

ISO 50001 Energy Management System Case Study

2020

Argentina

Verallia Argentina

Our commitment: produce more and better with the minimum energy consumption.



Organization Profile & Business Case

Verallia Argentine that belongs to Verallia Group, third global producer of glass packaging for food and beverages, offers innovative, customized and environmentally friendly solutions to more than 10,000 customers around the world.

Verallia produce approximately 16 billion bottles and jars per year, intended mainly for still and sparkling wines, spirits, food products, beers and nonalcoholic beverages.

Verallia's operational model is based on the combination of the strength of its international network (industrial presence in 11 countries, 5 technical and 13 product development centers) and the proximity maintained in its relations with customers.

Case Study Snapshot

Industry	Glass Manufacturer
Product/Service	Glass containers
Location	Mendoza Argentina
Energy management system	ISO 50001
Energy performance improvement period, in years	3 years
Energy Performance Improvement (%) over improvement period	Furnace 2: 3.5% Furnace 3: 7%
Total energy cost savings over improvement period	319,489 USD
Cost to implement EnMS	11,668 US\$
Total Energy Savings over improvement period	37,096 GJ
Total CO₂-e emission reduction over improvement period	1,027 (metric tons)

Verallia's motivation and EnMS drivers:

In 2004 Verallia entered the MEM (Majority Energy Market) as GUMA (major majority user). As a major consumer of energy, Verallia was always interested in improving its energy efficiency in pursuit of environmental care and economic development. This intention is reflected by Verallia being a member of the United Nations Global Compact, one of whose axes is the Principle of Respect for the Environment.

Verallia had already implemented several Management Systems: Quality, Safety and Health and Environment, as well as Food Safety for being part of the food chain. That is why the Management Systems and especially their

spirit of continuous improvement is already inserted in the company's culture.

“Just as years ago it became essential to have a quality system, an energy efficiency system is today a necessity of every company that wishes to be sustainable in a world that must preserve its resources and at the same time be profitable.”

—G. R. Olivera, EnMS responsible

Business Benefits

The benefits that had begun since improvements were implemented became tangible as specific energy indicators were defined. Thus, improvement points were also detected through analysis of deviations that were previously not easy to detect.

Implementation Costs and savings

The cost of implementing the EnMS wasn't very high since we were able to take advantage of the know-how of the people who were previously prepared by the GEF Energy Efficiency Project program.

The time used in training people, elaboration of procedures and internal audits was approximately 1500 hours.

50001 Implementation Costs	
Description	u\$s
Pre Audit IRAM	1650
Training 6 people in 50001 requirements - BV	700
Training 6 people in 50001 Audit - BV	700
Pre Audit BV	910
Auditors allowances Pre Audit BV	74
Auditors allowances Pre Audit BV	330
Auditors allowances Pre Audit BV	160
Certification Audit BV	2415
Auditors allowances Certif. Audit BV	91
Auditors allowances Certif. Audit BV	496
Auditors allowances Certif. Audit BV	141
Outsourced consulting	4000
Total u\$s	11668

After the energy savings were implemented, we had improvements in the performance of the plant. With the same amount of energy, production increased over the years. For these calculations we must take into account correction factors that take into account variables that have great influence such as the aging of the melting furnace. The ovens have a useful life of approximately 10 years and depend a lot on the treatment you have suffered. Through its useful life, the melting furnace experiences deterioration in its walls that causes energy to be lost in the form of heat.

Energy performance improvement achieved:

- Furnace 2: 3.5 %
- Furnace 3: 7 %

Although in both furnaces we have had an improvement in energy efficiency, it can be seen that in Furnace 3 it is much greater.

In order to compare one year with another, it is necessary to consider an aging factor in melting furnaces since in itself there will be a greater consumption over time, which does not mean that their energy development does not improve from year to year.

Since both furnaces are reached by the same aging variable, this is not the case with the extraction that is much greater in the melting furnace 2 and therefore has suffered more deterioration and consequently has greater heat losses.

Energy savings:

Saving Gj	2018	2019
Total	21.910	15.186

Saving USD	2018	2019
Total	271.057	48.432

Other benefits beyond economic

With the implementation of Standard 50001, the "Glass, a transparent action" program was strengthened. "Glass, a transparent action" is an environmental-social program that the factory has implemented since 2012, whereby glass is collected for recycling and the benefit of that collection is given to a pediatric hospital.

This action implies a significant saving of raw material and energy since less fuel is used to melt glass, which results in significant energy savings.

Another good practice that was reinforced with the implementation of the EnMS was the follow-up of all the plant, administrative and industrial staff, through the EVE (environmental events), a tool anyone can use in the plant to report energy wastage in any of its shapes.

The staff became more observant and innovative in ideas that lead to improvements in energy performance.

They learned that Energy efficiency can be applied in all the places where we operate, even in our own homes, and in this way, they became replicators of the concepts of energy improvement outside the plant.

Beyond the economic benefit, staff awareness was one of the greatest achievements.

Plan

Already in 2012 Verallia inaugurated its third glass melting furnace. This work that was designed, projected and executed with an interdisciplinary team and in which several companies of the group, from different countries collaborated, already had since its conception the energy efficiency incorporated. Then with the reconstruction of the melting furnace 2 in 2014, it was updated with the latest technologies and processes for energy saving.

Verallia went through these years working on the improvement from the energy point of view not only in

the improvement of their equipment but also in the improvement of the processes.

Because the furnace is the largest consumer of energy, various audits of specialists who analyze actions to improve the melting process were raised through the factories.

In this benchmarking work, the support and commitment of the highest positions that make strategic business decisions was fundamental.

In 2016 Verallia Argentina entered the GEF Energy Efficiency Project through the Secretariat of Strategic Energy Planning of the Ministry of Energy and Mining. Through this program, what was already being done in terms of energy saving in both glass melting furnaces, was made official.

The program consisted of a distance training of a group of people who formed the first Energy Efficiency committee.

The group was formed by people from different sectors that in one way or another were related to energy efficiency, from the purchasing sector, through workshops to large users within the plant such as the glass fusion sector and the sector of packaging manufacturing.

Audits were then conducted to see progress in implementation. Although this program gave the initial kick to the implementation, it was in 2017 that we were finally able to define a Policy, Manual, a baseline and make energy reviews.

The first step in this process was to recognize among the types of energy used today in the plant, which of them is significant, considering two criteria:

- Amount of energy saved.
- Percentage of energy with the possibility of saving.

Then and what we consider a very important step since it is the commitment signed by the CEO, we define the Energy Efficiency Policy.

At the end of 2017 we asked a certifying entity for a pre-audit from which we could draw numerous conclusions.

At this point, it was important to review the legal energy requirements to see if we met all the points required by the current municipal, provincial and national laws.

Finally, after an intensive staff training and internal audits in 2018, we were able to certify at the beginning of 2019.

“The efficient use of energy has fundamental advantages for our Company: Take care of a resource that is scarce, thus optimizing costs and preserving the environment.”

—Walter Formica, Verallia Argentina’s Director

Do, Check, Act

The energy efficiency committee (cited above), began meeting weekly and the Energy Efficiency Manual began to be developed.

The first thing was to identify the energies used in the plant, the major users of these energies and draw up work criteria to define which were significant or not.

The Energy Policy was defined and then the legal requirements that Verallia must meet from the energy point of view were analyzed.

In the energy review that was done, the consumption and use of energy was evaluated and these data were taken in kwh per ton of glass produced to what we call the Energy Baseline. This Baseline was taken in a year considered stable. (During that year there were no stops in the melting furnace due to repairs or the inclusion of new production lines)

The frequency of this review is at least once a year.

Among others, the improvements (in equipment and processes) that were made were:

- In lighting technology changes (led) and placement of sensors.

- Motor replacement for those commanded by frequency inverters. The engines are of efficiency class IE 3 Premium.
- Installation of energy consumption meters in 4 and 7 kg compressors.
- Close heat loss points with ceramic welding.
- Closing of furnace holes and sight glasses.
- Relocation of metal burner sleeves to reduce parasitic air intakes.
- Throat temperature decrease in white glass.
- Analysis and elimination of losses in Batch Plant tapes.
- Implement daily consumption indicator of 7kg and 4kg compressors.
- Reduction of fire change time in both melting furnaces.
- Endoscopy to identify points of heat loss.

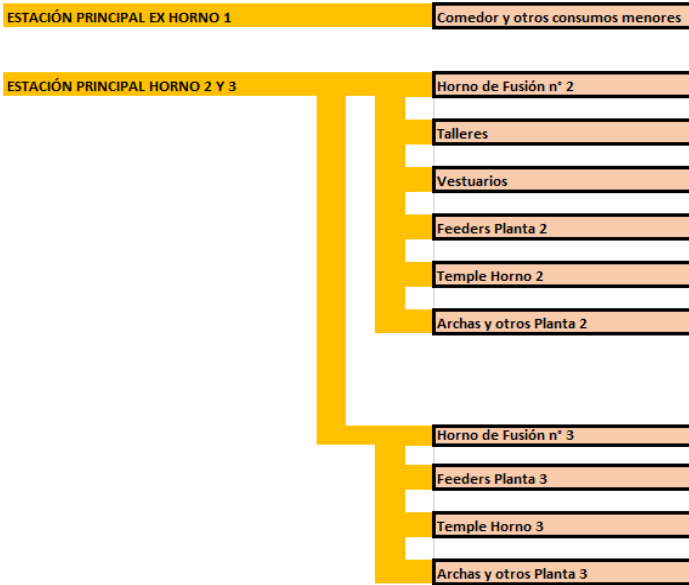
ENERGY CONSUMPTION BY SOURCE IN 2017 IN KWh	
NATURAL GAS	84,46%
ELECTRICITY	15,22%
GLP	0,26%
GASOIL	0,06%

Energy use diagrams were developed and from there the melting furnace (natural gas) and the compressors of the plant could be defined as significant. (electricity)

Energy use diagrams

We use diagrams to see in which points of the plant the energies are consumed, and which were the biggest consumers of those energies: significant users of the Energy. (USES)

Example: Natural Gas



The indicators defined between management and headquarters are then converted to operational indicators so that the operational level knows what role it plays in energy performance.

The energy objectives to be followed are then defined and thus the improvement plans are drawn. This objectives is sometimes divided into goals.

The plans must contain at least

- the proposed goal,
- the means and deadlines for achieving it,
- the person or persons responsible for reaching it,
- the method by which the improvement is verified.

Responsibilities

As for the taking of responsibilities of factory personnel is done through communication through:

Theoretical-practical training.

Newsletters

Daily dialogues before taking the work shift.

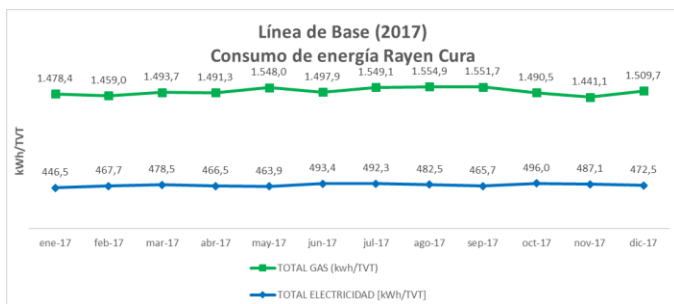
Meetings in work shifts.

Internal audits

The group of people that make up the energy efficiency committee is also in charge of internal audits. These audits are defined in an annual plan where all the areas and processes involved in Energy Efficiency are reviewed.

As a major consumer of energy and to comply with Law 27,191 of Renewable Energies, Verallia buys this type of energy directly from a generator. This law requires that a growing percentage of the company's electricity consumption come from renewable sources.

Baseline



Energy Performance Indicators

Specific indicators were defined to monitor and measure energy performance.

The indicators allow various sectors within the plant to understand the energy performance for which they are responsible.

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Transparency

Verallia Argentina has announced the implementation and certification of Standard 50001 to the community and its customers through the annual presentation of the Queen's bottle. (bottle that is allusive to the election of the National Queen of the Harvest) Verallia also declares the certifications obtained on its website.

<https://ar.verallia.com/desarrollo-sostenible/sostenibilidad>

require, and thus very valuable information was lost.

Lessons Learned

Through the implementation of this System the staff realized very important things:

- The involvement of people is greater through the example, so the commitment of the Company Management is essential.
- Each contribution (specially staff behavior) counts and makes the difference even if it is small.
- The benefits are not only environmental but also economic.
- Awareness was perhaps the most difficult task, but it paid off. For this, it was necessary for each operator to understand the influence of their daily work on saving energy and thus take the commitment to act accordingly.

Points to consider and avoid:

- The first thing to consider for an implementation like this is the TRAINING of all the people involved, since nobody will work if they are not first convinced of the advantages that this work brings. Perhaps we started to work without sufficiently training the staff to be convinced by the objective to be achieved.
- Another of the points to improve, which we noticed after the implementation is that there were already many DATA and we were not analyzing them with the depth that they