EENP AWARDS 2016

BEST PRACTICES

ASIA PACIFIC BREWERIES SINGAPORE

Background of Company

Asia Pacific Breweries Singapore Pte Ltd, established in 1932, is wholly owned by Heineken. APB Singapore, Tuas factory started its operations since 1988. Sprawling across nine hectares in Tuas, it is the largest commercial brewery in Singapore. From milling to fermentation and filtration, the brewery adopts the most technologically advanced brewing process that is fully automated.

Project Description

Retrofitting of Process Cooling Plant

Sub-zero cooling is required in various stages of the brewing process (e.g. wort cooling, fermentation, deaerated water, yeast storage). An ammonia refrigeration plant, which was commissioned in 1989 and consisted of 4 STAL compressors, was used to meet the cooling demand. From a benchmarking study, it was found that the efficiency of the refrigeration plant was poorer than the industry standard (4kWh/HL* compared to 3.4kWh/HL).

APB Singapore studied its process cooling requirements and found that the alcohol water supply and return temperatures for wort cooling and blending water could be increased as shown in the table below. Hence, APB Singapore installed two new cascading compressors to provide cooling for the wort cooling and blending water lines. This resulted in a decrease in cooling demand from the existing ammonia refrigeration plant and only up to 2 nos. of existing STAL compressors were required to operate.

Coooling Circuit	Existing Alcohol Water Temperature		After Project Implementation Alcohol Water Temperature	
	Supply	Return	Supply	Return
Wort Cooling Line	-4 °C	20 °C	3 °C	27 °C
Blending Water Line	-4 °C	6 °C	-4 °C	27 °C

* 1 hectolitre (HL) = 100 litres

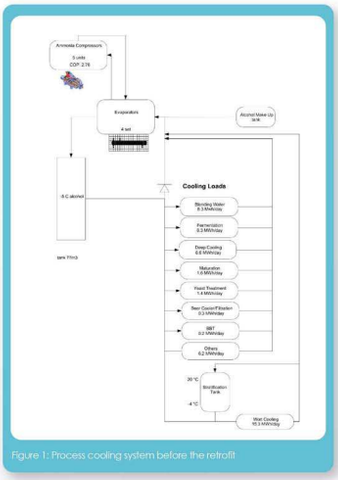

Figure 1: Process cooling system before the retrofit

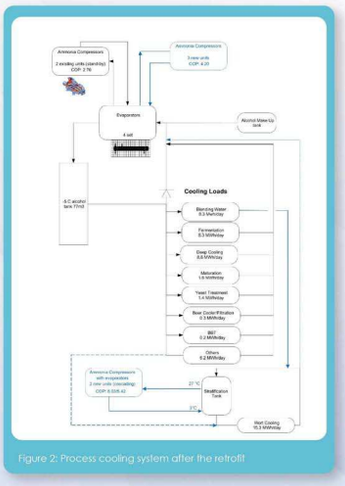

Figure 2: Process cooling system after the retrofit

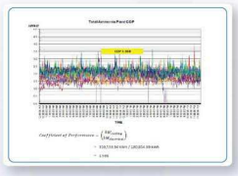

Figure 3: Energy consumption of the ammonia refrigeration plant before the retrofit

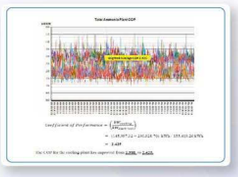

Figure 4: Energy consumption of the ammonia refrigeration plant after the retrofit

Results

This modification improved the efficiency of the refrigeration plant to 3.2kWh/HL and resulted in an annual energy savings of 1.5 GWh.