

# CASE STUDY: IMPLEMENTATION OF THE ENERGY MANAGEMENT SYSTEM AND SYSTEMS OPTIMIZATION AT EMPRESA DE FOSFATOS DE BOYACÁ S. A.

## Industrial Energy Efficiency Programme in Colombia



El futuro  
es de todos

Minenergía

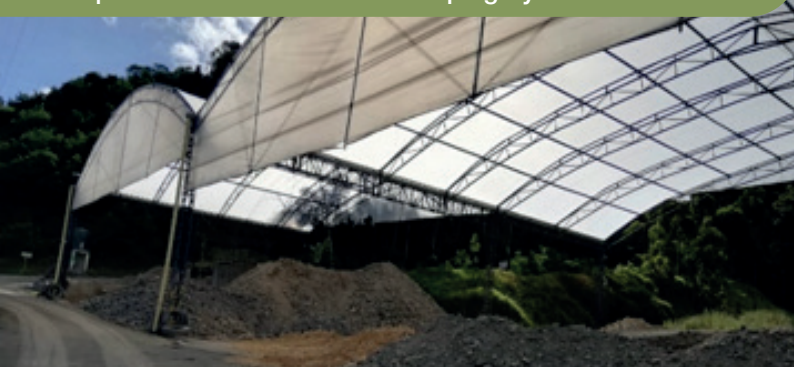


ORGANIZACIÓN DE LAS NACIONES UNIDAS  
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GLOBAL ENVIRONMENT FACILITY  
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EMPRESA DE FOSFATOS DE BOYACÁ S. A. company enrolled in the courses offered by EEI Colombia in the Cundinamarca and Boyacá regions during 2017 and 2018, to implement an Energy Management System (EnMS) under NTC ISO-50001 guidelines, along with the Optimization of Motor and Pumping Systems.



EMPRESA DE FOSFATO DE BOYACÁ S. A. company made an investment, duly documented by EnMS, close to COP 400MM, of a curved beam tent that provides important energy savings, as it guarantees that raw materials have lower humidity percentages upon entering the drying ovens.

Source: FOSFATOS DE BOYACÁ

**“Energy efficiency is the driving force of our change towards productivity and sustainability”**

Wilmer Correa, Director of Planning and Automation, Fosfatos de Boyacá

### Overview:

EMPRESA DE FOSFATOS DE BOYACÁ S.A. is a company dedicated to the production of fertilizers and soil amendments, located in Pesca municipality, Boyacá.

The implementation of an Energy Management System (EnMS) along with the optimization of motor systems, were adopted as an alternative to the continuous process improvement and as part of the R&D&i strategies that strive for greater competitiveness through best operational practices.

The energy sources for the productive process are electric power and coal, used in drying, milling and grinding processes.

### Relevant Information:

**Program implemented:** EnMS and Optimization of Motor and Pumping Systems

**Base year:** 2017

**Energy sources:** Electric power and coal

**Scope and limits of EnMS:** Drying, milling, grinding and environmental control

**Improvement actions:**

**Best practices:** O&M, operational control, process adequacy

**Technological change:** Milling start, storage infrastructure, variable speed drives and high-efficiency motors

**Goal:** 5% reduction in consumption of electric power and 2% reduction of coal

**Identified savings:** 3.162 kWh/month of electric power and 0,8 ton/month of coal

**GHG reduction:** 3,3 tCO<sub>2</sub> eq / month

## Achievements: \_\_\_\_\_

By doing an energy review, as per ISO 50001 requirements, FOSFATOS DE BOYACÁ S.A. defined the scope of its EnMS to address the drying and milling processes, which consume 100% of coal and 80% of electric power at the plant. Savings of 5% and 2% of electric power and thermal power respectively are expected upon application of a series of actions which include the implementation of best operational practices (Start/stop of equipment and O&M), production planning, implementation of control systems and automation of operational control variables by process, technological upgrade on the milling process start system, on thermal insulation and on fuel feed systems and improvements in the storage infrastructure of raw materials (Phosphate rock and coal).

By applying Motor System Optimization tools to the milling and grinding processes, saving opportunities were detected, replacing current motors with new, high-efficiency equipment. Energy savings of approximately 21% are expected, based upon the assessment of process conditions to increase the load factor, best operational practices and the installation of variable speed drives and soft starters.

A Pumping System Optimization analysis, focused on the environmental control process (Trimmer), allowed to conclude that operating a pump at 75% of its rated/design speed, in order to match system flows, is the best possible scenario regarding energy efficiency. Several improvement opportunities were also identified through best maintenance practices, the installation of flow control accessories and by replacing pumping equipment.

## Success factors and lessons learned: \_\_\_\_\_

“Formulating an energy policy aligned to corporate strategy is the reference point of the management system; it has been integrated to the productive activity through communication strategies spread to all levels in the organization.

Our previous experience implementing a (Quality) Management System at the company, eased the construction of a robust documental structure of EnMS, which has become a platform of systematic data-logging of energy consumption; production and impact variables; to ensure effective planning, operation and process control, thus guaranteeing the validity and relevance of the system. Every process which is

monitored and controlled provides savings and facilitates the formulation of improvement measures regarding energy performance. The EnMS methodology can be applied to process lines or to apparently simpler systems and, even then, it can produce valuable information that improves productivity. This process allowed our company to identify that those systems showing the greatest consumption are not necessarily the ones presenting the most interesting potential in terms of energy and financial performance.

The tools of the EEI Colombia program allowed the detection of productivity improvement measures not previously contemplated.”

*Wilmer Correa, Director of Planning and Automation,  
Fosfatos de Boyacá*

## Future actions: \_\_\_\_\_

EMPRESA DE FOSFATOS DE BOYACÁ S. A. company is planning to apply the EnMS methodology to all productive processes. In alliance with local universities, they are working on improving the measuring mechanisms of Significant Uses of Energy in order to structure a base line for each of the seasonal conditions of the process.

The company expects to become ISO 50001 certified and be a reference of regional energy efficiency and of the productive sector.

## For further information: \_\_\_\_\_



*This program, an initiative of UPME and UNIDO, has been created with the purpose of strengthening technical capacities in Energy Efficiency and to foster the implementation of EnMS, as support and contribution to the productivity and competitiveness of the national industry.*

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