

DOMESTIC REFRIGERATORS: ENERGY CONSUMPTION AND CONSERVATION POTENTIAL

D.G.D.C. Wijeratna

Domestic sector consumes about 39% of the electricity generated in the country. Refrigerators make a significant contribution to this consumption. Ownership of refrigerators in the domestic sector has been estimated by a recent survey at 56% of the electrified households; another survey places the figure at 26.77% (this survey included non-electrified households also). First survey is biased towards higher income groups and the second towards low income groups.

As no figures were available for the average consumption of refrigerators, field measurements of 27 refrigerators were carried out using standard kilowatt-hour meters. Electricity consumption over a period of approximately one month was noted and the daily consumption was computed. The values ranged from 3.9 kWh/day to 0.66 kWh/day with an average of 1.64 kWh/day (50 kWh/month or 600 kWh/year). Most of the refrigerators were from around Colombo and were of capacity 8 cu. ft.

The number of domestic consumers in Sri Lanka in 1993 was 1,351,514. From this figure, the number of refrigerators in Sri Lanka can be estimated to be between 756,848 and 738,426 using the survey results mentioned above.

The energy and power demand and the corresponding generation can be computed from the above. Demand figures range from 454 - 227 GWh for energy and 52 - 26 MW for power; generation ranges from 567 - 284 and 93 - 46 MW.

Efficiency improvements above 60% - up to 80% with technological breakthrough have been predicted. With available technologies, improvements of the order of 40% are economically viable. These improvements are possible by increasing the insulation and changing over to more efficient compressors.

The technical potential for conservation, therefore, lies in the range 34 - 200 GWh and the economic potential 225 - 120 GWh. As the number of refrigerators is growing at the rate of about 16% per year, in addition to the above about 15 GWh, can be saved every year.

It can be concluded that at least 120 GWh per annum can be saved by changing over to efficient refrigerators. The Government and utilities should not waste any time realizing this. Work should be undertaken to carry out (i) a more comprehensive survey (ii) measurements over a longer period of time and in different parts of the country.