# ISO 50001 Energy Management System
## Case Study

**2021** Argentina

# Lubricantes Avellaneda S.A.U.

*Through EnMS implementation, we achieved a 21% reduction of energy consumption and as well as CO2 emission.*


Our Products

## Organization Profile & Business Case

LASAU is a company whose specific activity is blending, filling and storage of lubricant oils for the automotive, industrial and marine sector, with a portfolio of more than 350 products. It belongs to the Trafigura group. Since 1946, the plant is located in the city of Avellaneda; Buenos Aires province and occupies an area of approximately 8,100m2. Throughout 75 years of existence, it has gone through different administrations that have left learnings that form our culture nowadays.

The capacity is 2,400m3 in one shift. The current production, supplies to 10% of the argentine market and its sales with Puma Energy brand represent 4%. It also manufactures products from other brands, as it has done previously during its history.

It is certified ISO 9001, ISO 14001, ISO 45001, and ISO 50001 and has recently achieved certification in IATF 16949 for its automotive quality.

| Case Study Snapshot | |
|---|---|
| **Industry** | Lubricant manufacturer |
| **Product/Service** | Lubricant oils |
| **Location** | Argentina |
| **Energy management system** | ISO 50001 |
| **Energy performance improvement period, in years** | 2 |
| **Energy Performance Improvement (%)** over improvement period | 21% |
| **Total energy cost savings** over improvement period | $USD 39.569 |
| **Cost to implement EnMS** | $USD 15.901 |
| **Total Energy Savings** over improvement period | 1.720 (GJ) |
| **Total $CO_2$-e emission reduction** over improvement period | 103 (Tn) |

It has 60 employees to deal with operation and management activities.

LASAU acts with social responsibility and in an ethical way, with a focus on profitability, considering quality, safety, the environment and health at work (HSEQ) as an integral part of its business.

Under this premise and within the framework of the Plant HSEQ Committee, composed of those responsible for each area, the initiative arises to achieve an improvement in energy performance, increase efficiency and control energy uses and consumptions.

According to the guidelines of its policy, the importance is based on:

- Care for the environment (use of non-renewable natural resources).
- Reduction of greenhouse gas emissions.
- Optimization of energy efficiency.
- Reduced operating costs.

That is why, in 2015, it assumes the commitment to develop its activities making a rational use of energy in support of the sustainability of its global objectives.

***"The success in the implementation of the EnMS system was directly related to the incorporation of energy efficiency into the culture of the organization"***

—Silvana Bertuzzi, EnMS Implementation Leader

## Business Benefits

The implementation of EnMS allowed LASAU to improve the efficiency of the energies used in the process, achieving a reduction of 21% per liter produced.

| | Year 2014 | Year 2015 | Year 2016 | Year 2017 | Energy efficiency 2014 vs 2017 |
|---|---|---|---|---|---|
| Production (L) | 32.517.811 | 33.820.955 | 29.207.485 | 31.210.455 | 21% |
| Mcal/L Produced | 0,0636702 | 0,0589589 | 0,0593043 | 0,0505088 | |

**Table 1. Energy efficiency**

| | Billing 2017 | Billing without ISO 50001 | $ Saving | % Saving | USD Saving |
|---|---|---|---|---|---|
| Natural Gas | 563.363,53 | 701.437,17 | 138.073,64 | 25% | 7.504,00 |
| Electricity | 929.788,35 | 1.173.761,46 | 243.973,11 | 26% | 13.259,41 |
| Gasoil | 36.508 | 71.582,32 | 35.074,58 | 96% | 1.906,23 |
| LPG | 24.600 | 35.992,34 | 11.392,34 | 46% | 619,15 |
| | **1.554.260** | **1.982.773** | **428.514** | **28%** | **23.288,79** |

**Table 2. 2017 UDS savings**

| | 2014 | Saving 2015 | Saving 2016 | Saving 2017 | Total Saving |
|---|---|---|---|---|---|
| USD | | 3.653,98 | 12.626,14 | 23.288,79 | **39.568,90** |

**Table 3. USD Period savings**

The economic impact in 2017 was equivalent to reducing energy cost by 28%.

In addition, tons of CO2 emissions were reduced by 21%

| | Tn CO2 2017 | Tn CO2 without ISO 50001 | Emission Reduction (Tn) | Emission Reduction (%) |
|---|---|---|---|---|
| Natural Gas | 265 | 329 | 65 | 20% |
| Electricity | 121 | 153 | 32 | 21% |
| Gasoil | 5 | 10 | 5 | 49% |
| LPG | 4 | 6 | 2 | 32% |
| | **395** | **498** | **103** | **21%** |

**Table 4. Co2 Emission reduction**

As soon as it was decided to implement EnMS, the resources used were man-hours for learning meetings, trainings and data collection. Energy measuring equipment was also purchased. The investment in implementation was not significant and there were significant benefits. The associated costs were recovered in the second period of implementation of the EnMS

| | Hs Own Staff | Hs external Own Staff | Investment in equipment | USD TOTAL |
|---|---|---|---|---|
| Resources used for implementation | 598 | 156 | 7.344 | **15.901** |

**Table 5. Resources**

***"The implementation of the system not only generated changes and good habits in the organization, but also changed our daily behavior in our home"***

— Federico Luchetti, Laboratory Supervisor.

## Plan

By virtue of being a multinational company and following the global trends of efficiency and productivity, from the leadership came the decision to implement the EnMS. From that moment onwards, the EnMS became part of the strategic decision-making process by joining the integrated management system of the plant.

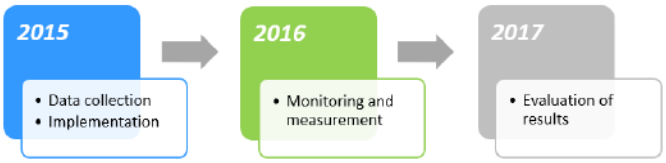


**Figure 1. Plan**

A multidisciplinary team composed of representatives of each sector was formed; whose working methodology used was that of the PDCA cycle.

The energy sources used in the plant were determined. The distribution was as follows:

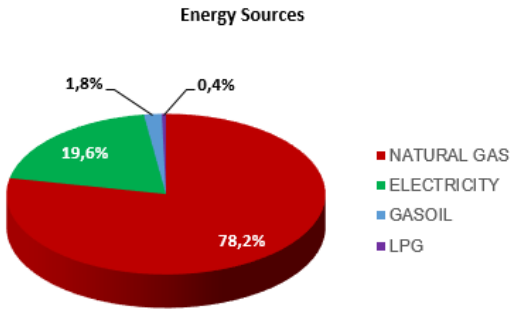


**Figure 2. Energy sources**

Consumption data was collected for each use in order to determine the significant ones, taking real data and in some cases making estimates between the power of the equipment and the utilization factor.

***"Investing the necessary time and resources in the data collection stage, allows a strategic planning of better quality"***

— Mariano Di Iorio, Maintenance Manager

As the variable that affects these significant uses is production, indicators were established to monitor and manage them.

A documented procedure was established to carry out energy planning linked to the processes that are developed in the plant, while operational controls were part of each process standard.

The analysis of uses and consumptions was based on measurements carried out monthly, adding said data to the energy matrix.

- Substantial energy consumption, those that contribute 80% of the total energy consumption consumed by the plant.
- Considerable potential for the improvement of energy performance, those equipment considered by the HSEQ Committee with high potential for the improvement of energy performance, where through the application of behaviors, consumption habits, work organization, operational variables are susceptible to considerable reductions in energy consumption.

The energy review is carried out annually and the opportunities for improvement are established, within the framework of the Plant HSEQ Committee, where those responsible for each area revalidate their commitment and allocate the necessary resources. In this instance, all suggestions made by staff working for the organization are also considered.

In case of major changes in the facilities, equipment, systems or processes, a new energy review is carried out and the opportunities for improvement and their respective programs are reviewed. In addition, estimates of future energy uses and consumption are considered during the review.

The flowchart of the energy review process is as follows:

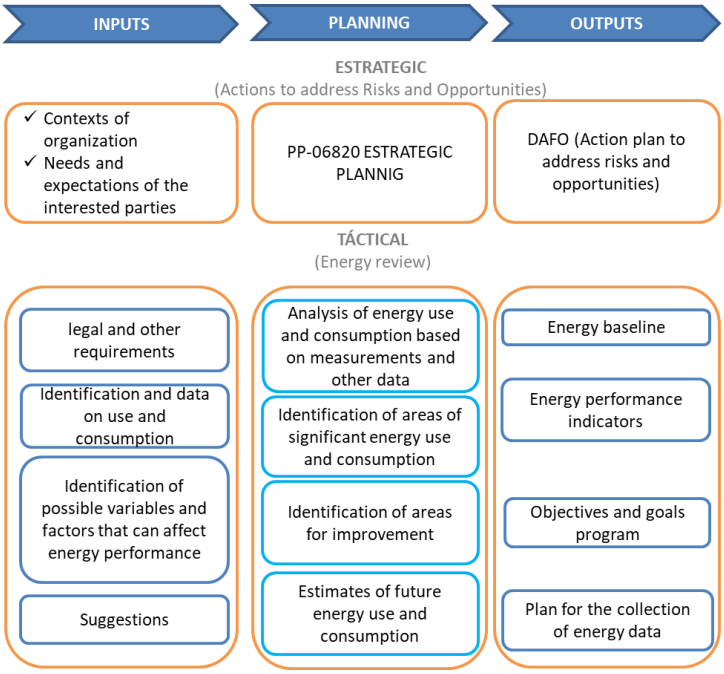


**Figure 3. Flowchart of the energy review process**

## Do, Check, Act

In 2015, ISO 50001 certification was set as a goal and the following opportunities for improvement related to energy efficiency emerged, which were transformed into objectives for the year:

- **Natural gas**: 20% annual consumption savings in 2017 compared to baseline values (2014).
- **Electric Energy**: reduction of 17% annual consumption in 2017 compared to baseline values (2014).

For this, a portion of the budget was allocated and approved by the HSEQ Committee, and a team was defined with the representatives of each area for the execution of the actions associated with the objectives, also with the collaboration of an external consultant.

At the annual meeting with all staff, senior management communicated the results of the objectives of the previous period and those set for the current period.

As a starting point, 2 work teams were assembled, composed of production, distribution, laboratory, maintenance and HSEQ personnel. One of them worked with the natural gas objective and the other with the Electric Energy.

Historical data on energy consumption were taken to determine what the most significant uses were and to work on them. Data on greenhouse gas (GHG) emissions were also taken. It should be noted that the incidence of natural gas and electric energy consumption represents 98% in the generation of GHG.

For the case of the use and consumption of natural gas, there were two independent meters, from the service provider. On the other hand, in the case of Electric Power there were no point meters, only data from the general meter. The team had to work on the differentiation of uses and the estimation of consumption. All equipment was listed and consumption was estimated according to the technical detail of each equipment and its hours of use.

Once the significant uses were determined, the following methodology was used to address the opportunities for improvement:

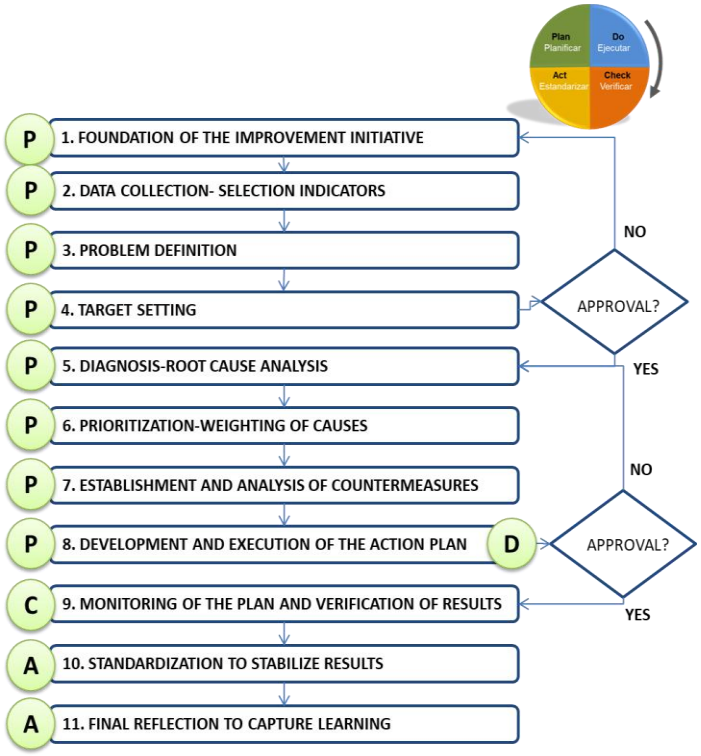


**Figure 4. Methodology**

A root cause analysis was performed by applying the tool called Cause and Effect Diagram or Fishbone for each of the significant energies:

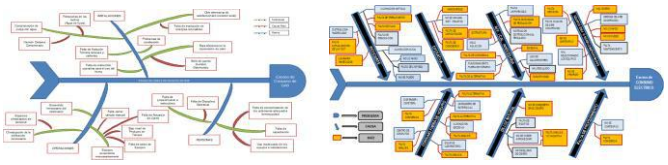

**Figure 5. Natural and Electric Energy fishbone**

From this analysis, the causes were prioritized and the necessary countermeasures were established, resulting in an action plan, such as:

| CAUSES | COUNTERMEASURES | ACTIONS |
|---|---|---|
| LACK OF STANDARDIZATION REGARDING CONDITIONS OF USE OF TANKS (LEVEL / TEMPERATURE) | Operational procedure to be agreed by the Production, Purchasing, Planning and Laboratory sectors | 1) Verify existing measurement sheets (max and min operating TKs) |
| | | 2) Determine maximum heating temperatures of basic and additives ensuring quality. |
| | | 3) Evaluate whether operationally the conditions are in place to respect the guidelines and characteristics of raw materials. Ditto in the case of product changes. |
| | | 4) Write procedure (include alarm signage) |
| | | 5) Dissemination of the procedure (responsible to the sector) |
| | Control compliance (Operational Discipline) | 1) Incorporate into the VCP program (Purchasing, Planning, Production, Laboratory) |
| UNNECESSARY START OF HEATER | Perform analysis to determine optimal heater temperature. | Evaluate if heater / tank temperatures are correct for operation (setting vs consumption) |
| | Operating procedure Heater and tanks | Prepare product temperature maintenance procedure, switch on and switch off, production planning based on heater settings |
| | Analyze heat reuse (exchanger) | Consult with the supplier for the possibility of incorporating a heat exchanger |
| IMPROPER USE OF THE FACILITIES (EQUIPMENT AND PROCESSES) | Operational Discipline | Awareness to all personnel involved in the operation |
| | | VCP |

**Table 6. Action plan**

The main actions were based on implementations and updates of operating procedures, operational controls and training on good habits in the use of energy.

The action plan took a year to implement, its monitoring was carried out periodically in meetings of the Plant HSEQ committee achieving 20% savings in Natural Gas and 21% in Electric Energy.

In addition, energy performance indicators were defined for each equipment that could affect consumption, which are monitored monthly, their deviations are analyzed and actions are taken to correct them.

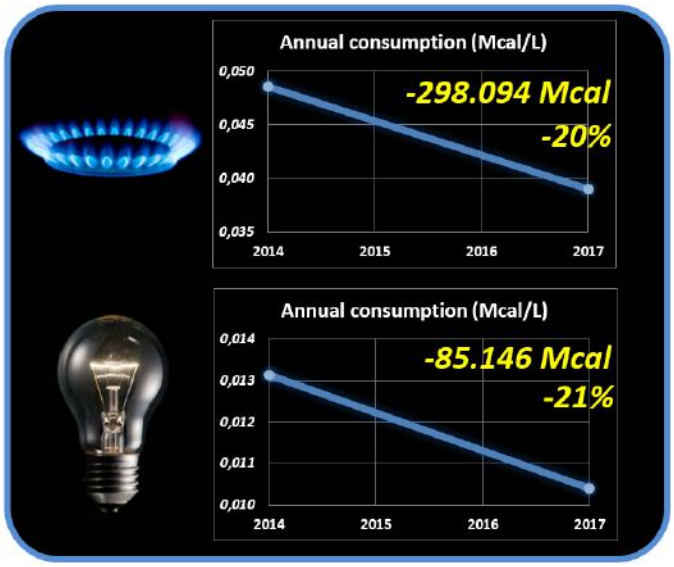


**Figure 6. Consumptions**

***Sustainability is key to the future of leading companies. It must be understood as an essential part to carry out the business. It is part of the evolution of companies in conjunction with the environment.***

— Anibal Vrdoljak, Plant Manager

The improvement of energy efficiency is calculated by comparing the indicator vs the goal calculated from the baseline.

Energy baseline is made using information from the energy review of the previous period. It is updated when one or more of the following situations occur:

- Energy performance indicators no longer reflect the plant's energy use and consumption.
- When major changes have been made to processes, operating patterns or energy systems.
- In case of strategic decision of the HSEQ Committee.

The relevant variable to normalize consumption is the liter of lubricant produced and the following formula is used to measure energy performance.

$$\left[\frac{\text{Baseline Period Energy indicator} - \text{Reporting Period Energy indicator}}{\text{Baseline Period Energy indicator}}\right] x\ 100$$

In addition, other energy performance indicators are identified to monitor and measure significant consumption.

They are updated monthly and analyzed in the periodic meetings of Indicators, chaired by the Senior Management of the SGI, its management team and leaders (HSEQ Committee).

A Management Program is established annually and is periodically monitored by the HSEQ Committee.

The person in charge of each sector is responsible for monitoring, participation and motivation of the personnel involved in the achievement of all the objectives of the organization.

Operational control

It was established in a procedure of operation of equipment with significant consumption and then was extended to the rest of the standards of each sector.

Some of them are measurements of energy consumption, preventive maintenance, predictive maintenance, standard operating conditions (temperatures, times of use, on and off, etc.).

Procurement requirements for energy efficiency

The criteria for evaluating the energy performance of contracted goods and/or services are incorporated into the purchase requirements.

## Transparency

The results were transmitted to all staff in the framework of the annual results meeting.

At the same time, a communication was issued to customers and suppliers about the certification achieved and the energy policy was published on the organization's website.

Additionally, since the certification it is communicated to all personnel entering the plant through graphic (triptych) and visual (video) media.

## What We Would Have Done Differently

- As mistakes made we can mention that we did not have the necessary continuity and follow-up. Despite this, we were able to achieve good results, and the application of the method served as a means to deal with a problem that existed in the Plant and that until now was not included among its priorities.
- We learned that the data collection stage is the most important, because for various reasons we had to re-collect information we needed to continue planning.
- Not knowing the consumption drivers made it difficult to define the indicators so that they were representative at the time of the definition of the action plans. This created the need to review the indicators to arrive at the most efficient decision-making.

***"ISO 50001 certification not only generated an optimization in the processes and costs of plant operations, it´s also part of the proposal and transmission of values to the client, allowing to reach new markets"***

—Luis Alberto Rodriguez, Lubricants Manager