

*GPEC 2004 Paper Abstract #39:*

**Title: Environmentally Conscience Production of Thermoformable Sheet and Film Products**

Author(s): Siegfried Lackner, Senoplast Klepsch & GmbH Co., Austria

For the 47-year old company, pro-active environmental protection is a declared aim backed up by impressive achievements: the planting of extensive green areas and a sustainable biotope (1978), the Austrian industry award for environmental protection (1985), the implementation of ISO 9001 and 14001, and most recently the Austrian Environmental Reporting Award (2001). Such recognition has only strengthened Senoplast's resolve to continue working for a healthy and beautiful natural environment in the province of Salzburg (Austria).

As a firm believer in the climate alliance, Senoplast has signed up to a voluntary reduction of greenhouse gas emissions. Its new biomass thermal energy facility enables waste heat from the manufacturing process to be used purposefully, creating a symbiosis between production and heating operations. Throughout the year, a heat exchanger captures waste heat from the production process and turns it into hot water at a special plant for 86 public and private sector customers. With annual mid-term savings of 200,000 liters of heating oil, CO<sub>2</sub> emissions are drastically down, resulting in improved air quality.

Such measures also protect the amphibians living around the company site. A new amphibian control system has been developed in-house to protect the biotope, which now borders on a busy traffic and employment area due to the expansion of the commercial zone towards the center.

## Environmentally Conscience Production of Thermoformable Sheet and Film Products



Author: Siegfried Lackner  
46 years old  
environmental management by Senoplast Klepsch & Co Gmbh & Co KG

Senoplast is a part of the Klepsch-group ([www.senoplast.com](http://www.senoplast.com))

In this report I will show you **who** we are, **what** we make, **where** and **how** we do that, and above all, **how** all this fits into a **sustainable strategy**.

### Who we are:

Senoplast is the core business in the Klepsch Group.



Originally set up as a purely commercial company by Mr Wilhelm Klepsch in Austria's Zell am See back in 1956, Senoplast Klepsch & Co has now been trading for some 47 years.

Company name:	Senoplast Klepsch & Co GmbH & Co KG
Main site:	Piesendorf / Province of Salzburg / Austria / Europe
Secondary site as 100% subsidiary:	Queretaro / Mexico
Number of staff:	370
Sales at main plant:	~ USD 100m
Size of main plant site:	872,000 square feet (81 000 m <sup>2</sup> )
Developed area at main site:	140,000 square feet (12 985 m <sup>2</sup> )
Product:	Thermoformable co-extruded plastic panels and films (semi-finished plastic products)
Product name:	senosan®

### What we make:

Senoplast manufactures semi-finished plastic products in the form of sheet and films. The actual end-product is created by our customers through thermoforming. Our thermoplasts can be used in a wide variety of ways. Six sales divisions have been set up to handle products made from our thermoplasts.

### Where we make our products:

We operate from two production sites. Our main facility is based in Piesendorf / Province of Salzburg / Austria / Europe. The second is in Queretaro / Mexico.

### How we produce them:

The production process is centred on **co-extrusion**. For raw materials, our plants source granulates from leading manufacturers of plastics. These are then 'transformed' into panels and films by means of wide slot co-extrusion.

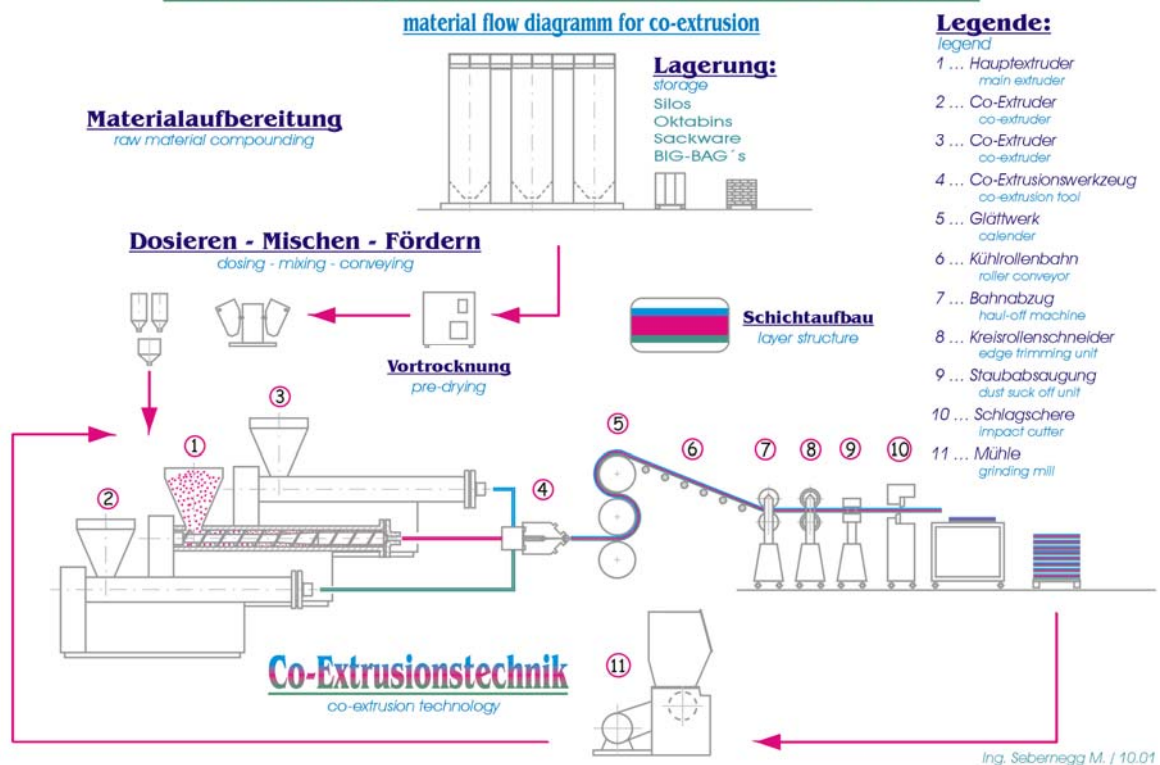
In its use of technology, SENOPLAST is a market leader when it comes to manufacturing sheets and films made of PS, ABS, PET, special kinds of multilayer coextrusions in PS/PS, ABS/ABS, ABS/PMMA, or other synthetic products made from such materials in accordance with the specific requirements of our customers.

The granulate is delivered to Senoplast in silos transported on the back of trucks, though we intend to revert to rail consignments in the near future.

The first step in the production process may or may not be necessary. It consists of the preliminary drying of the granulate, and is followed by dosing and mixing.

The most important units in the process of transforming the granulate into sheets or films are the main extruder and its co-extruders, the extrusion tool, the smoothing roll, the cooling role line, the line outlet, the circular roll cutter, the dust extractor and the cutter.

## Materialfließschema für die Co-Extrusion



Any peripheral cuttings and production shavings are reground in the mills and immediately fed back into the product.

This is how we produce over 43 000 tons of synthetic semi-finished products each year.

The name senosan® stands for excellent quality in terms of sheets and films. It also stands for an environmentally friendly and virtually waste-free form of production. Above all, when it comes to the recycling field, Senoplast offers a wide range of products that meet increasingly stringent requirements in terms of environmental compatibility and reusability. senosan® semi finished products can be used in a virtually unlimited number of ways.

The technical plant and equipment we use was for the most part designed, developed and built in-house.

The requirements of our customers constitute the benchmark for our services. Senoplast has been certificated according to ISO 9002 since December 1992 and to ISO 9001 since March 1997.

## How we do this in terms of sustainability:

For the benefit of our customers and interested sections of the public, we set out our responsibilities for pro-active environmental protection in a documented environmental management system, which has been externally audited in accordance with ISO 14001 since autumn 2000.

In doing so, our aim is to subject our previous achievements to an objective review and systematically improve them on an ongoing basis in accordance with an internationally recognised set of standards.

So we have set our own environmental policy:

- At Senoplast, safety and environmental protection can only be achieved through pre-emptive action and our own sense of responsibility.
- Safety and environmental protection are assigned the same priority as our corporate goals.
- Above and beyond our compliance with statutory regulations, we work on site to formulate, pursue and audit our goals for achieving continuous improvements in environmental protection and occupational health and safety.
- We expect our members of staff to act with a high sense of responsibility and commitment.

## Milestones in our environmental protection strategy:

- We first developed an ecological action plan in 1982. Since then this has gradually been implemented or phased in at shop level over the years. We adopt a holistic approach that unites both economic and ecological perspectives to scrutinize our core operations and identify areas for improvement on an on-going basis.

- In 1985 we received the industrial environmental protection award for harmoniously integrating our site into its natural surroundings, for creating a biotope and for setting up a park on the factory site.



- After a brief period of preparation we introduced our quality management system in October 1992. It has now been certified according to ISO 9001.



- Since December 1999 we have been a 'climate alliance company', meaning that we pay particular attention towards achieving improvements that benefit the climate, such as our voluntary efforts to reduce the causes of CO<sub>2</sub> emissions.

- We received ISO 14001 certification in November 2000.

- We were delighted to receive the Austrian Environmental Reporting Award (AERA) in the 'Mother Earth' category for our environmental report in 2000, confirming it as one of the top three reports of its kind in Austria.
- One year later we achieved 2<sup>nd</sup> place in the AERA awards.
- Finally, in December 2002 and 2003 we managed to attain the coveted first place twice in succession for the 'sustainability and environmental reporting' category.



- In autumn 2003 we implemented a new waste heat utilisation system in connection with a biomass heating plant. The reason I mention this is because we are now able to achieve annual savings of some 53,000 gallons (200 000 litres) of fuel oil.

We are continuously devising and implementing projects. Our successes in the field of environmental protection have strengthened our resolve to gain official recognition for these precautionary and exemplary measures. We have made it our business to preserve the healthy condition and beauty of our part of the world, together with its recreational value, for our guests and ourselves.

Our environmental achievements are evaluated using internal criteria and through the internal and external audits that take place each year.

#### Communication:

Our business units are responsible for ensuring precautionary environmental protection at company level. At the same time, each of our staff bears a large responsibility for thinking and acting carefully and environmentally when dealing with resources.

Open dialogue and striving for continuous improvement are two pillars of an environmental policy best evidenced in the awareness and actions of Senoplast staff. In this connection, for example, we have two teams currently seeking improvements with regard to two important issues: ventilation at the workplace and reduction of dust emissions.

Our information is channelled through the quarterly company newspaper, notices, circulars and our in-house IBIS (Integrated **B**usiness **I**nformation **S**ystem).

#### The 'Seno Auxiliary Service':

The 'Seno Auxiliary Service' was established with all of the Klepsch staff in mind.

It is responsible for handling all kinds of social issues, including the provision of in-house medical services under the supervision of a qualified doctor and the leasing of equipment such as gurneys, crutches and sickbeds, etc., to the Kaprun Hilfswerk, a local welfare organisation.

We also conduct visits to hospitals and have just introduced the anonymous services of a psychotherapist.

The service staff are bound to absolute secrecy with regard to the services they administer.

#### The Senoplast Social Club (FZC-Aktiv):



The Senoplast Social Club is an institution, which was originally set up in 1975 for Senoplast and Senco R & D personnel to foster and improve the spirit of community among members of staff by organising joint leisure activities. Most of these company sports are funded at least in part by the Club.

The environmental program we are currently working on includes one substantial project:

#### Our waste heat utilisation system in connection with a biomass heating plant

The title we have chosen is 'Regional heat for Piesendorf – heat generation through biomass and the sensible use of waste heat from the Senoplast production process.'

The speciality of this project is the symbiosis between manufacturing operations and the biomass plant that supplies heat to 80 customers in the tourist resort of Piesendorf, which has about 3,200 inhabitants.

This chart guides you through our production process:

So to begin with, the material goes from our silos to the extruders and to the extrusion tool. When it reaches this stage, the plastic has been heated up to about 428 degrees Fahrenheit (220 degrees Centigrade). It's then pressed, or as we say calendered, between two steel rollers, which is where it obtains its surface characteristics.

And this is precisely the place where the thermal energy is released.

So this is how waste heat is created around the clock, 360 days a year.

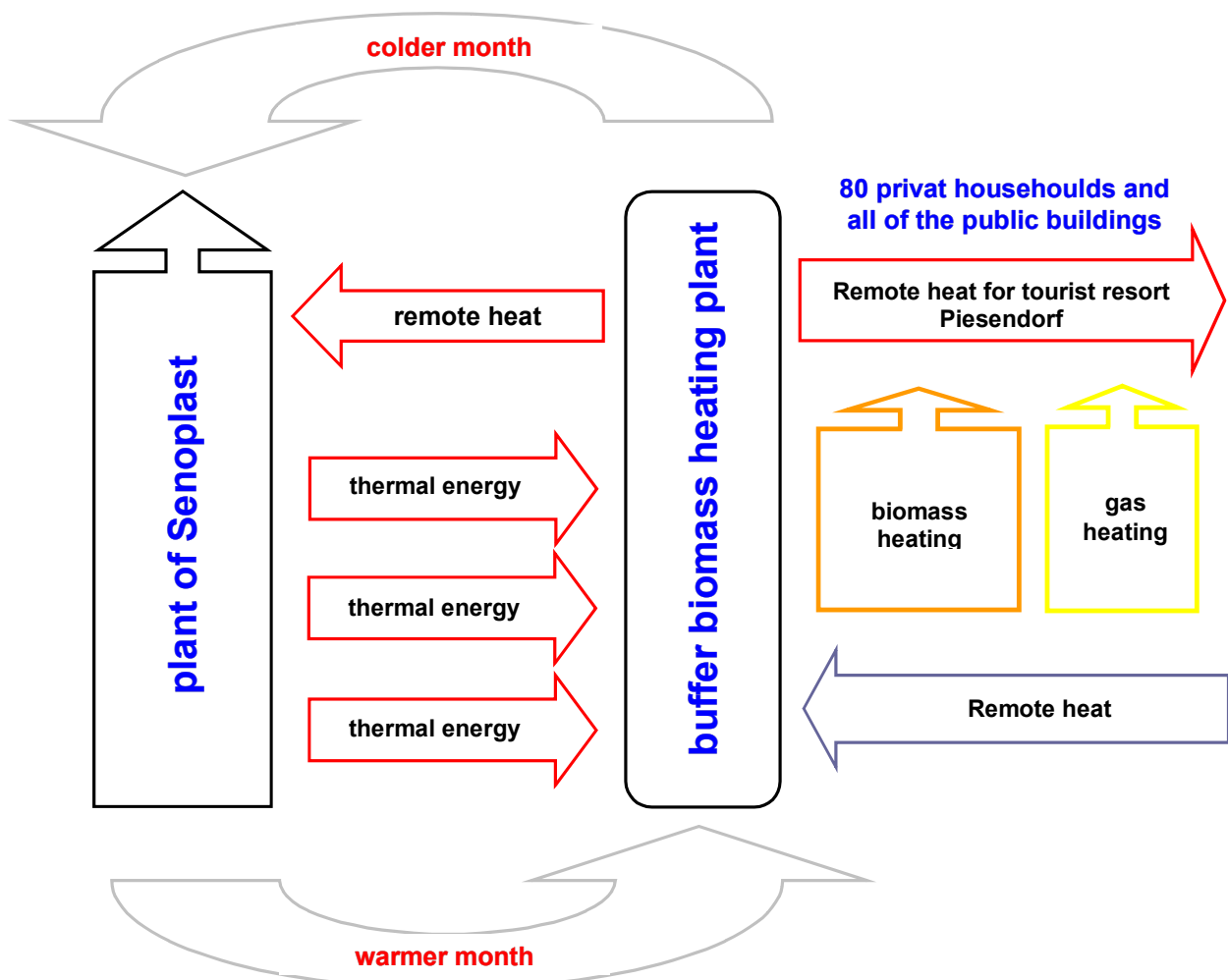
But the clever thing about the system is the heat exchange during the year.

During the colder months the heating plant supplies remote heat. In the warmer months of the year energy is 'given back', as it were, for supplying hot water via the biomass heating plant to 80 private households and all of the public buildings, such as the local council, kindergarten, retirement home and schools in Piesendorf.

This combination means that excess thermal energy in the summer can be stored up for the winter.

The system also displays a further number of synergies, such as the closed cold water cycle (clean water through processing reduces the incidence of faults in pumps, valves and heat exchangers) and the reduced amount of groundwater required for cooling following the release of energy.

Thanks to the substitution of some 53,000 gallons of fuel oil per year in the medium term, CO<sub>2</sub> emissions will be reduced by about 1 100 000 pounds (500 metric tons).



## Environmental costs in summarized form are re-assessed year by year:

The following costs are evaluated and compared:

- costs for waste elimination per unit of weight (kg) of finished product
- costs for education, training, communications, climate alliance, audits..
- costs for use of water (cooling)
- costs for running the external systems
- costs for investments in the environmental field

## Biotope and amphibian control system (ethics):

An integrated fire protection pond and biotope system was created when the plant was first set up in 1978.

In recent years the biotope has become one of the most important ponds in the region. It offers a safe habitat to some 500,000 amphibians.

The expansion of the commercial zone in Piesendorf has now moved the biotope to the centre of a very busy traffic and work area.

By fencing in the pond and installing a control system towards the neighbouring amphibian underpasses, we have been able to ensure safe and secure migrations between the various habitats.

Since existing control systems or enclosure fences were hardly an ideal solution, an in-house team at Senoplast developed a completely new kind of amphibian control system in the form of a multi-layer ABS composite.

We conducted a series of experiments to develop an ideal surface structure, which makes it impossible for the amphibians to bypass the fence.



- Benefits:
- cost effective
  - weather-proof
  - modular extension options
  - low maintenance levels
  - simple to install
  - environmentally friendly production
  - 100 % recyclable



## We are a climate alliance company:

What does that mean?

In 1999, we decided that we would fulfill the necessary criteria and join the climate alliance to demonstrate our solid commitment to environmental protection.

In order to become a climate alliance company and gain authorization to use the logo, organizations are required to take a number of climate-related measures. These are checked and monitored each year. The overall aim is to reduce the causes of greenhouse gas emissions, in particular those of CO<sub>2</sub>.

**To this end, a quantum leap occurred in 2003. As I mentioned before, the combination of the biomass heating plant and waste energy utilization is helping us save some 53 000 gallons of fuel oil a year. That means about 1 100 000 pounds less of CO<sub>2</sub> emissions.**



So that was a brief but representative look at Senoplast's environmental activities.

Our motto: We have a vision, lets do it!