



**3+1 SURPRISING SOURCE OF ENERGY
SAVINGS IN INDUSTRY**

A very effective method in energy efficiency in industrial settings is to become aware of the concept of productive versus non-productive energy. Productive energy is ANY energy that supports the production process or is required for the production itself as well as important related issues such as workers' safety and product quality. Non-productive energy is everything else, that's it. Dead simple, right? Not quite, look at lighting for example, during a night shift it is an absolute essential part of productive energy unless you want your workers to wear headlights like miners do. During dawn hours, however, more and more light fittings switch to be part of the non-productive field, especially those under sky lights where free sunlight eventually makes the artificial light redundant. So, the issue becomes **drawing the line between productive and non-productive energy** during any specific time of the day or night and production scenario (full production, production halt, stand-by, maintenance, factory shut down).

Using this concept allows us to hone in on some of the **best-known secrets of energy efficiency** (we all know it, but don't quite get around to do something about it). Here we go:

1. Compressed Air Leaks

The evergreen. It used to be considered just as air we breathe, so we use it for cleaning our workplace, cooling our foreheads (beware: you can push compressed air directly into your blood stream on direct skin contact, leading potentially to death) or we simply get used to that hissing noise we know so well to be part of our production process. Many companies have leak rates of 50% and are fully unaware of it. And yes, compressed air is the most expensive energy form we use in industry.

Solution:

- ▶▶ Install an **electrical meter** on your compressor or even better (but much more expensive, too, a compressed air flow meter)
- ▶▶ Using **regression analysis** plot your production variation against compressor energy consumption, the baseload (y-axis intercept) will in most cases indicate your leak rate.
- ▶▶ Do a **shutdown test** (during non-production time switch off parts of your compressed air distribution system at fixed intervals and in a systematic way and track on the data when your consumption declines most indicating where your system's biggest leaks are)
- ▶▶ Tell your staff that you will have a **special focus on compressed air leaks** and promise them a reward (bowling with free beer) if they help you reduce the leak rate to less than 10% (considered normal and acceptable). Payback on beer and bowling should be in weeks if not days.

2. Air handling units/HVAC

Another invisible/“just air“ energy consumer. Do find out how much it actually uses, if less than 10% ignore, if more, then definitely look into this and quantify the proportion of your energy use (should be part of any legal energy audit).

Things to look out for:

- ▶▶ **Temperature set points** (when does heating/cooling start, can we increase the middle interval where neither is required?)
- ▶▶ Can we use **free cooling** (use chimney effect in morning hours).
- ▶▶ Consider a **price comparison** between a nice quality set of worker sweatshirts compared to a 3°C reduction in hall temperature (and get the unions on your side before doing this)
- ▶▶ **Close doors/windows** and skylights in winter and especially during spring or fall when noone thinks of heating any more or yet. If everyone says that they are doing it, send someone during the night shift to observe the gates from a distance. You might be surprised about the prolonged periods of open doors.
- ▶▶ Consider setting **recirculation of air** wherever feasible.
- ▶▶ Consider **heat recuperation** and ensure that the installations and filters are well maintained.
- ▶▶ **Frequency drives** are a great new feature on HVAC units. But while the mere installation delivers around 10% savings by itself, consider exploring where your optimal air exchange rate at any given production state really is. We have been able to reduce air handling units to 30% of their prior consumption while taking into account hygienic workplace limits and air emission rates. Yes, these installations were usually designed with a BIG (read \$\$\$) safety margin.

3. Switch-off programs during breaks and weekends

Have you ever plotted your weekend non-production energy consumption over time? Do you see the baseload dropping more or less constantly until it reaches the lowest point on Sunday afternoon just before it rises again sharply for the production start of the new work week? Well, take that lowest point from Sunday afternoon and draw a horizontal line backwards to Friday midnight (or whenever you started your weekend), the area between the two lines is your **minimum savings potential**. Chances are that your baseload can be further reduced below the Sunday minimum using the concept of „what do I really need on a weekend in this hall to allow for maintenacne activities and safe conditions“.

With one of our clients we achieved a 40% reduction over a mere 3 month period by:

- ▶▶ Regular **weekly feedback** about weekend performance for all involved staff (stakeholders)
- ▶▶ **Baseload checks** (night visits identifying machines and lighting that is still on but could be switched off)
- ▶▶ Communication of **quantified energy consumption** (forget about Joule and kWh, but let them know how many € or CZK that weekend cost and how much they could have saved. Supermarkets also tell us costs in monetary values, energy units are just another currency. Saying “you saved or wastes 200€ is so much more understandable to ANYONE, than talking about 2000-6000 kWh or 600 m³ or 7200 MJ; it’s simple math, c’mon make the extra effort.)

Which is the perfect segway to the fourth, bonus, point:

Involve people in energy management.

A lot of what I said above involves understanding complex situations in everchanging settings. One way to counter your staff’s lack of discipline is automatization. No need to write about it here, the entire world talks about it incessantly and the market is awash with automatization solutions. The problem as always is the price for new equipment and the fact that even automated processes need to be regularly adjusted to changed settings. Yes, you feared it: you can’t engineer around your staff. So, how about taking them head on, involving them and giving them a stake in the outcome. Be prepared for their questions “Boss, what are we going to get from this“, let yourself be surprised that sometimes all your workers want is acknowledgement of a well managed change process and some praise. Don’t fool yourself, this all sounds simple, but it’s not easy. The reward however, can be significant. We generally achieve 10+% annual energy consumptions savings in our programs based on combining the three core ingredients of efficient energy management: **people, technology and meaningful data**. If you get stuck, get in touch, maybe we can help you.

HE Consulting

At HE Consulting our main expertise is to help industrial clients achieve **significant energy savings** at their manufacturing facilities. Our approach is different from that of our competitors and from what most people believe **energy management** is about. The methodology we developed has proven to deliver for our clients large energy savings within only a short time period.

How can we support you?

- ▶▶ Preparation for ISO 50001 certification
- ▶▶ Energy Audits according to legislative requirements (406/2000, respectively, 27/2012/EU)
- ▶▶ Energy Assessments of individual projects (according to 406/2000)

However, we are not satisfied with merely identifying a savings potential for our clients and put it in a paper report. ISO 50001 certification or an energy audit with HE Consulting means that in addition to certification preparation or reaching compliance **we will not stop supporting you until the initially defined savings potential is delivered** and until you see this in a reduction of your energy bills. We call our unique methodology [QUEST](#), standing for quick energy savings technique.

What makes us different?

- We **make energy visible** in a way that you will understand. Different from conventional monitoring of consumptions we teach you to work with energy data in a new way.
- We **focus on the human factor** in energy management and help you with introducing the concept of „energy culture“ to your company, meaning a paradigm shift where the responsibility for energy consumption does not lie any longer exclusively with the energy manager.
- We use and deploy rapid and effective data tools and methods but will stay with you as long as it takes until you have acquired these and can **use them independently** without our support.
- We will ask you to pay for our services only after it is apparent that they will deliver the results and objectives that we have defined together at the beginning. This makes the program **self-financing**.



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