

Reducing Energy and Environmental Impact by Implementing Sustainable Practices

Executive Summary

In a world increasingly concerned with climate change and sustainability, industries must adopt greener and more efficient practices. This white paper highlights a successful initiative aimed at reducing energy consumption and environmental impact by optimizing steam usage in chemical plants. **The outlined measures not only delivered significant environmental benefits but also achieved impressive operational cost reductions and productivity improvements.**

Introduction

Industries are under growing pressure to minimize their carbon footprint and optimize resource usage. Steam generation, which heavily relies on coal (constituting 90% of energy generation), remains a major contributor to industrial emissions and inefficiencies. Simultaneously, water recycling rates are only at an average of 40-45%, representing an untapped opportunity for resource optimization.

The Challenge: Why Focus on Steam?

- **90% of energy** in industrial processes is generated through **coal combustion**, leading to substantial carbon emissions.
- Steam systems are significant coal consumers with large potential for optimization.
- **Only 40-45%** of water is typically recycled, wasting a critical and increasingly scarce resource by having lower Condensate recovery factor.

Objective

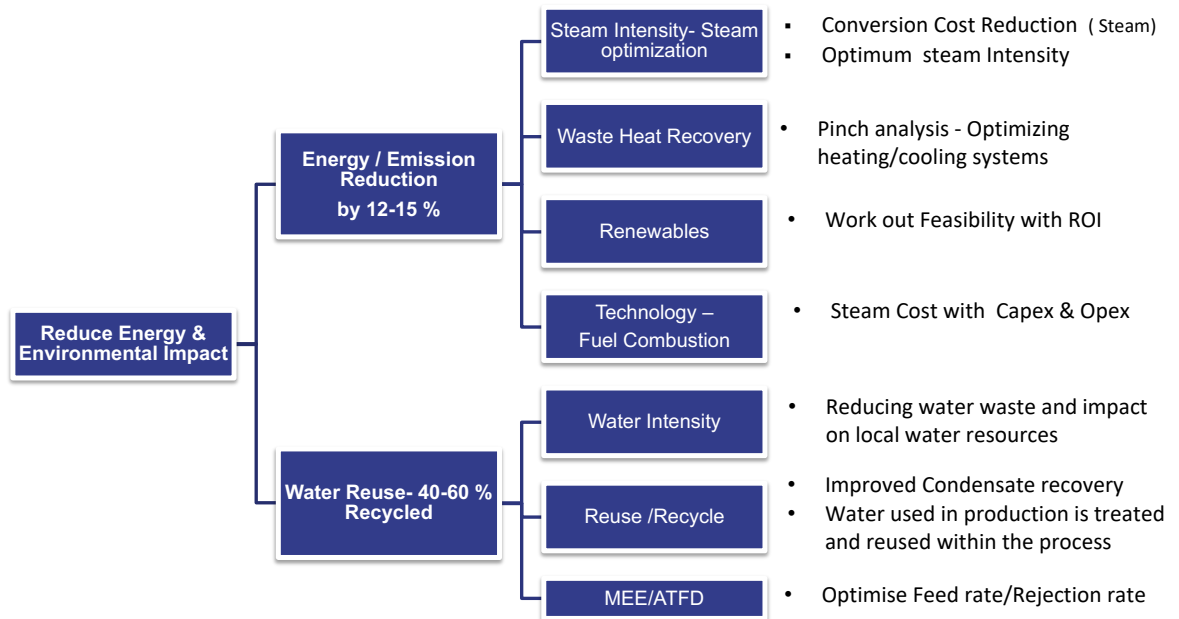
- **Reduce operational expenditure (OPEX) by 12-18%.**
- **Improve productivity by 5-10%** with reduced emission
- **Enhance environmental performance** by cutting emissions and water usage.

Solution Approach: Sustainable Steam Management

A focused approach was undertaken to optimize steam usage across chemical plants using the following strategy:

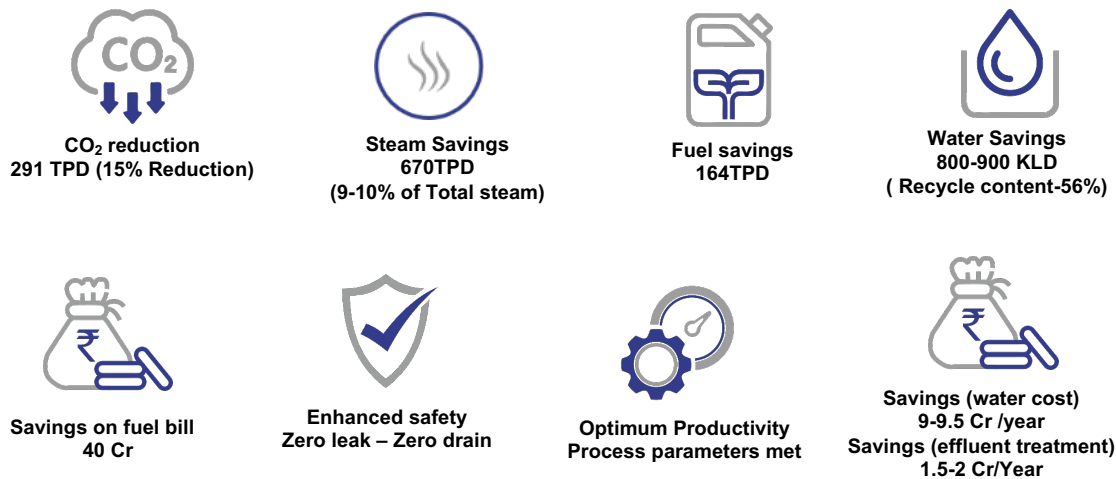
- **Energy Efficiency** : Focus on fuel combustion and energy efficiency technologies for steam generation & with improvement of Condensate recovery factor.
- **Equipment-Level Focus**: Target major steam-consuming equipment by analyzing input/output variations, identifying pain points, and implementing corrective actions.
- **Energy Benchmarking and KPI Monitoring**:

- Section and product-wise monitoring.
- Real-time performance tracking to sustain gains.
- **Technology Adoption:** Exploring the use of green hydrogen (H₂), solar base system for future steam generation to achieve deeper decarbonization, with cost-parity.



Outcomes and Impact

Implementation at five chemical plants in Gujarat led to:



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Strategic Importance

Ongoing engagement, technology upgrades, and a focus on continuous improvement have proven critical in sustaining these benefits. Furthermore, targeting a **10% YoY reduction in energy costs** could lead to an **overall 47% reduction in energy usage** by 2030, contributing significantly to regional and national sustainability goals.

Conclusion

Optimizing steam systems offers a significant and immediate avenue for cost savings, resource conservation, and environmental impact in the chemical industry. The success achieved at the Gujarat base plant stands as a compelling example for broader implementation across the sector.

To build on this momentum, dynamic KPI management must be embraced as a core strategy for long-term productivity, profitability, and sustainability. Forbes Marshall's Service, backed by seven decades of expertise, delivers a comprehensive approach—from utility design centered on plant processes to technology integration, operational best practices, and continuous KPI improvement. This end-to-end solution not only enhances operational efficiency and reduces energy costs but also ensures sustained performance aligned with industry benchmarks.

In conclusion, adopting such a structured and expert-led approach is key to driving sustainable growth and competitiveness in the industrial sector.