



Large manufacturer saves big with energy efficient lighting

By G Burley, QDM

A Port-Elizabeth-based Energy Saving Company, known for their roll-out of Eskom's lighting and sensor retrofit projects, conducted an on-site audit of the plant of a Nelson Mandela Bay-based manufacturer and discovered that sustainable energy savings opportunities existed.

In 2014 a Nelson Mandela Bay-based manufacturer approached a local energy saving company, to assist in reducing its monthly energy account. Energy saving has become a fundamental component of South Africa's energy and environmental policies as it reduces greenhouse gas emissions in a more cost effective way than any other energy or climate policy.

Despite a major drive to switch off lights when not needed, lighting and air-cons are often found left on in unoccupied offices and warehouses as was the case in this project.

Financial investment

After consultation, an investment of R2,3 M was made towards energy saving lights and motion sensors. A first point of call for all energy saving projects is to upgrade the lighting fixtures according to the premises' exact needs as well as installing updated technology which can significantly optimise power usage. The company decided to move away from the old technology and quality energy saving lights were installed.

The sensors regulate the lights and air-con in the offices and warehouse when there is no occupancy. In the office block savings of around 40% per year were forecast with lighting and air-con accounting for up to 60% of the building's running costs per year.

Installation

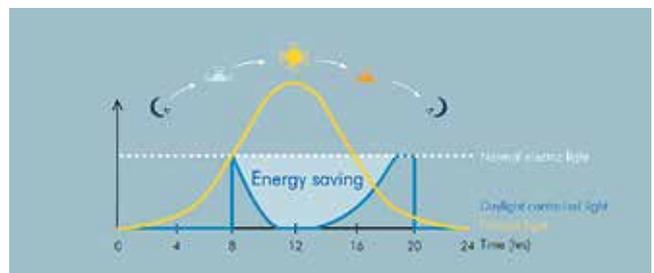
The installation took three months as 921 indoor and outdoor lights were replaced and 497 sensors were installed. Lights were selected according to their energy saving and payback advantages not according to what was the latest in the market.

This step was important as an investment of this amount needed to be justified on grounds of efficiency, quick payback and minimal disruption to the premises. While the project would have still been

attractive to the investors without installing sensors, it was the installation of these motion sensors which propelled the payback giving immediate results. The basic equation relating to lighting controls and energy usage can be described by:

$$\text{Energy} = \text{Power} \times \text{Time}$$

Until fairly recently, lighting control systems were typically designed to control either the power or the time but never both. As newer and improved methods of control have emerged (Passive Infrared (PIR), Ultrasonic, Microwave and Microphonic) the concept of energy saving through lighting has shifted away from just the mandatory upgrades of lamps and ballasts and moved towards a combined methodology where by the combination of lighting and sensors is used to yield optimum savings in any environment.



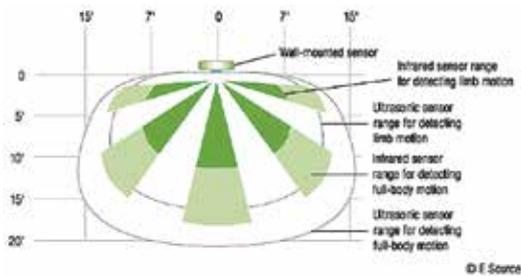
A great deal of consideration went into choosing the correct lights for each application; from this process what became clear was that 'pure savings' cannot be the only aspect considered when assessing a lighting upgrade. The need for the implementation of energy savings must be balanced with affordability of the investment required to achieve the savings in question. This is where the debate on Light Emitting Diode (LED) versus Halogen technology arose: Whilst year on year an equivalent LED light system would reduce lighting energy

consumption by 84%, the initial upgrade to the lighting infrastructure required to support the LEDs would increase the total project cost by 24% (an additional R550 000 in this case).

A middle ground was clearly needed and was reached by balancing savings and initial cost. Replacing the larger 'flood light' forms with LEDs whilst leaving other light forms as Halogen technology but still upgrading the lamps (e.g. T8 to T5 technologies with savings of 70%). A project was then implanted that still achieved remarkable savings whilst keeping the Rate of Investment (ROI) and investment at acceptable levels.

This project saw immediate savings of 45%, peaking at 69% in January 2015 – averaging out at 52% over the year.

As the market for LEDs grows and the development in the technology as a whole increases a future will begin to immerse where the LED will become the top choice for lighting upgrades, as a lower cost will eliminate all possible reasons not to convert to LED systems, but for now the Halogen will still hold the monopoly on the lighting sector.



Results and ROI

The project saw immediate savings of 45% peaking at 69% in January 2015 averaging out at 52% over the year. Savings accounted



for 476 MWh in this first year, producing an astonishing payback of 3,5 years saving over R700 000 per year in energy costs.

To put that into perspective the savings equate to around 331 metric tons of CO² or 162 000 kilograms of coal. This would be enough power for 90 homes for a year and equal the removal of 140 tons of garbage that is sent to landfill sites.

The energy saving efforts have been driven by the management at the plant with the good news story influencing the way the staff look at energy and how they use it in their own homes.

The success of the project has resulted in the manufacturer deciding that it will be rolled out to their other sites.

Conclusion

While the South African market has become flooded with energy saving products it is not simply the acquisition, but the implementation of these products combined with the knowledge and data collected by company like QDM spearheading the shift towards efficiency that builds and drives commercial and residential alike to implement programs like this.

As a country with a looming energy crisis there is no better time to adopt the mindset of personal accountability for energy consumption in all forms. Hopefully the success of this project will inspire many others to follow suit as this is just one step towards a 'greener' and more sustainable South Africa.



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