

Thesis Title	Energy Conservation Potential in Plastic Factory
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Abstract

This work reports the result of the energy analysis and suitable economic analysis in a plastic factory that cover the electrical lighting, motor and heater in process. The main energy consumer was extruder with 50 hp motor. The first law efficiency of the extruder was estimated for PS, PP(A), PP(B) and ABS at 44.1 %, 49.9 %, 47.6 % and 52.5 % respectively. The energy consumption index for PS, PP(A), PP(B), and ABS were 0.420 kWh/kg, 0.399 kWh/kg, 0.527 kWh/kg and 0.328 kWh/kg respectively. The rated capacity of the existing transformer was of 1000 kVA that operate at 20.3 % of full load. The load factor and power factor of the factory were 0.38 and at 0.95 respectively. The average energy consumption was 53.5 MWh/month. The maximum electrical demand was about 193 kW. The maximum electrical load is noted to be at the starting period of the day.

Electrical energy saving can be achieved by reducing electrical energy demand by about 156 kW. 30,615 B/yr will be saved. In electricity in lighting system can be saved by reducing unnecessary fluorescent tubes both 18 and 36 watts all amount 57 and 10. The saving will be 10,251 B/yr. Moreover, the low watt loss ballast has been considered. The installation of 48 low watt loss ballast will save upto 1,615 B/yr with pay back period of 4.25 yr. In motor, if high efficiency motor has been used instead of low efficiency motor, 6,980 kWh of electricity will be save per annum. The pay back period was 3.7 yr.

Electrical energy saving in process can be achieved by shifting cleaning period of extruder from starting period in the morning to the evening after work. So the saving will be 42,894 to 96,840 B/yr. The high loss from the surface of the extruder could be reduced by fibreglass insulator, which would save 53,350 kWh/yr or 115,450 B/yr and the pay back period was less than 1 yr.

Keywords : Extruder / Maximum electrical peak demand / Energy conservation / Plastic factory.