CHAPTER 8

ENERGY CONSUMPTION AND CARBON-DI-OXIDE EMISSION

8.1 ENERGY CONSUMPTION IN INDIAN DYEING INDUSTRY

At present Indian textile dyeing industry consumes 62.2 PJ of energy and it is likely to go up to 101.8 PJ in 2022, assuming the present trend and current technology being maintained. Due to the shortage in energy supply, it is necessary to adopt new technologies so that energy demand can be reduced to a considerable extent. The trend of energy consumption for the past 10 years in textile dyeing industry is shown in the Figure 8.1 These data are regressed and a fit equation is developed to describe the future trend in energy consumption for textile dyeing. Magnetically stirred hot plate dyeing is not considered for projection due to marginally small improvements in energy efficiency obtained in the process.

Fig 8.1 Indian dyeing industry energy consumption from 1996 – 2008
The fit equation is given as follows.

\[ Y' = 2.608x' + 36.54 \]  \hspace{1cm} (8.1)

where \( Y' \) = energy consumption, in PJ
\( X' = 1 \) for year 1998 and so on.

Based on the equation (8.1), the future energy requirement is projected and projected energy consumption is shown in Figure 8.2.

![Projected Energy Consumption in Indian Textile Dyeing](image)

**Fig 8.2 Anticipated energy consumption for Indian textile dyeing sector from 2010 – 2022**

Projections are also made for total energy consumption assuming that the advanced technologies like ultrasound, infrared and microwave will be implemented during the next decade in a phased manner. Figure 8.2 gives the projected energy consumption for Indian textile dyeing sector with a phased implementation of non-conventional dyeing technologies from 2010 – 2022.
8.2 CO₂ EMISSION AND REDUCTION POTENTIAL

The emission of CO₂ based on present energy consumption in Indian dyeing industry and possible reduction in CO₂ emission due to adoption of these non-conventional dyeing technologies in the next decade is shown in Figure 8.3. At present the CO₂ emission is about 12 million tonnes and it is likely to grow up to 19 million tonnes if the present trend continues.

![CO₂ emissions graph]

**Fig 8.3** Projected emissions and reduction potential under different technologies

Thus, it is possible to reduce energy consumption and CO₂ emissions to great extent through the possible adoption of these technologies. On an average, about 30% reduction in energy consumption and CO₂ emission is possible due to adoption of these technologies.