DESIGN OF INFORMATION SYSTEMS. BPMN 2.0 THERMAL POWER STATIONS

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Abstract. *This article covers the main issues of designing automated systems, where the process of providing hot water and electricity to the population of the heating station is drawn up in a project form in BPMN. In addition, the tasks of all heat supply devices and their sequence are shown in the complete project. The purpose of the article is to design the project of the system of heat energy supply stations in the BPMN, created on the basis of new methods of today, and to carry out its wider application in the countries of the world, as well as to increase the interest of students and young people in designing.*

Keywords: *Information technologies, systems design, notation, heat energy supply station, system, notation, mechanical energy, power transmission, transformator.*

Introduction

Currently, the development of science and technology is increasing the demand for automated systems. In our country, the main factor of the development of science and technology is also paying great attention to the further development of the automated system.

The information society creates a great ground for economic and scientific-technical progress, the quality of products produced in the country and the improvement of labor productivity, the improvement of macro- and micro-level management of the economy, and the development of promising scientific directions. The establishment of such a society is closely connected with the achievements of scientific and technical development and the application of information and communication technologies in advanced production areas and the creation of materials and raw materials. Information processes serve as the main basis for human development, which is considered the main social productive force of society. It gives people a great opportunity to improve their skills in the wide application of the most modern computer equipment and to test their inexhaustible abilities in practice.

Arming people with modern technologies that increase their information processing capabilities is the most important technical and economic task that requires rapid development of the information industry. The use of information technologies in the economy ensures the quality of economic information, its accuracy, objectivity, speed, and as a result, the opportunity to make management decisions on time increases.

Therefore, the formation of the national information system is one of the most urgent tasks of today and is the main factor of the development of society.

The main criterion for the introduction of information technologies should be oriented to every person, in any market relationship and in public administration. Information technologies include an information system that is used in all areas of human activity and has an organizational, economic and social structure.

Information systems and technologies are being used more widely in various fields of personal activity year by year. The goal of their creation, implementation and widespread use is to solve the problems of society and the information of the whole life of a person.

Material and Methods

Currently, the demand and interest in designing information systems is increasing. We can now use many programs to design our systems. Among these, we can take many programs such as BPMN (Business Process Model and Notation), UML, Erwin Modeler. By projecting, we will express our systems more clearly and understandably, and ensure the perfect completion of the work. The project of heat and electricity supply stations is also compiled in BPMN, which fully reflects the processes of the heat and power plant, how to provide the population with hot water and electricity, and what devices are used in this process. The project allows the user to view it. allows you to understand the content of the project. The project is fully covered with various elements in the BPMN program.

The main goal of BPMN is to create standard conventions that all business users can understand. Business users include business analysts who create and improve processes, technical developers who are responsible for implementing processes, and managers who monitor and manage processes. Therefore, BPMN is designed to serve as a link between the design phase of a business process and its implementation phase.

Currently, there are several competing standards for business process modeling. The spread of BPMN helps to unify basic business process concepts (e.g., public and private business processes, choreographies) and more complex concepts (e.g., exception handling, transaction coverage).

A small list of symbol categories has appeared to allow people working with BPMN diagrams to easily recognize the main types of elements and to read the diagrams correctly. The main categories of elements allow to add information that meets the requirements of complexity without making significant changes to the overall structure of the diagram for internal changes, as well as for ease of understanding.

There are five main categories of elements:

1. Flow elements (flow objects);
2. Data
3. Connecting objects;
4. Areas of responsibility (swimming lanes);
5. Artifacts.

Results

The project of thermal energy supply stations will help the user to increase his knowledge of this topic and develop his interest in designing it. Currently, many people do not know about the process of providing heat energy to the population, and through our project, even a person who does not have any knowledge and skills in this topic can see the project and learn about the process. Through this project, Issiklik will get information about what to pay attention to in the construction of thermal power plants, what tools and equipment can be used. In our project, the processes are expressed in a vertical form, and the tasks of each piece of equipment are shown.

Classification of schemes in the picture:

- Yellow rectangles are multi-room houses
- Yellow lines - hot water supply to the population

- Blue lines - distribution of cold water to the population
- Purple color-electric energy goes to the population

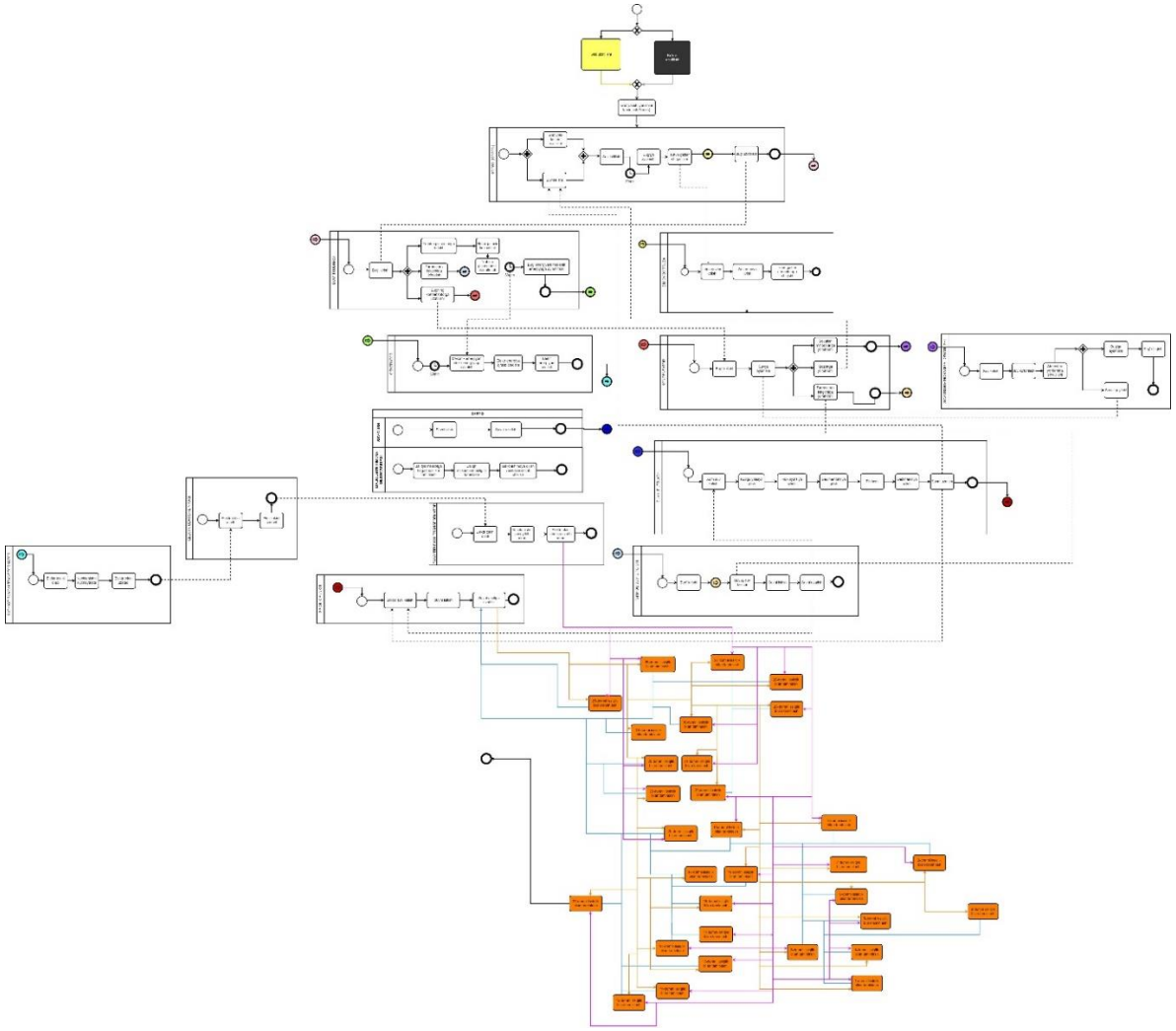

Figure 1. The complete view of the supply of the thermal power plant

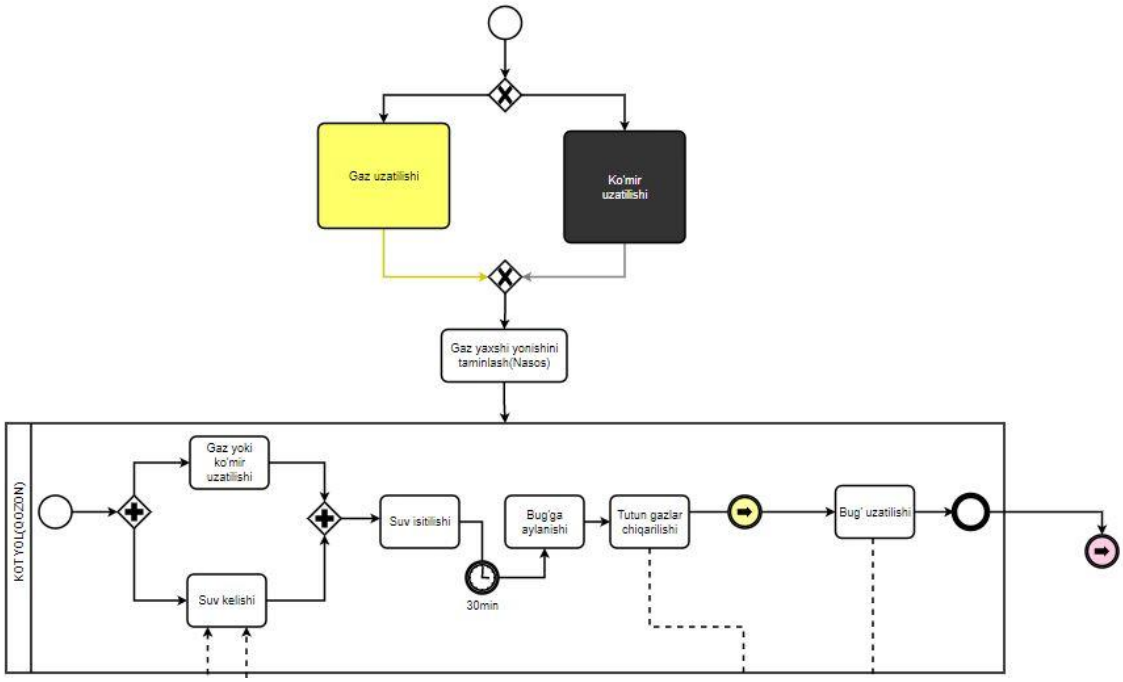

Figure 2. Gas transmission and boiler operation

Here, the boiler is heated by gas or coal and ensures the process of heating the water in it, and the steam resulting from this heating is sent to the steam pipe. Also, the smoke gases are collected in the boiler. Through the chimney, these smoke gases are released into the atmosphere. In this process, air also enters the chimney. The chimney is usually built higher, which helps it release the smoke gases without harming the population. This is why thermal power plants are usually built in places far away from the population.

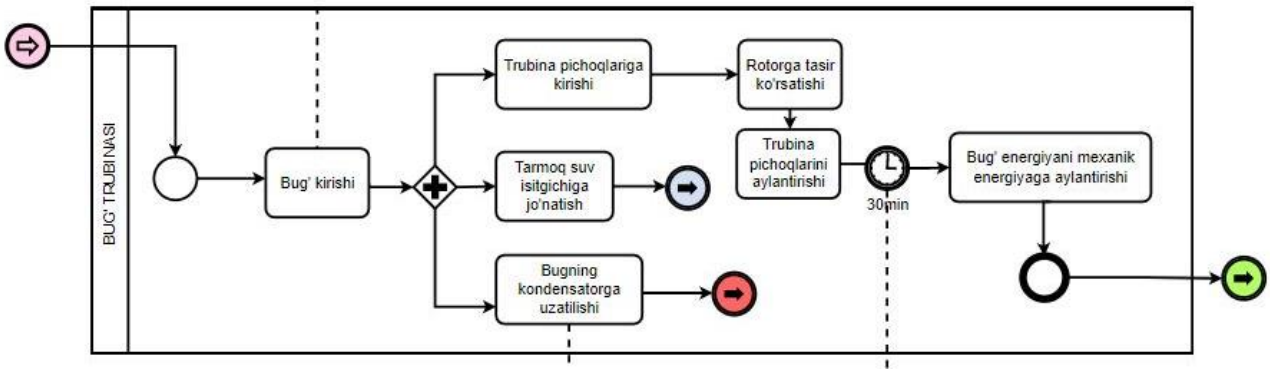

Figure 3 Steam pipe operation

The steam pipe enters the steam from the boiler and the steam turns the rotor blades to help convert the steam energy into mechanical energy. The steam is also sent here to the mains water heater and the condenser.

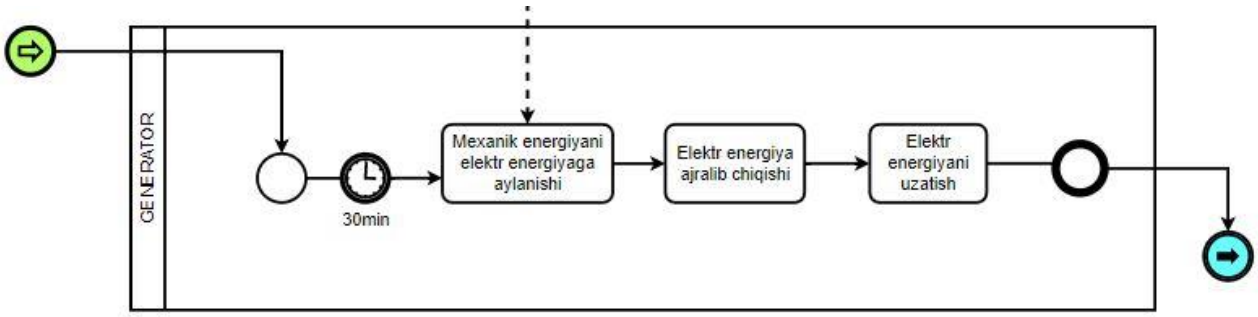

Figure 4 Generator

The generator converts mechanical energy into electrical energy and sends it to a step-up transformer. The condenser converts the steam from the steam pipe into water and sends the water to the water treatment plant and cooling tower. The cooling tower cools the water coming from the condenser through atmospheric air, turns part of it into steam, and cools part of it back to the condenser. In the process, the water is pumped through and prevents the condenser from overheating. Water to the water treatment plant comes from the river and from the condenser and heat station.

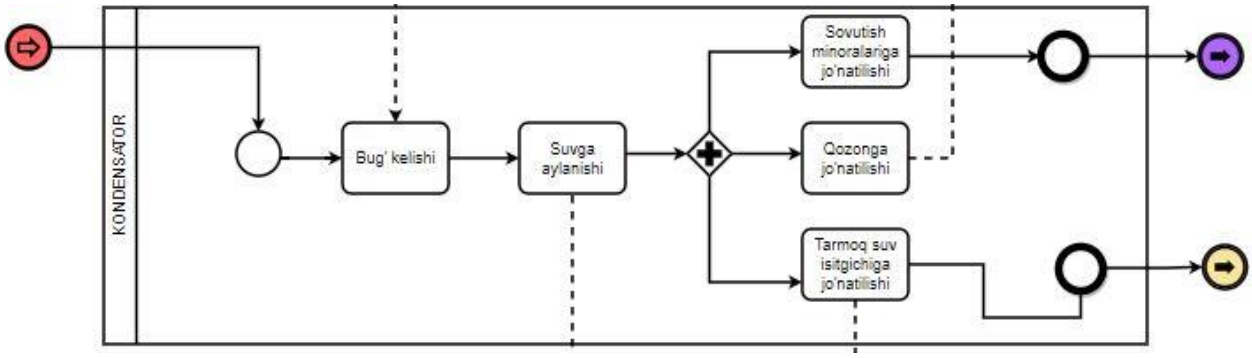

Figure 5 Condenser

These waters are purified and fed to the boiler. In the process of water purification, water undergoes the processes of coagulation, flocculation, sedimentation, filtration, and disinfection. Figure 5.

Through the heating point, the water coming from the apartments is heated and pumped to the buildings where residents live.

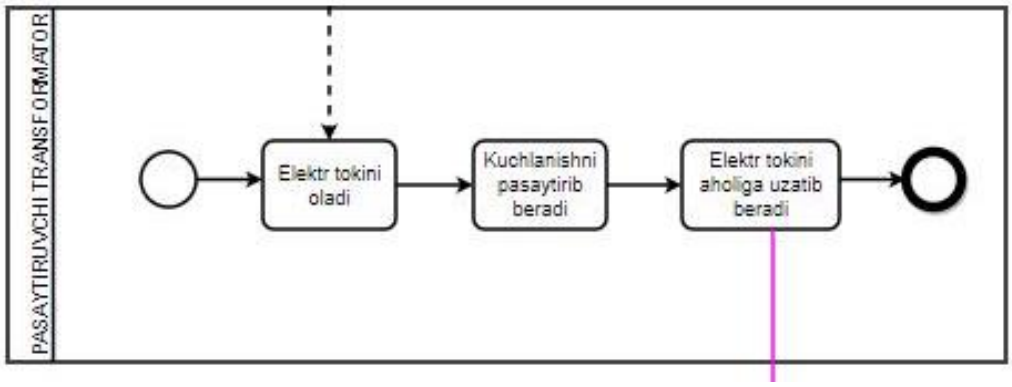

Figure 6 Step-down transformer

The power line transfers the current from the step-up transformer to the step-down transformer. Here, step-up and step-down transformers help to reduce the electric current lost on the road and transmit it to the population at the required voltage. Electricity is transmitted to the population through step-down transformers.

Providing the population with hot water and electricity through these processes was fully covered in the BPMN project.

Discussion

The standard business process model BPMN enables enterprises to understand their internal business procedures in graphical symbols and enables organizations to communicate these procedures in a standard way. In addition, graphic symbols help to understand cooperation and business operations between organizations.

Advantages

1. "In the minimal configuration" BPMN is a simple, convenient and compact way of describing the enterprise architecture, supports the process approach and is syntactically close to the previous languages of the ARIS, IDEF, etc. families.

2. BPMN is a free script, on the basis of which free BPMN modeling tools have been successfully created.

3. BPMN is able to model the processes to be executed, bringing its formalization to such an automated level, where, for example, the checking of conditions and the execution of scripts (script tasks) can be assigned to a machine rather than to its operator.

4. BPMN is distinguished by the existence of a single XML format for storing (more precisely, export-import) diagrams, and some BPM tools support this format.

Disadvantages

1. BPMN describes only the architecture of corporate processes, that is, it is an architectural language that describes the transformational paradigm (what should be done?). At the same time, it describes the information architecture of the enterprise (input, output and internal documents, the way of document circulation processes and methods, etc.) are very weak in description, that is, BPMN descriptions are almost useless in ECM implementation. BPMN language is not suitable for describing the communication architecture of the enterprise: positions and authorities, requests, orders and promises.

2. Many BPMN functions are selectively implemented by existing BPM tools. Worse, the limitations also appear technologically at the level of describing the application development process to fully formalize and automate them. Also note that different BPM tools actually support different subsets of BPMN.

3. BPMN notation is too complex for functional customers to understand and even analysts with ARIS/IDEF modeling experience will have to learn it in a special way.

BPMN is used by analysts in response to the wishes of customers, but they see it more as an "improved" flow diagram (flow charts) than an example of advanced technology for modeling business processes.

Based on BPMN 2.0 technology, our Thermal Power Stations project was created, and Thermal Power Stations serve to provide the population with electricity and hot water. In our project, the transmission of electricity and hot water to apartment buildings is clearly and clearly described, through which we will learn what to pay attention to in the construction of thermal power plants. But now, in many foreign countries, the production of electricity without using coal and gas products is rapidly developing. The reason is that coal and gas products require a lot of money, and such products cause damage to the atmosphere.

Conclusion

The possibility of elements of BPMN 2.0 technology and the importance of these methodologies in the areas of design and modeling today are very important.

In conclusion, it can be said that the role of BPMN 2.0 technology in the field of design is important in the current era of digital technologies. Our project is built on BPMN 2.0 technology, which describes the process at the Thermal Power Station. As a result of creating the project, many elements of the BPMN 2.0 technology were introduced, the function of the elements was studied, and ideas about the design of information systems were strengthened. Through the creation of project processes, not only familiarization with the programs, but also a complete study of the project topic, strengthening of knowledge and skills in this field was achieved.

Thermal power plants work process is clearly simplified by BPMN 2.0 technology. A person who sees this process will have information about the task of the process even without any theoretical knowledge. Here, each process is described through the elements of BPMN 2.0, and the project also shows how the hot water supply from the thermal power plants and the electricity supply will be transmitted to the apartments. The project helps to know what to pay attention to in the construction of thermal power plants, what devices are better to use and what devices to bring. As a result of the construction of thermal power plants through the project, many personnel will be employed and it will be a solution to the problems of electricity supply in our country, as well as providing employment to the population. We can start the production of electricity and export electricity to foreign countries through our Issiklik power plants project. This will help our country to develop and take its place among the developed countries of the rest of the world.

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