



Source pump and de-coupler in the sub-station

Reshape Hydraulic Balance, Improve Energy Efficiency

Grundfos iGRID hydronic balancing system brings new life to urban district heating

Project background

In the urban heartland of Wenshang County, Jining City, with streets and valleys crisscrossing, the Xinhe Community, tobacco office building, residential buildings, and several bungalows are interwoven within a unique area covering 25,800 square meters. The continuously evolving and expanding urban landscape, combined with the outdated equipment, facilities, and pipeline systems in the area, present a challenge for Sihe Thermal, Xinhe Community and the tobacco company's heating station in providing centralized heating for this region.

Challenges abound, and modernization upgrades are imminent

The heating station with high energy consumption

The currently operating heating station system has relatively high energy consumption, and its operating costs remain high, making it unable to meet the current energy-saving and emissions reduction requirements. The main reasons for high energy consumption are as follows:

- Aging equipment: The heating station's pumping system and other equipment operate with low efficiency, resulting in high energy consumption.
- Lack of control and regulation measures: This leads to low energy utilization efficiency.
- Hydraulic imbalance: The pipeline system lacks effective balancing and regulation measures, leading to wasted thermal energy.

Heating performance of the bypass

The heating performance of the tobacco bypass during the heating season is significantly inadequate, unable to meet the heating demands of users. It has become a common practice for end-users and top-floor users to drain water, resulting in high consumption of water, electricity, and heat. This has made the tobacco bypass the "most troublesome community" for the heating company.

High difficulty in system maintenance

Due to the complexity and aging of the heating system, daily maintenance and management face numerous challenges. The issue of inadequate heating becomes more prominent during the

Electricity consumption per unit decreased by

32%

compared to last year

Water consumption decreased by

49%

compared to last year

Thermal energy consumption per unit decreased by

6%

compared to last year

Complaint rate decreased by

45%

compared to last year

* All of the above data are from the heating company's statistics.

GRUNDFOS 

Possibility in every drop



Control cabinet



Distributed pump outdoor installation

cold season, leading to increased user complaints. To compensate, the pump speed has to be increased, along with higher secondary water supply pressure and circulation flow. Frequent failures and leaks in the old pipeline network raise maintenance costs and threaten the stability of the heating service, putting significant pressure on the company.

Solution: Precisely addressing aging of heating equipment and system defects

From site survey to optimization plan

After thoroughly understanding the requirements, Grundfos first conducted an on-site survey, carefully documenting the operational status of the existing heating system, the pipeline layout, and equipment configuration. Next, a comprehensive optimization plan was developed through a series of professional hydraulic analyses and other steps.

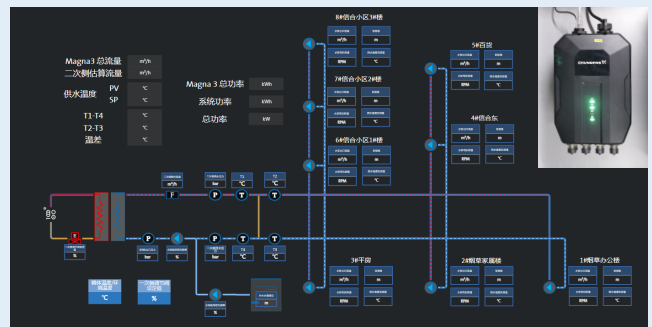
- **System Modeling:** Establish a hydraulic model of the entire system to simulate the hydraulic balancing and circulation resistance of each bypass, evaluating system performance under different operating conditions.
- **Index Loop Analysis:** Focus on analyzing the index loop. Through optimization design and regulation measures, ensure that these loops can meet the designed heating capacity and circulation efficiency during actual operation.
- **Hydraulic Calculations:** Based on the model's calculation results, optimize the pipeline layout and equipment selection to ensure that the system can achieve both hydraulic and thermal balance during actual operation.

Grundfos iGRID Hydronic Balancing System Solution System Self-Balancing

Grundfos' solution installs smart regional pumps at key nodes in the system, allowing these pumps to independently adjust the hydraulic balance of their respective areas. Through modeling and analysis, initial operating parameters for each distributed pump are set, and fine-tuning is carried out during actual operation to ensure the system maintains hydraulic balance under different operating conditions, thereby preventing energy and circulation electricity waste caused by hydraulic imbalance.

Smart Control and Optimization

By introducing the GiS smart control system, Grundfos provides real-time monitoring and regulation of the distributed pumps to ensure system efficiency and stability. At the same time, the Grundfos cloud platform records and analyzes system operation data, continuously optimizing the operating strategy to further enhance energy-saving results. This intelligent management ensures the long-term stable operation of the system, providing users with an efficient and reliable heating solution.



GiS platform

"Grundfos' hydraulic balancing system installs smart regional pumps at key nodes, achieving hydraulic self-balancing and providing on-demand heating based on the specific needs of each area. This not only reduces energy consumption but also significantly improves the heating performance of the system."

Jining Sihe Thermal Co. Ltd. Wenshang Branch
Xiangshan Zhao, Director of the General Office

This heating system renovation project has not only significantly improved the system's performance and reliability but also laid a solid foundation for future energy-saving upgrades and technological advancements. By optimizing the pipeline layout and introducing advanced hydraulic balancing technology and smart control systems, the project demonstrates the immense potential of modern heating technologies in enhancing efficiency and user experience. Additionally, it provides valuable reference and demonstration for future innovations in the heating sector.