Automated System of Electrical Energy Calculation and Control

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ABSTRACT: Today, one of the main problems, not only in our republic, but also in different parts of the world, is the effective supply of electricity to consumers. Therefore, in this article, it is recommended to introduce the increasingly developing GSM/GPRS technology into the electric power system.

KEY WORDS: energy saving, electrical energy, factors, GSM/GPRS network.

I. INTRODUCTION

Currently, information technology is deeply penetrating all aspects of our life. This plays an important role in the continuous supply of electricity to the population and industry, which is one of the urgent issues in our republic today. That is, for the effective use of the electricity currently being developed, it is required to increase the accuracy of measuring devices and deliver the measured data to the central control points on time. In our republic, many consumers of electricity are located far from the supply source. In this case, collecting data in a timely manner is a somewhat complicated matter. Because of this, it is important to introduce modern technologies in this field as well. The basis of this technology is the delivery of the necessary information between the electricity control point and the consumer using a wireless communication system. The development of an automated system of data collection and transmission has many advantages when organizing a data transmission channel between remote objects in wireless communication systems. In particular, it creates opportunities such as calculation of energy resources and water costs, control of gas, water and electricity meters, regulation of traffic flows by remote control of street lights.

In addition, wireless data communication channels are widely used in commerce, medicine and other fields.

II. LITERATURE SURVEY

In this article, we consider the application of the data transmission channel in the automated system of calculation and control of electric energy (EEHBAT). This is a commercial system that collects data on the calculation and management of electricity consumption in various facilities (residences, universities, offices, etc.), processes them, and makes conclusions about the costs of the consumed energy. The EEHBAT system includes electricity meters, servers, data transmission channels, an automated workplace of a specialist, etc. The main purpose of creating such systems is to find answers to technical and economic questions [1].

III. METHODOLOGY

Until now, wireless communication lines have been rarely used because technical solutions have been found to use wired communication networks through the RS-485 interface. But later, the creation of the IEEE 802.15.4 wireless communication standard made it possible to use wireless communication lines. This led to a reduction in the cost of cables. The flow of data received from the meters is collected in the concentrator of the network center. The concentrator stores this data in its memory in batch form. There may be many concentrators in the EEHBAT system, but one concentrator is sufficient for data management and monitoring in the data collection and processing center (DCM) [2].

"How to organize data transmission with all concentrators in the system in one MYQM?" a question may arise. Nowadays, the answer to this question is "through the GSM network".

GSM technology using data transmission three main opportunity available :

• SMS (Short Message Service) is short the news transmission service _

• GSM (Global System Mobile Telecommunication) - sound information transmission service _

• GPRS (General Packet Radio Service) data package in the form of transmission service _

SMS service is very popular among mobile phone users. The data is transmitted in the form of a simple short message. The main advantage of this service is that it is very convenient to use, the price is cheap enough, and messages are easily delivered. Disadvantages include the inability to quickly deliver messages to their destination and the limited number of characters in messages (maximum 160). As a result of these shortcomings , it is impossible to continuously record data from meters in objects . It is effective to use SMS service once a day to receive data from meters . This service is used to send messages when there are failures of emergency objects in the system we are looking at.
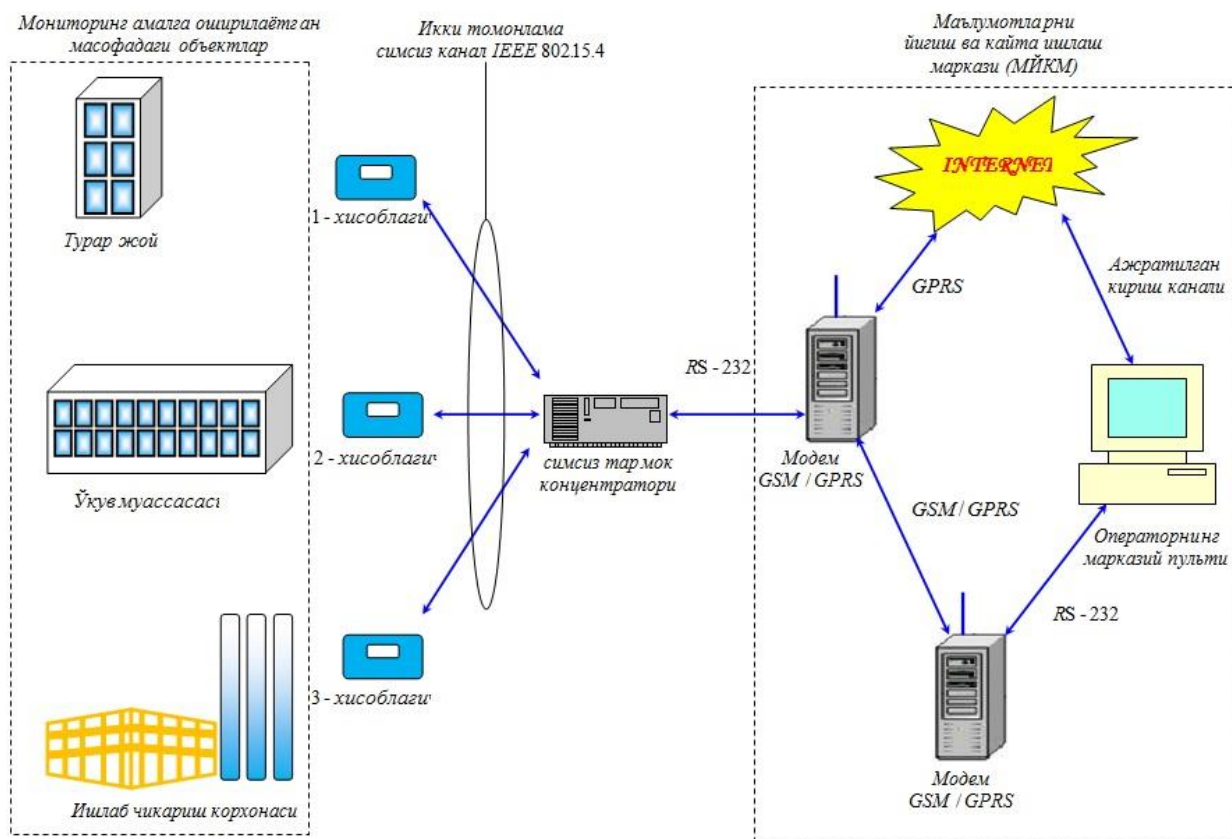
Automated system of electricity calculation and management.

High-speed data channel switching (HSCSD-High Speed Circuit Switched Data) enables the transmission and reception of any amount of data between objects in a precise time scale (on-line) in the format of "point-to-point" communication. The main advantage of this type of communication is high-speed and reliable data transfer. The data transfer rate can be 9600 Kbit /s in one GSM channel, 19200 Kbit/s and more in multi-channel mode. The disadvantage of using GSM channels in the EEHBAT system is the use of modems for small data transmissions, that is, the use of modems even for short data transmissions is economically expensive. In this case, subscribers spend money for the entire communication session.

The optimal option for data transmission in the GSM network is the use of GPRS (General Packet Radio Service) technology. The main feature of this technology is that subscribers can be permanently connected to the network through a virtual communication channel. The subscriber is provided with a real radio channel during data packet transmission, and the rest of the time is used for packet transmission of other users in the network. Thus, the subscriber does not permanently occupy the physical channel, as in CSD and HSCSD mode, and as a result, he is not charged for the entire communication time, but only for the traffic. As a result, the cost of transmitting each byte of data is reduced. Therefore, GPRS technology is the optimal way for continuous and quasi-continuous monitoring of the system. Using GPRS technology, the maximum possible speed of data exchange can theoretically be up to 170 Kbit/s.

An ordinary mobile phone (supporting GPRS service) can also be used as a data transmission device. However, it is desirable to use a special external terminal module, i.e. modem, which is more favorable from the point of view of value, works efficiently and reliably, and is resistant to harmful environmental influences. The GSM/GPRS module is a bodyless element (OEM-module), which consists of a radio frequency unit, digital power supplies, an interface for communication with external devices, a case, an antenna, etc. These parts of the GSM/GPRS external terminal are always ready for operation. The main advantage of this module is its ability to easily integrate with remote objects, that is, the concentrator. This limits the proliferation of unnecessary cases of devices in objects, but it is necessary to place additional circuits that ensure the operation of the module on the concentrator board. Modules from different module manufacturers are similar in function and architecture, but they differ from each other by the presence of specific connectors [3].

When replacing a module of one firm operating in the system with a module of another firm, a schematic and technical adaptation device is needed to create mutual compatibility with other host devices in the same system. The data transmission channel through the GSM/GPRS module is implemented with the basic function. These modules are the management controllers. The implementation of this function is provided by the manufacturers of special software and hardware that enable the opening of the three u n module architecture. These tools allow you to load and configure applications. One or more interfaces such as UART (Universal Asynchronous Receiver/Transmitter), SPI (Serial Peripheral Interface), USB (Universal Serial Bus) and others help in loading applications in practice.

If the module is built on the TCP/IP stack, the issue of GPRS channel organization will be simplified enough. In this case, the module built on the TSP/IP stack can organize a data transmission channel based on GPRS technology using AT-commands. Currently, many modules are integrated in the TSP/IP stack and are able to organize GPRS technology classes 8 or more. RS-232 interface is used to connect GSM/GPRS terminal modules with external devices. As an external device, hardware based on microcontrollers is used, just like in a computer. In the considered system, the RS-232 interface is used to connect the GSM/GPRS modem at the operator's workplace, and the GSM/GPRS modem with the concentrator.

IV.CONCLUSION AND FUTURE WORK

The use of such technologies in systems allows for system control and continuous monitoring. In addition, such systems can be organized not only with the help of GSM/GPRS technology, but also with the help of Wi-Fi and WiMax technologies. The company MaxLine, currently operating in our country, offers the use of wireless communication channels in various systems based on WiMax technology.
the above -mentioned wireless communication systems are widely introduced in the field of electric energy, some issues of continuous supply of electric energy to residents, educational institutions, medicine, etc. in remote rural areas of our districts would be positively resolved.

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