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SMART COUNTERS FOR IMPLEMENTATION IN INTEGRATED SMART GRID

СМАРТ СЧЕТЧИКИ ДЛЯ ВНЕДРЕНИЯ В ИНТЕГРИРОВАННУЮ ИНТЕЛЛЕКТУАЛЬНУЮ ЭНЕРГОСИСТЕМУ

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Аннотация. В статье рассматривается понятие интеллектуальной энергосистемы (Smart Grid) и ее элементы, в частности рассматриваются смарт счетчики, которые являются неотъемлемой частью интеллектуальной энергосистемы, так как эти счетчики не только считывают потребленную электроэнергию, но и занимаются сбором данных, передачей и мониторингом информации.

Abstract. This article discusses the concept of Smart Grid and its elements, in particular, smart counters are considered that are an integral part of the intelligent power system, since these counters not only read the consumed electricity but also collect data, transmit and monitor information.

Keywords: Smart Grid, power system, data transmission, smart counters.

Ключевые слова: Smart Grid, энергосистема, передача данных, смарт счетчики.

As we are all aware technology development is progress but with the advancement of technology comes to us also the problem needs the electricity. Power consumption makes us think about the future, how we respond to the needs of mankind to electricity. If we now take the necessary decisions can be late in the development of technologies. As the world practice shows us that the entire electricity network may be intellectualization, as developed countries have begun to do so of course, they also develop an optimal solution. But these countries have already highlighted huge budgets for this industry because scientists in these countries see a future in this field and they are confident that intelligent grid will provide complete control over the entire system that is centralized and distributed energy system.

There is such a notion as “Smart Grid” that is intelligent energy system is an automation system that independently monitors and distributes the electricity flows to maximize energy efficiency. The use of modern information and communication technologies, allows you to communicate equipment Smart Grid network with each other, forming a unified intellectual system of energy supply. Hardware information collected is analyzed and the results of the analysis can help you optimize the use of electricity, reduce costs, increase reliability and efficiency of energy systems [1].

Intelligent power system consists of many parts and they all together make up one whole centralized energy management system. In our case we hold national grid integration of renewable energies in particular with solar power plants. This we get an integrated working Wednesday from two sources of power generation. Using the integrated system, we achieve a balance in power consumption that is one system will cover another loaded during peak moments. But to achieve the

full functionality of the system need to implement part of the system very much, this can be achieved gradually realize one-part step by step.

An integral part of the intellectual power systems is electricity counters, which is the measurement of electricity consumed in objects whether they are residential or industrial. Based on today's technology we have already modern counters so-called smart counters. These counters have properties which distinguish them from conventional counters, they allow to evaluate the energy consumption and transfer data to the operator and consumer cellular, Wi-Fi and other wireless communication channels. Electricity counters can be programmed to communicate with various appliances and control it to suit different environments. Smart counters allow you to detect energy losses in networks, thus making it easier to find and fix defects on line [1]. The distinctive feature of smart counters this, that they can control electricity tariffs in both parties that there is a counter monitors the incoming energy and also extends electricity, and this simplifies the sale and purchase of electricity. This is useful if the user produces electricity using solar converters and that he is not only a consumer but also a producer [2–3].

For the transition to Smart Grid technologies in Uzbekistan delivered priority is development of the concept of accounting of all technological devices that are required in the development of intellectual power grid. One such technical devices is smart counters that measure the electricity in kW.

Today, there are many manufacturers of electronic smart counters and smart counters are necessary in our lives. But they do not all meet the required world standards. For example, three-phase intellectual ALPHA SMART AS1440 counters are made by Russian producers based on Alpha technology smart [4].

The functionality of the counters is:

- measuring and accounting for active and reactive energy, work in many tariff mode;
- measure and display parameters of three-phase electrical network (currents, voltages, frequency, power factor);
- Self-diagnosis;
- recording and storing of data load schedules and network settings in the memory of the counter;
- proof of accepted or transferred information;

The counter has been tested and is manufactured in accordance with State standards. Also, AS1440 has the following equipment:

- GSM/GPRS modem;
- PLC module;
- radio communication module, 868 MHz;
- Ethernet Module (<https://goo.gl/KtunSs>).

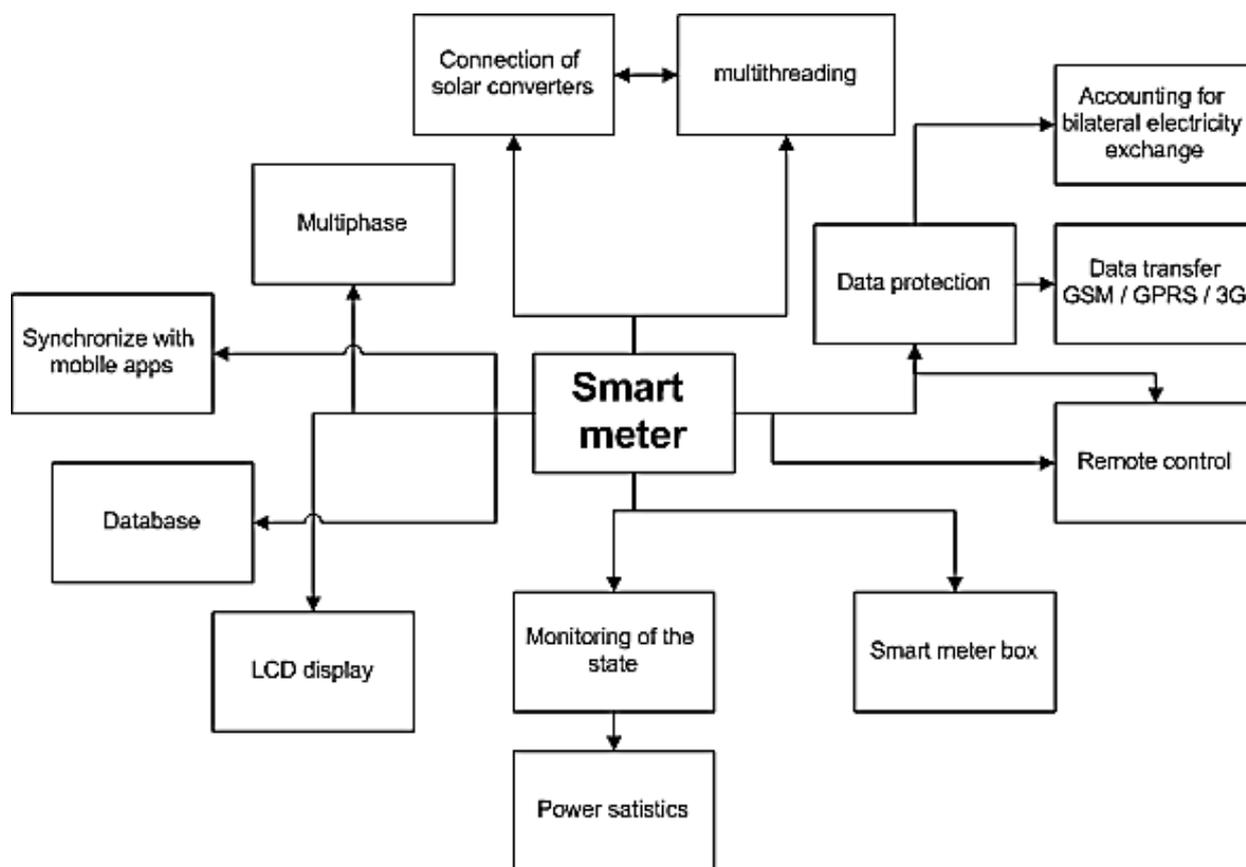


Figure. Form functionality of Smart counters.

In addition to Russian manufacturers, there are foreign manufacturers of smart counters. One such company is Landis + Gyr is the company produces electric counters for many years and has experience in production but also their electric counters are of good quality and manufacturability. The counter under the brand name Landis + Gyr E850 not bad candidate uses in Smart Grid technologies, because these counters are network and you can use them integrated with other sources of electricity:

- Accuracy class 0.2 S/0.5 S for active energy and 0, 5S/1 for reactive energy;
- 50/60 Hz and 16 2/3 Hz (railway infrastructure);
- 8-digit liquid crystal display (LCD) for local readout data;
- Exchangeable communication modules (RS 232/RS 485/Ethernet/GSM/GPRS/UMTS (3 g);
- built-in optical interface and serial interface RS485 DLMS Protocol;
- communication with several third-party vendors;
- up to 8 push pins (for energy flow, control pressure (Pmax, Qmax) period of capture);
- 4-square measurement (+ P–P, + Q–Q, Q1 ... Q4);
- measurement of the instantaneous phase voltages and currents;
- phase angle Measurement and determining the direction of rotating field;
- monitoring the instantaneous voltage (imbalance, excess/low voltage failure) and current (imbalance, overcurrent);
- voltage drop Table;
- management tariffs;
- time of use (TOU);
- Load profiles daily snapshot;
- Saved billing profile;
- bypass feeder;
- logs;

–three configurations of software (<https://goo.gl/3u4h1f>).

This article was reviewed by two kinds of Smart counters and their capabilities, features and functions. Studies have shown that the counters from Landis + Gyr are more modern and meet the requirements of the technology and are more suitable for integration with intellectual energy.

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