



Printing company
Ecoprint
Environmental report 2008



E L F



Contents

Introduction	3
Methodology for the assessment of environmental impact	4
Ecological footprint	5
Environmental impact measured by the ecological footprint method	5
Waste	6
Electricity	7
Thermal power	8
Transport	9
Water	9
Office paper and other consumables	10
Consolidated table of the ecological footprint	11
CO ₂ emissions	13
Summary	14



Introduction

This is the second environmental report of the printing company Ecoprint, aimed at providing an overview of the impact of the company's activities and use of resources on the surrounding environment. Ecoprint is the first printing company to compile and publicize an environmental report.

In 2008, Ecoprint was the first Estonian company to be listed among the three finalists at the Business Environmental Awards Competition (European Business Awards for the Environment) organized by the European Commission! In the same year, Ecoprint was also nominated the Year's Environmental Performer in two categories, environmental management system and environmental friendly product (Green Print), by the Ministry of Environment.

The printing service Green Print (publications printed on environmental-friendly paper with natural colours) is a registered trademark since 2004. While also other printing companies produce publications made of recycled paper, Green Print also uses environmental-friendly printing inks, which are produced of rapeseed and soybean oil instead of petroleum, using a pine resin as binding substance.

Ecoprint is undoubtedly the leading printing company in the field of environmental awareness, not only among printing companies but also other businesses, because it seeks and continuously implements different environmental-friendly ways in their daily activities as well as in long-term investments. The difference between Ecoprint and most other businesses is in particular the attitude of the company's owners and management and their courage in implementing new solutions.

The new production and office building uses wind to produce electricity, rainwater for the irrigation system, and residual heat from the printing machines for warming fresh air and for space heating with the help of a heat exchanger in the ventilation system.

To counter-balance its environmental impact, Ecoprint plants trees with its entire collective and its more active customers each year. Thanks to its long-term experience, Ecoprint's staff is able to plant 4 000 young fir-trees in half a day.

Triip was the only Estonian printing company to be accredited with a FSC (Forest Stewardship Council) Supply Chain Certification, whose aim is to ensure the correct transport and processing process from felling the timber until the final product made of FSC forest-grown timber (timber originating in a forest managed according to the sustainable forest management principles – logging is legal, the forest ecosystem is not damaged during logging and no illegal or child labour is involved). Only companies with a corresponding certification may use the FSC logo and / or its brand name to label their products. For each industry sector, including for printing, individual requirements have been established.

In the preparation of Ecoprint's environmental report, the ecological footprint and the CO₂ emissions measurement methodology was used. Longer and more specific information on every measured component is provided.

In 2008, a total of 43 people worked at Ecoprint. The company had a turnover of 29.4 million kroons.

Ecoprint's 2008 environmental report was compiled by Anu Kõnnusaar, who is voluntary environmental manager at the Estonian Fund for Nature (ELF).



Methodology for assessment of environmental impact

The calculation of the use of resources was guided by the principle that these components are measured as far as Ecoprint is the end-user (such as thermal power for space heating). The extent of the measurements is parallel to that of the financial interests, and all the raw data comes from accounting.

Ecoprint's 2008 data on the use of resources is comparable with those of 2007, because during the preparation of the 2007 environmental report it was already known that the printing firm Triip, the printing plant Guttenberg, and the prepress company Repro will be united as the printing company Ecoprint. For 2007, the accounting data from Repro and Guttenberg was therefore added to Triip's data. The data from earlier years (2002-2006) on the use of resources is not comparable to the 2007 and 2008 data, as then it related only to the printing firm Triip.

In the preparation of Ecoprint's environmental report, the raw data obtained on 15 components (electricity, heat, water, waste, transport for persons and goods, use of office paper etc.) was processed according to several methods widely-used in the world in order to facilitate the understanding of the measurements. The main methods used are the ecological footprint and the measurement of CO₂ emission and its equivalents. The report was guided by the protocols of Montreal (1987) and Kyoto (1997), the Agenda 21 Objectives and the general principles of sustainable development.

The measurement of the use of resources does not include a compilation of the ecological balance of both positive and negative environmental impacts. Only the natural resources used for the implementation of activities are measured, that is, the negative environmental impact. As of now, a methodology allowing a quantification of the 'good' vs. the 'bad' influences on an equal basis does not exist. **Thus, the use of natural resources in day-to-day operations is presented in Ecoprint's environmental report.**



Ecological footprint¹

The basis for the calculation of the ecological footprint **is the land as limited resource** used by people in order to meet their needs. The Earth's surface is divided into several categories:

- energy land (land area necessary for the production of energy and for distribution systems);
- built-up land (buildings, roads etc.);
- cultivated land (garden, agricultural, pasture and forest land);
- bio-productive sea (major fishing territory);
- land of biological diversity (untouched nature);
- other land (rocks, deserts, etc.).

The ecological footprint is the yardstick for measuring the use of natural resources necessary for an activity. **The ecological footprint assesses the use of space associated with the lifecycle of a product or service, and is measured in hectares per year** (ha-year). The ecological footprint index shows how much productive land and water are used in the production and the use and absorption of consumed materials.

The organization's ecological footprint calculations are based on two simple facts. It is possible to monitor and identify most of the resources consumed by the company, and a variety of residues, which are generated.

Most of the resource and waste streams can be converted to biologically productive area, which is necessary for the production of these resources and the elimination and prevention of waste².

Environmental impact measured by the ecological footprint method

In the calculations of the ecological footprint, 10 different components³ are taken into account, which correspond to goods and services used or generated in Ecoprint's activities. Components are in turn divided in the six sub-areas (human transport, electricity, thermal power, water, waste and goods transportation). For better comparability, the ecological footprint per employee is presented separately⁴. It should be emphasized that it is fair to compare the ecological footprint per person of different companies only if they offer similar products or services (e.g. a car plant can be compared to another car plant but not to a bicycle plant, although at first glance both companies seem to produce similar products - means of transport).

¹ According to the Estonian Fund for Nature (ELF), the ecological footprint method of one of the best methods whose use around the world is steadily increasing, allowing for complex assessments of the impact of activities of countries and organizations on the environment. We recommend to read Chambers et al, Sharing Nature's Interest, 2000 (available in the library of the Estonian Fund for Nature).

² The national burden on the ecosystems (translated from the book Ecological Footprint of Nations). Estonian Ministry of the Environment and the Estonian Green Cross. 1997. 32 p.

³ Consumed office paper and quantities of hazardous waste are not components of the ecological footprint, as the corresponding factors of the ecological footprint are missing.

⁴ The number of employees is derived from the average of all three companies.



Waste

According to the Ecological footprint method, one of the biggest environmental impacts of Ecoprint continues to be production of waste with 85% or 380.6 ha-years. However, it has made very good progress in waste management. Now a financial situation has been reached in which the costs for municipal and hazardous waste are covered by the sales revenue for printing plates and waste paper sent to recycling!

In 2002, separated collection for scrap paper and cardboard was initiated and in 2003 also for hazardous waste; in 2004 a photopolymer technology device was acquired which decreases the output of hazardous waste and scrap paper; in 2005, an electronic customer administration system was adopted, reducing paperwork in the internal company management. The aluminium printing plates go to recycling.

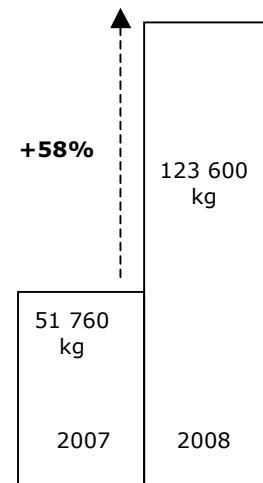
Accrued recyclable waste:

scrap paper and cardboard 123 600 kg;
metal waste 8 900 kg.

Accrued landfill waste:

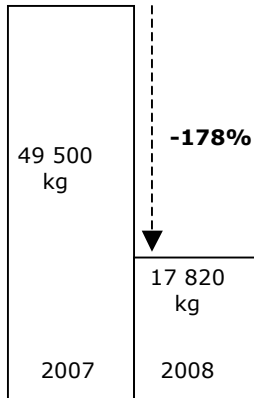
municipal waste accrued during the year:
 17 820 kg;
hazardous waste accrued during the year:
 3 315 kg (special handling is licensed through the intermediation of recovery facility).

In 2008, a press container was leased to replace a normal garbage can in collecting paper and cardboard, which allows reducing the amount of energy used for the transport of waste on the one hand and to measure the amount of accrued scrap paper more accurately on the other. While for the previous years' environmental reports, the amount of scrap paper was calculated on the basis of container volume and statistical data on the specific weight of scrap paper, the 2008 data is based on precise measurements.



Regarding the different types of waste, most scrap paper and cardboard was created in year 2008: 123 600 kg, or measured in ecological footprint units: 302.8 ha-years (68 % of the total footprint). The comparison with the 2007 data shows a significant increase in paper and paperboard waste: 58%. This is due to an increase in production volume and to more careful sorting of waste.

Particularly scrap paper accrues from cutting residues of publications, defective production, test sheets and packaging. A smaller share is made up by high-quality office paper, newspapers / magazines, envelopes, etc.



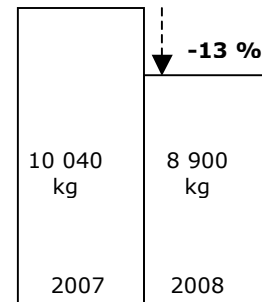
Turning to quantity, the generated municipal waste was in second place: 17 820 or 72.0 kg ha-year (16% of the total footprint).

Such a drastic decrease in accrued municipal waste is a great achievement! In addition to the better sorting of waste and the increase of 58% in scrap paper and cardboard sent to recycling, Ecoprint considers the re-location of the printing plant to the edge of the city, away from the commercial centre, as another factor for the significant reduction in municipal waste. Previously, the printing plant was located very close to the market, from where employees bought meals during the lunch break. At the new location, the staff has the possibility to collectively order

meals or takes meals to be warmed-up from home.

The significant reduction in accrued municipal waste is certainly one of the reasons why the income from secondary raw materials sent to recycling enables covering the costs for both municipal and hazardous waste management.

The generated amount of metal waste was 8 900 kg or 5.8 ha-years (1.3% of the total footprint). In a yearly comparison, the amount of metal scrap was reduced by 13%, which is also a significant achievement considering the increase in production. According to estimations, this is conditioned by the increase in editions of publications, allowing for the production of more publications with a smaller number of printing plates.



3 310 kg of hazardous waste accrued in the year 2008, which is 43% more than in 2007.

Printing inks used in 2008 amounted to 2 150 kg, which is 25% more than in the previous year. Although the printing inks used by Ecoprint are made from natural oils and resin (rapeseed and soybean oil with pine resin as binder) instead of conventional oil, the waste and packaging from the printing inks are disposed of as hazardous waste. In addition to the environmental friendliness, the used printing inks are odourless, which is crucial also for the health and well-being of workers in the printing plant.

In the calculation of the ecological footprint and CO₂ emission, hazardous waste and printing ink are unfortunately excluded due to the lack of corresponding factors.

Electricity

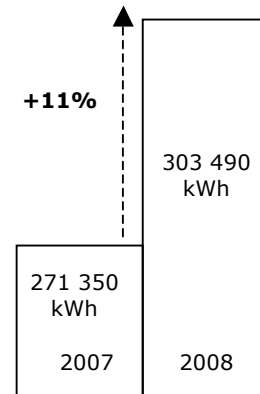
Ecoprint's new production building produces electricity with the help of three wind turbines foreseen for urban use, installed on the roof of the printing plant. The design of the Airdolphin wind turbine blades is inspired by the surface of an owl's wing in order to minimize noise. In year 2008, Ecoprint's windmills produced 320 kWh for the printing plant's own use.

In addition, for many years (since 2002), Ecoprint is the holder of the Green Energy Category III certificate – this means it consumes 6 000 kWh of wind and water power per year.

In the calculation of the footprint, 19% of the power line loss occurring in the transmission of electricity from producer to consumer is added to wind and hydropower, as well as to power produced from oil shale.

In 2008, the consumption calculated including the power line loss was 7 140 kWh from Green Energy and 296 350 kWh from oil shale power. Although the share of energy produced from renewable resources was about 2% of the annual electricity consumption, the wind and hydro power footprint amounts to 0.4 ha-years and the oil shale power footprint to 99.5 ha-years (the difference is almost 300-fold).

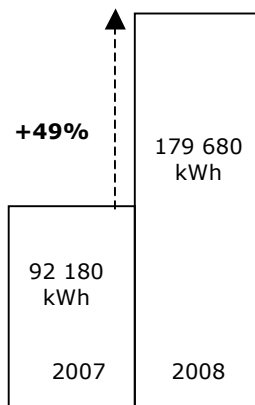
Compared to 2007, the total consumption of electricity increased by 11%. This is estimated to be related to moving to larger production premises and to the increase in the volume of work in 2008.



Thermal power

In the first months of 2008, the former production premises of Ecoprint were still used and heated by Tartu's central boiler plant. During this period, 45 560 kWh of thermal power were consumed, which were generated to 37% of natural gas, to 52% of peat and to 11% of wood and waste wood. The energy loss incurred by the utility line of the district's heating networks is added to the direct consumption.

Ecoprint's new production facilities are heated by a gas boiler, which consumed 13 870 m³ of gas. The calorific value of gas is a calculation based on the data of Eesti Gaas according to which the combustion of 1 m³ of natural gas generates 9.3 to 9.4 kWh of thermal power (9.35 kWh is used for the calculation).



In 2008, Ecoprint used a total of 179 680 kWh of thermal power, of which 82% was produced from natural gas, 15% from peat, and 3% of wood and waste wood. The total ecological footprint of thermal power is 15.1 ha-years, of which 13.9 ha-years or 92% is produced by natural gas.

In 2008, 49% more thermal power than in 2007 was used, which is due to putting into service of increased office and production space, as well as the fact that in summer 2008 a boiler plant was used to produce hot water. An improvement of results is expected for 2009, when solar panels will be installed for heating water.

In the new printing plant, different ventilation systems with heat exchangers are used in the production and office premises. The thermal power released by the printing plant's equipment is used to heat the inflowing fresh air.

The existence of two different ventilation systems allows for the separate use of production and office premises, which is very useful when the production plant needs to function in several shifts. Outside the working hours (i.e., on working days from 5 p.m. - up to 2 hours before the beginning of the next working day), the office's ventilation system

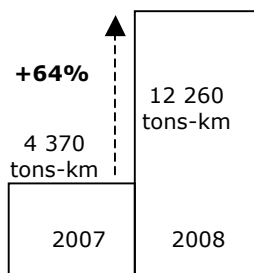
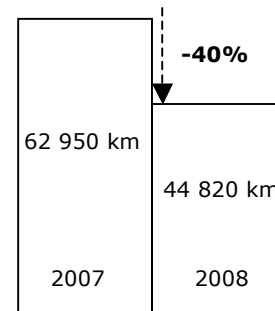
is automatically switched to energy-saving regime, thereby economizing electricity. The printing plant's ventilation system is adjusted according to the duty roster.

Transport

According to the ecological footprint and the CO₂ emissions calculation methods, the transport is classified in two categories: transport for people and transport for goods. Transport for people are work-related business travels of employees by car, bus, train, ship or airplane, and the transport for goods is the transportation of goods by lorry.

In 2008, the transport car was used for 44 820 km (or the distance from Tartu to Tallinn on every working day), leaving an ecological footprint of 4.3-ha-years, which is 1% of the total footprint.

Since March 2008, Ecoprint stopped having its own small commercial vehicle (passenger car), which is the main reason for the 40% reduction in car transport compared to 2007.



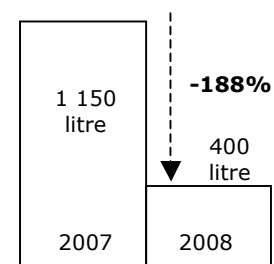
It is assessed that for the transportation of goods, 12 260 tons-km⁵ were effected, corresponding to an ecological footprint of 0.86 ha-years.

The publications are delivered to customers via private courier services companies in Estonia as well as abroad. The freight increase of 64% is due to the termination of goods transportation by Ecoprint's own means of transport.

Water

In the new production building, the rainwater collected from the roof of the printing plant is used in the irrigation system, which led to a consumption of 1/3 of the amount of water compared to the previous years!

Humidity in the printing plant needs to be at 60% in order to ensure the necessary humidity of the printing paper, thus reducing defective production. Rainwater is collected from the 850 m² roof surface of the printing plant and conducted into a 5 m³ tank. The automatic irrigation system continuously measures the humidity level and accordingly starts and stops the nozzles located at the ceiling. According to Ecoprint's calculations, one full tank of rainwater covers working a 12-day period at full load, if there is no additional rainfall in the meantime. During the drought period, the irrigation system switches from rainfall to tap water from the general network, and during the wet period redundant rain water is directed into the over-drainage.



⁵ The measuring unit of 1 tonne-km is equivalent to 1 tonne of freight for a distance of 1 km or 0.5 tonnes of freight for a distance of 2 km.

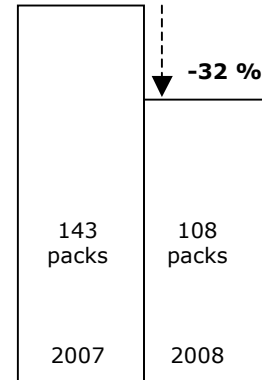


According to Ecoprint's estimations, the use of rainwater reduces the use of tap water by 60%. Given that in 2007, 1 150 m³ of tap water was used and in 2008, 395 m³ of tap water, the use of tap water has been reduced by 66%. The consumption of tap water (395 m³) caused a 0.03 ha-year footprint.

Office paper and other consumables

In addition to the above-mentioned, the consumption of office, toilet and hand-drying paper was measured (but it is not taken into account in both the ecological footprint and the calculation of CO₂, since the corresponding factors are missing).

108 packs of office paper were purchased during the year, i.e. 270 kg, of which 31% was marked with the FSC⁵ sign and 69% was normal office paper. Per employee, this equals 6.4 kg or 2.5 packs of copy paper per year. Compared to the year 2007, 32% less paper was consumed.



In 2008, 270 packs of hand-drying paper were used (1 pack per working day), which is 18% more than a year before. 555 rolls of toilet paper were consumed per year (2 rolls per working day) or 39% more than a year before. Measurement of the use of hand-drying paper is also related to the generation of waste, because the consumed hand-drying paper represents a very large part of the municipal dustbin.

⁵ FSC (Forest Stewardship Council) labelled office paper is produced from timber originating from sustainably managed forests.



Consolidated table of the ecological footprint

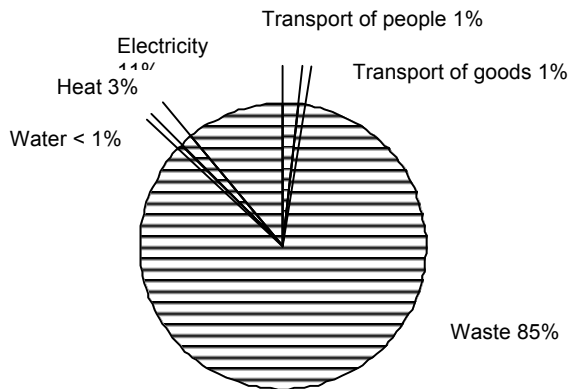
The environmental impact of 10 different components was measured with the ecological footprint method (there is no ecological footprint factor for the conversion of the characteristics of consumed office paper and hazardous waste, which is excluded from the calculation).

Components as a basis for measuring the ecological footprint	Consumption (rounded)	Ecological footprint per employee (ha-years per employee)	Ecological footprint (ha-year)
Transport of people (km)			
1. Car, incl. taxi	44 820	0.100	4.258
Electricity (kWh)			
2. Electricity produced from shale oil	296 350	1.123	47.713
3. Green Energy	7 140	0.004	0.173
Heat (kWh)			
4. Thermal power produced from biomass (peat, timber, rape waste)	31 650	0.022	0.948
5. Thermal power generated from natural gas	148 030	0.327	13.915
Water (m³)			
6. Consumed water	395	0.001	0.032
Waste (kg)			
7. Paper sent to recycling	123 600	7.125	302.820
8. Metal sent to recycling	8 900	0.136	5.786
9. Municipal waste (landfill)	17 820	1.693	71.948
Transport of goods (tons-km)			
10. Road transport	12 260	0.020	0.858
TOTAL		10.552	488.452

Ecoprint's biggest impact on the environment is caused by waste generation (85%). The following, more negligible, are electricity (11%), thermal power (3%) and the transport for people (1%). The proportions in the ecological footprint of the transport of goods and of water and sewerage (each less than 1%) are the smallest.



Ecoprint's 2008 ecological footprint



**448.5
ha-years or
10.6
ha-years
per employee**

Ecoprint's ecological footprint is 448.5 ha-years, 10.6 ha-years per employee.



Comparing the proportion of Ecoprint's annual financial turnover to its ecological footprint in different years (2007 and 2008), it appears that **in the year 2008, a 6% larger ecological footprint was caused by a turnover of 1000 kroons** compared to a 1000 kroons turnover in 2007.

In the comparison of national ecological footprints publicized in 1997, the surface available for human consumption was indicated with 1.7 ha per capita⁶. This is the average of present ecological reality.

However, according to a report of the World Wildlife Fund in 2000, the limit of sustainability was calculated with 2.2 ha per capita, whereas 10% were calculated for the maintenance of biodiversity.

The length of a normal working day is only 1/3 of the entire day, and during this time about three times more biological resources per person are used than allowed.

Thus, in spite of the numbers showing the austerity we are guided by, it is clear that the use of resources is above the optimum, or that we are living at the expense of the future.

⁶ According to the world population in 1993, a surface of 2.07 hectares of biologically productive area was calculated for each person. On the basis of the world population in 1997 and the optimistic assumption that the biologically productive area is not reduced, there are now only 1.94 hectares per capita left. Subtracting 12% for biodiversity conservation, we get $((1-0.12) \times 1.94 = 1.71)$ 1.71 hectares per capita left for human use.



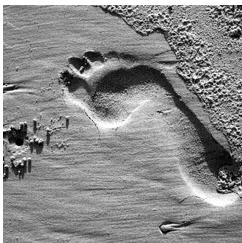
CO₂ emissions

In order to achieve sustainable development, it is necessary to restore a situation in which human activities do not exceed the dynamic balance in natural systems' buffering ability of the main substance cycles - CO₂ and water. It must be known how high the buffering capacity is to be able to quantitatively assess the impact of human activities in order to ensure sustainability.

CO₂ emissions were measured in 4 components. In the conversion of the measuring results to CO₂ emissions, the Handbook for the Calculation of Greenhouse Gas compiled by United Nations Environmental Program was used⁷.

Measured component	CO ₂ emissions, tons CO ₂
Electricity	
1. Electricity generated from shale oil	221.4
Thermal power	
2. Thermal power generated from natural gas and shale oil	29.9
Transport of people	
3. Car (diesel)	12.0
Transport of goods	
4. Road transport	9.6
TOTAL	272.9

The International Commission on Climate Change (IPCC) proposed a size of environmental space of 1.7 tons of CO₂ per person and per year, the equivalent to 4.66 kg of CO₂ per person per day⁸. The limit of the amount of CO₂ emitted per working day per person is considered to be 70% of the value offered by IPCC. Thus, the tolerated environmental space per person is 1.19 tons CO₂ per year or 3.3 kg CO₂ per day.



Given that Ecoprint produces 272.9 tons of CO₂, but environmental space allowing only 50.6 tons of CO₂, Ecoprint shall compensate 222.3 tons of CO₂ emissions over-generated during 2008. It is known that in average 1 km² of forest binds 97 tons of pure carbon per year, or 356 tons of CO₂ per year.

Therefore, in order to bind the over-generated 222.3 tons of CO₂, 0.62 km² or 62 ha of forest will be needed.

⁷ The GHG Indicator: UNEP Guidelines for Calculating Greenhouse Gas Emissions for Businesses and Non-Commercial Organisations

⁸ Vilu, R. Randla, T. Kuidas mõõta keskkonna jätkusuutlikkust. (*How to measure the environmental sustainability*) Manuscript. Tallinn, 2002



Summary

This report is factually the second environmental report of Ecoprint, but essentially a continuation to the environmental reports compiled by Triip for 5 years, which has the longest known tradition among Estonian enterprises (a total of 7 years) in preparing environmental reports using the ecological footprint and CO₂ emissions methods.

Ecoprint's environmental report is based on 15 measurable components (electricity, heat etc.), which serve as a basis for the calculations. The company's ecological footprint in 2008 is 448.5 ha-years; 10.6 ha-years per employee. This is more than the biological resources allow. Similarly to the ecological footprint, CO₂ emissions were measured. During the year, 272.9 tons of CO₂, which are 222.3 tons more than allowed by the balanced environmental space. For binding the over-generated CO₂, 62 ha of forest are needed.

The most important achievements are the developments in waste and water management. In the waste management, the municipal waste was reduced by 178%, which allows covering management costs for municipal and hazardous waste with the income from the sale of the paper and cardboard waste, printing sheets as well as secondary raw materials. Thus, payments for waste management in 2008 were 0 kroons.

In the water management, the tap water consumption was reduced by 188%; i.e. in the year 2008 only 1/3 of last year's amount of water was consumed. Such a reduction in the consumption of tap water was not derived from curbing earlier wasting, but by putting into service the use of rainwater. Rainwater collected from the printing plant's roof surface of 850 m² is used to keep the humidity at 60%, which is necessary for optimal humidity of the printing paper and thus the prevention of defective production.

The following environment-related objectives set by Ecoprint have been met in 2008:

- Reduce the amount of municipal waste per employee each year by 10%;
- Annually buy the Green Energy Certificate;
- Plant each year at least 1 000 new trees with the help of co-workers and customers;
- Organize once a year an event aimed at raising social and environmental awareness of clients;
- Increase the proportion of publications produced from recycled paper and FSC paper to 50% of the total turnover (10% in each year).

The continuing challenges provide the following specific objectives:

- Reduce the ecological footprint by 5% annually and to reach an ecological footprint of not more than 95 ha-years by 2010;
- Reduce the consumption of thermal power by introducing an energy-efficient production building and by reusing residual heat.

Ecoprint's environmental-related activities continue to meet a lot of appreciation. In 2008, Ecoprint triumphed at the business awards for the environment competitions at Estonian as well as at the European level, winning the title of The Year's Environmental Performer in two categories in Estonia and landing among the three finalists at the European Commission's competition European Business Awards for the Environment.