



**Ecoschool Program
Report
1999 - 2008**

Starting point

30 state and urban schools in Regensburg consume approximately 2 million m³ of natural gas, 2.2 million kWh electrical energy and 50 million litres of drinking water annually. The costs for energy and water consumption as well as for waste disposal are about 1.9 millions Euros yearly; this amounts to 100 Euro per pupil.

Aim of the program

30 schools started the ecoschool program on January 1st, 1999, which was carried out by the office of schools (office 40) and the office of buildings and technics (office 60) in cooperation with the Centre of Efficient Energy Application and Environment GmbH (ZREU). The aim of the project was to teach the pupils a conscious way of using energy and dealing with the environment and to achieve a lower consumption of resources (electrical energy, gas, oil, water, waste). The program should motivate pupils, teachers and caretakers to participate actively in the principle of saving energy. As a reward and motivation the schools received a part of the economized operating costs their free disposal.

With the ecoschool program, three aims were reached:

- the ecological object to save energy and resources and therefore to decrease the environmental pollution and the greenhouse effect;
- the pedagogical aim to give pupils practical experience, how energy can be economized successfully by conscious acting;
- the economical aim to save money for resources, which can partly be reinvested in additional energy saving measures.

Realization

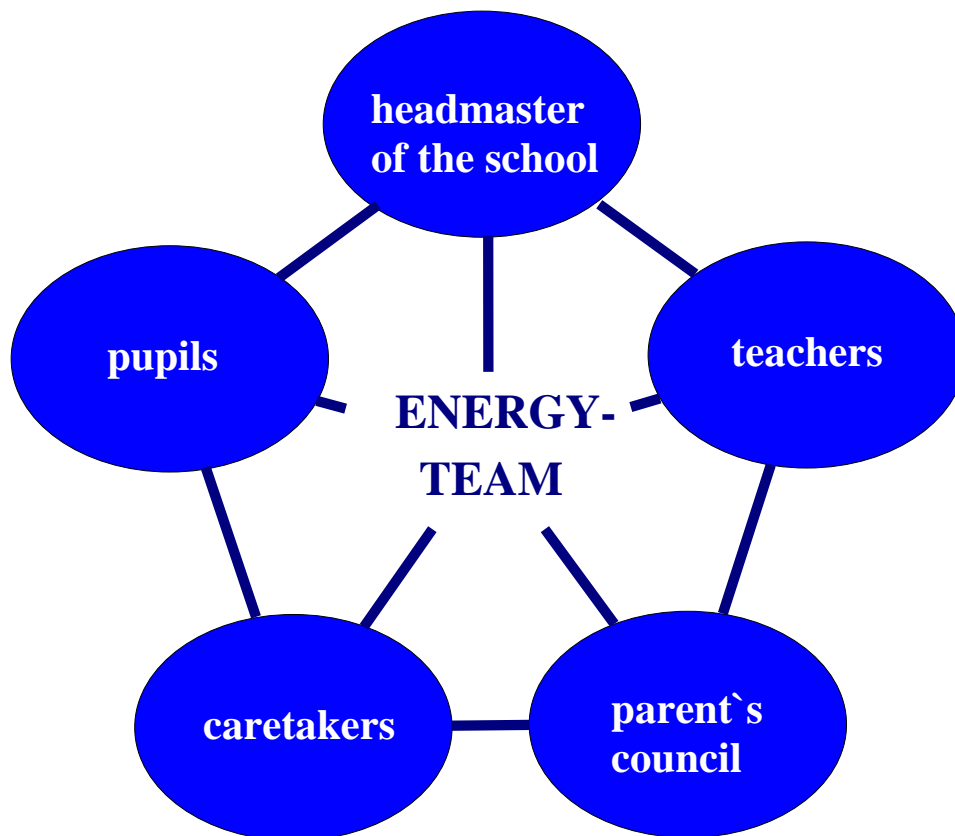
The aspired savings were achieved either by low cost and no cost measures above all a change of behaviour or by an optimization of the internal building organization.

During the project almost half of the economized money was reinvested by the administration into energy-saving measures. About 25% of it was paid back to the schools at their free disposal. The remaining part was transferred to the engineering office ZREU for advising this project. The ecoschool program did not cost anything for the city of Regensburg.

Introduction phase

Mayor Gerhard Weber started the ecoschool program with an introduction event on January 12th, 1999. The concept of the program, the planned measures as well as the contact persons in the case of administration and ZREU were presented to the headmasters of all schools.

Teachers, pupils and caretakers were integrated as important activists into the program. An energy team was formed in every school.



Teachers, pupils, caretakers and members of the parent`s council coordinated the activities together with the school management at every school. "Energy managers" were elected in every class. All pupils were motivated to act as energy detectives and to offer suggestions to the energy managers and/or the energy team of the school. The energy teams discussed about achieved success and planned activities in regular sessions. At the beginning of every school term (1 year) the school management was asked to inform the office of schools about the members of the energy team.

At the beginning of the program in spring 1999, all participating schools were inspected by ZREU and office 60 with the support of office 40. By this weak points were found out and a detailed list of measures was elaborated. ZREU presented an extensive check list to the energy teams concerning energy and water saving as well as waste avoidance. By means of

the inspection records, located defects were abolished extensively. On March 22nd, 1999 first results were presented to the schools by an information event. In the end of July 1999 ZREU submitted a report with low cost and/or no cost measures which were realised mostly by the administration or which were noted in a classified manner as re-investigating-measurement.

To make the consumption of gas, oil, electrical energy and water as well as the waste accumulation in schools transparent and comparable, characteristics were introduced and baseline figures determined. The average consumption of the years 1996, 1997 and 1998 served as basis for the calculation. A climate adjustment to take the annual changing temperatures into account was carried out.

For the continual information of the schools and their E-teams "Newsletters for energy managers" were elaborated by ZREU in periodical intervals in cooperation with office 60, office 40 and office 31 – office of environmental-, nature- and consumer-protection. These letters gave advice for energy conscious behaviour, experimenting models, excursion possibilities, exhibitions, competitions, activities in the schools and the current state of the ecoschool program. In July 1999 office 60 visited all schools in order to discuss first experiences, wishes and problems within the framework of the ecoschool program with the participants.

With the new school term, a poster competition about the "10 golden rules for energy saving and resource care" was started. For a further motivation, ZREU and office 60 organized trainings for the energy managers of all schools. The objects of the program were presented again to the actors. Workshops are offered every year to all schools.

ZREU and office 31 compiled a collection of papers with instruction materials for teachers in coordination with office 60 in January 2000 and again in March 2004 with office 31 which was sent out to all schools.

External users of the school buildings like sport clubs or for example institutions for adult education were included early in this program. The day nurseries at schools were visited by office 60 in summer 1999 and informed about the program. The sports clubs were informed by the sports office during the sports hearing in October 1999 by a lecture of ZREU and in December 1999 they were requested to participate in the program through a collection of energy-saving tips particularly for sportsmen.

The caretakers were also included in the program right from the beginning. They accompanied the building inspections, participated in the school visits in the summer and

were informed correspondingly within the framework of their caretaker training about the ecoschool program.

Implementation phase

Within the first five years of the project – from 1999 up to 2003 with the assistance of ZREU – the consumption of fuel, natural gas and so on was calculated per school and registered by office 60. After the end of a year the savings realized by ZREU were compared to the baseline figures. Changes in the buildings and resulting energy improvements of the school buildings as well as variations of the pupil numbers were considered via baseline figures corrections.

During the heating period the room temperatures were controlled in random samples and the temperature in the time of absence were optimized. Problems with over- or underheated rooms were registered and eliminated by office 60. With the help of the central control system and random test data sheets from caretakers the energy-consumption was controlled and optimised by office 60.

Office 60 planned the most efficient economic reinvestigation measures in cooperation with ZREU. The funds came from the savings of the ecoschool program.

As an additional incentive and motivation, a quiz was carried out at schools and the best ideas concerning the subjects energy and water saving as well as waste avoidance got an award within the framework of a competition every year. The regional utility REWAG awarded some funds to the winners, too.

There were the following competitions within the framework of the ecoschool program:

- a poster competition “10 golden rules”, school year 99/00
- garbage avoidance, garbage separation, garbage utilization, school year 00/01
- energy from the sun, school year 01/02
- motivation measures, school year 02/03
- funny energysaving-tips, school year 05/06
- ecoschool program questionnaire 07/08
- ecoschool program questionnaire 08/09

Office 60 organized nine excursions for the energy managers in autumn 2000 concerning garbage separation and utilization to various companies in Regensburg.

Simultaneously the most economical school was also awarded every year by giving the awards to the competitors. Mayor Gerhard Weber presented the energy saving award of the ecoschool program of the city of Regensburg to the most successful economical school in a solemn event.

Results

More than 7.250 MWh of heating energy and 331.000 kWh of electrical energy could be saved and therefore 1.900 t CO₂ could be avoided. Furthermore 52 million litres of drinking water could be saved and the avoidance of 1.88 million litres of garbage could be achieved thus protecting our environment.

Economizing results within the framework of the ecoschool program (1999 – 2006)

year	heating energy kWh	electrical energy kWh	drinking water m ³	garbage m ³	emission t CO ₂
1999	315.000	65.000	3.500	200	114
2000	1.700.000	86.000	4.700	280	459
2001	830.000	15.000	8.300	200	208
2002	400.000	60.000	6.400	200	131
2003	285.000	17.000	3.000	200	78
2004	1.129.000	19.500	7.100	200	282
2005	610.000	20.000	6.700	200	160
2006	1.177.000	12.000	7.000	200	280
2007*	806.000	36.800	5.800	200	215
2008*	806.000	36.800	5.800	200	215
total	8.058.000	368.000	58.300	2.800	~2.150

** The numerously carried out energy saving measures, renovations and new buildings made new reference numbers partly necessary. The baseline figures of 1996 to 1998 are not usable any more. Therefore, since 2007 the savings have had to be calculated as an average value from the years before. The financial cost decrease per year proves an average amount of 75,000 €.*

In the ecoschool program the costs for heating, water, waste water as well as for garbage disposal could be reduced by **811.400** Euros. The money economized by the achieved reduction of the resources was used for

- reinvestigations in energy saving measures
- costs for the personnel
- the schools directly

Thus the ecoschool program finances itself by its savings!

Cooperation partners

This project was realized by the "Centre of efficient energy application and environment GmbH" till 2003; contact Mr. Konradl, Tel.: +49 941/ 46419-14, j.konradl@kewog.de.

The following departments from the administration of the city of Regensburg were involved in the project:

- office 60: office of buildings and technics
- office 40: office of schools
- office 31: office of environmental-, nature- and consumer-protection, since 2003 this office is a member of the eco team instead of ZREU or KEWOG

Present state and contact partners since October 2003

The homepage ([www. Schulen.Regensburg.de /Projekte/Ökoschulprogramm](http://www.Schulen.Regensburg.de/Projekte/Ökoschulprogramm)), supplies you with further information und materials about the ecoschool program.

The office of environmental-, nature- and consumer-protection (contact: Dr. Hahn, project-leader, Tel.: +49 941-507-1313 or Mr. Mueller, Tel.: +49 941-507-2311) or the office of building and technics (contact: Mr. Bachsteffel, Tel.: +49 941-507-4605) advise the project. We inspect buildings, teach E-teams by meetings, offer lessons to classes, answer questions about the ecoschool program and try to solve problems with the buildings or the technics as quickly as possible.

Furthermore the office of schools (responding partner: Mr. Fleischer, Tel. + 49 941/507-1401, Mrs. Gallo, Tel.: + 49 941/507-1408) supports the project in a well-tried manner.

New award system

So far schools have been awarded due to their saving money. Office 60 provided the data of each year for this purpose in reference to the years 1996 – 1998 according to their individual consumption. Changes and expansions of buildings, repairs and daytime schools made new reference numbers partly necessary. In case of a total rebuilding of a school assessments had to be changed completely. In this case new reference numbers had to be fixed. The permanent change of reference numbers has taken more and more time and effort.

The whole assessment of consumption data for awards becomes more and more difficult for office 60, because the uncertainty of the assessed consumption data as to the reference numbers of 1996 – 1998 has always increased. Therefore a change in the assessment is necessary.

Advantages and disadvantages of the present award system.

Advantages: In the first years the real savings could be fixed exactly. The assessment system was relatively neutral.

The distribution of money to schools and caretakers due to the number of pupils was simple for the administration.

Disadvantages: Schools with the greatest savings normally had the highest consumption before the program started. Those schools which had already been very economical could reach only a small decrease in consumption during the program.

A new assessment of reference numbers as to changes e. g. the expansion of buildings, house repairs, additional computers, installation of daytime schools etc. cannot be done any longer.

Work for the assessments of savings in the consumption of water, heating, electrical energy and waste takes more and more time and lacks precision.

Initiatives of pupils cannot be promoted by the present assessment method.

The competition of 2005 found little response.

The new award system from the term 2007/2008 on assesses the organizing measures at schools and actions.

The added questionnaire serves as a basis for awarding the carried out activities.

We also expect a certain revival of the ecoschool program because individual initiative is thus paid better.

In the future we think of a fixed amount of 75.000 € per year, so that office 60 doesn't need to assess exactly the sum of savings in each school. An increase of energy prices causes higher savings. It is relatively easy for office 60 to assess the energy savings of each school. These two factors – an increase in energy prices and total savings of energy for all schools – could serve as a means for the assessment of the yearly amount of saved money in the future. This would guarantee an up-to-date reference. The official committee will have to make a corresponding decision.

The money for the schools and caretakers is distributed due to a credit system. The maximum amount is restricted to 1000 € for each school and 250 € for each caretaker. Each school can hand in a proposal for the award together with the caretaker.

Planned distribution system:

Reinvestments: 43.750 € at least

Schools: 20.000 € (upper limit)

Caretakers: 5.000 € (upper limit)

Special awards for the best schools and caretakers: 6.250 €

Only those schools will get money which have handed in the full questionnaire at the fixed time. Each competitor will receive a certain amount of money due to the number of credit points.

In May the three best schools and caretakers will be awarded.

The special prizes for the most successful schools and the most engaged caretakers are rather high.

	School	Caretaker
1 st price	2.500 €	750 €
2 nd price	1.500 €	500 €
3 rd price	750 €	250 €

The awarding of the prices will take place in June 2009 still according to the old procedure.

The foundation of a work group of leading people in the ecoschool program

The leading people of ecoschool program will have the chance for an exchange of information and experience one or twice per term (1 year).

Colleagues of other cities recommend the award system described above together with the work group, because thus the ecoschool program can be carried out more actively in schools.

Awards

In 2004 the city of Regensburg received the award "school carrier agency 21" for effective environmental work at schools. The German Society of Environmental Education in cooperation with the Federal Office of Environmental Protection praised the exemplary commitment of the city. The city of Regensburg and all persons concerned achieved a successful contribution to the avoidance of waste as well as a decrease in energy and water consumption with the ecoschool program.

The city of Regensburg received the award „Climate -Protection-City 2006“in 2006.

The exemplary engagement in protecting the climate was the reason for the organisation German Environmental Aid to praise the city of Regensburg. All partners of the ecoschool program have performed an important contribution to this award.

Energy-relevant savings 1999-2008: 811.400 €
Re-investment: 471.150 €

Applied measures / technologies

Examples:

- thermo-stops in storage water heaters
- energy saving lamps for plants
- use of dustbins with reduced capacity
- re-fitting of water-saving push-buttons in toilets
- removal of surplus urinals
- load throw-off circuit
- re-fitting of clock timers
- installation of motion detectors
- clock timers for corridor lighting
- light control in gyms
- network connection of PV-plant
- exchange of fluorescent tubes 2:1
- controlled hot water pumps
- replacement of a 150 kW standard boiler by a 70 kW low-temperature boiler
- replacement of two atmospheric burners by one 260 kW condensing boiler
- repair of combined heat and power unit
- substitution of 55 standard fridges by energy-efficient fridges
- control of ventilation system in a school
- re-fitting of toilet tanks
- network connection of combined heat and power unit
- ventilation plants with heat recovery, use of modern energy-efficient ventilators, optimisation of control systems

Chronology of the first energy savings activities at schools in Regensburg

1996: Mayor Gerhard Weber presents the project „energy cost-reducing-action at schools in Regensburg“ at the Werner von Siemens High School. There was an exhibition with posters and numerous booklets about climate protection as well as energy-, water- and waste-saving. Co-workers of the office for environmental-, nature- and consumer-protection offered lessons to the schools for these topics. The exhibition was requested by approx. 20 schools. Many pupils were informed about environmental protection.

1997: In all classes at the Werner von Siemens High School a quiz was accomplished about climate protection and energy saving. Mayor Gerhard Weber distinguished the best classes. The above mentioned exhibition was presented in numerous schools. In connection with the lessons which had been done some actions followed e.g. a play, which received the environmental award of the city Regensburg, a day of open doors with the emphasis environment or for instance an environmental booklet, which was written by pupils of an elementary school.

1998: The city Regensburg begins the first preparatory work for the ecoschool program in co-operation with engineer office ZREU. All schools should participate financially in saving energy, water and waste. There will be an additional possibility for pupils, energy managers and teachers to contribute something in the field of environmental protection.

The period of 1999 to 2003 is described in the report.

Ecoschool program actions since November 2003

<u>Term</u>	<u>action</u>
2003/4	
Nov.	Circular of Mayor Gerhard Weber: new organization
Nov.	Homepage: www.schulen.regensburg.de
Nov. – Jan.	school visits and overhead-foils to each school
Jan. - May	energy manager trainings
Feb.	honouring by Environment Federal Office: School bearer 21th
March	circular
2004/5	
Sep.	circular
Sep.	Telephone action: Energy manager training offer
Oct	award ecoschool program 2003 by Mayor Gerhard Weber
Oct.	circular
Oct. - January.	energy manager trainings
Nov.	circular: competition
July	award ecoschool program 2004 by Mayor Gerhard Weber

2005/6

- Oct. - Jan. energy manager trainings
- May circular: garbage separation
- May award ecoschool program 2005 by Mayor Gerhard Weber

2006/7

- October. Circular by Mayor Gerhard Weber: new award system
- Nov. - February. energy manager trainings
- Dec. competition of the DUH „Federal Capital in climate protection “
Climatic Municipality 2006
- Dec. head master meeting with Mayor Gerhard Weber: new award system
- Dec. caretaker training: garbage separation
and introduction into the new award system
- Feb. circular: Establishment of a working group with eco-
school program
- March meetings of the working group ecoschool program
- June award ecoschool program 2006 by Mayor Gerhard Weber
- July the company Iliotec presents the exhibition solar didactic exhibition in
the Albert Schweitzer school

2007/8

- August. ecoschool program is with the European Union-project ENERinTOWN
Best Practice example:
www.enerintown.org/municipal_energy_management
- Sep meeting of the working group ecoschool program
- Nov. ecoschool program is led as European Union-project
- Nov. - February. energy manager trainings
- March evaluation of the competition
- April caretaker training
- July award ecoschool program 2007 by Mayor Gerhard Weber

2008/9

- Sep. circular
- Oct. Meeting of the working group ecoschool program
- Nov. - Feb. energy manager trainings
- March evaluation of the competition
- May caretaker training
- July award ecoschool program 2008 by Mayor Gerhard Weber

Ecoschool Program

Questionnaire for the awarding of implemented activities

School: _____ Term: _____

Teacher: _____

1. Basic conditions

- 1.1 Are there energy activists in each class?
yes (5) no (0)
- 1.2 Is there an energy team?
yes (3) no (0)
- 1.3 Is there anybody who is responsible for eco school program?
yes (5) no (0)
- 1.4 Are there training courses for energy activists annually?
yes (5) no (0)
- 1.5 The headmaster takes care that these training courses are carried out annually and that energy activists are elected
yes (3) no (0)
- 1.6 Is the content of our homepage www.schulen.regensburg.de known?
yes (3) no (0)
- 1.7 The questionnaire for environmental detectives, see homepage, is distributed regularly to the energy activists?
yes (1) no (0)
- 1.8 Is recycled paper used for copying and printing texts?
always (3) sometimes (1) never (0)

2. All teachers

- 2.1 The energy activists are supported in their difficult task?
yes (1) no (0)
- 2.2 There are pupils papers, texts for the homepage and lectures about environmental topics
yes (3) no (0)
- 2.3 Have you carried out excursions last year?
yes (3) no (0)

3. Caretakers

- 3.1 Together with the teacher and pupils team the caretakers control the success of the separation of waste at least four times a term
yes (8) no (0)
- 3.2 The caretakers report about failures in the separation of waste to Mr Müller, Tel. 0941/507-2311.
yes (2) no (0)
- 3.3 In the evenings the gymnasiums are often used by sports clubs. The caretakers control the cleaning of the rooms.
yes (2) no (0)
- 3.4 Wrong behaviour is reported to the leading people of the ecoschool program
yes (2) no (0)
- 3.5 Are buildings, doors, windows, technical facilities controlled as to damages, which concern the ecoschool program and is the result reported to the headmaster?
yes (5) no (0)
- 3.6 A monthly report is sent to office 60.
yes (5) no (0)

4. Actions and activities

4.1 Posters in the school
yes (1) no (0)

4.2 Light switchers are being marked
yes (1) no (0)

4.3 Days for special projects assigned to environmental topics
yes (2) no (0)

4.4 Participation in competitions about environmental activities
yes (2) no (0)

4.5 Proposals for improvements
yes (5) no (0)

4.6 Other activities
yes (5) no (0)

4.7. Tidy classrooms, floors and school yard
very good (6) good (4) moderate (2) weak (0)

5. Remarks

(5) no (0)

6. Activities, which effect a private household

Kind of activity: (5) (3) (0)

Date _____

signature
headmaster of the school

signature
teacher

signature
caretaker

A waste checklist for the energy team

School: _____

Name of the caretaker: _____

Date of control: _____

Existing waste containers:

Volume	Number
120l	
240l	
770l	
1100l	

To which extent are the waste containers filled?

waste container	%

Is there any waste that can be recycled: no yes

If so, which and how much?

Type of waste	in percent (roughly)
Glass, bottles	
Paper, pressed paper, cardboard	
Cardboards for milk and juice (tetra paks)	
Plastic foils and bags (eg. of sweet and chips)	
Plastic cups and bottles (eg. of yogurt, butter milk)	

Where could this waste come from?

Being taken to school from at home

Could the waste come from what the caretakers sell in the breaks

Other origins _____

Are other wastes there that could be recycled: no yes ,

How could these wastes be separated better? _____

How could these wastes be avoided? _____

