CHAUVIN ARNOUX

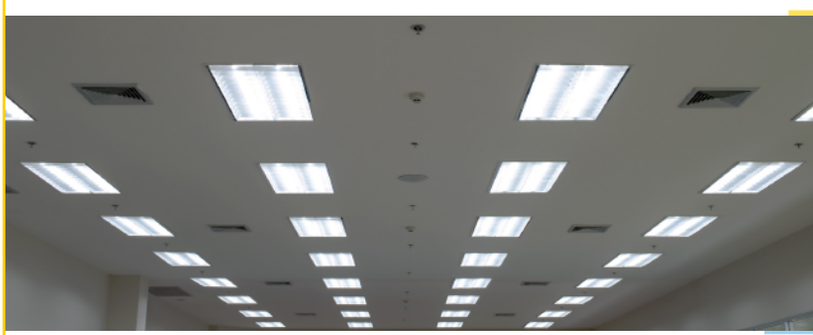
Save Energy Now!

Energy costs five times as much as it did a year ago, and further increases are inevitable. Which means you need to save energy. We all do. But how to do it? **Julian Grant** of **Chauvin Arnoux** has some suggestions.

If you have responsibilities for energy usage in an organisation or a building, you've probably already carried out energy audits and maybe you've also read a few articles explaining how to reduce your energy usage and your bills. But that was then, and this is now. Energy today is much more expensive than in the past, as you surely won't need reminding, so it's time to revisit those energy saving options. Some of the measures you deferred or dismissed in the past may now be very much more attractive.

Before looking at specific energy saving measures, however, I'd like to make a more general point – what you can't measure you can't control. That's certainly true of energy so, I recommend as a starting point investing in a portable energy logger (PEL), which is a modestly priced instrument that will quickly pay for itself. The PEL can be temporarily installed at numerous points around your electrical installation and will provide invaluable information about where, when and how much energy is being used. As we'll see later, it will also provide information about power quality, which directly affects energy costs.

To cut energy bills, the first thing to consider is out-of-hours usage which, for many organisations, wastes more energy than any other single factor. Lights left on are fairly obvious, but things like heating, office equipment and computers switched on out-of-hours may be harder to spot. The PEL provides a solution by logging energy usage over time, producing records that allow unnecessary power usage to be quickly and positively identified. Armed with this information, often all that's needed to make big energy savings is to install a few time switches or occupancy sensors.



Now consider lighting. It's easy to ignore this because lighting is often considered to be a relatively small user of energy. A few measurements with the PEL may well change this idea, and reveal that lighting is worthy of attention after all. The most obvious step is to replace conventional light sources with LED types, which are now available to fit almost all luminaires. Before and after measurements with the PEL are likely to show a dramatic improvement and, as a further bonus, the long life of LED light sources means that maintenance costs will be reduced as well.

While using the PEL to investigate where energy is being used, pay special attention to motor-driven equipment, such as air-conditioning plant. Often, this is designed so that the motor always runs at full speed but, in many cases, reducing the motor speed would have little if any impact on performance. This is important, because reducing the speed of a standard induction motor by just 20% reduces the amount of energy it uses by 50%. Adding variable speed drives to equipment can, therefore, be a very sound investment.

Moving on to power quality, perhaps the most important thing to look at is power factor which, once again, the PEL will measure and record. Many electrical devices consume reactive power which costs you just as much as any other power yet does no useful work. A measure of this is power factor and, if your electrical installation has a low power factor, it means you are paying for a lot of useless power. It is, however, possible to install power factor correction devices which will eliminate most of this useless power and thereby make a big difference to your energy bills.

Sticking with power quality, two other things to look at in the results from your PEL are phase imbalance and harmonics. Phase imbalance is a simple idea: in a perfect world, if you are working with a three-phase electrical supply, as most larger installations do, you would expect the voltage on all three of the phases to be identical. In reality, this may not be the case; there's often a few percent difference. That may not sound like much to worry about until you realise that a 2% voltage imbalance in a motor circuit can increase the current in the phase affected by 20%. The motor runs hot and up go your energy bills. Definitely worth investigating!

Finally, let's consider harmonics. These are currents at frequencies that are whole number multiples of the supply frequency. For example, with a 50 Hz supply, harmonic frequencies would be 100 Hz, 150 Hz, 200 Hz, 250 Hz and so on. Harmonics are mainly produced by electronic devices such as computer power supplies, variable speed drives and controllers for LED lighting installations. They are a problem for many reasons, but one is that they can increase heating in cables and equipment. That unwanted heat doesn't come for free – you're paying for the energy used to produce it.

Therefore, identification and control of harmonics is yet another way to reduce energy usage and costs.

In this short article, it has only been possible to mention very briefly some of the main areas that are worth investigating in the quest to reduce energy consumption; a much more detailed discussion is available in a Chauvin Arnoux white paper which you can access here bit.ly/3wQU41l.

Given the current world situation, high energy prices and even energy shortages are issues that are likely to be of enormous concern for a very long time to come. If, however, every consumer were to cut their energy usage by 20%, these problems could be overcome or, at the very least, minimised. Hopefully, this article has provided you with a few useful pointers to show where you might be able to start along that path.

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