

Case Study

Installing a Variable Speed Drive on a Steel Mill's Water Pumping System

Main activities	Steel Plant
Region	EU
Energy Consumption	The energy consumption of four pumps operating continuously was 61.9 MWh in the week prior to investment



Project goals

Cooling is an essential part of the steel production process. The plates leave the finishing mill at temperatures between 860° C and 950° C and are water cooled, requiring a continuous supply of cold water. Prior to the investment, no adjustment was made for variations in cooling requirements or production delays, resulting in much waste.

The goal of the project was to modify the cooling process to save energy.

Main investments

The four cooling pumps were fitted with new 210 KW motors, each with a dedicated pulse-width, modulated voltage source, variable speed AC drive, rated at 175 kW motor shaft output and linked to the mill computer. The two motors and their controllers operated on the standard industrial supply voltage of 415 volts instead of 2,750 volts as previously. Two new 2,750/415 volt transformers were also installed.

In a second phase, pumps and pumping speeds were matched to the cooling requirements of each plate and the divert route was blanked off. A computer control ensures that the variable water flow is maintained at constant pressure. The computer checks the configuration and switches on the lowest number of pumps needed to meet the flow and pressure requirement.

Benefits

Energy consumption fell from 61.9 MWh/week to 35.9 MWh/week in phase 1, then to 14.7 MWh/week in phase two. This represented a 76% saving.

Applications

Any industrial process requiring a variable flow of liquids to match demand.

Investment type	Cost (€)	Energy saved (KWh/year)	Saving achieved (€/year)	Payback period from energy saving
Steam boiler	310,000	27,740	93,000	3.3 years