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## **Prevention of Solid Waste Through Resource-conserving Product Development - An example to avoid waste -**

### Waste Quantities

With a brief survey of the international statistics on different quantities of waste the differences between countries become immediately clear. While in Austria, the amount of waste is approximately 230 kilogrammes per capita per year, Germany produces yearly 330 kilogrammes and the US produces one ton per person annually [OECD, 1998].

If the standard of living were directly related to amount of waste per person, Germany makes a better impression than Austria, but appears quite poor when compared to the US. While this was an attitude of the 60s and 70s, it is no longer appropriate. On the contrary, it would be desirable if the amount of waste created by a nation were seen as an indicator of its disrespect for nature. A society should be regarded as inferior the more resources are used or wasted. The relation between production, distribution and consumption should be such, that the use of natural resources and the production of pollutants is reduced as much as possible. This implies considering the total flow of materials.

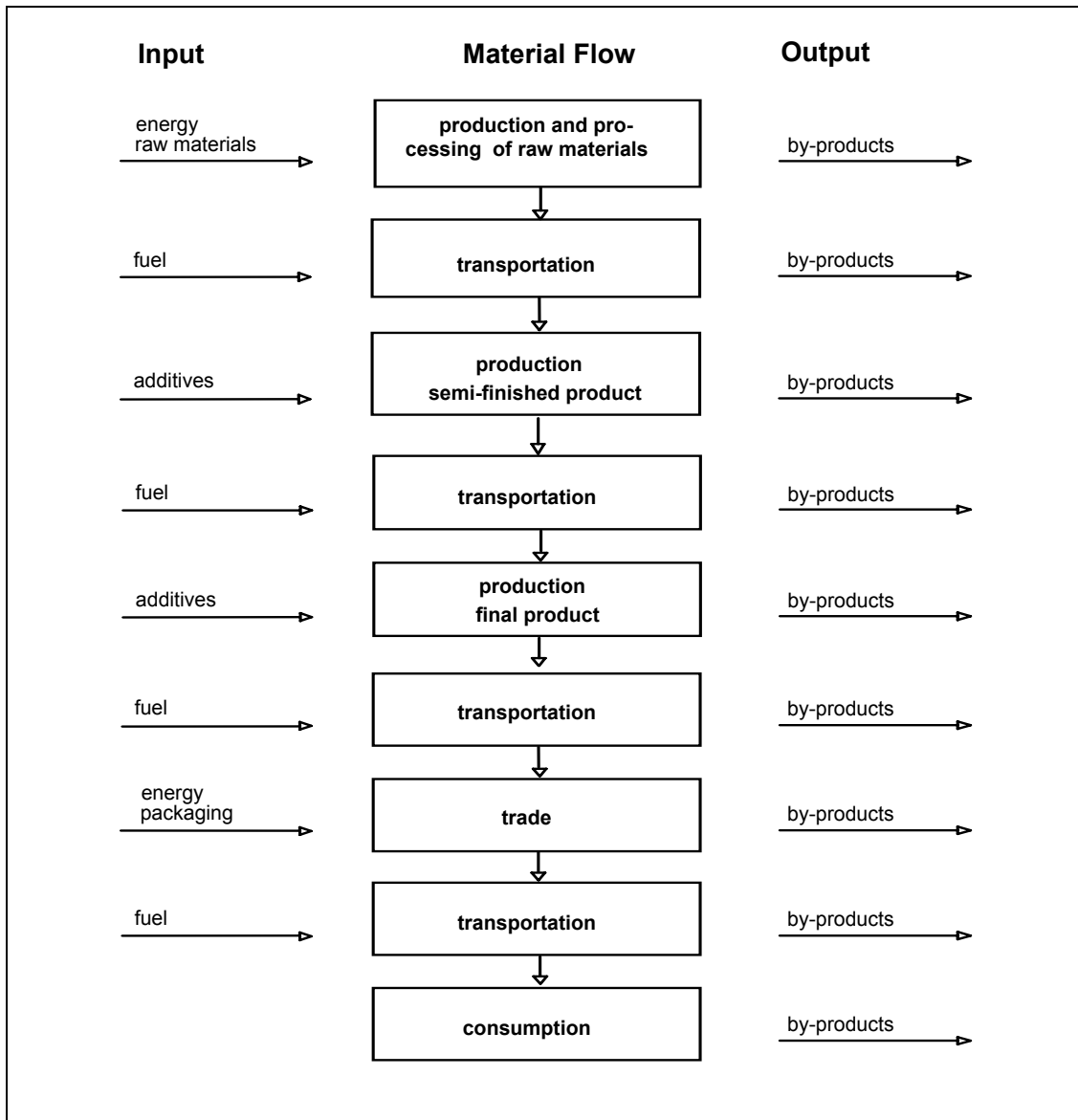


Illustration 1: total flow of materials for a given product

Ideally, zero waste is produced anymore, but some kind of impact on the environment can not be avoided. Every step in the processing of goods creates more or less harmful by-products.

#### The strategy

In the past, many individual steps have been taken to reduce waste. If the goal is also to reduce environmentally negative effects of the total life-cycle of a given product, recycling is not the way. Recycling does not save the environment under the present conditions. Using recycled materials and products is merely an excuse for producing ever more goods and therefore, pollution.

It has been shown that in the last twenty years there has been no significant relief for the environment through recycling or waste prevention because they could not compensate the total negative effects on the environment. Most initiatives for waste prevention and waste reduction are isolated, unstructured and uncoordinated, and thus environmentally ineffective. In what follows, a model strategy to implement waste prevention is presented which may be able to improve the situation.

A strategy for waste prevention must be based on an analysis of the present situation. Facts concerning the origin, composition and amounts of waste should be established. The major ecological weaknesses of a production process can be detected by means of ecological balance sheets. The objectives are then defined from that scientific basis in terms of waste prevention and waste minimization.

By-products to be prevented can also include products that could "safely" be recycled or disposed of. Paper products are a typical example: the paper production process is the single largest cause of the environmental damage in relation to consumption and production of communal waste. Neglecting its influence would make any strategy of waste prevention pointless.

Experiences from the IföR-Institut in Berlin are considered as well as different measures for implementation. Both are evaluated in terms of their efficiency and practicability. Concrete steps are selected to form an integrated system of measures, which creates conditions for easy implementation.

If, for example, the goal is to save paper, new photo copiers should be able to make two-sided copies automatically. The implementation of strategies for waste prevention generally involves not only the initiators but also a variety of people, whose priorities are not always related to environmental issues. Therefore, decisions and measures concerning the environment should be definite in character. To further motivate the persons concerned, they may be supported by environmental consultants or so-called project coordinators. The realization of waste prevention measures involves changes of production processes as well as changes of behavior. Therefore, it is important to monitor each step of the implementation and its acceptance, and to make necessary corrections if needed.

Within such a concept of waste prevention, the task of technical designers is to construct and design products meeting ecological criteria.

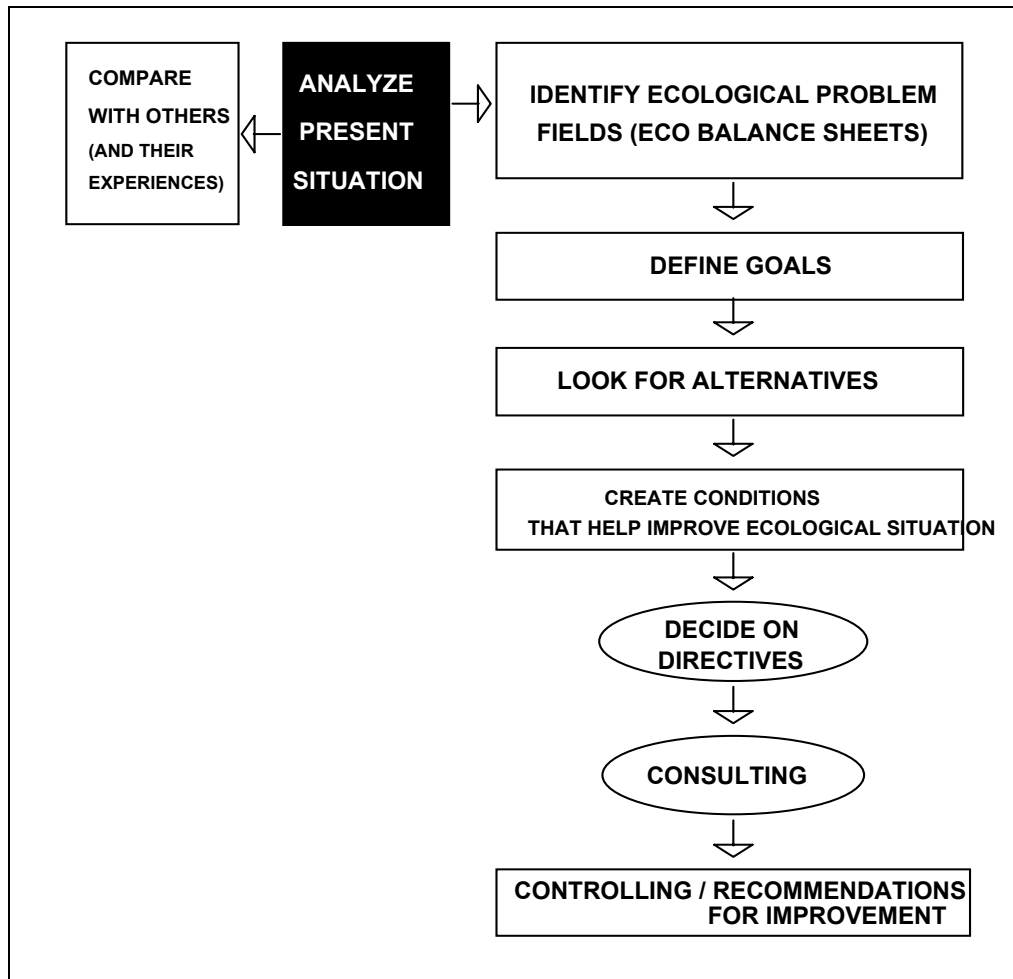


Illustration 2: step-by-step plan of an idealized waste prevention concept

An example for packaging: AIR-PACK

In search of an ecological packing material one finds straw, pop-corn and starch chips as possible alternatives to cardboard and styrofoam. While they may be slightly better, they are not real ecological improvements, e.g. because of global food shortage, soil-erosion etc.

Alternatives could involve doing without the product or reducing either the material used in the product or in its packaging. If a commodity is reasonable or necessary, it may, for example, not need to be packed at all in some cases, which would be the most reasonable alternative. Often, packaging material can be used more than once - bicycles for example are wrapped into re-usable blankets. Another solution that I would like to discuss here is packaging with air.

I call this packaging AIR-PACK. This returnable packaging is based on the air-cushion principle and meets the criteria of an ecologically safe package.

For transportation, goods can be placed inside a container made of double foil. Air is pumped between the two foils. The inner foil surrounds the object while the outer foil forms into a storable square.

Tests have shown that a sufficient durability of the foil can be guaranteed, and that the inflated square objects can be stepped without any problems.

Through AIR-PACK, an estimated 90 percent of packaging waste could be avoided (i.e. yearly more than one million tons of cardboard, styrofoam etc in Germany alone). Little energy and raw materials are needed to produce AIR-PACK. It is durable, weighs little and does not take up much space when deflated.

The AIR-PACK is environmentally superior to conventional packaging even after a one-time use. The environmental effects can be further reduced if standardized AIR-PACKs are returnable and re-used within a decentralised distribution system. Moreover, it would be less expensive than cardboard and styrofoam packaging.

Literature:

Kopytziok, Norbert: **Sachgebiet Abfall: Vermeidung ökologischer Belastungen. Die ökologische Wirksamkeit der Vermeidung und Verwertung von Siedlungsabfällen.** Rhombos-Verlag, Kurfürstenstraße 17, D-10785 Berlin, 1995 / 2001

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