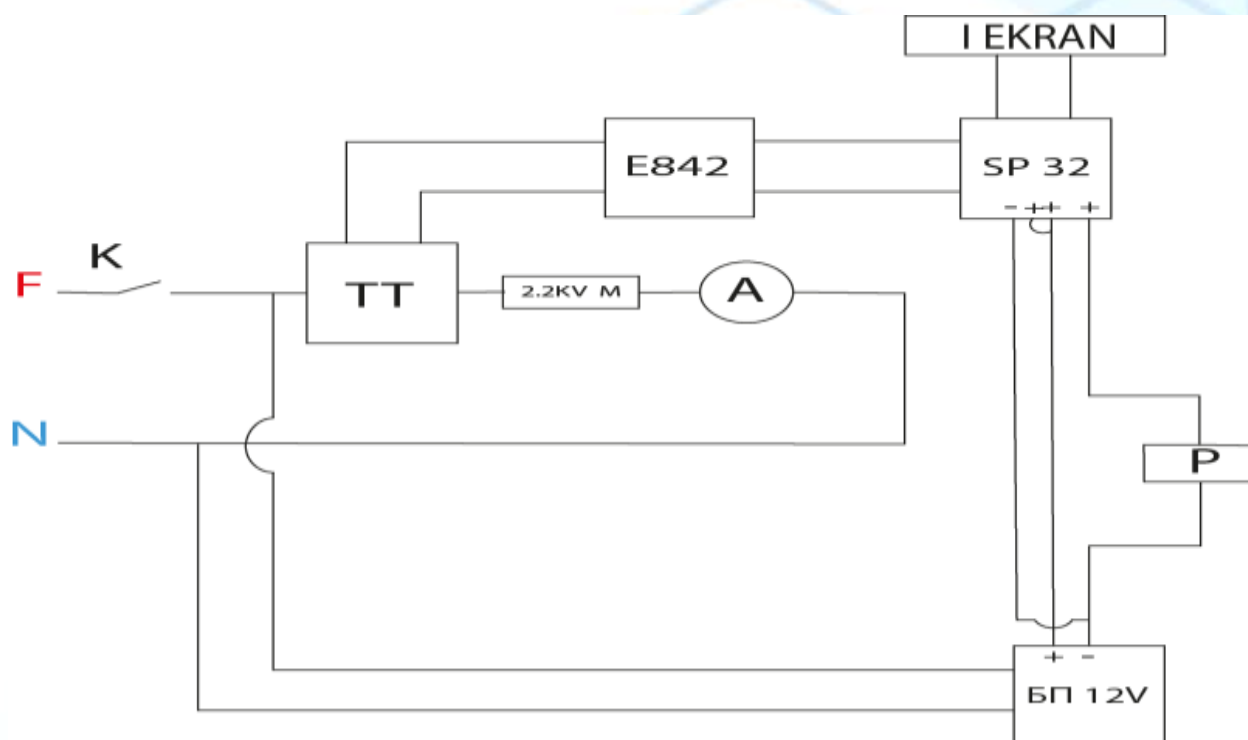


Fig.1

Name of devices	price (sum)
Automatic switch	50 000
Current transformer	160 000
Motor 2.2 kW	1 500 000
E 842	560 000
SP32	72 000
Induction screen	22 000
Relay 12 v	25 000
Power supply 12 v	55 000
DC/DC driver	10 000
Ammeter, voltmeter	45 000
Auxiliary devices	40 000
Total:	2 500 000

Appropriate metering and control methods play a crucial role in power plant load management. Monitoring and regulating the energy consumption of devices not only optimizes their performance, but can also minimize energy waste by identifying energy consumption. Using measurement tools such as watt meters and power monitors allows you to accurately measure the energy consumption of a device. This data can then be analyzed to identify patterns and steps can be taken to reduce energy consumption. Along with these tools, load shedding and usage timing can be implemented to regulate the energy consumption of devices. Load shedding reduces the overall load on the power grid by cutting off power to non-essential devices during peak hours. Time-of-use pricing encourages consumers to use energy-intensive devices during off-peak hours, when rates are higher. By promoting effective metering and control of energy devices, energy efficiency can be improved and environmental impact can be reduced(fig.2).[3]

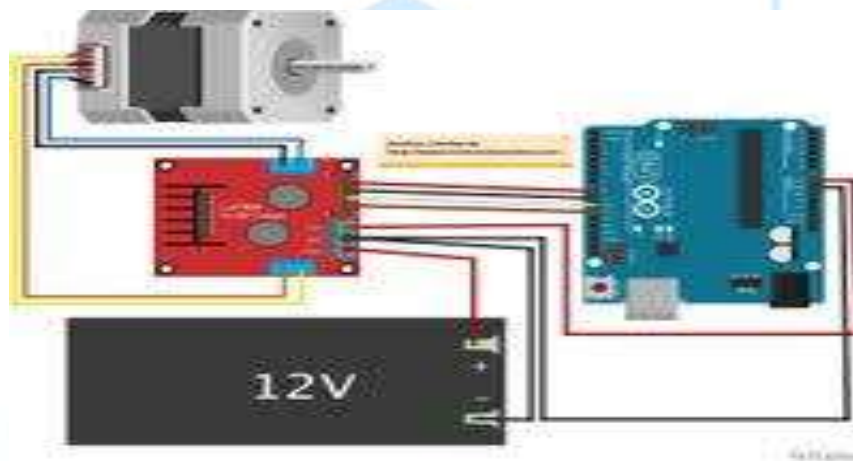


Fig.2

Effective management of energy installations is crucial to achieving energy efficiency and reducing environmental impact. Using appropriate measurement and control techniques, energy consumption of devices can be monitored, regulated and optimized for performance. One technique involves using measurement tools such as watt meters and power monitors to accurately measure a device's energy consumption. By analyzing the data from these tools, energy usage patterns can be identified and steps can be taken to reduce energy consumption. The second method involves implementing load shedding and time-of-use pricing to regulate the energy consumption of devices. With load shedding, the power supply to non-essential devices is cut off during peak hours, reducing the overall load on the power grid. Time-of-use pricing involves charging higher rates for energy during off-peak hours and lower rates during peak hours, incentivizing consumers to use energy-intensive devices during off-peak hours. Effective measurement and control methods ensure the management and optimization of the energy consumption of devices, increasing energy efficiency and further reducing the impact on the environment.

### Conclusion

Effective load management of energy devices is crucial in improving energy efficiency and reducing environmental impact. This can be achieved by using appropriate measurement and control methods. Accurate measurement of the energy consumption of devices can be done using watt meters and power monitors. The analysis of the data of this measurement allows to determine the energy consumption and thus to introduce measures to reduce the total consumption. On the other hand, control methods such as load shedding and time-of-use are useful in regulating the energy consumption of devices. Load shedding involves cutting off supply to non-essential devices during peak hours to reduce the load on the power grid. A time-of-use pricing strategy involves charging consumers higher rates for energy during peak hours and lower rates during off-peak hours, encouraging consumers to use energy-intensive devices during off-peak hours. These measures ensure efficient management of energy devices, optimization for performance and reduction of energy wastage.

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