A Case Study on Green Jobs

Makwanpur
I. Introduction:

The Nepal Ekarat Engineering Co. (P) Ltd. is a middle scale industry established as a joint venture with Thai company. It is located in Thana Bhanjyang, Hetauda Municipality, Ward No. 11, Makwanpur District. The company produces about 700 different sizes of power transformers per year, which are consumed mostly in the country. Some 99 employees are currently working in the company. It occupies about 0.75 ha land area.

II. Production Process:

The industry uses cutting, vacuum heating, sand blasting, assembling, painting, packaging processes to produce transformers of various sizes. It also repairs old transformers. The major raw materials used to produce these products are copper wire, silicon steel, transformer oil, MS items and others. It uses ground water source to meet water demand. Apart from electricity, diesel is used in the industry.

III. Environmental Issues and pollution control:

There are some environmental issues, which are related with air pollution, solid waste and discharge of wastewater.

A. Air pollution:

The industry has to carry out several activities, which causes air pollution. They are related with vacuum heating/evaporation, painting, sand blasting and use of fuel. In these processes, gasses such as $\text{CO}_2$, $\text{NO}_x$, $\text{SO}_2$ and other volatile particles are emitted. The industry however has been using different technologies to minimize its adverse impact on the environment.

B. Solid waste:

The main solid wastes produced by the industry are waste paper, packaging materials like paper, plastics and wood and MS items. The industry generates about 15 t scrap iron, 1 t silicon steel, 2 t wood, 1 t used transformer oil and plastics and paper wastes. Since they are easily recyclable, the industry collects them in especially provisioned Scrap yard and sells them afterwards. The industry stopped burning of wastes and provides remaining domestic waste to municipal collector.

C. Water consumption:

The industry uses water from its own source (well). The consumption is about 1000 lit/day. Although the consumption is not so high, it may cause lowers the
groundwater table and, in especially severe cases, drains to a watercourse.

D. Wastewater:

Wastewater is mainly produced during cleaning operations. The main source of water pollution is discharge of oils and grease. It has been discharging into side drain without any treatment.

IV. Environmental Management:

NEEK is an ISO 14001 and 9001 certified company and has been implementing Environmental Management System. It is in the process to implement Energy Management System (ISO 50001). It conducted energy audit in 2008.

The industry has been taking various measures to minimize air pollution by improving different procedures in heating, painting and sand blasting. It provisioned special scrap yard for storage of solid waste. The waste is collected in scrap yard and then sold to the scrap dealer.

V. Best Practices:

The industry has following best practices:

A. Painting: The industry used to apply open spraying method for painting transformer cover and parts. The method caused not only excessive loss of paints but also polluted environment through emission of hazardous paint particles. Recently it has installed system, where the product is poured by red oxide paint, which is followed by another pouring of required color of paint. Only after then, the product is sprayed with paint that is also in closed chamber, where exhaust fan has been installed. It not only saves paint consumption but also reduces paint emission.

B. Sand Blasting: The industry requires sand blasting to clean surfaces from corrosion and smooth the surfaces. This process used to emit excessive air pollutants and also used to cause noise pollution. Recently it has installed a system, where dust particles are not exposed to open environment but are collected with water and settles in the bottom. It also reduced noise pollution considerably.

C. Vacuum Heating: The industry requires to do vacuum heating to reduce moisture content in the new and old transformers. The company used to heat these transformers with 100°C for about 12 hours in a closed chamber. When the heating period is completed, the door of the chamber is opened and oil fumes are
exposed to atmosphere causing excessive air emission in the factory hall. Recently, the industry developed a mechanism, in which after completion of heating period, the temperature is downed to 40°C for two hours while the door of the chamber is still closed. During this time, the oil vapour is condensed and settled in the bottom of the chamber. When the door is opened, there is very limited air emission from oil fumes. It improved working environment to a great extent.

D. Solid Waste Management: The NEEK after implementation of Environmental Management System (EMS) segregates wastes at source and stopped burning and dumping of wastes in the compound. Now it sells metal scraps, wooden waste, paper waste, drums to scrap dealers and only remaining municipal wastes are provided to municipal waste collectors, which are negligible quantity.

E. Implementation of Management Systems: The industry has been implementing QMS and EMS. It is ISO 9001:2008 and ISO 14001:2004 certified company. It is now in a process to implement Energy Management System (ISO 50001). It means that the company has been continuously improving its environmental performances for sustainable industrial development. The company has defined environmental policy and communicated to all employees. It carries out environmental review every year. On the basis of existing environmental situation, it sets environmental objectives and targets and prepares and implements Environmental Management Programmes (EMP) to meet them. The industry also carried out energy audit to improve energy efficiency and minimize air pollution.

F. Use of Alternative Energy: The industry has one big hall, where labours require lighting to work. Now the industry uses transparent sheets in factory roofs, which provides natural light without consuming any energy. It also installed 10 air exhaust fans, which also do not consume energy for their operation.