ABSTRACT

With the information, intelligent, automation technology is mature and perfect, based on the intelligent information heating system gradually replace the traditional heating system, to achieve the fine management of heating systems to maximize energy conservation. Based on the introduction of the principle of intelligent heating system, this paper explains the design of intelligent heating system from the perspective of sensor layer, network layer and application layer. Finally, the large data function of heating wisdom is analyzed. For the domestic wisdom of the application of heating and provide a guide.

INTRODUCTION

As we all know, the heating industry with high energy consumption, high emissions, high input, low efficiency, "three high and one low" features[1]. Thermal industry as a heating industry managers, in order to adapt to the heating industry information, automation trends, in the hardware facilities put a lot of money, making the pipe network equipment and data acquisition device has been greatly improved. But with such good equipment, many heat companies for the heating pipe network adjustment is still using the operator in accordance with the manual experience of equipment operation to adjust and fault handling. There is still a hydraulic imbalance, oversupply phenomenon. The intelligent heating platform can make the central heating system reasonable adjustment and control, so that the whole network
achieves the optimal running state, the best heating quality, the lowest heating costs, and comprehensively improve the economic and social benefits of the heating network. Solve the problems that need to be solved in today’s heating industry, and bring a breakthrough change for the whole heating industry.

INTELLIGENT HEATING PLATFORM SYSTEM ARCHITECTURE

The system integrates data collection, processing, analysis, diagnosis, data visualization and result push as one of the heating industry, so that the heating industry to achieve information technology, automation and control.

The system structure is shown in Figure 1. The system is mainly divided into information sensing layer, data transmission layer and application layer. Information sensing layer is an integrated data acquisition, metering analysis and real-time control system, the main components of instrumentation equipment and field PLC controller. The data transport layer stores the data through the acquisition device via remote transmission to the system. Application layer on the collection of large data from the pretreatment excludes invalid data, easy to the next analysis and diagnosis. Intelligent computing center after the completion of the calculation of data analysis, the final results can be pushed to the heating business client, the system users can see the analysis of diagnostic results in the first time, in order to timely management of pipe network failure, maintenance of pipe network security, efficient, energy-saving operation.

INFORMATION SENSING AND DATA TRANSMISSION

Unattended heat exchange station information collection as shown in Figure 2. Unattended heat exchange station project is a monitoring technology in the central heating application of a phased results[2]. The system can be the first side of the heat transfer station for the return of water temperature, pressure, secondary side of the return water temperature, pressure data collection. Its overall structure is divided into upper data platform system and thermal station monitoring system in two parts. The upper data platform relies on all the functions of the existing monitoring platform to increase and improve the functions of the parameters of the thermal station, the data acquisition, data storage, data display, data query and remote control. Thermal station monitoring equipment through the advanced network and monitoring technology, the thermal station key data uploaded to the application platform. And can receive the remote control parameters issued by the host platform to achieve the local automatic control of thermal stations, abnormal warning, fault reminders and other functions.

The user temperature parameter of the hot user comes from the room temperature collector or the wireless room temperature collecting device in the heat metering system[3]. As shown in Figure 3.
Wisdom heat network up and down communications rely on dedicated fiber, broadband and 3G, 4G network transmission, so as to secure and accurate reception of various types of monitoring data.

Figure 1. System structure diagram.

Figure 2. Heat exchange station information sensing device.
ANALYSIS OF APPLICATION OF WISDOM HEATING NETWORK

Auxiliary Decision Analysis

Through the multi-dimensional statistical analysis of real-time data to help the operators to assist decision-making analysis.

According to the monitoring of the public building heat inlet flow, return water temperature and room temperature on the building for hydraulic balance analysis, to assist the operation of personnel to adjust the hydraulic imbalance, hydraulic imbalance analysis. As shown in Figure 4.

As shown in Figure 5. According to the theory of heat transfer, the statistical analysis theory is used to normalize the room temperature, and the typical temperature of heating is taken as the feedback parameter to realize the correction operation.
Analysis on Optimized Operation of "One Key Energy Saving"

According to the information system to collect the typical operating parameters, analysis of the main equipment operating conditions of the abnormal situation, the regular push to the operator to adjust the equipment running in a timely manner. As shown in Figure 6. Based on large data regression, analysis of heat and the operation of the hot user control is reasonable. It can predict the next 1 day, 3 days, 7 days of heating operation parameters, to guide the heating system on demand heating.

CONCLUSIONS

(1) Real-time feedback equipment to run data and diagnosis: the system real-time feedback on the data can be automatically on the data analysis and diagnosis,
can accurately detect whether the equipment is running online and running is reasonable.

（2）Can achieve the heat station unattended: the system through the replenishment pump automatically replenishment, circulating pump automatic start and stop functions, to achieve the heat station unattended, saving a lot of manpower and material resources.

（3）Automatic warning and alarm device: When the device runs to the limit, the system will automatically issue an alert. When the diagnosis results found the problem, the system will automatically alarm to the user.

（4）Data visualization: for the collection of data and the results of the diagnosis can be converted into graphs, tables and other elements shown in the element, easy to observe and analyze the equipment, the operation of the device at a glance.

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