

Success Story



Company name: GRAFICAS Z S.L.

Country: SPAIN

1) Description of the company and energy consumption:

Graficas Z is a 35-employee SME, devoted to artwork printing, high quality print outs on varied media and labelling. They are based in the area of Zaragoza and have an annual turnover of 3.5 M€. Their technologies are mainly offset printing, xerography, flexography and digital press printing. Printing machines are critical for their process and are commercial equipment, considered as black boxes within the energy audit scope. There is no fuel consumption, only electricity, reported to be 379 MWh / year. They work 221 days/year in two shifts (3.536 h/year). The company's production capacity is made up of 6 conventional printing lines plus 2 new digital printing lines. There are also formatting and finishing stations depending on the product to be manufactured. The 2 production halls are fitted with 2 similar heat pumps for both summer and winter service.

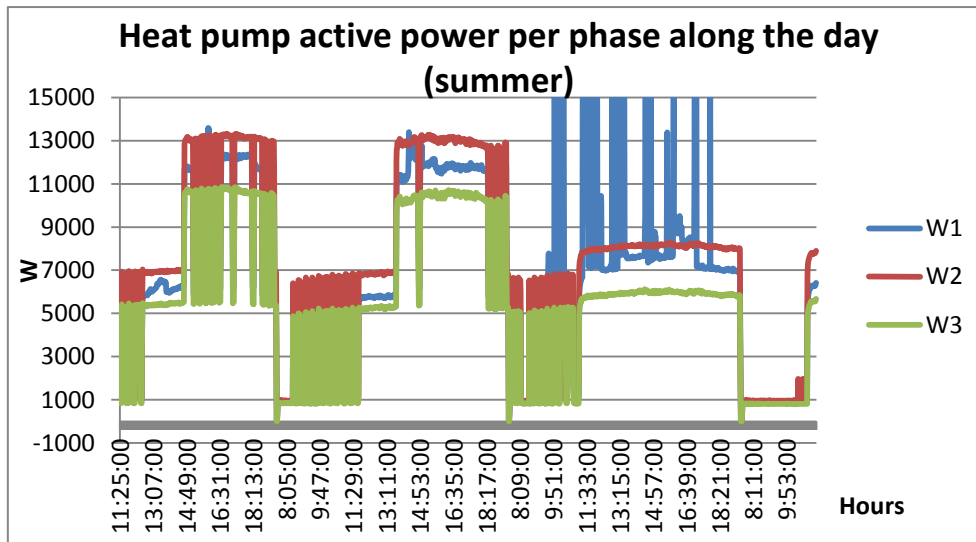
The company gas and electricity consumption in MWh before the PINE audit was as shown. No gas or fuel system is in operation.

<i>Electricity consumption</i>
<i>379,3 MWh/year</i>

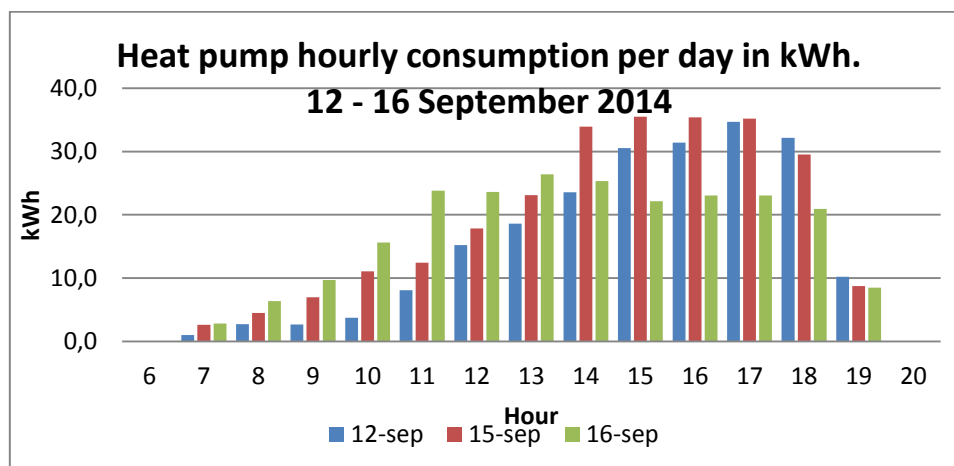
This company does not have high energy consumptions, or extreme inefficiencies to correct. It represents the typical situation of the SMEs in Spain that can be summarized in two words: too small, too smart. The company has too small consumptions to undertake large investments in energy efficiency and their staff has already taken measures for a rational, smart use of the energy. This fact entails a challenge to the PINE auditing team, in order to propose sensible energy efficiency actions to be implemented by the company. On the other hand, both management and related staff were enthusiastic about the project and the collaboration attitude with the PINE auditing team was always remarkable. Although the company's market target seems to be stagnant, the company keeps investing and innovating to enlarge the customer portfolio by offering new solutions to their customers and using up to date technology. Among the 8 production lines 4 of them are very recent and show the interest of the company to acquire the most up-to-date and productive technology. The acquisition of 2 new digital presses is also an effort to adapt to the current market of short and varying orders, with continuous modifications. All these reasons added up to select this company as a success story to present.

2) Description of the activities carried out with the company and key success factors:

A team of three auditors from CIRCE visited the company on June the 2nd 2014 to get to know the company management and staff. The company appointed one focal point to the PINE project that belonged to the quality and environment. This person worked with CIRCE staff in all the project phases. 3 more visits to gather data, take measurements and talk to maintenance staff were scheduled. Temperature by means of thermographic cameras and air flow rates were measured to assess heat transfer and evacuation. Electricity consumptions were also measured in September in one of the heat pumps in operation, getting the results that can be shown in the charts below, that were used to calculate the potential savings of a new heat pump equipment with speed drive system and higher ERR and COP.



3-phase active power consumption measurements where the 2 step heat pump levels can be easily identified showing the on-off cycles, and the idle consumption.



Evolution of the heat pump hourly consumption during 3 days in September 2014.

The main key success factor is the narrow collaboration attitude of the appointed company staff with CIRCE auditors, sharing information, experiences and data with a common purpose of improvement.

Another key success factor was the adaptation of the audit to company needs. Company technicians and workers know better than anyone else the company equipment and processes and where major energy wastes are. This focus on the areas suggested by the company led to greater customer satisfaction and

faster achievements. The compressed air nominal pressure reduction is one of the many good suggestions given by the company experts.

Another key success factor lays on the collaboration with equipment providers that can advise on the best market solutions and provide precise quotations for investment return estimations. This collaborating partner could be selected by the company as one of the possible suppliers for the action implementation.

"In Graficas Z, we are fully committed to the sustainability of our products and the fight against climate change. We like to do things well and explore all areas of business improvement, including energy usage. Our participation in the PINE Project has enabled us to discover new areas for improvement and accelerate those that were already underway". Jose Antonio Larroy. Manager Graficas Z.

3) The energy saving measures and the results

The company has analysed the proposals and is on the way to implement 3 interesting measures, achieving already an estimated saving near to 20 MWh/year and avoiding 6.5 t/year of CO₂ emissions.

- The first measure consists in the gradual replacement of the current machine headlights from fluorescent technology to LED technology in the highest workload lines. The investment of 3445 € is paid back in 3 years. Other similar investments in this sense have longer payback times as the hours of usage decrease.
- The second measure consists of reducing the compressed air pressure by 2 bars and has no investment. Preliminary analysis shows the feasibility of this action but the implementation is pending of some trials to ensure that this change has no impact on the production lines in any case.
- The third consists on linking the heat cooler of the two "Syncroline" units into one cooler pouring the extracted heat to the outside of the plant, and thus, avoiding cooling energy in summer, and then saving 9 MWh of heat pump electricity and 2,9 t of CO₂ avoided.

For the following 3 years, the company will continue monitoring these measures, and will implement two more measures, as described below:

- The installation of indoor ceiling air stratifiers will enable a more homogeneous mix of the indoor air, thus sending hot air accumulated at the top of the building to the bottom and avoiding extra heat from the heat pump in winter. Payback is estimated in 1.6 years and the savings could reach 6,7 MWh/year and 2,2 CO₂ t.
- The most expensive but impacting measure accepted is the replacement of the current heat pumps (one at each one of the two production buildings) by more efficient ones. Each new equipment has been quoted by an external company in 18.000 € each and the payback goes to 7,2 years.

Finally, one additional measure has been proposed and turned down by the company management.

- One of the production xerography lines has six water cooling systems, one per rotational cylinder, and the extracted heat is fully poured inside the building, thus forcing the heat pump to work tougher to get rid of it in summer. A system of flexible conducts with forced ventilation was proposed, with an adjustable valve to make use of the heat in winter.

The measure was rejected because the machine is approaching the end of life and the estimated payback was 5 years. The recommendation was technically quite complex and expensive. The recent acquisition of new more efficient printing equipment is accelerating this offset machine obsolescence.

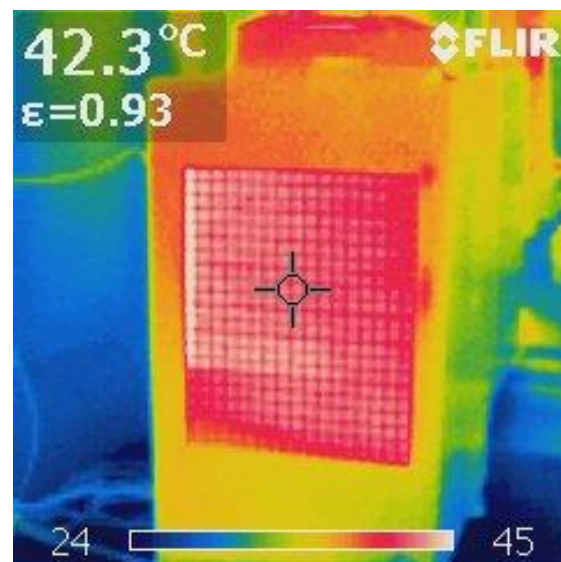
Aggregated savings account for a 15% of today's total consumption, which is a significant amount for an originally efficient company. In the following table the energy savings achieved after the implementation of the measures proposed by the PINE auditor are shown here below:

	<i>Electricity savings</i>
<i>Actual saving</i>	<i>19,69 MWh, 6,1 t CO₂.</i>
<i>Future total saving (in 3 years)</i>	<i>60,42 MWh, 22,4 t CO₂.</i>

Summary table of the energy efficiency measures:

Proposal #	Action	Energy saving kWh electric	Final Energy saving [toe]	Primary Energy saving [toe]	GHG emission [tCO ₂]	Investment in sustainable energy [€]	payback	Implemented	Will be implemented within 3 years	Will not be implemented due to...
1	New Heat pump	42744	3,7	8	14,1	36000	7,2		x	
2	Indoor air stratifiers	6728	0,6	1	2,2	1540	1,6		x	
3	Syncroline heat extraction in summer	8748	0,8	2	2,9	1000	<1	x		
4	Etipol heat extraction in summer	6556	0,6	1	2,2	4500	5			Near obsolescence
5	LED lighting	7924	0,7	2	2,6	3445	3	x		
6	Air compression pressure reduction (2 bar)	3019	0,3	1	1,0	0	0	x		

*** Company images**



Chiller of one of the xerography lines and a themographic picture showing the map of temperatures to assess the heat being extracted from the line in operation.



Xerography line capable to print 8 colours sequentially.



Other production equipment and finishing



The digital printing line



Heat pump building 2