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MONITORING AND MANAGEMENT SYSTEM FOR HEAT SUPPLY BASED ON THE IoT CONCEPT

To ensure the process of heat supply in Ukraine a centralized heat supply system is predominantly utilized. Due to inconsistencies in the modernization stages of the heating plant equipment (HP), problems concerning integration into a unified data exchange system arise, complicating evaluation processes and management. Analyzing monitoring and management systems, we conclude that heating plants in Ukraine do not use a systematic approach [1] in building information exchange between system components.

To facilitate information exchange in the HP system today, various technical solutions are used, namely: organized communication through dedicated fiber optic lines and GSM networks; part of the collected information (mainly meter data) is archived and transmitted to dispatch observation.

Problems and reasons inherent in the existing approach arise due to the lack of a systematic approach. There is insufficient equipment for information exchange, forcing HP engineers to develop unique software for typical equipment. Diversity of equipment and data processing systems leads to inconsistency in interaction between HP groups; lack of a unified information processing center prevents generalization of information and systematic analysis of situations.

The main reason for the lack of a unified information base, in our opinion, is the absence of a strategy in building an information system. It results in the inability to formulate technical specifications for new systems (allowing the acquisition of equipment that integrates into the system and does not require the development of special software for each new object). In addition, 40% of issues related to solving the energy conservation problem belong to the management sphere, and 60% to the sphere of using innovative technologies [3].

Therefore, implementing a systematic approach in the construction and strategy of information systems of HPs and DH networks, as well as using modern tools for organizing work within the Internet of Things (IoT) concept, will improve management efficiency in the heating supply system. One of the important characteristics of IoT systems is the ability to analyze and process large volumes of data. Applying machine learning algorithms and artificial intelligence allows identifying patterns, predicting events, and making informed decisions to improve and optimize the system's operation. The implementation of such technology provides a mechanism for solving problems such as forecasting energy resource volumes, optimizing the power of generating and pumping equipment, reducing network loads, and improving heating efficiency. Thus, achieving the set goals through the application of the IoT concept will allow: to obtain a unique equipment identification system; use MQTT technology for data collection, enabling message exchange between devices on a "publisher-subscriber" basis; use software and hardware complexes for integration of existing equipment, allowing cross-conversion Modbus to MQTT and vice versa.

The presentation will provide a technical solution for building telecommunications network of the IoT system, show the network structure, which will support real-time data transmission and provide communication between various components of the intelligent heating system; demonstrate a conceptual approach to developing hardware for integrating existing equipment and appropriate software. Further research will focus on developing a database and knowledge to improve the efficiency of information storage and analysis, as well as developing a methodology to improve efficiency of balancing HP loads based on the IoT system.

REFERENCES

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