

Macral Accounting Energy

AREAL, Portugal

Summary

The subjects of study are three supermarkets located in Vale do Lobo, Quinta do Lago and Albufeira, all in Algarve Region, from the Macral Company (local company). The objective of this work has been to analyse the contracts and invoice matters of electrical energy and the power factor correction of the three BTE (Low Special Voltage, superior to 41,4 kVA) consumers.

End-user area	Target Audience	Technical
<input type="checkbox"/> New buildings	<input type="checkbox"/> Citizens	<input checked="" type="checkbox"/> Energy efficiency
<input type="checkbox"/> Refurbishment of buildings	<input type="checkbox"/> Households	<input type="checkbox"/> Heating
<input type="checkbox"/> Transport and mobility	<input checked="" type="checkbox"/> Property owners	<input type="checkbox"/> Cooling
<input type="checkbox"/> Financial instruments	<input type="checkbox"/> Schools and universities	<input type="checkbox"/> Appliances
<input type="checkbox"/> Industry	<input type="checkbox"/> Decision makers	<input type="checkbox"/> Lighting
<input type="checkbox"/> Legal initiatives (municipal regulations, directives, etc)	<input type="checkbox"/> Local and regional authorities	<input type="checkbox"/> CHP
<input type="checkbox"/> Planning issues	<input type="checkbox"/> Transport companies	<input type="checkbox"/> District Heating
<input type="checkbox"/> Sustainable communities	<input type="checkbox"/> Utilities	<input type="checkbox"/> Solar energy
<input type="checkbox"/> User behaviour	<input type="checkbox"/> ESCOs	<input type="checkbox"/> Biomass
<input type="checkbox"/> Education	<input type="checkbox"/> Architects and engineers	<input type="checkbox"/> Wind
<input checked="" type="checkbox"/> Other (Local Industry – Supermarkets)	<input type="checkbox"/> Financial institutions	<input type="checkbox"/> Geothermal
	<input type="checkbox"/> Other	<input type="checkbox"/> Hydro power
		<input type="checkbox"/> Other

Context

The tariff system in Portugal, distributes the consumers of Low Voltage into staggering accordingly the required power.

- From 1 to 20.7 kVA;
- From 20.8 to 41.4 kVA;
- Superior to 41.4 kVA.

The price in 2000 of each kWh, will be accordingly the scales:

For the consumers with mores than 41.4 kVA, which is the situation that we are interested in:

Power Prices (in Eur./kW by month)

Tariff of Medium Utilisations	Tariff of Long Utilisations
2,33	6,55

Energy Price (in Eur./kWh of consume)

Tariff of Medium Utilisations			Tariff of Long Utilisations		
Busy Hours	Full Hours	Empty Hours	Busy Hours	Full Hours	Empty Hours
0,161	0,069	0,045	0,092	0,053	0,035

Beyond the power values and the energy prices, we have to consider that for consumptions above 41.4 kVA of power, we can choose between 2 cycles types:

- Daily Cycle - Timetable of the busy, full and empty hours, equal to every days of the week, including Saturdays and Sundays.
- Weekly Cycle - During the days of the week, to the busy hours it is added plus ½ hour. At Saturdays there is only full and empty hours and at Sundays there is only empty hours.

Concerning the subject of the Energy Efficiency, AREAL create two software. One to analyse the contracts and invoice matters of electric energy, because only knowing very well the tariff system, and installation function, we can choose the best contract for a specific consumer. This is what we can do with our software. The other software is a calculus sheet which determine with expedition and efficiency the several Power Factor Capacitors (PFC) needed to correct the Power Factor, in order to cancel the reactive energy consumption. This calculation also determines the Technical/Economical viability for each conjunct of Power Factor Capacitors.

Objectives

The objective of this project is to reduce the invoice of electricity and to eliminate the reactive energy consumption. Is also objective of this project to change the staff and manager behaviour concerning the energy consumption, promoting the dissemination of renewable energies and the optimisation of the energy consumptions.

Process

The project is divided in four phases.

Phase	Description
1	<ul style="list-style-type: none"> • Electric data Survey; • Electric data input in software; • Analysis of the contracts and invoice matters of electrical energy and the power factor correction; • Power factor capacitors sizing.
2	<ul style="list-style-type: none"> • Electric energy contracts change; • Power factor capacitors installation.
3	<ul style="list-style-type: none"> • Electric energy consumption and power attendance; • Possible reactive energy consumption attendance.
4	<ul style="list-style-type: none"> • Financial saving calculation by the electric energy contracts changes; • Financial and reactive energy saving calculation by the power factor capacitors installation;

Financial resources and partners

The project has been realized only by AREAL.

The costs of the project, except the capacitors, have been supported by AREAL Associates (the capacitors have been supported by Macral).

Results

The objective has been achieved, reducing the invoice in electric energy and eliminating the reactive energy consumption.

Financial savings [€]	
Electric energy invoice saving in the three consumers in the first year	1.189
Electric energy invoice saving in the three consumers in the second year	2.498
Reactive energy invoice saving in the three consumers	3.718
Total	7.406

Note: The payback time for the capacitors has been 14 months for the three consumers.

Lessons learned and repeatability

The project has very high repeatability in all AREAL Associates, Hotels, all Algarve Municipalities and Algarve Institutions (big energy consumers).

That's a project that all energy agencies can manage similar experiences, and trying to motivate the managers to invest the financial savings in renewable energy.

Contact for more information:

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