

A Technological Leap Towards Efficiency and Sustainability

Overview: A leading manufacturing company serving the aerospace market, with four distinct sites across the UK identified an urgent requirement to upgrade its cooling infrastructure. Each facility was equipped with a myriad of cooling systems which, over successive years, had become technically outdated and operationally suboptimal. Motivated by a dedication to environmental sustainability and engineering excellence, the company embarked on this ambitious project.

Client Challenges:

Aging Infrastructure:

- The company's cooling systems had been in place for many years. Over time, various modifications, including the addition and removal of equipment, had been made to these systems. This led to a patchwork of components that were not necessarily optimised to work together, resulting in inefficiencies, frequent breakdowns, and increased maintenance costs.
- This inconsistent approach precipitated regular system failures, diminished operational efficiency, and escalated maintenance overheads, thereby impeding the company's production throughput.

Water Consumption:

- Environmental sustainability was a priority for the company. The company had set directives to minimise water usage across all its operations. Their existing open water cooling systems were inherently high consumers of water. This not only went against their sustainability goals but also translated to higher operational costs due to water treatment and replenishment needs.

Legionella Risk:

- **Health & Safety Implications:** The open water systems posed a heightened risk of Legionella outbreaks. This necessitated stringent water treatment regimens, safeguarding the health of the workforce.
- **Financial Implications:** The continuous requirement for water treatment and surveillance introduced a substantial recurrent cost, both in fiscal terms and manpower allocation.

Unknown cooling requirements:

- **Technical Ambiguity:** The various engineering adjustments over the years meant that the company lacked precise metrics on the operational capacities and technical specifications of each system.
- **Strategic Impediments:** This lack of information made planning for future system expansion or modification virtually impossible.

Economic Considerations:

- **Financial Overheads:** The culmination of these challenges resulted in spiralling operational costs, adversely impacting the company's financial health.
- **ROI Analysis:** Capital expenditure on makeshift solutions were yielding diminishing returns, underscoring the need for a holistic system overhaul.

Solution: A leading industrial manufacturing company championed a methodical, data-centric approach: The company adopted a consultative approach, initiating performance monitoring at all sites to determine actual cooling needs. Starting with the site that presented the most significant opportunity for improvement. The solution involved:

- **Adiabatic Cooler Installation:** Installing an adiabatic cooler, a closed system replacement for traditional cooling towers, reducing water usage and Legionella risk.
- **Pipework & Pump Installation:** Implementing new pipework and a pump set with variable speed controls, ensuring optimal energy and water usage.
- **System Streamlining:** Consolidating the cooling infrastructure, replacing two tanks, a cooling tower, and six constantly running pumps with a more streamlined system.

Results: The engineering transformation yielded:

- **Energy Conservation:** An annual reduction of 410,515 kW in electrical consumption.
- **Water Stewardship:** An annual conservation of 1,834 m³ of water.
- **Economic Dividends:** The amalgamated savings translated to an estimated annual fiscal benefit of approximately £70k, a metric set to appreciate with the escalating trajectory of electricity tariffs.
- **Accelerated ROI:** The project's return on investment was realised within a mere 2.2 years, when accounting for the costs associated with water treatment.

Conclusion: The company's proactive approach to upgrading their cooling systems not only enhanced their operational efficiency but also significantly reduced their environmental footprint. This case study serves as a testament to the tangible benefits companies can achieve when they prioritize sustainability and operational excellence.