GLOBAL CARBON EXCHANGE™

Making Business Sense of Climate Change

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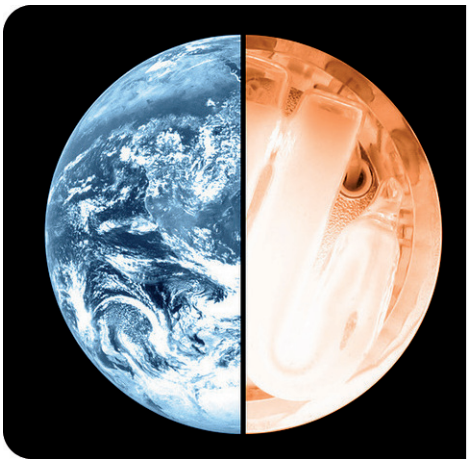


Case study: Bakos Brothers Lighting Audit – Decorating Centre

> "The scientific evidence is now overwhelming. Climate change presents very serious global risks, and it demands an urgent global response."
>
> The Stern Review on the Economics of Climate Change, HM Treasury, UK Government, 2007

The Challenge

South Africa is currently the 14th largest greenhouse gas emitter in the world, a reflection both on the country's heavy reliance on coal and on a high level of energy inefficiency. This, combined with escalating electricity prices, potential quotas and load-shedding, is driving a growing number of businesses to take action by implementing energy and carbon management as a key focus area. Such action usually results in improved organisational efficiency and significant cost savings. Global Carbon Exchange (GCX), a carbon and energy-efficiency consultancy, assists companies with determining their carbon footprint, implementing energy audits and with the development of an effective end-to-end carbon and energy management plan.

Key Results

- **Investment:** R 140,000
- **Payback period:** 21 months
- **Return on Investment:** 53%
- **Cost Savings:** R74,484/year
- **Energy savings:** 112,718 kWh/year
- **CO_2 Emissions avoided:** 108 tonnes/year

The Background

Bakos Brothers is a family-owned furniture business offering an upmarket range of imported furniture and accessories as well as an interior design service. It is based in Gauteng and has four retail outlets.

The Objectives

GCX conducted a Carbon Footprint Assessment of Bakos Brothers' operations in December 2008. The company was found to have very high electricity consumption so GCX recommended that it carry out an energy efficiency audit of its operations. As a starting point, Bakos Brothers commissioned GCX to conduct a Lighting Audit of its Decorating Centre showroom in Jan Smuts Avenue and also allocated a monthly budget to energy-reduction measures. The objective of this audit was to provide Bakos Brothers with the best strategy for reducing the energy consumption of its lighting system whilst remaining within the designated monthly budget for lighting retrofits.

Bakos Brothers also aspires towards the broader goal of reducing the overall environmental impact of its operations.

> I chose GCX for their fantastic reputation world wide. I have found their team young, keen and wanting to change the world. Their easiness to assist and professional approach made my experience with GCX most pleasant. I undoubtedly recommend and place GCX as the industry leaders in helping business and people in combating climate change!
>
> Ryan Bakos, CEO, Bakos Brothers

The Process

A full lighting audit of the facility was undertaken. This involved:

- Meeting with the maintenance manager to ensure that all the correct lamp wattages and types were known;
- Inspection of the HVAC system to ascertain the coefficient of performance of the system;
- Establishing an inventory of all the light fittings and operational hours in the facility.

The data gathered from the above inspections and inventory was then analysed. Calculations were based on all lighting being operational for 12 hours per day, 6 days per week, except for the store room which is only used for 2 hours per day, 6 days per week. Suitable retrofitting options were proposed and payback periods were calculated. An implementation strategy for each technology was developed so that the total cost of the project would fall within the allocated budget.

The Results

The table below lists an inventory of the current lighting system at the Decorating Centre Showroom. It is clear that by far the highest cost is for the 50W downlights.

Type of Light	Category	Wattage of Fitting	Number of Fittings	kWh/ Year	Cost/ Annum*
50W Downlight	Tungsten Halogen	50	531	99676	R 53,756.92
60W Globe	Incandescent	60	13	2741	R 1,524.86
2 x 58W Fluorescent	Fluorescent	133	59	29460	R 15,888.16
11W CFL	Compact Fluorescent	11	16	661	R 356.35
40W Candle	Incandescent	40	100	15017	R 8,098.97
100W Haloline	Tungsten Halogen	100	9	3379	R 1,822.27
3 x 10W Halostar	Tungsten Halogen	30	46	5181	R 2,794.15
150W Powerstar Metal Halide	Metal Halide	165	5	3097	R 1,670.41
Total				**159212**	**R 85,912.10**

* It was assumed that the following tariffs apply:

Energy Charge: High Season - R0.37/kWh ; Low Season - R0.25/kWh
Demand Charge: High Season - R81.52; Low Season - R77.63

The next table summarises the recommended retrofit options and gives the Rand, kWh and Carbon Savings per year as well as the payback period.

The calculations are subject to:

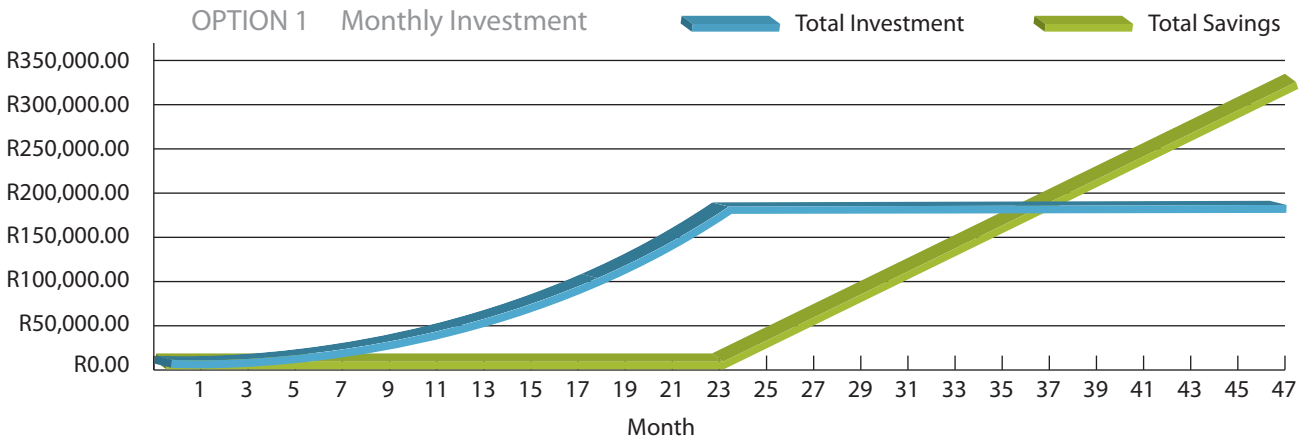
- Bakos Brothers' approval of the light quality from these fittings;
- all assumptions being correct.

Bakos Brothers Lighting Audit – Decorating Centre

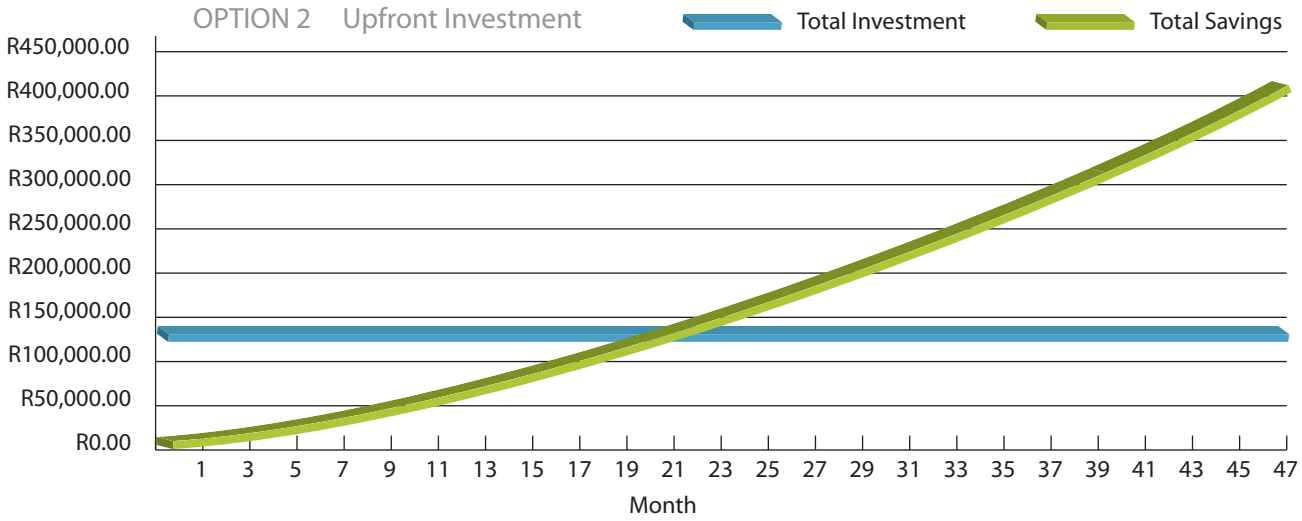
Type of Light	Replacement	Category	kWh Savings / Year*	Rand Savings / Year*	Carbon Savings / Year* (Tonnes)	Payback (Years)
50W Downlight	5W Tytan	LED	89,665	R 57,419	85.9	2.1
60W Globe	11W CFL	Compact Fluorescent	2,400	R 1,371	2.3	0.3
2 x 58W Fluorescent - CCG	Electronic Ballasts	Fluorescent	3,340	R 2,449	3.2	2.1
11W CFL	None	Compact Fluorescent	0	R 0.00	0.0	N/A
40W Candle	1W Tytan	LED	14,600	R 11,811	14.0	0.6
100W Haloline	No Direct Lamp Replacement	Tungsten Halogen	0	R 0.00	0.0	N/A
3 x 10W Halostar	None	Tungsten Halogen	0	R 0.00	0.0	N/A
150W Powerstar Metal Halide	23W Eurolux	Compact Fluorescent	2,713	R1,433	2.6	0.1
TOTAL			**112,718**	**R 74,483**	**108**	

***Note: These savings levels will only be achieved after retrofitting is complete. The savings include maintenance, air conditioning and energy savings.**

Using the recommended retrofits, an implementation strategy was developed according to the designated budget of R5,000.00 per month. In order to accommodate the budget, it was decided that the monthly savings should be accrued onto the budget in order to accelerate completion of the project. By doing this, the retrofit program will require an investment of approximately R 184,000.00 and will take 23 months to complete (see graph 1 below). Up to 23 months, savings are represented as nil because they are re-invested. The graph illustrates that It will take approximately 3 years from start of implementation to reach breakeven, (taking into account projected price increases for fittings and electricity) whereafter all savings will be profit. These savings will rise annually in line with electricity price increases.



An alternative option for Bakos Brothers would be to invest the full amount required for the retrofits up front. With this option, the investment required would be +/- R140,000.00, and breakeven would be reached by 21 months, whereafter all savings will be profit (see graph 2 below).



In conclusion, after completion of the retrofit programme, a significant saving of approximately 70.79% will be achieved on the lighting bill per annum, giving the return on investment (ROI) shown below:

INVESTMENT OPTION	TOTAL INVESTMENT (Cost)	ROI**	Payback Time	Annual Projected Cost Savings	Annual Projected Energy Savings	% kWh Savings (Lighting only)	Annual Potential GHG Emissions avoided
R5,000 p/m (with savings accrued)	R184,000	40%	37 months	R 74,483	112,718 kWh	70.79%	108 Tonnes CO_2e
Full amount upfront	R140,000	53%	21 months				

** ROI = The ratio of Savings on an investment relative to the total Cost

The Recommendations

The following conclusions were drawn from the audit:

- There is large potential for savings on the lighting system at Bakos Brothers' Decorating Centre Showroom;
- It is possible to implement the project in a 2 year period provided that the savings achieved each month are fed into the budget for the following month.

It is recommended that Bakos Brothers:

- Ensure that the downlight replacement fittings meet their lighting requirements;
- Implement the energy reduction strategy outlined above;
- Implement energy/lighting audits of their other 2 outlets as well as their office and warehouse.

The Future

To maximize savings, the monthly investment could be increased, thereby accelerating the implementation strategy, or the upfront option could be considered. In addition, Bakos Brothers could extend this programme by conducting energy efficiency audits on all their facilities.

Not only will this lead to significant and ongoing cost savings, but it will also provide a sound basis for reducing Bakos Brothers' environmental impact.

GLOBAL CARBON EXCHANGE ASSESSED

> "GCX believes that climate change is the single biggest economic, social and environmental challenge we face this century."
>
> Kevin James, CEO, Global Carbon Exchange (GCX)

South Africa – Cape Town

Ground Floor, Liesbeek House,
River Lane, Mowbray,
Cape Town 7700,
South Africa

[t] +27 (0)21 680 5146
[f] +27 (0)21 680 5011
[m] +27 (0)83 258 6316

South Africa – Johannesburg

PO Box 2035,
Gallo Manor 2052,
Johannesburg,
South Africa

[t] +27 (0)11 784 6399
[f] +27 (0)11 783 2134
[m] +27 (0)82 900 1738

USA

110 Smith Street NE,
Huntsville,
Alabama 35801,
USA

[t] +1 256 533 4700
[f] +1 256 533 6040
[m] +1 256 6551280

Namibia

No 12 Kupferberg Street,
Eros, Windhoek,
Namibia

[t] +264 (0)61 27 2178
[f] +264 (0)61 27 2178
[m Nam] +264 (0)81 228 3582
[m SA] +27 (0)82 496 4322

Australia

Level 31, ABN Amro Tower,
88 Philip Street, Sydney 2000,
Australia

[t] +61 (2)82112789
[f] +61 (2)82110555
[m] +61 404 314 935

Indonesia

Jalan Cilandak Tengah 22C,
Jakarta Selatan 12430,
Indonesia

[t] +62 (0)813 4543430
[m] +62 878 706 79445

Ukraine

1-go Travnja, 2,
Kagarlik, 09200,
Ukraine

[t] +38 (0)95 5213654

www.globalcarbonexchange.com | info@globalcarbonexchange.com