

EUROPEAN GREEN CITIES NETWORK

MANUAL

TRAINING ACTIVITIES FOR SCHOOL CHILDREN



Regional Energy Center of Thessaly



**VOLOS MUNICIPAL ENTERPRISE
FOR URBAN STUDIES CONSTRUCTION
& DEVELOPMENT**

GREECE, 2003-2004

CONTENTS

INTRODUCTION - AIMS OF THE TRAINING PROGRAM	3
PLANNING THE TRAINING PROGRAM	4
TRAINING SCHEDULE.....	4
TRAINING METHOD	5
SYNERGIES WITH OTHER PROGRAMS	7
CONCLUSIONS	8
ANNEX I – TIMETABLE OF THE TRAINING PROGRAM	
ANNEX II – LIST OF PARTICIPATING SCHOOLS	

INTRODUCTION

AIMS OF THE TRAINING PROGRAM

Between September 2003 and November 2004, Volos Municipal Enterprise for Urban Studies Construction & Development (DEMEKAV), as a member of the *European Green Cities Network* (EGCN), has carried out a training program in *sustainable energy management of various types of buildings and infrastructure*, which was targeted on schools. This program aimed to elicit the interest of pupils in energy save matters and enter the dimension of energy economy in their everyday life.

The school building is the main space of children's activity, as the place where they spend at least half of their daytime. Simple everyday tasks adopted by pupils, may contribute greatly in the reduction of energy waste in the huge school building complexes. Moreover, the adoption of energy saving tasks by the child may determine the behaviour of the whole family in pupil's house. To succeed this, we have to grow the awareness of pupils about the importance of saving energy.

In general, the training program aimed at the formation of aspect and behaviour form the future (active) citizens as regards the use and consumption of energy. We have followed a training method of showing and explaining cases of local buildings (where energy shaving interventions have been applied) and on the spot visits for achieving a better uptake from the pupils.

In the case of students, the purposes of showing and explaining new technologies, materials and methods applied on buildings for energy saving reasons, are multiple:

1. Acquaintance with the new technologies generated to help human's life
2. Rise of pupil's interest due to power of example
3. Better comprehension of ways and methods for saving energy

As a whole, the objectives of the training program were:

1. Acquaintance of pupils with energy saving themes
2. Raising of children's awareness on energy saving issues
3. Reduction of energy waste in school buildings

PLANNING THE TRAINING PROGRAM

Our experience showed that the themes that should be examined while planning a training program for pupils are:

1. The environment of the child.

Which are the places where the child lives, learns and plays? Which are the needs children have?

2. Current use of energy in the environment of the child.

Energy use in school buildings and pupil's house (Systems of heating and cooling, exploitation of solar energy, electrical devices)

3. Human behavior and rational use of energy.

Examination and explanation of the main reasons that establish stumbling in the rational use of energy.

4. Energy and local society.

Appreciation and use of energy from social groups in various local societies, even countries.

Moreover, it is important to notice that, when training children and especially younger children, there are some basic thematic units that should be developed in order to give pupils understand key concepts like *energy*, *alternative source of energy*, etc. The experts should be informed from school teachers about the things pupils know about energy and configure the training material accordingly. The basic themes that pupils should comprehend, as a precondition to uptake a training course in sustainable energy management of buildings, are:

1. What is energy? The importance of energy for human's life
2. Sources, forms and transformations of energy
3. Production, transfer and consumption of energy – energy consumption problems because of shortness of the resources.
4. Alternative sources of energy: water, air, solar energy, etc

TRAINING SCHEDULE

During September 2003 – November 2004 we have followed up a training program regarding sustainable energy management of buildings, which was targeted in schools. The training seminars were held in charge of the Regional Energy Centre of Thessaly (RECT) and DEMEKAV by Mr. G. Gangas and his colleagues¹ and lasted two (2) days per week for each school.

Almost every Friday of each week, a school was hosted at the building of DEMEKAV and RECT. The first day of the seminars was divided in two phases:

¹ GEORGE GANGAS, Mechanical Engineer MSc ; VASILIS SGOURIS, Civil Engineer; KOUTSIANA FROSSO, Urban & Regional Planner; THOMAS PRASSAS, Electronic - Electrical Eng.

a) From 10:00 a.m. to 2:00 p.m. Mr. Gangas and his colleagues were carrying an introductory lecture concerning sustainable energy issues (renewable energy sources, passive and energetic systems of solar energy, etc.) and they presented case studies of local buildings built on energy saving standards (“Tsalapatas” old bricks & tiles factory complex and RECT’s building²). The material of these lectures, which includes Power Point presentations and other documents, is integrated in annex I.

b) From 2:00 p.m. to 4:00 p.m. it was carried a show excursion at the site of “Tsalapatas” old bricks factory in the urban area “Palia”. This old industrial building, along with RECT’s building, was renovated by using elements of bioclimatic architecture by DEMEKAV.

The second day of the training (Saturday) was devoted to show excursions at the site of the Small Hydro Power Plant (1MW) at the area “Sarakinos” and at the site of the Biogas Power Plant (300 KW), which is situated at the ground of the Municipal Sewage Plant. These two alternative Power Plants were also planned in charge of RECT and DEMEKAV.

Because the target group of the training program included schools of all levels of compulsory education (primary schools, high schools and lyceums), the exact content of the seminars and the way of presentation was adjusted to the pupil’s age and level of education.

A complete list of the schools attended the training program in the period 09/2003-11/2004 is attached in annex III. The Timetable of the program, which analyses the visit’s schedule, is also attached in annex II. According to the schedule, 33 schools have attended the course in a 10 month’s period (09/2003-06/2004) and further more 6 schools have attended the course in beginnings the new school year 09/2004-11/2004.

Schools which have attended the training program organized by DEMEKAV *did not pay for the training courses.*

TRAINING METHOD

Because the training program was targeted on school children the training methods were adjusted to the age and educational level of pupils. With the help of the school teachers, Mr. Gangas and his colleagues managed to transfer in a comprehensive way basic knowledge on sustainable use of energy and explain how simple energy saving applications work to children.

During the first day of theoretical induction school children and their teachers were gathered in the building of DEMEKAV (see photo on the cover) and had a four hours of discourse. In these lectures, were mixed in a progressive way simple to explain natural processes, like the *diffusion* and *incidence* of solar energy on earth, with more advanced theoretical concepts like the “Trombe” wall. During the lectures questions were allowed and encouraged, to avoid open questions, in order pupils to be ready to see and understand later the

² DEMEKAV and RECT are accommodated in the same building

way energy saving applications function. The presence of teachers is rated necessary, because they have a better view of the things pupils know and the way they uptake significations and many times their mediation was essential to give pupils understand what the specialists meant. It is important to notice that schools which came to attend the training courses were not ignorant of the subject, because they all went into the Greek Minister's School Program for the Environment and for this reason pupils had a previous intercourse with energy matters. The material presented to them was standard but the insistence in various subjects was different, according if they attended primary school, high school or Lyceum. The training material (see annex I) negotiated three main subjects on the field of energy save:

1. Theoretical induction on the forms and characteristics of alternative energy sources with an insistence in solar energy and its applications
2. Simple and advanced measures to obtain energy save in school buildings
3. Exemplifications of energy saving interventions in buildings (derived by DEMEKAV 's experience) and show of case studies

During the four hours training children had some short time breaks, to be ensured that they would be eager and able to catch up with the lectures.

The purpose of holding the lecture's part in the building where DEMEKAV and RECT are accommodated, rather than going to schools and carry out the lectures there, is double. The children would stay for four hours in a building constructed with energy save standards and thus they would be curious to know *why they made it like that? For which purpose they have put so many windows in such a setting? Why they have used this material? etc.* Moreover, they could observe by their own the function of various elements, like for instance the way the solar radiation is coming through the windows and how the interior of the building is being lightened as the day goes on because of the special arrangement of windows. Moreover, for the experts it was very easy to show each moment what they meant by giving pupils understand with concrete examples.

The last two hours of the first day were devoted to a show excursion at the site of "Tsalapatas" old bricks and tiles factory in the urban area "Palia". This old industrial building was renovated by DEMEKAV with the use of elements of bioclimatic architecture. The energy saving applications incorporated in this building had been presented to pupils previously during the lecture's part and include the solar chimneys for natural ventilation, insulated panels on the roof, double glazing, insulation of the floor, glazing areas and openings on the roof for natural lightning, etc. The visit helped pupils to understand better the function of the applications, to see how some simple applications are incorporated on the building and how they look like, to be able to notice elements that they did not before and to know what they serve.

On the second day, we had some more on the spot visits, at the site of the Small Hydro Power Plant (1MW) at the area "Sarakinos" and at the site of Biogas Power Plant (300 KW) which is situated at the ground of the Municipal Sewage Plant. These are two alternative Power Plants of small energy production that consist models in local and regional scale. Because

DEMEKAV is the owner of the plants and had an active role in their planning and development process, it was decided that it would be useful for pupils to visit the plants and see how they work. This was an opportunity for pupils to have a close look on the plants, which is something they have not the chance to see often, and an example of exploitation of alternative energy sources, namely water and waste.

Notices:

1. Pupils who have previously taken an environmental course are likely to be more interesting and active in the training process. They also tend to understand quicker and better.
2. Long time and specialized lectures have a negative effect on the interest of children, regardless their age, thus the training process has to be divided per thematic unit of gradually advanced specialization.
3. Theoretical concepts should be explained with a practical paradigm. Concrete example helps to obtain comprehension and uptake.
4. Children show greater interest and uptake things better when they see, thus on the spot visits are necessary as a means of educating children with a more effective and entertaining way.
5. Teachers have assured as that children who have attended the training program tend to understand better and show more interest in their afterwards environmental courses.

Proposal:

When the training course contacts with young children (primary school) it can be enriched with other activities like educative games, while when apply to elder pupils (high school and lyceum) can be combined with visits in significant urban sites in order to make the training process more interesting and appeal to pupils.

SYNERGIES WITH OTHER PROGRAMS

The realization of the training program was facilitated by the Greek Minister's school program for the Environment, named "Environmental Education". First of all, it was easy to find schools willing to attend the seminars. Secondly, pupils who came to attend were already informed in environmental matters and even energy saving applications, as a sequence they were more concerned and a better audience. Moreover, after the first meeting and discussion, it was easier to convince the teachers to fill in and help with the updating of the *recording form on energy performance of school buildings*.

Though on the spot visits from schools were scheduled because of the Minister's Program, it was not compulsory for DEMEKAV to participate, but

did it eagerly, in order to promote the aims of European Green Cities Network along with facilitating the school's training process. For this reason, DEMEKAV planned and carried out a training program on *energy save in buildings*, focused in school buildings.

The lectures of the first day of each 2days training course covered the requirements of the Minister's Program, while the show excursions of first and second day was an initiative of DEMEKAV which aimed to rise the pupil's apprehension and interest.

Furthermore, part of the Greek Minister's school program is the establishment of the "green week" at the end of each school year, during which pupils undertake various demonstration activities about the environment. DEMEKAV has participated in these activities on May 2004 by presenting a lecture about energy saving applications in buildings to pupils during a gala held at the University of Thessaly. This activity was not part of the training program.

CONCLUSIONS

We have carried out a one and a half year training program for pupils and had the chance to teach and some times learn from children. The training had not the character and aim to facilitate policy making, thrust the market borders or advance the local experts potential, but we do believe that it is essential to educate young people and make them familiar with the new technologies from an early age, especially if this comes to improve their life and protect the environment.

Our conclusions derived from the training process are summarized as follows:

- The participation of pupils in the attempt to obtain a more sustainable use of energy, requires, before everything else, the cooperation between teachers, parents and the society (experts, politicians, etc)
- Many schools which have attended the training program accepted to join in a survey for the energy performance of the school buildings and have shown a notable will to undertake simple tasks of energy save in their buildings
- Accruing from the training program, a communication network between schools and DEMEKAV has been developed, that lead in other cooperative activities afterwards

The positive outcomes of the training program have lead as to consider seriously its continuance and extension, in a manner that will generate more benefits for schools and the city as well.

ANNEX I: TIMETABLE OF THE TRAINING PROGRAM

TIMETABLE IN 2003

SEPTEMBER

WK in 2003	SUN	MON	TUE	WED	THU	FRI	SAT
36	0	1	2	3	4	5	6
37	7	8	9	10	11	12	13
38	14	15	16	17	18	19	20
39	21	22	23	24	25	26	27
40	28	29	30	25	26	27	28
41	29	30					

SCHOOL 1st all day Primary school of Portaria
SCHOOL 12th Primary school of Volos
SCHOOL 18th Primary school of Volos

OCTOBER

WK in 2003	SUN	MON	TUE	WED	THU	FRI	SAT
41				1	2	3	4
42	5	6	7	8	9	10	11
43	12	13	14	15	16	17	18
44	19	20	21	22	23	24	25
45	26	27	28	29	30	31	

SCHOOL 2nd Primary school of Volos
SCHOOL Primary school of Afetes
SCHOOL 1st Technical Lyceum of Volos
SCHOOL 2nd high school of Volos
SCHOOL Primary school of Nikaia

NOVEMBER

WK in 2003	SUN	MON	TUE	WED	THU	FRI	SAT
45							1
46	2	3	4	5	6	7	8
47	9	10	11	12	13	14	15
48	16	17	18	19	20	21	22
49	23	24	25	26	27	28	29
50	30						

SCHOOL Primary school of New Karies
SCHOOL Primary school of Aetolofos Agias
SCHOOL 5th Primary school of Larissa
SCHOOL 13th Primary school of Larissa

DECEMBER

WK in 2003	SUN	MON	TUE	WED	THU	FRI	SAT	
50		1	2	3	4	5	6	SCHOOL 23rd Primary school of Larissa SCHOOL High school of Pyrgetos SCHOOL General Lyceum of Pyrgetos
51	7	8	9	10	11	12	13	
52	14	15	16	17	18	19	20	
53	21	22	23	24	25	26	27	CHRISTMAS VACATION
54	28	29	30	31				

TIMETABLE IN 2004

JANUARY

WK in 2004	SUN	MON	TUE	WED	THU	FRI	SAT	
1					1	2	3	CHRISTMAS VACATION
2	4	5	6	7	8	9	10	
3	11	12	13	14	15	16	17	SCHOOL 6th General Lyceum of Larissa SCHOOL 1st high school of Larissa
4	18	19	20	21	22	23	24	
5	25	26	27	28	29	30	31	SCHOOL HOLIDAY

FEBRUARY

WK in 2004	SUN	MON	TUE	WED	THU	FRI	SAT	
5	1	2	3	4	5	6	7	SCHOOL General Lyceum of Livadi Elassonas SCHOOL 5th-16th Primary schools of Karditsa SCHOOL 11th Primary school of Karditsa SCHOOL Primary school of Makrixori
6	8	9	10	11	12	13	14	
7	15	16	17	18	19	20	21	
8	22	23	24	25	26	27	28	
9	29							

MARCH

WK in 2004	SUN	MON	TUE	WED	THU	FRI	SAT
9		1	2	3	4	5	6
10	7	8	9	10	11	12	13
11	14	15	16	17	18	19	20
12	21	22	23	24	25	26	27
13	28	29	30	31			

SCHOOL 3o Primary school of Palamas
SCHOOL Primary school of Gefyria
SCHOOL General Lyceum of Itea Karditsas
SCHOOL High school of Farkadona

APRIL

WK in 2004	SUN	MON	TUE	WED	THU	FRI	SAT
14					1	2	3
15	4	5	6	7	8	9	10
16	11	12	13	14	15	16	17
17	18	19	20	21	22	23	24
18	25	26	27	28	29	30	

SCHOOL High school of Rizoma Trikalon
EASTER VACATION
SCHOOL 1st high school of Pyli
SCHOOL General Lyceum of Farkadona

MAY

WK in 2004	SUN	MON	TUE	WED	THU	FRI	SAT
18							1
19	2	3	4	5	6	7	8
20	9	10	11	12	13	14	15
21	16	17	18	19	20	21	22
22	23	24	25	26	27	28	29
23	30	31					

SCHOOL General Lyceum of Pyli
SCHOOL 6th Primary school of Grevena
SCHOOL Primary school of Palaiokastro Sitias
SCHOOL 2nd Primary school of Agios Nikolaos

JUNE

WK in 2004	SUN	MON	TUE	WED	THU	FRI	SAT
23			1	2	3	4	5
24	6	7	8	9	10	11	12
25	13	14	15	16	17	18	19
26	20	21	22	23	24	25	26
27	27	28	29	30			

SCHOOL 3rd Primary school of Rethimno

SEPTEMBER

WK in 2004	SUN	MON	TUE	WED	THU	FRI	SAT
36				1	2	3	4
37	5	6	7	8	9	10	11
38	12	13	14	15	16	17	18
39	19	20	21	22	23	24	25
40	26	27	28	29	30		

SCHOOL High School of Aliveri
SCHOOL 1st Technical Lyceum of Xalkida

OCTOBER

WK in 2004	SUN	MON	TUE	WED	THU	FRI	SAT
41						1	2
42	3	4	5	6	7	8	9
43	10	11	12	13	14	15	16
44	17	18	19	20	21	22	23
45	24	25	26	27	28	29	30
46	31						

SCHOOL 22nd Primary school of Patra
SCHOOL Primary school of Vasilikos

NOVEMBER

WK in 2004	SUN	MON	TUE	WED	THU	FRI	SAT
46		1	2	3	4	5	6
47	7	8	9	10	11	12	13
48	14	15	16	17	18	19	20
49	21	22	23	24	25	26	27
50	28	29	30				

SCHOOL 1st Technical Lyceum of Amaliada
SCHOOL 4th Technical Lyceum of Kalamata

1ST OF DECEMBER-END OF TRAINING PROGRAM

ANNEX II: LIST OF PARTICIPATING SCHOOLS

NAME OF SCHOOL	DIRECTION OF EDUCATION	RESPONSIBLE TEACHERS	TEL - FAX
Primary school of Nikaia	A' Larissa	Batsilas V.	2410 921226
Primary school of New Karies	A' Larissa	Pappagianni Z., Kaletsios S.	2410 -791274 FAX: 791274
Primary school of Aetolofos Agias	A' Larissa	Draganidakis S.	24940 41403
5th Primary school of Larissa	A' Larissa	Moloxas V., Billis D., Karapanos P.	2410 236589 FAX: 236589
13th Primary school of Larissa	A' Larissa	Nikou N.	2410 660098 FAX: 660098
23rd Primary school of Larissa	A' Larissa	Mitrakas Apostolis	2410 238689 FAX: 230170
High school of Pyrgetos	B' Larissa	Dimovelis P.	24950 41079
General Lyceum of Pyrgetos	B' Larissa	Dimovelis P., Tsironikas I.	24950 41082 FAX: 41082
6th General Lyceum of Larissa	B' Larissa	Kapsouras	2410 619990 FAX: 614566
1st high school of Larissa	B' Larissa	Kampagianni E.	2410 620720 FAX: 620720
General Lyceum of Livadi Elassonas	B' Larissa	Ziaka V., Kolimenou M., Meliopoulou E.	24930 41394 FAX: 41394
1 st all day Primary school of Portaria	A' Magnesia	Karagiannis I., Filaretos N., Mastellis V.	24280 99440 FAX: 99128
12th Primary school of Volos	A' Magnesia	Gountelias T., Souliotis A.	24210 72368 FAX: 72368
18th Primary school of Volos	A' Magnesia	Fergadakis X., Grassos G.	24210 85731 FAX: 84814
2nd Primary school of Volos	A' Magnesia	Sandravelis A., Pateri G., Mouzala D.	24210 39596 FAX: 39596
Primary school of Afetes	A' Magnesia	Skrimpas A., Fotiou X., Pelekanou D.	24230 55066 FAX: 55066
1 st Technical Lyceum of Volos	B' Magnesia	Kalavriotou A., Fotou T.	24210 22848 FAX: 22848
2 nd high school of Volos	B' Magnesia	Targontsidou	24210 72316 FAX: 71004
5th-16th Primary schools of Karditsa	A' Karditsa	Pappa K., Thodou P.	24410 22806 FAX: 76931
11th Primary school of Karditsa	A' Karditsa	Aggelidakis G.	24410-26343
Primary school of Makrixori	A' Karditsa	Askitis S., Kokali A.	24410 67147 FAX: 67147

3o Primary school of Palamas	A' Karditsa	Gargani A., Zarganas K.	24440 22792 FAX: 29093
Primary school of Gefyria	A' Karditsa	Garganakis T., Anagnostopoulos D.	24430 94163
General Lyceum of Itea Karditsas	B' Karditsa	Karamoutrou A., Koumpouras A.	24410 22237 FAX: 31855
High school of Farkadona	B' Trikala	Makalos S., Poulios A., Tsiouris F.	24330 22221 FAX: 22900
High school of Rizoma Trikalon	B' Trikala	Papathanasiou E., Varbomiti X.	24310 96032 FAX: 96032
1st high school of Pyli	B' Trikala	Douvlis S., Vagenas X.	24310 22251 FAX: 22241
General Lyceum of Farkadona	B' Trikala	Milonas Aris	24330 22251 FAX: 22930
General Lyceum of Pyli	B' Trikala	Katsikas A., Korkis A..	24340 22177 FAX: 22177
22nd Primary school of Patra	B' Axaia	Balasis N, Spanos V.	2610 520107 FAX: 520107
Primary school of Vasilikos	A' Axaia	Stavropoulos S, Pavlidis D., Orfanidis N.	26940 61443 FAX: 61443
1 st Technical Lyceum of Amaliada	B' Hlia	Panagiotopoulos V. Xristidis X.	26220 22426FAX 22426
4 th Technical Lyceum of Kalamata	B' Messinia	Vrionis D., Maxaira X., Kokkolis D.	27210 95561/81825 FAX: 95561
High School of Aliveri	B' Evia	Glarou K., Makridou X., Georgopoulou X.	22230 22308 FAX: 29714
1 st Technical Lyceum of Xalkida	B' Evia	Akriotis G., Mailis N.	22210 27913 FAX:78690
Primary school of Palaiokastros Sitas	A' lasithi	Koutsas Evagelia, Kontogiannakis Emanouil	28430 61213 FAX: 26004
2nd Primary school of Agios Nikolaos	A' lasithi	Solidakis K., Karavokiri V., Vergadou K.	28410 22496 FAX 89238
3rd Primary school of Rethimno	A' Rethimno	Andrianopoulos Ioannis	28310 29088 FAX 29088
6th Primary school of Grevena	A' Grevena	Zioga Elli	24620 80327 FAX 80327