

Need for Energy Management in Health Facilities

Conference of the Association of Medical Engineering of Kenya

Presentation by:

Willis B. Makokha (willimako@yahoo.co.uk)

Calvince Mbeo (mcalvince@gmail.com)

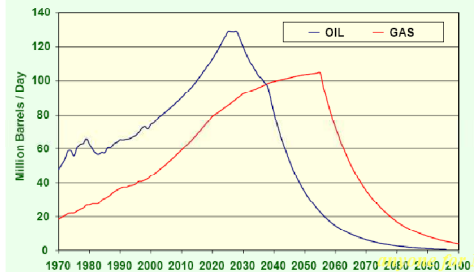
KIRDI, Nairobi

17th November 2008

INTRODUCTION

Energy Situation: *Is this sustainable?*

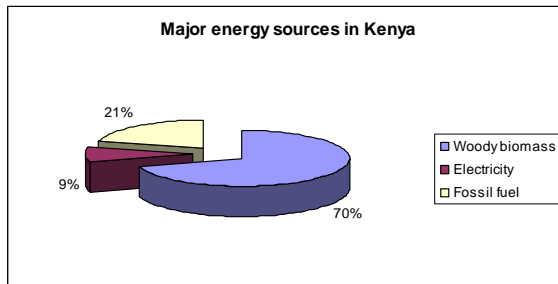
FORECAST OF WORLD OIL AND GAS PRODUCTION
HIGHER GROWTH SCENARIO



Source: Armando, C. Oliveira & Clito Afonso: Situations and trends for renewable in Europe and beyond

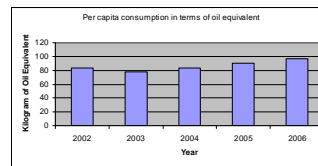
ENERGY DEMAND – SUPPLY: 1

Major energy sources in Kenya



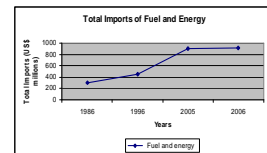
Source: Energy Policy Paper; 2004

ENERGY DEMAND – SUPPLY: 2



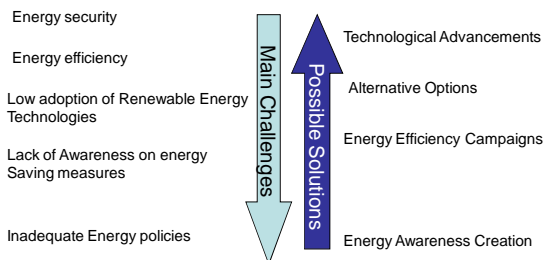
• Energy demand is in a growing trend and energy requirement in the commercial and service sector is steadily in the rise

- Kenya is a net importer of energy, up-to 90% of total energy demand is imported



Source: Economic Survey; 2007

SOLUTIONS VS CHALLENGES

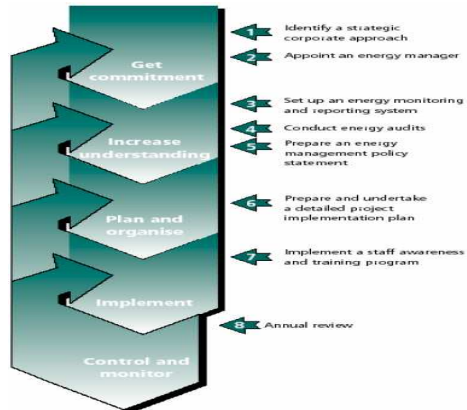


THE STRATEGY

Energy management strategy should be a comprehensive overview of where company decisions affect energy saving. The company therefore needs to consider implementing the following:

- 1) Publish a corporate policy
- 2) Establish an energy management responsibility structure
- 3) Monitor and evaluate performance
- 4) Set performance improvement targets
- 5) Improve the awareness of energy conservation amongst staff
- 6) Hold regular reviews
- 7) Report performance change and improvements to employees and shareholders

STEPS IN ENERGY MANAGEMENT



HOW ARE IMPROVEMENT OPPORTUNITIES DETERMINED?

- Facility benchmarking.
- Facility assessment.
- Life-cycle cost analysis.
- Past experience at Hospital.
- Experience of peer hospitals.
- Pro-forma results available upon request.

Financial analysis

- Use of NPV, SIR, IRR, PB, Retrofit
- E.g. Retrofit incandescent with CFLs
 - Energy compared: 100 W incand., 25W CFL => same Illumn.
 - Lifespan: CFL 50,000 hrs Cost: 400/=
 - Lifespan: Incand. 5000 hrs Cost: 40/=
 - Energy cost 6.65/= per kWh
 - Other: Annual light use = 5000 hrs, $r = 20\%$
- Analyses (consider retrofit case)
 - S_m : Marginal annual energy saving = $[(1-0.25) \times 100/1000] \times 5000 \text{hrs} \times \text{sh. } 6.65 = 2,493.75$
 $(S_m + PC_{\text{inst.}}) - (C_m + PB_{\text{O&M}})$
 - C_m : Marginal cost is initial purchases, instaln, O&M = sh. 400 (ignore instal, o&M) and is once in 10 yrs.
 - $P_{\text{inst.}}$: is annual purchases/replacement of incand. = sh. 40 per yr for 10 yrs (ignore instal, o&M)

- Factory manager replaces motors with EFF1. Cost to company is Sh. 2 mill. For purchase & instal. and 0.1 mill in today's sh. for o&m over 4yrs. Op cost increase at 5% p.a and disc. Rate is 10%. Salvage value at the end is sh. 0.2 mill. What is NPC?

$$NPV = -C + \sum_{t=1}^n \frac{(1+a)^t}{(1+r)^t} \times S$$

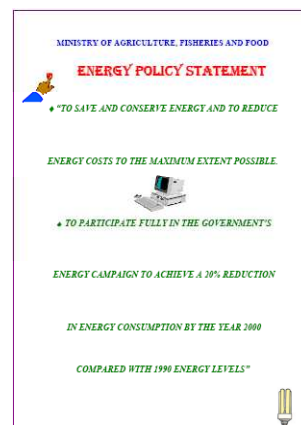
- $NPC = 2 + 0.1 \left[\sum_{t=1}^4 \left(\frac{1+a}{1+r} \right)^t \right] - 0.2 [1/(1+0.1)]^4$ where t ranges from 1 to 4 yrs, a is 5% and r is 10%.

POLICY MATTERS

THE POLICY STATEMENT

Hospital X will integrate energy management into our organizational policies, decision making, and institutional culture to ensure the most efficient use of energy in our new and existing facilities.

This achievement will be consistent with Hospital X's commitment to the High Value pillar in Strategic Vision 2015.



Case studies – Ref. 7 & 8

Sir Jamshedji Jeejeebhoy Hospital in Mumbai, Asia

The Goal: To devise “no- or low-cost” methods to improve energy efficiency and conserve energy through education of the users through campaigns and posters.

Occupancy: 1,352 beds.

Area coverage: 65 acres

Equipment responsible for 3/4 of energy consumption: operation theatres, high-end medical equipment, lighting, HVAC systems, water heaters, elevators, and water pumps.

Case study Cont. – Energy saving strategies

- Catchy campaigns that made use of easy to remember slogans;
- Use of various communication tools such as posters at strategic locations to inform staff of the steps that can be taken to conserve energy and minimize wastage.
- Maximizing usage of natural light during the day through passages and corridors;
- Turning off office equipment, fans and air-conditioners during unoccupied hours;
- Educating people about reasonable and efficient usage of water heaters and other electrical appliances;
- Plugging air leakages in air-conditioned rooms such as office spaces, operation theatre;
- Turning off water pumps when the tanks filled up.

Case study Cont. – Results

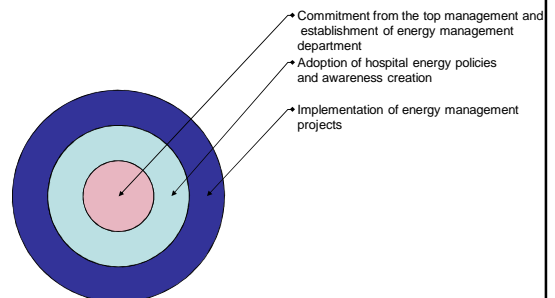
Fiscal Year (April to March)	Energy Savings (kWh)	Cost Savings (Million Rs.)
FY2002	473,000	2.13
FY2003	229,000	0.73
FY2004	110,000	0.99
Total savings	812,000	3.85 (US \$ 90,000)

Somerset Health Facility, UK

- **Goal**
 - Cut on a GBP 2.1 million bill by 25% in 5 years
- **Strategy**
 - Good housekeeping, awareness (humour, educative, publication, posters, artwork, competition/awards)
 - Some investment too
- **Result**
 - By end of third year, cum. net cost savings = GBP 1.015 million
 - Where GBP 331,000 was out of good housekeeping



What is required to conserve energy in hospitals:



THANK YOU



ANY
QUESTIONS?