



ENERGY MANAGEMENT SYSTEMS (EnMS)

ACSA King Shaka International Airport

Aviation – EnMS Expert level candidate plant 2013

BACKGROUND

Airports Company South Africa (ACSA) owns and operates South Africa's nine major airports, including the three international airports, OR Tambo (Johannesburg), King Shaka (Durban) and Cape Town with the National Department of Transport being the majority shareholder.

King Shaka International Airport (KSIA) in Durban, KwaZulu Natal is the first green field airport under Airports Company South Africa in over 50 years. It was opened on 1 May 2010, replacing the old Durban International Airport. Built at a cost of R6.8 billion, it hosts a variety of facilities including banks, retail stores, fast-food outlets and restaurants, as well as a full range of air travel related services. It is three times larger than the old facility with five times more retail space.

KSIA uses vast amounts of electricity to run the heating, ventilation and air-conditioning (HVAC) system for the main terminal building (103 000m² in size) and other buildings on site. Lighting for the various buildings as well as the highly specialised runway and taxiway lighting system also use significant quantities of electricity.

Since KSIA was opened, there has been a consistent effort to save energy, specifically by reducing the demand for electricity for lighting and air-conditioning in line with previously agreed targets. Rapidly escalating electricity tariffs resulted in energy management becoming an organisational Key Performance Indicator (KPI).

The IEE Project and specifically the implementation of an energy management system was identified as an ideal mechanism to holistically bring together all energy efficiency initiatives and KSIA signed up as a candidate plant for the EnMS expert level training in October 2012.

KEY FINDINGS

Over the period 2010 - 2013, three projects were undertaken, resulting in a total energy saving of 1 932 576 kWh, valued at R 2 761 249. With a total investment of R400 641, the estimated average payback period was 1,8 months. A reduction of 1 850 tonnes CO₂ was achieved.

IEE Project capacity building programme

KSIA has also taken the opportunity to further capacitate employees in the area of energy efficiency by participating in various training workshops for systems optimisation and energy management system implementation. The Expert Level Energy Management System Training was completed by KSIA's Mechanical Engineer. Other key management personnel from all site operations departments also participated in a half day Energy Awareness workshop.

IMPLEMENTATION OF AN ENERGY MANAGEMENT SYSTEM

The energy management workshop raised awareness around energy efficiency and highlighted the need for an EnMS, specifically to key management personnel. An energy management policy was also drafted and signed.

KSIA took several steps to implement the EnMS, including expanding KPIs and environmental policies to include energy specific requirements, attendance of workshops by members of senior management, identification of significant energy users (SEUs), identification of personnel to form an energy management team, identification of potential energy saving opportunities, the drafting of an energy policy by the energy team and its approval by management.

IMPLEMENTATION CHALLENGES

Because the site is very large, inadequate human resources were available to ensure proper implementation of the EnMS. The length of time required to implement the various stages of the Plan-Do-Check-Act method also proved challenging for this reason.

SUMMARY OF INTERVENTIONS

| System | Intervention | Capital Cost (ZAR) | Energy saving (KWh / annum) | Savings ZAR | Estimated Payback period (months) |
|---|--|--------------------|-----------------------------|------------------|-----------------------------------|
| Multi-storey parkade (MSP) lighting* | Reduced lighting demand by replacing old lighting with lower wattage light sources | 360 641 | 227 027 | 321 006 | 13.4 |
| Internal and external lighting of various areas | Programmed BMS control to reduce internal lighting by 35% and 65% to suit operational requirement and to switch off external lighting during the day | 20 000 | 881 297 | 1 260 798 | 0.20 |
| Air-conditioning | Programmed BMS control to switch off Air Conditioning to suit operations | 20 000 | 824 432 | 1 179 445 | 0.19 |
| Totals | | 400 641 | 1 932 756 | 2 761 249 | |

*An initial cost of R 590 107.82 was incurred to replace the lighting in the MSP. A rebate through the Eskom Standard Product Package of R229 466.95 mitigated the cost of this initiative.

LESSONS LEARNED

- **Energy savings** are possible without high capital investment.
- **Optimising existing systems** should be a starting point when implementing energy saving methods.
- **Implementing an EnMS** will ensure sustainable energy saving through monitoring and analysis of data.



Enquiries



For more information about the training workshops and participation opportunities:
www.iee-sa.co.za • Tel.: 012 841 2768 (Pretoria) 021 658 3983 (Cape Town) or 031 242 2365 (Durban)

For more information about partnership opportunities: www.unido.org • Tel.: 012 394 1567 (Pretoria)