

# 1. SUMMARY

*Environmental management at breweries concerns both inputs and outputs. Traditionally, the focus of environmental protection measures has been on emissions such as untreated waste water with a high organic content. However, as in many other industries, inefficient use of inputs (energy, water, malt, etc.) can also have serious environmental impacts. Environmental (and health) impacts can originate at various stages during brewing and packaging, as shown in Table 1.1.*

<p><b>Brewhouse</b></p> <ul style="list-style-type: none"> <li>● High discharge of organic matter</li> <li>● High energy consumption (heating)</li> <li>● High water consumption</li> <li>● Dust problems</li> <li>● Carrying of heavy loads</li> <li>● Caustic/acid from CIP systems</li> </ul>	<p><b>Packaging</b></p> <ul style="list-style-type: none"> <li>● High discharge of organic matter</li> <li>● High energy consumption (heating)</li> <li>● High water consumption</li> <li>● Handling of solid waste</li> <li>● Carrying of heavy loads</li> <li>● High noise level</li> <li>● Caustic/acid from CIP systems</li> </ul>
<p><b>Fermentation/Beer Processing</b></p> <ul style="list-style-type: none"> <li>● High discharge of organic matter</li> <li>● High energy consumption (cooling)</li> <li>● High water consumption</li> <li>● Dust problems</li> <li>● Handling of solid waste</li> <li>● Caustic/acid from CIP systems</li> </ul>	<p><b>Ancillary Operations</b></p> <ul style="list-style-type: none"> <li>● High water consumption</li> <li>● High energy consumption</li> <li>● Air pollution</li> <li>● Handling of solid waste</li> <li>● Handling of chemicals</li> <li>● High noise level</li> <li>● Hazardous waste generation</li> <li>● Ammonia</li> </ul>

**Table 1.1: Sources of Environmental and Health Impacts**

## **Resource Consumption and Emissions**

*The resources consumed, and the by-products and emissions produced, in a well-run brewery that uses returnable bottles (and is located in a temperate climate) are shown in Figure 6.2. (These may be regarded as "order of magnitude" figures generally applicable to many breweries.)*

### **Cleaner Production**

*A range of technologies and techniques are available to improve the eco-efficiency of a brewery, i.e. to reduce inputs to and outputs from a process. Options range from high-investment technologies, such as a centrifuge, to implementation of a better maintenance programme for detecting steam leakage.*

*Actions can be taken in any of these three areas:*

- *Training*
- *Engineering*
- *Plant equipment*

*Actions in one area should be co-ordinated with those in the others. Otherwise, eco-efficiency may be greatly reduced. There are considerable opportunities for synergies when actions aimed at improving eco-efficiency are combined.*

*Even in the most efficiently run breweries there are wastes to be managed. Waste management involves the treatment of waste water and the disposal of solid waste.*

*Waste water can be treated biologically using either anaerobic or aerobic processes. The choice of treatment will depend on a number of factors such as local conditions, type of packaging used, etc.*

*Separation of solid waste streams will enable the brewery to recycle, or re-use, valuable components before disposal.*

### **Environmental Management**

*In view of the increasing pressure from both beer consumers and governments for higher environmental performance, a systematic approach to environmental management can provide a framework for a brewer to make continuous improvements. Clearly defined responsibilities, employee involvement, explicit environmental policies and targets, training, and regular monitoring of results are essential elements of an environmental management system (EMS). An EMS does not necessarily have to be a distinct programme. It may be an extension of an existing quality assurance and/or health and safety programme.*

### **Government's Role**

*Government can make use of various policy instruments (regulatory, economic, persuasive/negotiated) to promote high environmental performance. It is of basic importance that policy-makers go beyond traditional command and control regulation to encourage cleaner production (prevention of pollution at source, energy efficiency, etc.). Creative permitting (integrated pollution control), disposal taxes, demonstration projects, and negotiated agreements are some of the policy instruments available.*