

Refrigerated Distribution Centre

Design, project management, commissioning and remote performance monitoring

Project Background

In 2008 a large multinational restaurant chain was developing a new refrigerated and dry goods distribution centre (DC) in Shenyang, Northern China. At the same time, the company had on-going issues with the operation and energy efficiency of its existing DCs in other locations around China.

Baseline's Role

The client initially contracted Baseline to assess and report on the operating performance and energy efficiency of one of its existing DCs. Baseline identified several areas for potential improvement in all of the facility's major mechanical and electrical systems. Baseline was then contracted to apply these approaches to the new DC in Shenyang with the following objectives:

- To improve the equipment reliability;
- To improve the facility's overall energy efficiency;
- To improve the temperature performance of the refrigerated storage areas and;
- To increase the environmental sustainability of the new DC.

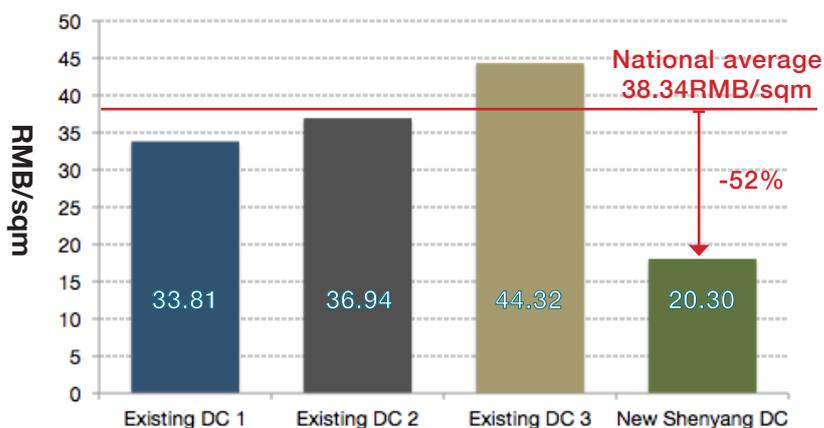
Baseline's Services To Meet Those Goals

1. Facility condition assessment of an existing DC.
2. Complete design of the refrigeration, heating, lighting and digital control systems.
3. Project management and quality supervision.
4. Full commissioning of each system.
5. Remote performance monitoring and reporting.

Main Technologies and New Approaches Applied

- Full digital facility management system (FMS) to control and monitor the lighting, refrigeration, ventilation, heating and facility energy usage instead of manual operation.
- Prefabricated modular refrigeration units and air-cooled condensers located on the roof of the DC instead of a traditional, industrial-type, centrally located refrigeration plant.
- Winter heating for the cool-room and loading dock and defrost of the freezer room evaporators using glycol instead of electric heaters.
- High-bay fluorescent lighting controlled with motion sensors instead of manually controlled HID fixtures.
- Propane-fired Roof Top Units (RTUs) instead of municipal steam supply.
- De-stratification fan system to achieve even temperatures throughout the dry goods storage area at different locations and levels.
- Automated demand ventilation system controlled with CO₂, CO and H₂ sensors rather than manual control.

RMB Energy Expense Per sqm of DC Construction Area



Summary

When Baseline was contracted to design the mechanical and electrical systems for a 20,000sqm refrigerated distribution centre (DC) in Shenyang it found the initial calculations completed by the Local Design Institute and the individual equipment suppliers were extremely conservative. Moreover, the approaches and technologies being suggested were not the most advanced technologies available and were not those best suited for use in a modern DC.

Working closely with the facility's end-user, Baseline designed and implemented the mechanical and electrical systems that achieved the lowest possible cost of ownership and quickest return on the customer's investment.

The end result was a facility that costs 52% less in energy to operate at the same time it is achieving better temperature and operating performance than any of the facility user's existing DCs in China.



Project Results and Benefits

- 52% decrease in energy expense compared to the owner's three other DCs in China on the basis of energy expense per sqm of DC area
- Large reductions in the size of all major mechanical and electrical systems resulting in reduced initial investment and usage of materials
- Decreases in initial and operating environmental impact and carbon emissions
- Compliance with temperature, humidity and indoor air quality standards
- Transparency in operating and energy efficiency performance via remote performance monitoring
- Improvements in equipment reliability and reductions in equipment downtime