

This is IPP!
**An Example of Successful Environmental Measures
within the Packaging Chain in Sweden.**

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S u m m a r y

For several years now environmental activities within the Swedish industry have been conducted from a holistic perspective. The basis for this is a method of approach that is based on continuous improvements, environmental management systems, lifecycle analyses and other codes of conduct, that have been introduced voluntarily with the object of improving the efficiency of environmental activities.

Lifecycle analyses are used to decide priorities for the environmental protection activities and in communications with the outside world. The method improves the knowledge available about the flow of resources and emissions into and from business establishments. The methodology is dynamic in that it builds on continuous improvements rather than on static sets of rules.

The management systems are based on effective and regular self-control and on external audits by independent auditors, as well as extensive preventive environmental measures to minimize the risk of harming health and the environment. Joint action by players in the production chain, customers and other stakeholders is an essential ingredient in this process. This joint action is critical for success in environmental activities.

A legal background that takes full account of a dynamic methodology is also very important. Many of the means of control and measures proposed in the EU Commission's strategy on IPP are already in use in industry's environmental activities.

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The individual goals of industry, in combination with the market forces, have proven to have great potential when it comes to bringing about environmental improvements in many areas and thus in leading society towards sustainable development. A holistic approach to the environment is necessary in order to optimize use of resources and reduce environmental impact. Knowledge, the dynamic methodology and the effective means that are applied in industry's environmental activities, as illustrated in this article, thus reduce the need for detailed regulations. The article is based on a document about IPP written by Stora Enso, the Swedish Forest Industries Federation and Tetra Pak.

Background

The environmental activities taking place within paper and packaging industry have clear objectives. Initially, they were focused on the environmental impact of local emissions, but, as more has been learnt and environmental protection measures have been taken, they have changed character and direction. Today's environmental activities are based on a lifecycle approach that involves many players and places greater focus on the products. The environmental measures are now based on a holistic approach with the goal of reducing the total environmental impact from raw material to recycling and recovery. In the case of paper-based products this means that environmental activities start in the forest and end with the recovery or recycling of for instance used packaging.

The environmental activities were initially driven by laws and the demands of governmental bodies, which were soon supplemented by the industry's own initiatives. Environmental organizations were also involved since they influenced environmental opinion. Criticism was primarily directed towards emissions into water and air, forestry and the growing volumes of waste, in this case largely addressed to the packaging industry. The environmental protection measures that were taken to reduce emissions were effective and resulted in radical reductions in emissions - up to 90% - over a 30-year period. New forestry methods were developed by the forest industry in collaboration with the authorities, environmental organizations and customers. Nowadays the forest industry uses sustainable forestry methods that take production-related, ecological and social factors into account. The packaging industry, which has faced many demands from society, was already basing its environmental activities on a holistic approach by the early 1980s, with a strong focus on all stages of the production chain. It makes use of new knowledge and tools, such as lifecycle analyses and environmental management systems based on voluntary co-operation between many different players. It is possible with the aid of these tools

to integrate the demands made by final consumers into the early stages of the production chain. This methodology results in savings in resources and reduced environmental impact.

Another important aspect of the environmental process is the provision of transparent and reliable environmental information by players at every stage along the chain. The forestry and packaging industries have spent many years developing a methodology that provides a structured description of environmental performance and valuable information for environmental reporting. The relationship with the consumer is important and this is based on a mutual exchange of information that plays a valuable role in the product development process. The market has gained a strong position as a force driving this process. Voluntary efforts in combination with joint action by the industry - from suppliers of wood to collectors of used packaging- are proving to be a good model for bringing about more effective use of resources and reducing environmental impact, seen from an overall perspective.

Environmental goals

The protection of and concern for the environment are urgent matters for industry. One goal of environmental activities is to bring about continuous improvements and an open attitude towards markets and audiences. The aim is to minimize the environmental impact of all aspects of a business, in so far as this is technically possible and economically feasible in accordance with the thinking behind Swedish and EU environmental legislation. When an overall perspective is adopted, measures can be introduced where they will produce the greatest environmental benefit.

Product and system

This example deals with the distribution of one litre of milk in a Tetra Brik package - from the forest via the production and consumption of a litre of milk to the recycling of the packaging.

Tetra Pak, the forest industry, the food industry and the retail trade aim to help bring about the safe, effective and environmentally sound production and distribution of liquid foods to consumers all over the world.

The beverage carton is manufactured out of liquid board to give stability and rigidity, and lined with polyethylene plastic for protection against moisture. The liquid board is, in turn, mainly a

product of the Swedish and Finnish forest industries. The plastic comes from the chemical industry and the milk from Swedish farms.

The system - one litre of milk in a Tetra Brik package - has been studied in numerous lifecycle analyses carried out by Stora Enso, Tetra Pak, Borealis, Swedish Dairy Association and others. All the studies show that the greatest environmental impact stems from the actual milk production. The manufacture and disposal of the package represents only about 10% of the total environmental load. In this way, the packaging helps to reduce the amount of waste and, subsequently, its total environmental impact.

Environmental activities in the product chain

The environmental activities are based on co-operation throughout the production chain with the goal of making improvements at each stage of the process. Some examples of improvements are described in the following.

Liquid board manufacturer

The problem of **emissions** no longer dominates in the environmental activities in the pulp and paper industry. Research and development have produced new processes and treatments. Emissions mainly into water have been greatly reduced since the 1970s, as a result of which the environmental conditions in lakes and rivers that receive effluent from the pulp and paper mills have improved markedly.

Forestry methods have been developed in collaboration with many interested parties and considerable attention has been devoted to providing open information about the result of these changes.

The principle is that forestry shall be responsible and focused on sustainability. It is characterized by challenging economic, environmental and social goals, which will be reflected in a continuous improvement process. In modern forestry the environment is taken into consideration in connection with all harvesting, and forest stands are left untouched for ecological reasons.

One of the most important practical instruments is known as ecological landscape planning. This has brought radical changes in working methods and results. One way of facilitating

communication with other parties is have the forestry certificated to verify adherence to long-term sustainable principles, such as FSC (Forest Stewardship Council). High priority is now given to ensuring that wood comes from areas where sustainable forestry methods are used.

In the area of **transport**, the objective is to identify systems that save resources and improve efficiency.

One such example is a new strategy applied by Stora Enso for deliveries from its Swedish mills to continental customers; this is known as BasePort. The BasePort transport system is an efficient multimodal transport system that integrates the Swedish rail system with the North Sea traffic. The multimodality has been made possible through the development of a new cargo carrier - the SECU - Stora Enso Cargo Unit. The results to date indicate that it is possible to halve energy consumption and thus to halve emissions.

Within the **product** area there are several examples of improvements that have been initiated thanks to closer co-operation along the product chain on exploiting the improvement potential on the basis of the functional qualities of the product. It has been possible to reduce the gram of the paperboard used for the beverage carton without this having a detrimental effect on the quality of the finished carton. The use of other types of pulp has made it possible to increase the number of beverage cartons that can be produced from a given volume of wood, with further savings of resources as a consequence.

Plastics manufacturer

If a beverage carton is to function effectively as a container for liquids and to resist penetration by moisture from outside, the packaging should be laminated with polyethylene (LDPE) on the inside and the outside. The lamination process at Tetra Pak's factories generates emissions in the form of plastic fumes, which can cause unpleasant odour in the neighbourhood. These fumes are cleaned by a process of absorption and combustion to reduce emissions into air.

The plastics manufacturer has taken steps to reduce the volume of residual solvent in the plastic, which has also helped to reduce the volume of fumes. Indeed, the manufacturer has been so successful that Tetra Pak is now engaged in discussions with the supervisory authority on the consequent redundancy of the treatment plant for emissions into air. The consumption of the fuel (LPG) needed to operate the treatment plant today generates more CO₂ emissions than if

the remaining plastic fumes were emitted without cleaning.

Packaging manufacturer

Environmental activities at the packaging manufacturer are largely a matter of resource management. This has been achieved by optimizing the use of materials in terms of type and volume. Modern beverage cartons are made out of a liquid board that is 20% lighter than that used 30 or 40 years ago. This means not only a saving in terms of material but also reduced environmental impact from transportation.

At many of Tetra Pak's plants, a primary environmental objective has been to reduce emissions of solvents in the printing ink. It has been possible to virtually eliminate emissions of organic solvents over a 20-year period with no loss of production, by changing over to water-based inks.

Transportation is another central environmental issue that falls under the environmental management system. Tetra Pak has produced a guideline for how the company is to work with transport for both goods and personnel. This instruction applies throughout the Group, and gives the company control, when selecting suppliers, of the transport services, who provides them and in what way, and thus of the environmental impact. In recent years, Tetra Pak has been involved in the Network for Transport and the Environment (NTM) , in which major Swedish transport operators have been co-operating on the development of a standard evaluation form for the suppliers' environmental activities. Tetra Pak use this form in its procurement of transport services. In that form the transport supplier provide information about the company's environmental goals and policy, the employees' environmental competence , the energy consumption of the company's vehicles and emission data. Acting on the replies of the transport providers, Tetra Pak has colour coded them according to their environmental friendliness : green-coded suppliers are most environmentally friendly, red-coded suppliers are least. On the basis of this evaluation Tetra Pak has discussions with transport providers on improvements of their activities and action plans.

Design for Environment is a methodology to consider and address environmental aspects throughout product development. In practice it means applying life cycle thinking to product development. In Tetra Pak the so-called Innovation Process applies to the development of packages and equipment. Design for Environment specifications are included at every stage, from idea generation, through prototype development until actual commercial release. At the

end of each phase, a tollgate has to be passed through the evaluation against previously set environmental objectives. Those objectives include use of resources, use or emissions of harmful substances, recovery options and possibility to recycle new packages, as well as consumers' environmental perception. Tetra Pak design for environmental standard has already been applied in a number of new and existing equipment's and its use in packaging development is being strengthened through training of designers and product managers.

Milk producer

Milk production includes all the steps in the process from the cultivation of fodder to the dairy. The Swedish milk organization, Swedish Dairy Association, has carried out lifecycle analyses to provide information about the environmental impact of the production process and to introduce measures where they produce the greatest environmental benefit. The different steps in the production chain are the farming at the dairy farm, transportation and production at the dairy. The farm has the greatest environmental impact. Also in the broader perspective, which includes all the stages from farming to the handling of used milk cartons, farming still has the greatest environmental impact. This has been illustrated using lifecycle analyses.

When it comes to other types of environmental impact, such as acidification and excessive fertilization, farming once again plays the main role. Measures have been taken to reduce nitrogen emissions that are the cause of excessive eutrophication of watercourses. Reduced use of commercial fertilizer and new methods of cultivation have helped to reduce environmental impact, although expressing the improvements in quantitative terms is difficult. Key figures being produced by various joint projects should make it possible to quantify these environmental improvements. Dairy producers have focused their environmental activities on improving their transport efficiency. The industry has developed a model for communicating environmental information about the transportation of dairy products, in the form of an environmental product declaration that includes quality assured facts and figures.

Consumer

Developing packaging to meet the needs of consumers is important in terms of resource management. Since the greater part of the total environmental impact of the entire product chain is caused by farming, it is important that the food in the packaging is consumed and does not go to waste.

One way of meeting the needs of the consumer is to develop packaging of the right size and types of packaging that can be resealed after opening. Tetra Pak has developed packaging that is designed to meet the needs of different types of customer. The packaging itself helps the consumer to use all the product - an effective measure to provide the maximum possible benefit for the environment and for the consumer. Each year, Tetra Pak in Sweden carries out consumer surveys to keep track of consumer views on packaging and the environment. These surveys show that the consumer considers the most important environmental aspect is for the packaging to be recyclable. The consumer also wants suitable packaging that preserves and protects the food product, and packaging that is easy to handle and open. As a result of changing consumption patterns and the increasing number of small households, today's consumer wants drinks packaging that holds smaller volumes and that can be resealed. Today's consumer takes it for granted that the environment was taken into account when the packaging was designed and manufactured and that it can be recycled.

Recovery and recycling

The recovery of used paper products is very advanced in Sweden. Of those paper products that are covered by mandatory or voluntary producer responsibility, more than 70% are collected and recycled to produce new paper. If you add to this the volumes recovered for energy, the recovery rate is almost 90 per cent.

The use of recycled fibre as a raw material in the paper industry is not a new phenomenon in Sweden. The collection of newspapers and magazines from households and of corrugated board packaging from trade and industry has been going on for more than half a century. Over the years the industry has developed and refined methods of using these attractive raw materials in high-quality applications and for a variety of purposes. Following the introduction of producer responsibility for packaging, the collection from households of corrugated board and other paper and paperboard packaging really began in earnest. In addition to this, the voluntary efforts put into collecting office paper have improved and expanded the arrangements for collecting wood-free paper from offices. Producer responsibility for newspapers and magazines has also stimulated the collection of these types of paper in sparsely populated areas and in the inland regions of northern Sweden.

82 per cent of the used paper collected (recovered paper) consists of newspapers and corrugated board. Packaging collected from households accounts for 7 per cent and office paper for 11 per

cent of all material collected.

The term "recovered paper" is an umbrella term for all types of collected paper products. Thanks to technical developments, many different kinds of paper products can be recycled for use as raw materials. For example, numerous mills can now, after extensive investment, recycle plastic coated and aluminum-laminated paperboard, which means these products are no longer a problem technically. The higher the degree of recycling, the greater the volume of waste products that must be dealt with. Some of the rejected materials-plastic, waste fibre - can be used to produce energy and can even make a positive contribution to the overall financial situation at the factories handling this fraction. New investments in energy installations will possibly increase the return on this fraction, making energy recovery a more attractive option.

An example of the productive use of waste that was once sent to land fill is provided by Örebro Kartongbruk, which produces plasterboard. The raw material used is waste paper that contains paperboard, including beverage cartons, collected from consumers. By installing a new solid fuel boiler and introducing new drying techniques, the mill has been able to reduce its environmental impact and increase its level of environmental awareness. The energy locked into the waste can now be recovered, which meant a marked reduction in the consumption of electricity and oil. The volumes of waste sent to land fill have consequently been virtually eliminated.

Discussion

From having once been handled as a quite separate activity in companies, environmental activities are now increasingly integrated into the business as such, a development that has been driven by the demands placed on both company and product by an environmentally-friendly market. Today, environmental problems are tackled from a holistic perspective.

An important aspect of this market-driven environmental development is the forceful measures undertaken voluntarily by industry in the early 1980s, when lifecycle analyses were first used as an internal tool for locating the parts of a product chain where environmental activities could be applied in order to obtain the greatest possible environmental benefit, and for publicising the environmental performance of the product or business. The forestry and packaging industries were among the first to use the method and thus contributed to its development.

This holistic approach to solving environmental problems paved the way for a new set of

standards that would form the basis and provide support for a group of tools designed to help companies organise their environmental activities. Industry took an active role in the preparation of these standards, and by the mid-1990s it became possible for companies to have the environmental management systems certificated in accordance with international and European standards (ISO 14001 and EMAS respectively). Environmental management systems have been introduced in many companies and are an important tool, not least in relation to customers, since the environmental management system allows a company to publish its environmental activities in a credible and reliable manner.

An environmental management system bases its activities upon a number of aspects, which themselves serve as the basis of the company's environmental policy and goals. The system depends on having information about all flows at every point of the production chain - from before input to after output. This means that many different players contribute to the total environmental performance of any one product.

A chain of players begins with the supplier of the raw materials and ends with the recycling of products. Each individual part in the chain affects or is affected by the following and preceding ones. The environmental activities of the suppliers and recycling operators are therefore important. Customers not only demand results from the environmental management system, they also expect environmental information about the products, at times specific, at times concerning its entire life cycle, information which many companies provide. Such information is an important component in any environmental management system, since it is based on procedures for areas such as the monitoring, follow up and control of flows.

Nowadays, companies take far-reaching responsibility for their products during their entire lifecycle from extraction of raw material to its handling once it has served its original purpose. Industry has also helped to draw up standards for products, which allow consistent and credible product assessments to be made. These include the product-related standards in the ISO 14000 series (e.g.LCA, design for environment, environmental performance) and standards linked to the EU's Packaging Directive.

A few years ago, a number of companies in the packaging industry in Sweden set up Miljopack, a trade and industry group dedicated to developing a practical self-imposed control system for the handling of part of the packaging legislation. The government has welcomed the initiative and is showing great confidence in the industry. This solution reduces the need for detailed legislation

and official controls.

Many types of product, including packaging, are covered by what is known as "producer responsibility" , either mandatory or voluntary. This producer responsibility includes packaging and newspapers and encourages a voluntary undertaking for office paper. Companies in the forest and packaging industries are thus demonstrating their readiness to find solutions that provide effective processing of used products.

Many companies attach importance to publishing their environmental activities to different interested parties. Most of this is done on a voluntary basis in the form of environmental product declarations, labeling and environmental audits. Exchange of information is essential for driving developments.

It is also important that the environmental data are published in an uncomplicated and credible manner, and designed to meet the needs of different target groups. Consequently, companies in several industries are collaborating with researchers to produce suitable databases.

The same holistic approach as that developed by the companies along the packaging chain over the past decade has also been formulated within the EU in the form of the Integrated Product Policy (IPP). This policy has been designed to reduce the environmental impact of different products and services and thereby limit the flow of pollutants. The policy is intended to provide guidance for developments in the product area not only on a national level but also for Sweden's activities within the EU and globally.

The methodology and procedures that have been developed in the environmental area have proved successful and effective. Measures and commitments are often costly, particularly in the early stages, but in the long term are shown to generate savings in resources, streamlining and a reduction in environmental impact. The IPP perspective has been embodied in countless production chains in Swedish business. All this puts Swedish industry in a good position to respond to all the demands, both short- and long-term, that may be made on it in the future by an environmentally aware market.

(原稿受付2004年7月7日)