

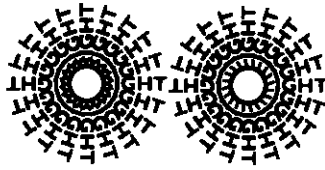
**ENERGY-SAVING LIGHTING ELECTRONICS
A TRIPLE WIN: FOR THE ORGANIZATION, FOR THE HUMAN BEING AND
FOR THE ENVIRONMENT**

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It is a pleasure to be able to share some ideas with you this morning on what lighting electronics can accomplish when contradictory, or at least paradoxical needs are to be met. These needs are the well known necessity to save energy on the one hand, and the new, often increased demands by today's utility building, or by its occupants in particular, on the other. In many cases, "never the twain shall meet", but in case of Lighting as a building function, it is indeed possible to obtain the best of both worlds. The matchmaker: lighting electronics. How this synergy can be achieved today, and what developments on the matter can be expected in the near future, is the scope of my message to you today. In the following, my focus will be on the office application. But most of my statements are relevant to other types of utility buildings as well: think about hospitals, schools, and plants.

Since the good things in life often come threefold, it won't surprise you that, talking about the development of lighting electronics in energy saving, we can in fact distinguish three stages. Let's go through each of these stages in more detail.

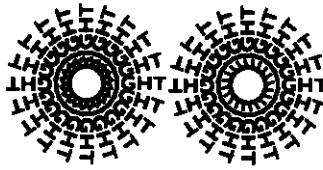
The first stage is meanwhile quite well known. It could be called the stage of *Static* solutions, since the category consists mainly of electronic facilities that operate regardless of external variables. Think about the compact fluorescent lamps with electronic ballast, which stood at the beginning of it all, beating the good old bulb about five times to one with respect to energy-efficiency. Think about the High Frequency ballasts and TL lamps. Lighting solutions with High Frequency Ballast technology have been on the market for some years now. As you are probably aware of, they can well represent a lowering of the energy bill by up to 50 percent, if compared to traditional lighting schemes with more lamps and with traditional ballasts and luminaires. Of this fifty percent, about thirty is



achieved by new lamps and luminaires and twenty by High Frequency ballasts. The market development, by the way, is far from static. Much to the credit of the subsidizing facilities that are now applicable in many countries, the market volume has passed a relatively stable sound barrier during the last two years, as the index figures show. However, it is far too early to report: "Mission Accomplished" and fly back to the air base. High Frequency ballasts still have no higher penetration than a few percent points of the total equipment installed today. In other words, the high cruising speed has to be maintained for the coming years in order to achieve a double digit penetration figure.

Why, by the way, is this double digit penetration figure necessary? It's a matter of simple calculation. Let's look at the Dutch Environmental Action Plan which our ministry of economic affairs and our energy distributors have committed themselves to. In the year 2000, consumption of electric energy in the office has to be reduced by 25 percent, which, globally speaking, implies that lighting energy consumption has to shrink a 25 % as well. Now, even when the most advanced lighting equipment could save 75 percent, this would still demand a climb of penetration by these new lighting solutions of about one-third, or thirty percent. So there is really an amount of work to be handled. An important fact of life to realise ourselves, for it is all too easy for product- and innovation-driven specialists like you and me, to forget that it often takes time for the market to keep up with new developments that technicians already consider common.

The second stage, that I would now like to enter into with you, also shows higher acceptance within a specialist area than within the marketplace. It can be described as a set of *Dynamic* facilities, since, contrary to the ballasts mentioned, their operation depends on variable external factors such as the weather and occupation of the office space. To put it simple, lighting is not always offered in the same amount and neither is the need for it constant. So it is useful to have controls which adapt to varying circumstances like the weather on the one hand and human behaviour on the other. This second category, in other words, consists of electronics that provide daylight linking and presence detection possibilities. First, let's look at daylight linking electronics. You could compare its effect with the way spectacles with tinted, changeable glasses work. The higher the amount of daylight entering the office room, the lower the amount of electrical lighting that an electronic sensor allows. And the lower, again, the electricity bill. If you recall my previous statement about the approximate 20 % saving by High Frequency ballast, we can add another 20 percent, as research has shown, when the daylight linking facility is installed.

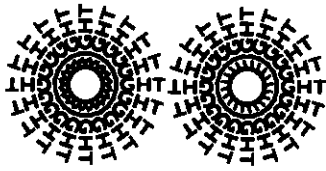


Now about presence detection as another powerful tool to reduce electricity consumption. As you know, the lowest energy consumption is achieved when the light is switched off. So, in an office or in any other workplace, it should be off as much as possible. I don't know what your office looks like, but I bet that every day, a large number of its rooms is not occupied for hours in a row. For a start, if two colleagues have a meeting, one of their rooms is vacant for sure. But office workers also happen to visit others outdoors, to have lunch outside, to take an afternoon off or to stay home with the flu. In short, chances are that the average office is not occupied constantly and that it would be a waste to have the lighting switched on without interruption. Now, there would not be much of a problem if every individual employee would see to it all the time that the lighting in his office is switched on and off in perfect tune with his requirements. But, again, in this respect humans are only human too. So it pays, to give them a hand on the matter. Our recently introduced presence detection electronic equipment switches the light on no earlier than when it registers somebody entering the room it controls. And to be sure, it continuously re-checks occupancy of the room and switches off the lights again when, for instance, it was just the secretary who left again after bringing in the mail. The delay time of the switch can be adjusted to the use of the room it is operative in.

Back to our savings chart, our experience indicates that we can add another 15 percent on top of the previous savings, when the presence detection option is exercised in an average office environment. But this score varies enormously between applications. It can shoot up to 60 percent for a lavatory or even 80 percent for archives or a bicycle lot.

I would now like to have a closer look with you at the third stage, which bears both actual and expected future developments. This stage can be described as the stage of *Differentiation* and it is here, that the human factor is of even increasing importance.

Very few things in life are truly constant, and the average organization of the nineties is certainly not one of them. Think about a few well-known tendencies: the need for more organizational adaptability to keep up with accelerating change, the flourishing of parttime jobs, internationalization, ageing of the workforce, upgrading of the average job level due to automation and higher education, etcetera. As a consequence, office facilities aren't exactly immune to changes either. Two tendencies are paramount: more flexibility on the one hand, and more quality on the other. Regarding

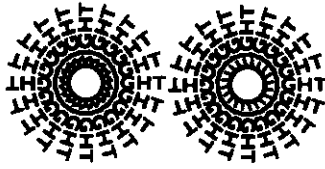


flexibility, it is clear that today's office has to meet more demands than ever. Lighting equipment too, has to be able to serve different purposes at different times. Phone jobs in the morning, a meeting with five others at eleven, a working lunch, a tough evaluation meeting about somebody's performance at three o'clock, a document written during most of the afternoon and evening: all of these jobs at hand have different demands regarding functional lighting and atmosphere lighting. Moreover, you just switched offices with someone else for the third time in two years: your predecessor liked to have his desk at the entrance and his meeting table near the window. You prefer the reverse, because you happen to get bright ideas at your desk when you're able to look through the window with that visionary stare that took some time for your boss to value adequately. Anyhow, the lighting equipment must cater to all of these requirements.

Quality too, is of utmost importance. It has been for a long time, but its priority is on the rise due to the increasing individualization of the office worker. Not only because the average white collar job is experiencing a steady upgrading due to trimming of organizations and inclining office automation. There is also the reason, that you are willing to accept company reshuffles as long as you're not treated like a number. In other words: if there is less stability to rely upon in the office than there was in earlier days, be it about your own career or about your physical location in the organization, an improvement of that very same comfort may form an effective compensation. Given the dominating budget that most companies spend on wages, read on people, it might be pound foolish to be penny wise on this matter, since even the most sophisticated new lighting equipment costs only a fractional percentage of the total running costs of the organization. A productivity improvement of a mere one percent due to optimal lighting, would already be ample economic justification.

If your office won't be yours for the rest of your working life, it should at least make you feel it is. The one way to succeed in making that impression, is to offer as much possibilities for personal settings as possible, also in lighting. Not only for yourself, but also for the previous and the next user of the office room: remember my statement about flexibility. No two persons are alike, and "the" optimal lighting preset doesn't exist.

Now, the problem is, that the more individual the office lighting is, the more settings must be offered to choose from. Instead of four standard luminaires per office, as is shown in the following scheme, different types of lamps and luminaires have to be installed in order to have the right light at the right time. The next schemes show some work situations with different lighting used. The risk is obvious: the amount of watts per office

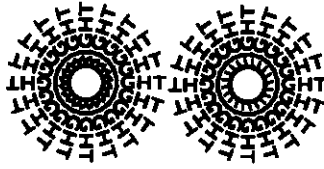


unit installed on behalf of the lighting function, tends to move upward. Whether we appreciate it or not from an energy conservation point of view, the needs for flexibility and quality push up the amount of watts installed. Now, you might argue that one must be sensible and that only a part of all the available lamps have to burn at a given moment. But unfortunately, humans are only human in this respect as well and in a free democratic country you cannot control, let apart enforce, that they don't turn all the switches on at the same time for the sake of convenience. You can't enforce do's and don'ts; but you surely can reduce excessive use.

This is where the third generation of lighting electronics comes into play, to be expected soon in a theatre near you. Only lighting electronics can provide the right conditions for the achievement of the paradoxical objective, to meet an increasing number of demands in an increasingly personal manner, whilst at the same time economizing through lower energy consumption. This can be achieved, for instance, through the IFS system which provides central control of the lights, switching it off at certain fixed times, say at 13.00 hours during the lunch break. The people who continue working in their office can switch the lighting on again with an easy remote control (do they still need the light they were needing this morning?). The ones who left for lunch (and maybe don't return to their desk for the rest of the day) don't leave the light burning for nothing.

An even more personified feature to be expected in the near future, will be the programming of fixed presets. That way, it can be warranted that although the number of watts installed is high, the amount used can never exceed a given level because the programming forbids certain irrational combinations to be switched on. In the following schemes, you see examples of options that could be accepted by the program, and options which could be rejected because they would not be functional and would consume too much energy.

Ladies and gentlemen, as you may already have concluded for yourself, today's lighting electronics are about to close the gap between the need for utilization of financial resources on one hand and the need for more added value in today's office on the other. Very soon, the gap will be closed by the newest generation, which will offer a unique combination of benefits to office, office worker and, due to optimal energy utilization, to the environment as well. A clear win-situation from all three angles. To make it happen, I have one final message, especially directed to the energy distributors who are present today. Your subsidizing will be crucial for the success of the second and third wave, just as it is at present for the first stage. The options that I mentioned in the part before, represent



a high energy saving potential, but the ones currently available, daylight linking and presence detection electronics, are expensive to manufacture, which will also be the case for the third generation of electronics. That means, they aren't exactly a bargain now and won't be either. In other words, you and your clients may well be faced with a declining return on investment, although the energy saving potential will be substantial. Remember what I just said about the increasing market demands: they will be fact of life. Higher quality demands will push up energy consumption autonomously, whether we like it or not. It is only when we are willing to face this autonomous tendency, that we are able to do our utmost to turn this growth into a decline. Let's look at it this way: to stop the increasing need for mobility is not a realistic option. But to create the right peripheral facilities in an integrated way, might do a good job in reducing the total amount of traffic. If we produce the cars with high fuel economy, I hope you will take care of the car-pooling facilities.

Thank you for your attention.