SMART Factories Programme Case Study 04:

Transitioning to Sustainable Energy
Maple Garment Manufacturing's Shift from Coal to Biomass Fuel

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About the Study

The Boiler Case Study at Maple Trading Co.,LTD Garment Manufacturing highlights the factory's impactful shift from coal to biomass fuel, demonstrating how adopting sustainable energy practices can transform a traditional manufacturing operation.

By documenting Maple Garment's journey, this study reveals the challenges faced and solutions implemented, shedding light on the environmental, operational, and financial benefits of this transition. Sharing this case to encourage other factories to consider similar sustainable energy practices, showing that, despite initial challenges, the shift is achievable and offers numerous long-term advantages.

Scope of the Study

Maple Garment's fuel transition from 2017 to 2023 involved replacing coal with rice husk briquettes, a renewable biomass fuel. This switch reduced emissions and improved efficiency, positioning Maple as a leader in sustainable energy within Myanmar's garment industry. Data shows notable improvements in fuel efficiency, emissions reduction, and cost savings due to the change.

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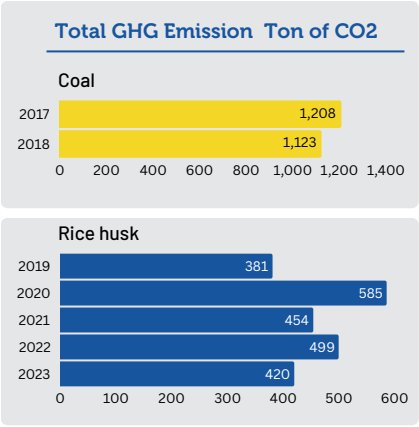
Factory Profile

Established in 1998, Maple Garment operates a 5,375 square-metre facility with 871 employees and primarily produces jackets, trousers, and coats. Maple exports to markets in Japan and Europe, supplying brands such as Takko, Itochu, and Mizuno. Despite recent challenges, the factory maintained a strong production output in 2023, demonstrating resilience.

Assessment Summary:

Addressing Challenges and Solutions

Switching to biomass fuel required a substantial upfront investment in a new boiler system, partially offset by a Responsible Business Fund (RBF) grant. RBF Myanmar is a 'Challenge Fund' to promote responsible business practices of Micro, Small and Medium Enterprises (MSMEs) in Myanmar.



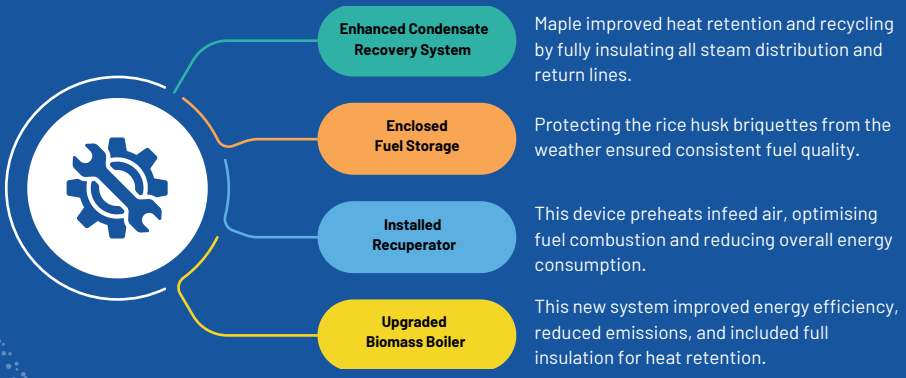
The transition posed unique challenges, including a 20-25% increase in ash production compared to coal, and corrosive flue gases that wore on the exhaust ducting. Maple addressed these issues by repurposing the ash as fertiliser on a nearby farm and upgrading the exhaust system with thicker, corrosion-resistant materials. These solutions not only resolved initial concerns but also set a standard for long-term sustainability.

Key Issues and Implemented Improvements

Before the transition, Maple's outdated coal boiler had multiple inefficiencies such as uninsulated pipes caused thermal energy loss, lack of air preheating wasted fuel, the condensate recovery system was inefficient, and unprotected coal storage led to contamination.

Pre-Transition Challenges:

Implemented Improvements:



Financial Impact

MADE's recommendations yielded significant improvements cost savings. The following financial figures underscore the cost-effectiveness of sustainable energy investments.

Total Annual Saving
$5,151

Recuperator Fuel Savings	Annual Savings from Biomass Boiler	Insulating Steam Lines Savings
$1,762	$2,179	$1,210

Visual Comparisons

The transition at Maple showcased significant improvements in operations. The old boiler was inefficient and poorly insulated, while the new biomass boiler features full insulation, a preheated air system, and a secure storage facility, reflecting Maple's dedication to safety and efficiency. Additionally, the upgraded condensate recovery system emphasises a commitment to energy reuse and enhanced efficiency.

Old Inefficient Boiler

Unprotected Fuel Storage from Rain

Old Condensate Recovery System

Newly Improved Boiler

Well-Protected Fuel Storage Area

Efficient Condensate Recovery System

Our monthly production has seen a significant boost as part of our efficiency improvements. Previously, the old boiler could support only about 40 irons, but with the new boiler, this has increased to approximately 70 ironing tables. Additionally, we've achieved a reduction in carbon emissions, contributing to environmental sustainability.
Tin Aung Swe, Boiler Supervisor

The boiler room is much cleaner now, and we've eliminated extra tasks like chopping wood for the old boiler, making our work more efficient and manageable.
Nilar, General Manager

Recommendations for Future Efficiency

SMART sustainability team recommends installing steam and water meters for real-time monitoring of boiler performance and exploring solar thermal options to supplement biomass fuel. These initiatives would further Maple's commitment to energy-efficient manufacturing.

Key Takeaways

Maple Garment's successful transition from coal to biomass fuel serves as a model for other garment factories aiming for sustainable energy solutions. By addressing initial challenges and investing in targeted improvements, Maple reduced emissions, cut operational costs, and minimised waste. This case study highlights both the obstacles and rewards of sustainable energy transitions, offering guidance for other factories considering a similar shift towards resilience and environmental responsibility.

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