



# Case study on sustainable energy VENTILATION & COOLING SYSTEMS

## Conventional fans replacement to BLDC

*Trax Apparel (Cambodia) Co., Ltd*



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



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# 1. Factory Information

Trax Apparel (Cambodia) Co., Ltd is a garment factory, mainly producing sportswear. The table below summarizes the company profile:

1	Industry name	Trax Apparel (Cambodia) Co., Ltd
2	Address	Phnom Penh, Cambodia
3	Year of establishment	2012
4	No. Production	7 M pieces
5	No. Employees	2,500 in 2020

Trax Apparel (Cambodia) Co., Ltd. joined the projects in 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 implement most of the recommendations and demonstrated interest in the large potential for electricity savings of switching to BLDC fans.



*We aimed at improving room temperature and reduce maintenance operation from our belt driven fans. Energy audits recommending BLDC fans, with a promising 30%-50% savings, we considered testing this technology before a more general implementation*

**Mr. Suon Tithyama Tinine**  
Compliance Manager

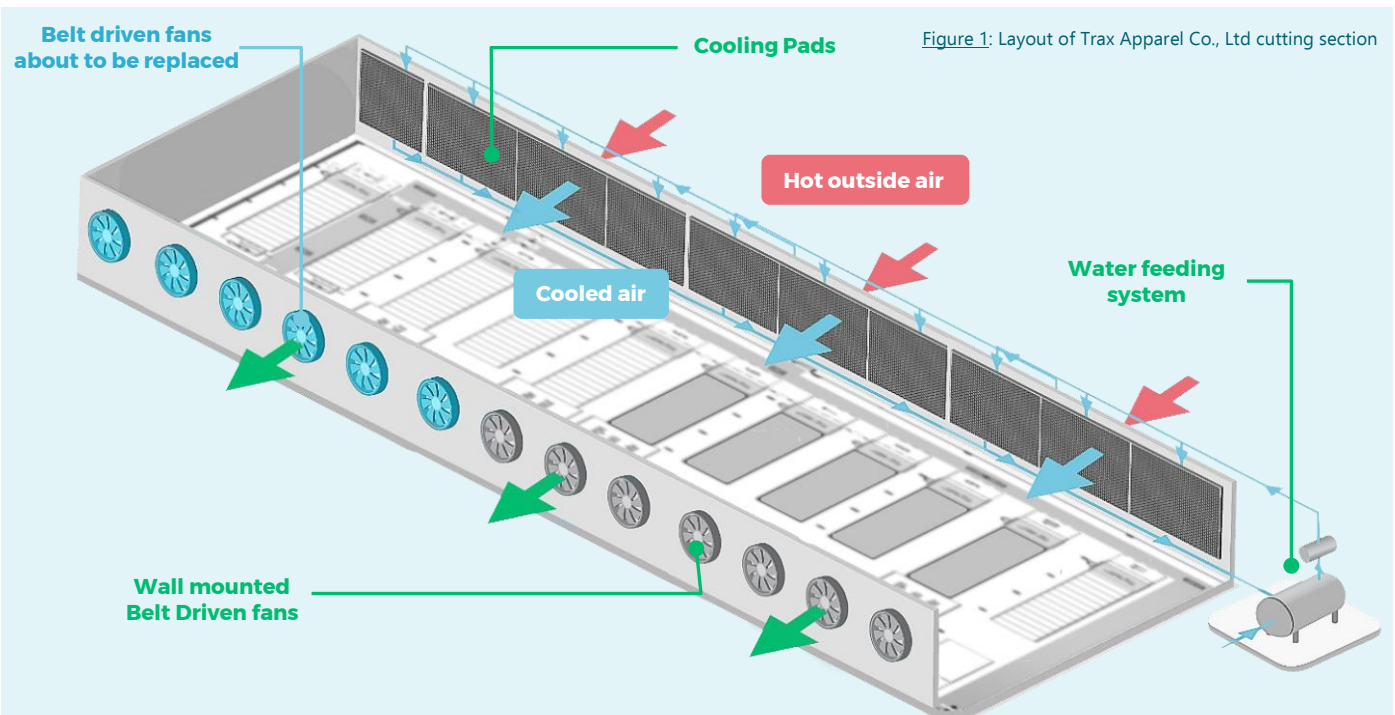


# 2. About the Ventilation system

Trax Apparel (Cambodia) Co., Ltd. factory comprises 4 process buildings with multiple floors, most of which are equipped with evaporative cooling pads and wall-mounted fans, totaling more than 100 fans. Consequently, there is significant potential for electricity savings and GHG (greenhouse gas) emission reduction by transitioning to a more efficient technology: BLDC (Brushless DC) fans with controller.



Figure 1: Layout of Trax Apparel Co., Ltd cutting section



The initial investment being significant, the factory has expressed the desire to conduct a test with a few fans before making a larger investment in the entire facility. As a result, they planned the replacement of six fans in the cutting section of the factory to evaluate the actual savings before planning for a more extensive investment.

### 3. Energy Efficiency Measure Implementation

The factory has invested in six BLDC fans with variable speed, enabling them to adjust usage based on cooling needs, achieve significant savings and improve perceived temperature in the factory. For an equivalent airflow, the new fans have a rated power that is half of the old ones.

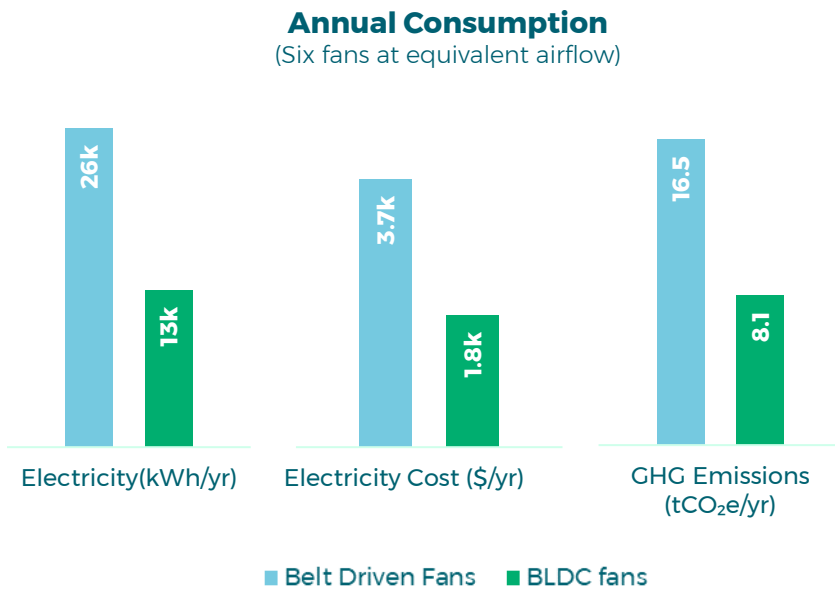


DESCRIPTION	Unit	Conventional original Fans	New BLDC Fans		
			Low speed	Medium speed	High speed
Air speed	m/s	5.3	5.9	7.2	9.53
Fan Diameter	m	1.23	1.23		
Airflow	m <sup>3</sup> /h	22,820	25,065	30,783	40,777
Power	kW	1.5	0.72	1.01	1.62
Specific Energy Consumption (SEC)	W/m <sup>3</sup> /h	0.064	0.029	0.032	0.040

Table 1: Measured performance of the fans

### 4. Savings Opportunities

After installing the new BLDC fans, the factory significantly reduced the energy consumption of the 6 replaced fans, considering equivalent airflow. The energy consumption before and after the installation is as follow:



After this successful testing, with a reduction in electricity consumption, significant improvement of temperature condition and control, as well as reductions in both vibration and noise, the results are quite promising and we are considering replacing more fans in the factory.

**Mr. Shinnasorn Phimphasoot**  
Chief Operation Officer



After analyzing the results following the installation of the BLDC fans, significant improvement in fan efficiency by 50% was observed at equivalent airflow. This demonstrates the tangible benefits of implementing energy efficiency measures within the factory.



**Investment Cost**  
3,224 USD\*



**Payback Period**  
1 year 9 months



**Annual Cost Saving**  
1,900 USD/year



**Annual GHG Reduction**  
8.4 tCO<sub>2</sub>e/year

\* Includes six fans and delivery fees



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**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).

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