

Steam reduction Thermal storage Utilization of exhaust heat

Tamura Seimen Ltd.

Tamura Seimen Ltd. is a limited liability company that was founded in 1947. The company provides noodle products in general such as boiled udon noodles and raw Chinese noodles, etc., to restaurants, schools and supermarkets in Tsuyama-shi, Okayama. As a business that firmly takes root in the local community, the company also actively promotes development of new products that use local foodstuff such as "Tsuyama Rahmen," "Tsuyama Horumon Udon Style Yaki-udon."



Location: 75 Tamachi, Tsuyama-shi Okayama
Site area: approx. 650 m²
Total floor area: 1,200 m²
<http://www.entree.co.jp/tamura/>

Supply of hot and cold water to noodle production processes

Reduced utilization of fuel oil by supplying hot water of 90°C by heat pumps

Challenges before introduction

Fuel oil cost and CO₂ emissions because of high dependence on steam

When the new factory was constructed in 1993, the company introduced heat recovery heat pumps. They were revolutionary equipment at that time. But as they could supply hot water of only about 60°C, the dependence on steam boilers that use fuel oil was still high. Therefore, the sharp rises in fuel oil prices in recent years have become a risk to increase costs, and a large amount of CO₂ emissions is also a problem.



Customer's voice

Mr. Kazuyuki Nagase
General Manager of Production Department
Cosmos Foods Company

Our mission is to deliver everyday fresh noodle products that satisfy customers in our local communities. I believe that the recent renewal of equipment is necessary to continue to honor the mission.

If fuel oil prices jump up by twice as is the case with 2008, we cannot make our business plan at all. In this regard, the new equipment mainly uses electricity and the risk of cost fluctuation is small. So, we can put all our efforts into noodle production with peace of mind. As the trends of fuel oil prices are expected to remain uncertain in the future, I think that the breakaway from the dependence on fuel oil is a natural choice for a business.

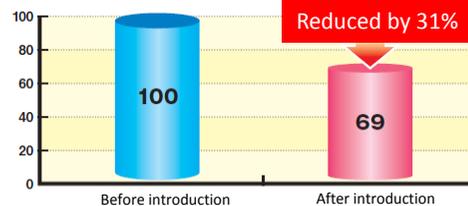
Moreover, as our company has close relations with the local communities, environmental consideration is a point that we have to keep in mind. In this regard, we also expect much from heat pumps which can reduce CO₂ emissions. I hope that other business lines make more use of heat pumps.

Positive effects after introduction

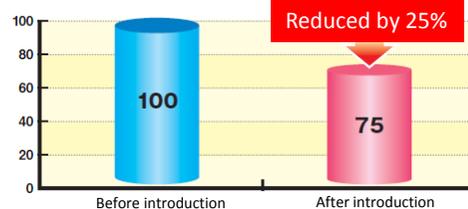
Fuel oil reduced by 70% or more and the CO₂ emissions and cost are successfully reduced

As a result of introduction of a new system with higher efficiency that can supply hot water of 90°C, the amount of fuel oil used per year was reduced by 70% or more from about 16,500ℓ to about 4,500ℓ. CO₂ emissions are also expected to be significantly decreased by 31% to about 29 tons per year. The energy cost of fuel oil and electricity together is expected to be reduced by 25% per year by making good use of nighttime power to reduce the cost as much as possible.

Comparison of CO₂ emissions



Comparison of energy cost



[Calculation conditions]
● CO₂ emissions intensity
● Electricity : 0.555 kg-CO₂/kWh (*1) ● Type A fuel oil: 2.71 kg-CO₂/ℓ (*2)
(*1) Act on Promotion of Global Warming Countermeasures

Points of new system

Demand for cold heat and hot heat in production processes is met efficiently at low cost.

In a place where there are demands for both cold heat and hot heat like food factories, hot water used to be supplied by steam boilers and cold water by chillers in general. The heat recovery heat pumps, which we introduced in 1993 when the new factory was constructed, are an epoch-making system which allows us to supply hot water and cold water more efficiently. However, at that time, the system could increase its output temperature to only about 60°C. Therefore, in order to raise the temperature of hot water to 98°C necessary for the process to boil noodles, it was required to raise the temperature of the hot water by another 40°C by using a steam boiler in combination.

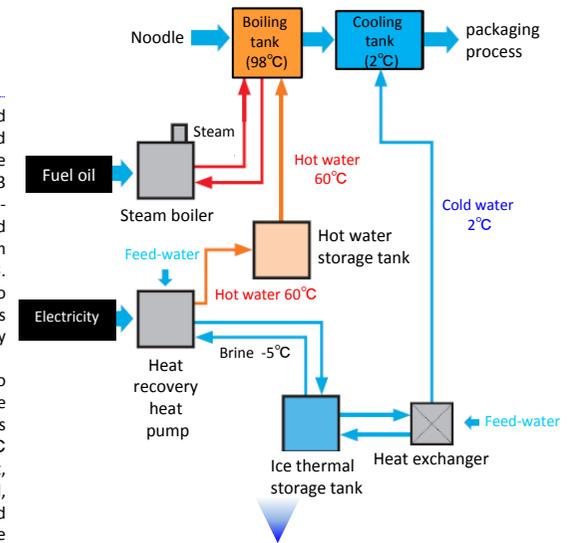
With the heat recovery heat pumps (water heat source Eco Cute), which we started operating in September 2009, the output temperature largely increased to 90°C. Thus, it is necessary for the steam boiler to heat hot water by only 8°C to 98°C required for the noodle boiling process. As a result, the dependence on the steam boiler significantly decreased, and we have successfully reduced fuel oil usage cost and CO₂ emissions. Moreover, cold heat can be stored in ice thermal storage tanks and can be supplied at 2°C during daytime. This is also an advantage. As both hot heat and cold heat are stored in thermal storage tanks (hot water storage tanks and ice thermal storage tanks) during nighttime to supply later, cost reduction can be promoted by making good use of nighttime power.

In the past, we started operating the steam boiler at 4 o'clock in the morning to raise the temperature of hot water to 98°C. As the output temperature increased to 90°C, we can now be in time even though we start working at 6 o'clock in the morning. Consequent labor reduction for our employees is also a positive effect of the introduction of the new system.

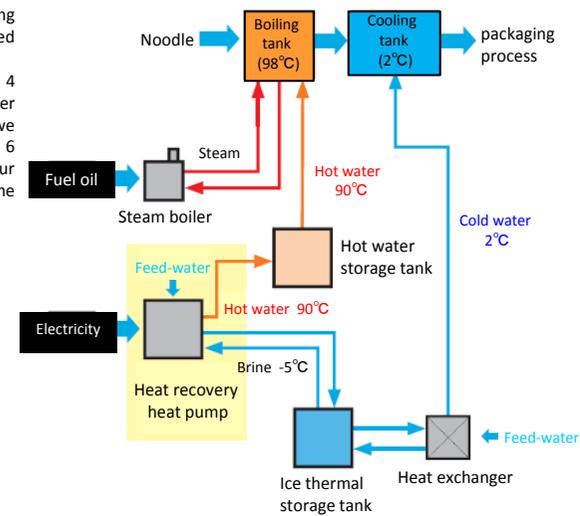


↑ Cooling tank used after the process of boiling noodles

Outline of system before introduction



Outline of system after introduction



Outline of equipment

- Time of introduction: 2009 (renewal)
- Pieces of equipment introduced:
 - Heat recovery heat pump (water heat source Eco Cute) x 1 unit
 - Hot heat 56 kW (90°C) Cold heat 38.2 kW (-5°C)
 - Hot water storage tank 15 m³
 - Ice thermal storage tank 4.1 m³



↑ Hot water storage tank



↑ Heat recovery heat pump (water heat source Eco Cute)