Energy Conservation

No more toys for the boys!

For most of our customers in the manufacturing industry (and not only!) energy is one of the first three items, cost wise, in their P&L. This fact has not kept them from looking at all the other cost items in search for optimisation and, often, neglecting energy. Optimisation efforts have looked at manpower, general expenses, purchasing, other running costs, but energy is rarely in the menu.

This does not mean that they have done nothing to improve their energy position, often we find several programs in place, like:

- Investments plans in new, energy efficient technology (in the core business)
- Investments in side businesses having to do with energy
- Purchasing actions to reduce the cost of energy
- Audits to determine energy waste
- Emotional communication to involve employees in saving energy

Once a company has run through one or more of these actions, there is often a high level of frustration in the management, why is that? Analysing each of these actions it is easy to identify strengths and weaknesses of each approach:

Action	Strengths	Weaknesses
Investing in new process technology	○ Permanent benefit ○ Products are more competitive	○ ROI seldom justifies investment for the sake of energy consumption alone ○ Usually viable only if replacement is needed due to other reasons
Investing in side businesses	○ Additional revenues	○ Usually high risk investments in an unfamiliar environment ○ Long payback periods
Better purchasing	○ Actions are external to the company	○ It's a one off action, further improvements are unlikely after the first period
Auditing processes	○ Quick and inexpensive	○ Low adoption, difficult to overcome internal resistance ○ Often 'experts' know very little about the core processes
Emotional Campaigns	○ Involvement of employees	○ Messages are vague and often inadequate ○ Induce frustration ○ Lack of clear targets

What we hear from our customers is that investments, let alone one or two successful experiences, are not producing the expected results or investments plans exist, but cannot be approved because they can't pass the hurdle rates of return or compete with badly needed investment in the core business.

Once the necessary steps of purchasing optimisation, like switching suppliers, creating optimised supply mixes or adhering to consortia are over, there are no further improvement steps to be achieved.

Audits and emotional campaigns usually work badly because the first point out at issues, but do very little to suggest viable solutions, the latter because, once we have bomb-shelled our employees with messages about their role in saving energy, often we can't do any better than asking them to switch their light off

when they leave the office and to push only on button to call the lift instead of two, leaving them to ask themselves how they can really contribute to reduce the waste of energy.

This is when, if you are a General Manager, a CFO or have a high responsibility role in an operation, should start asking yourself a few questions:

- Do I really need to invest in new equipment to spend less for energy?
- Why have we been successful at tackling waste in other areas (e.g.: poor quality) but we have the feeling (or we know from benchmarks) that we are wasting energy?

One of the issues with energy is that you don't see it and that very few people inside a company, as we often find, have visibility on the overall expenditure and consumption of energy. Waste in production usually translates into heaps of off-quality material and scraps, waste in the supply chain into delivery delays and highly visible complaints from customers.

Waste in the energy chain results into invisible thermal exchanges, losses of compressed air, steam, hot water and, at the end of the month, into a cash flow into the pockets of your providers. Very few people in your company see these flows, and even less know the value of the losses, that is the cost per hour, e.g. of steam losses, air flowing freely, pumps or compressors recycles or high oxygen rate settings in furnaces.

There are three levels of KPIs for tracking energy consumption:

Level	Who	When	What	% Found
1	CFOs, GM, SVPs	Monthly/Quarterly	Aggregate monetary expenditure for energy supplies	> 95%
2	VPs OPS, site managers, functional managers	Weekly/Monthly	Monetary + volumes by source	< 60%
3	Functional managers/Supervisors/Operators	Shift/Day	Volumes/operating parameters by key process area	< 25%

Level 1 gives an aggregate monetary view of the overall cost of energy, it's a lagging indicator, it is viewed and analysed AFTER the waste has happened and does not give any hint about what is possibly wrong in the utilisation of energy. Level 2 can supply some information about where the waste is happening, but does not suggest why. Level 3 allows immediate intervention on the process, directly from the field, BEFORE the waste happens.

During our discussions with clients and potential prospects we have realized that almost half of the companies stop at Level 1, while only 25% have Level 3 indicators in place. If you can't see it and you don't measure it , no wonder if you are having trouble in curbing down your energy consumption.

In a manufacturing environment usually plants and their governing processes have been first optimized for quantity, then for quality and finally for environment and safety. Energy is not yet part of the equation in many companies.

What are the options left if you have financial constraints limiting your investments and you have already done whatever could be done to reduce the specific cost of energy?

You can be quite sure that your plants and processes have still much to give in terms of consuming less energy.

When it comes to question the consumption, engineers will do what they find logical given their professional skills : propose to replace motors with higher energy class ones, place inverters everywhere, change windows, heating systems, install heath recovery systems, very few will start looking at the way the current hardware is utilised, think about cycles, settings, instruments maintenance, cleaning cycles, reporting systems, shift handover notes, planning implications.

Most of this information or practices are crystallized after years and years of doing the same thing all over again and the lack of knowledge of the monetary impact of bad decision making in energy consumption does not prompt for action.

In complex energy devouring environments, such as refineries, we have obtained outstanding results launching energy conservation initiatives that started from the assumption that no investments could be part of the program.

Involving the field people, working closely with them we found that latent within the organisation there was a deep knowledge of changes in the processes and practices that could have an impact on energy. We helped to build plans with a strong business case around these ideas and to grow the awareness about the cost of energetic waste.

This resulted in annual savings of millions of Euro that could be achieved in times that are a fraction of the time usually needed to introduce new investments. Energy consumption savings in these projects have ranged between 5% to 10 - 12% and this has proven to be interesting even in less energy intensive environments, such as retail and distribution or banking.

These are good news for al the General Managers and the CFO who are frustrated about the efforts of their company in reducing the energetic cost of their operations. What appeared to be uniquely the turf of engineers can be the ground for a review of management practices and behaviours that will lead to projects with extremely high return of investment and will teach their technical teams how to get the most out of their assets before asking for new hardware.