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2011

English

# Z-ECO

ZIEGLER PAPER MILL

## Environmental Report 2010

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**ZIEGLER**  
P A P I E R

[www.zieglerpapier.com](http://www.zieglerpapier.com)





Dr. Reinhard Jäger, Production Manager  
and Head of the Environmental Management System

## DEAR READER

You have before you the eighth edition of Z-ECO, in which Ziegler Paper Mill informs its external partners about its environmentally relevant activities and achievements in 2010.

During the year under review, the markets once more proved highly volatile. While we were scarcely able to meet demand for our products in the first six months, the situation tailed off in the last quarter. For this reason, although the volume of paper supplied to customers was some 4% higher than in the previous year, when capacities had also been underused, it remained below the level budgeted. One factor contributing to this was the complete breakdown of our process control system in spring 2010, which totally prevented the production of paper for more than two days. The markets for raw materials, which have a decisive influence on our results, were also volatile. From mid-2009 to mid-2010, pulp prices climbed ever higher, although they tended slightly downwards towards the end of the year. But the prices of other raw materials, too, increased markedly as a result of the general climb on the commodities markets.

In view of this situation, over which we are unable to exert any substantial influence, we must be satisfied with a result for the year that was lower than that for 2009.

Thanks to better utilisation of capacities than in the previous year, specific volumes of fresh water and wastewater returned to normal. This was not the case with energy, however, where it was clearly demonstrated that the mix of paper qualities produced has a far from insignificant influence on the specific consumption of both electricity and gas. You will find details of this in section 2.3 below.

We take pride in the progress we have achieved in the realm of work safety; as far as industrial accidents during the year were concerned, we had the lowest figures for our sector in all of Switzerland and by far outstripped our goals in this respect.

## 1. ZIEGLER AT A GLANCE

Ziegler Paper Mill produces premium-quality wood-free fine papers for the printing industry and customised specialty papers for industrial processing. The headquarters and production facilities of this independent fine paper manufacturer are located in Grellingen near Basel, Switzerland.

Our premium products are sold in the following countries (previous year's sales figures in brackets): Switzerland 45% (48%), Germany 20% (19%), UK 8% (8%), USA 4% (4%), Austria 4% (4%), Italy 5% (4%), Holland 3% (3%) and France 4% (4%).

Other markets account for approximately 7% (6%) of sales. The country-by-country breakdown for 2010 shows scarcely any change over the previous year. Our domestic market of Switzerland continues to account for the lion's share of sales and will continue to do so in the future, even though this trend is weakening because an increasing volume of our specialty papers is being marketed worldwide. In the USA, we have been represented by our own sales company since 2001, while in Europe and Asia we work together with international trading companies.

PRODUCTION VOLUME	UNIT	2007	2008	2009	2010	DIFFERENCE 2009/2010
Gross production	tonnes	82 641	85 050	76 760	79 721	+ 3.9 %
Net production	tonnes	69 737	72 516	62 246	64 932	+ 4.3 %
Waste	tonnes	12 904	12 534	14 514	14 789	+ 1.9 %

FACTS 2010	
Business	Production of premium-quality, wood-free fine papers and specialties
Product lines	Corporate Design, Natural Design, CAD/Office, Specialties
Plant & equipment	Paper machine PM 3, slitter-winder, large-format sheet cutter, small-format sheet cutter; central power plant with gas turbine/waste heat boiler (combined heat and power plant)
Annual output	64 900 tonnes (sales volume)
Wire width PM 3	331 cm (trimmed)
Weight range	40-400 g/m <sup>2</sup>
Quality assurance system	ISO 9001:2000, Registration No. 08-342-047 (03.04.2008-02.04.2011)
Environmental quality system	ISO 14001:2004, Registration No. 08-342-047 (03.04.2008-02.04.2011)
Work safety system	OHSAS 18001:2007, Registration No. 08-342-047 (03.04.2008-02.04.2011)
FSC certificate	FSC-STD-40-004 (1.0), Registration No. SQS-COC-024310 (12.09.2005-11.09.2010) FSC-STD 40-004 (2.0), Registration No. SQS-COC-024310 (12.09.2010-11.09.2015)
Raw stock	Market pulps with FSC certificate and from other internationally recognised wood certification programmes. Transported exclusively by ship and rail.
Water	Own ground water well; high level of closed-loop recirculation
Workforce	180 people working days or shift work
Sales	approx. CHF 105 million
Investments	approx. CHF 4.1 million
Legal form	Family-owned corporation (AG) with share capital of CHF 1 million
Year established	1861

Although the production volume of paper supplied to customers rose by 4.3% in comparison with the previous year, it was markedly lower than the average for the past 5 years. The reason for this is that a good two days' production was lost in spring 2010 due to the breakdown of our process control system and because demand fell off in the 4th quarter resulting in the paper machine not being used to full capacity towards the close of the year.

## 2. USE OF RESOURCES

The specific consumption of fresh water, raw materials and energy provides a measure for the efficiency of our utilisation of resources.

### 2.1 Fresh water

Although fresh water usage during the year under review fell by only 0.3%, our markedly higher production volume meant that specific fresh water usage decreased by 4% and was thus clearly lower than 5 l/kg paper gross once again.

	UNIT	2007	2008	2009	2010	DIFFERENCE 2009/2010
Fresh water usage	m <sup>3</sup>	387 701	397 279	387 893	386 546	- 0.3 %
Specific fresh water usage	l/kg paper gross	4.69	4.67	5.05	4.85	- 4.0 %

## 2.2 Raw materials

During the year under review, 1.030 kg of raw materials was used to produce 1 kg of paper sold (without water component) compared with 1.029 kg the year before. This confirms a high level of efficiency in our usage of raw materials, which will become of even greater importance as the price of raw materials continues to rise.

It should be noted, however, that calculating all raw materials in bone dry terms always involves a degree of uncertainty due to lack of precision in respect of specific water content.

Losses are concentrated on wastewater, where solids flocculated in the pre-treatment plant are filtered out as paper sludge and soluble contents, primarily starch, are broken down in the municipal biological treatment plant.

	UNIT	2007	2008	2009	2010	DIFFERENCE 2009/2010
Specific raw material usage	kg bone dry/kg paper bone dry	1.028	1.027	1.029	1.030	+ 0.1%

## 2.3 Energy

Energy supply at Ziegler Paper Mill is based on a combined heat and power plant with a gas turbine. Electricity is generated thermally using co-generation with the gas turbine. Any extra electricity required is purchased from the public grid. The waste heat from the gas turbine is used together with additional heat from a natural-gas furnace to produce steam for the paper machine. As the gas consumption shown in this report covers both the heating needs of the paper machine as well as power requirements for the thermal generation of electricity, the total of energy needed is made up of the sum of purchased gas and purchased electricity.

Consumption of both electricity and gas was markedly greater than in the previous year because gross production was some 4% higher. But specific values were also above year-back levels. Although we had 10 days during the 2010 heating period when machinery was shut down and the gas turbine ran at base load in order to ensure the premises were adequately heated without any paper being produced, this accounts for less than 0.2% of gas consumption and is not the main reason for our higher specific energy consumption. This is far rather due to changes in the categories of paper produced since not all qualities require the same specific energy consumption. There are two major forces driving energy usage. In the case of electricity, it is pulp refining with some 1.5 MW installed capacity, plus the infrared electric dryer with 1 MW installed capacity, which is used for our coated papers. As far as gas is concerned, it is the volume of water that is vaporised in the

dryer section, which depends primarily on the dryness content after the press section. As the dehydrating efficiency of the wire and press sections decreases with increased refining, i.e. dryness content sinks, a higher level of refining automatically leads both to a higher consumption of electrical power of the refiners and also to higher steam usage for drying the paper in the dryer section and thus to a higher consumption of gas used to produce the steam.

Add to this the drying of coated papers using the electric infrared dryer and the result is a need for additional electricity. Our highly-refined categories of paper are tachograph paper (+ 20% higher volume than previous year) and Z-Release (+ 45% higher volume than previous year), as well as - to a lesser extent - Z-Evolution (+ 575% higher volume than previous year). Infrared drying is additionally used in the case of both Z-Release and Z-Evolution. Overall, 2,735 tonnes or 55% more of the three product groups mentioned above were produced than in the previous year. All three of these product groups are specialty papers that are in line with our corporate strategy of concentrating on specialties for niche markets. The higher the proportion of these more energy-intensive categories in the total volume of paper produced, the higher the level of specific energy consumption. This strategic situation confirms that we are correct to focus our efforts on improving environmental performance and energy efficiency in the future.

This focus makes good economic sense in view of the high cost of energy and the current uncertainty with regards to future CO<sub>2</sub> legislation.

	UNIT	2007	2008	2009	2010	DIFFERENCE 2009/2010
Thermal power production	MWh	30 538	31 106	28 938	30 956	+ 7.0%
Power consumption	MWh	38 651	40 404	36 703	39 572	+ 7.8%
Specific power consumption	kWh/kg paper gross	0.468	0.475	0.478	0.496	+ 3.8%
Gas consumption	MWh	150 026	154 338	142 237	148 973	+ 4.7%
Specific gas consumption	kWh/kg paper gross	1.815	1.815	1.853	1.869	+ 0.9%
Specific steam consumption	kg steam/kg paper gross	1.786	1.769	1.756	1.815	+ 3.4%
Total specific energy consumption (purchased electricity + gas)	kWh/kg paper gross	1.914	1.924	1.954	1.977	+ 1.2%

### 3. WASTE EMISSIONS

#### 3.1 Wastewater

The fresh water obtained from the company's own groundwater catchment system is used over and over again thanks to in-house recycling. After having been used repeatedly, the water is cleaned in the mill's own mechanical treatment plant which went into operation in 2007. In this plant, suspended solids are flocculated, almost totally removed by filtration and discharged as compacted paper sludge. During the year under review, the absolute volume of wastewater produced came to some 280,000 m<sup>3</sup> and thus represented the lowest level ever. As a result of increased production, specific wastewater therefore sank by 2.5% compared with the previous year and amounted to some 3.5 l/kg paper gross - a very good figure in comparison with other paper mills. On the other hand, the volume of solids in the wastewater was markedly higher and indi-

cates a lower level of efficiency in our pre-treatment plant. In point of fact, efficiency in pre-treatment depends on what categories of paper are produced and declines markedly in the case of coated qualities and ink-jet papers with cationic finishing. Since these qualities will be becoming strategically more important, there is need for action to be taken here to improve the pre-treatment process. As we must pay for the treatment of contaminants handled by the municipal effluent treatment plant, improving the volume of these is of definite commercial benefit. During 2010, too, the Office of Environmental Protection and Energy again took random samples to check the composition of our wastewater. Our waste treatment plant and the composition of the wastewater samples conformed to requirements. Before the clarified wastewater is returned to the ecosystem through surface water, it is also treated biologically at the ARA municipal treatment plant in Birsfelden.

	UNIT	2007	2008	2009	2010	DIFFERENCE 2009/2010
Wastewater	m <sup>3</sup>	290 043	287 361	287 593	280 544	- 2.5 %
Specific wastewater	l/kg paper gross	3.51	3.38	3.75	3.52	- 6.1 %
Waste solids	kg	55 670	26 270	26 880	33 134	+ 23.3 %
Specific waste solids	g/kg paper gross	0.674	0.309	0.350	0.416	+ 18.7 %

#### 3.2 Waste air

Significant quantities of waste air are produced by

- Ventilation and air-extraction of the paper machine and manufacturing halls: Although the presence of organic pollutants resulting from pulp and other raw materials can be detected, they are irrelevant as an emission. The fact that the waste air escaping into the atmosphere is visible is caused by the presence of condensed steam in the waste air.
- Generation of electricity and heat in the central power plant through the combustion of natural gas:

When talking about the waste air from our central power plant, a distinction must be made between

- the emission of the air pollutants carbon monoxide (CO), sulphur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>) and soot, all of which tend to have a regional impact and
- the release of the greenhouse gas CO<sub>2</sub> from fossil fuels, which has a global impact.

##### 3.2.1 Air pollutants CO, SO<sub>2</sub>, NO<sub>x</sub>, soot

Unlike the paper machine, the central power plant is very relevant as a source of emissions. For this reason, it is inspected by an official monitoring authority (Basel Air Pollution Control Office). Waste emissions must be monitored following alterations to the central power plant or every two years at least. Since they were last measured in December 2009, no inspection was necessary in 2010.

Monitoring report of 21.12.2009: all limits complied with.

##### 3.2.2 Release of fossil CO<sub>2</sub>

Heat and electricity are generated in the Ziegler mill by burning natural gas. This produces CO<sub>2</sub>, a gas which has a major impact on the environment.

As alternative technologies that do not depend on fossil fuels are not likely to be available in the near future, Ziegler Paper Mill relies on the solution that is best for the environment at the present time: a natural-gas-based combined heat and power plant with a gas turbine for generating electricity and a waste heat boiler for producing steam with emphasis on the best possible energy efficiency. The release of CO<sub>2</sub> is one of the most important environmental issues in the area of climate protection. For this reason, the Swiss government passed legislation in 1999 governing CO<sub>2</sub> emissions which requires a reduction in fossil fuel emissions of CO<sub>2</sub> resulting from energy generation. This should be achieved by means of voluntary agreements on the part of users of fossil fuels aimed at reducing their emissions to a set target. Users that do not enter into these agreements or do not reach the targets set have to pay a levy in respect of CO<sub>2</sub> from fossil fuels. After the failure of an industry-wide solution for the Swiss paper manufacturing sector under the leadership of the Energy Agency for Industry (EnAW), a Swiss organisation that was founded in 1999, Ziegler Paper Mill formulated its own reduction aims as an individual company. These were audited and recognised by the government. In accordance with its CO<sub>2</sub> legislation, the Swiss government allocates companies an annual CO<sub>2</sub> quota based on the CO<sub>2</sub> intensity achieved in comparison with that aimed

for in accordance with agreement targets. Actual CO<sub>2</sub> emissions are then deducted from the quota. In order for companies to pay no CO<sub>2</sub> levy, their CO<sub>2</sub> account must not show a

negative balance. Any surplus on the CO<sub>2</sub> account can be accumulated, sold on the market in the form of CO<sub>2</sub> certificates or offset internally – by supplying CO<sub>2</sub>-neutral paper products.

**REDUCTION TARGETS FOR ZIEGLER PAPER MILL [AS PER ENAW CALCULATION MODEL WITHOUT CORRECTION FOR COMBINED HEAT AND POWER GENERATION]**

	<b>STATUS 2000</b>	<b>ACTUAL 2008</b>	<b>ACTUAL 2009</b>	<b>TARGET 2010</b>	<b>ACTUAL 2010</b>
CO <sub>2</sub> output in t/a	27 992	30 559	29 184	26 184	29 828
CO <sub>2</sub> intensity <sup>1</sup> in %	100.0	83.2	87.8	98.0	86.5
Energy efficiency <sup>2</sup> in %	100.0	118.4	113.0	104.0	114.3
CO <sub>2</sub> quota in tonnes pa		36 144	32 541		33 789

<sup>1</sup>)  $100 \times \text{CO}_2 \text{ output} / (\text{CO}_2 \text{ output} + \text{reduction in CO}_2 \text{ output})$  <sup>2</sup>)  $100 \times (\text{TEC} + \text{reduction in TEC}) / \text{TEC}$ ; TEC = total energy consumption

As can be seen from the table above, since quotas began being allocated in 2008 Ziegler Paper has always had a significant positive balance resulting from the difference between our CO<sub>2</sub> quota and the volume of CO<sub>2</sub> actually produced, with our actual CO<sub>2</sub> intensity clearly lower than that targeted. To date, no CO<sub>2</sub> certificates have been sold from the CO<sub>2</sub> account. Instead, Ziegler Paper uses its very positive CO<sub>2</sub> balance to give customers the opportunity of obtaining some of our production volume as CO<sub>2</sub>-neutral paper.

### 3.3 Solid waste

Our waste management programme is governed by the motto: "Prevent – recycle – re-use!"

- The major waste product in paper production and finishing is the manufacturer's own paper scrap. Virtually all our scrap is recycled internally and forms a component in all our fibre recipes.
- The mechanical treatment plant also produces waste in the form of paper sludge. This sludge consists primarily of fibres and fillers. Since it represents a loss of valuable raw materials, it is our constant endeavour to minimise this loss by means of appropriate process controls. The year under review saw the production of 390 tonnes of paper sludge bone dry compared with 316 tonnes for the previous year (with an average dryness content of approx. 45%). Since 2007, the paper sludge we produce has been fermented to create

valuable, environmentally-neutral biogas in a biogas plant located near the mill.

- Waste from packing paper, cardboard, printed matter and spool cores is recycled externally as waste paper.
- Waste stretch film is also recycled externally.
- Wood waste from shipping and packaging is treated externally in a CO<sub>2</sub>-neutral thermal process.
- Waste materials from maintaining the infrastructure are collected, separated and the vast majority recycled externally. The only hazardous waste produced is used oil from machinery maintenance (lubricating oil/hydraulic oil).
- Our paper products can be completely recycled after use by our customers and contribute to the recovered fibre that is essential for maintaining the waste paper fibre cycle. This aspect is often completely ignored when ecological comparisons are made between paper products based on virgin pulp and those using recycled paper.
- Packaging materials from our paper shipments can also be dealt with by our customers using the same means of recycling and re-use cited above.

### 3.4 Noise

In the year covered by this report, no complaints were received from local residents. Noise emission limits along the perimeter of the mill site were complied with in full.

#### 4. ACCIDENTS

There were no accidents or other incidents that might have resulted in contamination of the soil or water (River Birs, groundwater) in the year under review.

#### 5. POLLUTION AND WORK SAFETY

In compliance with our legal obligations, but also out of respect for our employees and their health, we ensure the best possible standards of work safety and protection against pollution within the mill.

##### 5.1 Protection against pollution

Basically, it is noise pollution that can impact on operating personnel and we effectively combat this by distributing individually-customised ear protectors to staff and obliging them to wear these.

##### 5.2 Work safety

- In line with regulations, the safety commission (SIKO) staged four meetings.
- As is the case every year, an external audit was performed by the Swiss Accident Insurance Fund (SUVA).
- Various SUVA checklists were worked through by those responsible.
- During supervisory training, a STOP safety inspection tour was again made, during which any gaps in safety provisions were noted, documented and subsequently dealt with.
- A basic course in work safety was held for all new members of staff.

- There were also courses held for fork-lift drivers in accordance with our work-safety programme.
  - A repetition course on work safety was held during the annual training session for our shift workers, one of whose focuses was the use of reports on damage to equipment in order to prevent accidents.
  - The managers responsible in Technology and Production received training on accessing vats and containers.
  - A monthly notice displayed on bulletin boards provides staff with constantly up-dated information on the current status with regard to accidents.
  - Poster campaigns on the subject of safety with documentation material from SUVA were continued.
  - Instruction for our fire-fighting team was carried out in accordance with the 2010 training programme.
- There was a gratifying reduction in the number of industrial accidents. Both the number of accidents and the amount of working time lost sank to record levels. Our on-going efforts to improve work safety appear to be having an effect. Of course, there is always an element of luck involved in this positive result since the most common causes of accidents in the workplace are not operations-specific (stumbling, etc.). Although the 18 non-work-related accidents suffered in 2010 were fewer than for the two previous years, the number was still higher than our internal target of 12 accidents. These non-work-related accidents were primarily due to falls, sports injuries and DIY accidents.

	UNIT	2006	2007	2008	2009	2010 (TARGET)
Industrial accidents	Number	22	10	14	14	4 (10)
Non-work-related accidents	Number	17	13	19	22	18 (12)
Time lost due to industrial accidents	%	0.89	0.36	0.37	0.42	0.07
Time lost due to non-work-related accidents	%	0.59	0.26	0.24	0.16	0.30

#### 6. AUDITS AND LEGAL REQUIREMENTS

- In January 2010, a customer from the pharmaceutical industry carried out a supplier audit in accordance with the GMP standard for packaging materials, which resulted in Ziegler Paper Mill receiving certification as a supplier of paper for package inserts.
- In March 2010, the SWISS TS performed a monitoring audit of our combined system in accordance with ISO 9001: 2000, ISO 14001: 2004 and OHSAS 18001: 2007 standards. This confirmed that all the requirements for maintaining certification were met in full.
- During the year under review, internal audits were performed covering the following areas: incident management, improvement processes, human resources, marketing and sales, development, testing media
- In addition to this, in June 2010 the SQS, CH-3052 Zollikofen, carried out a recertification audit for the FSC-STD-40-004

(2.0) and FSC-STD-40-005 (2.1) chain-of-custody standards. The results of the audit were positive, which means that Ziegler Paper continues to be authorised to supply FSC products bearing the FSC label in accordance with the mixed-credit system. These products are subjected to thorough monitoring and come from forests run in full compliance with the principles and criteria of the Forest Stewardship Council (FSC).

##### Legal requirements

No relevant changes came into effect during 2010. With the termination of the wastewater agreement by Canton Basel-land with effect from 31.12.2009, Ziegler Paper became subject in the year under review to the wastewater legislation of the commune of Grellingen for the wastewater it discharges. Summary: All legal requirements in respect of both the environment and work safety were complied with in full; no matters are pending with the authorities.

## 7. ECOLOGICAL BALANCE SHEET

Specialised environmental consultants were commissioned in the two years prior to that under review to draw up an ecological balance sheet providing details of Ziegler Paper's environmental impact and carbon footprint, the results of which were presented in our environmental reports for the years 2008 and 2009. In the year covered by this report, the same consultants used data from 2009 to perform a study of emissions into both water and air in accordance with the criteria of the Paper Profile organisation. This methodology concentrates exclusively on the production process of the paper and the fibres used in this process (in our case pulp). This manner of inquiry ignores, for instance, the environmental effects of other raw materials used and of transport. It is a somewhat simpler form of examination than the ecological balance sheet, which takes into account all relevant factors "from cradle to grave". It does, however, have the advantage of producing concrete emission values that can be determined in accordance with standardised procedures and thus enables a direct comparison of specified emission parameters.

*The following emission parameters were determined*

### *Emissions into water*

- **COD:** chemical oxygen demand. Measure of the pollution of wastewater by oxidizable contaminants
- **AOX:** adsorbable organic halides. Primarily result in paper-making from bleaching pulp using chemicals that contain chlorine. No chemicals are used in making paper at Ziegler Paper Mill that can lead to the formation of AOX

### *Emissions into the air*

- **SO<sub>2</sub>:** sulphur dioxide. Paper manufacture at Ziegler Paper results in no sulphur dioxide since the natural gas which we use as fuel contains no sulphur. Cause of acid rain.
- **NO<sub>x</sub>:** nitrogen oxides. Occur during all forms of combustion in which air is used as a source of oxygen, therefore at the Ziegler mill, too. Primary cause of summer smog.
- **CO<sub>2</sub>:** carbon dioxide from fossil sources. Occurs during the combustion of fossil fuels to generate energy. Caused at the Ziegler mill by the combustion of natural gas.

EMISSION PARAMETERS	QUANTITY			
	ACTUAL	BEST CASE	WORST CASE	OPTIMAL CASE
COD (kg O <sub>2</sub> /tonne paper)	3.245	2.811	4.678	7.322
AOX (kg AOX/tonne paper)	0.065	0.018	0.134	0.038
SO <sub>2</sub> (kg SO <sub>2</sub> /tonne paper)	0.557	0.006	1.348	0.139
NO <sub>x</sub> (kg NO <sub>x</sub> /tonne paper)	1.814	1.342	2.800	1.632
CO <sub>2</sub> (tonne CO <sub>2</sub> /tonne paper)	0.504	0.464	0.557	0.575

The emissions resulting from the mix of pulp utilised in 2009 are shown in the ACTUAL column below. Details of quantities refer to one tonne of paper averaged for the year. Any fluctuations resulting from the production of different categories of Ziegler paper have not been taken into account.

As the ecological balance sheets drawn up in previous years demonstrated that the pulp materials used have a decisive influence on Ziegler Paper Mill's environmental impact, the above emission parameters were additionally calculated for different proportions of the pulp used. Data were originally collected for the Austrian Ecolabel, which allocates a weighted number of points for each emission parameter. The study therefore also determined the mix of the pulp used which resulted in the lowest number of points (Best Case) and the mix giving the high-

est number of points (Worst Case). Over and above this, the mix of pulp was also calculated which - taking into account all forms of environmental impact (calculated with UBP 2006 incl. forest valuation) - minimises overall environmental impact (Optimal Case). Particular attention was paid here to the aspects of forest management.

The results demonstrate that the optimum pulp mix varies depending on the weighting of the individual environmental effects. For instance, according to the weighting used by the Austrian Ecolabel practically the same number of total points results for the ACTUAL mix of the pulp and the Optimal Case mix despite differences in pulp composition. When the aspect of sustainability is considered, however, the Optimal Case mix is clearly the better choice.

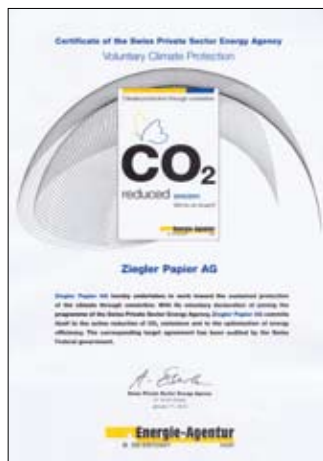
**8. ACHIEVEMENT OF GOALS**

The Management had set the following concrete environmental goals for 2010:

- Compilation of a report programming measures aimed at reducing wastewater, taking into consideration conditions for the cost structuring of wastewater charges from 2010 on.
- Achievement of goal:  
The report has been drawn up and shows that by using modern membrane separation technology a significant proportion of wastewater could be treated to produce a quality of water that could be recycled to a number of different user groups as a substitute for fresh water. Using less fresh water results in a correspondingly lower volume of wastewater. Economic analysis of this has, however, shown that given the situation prevailing today an investment in a wastewater treatment plant of this kind is not economical. The management has taken note of the report and may reconsider the solution in the event of changes to the economic situation.

**9. FUTURE OBJECTIVES**

- Environment:  
Pilot of a production-scale biocide-free system for combating slime: Traditional biocides as used by Ziegler Paper Mill are the raw materials with the highest toxic potential that are used in the manufacture of paper. Although they are used only in very small quantities, they are still detectable in the air, in wastewater and in the paper products. For this reason, their complete or partial replacement by a biocide-free system would represent a desirable improvement.
- Work safety:  
The target for 2011 is to keep the number of both industrial and non-work-related accidents lower than the corresponding 5-year average for 2006-2010.





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