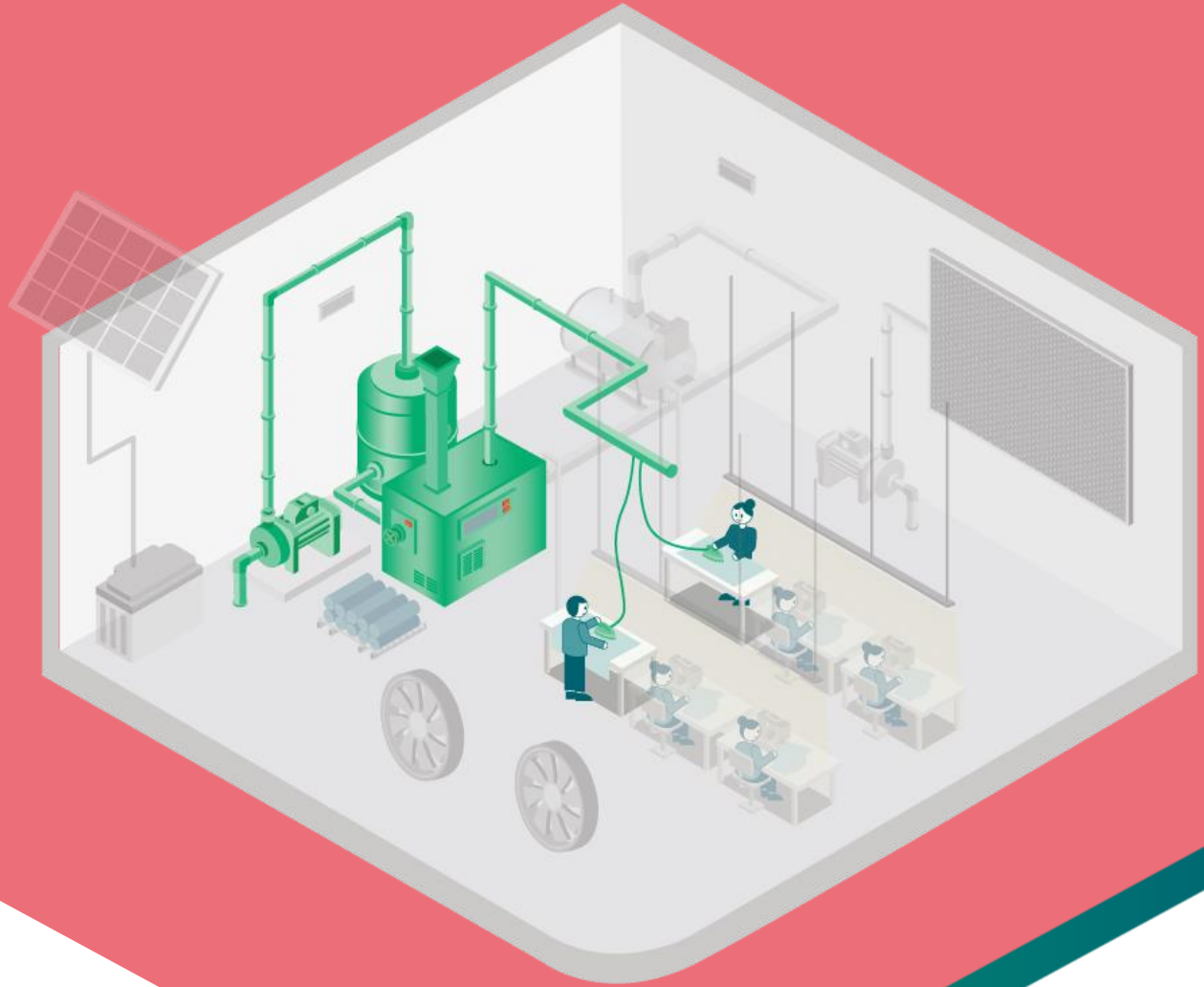




Case study on sustainable energy **BOILER AND STEAM SYSTEMS**

Condensate Recovery Installation

Chea Sinat Garment Co., Ltd



**SWITCH
GARMENT**
PROMOTION OF SUSTAINABLE ENERGY
PRACTICES IN THE GARMENT SECTOR
IN CAMBODIA



switchasia



Funded by
the European Union



1. Factory Information

Chea Sinat Garment Co., Ltd (CSG) is a Khmer-owned garment factory, mainly producing jeans and short pants. The table below summarizes the company profile:

1	Industry name	Chea Sinat Garment Co., Ltd
2	Address	Phnom Penh, Cambodia
3	Year of establishment	2002
4	Annual Production	200,000 to 250,000 pieces
5	No. Employees	549 in 2020

Chea Sinat Garment Co., Ltd. joined the Project on 21st July 2021 . The projects aim to increase competitiveness and decrease the environmental impact of the Cambodian garment industry through sustainable production.

Following its enrollment, the factory participated in an initial walkthrough audit, which resulted in the formulation of a set of recommendations. The factory decided to install a condensate recovery system because it was the most promising saving with minimal investment. Additionally, the recommendation could be implemented directly by the factory energy engineers.



Due to economic challenge, we started from low-cost investment energy efficiency measure by recovering our wasted condensate as per the recommendation from the expert. We also have plan to replace the boiler and to improve the control of thread piece sucking machines.

Mr. Thydeth Bun

Factory Owner



2. About the Boiler system

Chea Sinat Garment Co., Ltd. installation includes a 0.5-ton per hour steam boiler that utilizes wood logs to generate steam, supplying it to the production area for 30 ironing station.

DESCRIPTION	RESULT
Number of boilers	1
Boiler size	0.5 TPH
Operating pressure	6 bar
Steam temperature	165 °C
Steam pipe diameter	34 mm
Material	Steel
Pipe from Boiler to Production	60 m
Pipe from Production to Drain out	60 m
Firewood type	Cashew
Insulation	Piping system Boiler partially
Condensate management	None
Grate type	Fixed grate
Year of installation	2018
Boiler Efficiency	38.57 %



Figure 1: Boiler system before installation of condensate recovery

The boiler's performance was noted be very poor in term of energy efficiency, it has been recommended to install condensate recovery to improve boiler efficiency, save water and energy, as well as reducing carbon emissions.

3. Energy Efficiency Measure Implementation

Condensate recovery for boiler is the process of collecting and returning condensate to the boiler to be reused as feedwater. Based on the recommendation, the factory installed a condensate recovery system, including a 500 liters tank. The recovery system piping and tank were insulated to minimize heat losses. Additionally, they repaired the insulation of the steam piping network from the boiler room to the production floor and managed air intake to optimize excess air in combustion, minimizing loss through flue gas.

Benefits of condensate recovery are following:

- **Reduced fuel costs:** Condensates being hot, returning it to the boiler pre-heats the feedwater, reducing the amount of energy needed to heat it. This can lead to significant fuel savings.
- **Reduced water treatment costs:** Condensates being relatively pure water, returning it to the boiler reduces the need for chemical water treatment and reducing the amount of blowdown required. Blowdown being the process of removing water from the boiler to control the concentration of dissolved solids in the boiler water.
- **Reduce water waste:** Condensate recovery can help to reduce water consumption as well as water waste.

Thanks to the condensate recovery system, the temperature of the boiler feedwater increased from 35.4°C to 76.1°C, leading to significant savings for the factory.



35.4°C

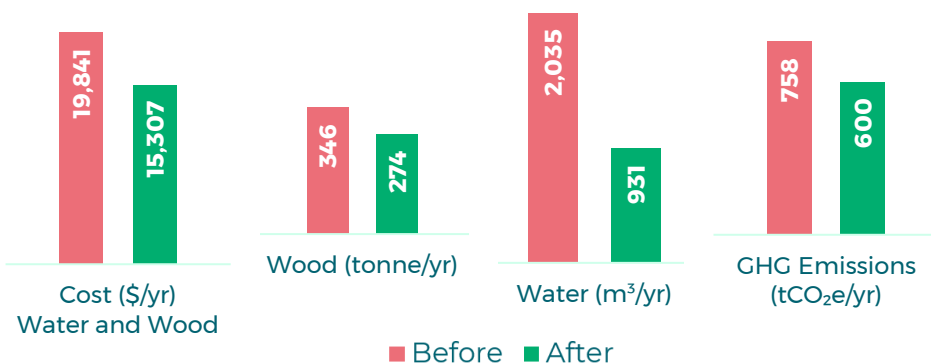
76.1°C

Figure 2: Condensate Recovery temperature increase

4. Savings Opportunities

After installing condensate recovery system, the factory significantly reduced its energy (21%) and water (54%) consumption of their boiler system. The energy consumption before and after the installation is as follow:

Annual Consumption of the Boiler



“After implementing this measure, we can observe that our wood purchase could drop by half of what we usually purchase for some months. Our boiler has better performance as well. On top of that, we can see the saving of water for boiler.”

Mrs. Raneth Bun
Compliance Manager

After analyzing the results following the installation of condensate recovery, significant improvement in efficiency by 21% was observed. This demonstrates the tangible benefits of implementing energy efficiency measures within the factory.



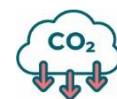
Investment Cost
1,500 USD



Payback Period
4 Months



Annual Saving Cost
4,534 USD/year



Annual Saving GHG
158 tCO₂e/year

**Edition:**

January 2024

Developed by:

Geres

With the contributions of:

This Case Study has been made possible thanks to the Switch Garment and VETHIC projects. They aim at providing hand-holding support to garment manufacturing units in the country to identify and adopt sustainable energy practices.

Switch Garment, a project funded by the European Union SWITCH-Asia Grants Programme and jointly implemented by Global Green Growth Institute (GGGI) Cambodia, Textile, Apparel, Footwear & Travel Goods Association in Cambodia (TAFTAC) and Geres aims at 'Promotion of sustainable energy practices in the garment sector in Cambodia' ("Switch Garment"). The objective of this project is to increase the competitiveness and decrease the environmental impact of the Cambodian garment industry through sustainable production.

The VETHIC project (2022-2024), funded by Agence française de développement (AFD), aims to improve the environmental performance of the Cambodian textile sector by activating the levers of energy transition. The project is jointly implemented by Geres, TAFTAC, Cambodia Women for Peace and Development (CWPD), and Live and Learn Cambodia (LLC).

Contacts

**E-mail:** switchgarment@gggi.org**Website:** <http://www.taftac-cambodia.org/partners/switch-garment>**Follow us on social media:** @switchgarment

TAFTAC | Textile, Apparel, Footwear & Travel goods Association in Cambodia

Royal Group Phnom Penh Special Economic Zone, Phum Trapeang Kul, Sangkat Kantaok, Khan Kamboul, Phnom Penh, Cambodia. 120906

+855 622 8888

www.taftac-cambodia.org
info@taftac-cambodia.org

GERES | Cambodia Office, Phnom Penh

Building #7B (3rd floor), St 81 corner St 109, Phnom Penh

+855 (0) 16 600 617 /

+855 (0) 78 767 499

www.geres.eu
cambodia@geres.eu

GGGI | Global Green Growth Institute

Ministry of Environment, Techo Heritage Building, No 503, Road along Tonle Bassac, Sangkat Tonle Bassac, Khan Chamkarmon, Phnom Penh, Cambodia

www.gggi.org
cambodia@gggi.org