INTRODUCTION

Energy efficiency has become an inseparable part of business globally and major role players in the economy are embarking on comprehensive efficiency initiatives driven by the following:

- **The cost of electricity in South Africa**

  Average increases of at least 25% per annum have been announced for the next three years with a further 25% per annum for the following two years

  Large Power Users have already been warned to reduce electricity cost by 10%

- **An increasing concern regarding sustainability of energy supply**

  Eskom has already announced that their capacity is under pressure and that they might not meet the capacity requirements post 2017

- **Environmental impact of industry on the environment**

  Global warming, pollution and the threat of a shortage of resources such as water, and South Africa's coal generation, have resulted in a more responsible approach to business as a whole and a drive to do more with less.

In a commercial environment comfort cooling i.e. air conditioning represents the biggest portion of electricity consumed with lights and office equipment taking a distant second and third place. The logical starting point with regard to energy efficiency would therefore be to ensure the optimal efficiency of air conditioning systems.

Most buildings have individual air conditioning units in their offices which creates a very comfortable environment but which is regrettably not always energy efficient. To simply replace the cooling systems can be extremely expensive and the waste created with hundreds of air

conditioners being dumped is not ideal. The best alternative is to improve existing systems through a solution which is simple and easy to install and which results in the desired energy efficiency. A pay-back period of less than 2 years (24 months) ensures a significant positive impact on both bottom line and the environment.

AREAS OF CONSUMPTION

In a typical commercial environment the main consumers are the following:

- Comfort Cooling (Air Conditioners)
- Lighting
- Office Equipment (PC's, printers, copiers etc)
- Kitchen/Canteen/Geysers

RATIOS

Site inspections and detailed metering exercises at office buildings consisting of offices (both open plan and individual), board rooms, a call centre, reception areas, kitchen and bathrooms, indicated that the ratio of consumption is as set out in the diagram below:

A saving of as little as 16% can result in a reduction of 8% of the entire cost of electricity.

COMPARATIVE COSTS OF ENERGY EFFICIENCY INTERVENTIONS

A large number of energy efficiency interventions are available in the commercial environment consisting mainly of office buildings and it is important to ensure that whichever intervention or combination of interventions are selected, the pay-back period warrants the cost per kWh.

Most interventions target lighting, although lighting does not represent more than 31% of the entire electricity consumption.

The Airco Saver has proven to be the best value for money due to a short pay-back period and an affordable cost per kWh. It also addresses the biggest consumer of electricity in the commercial environment namely comfort cooling

Below is a table which sets out the average cost per kWh which can be expected from energy efficiency interventions.

CONSUMER	**INTERVENTION**	**COST/kWh**
Lighting		
Downlighters (12V 50W)	Replace with 11 Watt LED downlighters	R4 044.94
Fluorescent lighting (360W)	Replace with electronic ballasts and occupancy sensors	R21 542.58
Outside lights	Replace with induction type lighting	R14 951.31
Comfort Cooling		
Air conditioners	Replace with inverter type air conditioners	R25 184.63
Air conditioners	Install Airco Savers	R2 564-25

PROTEA CHEMICALS – WADEVILLE

TEST RESULTS

Introduction

A performance test was conducted at the request of Omnia at one of the offices in the administrative building of Protea Chemicals in Wadeville.

For the purpose of this test a mid wall split, 12000 BTU air conditioner was identified. The test was conducted by installing a profile kWh meter directly onto the air conditioner for a period of time together with an AircoSaver. The electricity consumption of the air-conditioner was measured for this period.

The AircoSaver was then removed from the air-conditioner and the electricity consumption of the air-conditioner was measured for a similar period but without the Airco Saver.

RESULTS

The meter readings which consisted of half-hourly logged data reflected the following:

Airco Saver On (21 April 2010 – 27 April 2010)									
	Electrical Values						Temperatures		
	Kwh	KVArh	Kw	KVA	KVAr	PF	Outside	Inside	AC
Average	0.09	0.03	0.19	0.21	0.07	0.67	15	18	16
Min	0.01	0.02	0.00	0.00	0.00	0.55	11	15	3
Max	0.64	0.16	1.29	1.31	0.31	0.99	26	24	21
Total Kwh	31.78								
Airco Saver Off (28 April 2010 – 4 May 2010)									
	Electrical Values						Temperatures		
	Kwh	KVArh	Kw	KVA	KVAr	PF	Outside	Inside	AC
Average	0.11	0.04	0.23	0.25	0.08	0.69	16	18	16
Min	0.01	0.01	0.00	0.00	0.00	0.55	11	14	7
Max	0.70	0.16	1.39	1.43	0.32	0.99	27	23	21
Total Kwh	37.96								
Improvement	**16%**	**12%**	**16%**	**15%**	**12%**	**4%**			

The comprehensive summary together with raw metering data as extracted from the metering device is included in this report in the CD attached.

Over and above the saving recorded in electricity consumption (**kWh**) the test has also shown a substantial saving in demand (**kVA**)

FINANCIAL IMPLICATION OF SAVINGS

To illustrate the financial benefit of the installation of the Airco Saver a comparison was made using the electricity tariffs of the following local utilities after implementation of the tariff increases scheduled for 1 July 2010:

UTILITY	TARIFF DESCRIPTION	c/kWh	R/kVA
Ekurhuleni	Tariff D	62c	R40.24
Port Elizabeth	Medium Business 400Volt	81c	R70.86
Cape Town	Large Power Users	41c	R97.24
City Power Joburg	Large Power Users LV	41c	R128-00

Calculations were done based on the following assumptions:

1. 191 air conditioners of various sizes per building
2. Air conditioners on 12 hours per day
3. 80% of air conditioners on at a time (diversity factor)
4. Annual tariff increases of 25%
5. Air conditioners only on from Monday to Friday
6. Air conditioners only used for 8 months per year
7. Saving of 16% on kWh as per test site
8. Saving of 15% on kVA as per test site

EXPECTED ANNUAL SAVINGS per BUILDING

UTILITY	YEAR 1	YEAR 2	YEAR 3
Ekurhuleni	R84 180.97	R105 226.21	R131 532.77
Port Elizabeth	R110 583.72	R138 229.65	R172 787.06
Cape Town	R66 358.72	R82 948.40	R103 685.50
City Power Joburg	R71 563.31	R89 454.14	R111 817.67

Calculations are attached

PRODUCT DESCRIPTION

The AircoSaver improves the energy efficiency of single split systems, AC system, e.g wall-mounted and window units and PTAC units of which millions have been installed in office buildings throughout South

Africa and to date no cost effective solution has been available to render them more efficient other than the simple timer switch or motion sensor.

The AircoSaver product is manufactured in Germany and complies with all international standards as well as IEC 60669-2-1:2009 required by SABS. Copies of the proof of compliance and test certificates are attached hereto.

This product will upgrade the ordinary air conditioner unit to an energy efficient unit without the cost of replacing existing units, which are still fully functional, with expensive inverter type units.

FUNTIONALITY OVERVIEW

The AircoSaver sensor driven software algorithms are designed to detect thermodynamic saturation (overcooling of the evaporator) and to optimize the compressor run time accordingly. When overcapacity is detected, the AircoSaver switches the compressor off and avoids inefficient overcooling. The evaporator fan continues to operate to remove stored energy from the evaporator and circulate the cooled air in the office.

TECHNICAL DATA

This solution is suitable for single phase and three phase air conditioners up to 120 000 BTU (ten tons)

Operating Data

	TYPE 1	**TYPE 2**
Input Voltage	230 V AC (+/-10%)	24V AC (+/-10%)
	50/60 Hz	50/60 Hz
Max Current consumption	15 mA	90 mA

Sensor measuring range	:	min. -10 degrees Celcius, max 55 degrees Celcius
Max allowable temp at sensor	:	70 degrees Celcius

Output (Relay)

Contact function	:	NO (Normally Open)
Switching voltage	:	24 V AC to 230 V AC
Max. switching current	:	12 Amp continuously /120 A temporarily (20ms)
		At 250 V switching voltage
Anti-short cycle protection	:	3 minutes (1 minute upon power-up)

Operating Conditions

Operating temperature	:	min.0 degrees Celcius, max 55 degrees Celcius
Relative humidity	:	min. 15%, max 90%

Storage and Transport Conditions

Storage temperature	:	min. -25 degrees Celcius, max 85 degrees Celcius
Relative humidity	:	min. 10%, max 95%

Dimensions

L x H x W	:	173 x 32 x 42 mm without tension relief
	:	231 x 32 x 42 mm with tension relief

2 YEAR WARRANTY

Coverage

The manufacturer of this product guarantees to the purchaser that this product is free of defects in material and workmanship for at least 2 years, commencing from the date of purchase.

This unit is warranted only in normal use. It does not cover failures caused by incorrect installation, abuse, misuse, modification or alternation of electrical circuitry or physical construction and events beyond the manufacturer's control.

The manufacturer shall not be liable for consequential economic damages resulting from breach of this warranty. Installation has to be conducted according to the AircoSaver installation instructions by qualified technicians.

This warranty does not cover any additional accessories necessary for installation (e.g. additional wiring)

Return Policy

Warranty units will be replaced at no charge.

Defective units shall be returned prepaid to one of our service centers and will then be replaced.

Returns will not be accepted without a Return Authorisation (RA) number. Please contact us by phone or through warranty@aircosaver.com to receive an RA number and specific shipping directions & postal address of your nearest service center.

The manufacturer shall not be responsible for labour costs of removal or reinstallation of this product.

COST

At the price of R920-00 excluding VAT and installation, the AircoSaver provides a cost effective upgrade to the air conditioner.