HIGH EFFICIECY ELECTRICAL ENGINES

FONDERIA DI TORBOLE S.p.A.

FONDERIA DI TORBOLE CASE (1)

During the year 2010 Fonderia di Torbole SpA has introduced high-efficiency motors to replace those of an old design, with the goal of reducing electricity consumption.

The project involved several phases of the production process, including the inverters.

For each phase datasheet of different motors has been analyzed to find those which best suited to the needs of each production phase.

FONDERIA DI TORBOLE CASE (2)

The analysis was focused on the following stages of production:

- intake
- blasting
- fettling
- cupola furnace
- moulding

HIGH EFFICIECY MOTORS (1)

The existing fleet consisted of:

- N° 27 motors classified efficiency_3
- N° 63 motors classified efficiency _2

The foundry has analyzed the technical and commercial proposals of six suppliers of electric motors.

Once the supplier has been chosen, the foundry made a trial to test and compare the consumption of a efficiency _2 motor with a motor rated IE2

HIGH EFFICIECY MOTORS (2)

Dept.	Number Replaced Motors	Size Replaced Motors kW	Obtenible Energy Saving Year/Kwh*
Intake	22	5,5 / 75	29.724
Blasting Machine 1	11	45 / 22	40.360
Blasting Machine 2	8	45	35.755
Fettling Dept.	22	22	61.488
Casting Dept	6	30	5.693
Cupola Furnace	8	30 / 22	39.481
Moulding Dept.	13	37	97.756

(*) Savings calculated as the difference, with the same load factor, between motors IE2 and existing electric motors

HIGH EFFICIECY MOTORS (3)

The change has affected in particular the small size motors, particularly those with ratings below 90 kW, as in year 2010 existed the tax deduction of 20% on the investment cost.

The foundry motors fleet went from an average yield of 87.5% to an average yield of 93.8%

Pay-back analysis took into account not only the cost of the investment and the tax advantage, but benefits arising from the recognition of TEE (Energy Efficiency Credits) calculated as a function of energy savings achieved.

HIGH EFFICIECY MOTORS (4)

Dept.	Energy Saving €/year **	Investment Cost €	Tax Deduction €	Estimated values TEE for two years €	Net Motors Cost	Pay-back Time month number
Intake	2.972	10.351	2.070	532	7.749	31
Blasting Machine 1	4.036	11.774	2.355	588	8.831	26,2
Blasting Machine 2	3.576	10.888	2.178	520	8.190	27,5
Fettling Dept.	6.149	15.889	3.178	894	11.817	23,1
Casting Dept	569	1.020	204	82	734	15,5
Cupola Furnace	3.948	12.101	2.420	574	9.107	27,6
Moulding Dept.	9.775	20.293	4.058	1.680	14.555	17,9

(**) calculation based on a cost of electrical energy equal to 100 €/MWh

Figures are been elaborated assuming that motors work 5.280 h/year.

CONCLUSIONS

Against an improvement of 6.3% of the efficiency of electric motors on the production lines savings in electricity consumption of 310 MWh/year were found, estimated at a saving of about 31,000 €/year, considering an energy cost of 100 €/MWh.

Therefore for an investment of about € 80,000 in a high efficiency IE2 motors, deducting taxes of 20% and calculating the remuneration of the TEE, an average pay-back within the first two years is expected.

Assuming an average life of IE2 motors of ten years, we could estimate energy savings of over € 300,000.

WHITE CERTIFICATES or TEE (1)

The TEE are issued by the Authority for Electricity Energy and Gas (AEEG) as a result of measures to improve energy efficiency by firms. There are pre-filling cards for standard interventions, while in more complex cases an articulated report is to be prepared.

AEEG authorizes the issuance of such certificates of 1 per TEE for each TEP (Ton Oil Equivalent) saved.

A TEP is equivalent to 11,627.907 kWh.

Torbole Foundry project, basing on the total fuel consumption saved, has obtained in order to have 27 TEE.

Recently a new AEEG directive has been issued, which has identified a minimum threshold of energy savings that should be guaranteed to be able to apply for TEE recognition .

WHITE CERTIFICATES or TEE (2)

Kind of project	Minimum size of the project toe/year
Standardized	25
Analytical	100
On balance	200

The standardized method is typically used by comparing the energy savings achieved by specific cards for industrial environments such as motors, flow regulators, inverters

The analytical method is used in cases involving actions for energy efficiency of natural gas or its decompression.

The on balance method covers most of the interventions proposed in the industrial sector, which by their nature are difficult to standardize.

WHITE CERTIFICATES or TEE (3)

The authority has determined the value of contribution per unit:

Data	Contribution €/toe
2004-2008	100
2009	89
2010	92
2011	94

OBLIGATIONS TO ELECTRIC MOTORS STANDARD IEC:

Waiting to assess the impact that the new classification will have on the market, it is important to remember the steps for the entering into force of the new rules, in addition to the obligations imposed on producers and buyers:

- since 2009 it is possible to use the new classification IE
- since November of 2010 all electric motors must be classified according to criteria established by the IEC 60034-30:2008
- by 2011 all industrial electric motors must be of minimum class IE2
- by 2015, all motors must be at least class IE3. Implementation of IE2 motors is allowed only if motors are controlled by variable speed device
- from 2015 will be mandatory the respect of minimum efficiency values for all electric motors sold