

ECOPROFIT[®] - Model of preventive environmental management and sustainable development for companies and communities

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Abstract

ECOPROFIT[®] is a model developed 15 years ago in Graz, and which has been successfully implemented in Graz as well as nationally and internationally. For the last 15 years it has run two programs in Graz: the ECOPROFIT[®] Basic Program for beginners and the ECOPROFIT[®] Club Program for companies that have completed the basic program.

The data evaluation for companies between 15 and 10 years ago – in other words, after 5 years of working with ECOPROFIT[®] – shows a savings over that time period of 3 million m³ of water, 35 million Nm³ of gas, and 300 MWh electricity¹ in Graz. Over the following 10 years the companies showed savings of 14.4 million liters of power fuels; 64.6 million m³ of natural gas; 222,600 MWh of electricity; 9.28 million m³ of water; 21,000 tons of residual waste and 403,150 tons of CO₂-emissions. These data clearly show that this program successfully contributes to the sustainable development of the participating companies and of the entire region. The basic principle of the originally developed model is the same as it always has been. Yet over time the program must be reformatted and adjusted according to the changing market requirements, to the needs of the companies and to development trends, in the form of new contents and focuses.

Key words: Cleaner production, sustainable development, networking, energy savings, interactive learning

¹ Jan, S.: (1999)

1 The ECOPROFIT® model

1.1 The program

The objective of the ECOPROFIT® model is to support companies when implementing sustainable development within the company. To achieve this aim two programs were developed which are still running in Graz. The ECOPROFIT® Basic Program is a one-year program for beginners, and the ECOPROFIT® Club Program is for companies which have completed the ECOPROFIT® Basic Program. In principle, the ECOPROFIT® Club Program is a network in which different companies from industry, tourism, as well as large companies and micro companies work together on their sustainable development. The companies receive specific input in workshops and the support they need to implement new technologies in their companies with individual consulting. The participating companies, consultants, authorities and research institutes have the opportunity for constructive networking and to benefit from various effects of synergy.

The key elements of both ECOPROFIT® programs are:

- Joint workshops
- Individual consulting
- ECOPROFIT® award

The final step of an ECOPROFIT® program is the award. For a company to receive this award, several criteria have to be fulfilled and reviewed by an independent commission, and the company must have implemented the following elements:

- Company-specific environmental policy
- Waste management system (including existing and planned minimization measures, input materials) and waste management plan
- Legal compliance audit with respect to the environmental performance
- Documentation of the environmental performance of the previous year
- Environmental program for the upcoming year
- Environmental review

Once they have realized the ECOPROFIT® program the companies are well prepared to implement an environmental management system according to ISO 14001:2004 or EMAS, because the method of ECOPROFIT® and the criteria for the ECOPROFIT® award are similar to the guidelines of the environmental system.

Figure 1 shows an overview of the ECOPROFIT® programs.

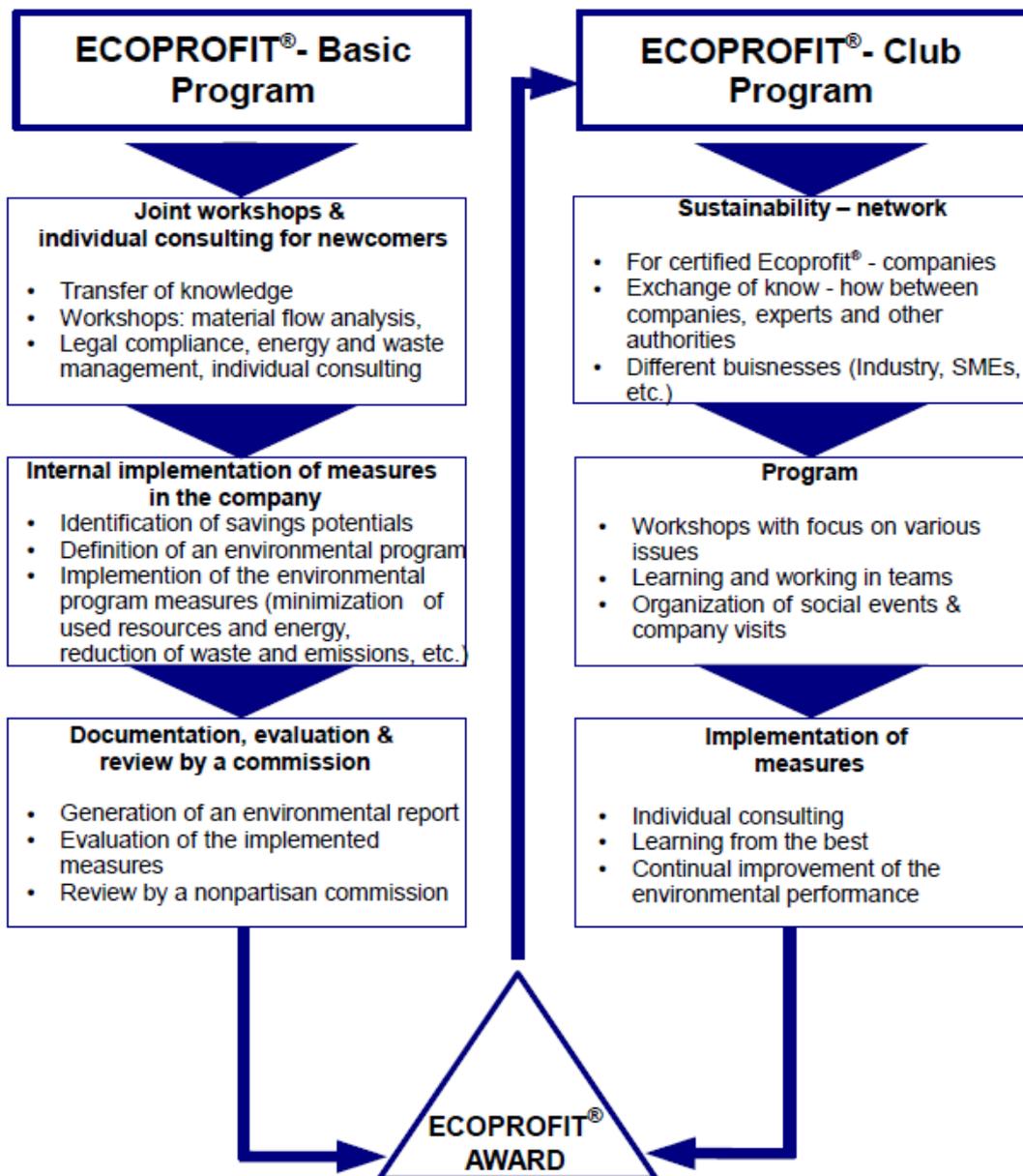


Figure 1: Overview of the ECOPROFIT® Basic Program and Club Program

During the one-year ECOPROFIT® Basic Program the topics of the 8 workshops are an introduction to Cleaner Production, waste management, energy- and material-flow analysis, environmental controlling and marketing, effective team work, creativity and legal compliance.

The topics of the workshops in the ECOPROFIT® Club Program change every year. For Club companies, further input on new topics or on topics that need intense attention are offered. Basically, the Club consists of the following program elements:

- Workshops, working groups and learning from the best in their fields
- Personalized and customized consulting
- Preparing and presenting the award

New topics for workshops and working groups in the ECOPROFIT® Club Program during the last year were:

- TRIZ (The theory of solving inventors' problems)
- TPM (Total production management)
- CSR (Corporate social responsibility)
- Energy efficiency and new technologies

The idea of ECOPROFIT® has spread in Austria and abroad and has been implemented in the following cities: Munich and Berlin, Germany; Gurgaon, India; Kampala, Uganda; Bucaramanga, Cucuta, and Medellin, Colombia; Pusan, Daegu, and Incheon, South Korea; and Panzhihua, China, among others.

The program enables the participating companies to implement sustainable development, to continually improve their environmental performance, and to measurably reduce waste and emissions in their region. The significant success factor is to recognize the regional stakeholders, like authorities, research bodies, consultants and companies, and to incorporate them together into one program. When implementing the program abroad, the structure and the contents of the program used in Graz are retained in order to communicate the basic knowledge of the ECOPROFIT® Basic Program and to motivate companies to work further on sustainable company development in the long run.

1.2 Key benefits

The ECOPROFIT® model is focused on the application of preventive environmental strategies with respect to processes, products and services, and it is a cooperation between local authorities and companies.

The success of the program often depends on the organizational involvement of environmental officers and on the investment of the leadership in the ECOPROFIT® program. The environmental officers are the primary participants in the ECOPROFIT® program. The majority of environmental officers in Austria are responsible for legal security, safety-related aspects and dealing with authorities. For the comprehensive examination of and coping with all areas of the company and also for the reaching of decisions it is important to involve the company leadership, product developers, controllers, and others in the program, not just the environmental officers. The participation of these groups, however, was minimal.

ECOPROFIT®'s important functions in the company, which lead to advantages for companies and authorities, are the following:

- Raising awareness for environmentally relevant topics in companies
- Bringing in an external point of view through individual consulting
- Motivating employees
- Consistently collecting and evaluating data using a structured approach with the help of worksheets and the given environmental report
- Involving authorities (lawmakers)

ECOPROFIT® - advantages for companies:

- Increase in production efficiency and reduction of costs due to the reduced consumption of raw materials and energy
- Reduction of costs due to smaller volumes of waste and emissions
- Transparent attribution of costs to material and energy flows
- Good overview of relevant laws and regulations for the company
- Awareness raising, motivation and fostering of team spirit within the companies
- Joint training programs
- Support of the project by local authorities
- Presentation of companies and regions via international networks
- Certification as an "ECOPROFIT® company" and integration in common PR activities

ECOPROFIT® - advantages for authorities:

- Controlling instrument for the implementation of sustainable structures
- Successful companies improve infrastructure and add to job security in a region
- Establishment of sustainable structures due to efficient support in the economy
- Environmental relief and lower expenses for bio-remediation
- Competitive advantages
- Improvement of the image of a region and promotion of tourism
- Higher quality of life for the inhabitants of cities and regions
- Support for the realization of Local Agenda 21 objectives to reach the Kyoto target

1.3 Results

The groundwork for efficient environmental monitoring and the measurability of the implemented steps comprise the yearly environmental report, which contains all inputs and outputs. The specific environmental indicators are generated yearly on the basis of these data, with the goal of being able to reproduce the effectiveness of the implemented measures over time.

The following represents the material and energy flows of the city of Graz²:

- Waste: 120,000 t/a
- Electricity consumption: 1,365 GWh/a

² Grazer Abfallwirtschaftsplan und Wasserverbrauch von Graz und den Umlandgemeinden (Haidinger)

- Natural gas consumption: 910 GWh/a
- Water: 1.9 Mio. m³/a
- Oil and diesel: 2,990 GWh/a

The ECOPROFIT[®] companies in the city of Graz could realize the following overall savings over the last 10 years:

- Power fuels: 14.4 Mio. liters
- Natural gas: 64.6 Mio. m³
- Electricity: 222,600 MWh
- Water: 30 Mio. m³
- Residual waste: 21,000 t
- CO₂-emissions: 403,150 t

The following diagram represents the relevant areas for planned and implemented measures.

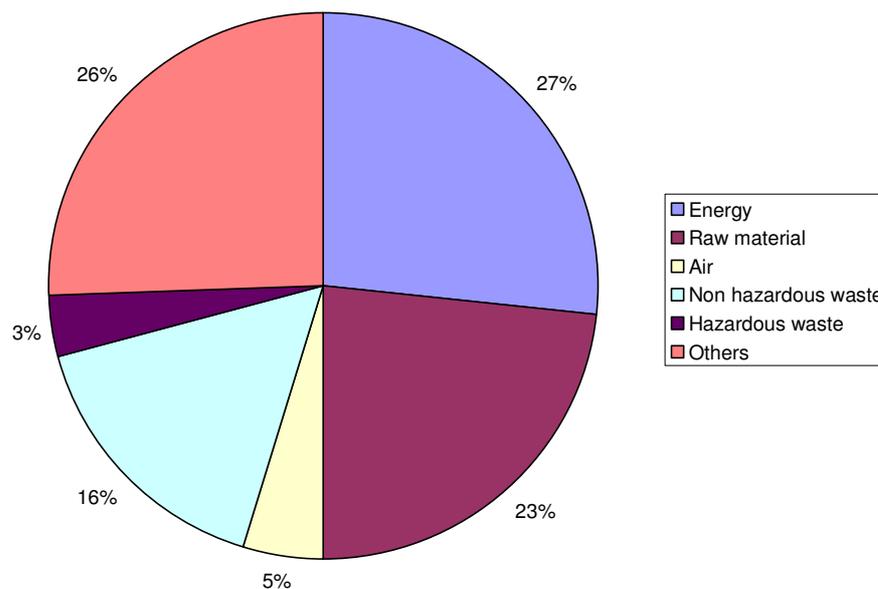


Figure 2: Planned and implemented measures within the ECOPROFIT[®] Basic Program 2006

The implemented and planned measures were assigned to the following categories quantitatively in the environmental report:

- Organizational measures: the improvement of operations in the form of job descriptions and instructions, for example
- New technology: process optimizing, heat recovery, improvement of feedback control, use of low-loss and energy-efficient technologies, use of renewable energy sources, etc.

- Environmentally friendly raw materials: these are measures aimed at using raw and auxiliary materials efficiently, while ensuring that the materials do not negatively impact the environment, result in minimal waste accumulation, and are not disposed of as hazardous waste.
- Internal and external recycling: e.g. double-sided printing, processing of ingredients, sorting waste and recycling
- Social and safety measures: e.g. travel cost allowances for employees, improvement measures for occupational safety, vehicle safety training for employees, etc.
- Network activity: collaboration with other ECOPROFIT® companies, implementation of mobility concepts in conjunction with another ECOPROFIT® company, building cooperations, shared use of presentation rooms, etc.
- Spreading an idea: for example, the implementation of an environmental discussion group, external communication over websites and newspapers, etc.

In Figure 3 the implemented and planned measures of five exceptional companies from the ECOPROFIT® Basic Program 2006 are represented. The largest piece of the pie represents the planning and implementation of organizational measures.

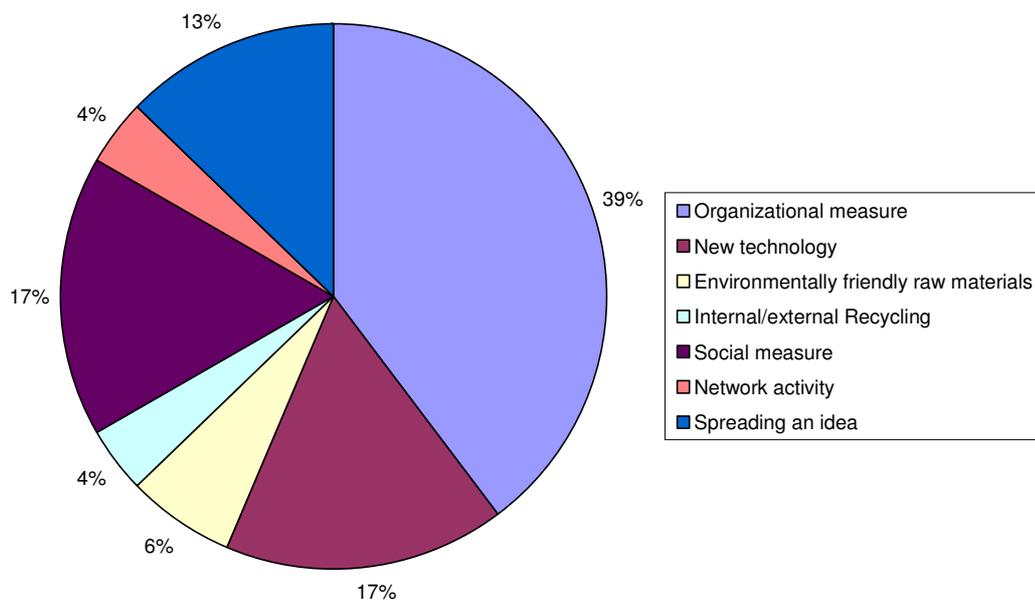


Figure 3: Categories of the implemented and planned measures of the ECOPROFIT® Basic Program 2006

In Figure 4 the implemented and planned measures of 45 exceptional companies from the ECOPROFIT® Club Program are represented according to category:

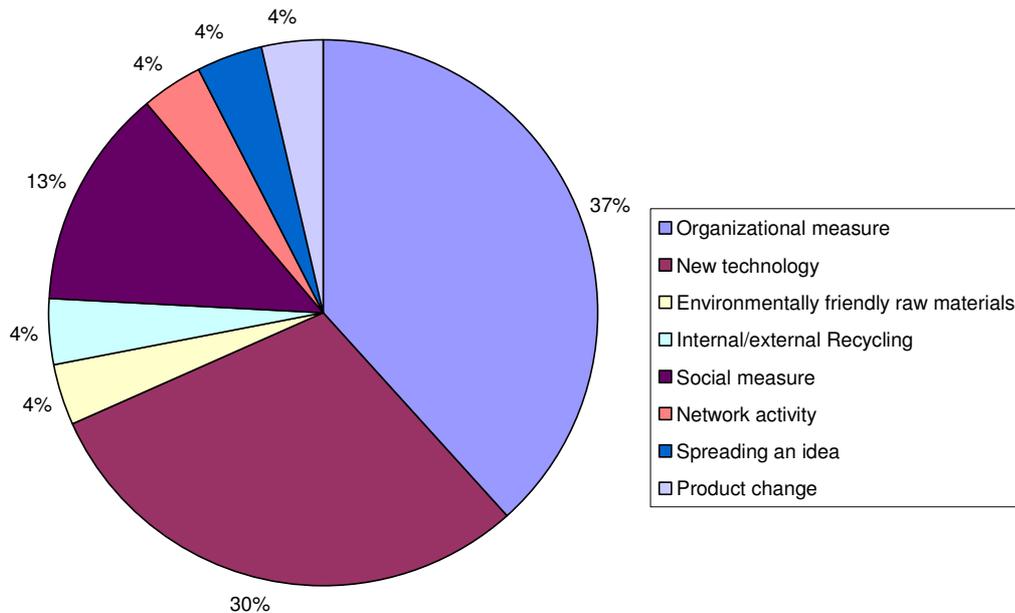


Figure 4: Categories of the implemented and planned measures of the ECOPROFIT® Club Program 2007

Looking at Figures 3 and 4 it becomes clear that when companies in the ECOPROFIT® Club Program work on the sustainable development of their companies over time, the proportion of measures which fall under the category “New technology” increases. The measures become increasingly more technical, which then leads to the need for individual consulting for problem solving, external laboratories, and technology developers to be tied together, and sponsors for the additional financing of extensive development projects to be found. At the same time it is necessary that the ECOPROFIT® program fits to the different target groups (industry, tourism, etc.). Above all with tourism enterprises and small businesses it shows that the financial value of the measures is especially relevant to the implementation of measures and that time less readily available than in manufacturing companies. For these companies we tried to shorten the program, but nonetheless the retention time of these businesses was significantly shorter than that of manufacturing companies, for example. In general we attempted to align the program with the needs of the companies and to integrate new components like innovation, mobility, and occupational safety. The ECOPROFIT® program was thus adjusted to cater to each target group.

1.4 Successful Examples

The following figure shows the results of the specific heat consumption of a brewery participating in the ECOPROFIT® project since 1995.

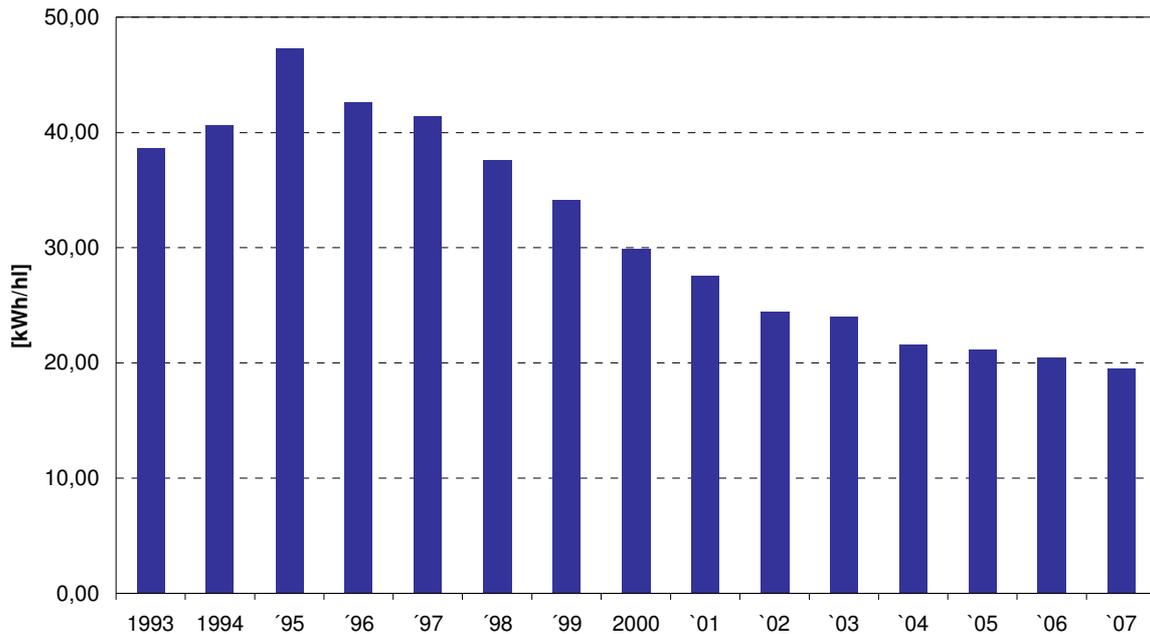


Figure 5: Specific heat consumption of a brewery

The reduction of the specific heat consumption per hectoliter of beer is due to the following measures:

- Optimization of the control of steam boilers, replacement of the insulation of the pipes and condensate return system
- Construction of a mechanical vapor compressor
- Optimization of the sterilization process
- Automatic controlling of the heat measurement
- Optimization of the brewing procedure
- Replacement of conventional pasteurizing with a flash heater
- Warm water use from the case washing machines
- Heat recovery
- Optimization of hallway heating

Figure 6 shows the decrease of the specific water consumption of a brewery since participating in the ECOPROFIT® project.

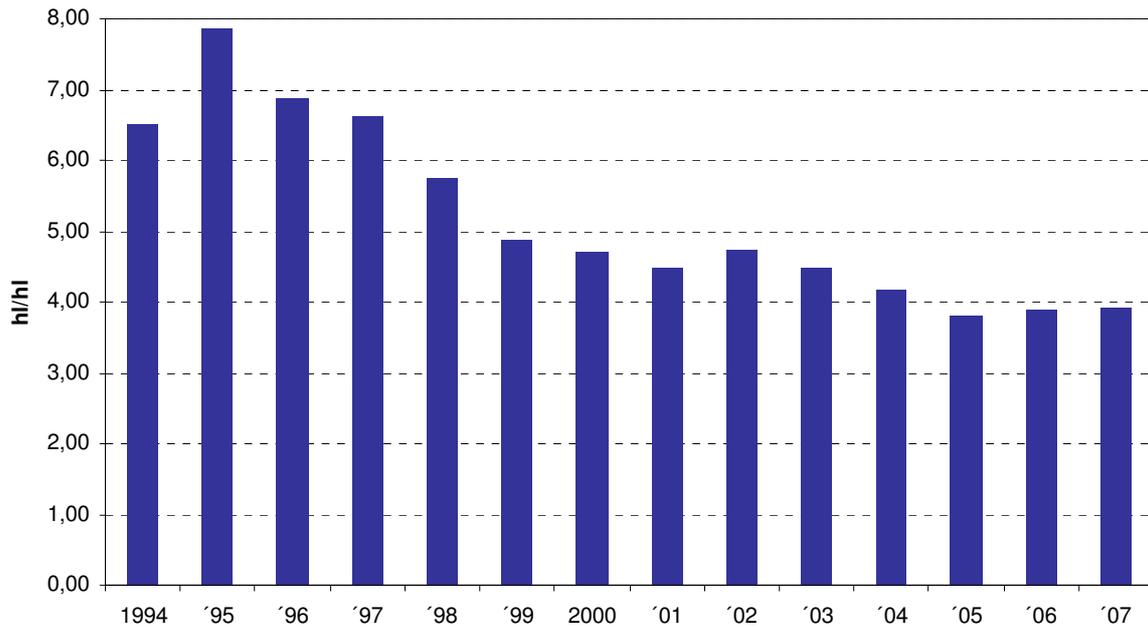


Figure 6: Specific water consumption of a brewery

The reduction of the specific water consumption per hectoliter of beer is due to the following measures:

- Optimization of the water treatment through reverse osmosis
- Use of recycled water to clean the filters
- Optimization of the cleaning procedures
- Recycling of the rinsing water
- Reduction of the rinsing processes in the brewery

The slight increase in water consumption in the years 2006 and 2007 can be explained by the brewery bottling its beer in smaller containers. In the company a successful environmental discussion group for employees was established, and in 2007 the total production management was implemented.

In Figure 7 the extraction of district heating of an ECOPROFIT® company is represented. This increase was made possible by the step-wise implementation of measures to use waste heat within the company. Currently a further increase of the waste heat use is being worked on within a research project.

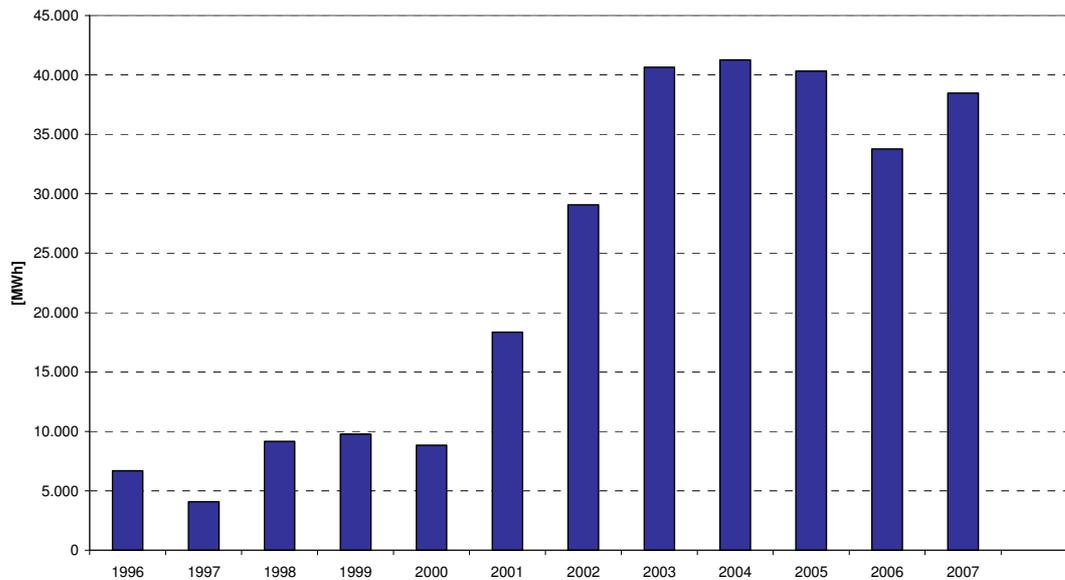


Figure 7: Increase of the district heating extraction

In Table 1 a mail-order company's savings over the span of its participation from 1995 to 2008 is represented. Here, the monetary savings are especially worth noting.

Table 1: Total savings of a mail-order company from 1995-2008

Activity	Amount	Savings [EUR]
Thinner middle layer of cardboard	468.8 t cardboard	333,400.00
Adjustment of heating and control of the blinds	1,690 MWh	131,600.00
Reuse of hangers	81.8 t coat hangers	307,600.00
Bigger delivery packages	73.4 t cardboard	83,000.00
Recirculation of cardboard internally	421.7 t cardboard	163,100.00
Complete use of trucks' storage space	880,890 km	828,800.00
Energy-saving measures	637 MWh	31,100.00
Total		1,878,600.00

2 Summary and conclusions

The ECOPROFIT® model has been implemented successfully in Graz for the last 15 years and has also proven itself valuable internationally. Throughout the course of the project it became necessary to adjust the program contents to the differing requirements of the companies, and to orient it toward the branch and size of the company.

Through the change in public opinion, the availability of sponsorships, increasing energy prices and the necessity for the reduction of CO₂ emissions, the focus of the participating companies as well as the ECOPROFIT® Basic Program and the ECOPROFIT® Club Program currently lies in the category “new technology” with the goal of increasing energy efficiency, reducing the use of primary energy and raw materials, and using renewable energy sources. To implement these measures changes in the processes are often necessary, which make comprehensive analyses and concepts essential. Such comprehensive consulting and observation cannot be developed within the ECOPROFIT® program – thus it is necessary to offer additional consulting programs. The participating ECOPROFIT® companies can receive specific input (introduction of new technologies, problem-solving tools, etc.) in the form of working groups. Furthermore, synergies can be used within the network, and companies can obtain information and experience reports relatively easily, unconventionally and without taking up too much of their time.

All participating sides are striving to continue the program further and to work actively on sustainable development in their companies and thus in their entire regions, because the achieved savings and the companies' engagement show that further potentials and the motivation for sustainable corporate development already exist. The combination of workshops and individual consulting has proven itself over 15 years. Here it will become necessary to actively assess the needs of the company and to customize the program to each company's differing needs.

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