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ANALYSIS OF HIGH-VOLTAGE SUBSTATIONS PROCESSES USING MULTIFUNCTIONAL RADIOMER DEVICES, PREVENTING ACCIDENTS AND ACHIEVING ECONOMIC EFFICIENCY

Yulchiyev M.E
Andijan State Technical institut
Makhmudova Z
Muminxujayev Sh
Andijan State Technical institut

Annotation: *Currently, the reduction of electricity costs is one of the pressing issues. The current technical and organizational problems in the electricity metering system, a number of topical issues related to the sufficiently efficient power distribution networks, and the reliability of electricity transmission lines and transformers. Introduction of automated information systems for real-time monitoring of network modes, prevention of possible accidents and effective solutions to these problems. Possibility of receiving information from the substation temperature, gas protection, object protection, fire safety (sensors) and sending this information via SMS with Radiomer Intelligent System log.*

Keywords: *electricity, distribution networks, metering systems, modes, alarm systems, automated information systems,mechnology, reliability.*

The energy efficiency of the use of electrical energy is a quantitative assessment of the process, which characterizes the level of technology used for the conversion, production, transmission and distribution of electrical energy. Indicators of energy efficiency of production, transmission and distribution of electric energy are the total specific fuel consumption by electric power system (EPS) in the regulated conditions of its operation, the absolute or relative normalized value of the total losses of electric energy and the regulatory environmental parameters of the system as a whole. At the present stage of electric power industry development, an improvement of energy efficiency in generation, transmission and distribution of electric power is are critical task for electric power system (EPS) of each country. This task is especially important for Uzbekistan, which has majority of energy-intensive generating equipment, put intro operation in 1960s-70s.

Energy efficiency in application of electric power – is a quantitative assessment of the process, which shows level of technology used for transformation, generation,transmission and distribution of electric power. Indication of energy efficiency in generation and distribution of electric power are total specific fuel consumption within EPS, under regulated terms of its work, absolute or relative

standardized value of total waste of total of electric power and standard environmental parameters of electric power system, as a whole[1].

The development of the energy sector is related to the continuous increase in electricity production. Why do people regard electricity as the main form of energy? For the production, distribution, and more convenient to use in the production[2].

The issue of electricity accounting is the most relevant in today's market relations. The main difficulty is that reliable estimation of power losses in distribution networks is almost impossible due to the technical and organizational problems in the electricity metering system. There are a number of urgent problems with the sufficiently high efficiency of transmission lines. These include:

- low reliability of electrical devices, excessive wear and deterioration of electrical systems, automation systems, protection, alarm systems;
- lack of timely, reliable and timely information on the operation of the power system; low efficiency of operated power grid operation during scheduled switching and emergency response;
- unacceptable power losses;
- power outages and lack of electricity due to an emergency.

The purpose of the automated system

The distribution of electricity generated by consumers with high voltage power lines is a classic example of complex technological processes that require methods, centralized control and control.

The concept of “reliability” is widely used everyday in all spheres of human activity (in science, technology, everyday life, art, medicine, etc.), which introduces the breadth of its interpretation. However, the practical solution of certain problems, and sometimes even clarification of their essence, is completely impossible without a clear establishment of certain concepts and relationships between them, the allocation of certain properties and their quantitative description. Therefore, it is advisable to begin the study of reliability by examining what is understood and the characteristics of reliability that are used in solving problems that arise during the creation and operation of artificial technical systems in general and electric power systems in particular[3].

Characteristics.

Works on the GSM 900/1800 network.

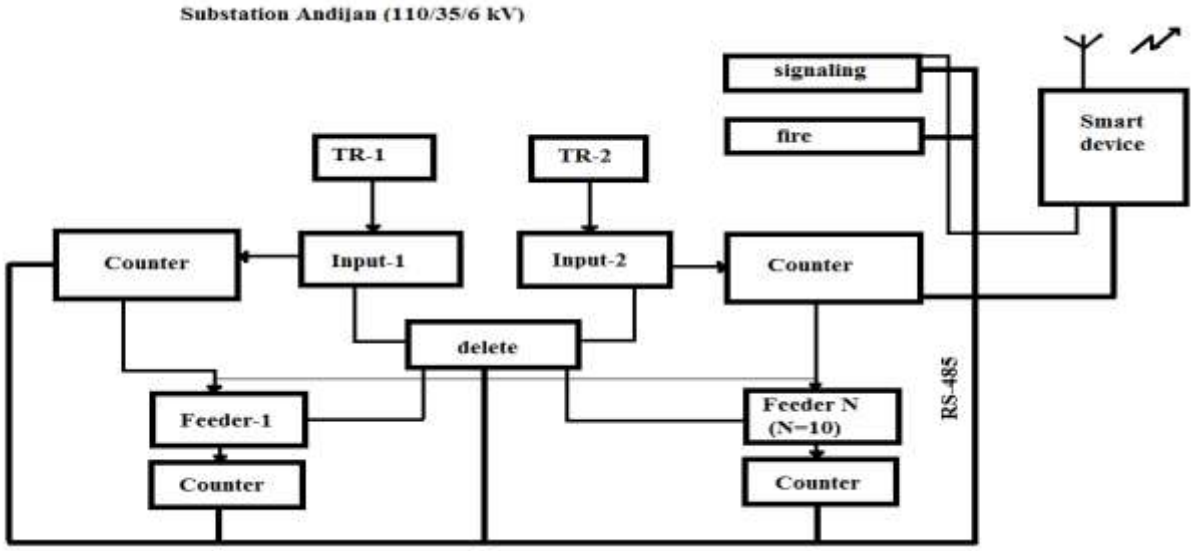
GPRS connection to the server through TCP / IP technology.

ADSL and Internet access.

Back up Server Availability.

Works with up to 15 different tires on one tire.

Fig,1.



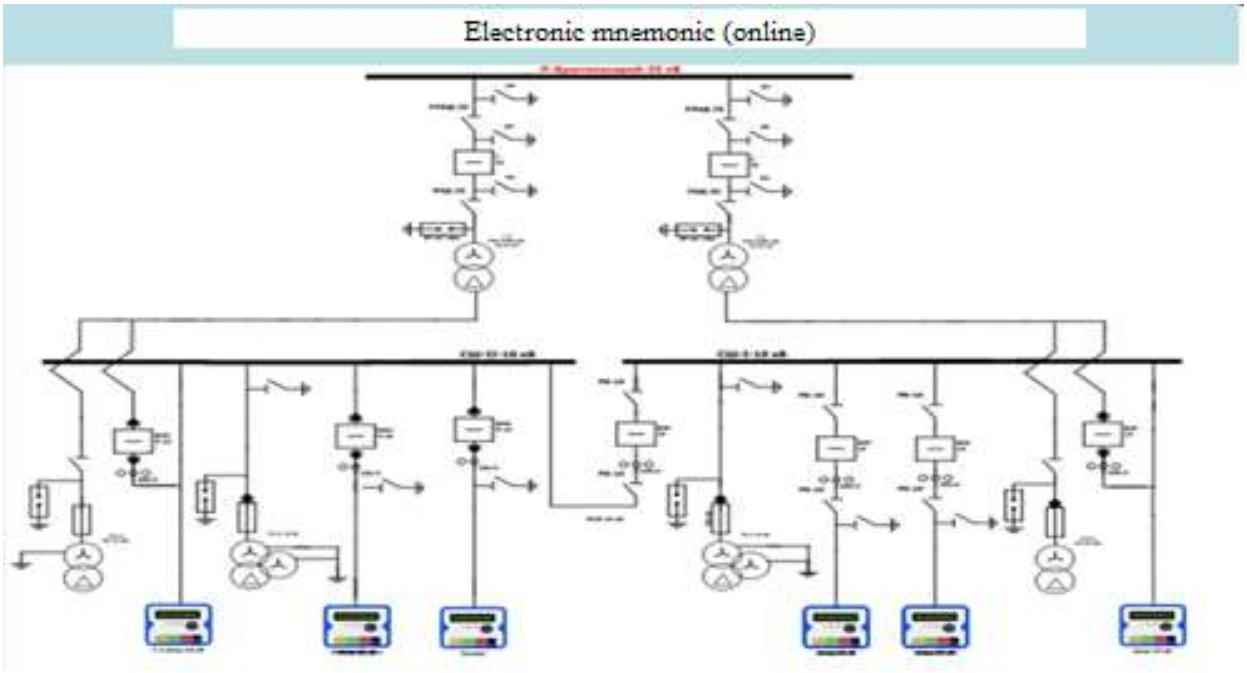
Database is available on the server and every 20 seconds the data from the smart device is recorded.

Data from the counter.

- Current (Phases A, B, C).
- Voltage (Phases A, B, C).
- Active power, kW (phases A, B, C).
- Reactive power, quark (Phases A, B, C).
- Full power, kVA (phases A, B, C).
- Frequency.
- Input / output active energy, kWT / hour (+ W / -W).
- Reactive energy input / output, kWh / h (+ Q / -Q).
- Angles between phases.
- Corners between current and voltage.

Fig, 2.

Fig, 3.



Filter numbers and allow other systems

• Intelligent device allows you to filter phone numbers, which allows the system to operate continuously, and can only be accessed through a memory number.

• Holley, Energomera, Mercury, Alpha, and other computer programmers have the ability to obtain information from the computer through an intelligent device.

• Alert, Security and Fire Safety.

• With the Radiomer Intelligent device it is possible to receive data from the substation from temperature, gas protection, object protection, fire safety (sensors) devices and send this information to the stored telephone numbers. If the load on the transformer overloads, the SMS will be sent in step 2 and after the set time the unselected feeders will be deleted.

- Stage 1: Chief Engineer on duty, district or city.
- Stage 2: The regional operational management officer.
- All data is recorded in the telemechanics database.

Фидер	Идентификатор	ТТ	ТН	Номер пломбы
Ф.Интеграл	434	20	100	1

Table,1.

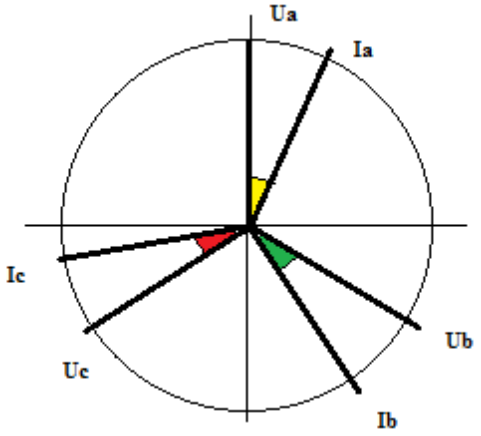
Число	+W	Роз.	kVt	+Q	Роз.	kVar	-W	Роз.	kVt	-Q	Роз.	kVar
02/03/2016 .06.00.	1360.150	-	-	390.7760	-	-	0.0	-	-	366.3260	-	-
02/03/2016 .06.30.	1360.170	40.0391	-	390.7880	23.9868	-	0.0	0.0	-	366.3260	0.0	-
02/03/2016	136	39.	79.83	390.8	30.02	54.01	0.	0.	0.	366.3	0.	0.0

.07.00.	0.189	7949	40	030	93	61	0	0	0	260	0	
02/03/2016 .07.30.	1360.2300	80.0781	119.8730	390.8270	47.9736	78.0029	0.0	0.0	0.0	366.3260	0.0	0.0
02/03/2016 .18.00.	1361.1600	-	-	391.4200	-	-	0.0	-	-	366.3260	-	-
02/03/2016 .18.30.	1361.2100	99.8535	-	391.4490	57.9834	-	0.0	0.0	-	366.3260	0.0	-
02/03/2016 .19.00.	1361.2500	80.0781	179.9316	391.4680	37.9639	95.9473	0.0	0.0	0.0	366.3260	0.0	0.0
02/03/2016 .19.30.	1361.2900	80.0781	160.1563	391.4930	50.0488	88.0127	0.0	0.0	0.0	366.3260	0.0	0.0
02/03/2016 .20.00.	1361.3300	79.8340	159.9121	391.5170	47.9736	98.0225	0.0	0.0	0.0	366.3260	0.0	0.0
02/03/2016 .20.30.	1361.3600	60.0586	139.8926	391.5350	36.0107	83.9844	0.0	0.0	0.0	366.3260	0.0	0.0
02/03/2016 .21.00.	1361.3900	60.0586	120.1172	391.5530	36.0107	72.0215	0.0	0.0	0.0	366.3260	0.0	0.0
02/03/2016 .21.30.	1361.4000	20.0195	80.0781	391.5590	11.9629	47.9736	0.0	0.0	0.0	366.3260	0.0	0.0
02/03/2016 .22.00.	1361.4300	60.0586	80.0781	391.5780	38.0249	49.9878	0.0	0.0	0.0	366.3260	0.0	0.0
03/03/2016 .06.00.	1361.5400	-	-	391.6540	-	-	0.0	-	-	366.3260	-	-
03/03/2016 .06.30.	1361.5600	40.0391	-	391.6690	30.0293	-	0.0	0.0	-		0.0	-
03/03/2016 .07.00.	1361.5800	39.7949	79.8340	391.6800	21.9727	52.0020	0.0	0.0	0.0		0.0	0.0
03/03/2016 .07.30.	1361.6200	80.0781	119.8730	391.7030	46.0205	67.9932	0.0	0.0	0.0		0.0	0.0
03/03/2016 .08.00.	1361.6500	60.0586	140.1367	391.7270	47.9736	93.9941	0.0	0.0	0.0		0.0	0.0

Table, 2.

Device type	DTS-546
Identifier	113376
Seal number	
Phase sequence	
Phase angle	
Current on	
Direction of phase currents	
Voltage limits	
Angle degrees (phases A and B)	120
Angle degrees (phases B and C)	120
Angle degrees (phases C and A)	120

TV	100	TT	30



	A	B	C	Total
Current A	0,057	0,059	0,059	
Voltages B	55,29	55,49,6	55,69,6	28800
Full power, kW				
Active power, kW	8.1	8.7	8.4	25800
Reaktive power kWar	4.2	4.2	4.2	12900
Angle degrees (A and B)	26.104	25.177	26.104	

	+W	+Q	-W	-Q	Number
Beginning of the month	1033.07	714.107	0.262	9.611	01/03/2016.00.01.46
Beginning of the day	1034.37	714.723	0.262	9.629	03/03/2016.00.02.05
The last	1034.64	214.843	0.262	9.63	03/03/2016.12.06.55

Primary server and auxiliary server.

• Intelligent device connects to the host server as soon as it starts up. If the primary server fails, it will automatically connect to the backend server. In order to improve and stabilize communication, the primary server and auxiliary servers must be connected to different Internet providers.

• The IP addresses of the servers must be static. 213.230.91.140 (RadioMer.uz)

• VEB Server and its convenience.

• The fastest and easiest way to get information right now is the web sites. Another good advantage of Web servers is that users can access information in any way they want, from their phones, tablets, and similar devices.

An automated monitoring system of electrical networks is designed to perform the following tasks and functions:

• Substation scheme.

• Structure of the system.
• Characteristics of the intelligent device.
• Counters.
• Information from counters.
• Memory.
• Filter numbers and allow other systems.
• System password.
• Types of web site access permissions.
• Alert, guard and fire safety.
• Circuit system.
• Additional discrete inputs / outputs.
• Technical characteristics of the station.
• Troubleshooting
• Primary server and auxiliary server.
• VEB Server and its convenience.
• Substance balance.
• Real-time telemetry balance.
• Consumers' Personal Cabinet
• Methods for summarizing the flow of electricity.
• RadioMer_ODS client software and its convenience.
• Electronic mnemoshema.
• Group substation (110 kV line).
• Feeder constraint statistics at the station.
• RadioMer devices.
• Failures.
• Economic analysis.

- centralized management and control of complex geographically distributed networks, but integrated networking processes;

- Efficient power management of the power supply network, where the necessary information should come from the power supply control point;

- processing and presenting information on the current state of managed facilities in a user-friendly way;

- collection of management and command data in the current managed technological process, which means a minimal delay in data transfer and management activities;

Ensure the highest reliability of information delivery and its reliability, as the damage caused by incorrect commands or other instant messages and the transmission of these messages can cause significant economic losses and, in some cases, emergencies. The automated system must meet the following operating requirements:

- High level of interference should be ensured for the reliability and reliability of the data transmission;
- Provide reliable information to the power points control center and provide this information to the engineer and dispatcher so that they can quickly and accurately respond to power failure;
- maintaining a complete record of the data collected and automatically storing the event log;
- It has the function of automatic self-diagnostics of devices and self-control of the unit, which maintains operation of individual boards and blocks;
- The automated system should also allow for relatively simple reconstruction during the expansion (duplication) of information and ensure compatibility with existing communication channel systems and equipment;
- The automated system must operate in a variety of environmental conditions: high humidity, heat, cold, fog, ice.

Summary:

All of the above problems are relevant and are widely discussed in our country and abroad. The reliability of electrical equipment can be solved by replacing worn-out equipment with new ones, but this is due to the need for significant investment. At the same time, the introduction of an automated information system for real-time monitoring of electrical networks can be an effective solution to these problems.

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