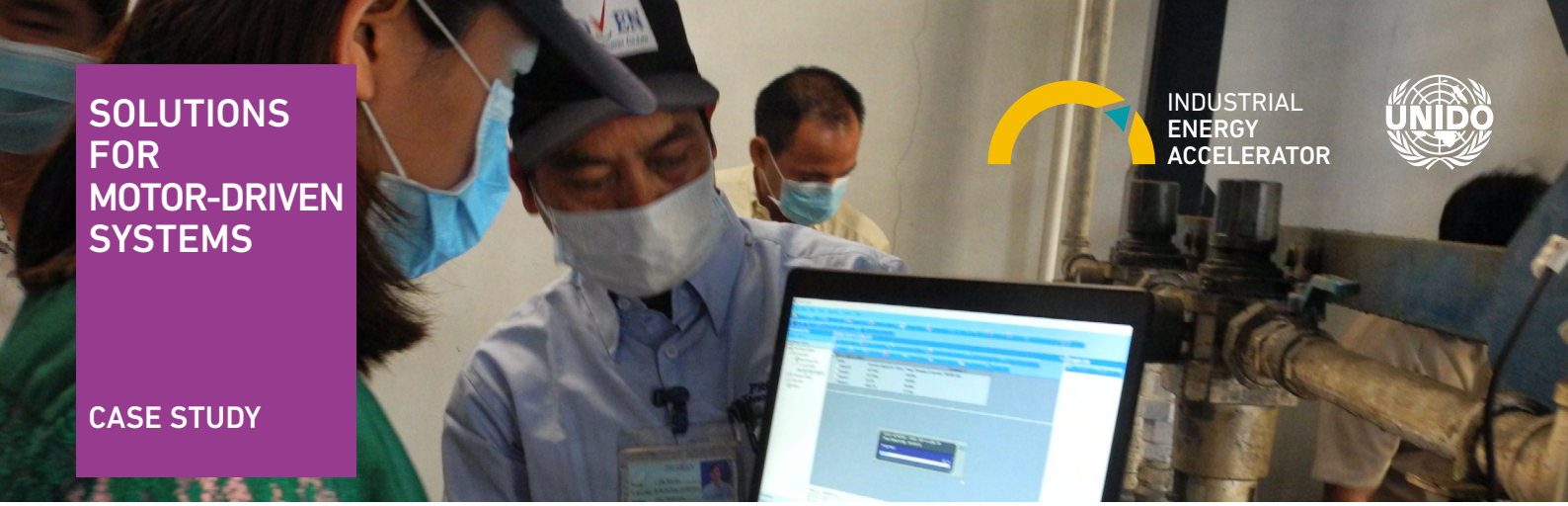

SOLUTIONS FOR MOTOR-DRIVEN SYSTEMS

CASE STUDY

INDUSTRIAL ENERGY ACCELERATOR

UNIDO

Proven Technology Industry Co

Yangon, Myanmar

Sector
Acid battery manufacturing

Intervention
Compressed air system optimization among others

EnMS and CASO implementation period
2017 to 2019

Investment $	USD $5,600
Financial savings (electricity & gas combined)	USD $8,358
Electricity saved	49,950 kWh per year
CO_2 emissions reduction	15.9 tons per year
CO_2 emissions improvement	2.68 %
Payback time	Six months

*Data is from 2018 to 2019

Company profile

Established in 1996 from humble beginnings, Proven Technology Industry Company Limited has grown to become Myanmar's leading lead-acid battery manufacturer. Predominantly servicing the country's automotive industry with its brand name TOYO and LION batteries, the conglomerate expanded in recent years into lead smelting, plastic injection and product distribution.

Proven Technology prides itself on pioneering commitments for sustainability and innovation. The company's strict 'reduce and reuse' approach is demonstrated in its ability to recycle more batteries than it produces.

The efficiency solution and UNIDO'S role

Electric lead-acid batteries are essential components in numerous applications. Worldwide demand is increasing for lead-acid batteries in residential, commercial, industrial and energy storage applications including electric vehicles.

Lead-acid batteries are among the most efficient batteries on the market to manufacture, typically requiring three times less energy per kWh to produce than lithium equivalents. Nevertheless, in many facilities there are still plenty of efficiency opportunities, particularly when it comes to the compressed air systems.

In 2017, Proven Technology engineers and management representatives participated in the first series of UNIDO's national training on Energy Management System (EnMS) and Compressed Air System Optimization (CASO). The training included the ins and outs of compressed air systems and their characteristics, how to use data loggers and related software to measure and monitor energy usage, and how to implement a compressor control strategy.

Following the training, UNIDO and a dedicated international technical expert worked closely with Proven Technology to improve the energy performance of its battery manufacturing plant. This review involved an analysis of air demand, associated power consumption, pressure profiles, compressor response and leakage levels on compressed air systems. Findings included significant losses and leaks in the compressed air system and inadequately sized and positioned compressed air receiver tanks.

Over a period of three months Proven Technology remedied these issues by implementing the following solutions:

- Adjusting pressure settings on the compressors
- Implementing an optimized strategy
- Changing installation configurations and filter sizes to reduce pressure drop across dryer
- Identifying and repairing leakages
- Installing appropriately sized receiver tanks
- Reducing energy demand and system pressure according to end use requirements
- Installing appropriately sized air receiver tanks at optimal locations in key areas

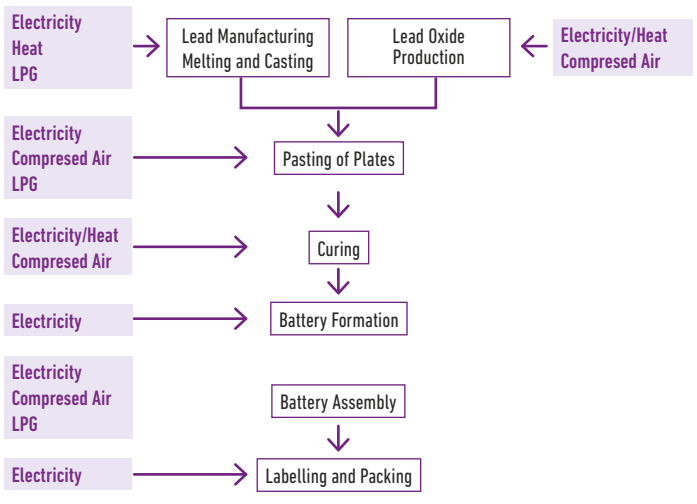

Figure 1. Lead-acid battery manufacturing process and its main energy inputs

Achievements

Overall, between its two manufacturing plants, Proven Technology achieved an impressive annual energy saving of 135,293 kWh. This is roughly equivalent to powering 450 average rural households for one month. In terms of energy savings, the company saved 21 per cent and 8 per cent of energy use from its respective compressed air systems.

Gaining company-wide commitment for the CASO initiative at Proven Technology was an overwhelming factor in the company's energy efficiency success story.

Having managed to recoup its initial USD $5,600 investment in less than one year, Proven Technology is more motivated than ever to investigate new ways to reduce its energy consumption and improve the efficiency of its manufacturing processes. Solar power is the next frontier. In the coming year, Proven Technology aims to provide 700 MW of the company's future energy needs through solar panels.

> "In Myanmar energy efficiency is still a relatively new concept. On top of that there are some hesitations about implementing technology and initiatives from outsiders. We have to work very hard to convince companies, especially their top level management, to take the leap into motor system optimization. Thanks to Proven Technology, the first company in the country to optimize its compressed air system with UNIDO's training, we now have a compelling example for other companies to follow."
>
> **Than Oo,** Myanmar National Project Manager for Industrial Energy Efficiency, UNIDO

Savings achieved

In addition to optimizing its compressed air system, Proven Technology simultaneously applied a series energy management system (EnMS) interventions which significantly helped to extend the company's energy, cost and emissions savings.

Measures Implemented	Investment [$]	Savings [$-year]	Payback [year]	Energy savings [kWh/year]	Emission Reduction [tco_2/year]
Smart Sensor Installation	USD $1020	USD $319	3.25 years	2,886 kWh	0.92 tons
Implementation of transparent roof-sheet in key production areas	USD $1600	USD $1905	0.84 years	17,040 kWh	5.42 tons
LED lighting	USD $4388	USD $5,485	0.8 years	49,358 kWh	15.7 tons
Change main breaker to switch breaker at lighting line	USD $802	USD $1,253	0.64 years	11,257 kWh	3.5 tons
Air compressor modified with receiver tank	USD $5,600	USD $8,358	0.6 years	49,950 kWh	15.9 tons
Installation exhaust valve	USD $230	USD $1,150	0.2 years	4,802 kWh	1.53 tons
Installation of sub-meter to assess energy use in key areas	USD $547	N/A	N/A	N/A	N/A

Challenges and lessons learned

Industrial energy efficiency is still a relatively new concept in Myanmar, where half of the population still don't have access to a reliable source of energy. In addition to this, many companies in Myanmar are unsure about the objectives of external organizations and experts. Therefore it is critical for UNIDO to work with progressive national companies like Proven Technology to demonstrate the long-term cost and energy saving opportunities to the wider industrial sector in the country. Since successfully completing the CASO programme with Proven Technology, UNIDO-Myanmar has generated interest and conducted a scoping analysis in more than seven industrial plants which were eager to optimise their motor and related energy systems.

In the beginning a key challenge for Proven Technology was its lack of established energy metering. There was only one onsite electricity meter in place for the entire facility. This is typical of manufacturing plants in Myanmar. Therefore in order to establish an accurate baseline for the numerous components within Proven Technology's lead-acid battery production process a detailed survey of the electrical equipment was undertaken to understand the various energy demands. This required the investment and installation of 17 additional sub-meters across two plants for continuous monitoring.

About the energy efficiency solutions series

Throughout 2020, the Accelerator is drawing on its collective wealth of experience and expertise to produce a series of **knowledge kits on industrial energy efficiency**. These cover five key energy efficiency solutions: Energy Management Systems; efficiency solutions for Motor-driven Systems; for Industrial Heat; for Industrial Cooling; as well as Energy Metrics and Performance Indicators.

Ready to take the next step in your motor system optimization journey?

Download the full UNIDO Solutions for Motor System Optimization kit **here**.

For more information about UNIDO's industrial energy efficiency programme in Myanmar contact Than Oo: **T.Oo@unido.org**

For inquiries about UNIDO's global industrial energy efficiency work visit **www.industrialenergyaccelerator.org** or contact **R.GHONEIM@unido.org**

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