ENGINEERED SOLUTIONS

CASE STUDY

Enhancing Efficiency, Improving Savings, and Ensuring Compliance:
A Boiler Control System Case Study for a Leading Chemical Manufacturer

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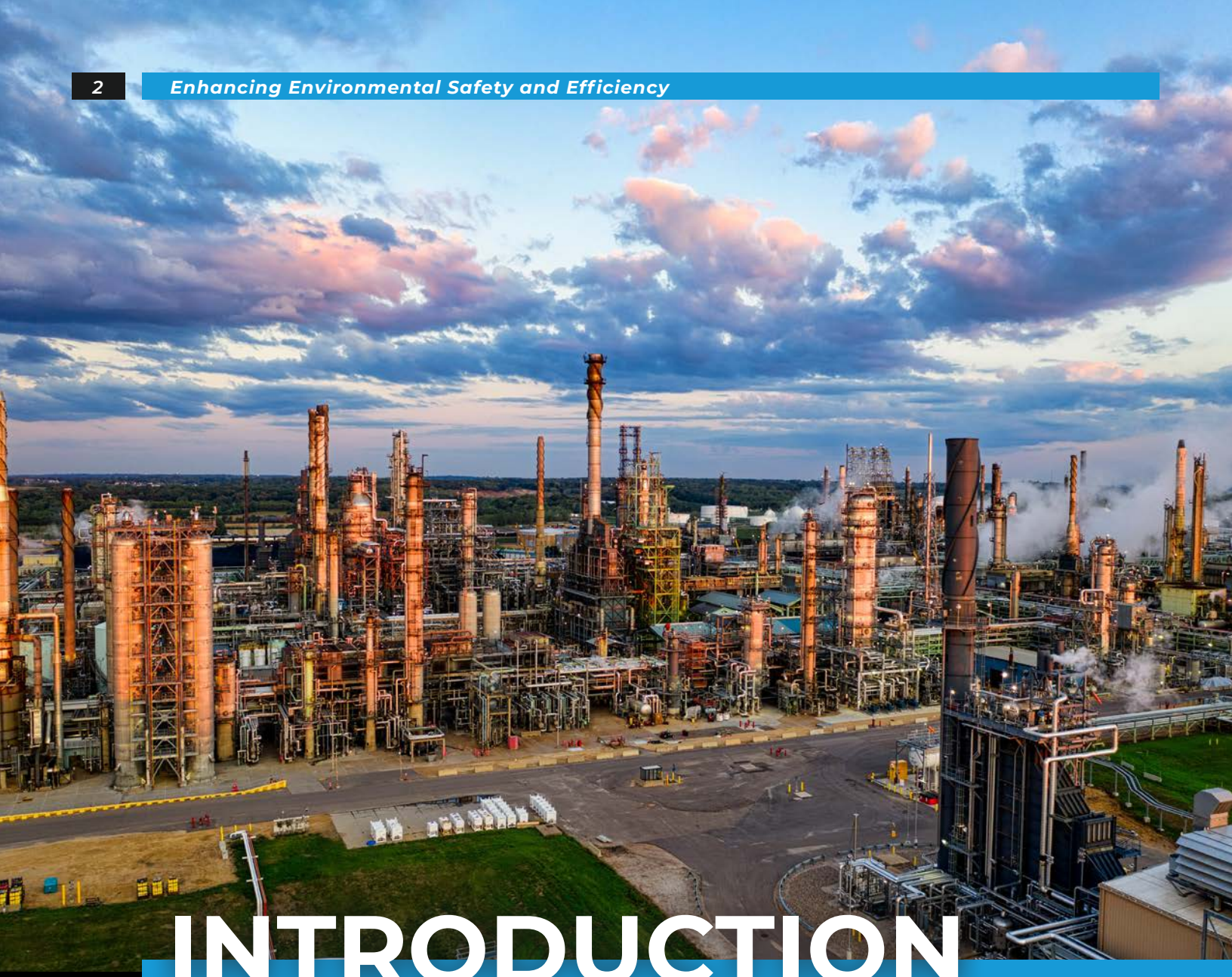

INTRODUCTION

The project aimed to update their boiler control system, ensuring compliance with safety standards while optimizing the use of excess hydrogen to heat the boiler.

This case study demonstrates Relevant's successful collaboration with a prominent chemical manufacturer based in the Milwaukee area that works with various industries, including coatings, construction, oil & gas, automotive, wind, and transportation sectors. The project aimed to update their boiler control system, ensuring compliance with safety standards while optimizing the use of excess hydrogen to heat the boiler. Our tailored solution not only reduced their reliance on natural gas, but also automated the start-up process and improved overall system efficiency.

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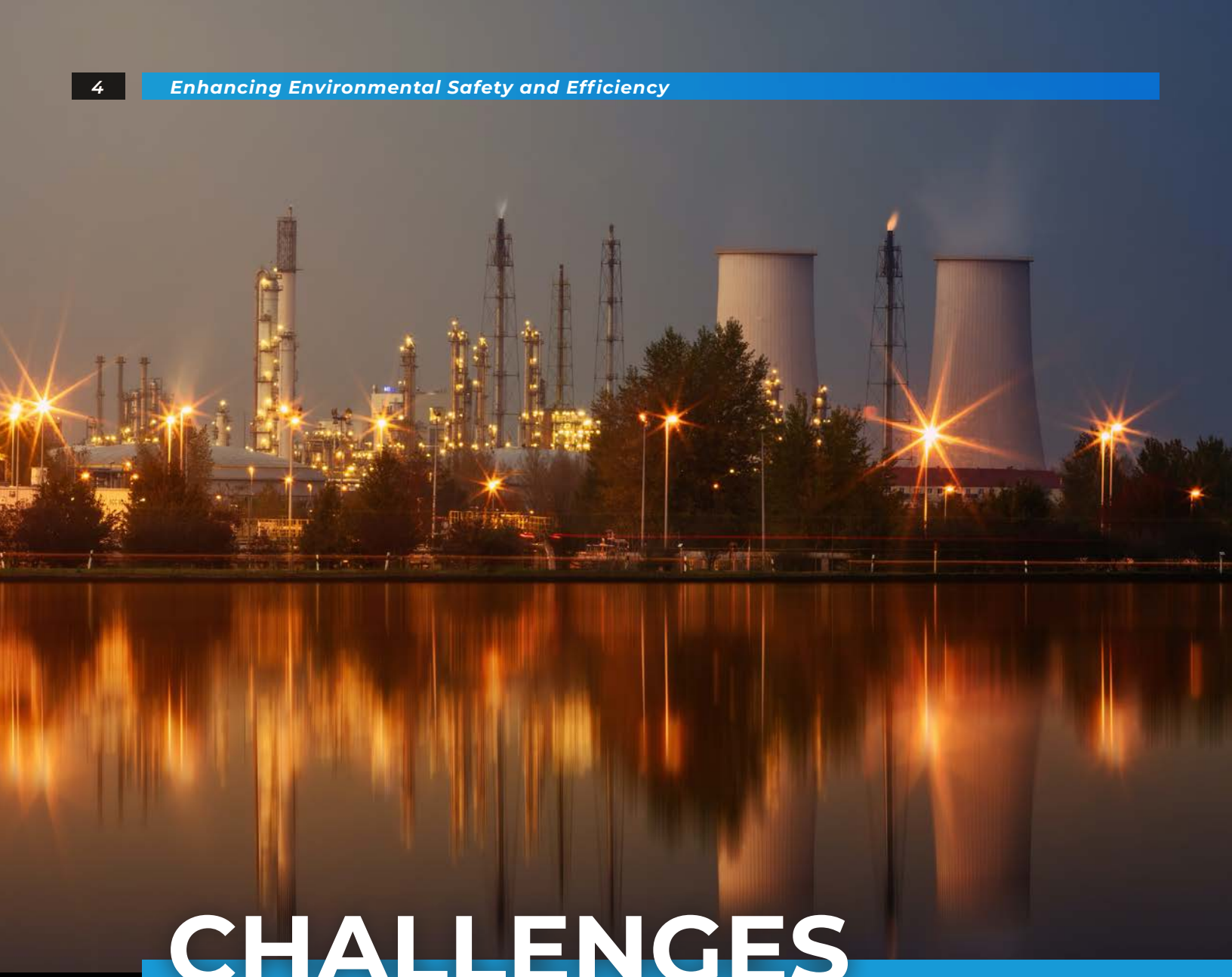

CHALLENGES & OBJECTIVES

1. Regulatory Compliance
2. Wasting Excess Hydrogen
3. Automation and Efficiency

01 REGULATORY COMPLIANCE

The chemical plant needed their boiler control system to be brought up to current safety standards and regulatory codes. The existing system fell short in terms of code compliance, manual operation, and adjustments to maintain efficient firing as process outputs changed.

02 WASTING EXCESS HYDROGEN

The goal was to reuse waste hydrogen, which contained trace amounts of organic chemicals, to heat the boiler. This aimed to reduce natural gas consumption by up to 10% and decrease maintenance requirements.

03 AUTOMATION AND EFFICIENCY

The chemical manufacturer wanted an automated start-up process and optimized fuel-to-air ratio to enhance efficiency, reduce downtime, and lower fuel costs.

SOLUTION IMPLEMENTATION

1. Site Audit and Study
2. System Design and Upgrades
3. Automation and Efficiency Optimization
4. Compliance and Monitoring

Our approach involved a comprehensive assessment of the chemical plant's existing system, identifying gaps and areas of improvement. The following steps were undertaken to achieve the desired outcomes:

01 SITE AUDIT AND STUDY

A thorough site audit and study were conducted to understand the existing boiler control system, identify safety gaps, and assess code compliance.

02 SYSTEM DESIGN AND UPGRADES

Based on the findings, a new control system was designed, built, and installed. This included the integration of safety components, such as air and gas flow conditioners, meters, pressure transmitters, safety shut-off valves, oxygen probes, and flame scanners. The system also featured a programmable logic controller (PLC) for combustion control and a user-friendly display for operation and troubleshooting.

03 AUTOMATION AND EFFICIENCY OPTIMIZATION

The new control system allowed for automated start-up and shut-down procedures, reducing operator intervention. The fuel-to-air ratio was optimized to enhance combustion efficiency, resulting in fuel cost savings of up to 10%. Individual waste gas streams could be started and stopped in sync with plant processes.

04 COMPLIANCE AND MONITORING

The system ensured compliance with environmental requirements by controlling the discharge oxygen level for complete combustion and maximum efficiency. Remote access to the operator interface via the SCADA system enabled real-time monitoring and logging of key variables throughout the facility.

RESULTS

1. Simplified Operation
2. Maintenance Cost Reduction
3. Fuel Savings
4. Compliance and Environmental Responsibility

Our engineered solution delivered significant improvements for the chemical plant:

01 SIMPLIFIED OPERATION

The operator could start and stop the boiler with a single button, streamlining the start-up process and minimizing manual intervention.

02 MAINTENANCE COST REDUCTION

By automating processes and optimizing fuel efficiency, maintenance costs were reduced, resulting in improved system uptime and reduced downtime.

03 FUEL SAVINGS

The optimized fuel-to-air ratio achieved up to 10% in fuel cost savings, making the overall operation more cost-effective.

04 COMPLIANCE AND ENVIRONMENTAL RESPONSIBILITY

The new control system ensured compliance with safety standards and environmental regulations, with monitoring capabilities to meet reporting requirements.

CONCLUSION

This case study demonstrates our expertise in designing and implementing advanced boiler control and burner management systems. By addressing compliance issues, automating start-up processes, and optimizing fuel efficiency, we enabled the chemical manufacturer to achieve greater operational efficiency, reduce maintenance costs, and promote environmental responsibility. Our customized solution improved their boiler system performance and also positioned them for long-term success in a highly competitive industry.

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