# Identified Energy Conservation & Management Opportunities in the Industrial Sector by EMC of NERD Centre.

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## ABSTRACT

This paper describes the identified energy conservation potential in different industrial sectors in Sri Lanka by Energy Management Centre (EMC) of NERD Centre.

Here I use the data collected through detailed energy audits by the Energy Management Centre of NERD Centre from its beginning (1984). All the identified energy conservation potentials were categorized, summarized and generalized for each industry category. Finally the energy conservation potential in Sri Lanka Industrial sector was predicted based on the data collected through energy audits conducted by EMC up to December 2001.

## Introduction

In Sri Lanka, the Industrial sector is responsible for around 40% of total electrical energy consumption (highest single consumer) and 17% of the total petroleum consumption. Therefore, energy conservation and management programs in the industrial sector play a vital role in national level energy conservation programme. Also the commercial sector is responsible for 20% of the total final energy consumption (Energy Balance 1999) Since most of the available hydro potential have already been exhausted, the increasing electrical energy demand has to be met through expensive thermal power generation.

Therefore, the energy conservation and management activities play a vital role in the national electrical energy generation. In order to initiate any energy conservation and management programme, it is very important to identify the effective potential areas for possible conservation opportunities.

In order to do the above task, Energy Management Centre (EMC) was established in the National Engineering Research & Development Centre in 1984. The EMC actually commenced work in January 1985 and has completed about 100 detailed energy audits in various industries and commercial establishments, as at December 2001.

## Analysis of Finding

The summary of identified energy conservation and management opportunities are as follows.
No. of energy audits conducted in each 5 year periods were as follows. (See table 01)

**Table 01**

| Period | 1985 - 1989 | 1990 - 1994 | 1995 - 1999 | 2000 - 2001 |
|---|---|---|---|---|
| No. of audits | 46 | 24 | 20 | 8 |

**Table 2 shows a summary of the energy audits.**

**Table 02**

| Industry Category | No. of Audits conducted | | | | |
|---|---|---|---|---|---|
| | 1985-1989 | 1990-1994 | 1995-1999 | 2000 -2001 | Total |
| 1. Brick and Tile | 3 | - | - | - | 3 |
| 2. Commercial Buildings | - | 5 | 3 | 1 | 9 |
| 3. Food and Beverages | 6 | 3 | 1 | - | 10 |
| 4. Hotel | - | 1 | 2 | - | 3 |
| 5. Production | 10 | 8 | 7 | 4 | 29 |
| 6. Tea | 12 | - | 1 | - | 13 |
| 7. Garments & Textiles | 4 | 3 | 2 | 2 | 11 |
| 8. Miscellaneous | 11 | 4 | 4 | 1 | 20 |
| **Total** | 46 | 24 | 20 | 8 | **98** |

Identified total energy cost saving potential in each category is as follows.

Table 03

| No. | Category | No. of Companies audited | Annual Saving | | | | Percentage Saving from Present Energy Cost (%) |
|---|---|---|---|---|---|---|---|
| | | | kWh | kVA/mon. | Diesel (lit) | Furnace oil (lit) | |
| 1 | Textile | 10 | 943,300 | 428 | 0 | 1,979,100 | 17 |
| 2 | Tea | 7 | 110000 | 166 | 40000 | 143500 | 8 |
| 3 | Misellenious | 18 | 907,711 | 1,253 | 0 | 2,016,930 | 18 |
| 4 | Hotel | 2 | 1,035,200 | 162 | 0 | 155,100 | 22 |
| 5 | Food & Beve | 7 | 517,780 | 203 | 88,550 | 327,000 | 18 |
| 6 | Com.Building | 9 | 860,740 | 545 | 0 | 0 | 15 |
| 7 | Brick &Tile | 3 | 162,822 | 214 | 0 | 1,000,000 | - |
| Total | | 56 | 4,537,553 | 2,971 | 128,550 | 5,621,630 | 16 |

If we consider the findings of energy audits there are some common energy conservation opportunities in all industry categories. Those are

1. Power factor correction
2. Use of efficient lighting systems
3. Efficiency improvement of burners of boilers and other heaters
4. Insulation of bare or poorly insulated steam/thermic fluid lines.
5. Replacing faulty steam traps and fixing steam leaks etc.

Most of the above energy conservation opportunities are frequently found in industry. In general, the energy cost reduction potentials are ranging from 10%-35% of the present energy cost, depending on the present energy utilization efficiency. We found that even some newly established factories also have nearly 10% of energy cost reduction potentials.

To conclude the findings, consider the Sri Lanka Energy Balance 1999, published by Energy Conservation Fund. In 1999 total electricity generation was 6184.51 GWh and power station use transmission and distribution losses were 1323.584 GWh. Therefore available energy for final use was 4860.929 kWh. Out of this 1904.942 GWh was consumed by the Industrial sector which was nearly 40% of the final energy.

**Conclusion**

According to our energy audit finding the minimum electrical energy saving potentials is in the range of 10%. Therefore, electricity consumption of the industrial sector can be reduced by 10% by implementing common energy conservation and management opportunities. The total saving represents nearly 190.49 GWh/year and this represents 4% of the total energy available for final use.

**Table 04 – Summary of the Sri Lanka Energy Balance 1999**

| 1999 | | | |
|---|---|---|---|
| Electricity – Commercial | - 20% | Petroleum, Industry | - 17% |
| Industry | - 42% | Transport | - 69% |
| House hold | - 36% | Household , commercial | |
| Street Lights | - 2% | & others | - 14% |
| | - 100% | | - 100% |

**References:**


1. Energy Audit Reports – Energy audits conducted by Energy Management Center e of NERD Centre
2. Sri Lanka Energy Balance – 1999, published by Energy Conservation Fund