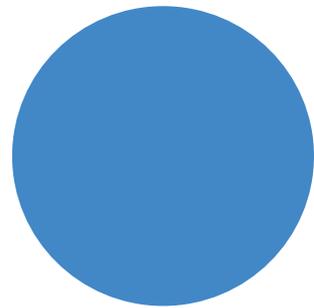


imageen

ECO DESIGN

BEST PRACTICES



INTRODUCTION

Eco-design requires the consideration of environmental effects during product design and development, with the intent to integrate measures to prevent or mitigate negative environmental impacts throughout the whole product life cycle. A similar definition could be coined for the eco-design of packaging, though its design should not be limited to packaging alone, as it is inseparable from the needs and demands of the packaged product. Without a product, no packaging is required. Key aspects of any packaging design, including eco-design, must be oriented towards ensuring packaging functionality, including protection of the product from external effects; preserving quality; preventing damage and contamination; and ensuring user-friendly handling from the moment the product leaves the production line until the packaging fulfils its function and is discarded by the end user. Packaging eco-design gains special relevance in the determination of appropriate waste management. Principally, the smallest possible amount of packaging is desired. Packaging shouldn't be a source of dangerous substances or heavy metal pollution during recovery. Packaging shouldn't contain components which could make recycling or material recovery more difficult, if the latter is even possible and supported with a satisfactory system for waste collection. It must be emphasised that the eco-design of packaging, with due consideration of environmental effects throughout the product life cycle, is not a process which is determined in general beforehand. Packaging can impact the environment in a number of ways; mitigating one impact could increase a second impact. An increase in content of recycled materials usually has an impact on increased packaging mass. A decrease in the amount of packaging used could increase the share of product being damaged during manipulation and transport, increasing product waste. New, lighter and thinner multilayer packaging may extend the shelf life of products, especially foodstuffs, but such packaging may be more difficult to collect and separate into individual material flows and recycle. New materials can exhibit many advantageous properties, but their recovery is usually not supported by a collection and recovery system, as such a system might not yet be economically justifiable. The final eco-design packaging choice is a compromise balanced on packaging's functional necessities, cost, technical limitations and numerous environmental influences, the solutions to which could be mutually exclusionary. Last but not least customer preferences must not be overlooked. Customers want attractive, handy and brand distinguishable packaging. Our booklet would like to present how small and medium-sized companies operating in the food and beverage sector in Slovenia choose their packaging with reference to the possible environmental effects this packaging may have during its product life cycle. The content of the booklet was shaped by the knowledge and experience gained working on the Imageen project, which dealt with the introduction of eco-design measures to small and medium-sized enterprises through the EEN, which was co-financed by the European Commission under the framework of the European Entrepreneurship and Innovation Programme. In the course of our discussions with company representatives about their approaches towards integrating environmental concerns in their final choice of packaging material, we noted a great interest for new materials. Our contracted partner MaTech gave us access to their database with descriptions of new materials during the course of the project. A selection of promising materials with their descriptions from this database has been included in the booklet. The materials have been chosen with regard to their applicability for packaging in the food industry and their potential contribution to lowering the environmental impacts of packaging.

PACKAGING MATERIALS

When contemplating the different packaging materials and design for food products and beverages, a number of aspects must be considered and counterbalanced, such as food safety and hygiene, contact between packaging and the foodstuff, preservation of freshness and taste, shelf life, the price of packaging materials, technologies available to form and fill packaging, distribution requirements, marketing demands and customer needs, waste management, etc. Today's products are tomorrow's waste, but tomorrow's waste must become the raw materials of the future. Packaging materials should be chosen according to their compatibility with reuse, recycling, biodegradability and/or compostability.

COMMON PACKAGING MATERIALS AND HOW THEY ARE BEING IMPROVED

GLASS has a number of excellent qualities; it is stress resistant, and resistant to elevated temperatures and chemicals. Green or brown tinted glass protects contents from degradation due to exposure to light and UV rays. Glass contains fluids and gasses excellently. The environmental impact of glass during its production is roughly the same as the impact of comparable plastic products. The final mass of a glass bottle is at least five times greater than that of an equivalent plastic one. The efficiency of glass production may be enhanced by decreasing friction. This is done traditionally by using lubricants in the forms of oil or grease. This coating is made of a water-based solvent that is dry to the touch, has microsphere additives, and is only visible by microscope. In the case of rubbing, and therefore friction, the microspheres break, releasing the substance contained within which then forms a lubricating microfilm between the two parts in contact. Glass offers many opportunities for reuse and high shares of material recovery and recycling.

METALS

The two most encountered packaging materials from metal are stainless steel and aluminium, displaying high resistance, protection, and durability. The main products manufactured with metal are barrels, cans and tins. Manufacturing using thin closing sheets is particularly significant. These sheets are then combined with plastic or paper/ paperboard to make them compliant with food contact requirements. Aluminium and plastic can then be separated using high pressure and vacuum processes, allowing both materials to be recycled. Waste metal packaging has a high share of material recovery.

PAPER AND CARDBOARD are composed of natural materials. Unfortunately paper is highly vulnerable to the effect of moisture and cannot contain fluids or gasses. To mitigate this quality, paper is combined with layers of metal and/or polymers and treated with special surface coatings which give it barrier properties and improve its aesthetic finish. These combinations make recycling more difficult and expensive. A new innovative coating procedure creates an impermeable layer, with improved characteristics in comparison to traditional PE layers and less environmental impact. The new layer consists of low density PE and a carbonate-based coating (CaCO₃), with a thickness ranging from a few microns up to a millimetre, resulting in lighter packaging, which is produced with higher material and energy efficiency.

PLASTIC

Though roughly 50% of goods in Europe are packed in plastic materials, the material itself presents only around 20% of the total packaging mass. Most often PE is employed to produce thin and flexible foil, PP for packaging and closure systems, PET for bottles and cups, and PS for foams. Raw materials to make plastics are derived from nonrenewable resources, while plastic needs a long time to decompose, thus presenting a considerable burden to the environment. Lately the de-

velopment of polymers derived from renewable sources, which may either be recycled or left to biological decomposition, has been rapid. The most notable materials of this kind are polymers made from PLA (polylactic acid) and PHA (polyhydroxy alkanooates).

WOOD

The most common types of wood packaging are pallets and crates. Food packaging is usually characterised by possibilities for reuse and a longer usage span. New processes have enabled the production of a light lamellar panel from pine wood, the unique structure of which guarantees a lower weight, dimensional stability and good thermalacoustic insulation. New materials called wood polymer composites have been developed which can be produced from wood residues. Wood flour and wood powder are added in variable percentages (up to 70%) to polyolefinic matrices (PE, PP, etc). The composites have a visual effect similar to wood but can be processed like traditional polymers. These materials display improved mechanical properties, resistance to water and impermeability.

THE PACKAGING OF THE FUTURE

The evolution of technology has enabled the design of material properties in accordance with product performance specifications. Due to new possibilities for additional treatment, polyethylene-based materials can be bent an infinite number of times without yielding, and the material has a melting temperature of 130°C. It is available on the market in a metal strip form of different thickness (from 0.4 mm to 1 mm) and width (from 2.5 mm to 10 mm). Multi-layer strips that can be bent in all directions comply with foodstuff contact requirements. The greatest leap forward in packaging has been the development of smart and active packaging. Smart packaging fulfils regular packaging demands and also signals if certain chemical or physical changes, such as temperature change, have been registered within the packaged good. Active packaging is packaging that reacts chemically or biologically to the packaged content, in order to extend the shelf life of the packaged good. Microspheres containing active ingredients which are added to the packaging break when shear stress is applied and release odour absorbent, sanitising and anti-microbial substances, vitamins, perfumes, etc. Active substances contained in nanospheres can be released due to changes in pH levels, temperature radiation, etc. The future development of nanoencapsulation techniques in food products, cosmetics and medical products will allow new properties and functions to be added to the packaging in terms of protection from humidity, heat and other critical conditions linked to food preservation and conservation. Inorganic-based nanoadditives can be inserted into PE and PP to absorb UV rays. These particles with dimensions of 50 to 100 nm are most commonly zinc oxide-based or titanium dioxide-based. In comparison with traditional inorganic additives, these materials offer greater UV protection, final transparency and robustness. They are applied to food packaging to prevent odour production and vitamin loss.

BIODEGRADABLE FOAM

Polylactic acid-based (PLA) natural foam is biodegradable and compostable. Starting from white granules, the foam is produced by machines similar to those used in the manufacturing of polystyrene foaming and has similar characteristics. It is suitable for packaging as it may be formed to follow customer designs similarly to tradition polystyrene foam packaging. It is available in a variety of densities, from 25 kg/m³ to 50 kg/m³. The foam does not decompose at room temperature. It is designed to decompose in an industrial composting plant, which combines a temperature of at least 70°C, the required moisture and bacterial components.

BIODEGRADABLE AND THERMOFORMABLE PLASTICS

The constituents of this plastic originate entirely, or almost entirely, from renewable agricultural sources and are biologically degradable. The primary commercial application of these plastics is

in packaging and display trays. The trays look, feel and function the same as traditional plastic trays, yet they are made from renewable resources and become compostable when they have come into contact with water. The material is suitable for containing dry foods such as biscuits and confectionary products. It is manufactured as flat sheet roll stock in a range of standard colours and gauges for industrial use. Biodegradable trays are not subject to the dramatic price variations common to petrochemical products.

CORN STARCH-BASED POLYMER MATERIAL

Material based on corn starch and thermoplastic biodegradable polymers is recyclable, biodegradable and compostable; it can be coupled with paper, cotton and different natural fibres such as paper and cotton. It offers antistatic properties and is suitable for packaging of pharmaceutical products, laboratory equipment and consumer goods. Thermoformed containers such as plant holders, packaging for cosmetics, plates, cutlery, cups, straws and lids used in the food industry can be manufactured through injection moulding and, in some cases, successive lamination onto plasterboard.

NON-PERMANENT ADHESIVE CLOSURE SYSTEMS

Polymeric tapes with an efficient, but removable, closure system. This characteristic occurs due to their surface, which is made of very small hexagonal knobs shaped like microscopic squashed mushrooms. This structure permits it to fasten onto other materials, such as woven and non-woven fabrics. It allows for easy removal, with many fastening and unfastening cycles, so buttons, clips or chemical closure systems (adhesives) are not necessary. The PP or PA based closure system differs from other, similar fasteners due to its minimal thickness (0.35 mm), weight (only 130 g/m²) and high flexibility. Tapes made from PP are applicable in temperature zones ranging from -30°C to +90°C. A strip made from PA can withstand temperatures of up to +130°C.

NATURAL FOAM MADE OF RECYCLED PAPER AND STARCH Natural foam made of recycled paper and starch is steam-processed without any kind of chemical ligand or solvent. Its characteristics are completely comparable to those of synthetic polymers. It is 100% recyclable and also compostable, allowing for better waste management at end-of-life as separation from the container it is associated with, namely paperboard, is not necessary.

COMPOSTABLE FILM FOR FOOD PACKAGING

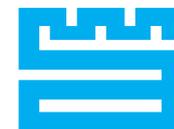
Compostable film is made from renewable resources such as cellulose. It is available in thicknesses from 20 to 50 microns in transparent, white, coloured and even metallic versions. Because they have a heat sealable layer on both sides, they have excellent hermetic properties against the flow of gas and contaminants as well as good chemical resistance to oils and fats. Metallic foil versions provide increased barrier properties to gases, aromas and moisture. They are used in food packaging applications such as for snacks, cereals, chips, bread and vegetables. They can be treated to make the surface printable with common inks used in the packaging sector or with natural inks as well. It is recommended to store the foil at 17 to 23°C and relative humidity between 35 and 55% to maintain film quality.

FIBRES AND FABRICS DERIVED FROM CORN

Natural fibres and fabrics made of 100% polylactic acid (PLA) derived from corn. The fibres combine the qualities of natural fibres and the performance of synthetic ones. Their qualities include strength, resistance, resilience and good moisture management, balanced with comfort and softness. Compared to traditional natural fibres they have lower specific weight and higher tenacity. PLA has a lower heat of combustion than PET and burns with less smoke than synthetic polymers. PLA has outstanding UV resistance and provides a low refractive index which allows for the achievement of intense colours after dyeing. The fibres display an inherent resistance to stains.

Bulgaria BEST PRACTICES

ASSENOVA KREPOST AD, BULGARIA



INCREASING COMPETITIVENESS BY IMPROVING ENERGY EFFICIENCY AND REDUCING THE ECOLOGICAL FOOTPRINT

The company has over 40 years experience in the production of flexible polymer packaging (transport, consumer) and films for agriculture and construction and more than 20 years experience in the production of woven bags and flexible containers of polymer materials. Technologically “Assenova krepost” AD covers the entire manufacturing cycle from initial polymers to end products, including various types of packagings, successfully implementing:



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- Extrusion of monolayer and multilayer film materials with various compositions and properties;
- Barrier, protective, UV-stabilized coatings;
- Extrusion coating and reinforcement, dry and wet laminating;
- Multicolour flexographic printing;
- Various types of confection and sets.

The quality of the company’s products is guaranteed by certified under ISO 9001: 2000 production and well organized monitoring systems. In its development “Assenova Krepost” AD is gradually updating the assortment and is optimizing the technological processes. Innovations and new ideas in the manufacturing process make the products more attractive, functional and cost effective to the customers.

A three-layer extrusion installation for processing of polymer raw materials and also of materials complying with the harmonized standard EN 13432 : 2000 for biodegradability is functioning on the territory of the company.

Description of the service provided by EEN/ESP

Within the project, meetings, company visit and in-house staff training on eco-design of FBP were held, identifying opportunities for implementation of eco-design approach in certain stages of the products life cycle. The company management and experts agreed that at that stage it was crucial to reduce fuel (natural gas) consumption by partial substitution with fuel from renewable energy sources. The need for change was also associated with the continuous increase of the natural gas price.

Results of provided service / expected changes after implementation of eco-design recommendation

The company installed boilers with eco pellets in production areas. Since the manufacturing halls of the company have very high ceilings, this leads to great losses of heat and respectively of energy. In this regard, "Assenova Krepost" AD has taken measures for the installation of suspended ceilings and thus reducing the height. As a result several effects have been achieved:

- Reduction of energy losses and therefore the expenses;
- Improvement of the working conditions and the employees comfort.

What is more, within the project a business connection has been established between a biodegradable granulate importer Ecovio and "Assenova Krepost" AD.

Potential further use of the provided service / expectation for the future

The expectations are, on one hand to significantly reduce the heating expenses, to increase the competitiveness of the enterprise, and on the other hand, to reduce the ecological footprint.

The aim is to raise and better exploit the energy potential of the enterprise by building energy efficient production lines in order to expand company activities and production diversity, as well as introduction of new products, in compliance with the EU policies for environmental protection and energy conservation.

As future activities, the company is planning gradual replacement of the current ink with organic solvents with water-based inks in the installations for flexographic printing.



RESTAURANT VEGGIC OOD, BULGARIA

FOOD TASTES BETTER WHEN ENVIRONMENT BENEFITS

The concept and realization of Vegan Restaurant "Veggie" is elaborated and implemented by young and active ladies from the town of Plovdiv, who are not indifferent to environmental issues as a whole. The idea for the restaurant was born about two years ago as an expression of the belief that healthy food can also be very delicious.

"The food, besides been delicious, can be very useful - to energise, cheer up, heal and make us happy. We cook guided by this principle", they declare.

The cooking products are of plant origin - fresh fruits and vegetables, cereals and legumes, raw and sprouted seeds and nuts, dried fruits, whole grain flours. Products of animal origin, sodium glutamate, E's, colorings, preservatives, artificial flavors and trans fats are not present in the chef kitchen.



The company offers also catering and take away services. The owners intend to expand business activities also in other Bulgarian cities.

Description of the service provided by EEN/ESP

Services within the project included:

- Introducing the principles of eco-design and purpose of the project;
- Company environmental performance audit through mapping;
- Identify areas with the greatest impact on the environment and opportunities for change;
- Analysis of the existing situation and costs/benefits comparison of the introduction of eco-design measures to the restaurant management;
- Promotion of eco-design measures implemented by the company to attract new customers through "green" image.

Results of provided service / expected changes after implementation of eco-design recommendation

As a result of the recommendations by the ESP, the following actions were undertaken by the company:

- Replacement of commonly used polypropylene and polystyrene packagings for catering and take away services with biodegradable packagings;
- Replacement of most cleaning agents with biodegradable, certified for organic production, Ecolabel etc.;
- Replacement of ordinary paper napkins with certified for eco-friendly aspects (FSC, PFSC, Blue Angel);
- Composting of biodegradable waste with Californian worms and using the resulting fertilizer to mature green areas.

Potential further use of the provided service / expectation for the future

The company management further intends to:

- Introduce bicycle delivery services to the customers, when appropriate;
- Purchase cooking products in larger packaging, in accordance with consumption, which will result in packaging reduction;
- Explore the possibilities to provide the compost to interested parties;
- Measure the environmental footprint of activities, analyse the results and identify possible remedial actions to reduce it;
- Promote the implemented eco-design measures and educate customers with the results achieved via the company website and on-site;
- Raise initiative among customers and encourage them to use their own reusable containers for take away services.



Croatia BEST PRACTICES

GALLUS JDOO, CROATIA



GALLUS CHICKEN AS ECO-DESIGN PRODUCT

Gallus jdoo is new company founded in 2014, specialized in production of smoked chicken using traditional Slavonian method of meat preservation. They have 1 employee and outsource current production.

So far they have 1 product; preserved chicken which comes in several packaging solutions; whole, half, and parts.

They have decided that not only their product is 100% natural but that they will use eco design for packaging solution.

Description of the service provided by EEN/ESP

Client was participant of IMAGEEN Plenary Conference in Osijek and after that continuously participating in workshops. Company visit (audit) was organized in June, several individual meetings, and in house training with tendency to defined visual identity and packaging according to Eco-design propositions. Gallus received education on eco design, LCA, packaging solutions available as well as basic company and market potential evaluation. Gallus is start – up company and have intensive need for first level services.

Client with recognised potential for improvement and willingness to participate in the project, also took a part in Advance support, leading by External expert. Evaluation of the various design alternatives, specific materials and energy consumption benefit, food safety and marketing/ consumer demands were analysed and recommendations made. Objective was minimisation of packaging waste and biodegradable vacuum bag was recognised as most acceptable solution.

Services provided were: company visit (audit), individual meetings (7 meetings), workshops, in house training, analyses of the production process, LCA analysis and preparation of the solution for packaging.

Results of provided service / expected changes after implementation of eco-design recommendation

It is expected that company will start using new packaging during December.

Potential further use of the provided service / expectation for the future

Company is oriented toward high end customers, so they will be looking for other eco design solutions for their basic product and if proved right they will expand it to other products.

PREHRANA DOO, CROATIA

ECO DESIGN PACKAGING FOR SAUER KRAUT

Prehrana d.o.o. is one of the oldest and biggest producers of pickled sauer-kraut and pickled turnip in Croatia.

Prehrana has 47 employees, cooperates with over 200 producers from all over Croatia and is working with several supermarkets in Croatia as well in Austria and Germany as producer of their house brands.

Around 60% of production is exported predominantly to Austria but as well to other markets such as: Germany, Hungary, Netherlands, Sweden and other countries.

Company is proud to be the leader on the domestic market in production of pickled sauer kraut which is made without any additives and using traditional methods, thus producing high quality eco end product rich in vitamins, minerals and other beneficial substances.

Currently company is not using eco design but they would like to use it in the optimisation of the packaging.

Process of pickled sauer kraut begins with cabbage being washed and put in containers with salt and water. Prehrana has unique recipe. Salt is from Solana Pag. Typically cabbage stays for up to 2-3 months in this phase until it is being pickled. Process is natural fermentation in controlled environment. On a weekly basis laboratory tests are being made to establish product quality.

At the end of this phase cabbage is being hand packaged. Prehrana uses primary, secondary and tertiary packaging.

From factory in Varaždin cabbage is being transported by trucks on EU pallets to customers all over Croatia (Billa, Lidl, Interspar, Konzum etc.) as well to the EU. Main EU market is Austria, where Prehrana is not selling directly but under the Lidl brand.

Description of the service provided by EEN/ESP

Prehrana participated in food eco-design service started from IMAGEEN Plenary Conference through workshops, individual meetings, company visit (audit) and in-house training. The objective was to provide the company with knowledge how to reduce costs and improve environmental performance through the preparation of eco-profile for one of their products and development of an eco-design project.

Services provided were: Workshop on eco design, analysis of the production process of sauer kraut, LCA analysis, SWOT analysis, MET matrix, preparation of the solution for new packaging.

Results of provided service / expected changes after implementation of eco-design recommendation

It is expected that company will start using new packaging.

Moreover company has now more in-depth knowledge on eco design and LCA.

Potential further use of the provided service / expectation for the future

It is expected that in the future company will use eco design for other products in their production line.



Germany BEST PRACTICES



AGRILUTION HU, GERMANY

ECO-DESIGN IN A NEW ECO-CONCEPT

Agrilution has been set up as a company in Munich in April 2013 by a young entrepreneur. Inspired by the ideas of »vertical farming« he gathered a group of young experts around him to turn the idea of the »Plant Cube« (Pcu) concept into reality. Pcu is a new form of farming at home, with a new electrical device and creating the perfect conditions in order to cultivate small green vegetables at home. The company is still in the testing and piloting phase and the team is working in introducing the product into the market. The team has grown to 7 people and is being supported by an experienced advisory board in the fields of management, sustainable development, vertical farming, plant science, horticulture, law, marketing and finance.

Description of the service provided by EEN/ESP

After having benefited from some consultancy services of the BayFOR, the company Agrilution worked together with the ESP in analyzing the possibilities and the potential methodologies which could fit with the objectives of the company. The design of the new product, including new materials, aesthetic, functionality and energy efficiency aspects were at the centre of the secondary advice service, but also the internal management of this new company and the impact of the project in the European agriculture and environment.

Results of provided service / expected changes after implementation of eco-design recommendation

The most relevant results are the selection of the better eco-design tool which enables the team to check and review many aspects of the product they didn't think about before. The use of the tool "Design thinking" determined the review of some new point that didn't come up before.

Potential further use of the provided service / expectation for the future

The registration of the company as client of the data base of new materials which is being used in the Project IMAGEEN is quite possible and the further collaboration with the ESP when new products would be put into the market, planning together the whole life cycle of the product from the conception to the end of the electrical device and its impact in the environment, passing through the external design of the machine.

GREEN MACHINES AND MANAGEMENT FOR THE BEVERAGE INDUSTRY

The Krones Group, headquartered in Neutraubling, Germany, plans, develops and manufactures machines and complete lines for the fields of process, filling and packaging technology. The company's product portfolio is included, moreover, services in intralogistics, information technology and in-house valve manufacture. The company delivers products mainly for all kind of beverage companies (breweries, the soft-drinks sector and at producers of still or sparkling wines and spirits) and secondary in the food and luxury industry. This company is the best example of a family company which evolves and adapts itself to the new times, not only including new technologies and novelties in engineering, but also for its concept of competitiveness, based on sustainability and versatility (products, processes and management).

Description of the service provided by EEN/ESP

In the framework of a BayFOR consultancy about the funding possibilities at EU level for research activities, the IMAGEEN Project was described and the portfolio of tools was mentioned. The employees of Krones showed interest in being involved in the information and advisory activities because in line with the company policy. The company benefited from all raising awareness, information and first advisory services and in December 2014 they received the advanced support services in form of a deeply analysis and consultancy from a Bavarian ESP focused on its internal management tool "ENVIRO". They work together for two days long using different tools and applying different methodologies to arrive to effective and realistic conclusions.

Results of provided service / expected changes after implementation of eco-design recommendation

After reading the final report of the ESP, the company KRONES is expected to study internally how to introduce more eco-design oriented specifications in their internal management tool. To this scope, the staff of the Innovationmanagement Unit will have some meetings with responsible of other departments in order to propose new methodologies to create synergies oriented to a more eco-friendly design of new products, especially regarding the internal management of the company.

Potential further use of the provided service / expectation for the future

The company is expected to adapt its internal management tool "ENVIRO" for a more environmental friendly management of the firm. The work together with the ESP made possible to identify some aspects of the tool which could be still more resource efficiency oriented and could have an impact in the reduction of the waste generation of the company (Waste management).

LEAF REPUBLIC, GERMANY



SMALL START UP WITH BIG POSITIVE ENVIRONMENTAL IMPACT

leaf republic is a German start up which seeks to unleash the demand for new bio-based products and green solutions in the packaging sector. It intends to be a catalyst for green economic growth in Europe. The main product of the company is a new 100% green oil-based packaging material with the bio-based alternative LEAF – leaves of the LEAF-tree in India which are traditionally used for food containers. Taking full advantage of Eco-Innovation Project: “Bio-degradable, sustainable Food Containers out of leaves and PLA” 4 the native properties of the leaves, leaf republic tries to speed up the creation and growth of the new emerging market of bio-based, sustainable packaging material.

<http://www.leaf-republic.com/>

Description of the service provided by EEN/ESP

After taking part in all of the sensitivity and raising awareness activities organised by the BayFOR in the frame of the IMAGEEN Project, they benefited also from the services and knowledge of a Bavarian ESP. They expressed their interest to study, with the support of the BayFOR, which tool would be the best to be implemented in this new company for the ecological design and production of their full-green food packaging solution. They work very intensive together with the ESP (telephone calls, visits to the company, meeting by BayFOR premises) defining internal processes and management methodologies which could help the Leaf Republic staff to improve the first results of the product prototype in order to make it marketable and at the same time 100% environmental friendly, from the concept to the recycling / disposal. The main difficulty of the company was to work with environmental standards at large scale. The analysis of the materials and the processes to generate different products with different characteristics in base on the need of the client was also a big issue during the full training services.

Results of provided service / expected changes after implementation of eco-design recommendation

One of the main results was that it was desirable to improve the internal communication strategy in order to accelerate the processes and to save time and resources during the conception of a new product. Also the inclusion of new materials (contact with food materials) in the portfolio of the company was a topic and the testing activities of the properties of them should be improved.

Potential further use of the provided service / expectation for the future

The new learnt skills about new methodologies and approaches to create new eco-friendly products in a 100% ecological way will influence the work of this company in the future. As it is a start up, they have a big room to try different work ways and test new management dynamics, for example, the Life Cycle Assessment. In this sense, a further future collaboration with BayFOR and the ESP is foreseen in order to maintain them update about the next steps in the growth of the company.



BEST PRACTICES

FIORITAL, ITALY

FROM CARBON FOOT PRINT TO PACKAGING



Founded in 1979, following a path of growth since the 60s from simple storage- trading fresh fish products to trade fresh sea-food products. Thanks to high capacity and a strong entrepreneurial spirit of innovation, become an industry leader in the Italian market and on the foreign one. In those years born the division DALMARE to seize new market opportunities related to the demand of new packaged products and quick to prepare for the mass distribution.

Description of the service provided by EEN/ESP

The analysis developed on the production chain of Fiorital allowed company to evaluate new alternative materials for packaging. In addition have been evaluated different configurations for packaging in terms of different shapes, color and retention properties Fiorital also intends to exploit commercially the efforts done and that are going do make to improve the environmental impact of products.

Results of provided service / expected changes after implementation of eco-design recommendation

Fiorital is considering to follow the path that will let company to develop its packaging and in some cases the development from scratch of a new packaging more eco-sustainable having a look on esthetic but also on power of conservation during the transport of goods to be commercialized.

Potential further use of the provided service / expectation for the future

Fiorital, taking advantages of the service offered by this project consider to investigate all possible measures to improve the whole life cycle of their products in particular the phase of packaging. Having already developed an initial carbon footprint, the next steps see the extension of the results obtained for the salmon but also for other products of the tip marketed by the company.

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INTERNOVA PACK, ITALY



SKINNY PACK: THE FUTURE OF PACKAGING

Founded in 1980 as a company dedicated to the design and manufacture of industrial molds, Internova started in the early 90s, thanks to the intuition of the owners to specialize company in injection molding of polypropylene containers typically directed to the food industry, becoming in a short time a valid and concrete point of reference on the national and international food packaging.

The experience gained over the years with the use of the multilayer film IMS has enabled Internova to develop and to patent a new concept, called Skinny pack.

What's the Skinny Pack: is a technology that allows to obtain a packaging with the characteristics of lightness, flexibility and eco-sustainability by reducing the use of plastic by up to 60% compared to a traditional packaging.

The innovation of this technology is based in putting together the concepts related to the functions characterizing the packaging i.e functionality, protection and conservation, logistics, information and ease of use with the concept that underlies the sustainability or the minimization of the use of materials, which then results in the end a smaller amount of waste to be treated.

From these assumptions started the collaboration with a known leader in the production and marketing of vegetables, which has decided to marry the technology devised by Internova to revisit and improve the quality standards of the packaging of its product line tip.

Description of the service provided by EEN/ESP

The challenge that the two companies have set was to be able to reduce the environmental impact of packaging by reducing the amount of plastic used to make it.

The goal was to get but not only build a light and flexible packaging but also environmentally sustainable. To this end have been studied all the considerations related to the life cycle of the product and the potential reduction of environmental impacts in terms of CO₂.

Firstly were evaluated both economic and environmental benefits associated with the use of a smaller amount of material. Then were studied benefits related to storage and transportation of the packaging: packaging lighter and stacking are able to guarantee easier handling and the use of a smaller number of means of transport. Finally, we have studied the technical procedures to fit the shape of the packaging without having to invest in new machinery.

Results of provided service / expected changes after implementation of eco-design recommendation

The development of new packaging has required at least a year and half during which the two companies have collaborated closely. It was necessary to make numerous tests on the shape of the package, both on

the label and on the supporting structure.

The shape of the pan has been amended slightly to be suitable for the implementation through the new type of technology. Have been done numerous tests on various types of film to find the right combination of thickness and characteristics. Finally the structure has been changed several times to obtain the best results in terms of mechanical properties necessary to withstand the stress, also in terms of affinity with the tag.

Essentially this was a project that involved all areas of the company, from design to construction of mechanical equipment, from the injection techniques to robotics. This has allowed the development of new molds, the improvements of some machines and the introduction of new system handling control and management of the production line.

Potential further use of the provided service / expectation for the future

The outcome of the collaboration was excellent as evidenced by the numerous certificates received.

Here are data that have been achieved:

- weight reduction of 40% compared to the original packaging;
- 40% reduction in CO2 emissions, considered the whole life cycle;
- fully recyclable packaging;
- functional features retained from the original.

Today, in a global market where the demand for sustainable and eco-friendly products is becoming increasingly important and decisive, the Skinny pack can then truly be defined as the packaging of the future.



LA BRENTA SRL, ITALY

CLOSURES OF BOTTLES MORE ECO-FRIENDLY AS POSSIBLE

Since 1971 Labenta produces closing devices for the beverage industries. Thanks to its presence in the national and international scene and also thanks to international branches, Labenta covers all marketplaces.

The company mission is to “gain and to maintain customers with love; become a leader in product innovation and service, think to conceive innovative closing devices for man, respecting the environment”.

The continuous investment on a combination of “people & technology” is the basis of its present and future. Flexibility is the main feature and the key of the success of the company.

The company is specialized in the production of caps with modern and automated area, follows the “lean production” philosophy to optimize time and costs; the highly qualified and trained personnel constantly monitor the production process; the laboratory carries out continuous tests throughout the whole production flow, ensuring the compliance of the batches produced.



Labrenta, which is producing caps for the beverage industry for over 40 year, has established itself as a leading production company in the international market, creating innovative and high-quality closing devices, as well as a company historically sensitive to environmental issues.



Description of the service provided by EEN/ESP

Labrenta proves that today it is possible to produce highly sustainable caps as a result of a comparison study on CO₂ emissions in the production of cork and synthetic stoppers. We performed a study of one of the most debated environmental issues at the international level, the carbon footprint production that comes from a LCA (Life Cycle Assessment). This comparative research made it possible to estimate the CO₂ emissions produced by the company. The study made it possible to quantify the potential environmental impact of the two processes, allowing Labrenta to identify the stages of the life cycle of the caps that most impact in terms of emissions according to their chain of reference. The research carried through by the analysis of the life cycle (Life Cycle Assessment) of the two caps, from the production of raw materials to disposal, has shown that synthetic corks in general have a greater environmental impact of emissions compared with corks. The estimated total quantities of CO₂ equivalent per gram of product is quantifiable in 14.8g for the synthetic cork and reach even the value of 'negative' in -15.6g for the cork. In the latter case it is important the contribution of the estimated absorption of plants that use CO₂ for their growth.

Results of provided service / expected changes after implementation of eco-design recommendation

From several years the company is demonstrating to be sensitive to environmental issues, energy efficiency and eco-design. They follow and develops internally the evaluation of alternative products that can be used evaluating specialized databases on the new materials. The company has proven to be helpful and sensitive to eco-design and IMAGEEN project and assess the possible deepening further analysis over the entire life cycle of a product or products sold.



Potential further use of the provided service / expectation for the future

It is stressed how further improvements could result from the creation of a supply chain for recycling or recovery of corks that today often end up in the "non-recyclable dry."

Serbia BEST PRACTICES

ART IVAL, SERBIA



PREPARING THE COMPANY FOR CERTIFICATION ISO 14 000

Art Ival was established in 1992, and it is specialized for the production of high quality chocolate products. Production brand "Premier", which is protected in the Intellectual Property Office of Serbia, under No. 55990, represents a large number of chocolate pralines, truffles and dragees of premium quality. The company introduced standards verified by certification bodies "Quality Austria" and the International Association of certification bodies "IQNet" for the quality management standards ISO 9001:2008, and the control of critical points in food production, HACCP.

Description of the service provided by EEN/ESP

The company took part in all our workshops and during the visit, the company has expressed a desire to be certified ISO 14 000 and it was agreed to help the company to set standards relating to the environmental protection. Life cycle of the product was analyzed and environmental service provider established the areas where the improvements can be done. Especially, attention was paid to the waste management and disposal. Since the company produces the food it is very important that the packaging keeps food safe from outside influence, hence some new eco-materials were presented to the company management.

Results of provided service / expected changes after implementation of eco-design recommendation

With the very small modifications that were suggested by environmental experts the energy efficiency improvement has been achieved. This way the company decrease the costs. The ESP gave suggestion how to improve waste management and waste disposal and this way the negative environmental influence was decrease. The company implemented a systematic approach that will achieve objectives related to environmental protection and, also, provide evidence that it has achieved the objectives set, in order to get ISO 14000 certification.

Potential further use of the provided service / expectation for the future

We are expecting that during next year this company will be certified for ISO 14000 standards.



DAIRY "PANČEVO", SERBIA

PREPARING THE COMPANY FOR CERTIFICATION ISO 14 000

With 70 employees, dairy "Pancevo" is a medium-sized company that is specialized in the production of milk, yogurt, and cheese. The company has intensively developed and introduced new plants for the production, during the last three years. During the process of innovation they were taking into account the environmental protection and trying to decrease negative impact on the environment. So far, they have HACCP and ISO 9001 standardization, and the plan was, with the help of expert, preparation for 14000 standards.



Description of the service provided by EEN/ESP

The company took part in our workshops and also, we visited the company. During this visit the main subject of ESP analysis was life cycle of the products, waste management and especially disposal of milk which has passed its expiry date. Main duty of environmental service provider was to identify and control the influence of all company activities, products and services to the environment. The company also was informing about new eco packaging and new materials.

Results of provided service / expected changes after implementation of eco-design recommendation

The environmental service provider gave suggestion how to improve waste management and waste disposal and this way the negative environmental influence was decrease. Since the company was preparing for introduction of ISO 14000 standards, the ESP helped implementing systematic approach that will achieve the objectives of environmental protection.

Potential further use of the provided service / expectation for the future

We are expecting that during next year this company will be certified for ISO 14000 standards.



Slovenia BEST PRACTICES

MERCATOR EMBA, SLOVENIA



A SYSTEMATIC APPROACH TO ECO-DESIGN PACKAGING

Mercator Emba is a medium-sized company which has evolved around foodstuff packaging. Their main products are coffee brands "Santana" and "Loka", instant mixed drinks and hot chocolate "BenQuick", dessert additives "Sweet Sin", dried fruit and Sun Nuts, and products distributed B2B such as fillings, drink mixes and syrups.



Due to their diverse line of finished products, the company utilises a large number of different packaging materials. Primary packaging usually consists of plastic, which can be comprised either from polymers or composite materials.

In 2011 the company switched from polyvinyl chloride, or PVC, to polyethylene terephthalate, or PET, packaging for their instant cocoa product line to secure collection and recycling of waste packaging being discarded by consumers in households. The collection and recycling of PET packaging is well established, while similar waste management of PVC is not assured. This transition proved very difficult as many changes and adaptations were required both to their packing line and the transport of their products.

Description of the service provided by EEN/ESP

The company maintains IFS and ISO 9001 certification and is contemplating ISO 14001 certification, as it is aware of how important consideration of environmental impacts of products throughout their lifecycle is, together with the incorporation these aspects into product design and development. Unfortunately, improvements are often linked to changes in technology or packaging lines, requiring additional investment. Packaging prevention at source is their primary goal, with an emphasis on cheaper and lighter materials as well as more simple materials containing higher shares of recycled materials or materials that are more easily recycled. They try to work with local packaging producers. Due to the companies wide array of products and subsequent packaging, some of the environmental goals can be counterintuitive. As was mentioned the company recently made a transition from PVC packaging material, not supported by a public system for collection and recovery to PE packaging material, where such a system is implemented, in order to improve their packaging environmental footprint. They are interested in new materials, due to which a search was made for high performance bio-based packaging in the MaTech database. Some concern was attributed to the fact that collection of new materials is not supported by a public collection and recovery system. New bio-based plastic materials which can be composted

must be appropriately marked in order to not contaminate the plastic waste stream, which is collected separately and recycled. These new materials are also much more expensive than regular plastics, which is another negative aspect. The company was advised on ISO 13428 standard for minimisation and resources efficiency checkpoints and possible packaging efficiency indicators.

Results of provided service / expected changes after implementation of eco-design recommendation

The company is aware that product packaging demands and environmental packaging aspects can be contradictory and are more easily managed, if they are assessed in a systematic manner. This systematic approach is supported by ISO standard 13428 on source prevention and minimisation. It is also beneficial if packaging characteristics are expressed as indicators which can be incorporated into the general management system to be assessed, compared and evaluated. Though the company applies packaging standards, an introduction of indicators is an opportunity to reassess their practices as both measures were supported by IMAGEEN tools and consultancy; as was the search for an appropriate substitute bio-based material with the database provided by MaTech.

Potential further use of the provided service / expectation for the future

The company is mindful of increasing consumer awareness concerning packaging's environmental impacts and eco-design. They are determined to design packaging which is easy to manage, may be reused or resealed, and is easily emptied. Finally their packaging also needs to be attractive, as it contributes to consumer brand recognition and encourages consumers to choose their product. These aspects will be evaluated through indicators and assessment procedures, which the company can choose and develop in greater detail through its systematic approach to packaging management.

PLANIKA DAIRY, SLOVENIA

RESOURCE AND ENERGY EFFICIENT MILK PACKAGING

Planika Kobarid Dairy produces a number of brand products such as milk, butter, sour milk, kefir, cream, whey, cheese curd and buttermilk and other products such as ricotta and cheese with a natural crust (Tolminc and Planika) or aged in wine from the Brda region and salted with salt from the Piran salt-pans (Kober, Brincl and Bric). The dairy is owned by the Tolmin agricultural cooperative and it buys milk from local dairy farmers living in the surrounding hilly and mountainous areas of the Tolmin, Kobarid, Bovec and Bohinj municipalities. The Tolmin area is known for its 17 high mountain pastures where cattle are left to graze on lush mountain grass during the summer. The dairy maintains an extremely high quality of milk by combining ancestral tradition with modern technological knowledge.

The dairy complements its commitment to environmental preservation through its packaging choices. Planika was one of the first companies in Slovenia to begin selling milk in transparent PET plastics. They are known for their milk available in glass bottles and are the only company in Slovenia which still use PE/PP milk bags. The PE/PP milk bags have a low mass of only 6,6 g (per 1000 ml of milk), making it environmentally low impact from many perspectives, ranging from resource efficiency to reduced energy consumption during transportation. Regardless of its low environmental impact, the PE/PP milk bag packaging is less inviting to customers as it is not so user-friendly (it is not stand-alone and cannot be resealed). The dairy applies composite packaging material from aluminium and paper for its butter packaging and PE tubs for its cheese curd packaging.



On site, the dairy implements a system to collect different packaging waste streams separately. Before transport the collected waste materials are bailed. In 2013 Planika Dairy was awarded the Resources Saved Certificate 2013 by Interseroh, which is an extended producer management organisation for packaging in Slovenia.

Description of the service provided by EEN/ESP

The dairy complements its commitment to environmental preservation through its packaging choices. Planika was one of the first companies in Slovenia to begin selling milk in transparent PET plastics. They are known for their milk available in glass bottles and are the only company in Slovenia which still uses PE/PP milk bags. The PE/PP milk bags have a low mass of only 6,6 g (per 1000 ml of milk), making it environmentally low impact from many perspectives, ranging from resource efficiency to reduced energy consumption during transportation. Regardless of its low environmental impact, the PE/PP milk bag packaging is less inviting to customers as it is not so user-friendly (it is not stand-alone and cannot be resealed). The dairy applies composite packaging material from aluminium and paper for its butter packaging and PE tubs for its cheese curd packaging. It is interested in bio-based compostable materials for packaging. The Matech database was searched for a possible substitution. Further inquiries proved the possible substitute material is much more expensive than the existing material used. The company was advised on ISO 13428 standard for minimisation and resources efficiency checkpoints and possible packaging efficiency indicators and will be able to use these tools to assess future ideas and changes.

Results of provided service / expected changes after implementation of eco-design recommendation

Calculation of packaging indicators onsite displayed the possibility to improve one of the packaging systems (primary, secondary, tertiary packaging) and reduce transport costs by approximately 15%. This possibility is now being verified, with regard to possible impact on product damage and other requirements.

Potential further use of the provided service / expectation for the future

The service laid out a platform to include material and energy efficiency indicators to evaluate future packaging developments in light of these eco-design parameters.

Plastic packaging is often under a lot of scrutiny from today's consumers due to the general public perception of plastic as a fabricated material, but the company's choice of PE/PP plastic bags for milk can be rationalised with a number of environmental benefits, such as resource efficiency, energy efficiency, low carbon footprint etc. Their choice was re-evaluated by the environmental service provider through ISO standard 13428 proposed check points on source prevention and minimisation. As the packaging is low weight it is also it has very good material efficiency indicator results as well as the filled packaging volume indicators of primary packaging, both assessments were supported by IMAGEEN tools and consultancy.



PANORGANIC, SLOVENIA

PACKAGING TO SUPPLEMENT INTEGRATED AND ORGANIC FOOD PRODUCTION

PAN ORGANIC



PanOrganic was founded in 2011. It is evolving from a medium-sized farm in the Pomurska region to a leading agricultural holding, producing fresh, high quality products. Their product range consists of garlic produced in Slovenia: trademark Česnek, Goji berries: trademark Goji, American blueberries trademark: Svet Borovnic and beans produced in Slovenia: trademark Fižolček

PanOrganic applies new technologies and innovative production methods which are in harmony with nature during the subsequent stages of fruit and vegetable growth, storage, treatment and processing, thus supporting the transition from traditional agricultural approaches to integrated and organic production.

They are especially proud of their garlic production and processing. The growth conditions of garlic are carefully planned. Appropriate storage of garlic is of vital importance as it affects its flavour and nutritional content. The garlic does not come into contact with any chemical preservatives, hormonal regulators or radiation to extend storage. Česnek is available in shops from July to March, due to its specially adapted growth in controlled conditions enabled by specialised mechanisation.

Packaging is extremely important for product distribution and consumer recognition. The garlic is packed in plastic mesh with a plastic label to avoid combinations of different materials, thus supporting recycling. They are currently contemplating the use of biodegradable packaging mesh. Garlic powder and chips produced by PanOrganic from their locally grown garlic is available in originally designed glass jars, which are easy to empty, clean, reuse and recycle, while preserving the product and having an eye-catching effect on consumers.

Description of the service provided by EEN/ESP

Packaging is extremely important for product distribution and consumer recognition. The garlic is packed in plastic mesh with a plastic label to avoid combinations of different materials, thus supporting recycling. They are currently contemplating the use of biodegradable packaging mesh. PanOrganic was supplied with information on a local PLA supplier producing mesh. Substitution feasibility was evaluated, within the service provided through IMAGEEN.

Information was also supplied on the packaging standards and legal demands. With product output, the quantity of packaging used is increasing, leading to future possible legislative obligations linked to the amount of packaging placed on the market annually. Requirements are negligible for below threshold packaging quantities and increase with packaging output, consisting of a statement on packaging, reporting, extended producer responsibility fees and packaging taxes. Through optimisation of the packaging system for one of the products, a 10% cost saving was recognised through the calculation of packaging indicators.

Information was also provided on packaging standards EN 13428, EN 13429, EN 13430, EN 13431, EN 13432 and how to implement them especially with regard to the information required in the packaging conformance statement explained in standard EN 13427.

Results of provided service / expected changes after implementation of eco-design recommendation

The technical and economic feasibility of bio-based materials will need to be assessed, especially

as bio-based packaging is twice as expensive as comparable conventional plastic packaging. In line with production growth the company is aware of obligation thresholds and legislative implications and will be prepared beforehand.

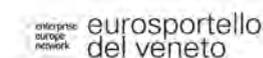
Potential further use of the provided service / expectation for the future

The project was a focal point for networking multidisciplinary professionals along the food and beverage packaging value chain. As PanOrganic is such a young, evolving enterprise, it was recognised during the course of project activities that they could benefit from a distinguishable packaging with a strong environmental tone for Česnek. Recognisable packaging could validate the choice of more expensive, bio-degradable PLA packaging. A contact PanOrganic and the Ljubljana Academy for Art and Design was instigated. Students were given a design brief for garlic packaging as one of their assignments; their ideas will be presented at the final conference in Ljubljana in December.





Business Support on Your Doorstep



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