

Lighting Education and Information

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ABSTRACT

Poland economy is presently characterised by extremely inefficient use of energy, several environmental problems from the mining and burning of coal and lignite as a basic fuel for electricity production, and increasing dependency on imported oil and natural gas. One of FEWE's important activity involves the education and information programmes. These programs are designed to inform and public, including energy consumers, students and various communities about a relevant importance of energy, energy efficiency, environmental issues etc.

Researches done by FEWE during the last years shows, that the light in most Polish schools is in very bad condition. In many schools the light intensity is much lower than obligatory standards and the inadequate luminaries effecting with discomfort glare are the reasons of the effect called „school short sighted”.

That situation was one of the reason of common WWF and FEWE project creation. Project addresses the schools should prove that it is possible solve simultaneously the technical problems, save environment and educate schools „society” - directors, teachers and school boys and girls about efficient energy use. The project should also create students interests in modern lighting technic and the connection between energy and environment.

Project consists of the two components : technical one and education. In the first part lighting system in the three chosen schools has been modernised. In the second component the „energy” competition for students, their parents and teachers was announced. The paper presents the results of both part of the project.

From seven years FEWE is engaged in education campaign addressed to the different group of customers. The

main goal of that kind of activity is popularisation of knowledge about connection between energy consumption and environment pollution. Polish electricity production is based on hard coal and lignite - 95% of electricity in the country is obtained from coal. Each produced kWh needs a pound of coal to be burnt. As the annual production in Poland amounts to circa 135 TWh, the pollution of the natural environment is about 137 million tons of CO₂.

From this 137 TWh about 15-16 TWh is consumed by lighting, in which 1.5 TWh is used for streetlighting. Commercial sector demand is about 6 TWh, and residential sector demand is about 7.5 TWh.

Researches done by FEWE in the last three years show that still the society education in energy field is very low. Very often „efficient light” means „poor light”.

Additionally Polish system of payment for electricity is unpropitious for efficient use of energy. The bills for electricity are prepared for half a year, based on the amount of energy consumed in previous six month. Calculated in that way sum of money is divided into three paid by customers each two months. At the end of the six month period the meters is being checked and the final settlements of accounts is prepared. In this way the purchasing if energy efficient appliance can affect the home budget after one year.

Up to the moment the organisation and institutions financed from central budget (e.g. hospitals, schools etc.) were not interested in any kind of efficient energy economy. The money comes from central budget were devoted for very particular goals (as salary, investment) and can not be shifted between that. So the money saved in electricity can not be spend for modernisation or extra salary.

Market transformation and changes in Polish economy caused also mentally changes in very many spheres. But still energy efficiency is far behind the trade and finance.

From two years FEWE is engaged in two projects aimed at lighting market transformation and education of Polish society - children, their parents, school directors. We want to advice them what kind light and in what way should they use.

The economy transformation shifted responsibility for schools from central administration organs (called „kuratorium”) to local authorities (called „gmina”). Under their supervisions are at the present over 20.000 schools, in which only 5% were build during last 10 years. Over 60% of all schools were build in 50's and 60's. Designed is similar way were lighted in same way.

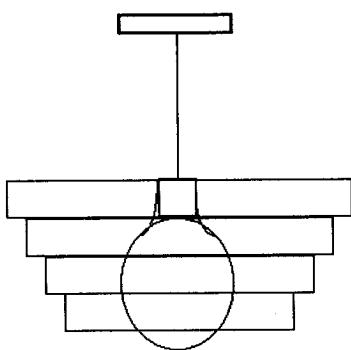


Fig.1

The picture above presents the most popular school fixture with 100W bulb.

In this time we do not have any obligatory light standards, nobody have spoken about glare and light reflections in black blackboards. It was time of demographic explosion and the most important were number of schools than the light quality.

Regular classroom 5 x 8 m was lighted with 6-10 fixtures with 100W regular bulbs.

In 1994 the Ministry of Industry and Trade and Ministry of Labour announced the obligatory standards applying schools lighting. According to that standards the light intensity in the classrooms should be 300 lux and in computer rooms 500 lux, in the same time the light uniformity and glare reduction must be secure. It means that any uncovered lighting source shouldn't be placed in the eyes working area.

In the schools building designed and constructed in 70's and 80's the regular bulbs were replaced by fluorescent tubes 20 and 40W. It decrease the energy demand but do not increase the light standard.

For some economical reasons the fluorescent tubes were installed in very simple fixtures, without any covers, globes and reflectors.

The light intensity in the classrooms grew significantly, but in the vision were uncovered fluorescent tubes. Even with 200-250 lux the light intensity is still not in conformity with Polish Standards. Schools directors and local authorities do know that the schools have bad lighting condition, but they do not know how the correct lighting

look like, how much does it cost and what profits could be expected.

Based on FEWE's experience demonstration projects was prepared in co-operation with WWF.

Three schools were introduced to the project as a result of co-operation with municipal authorities. Two of them - school in Józefów and Katowice - are typical elementary schools, which are fully or almost fully supplied with bulbs, in above mentioned covers. The third-one is a Warsaw-Ursynów new school, which is entirely lighted by fluorescent tubes with ensuring required 300 lux and an uniformity of the light. As a consequence, a big number of fixtures are in use, both in classrooms and halls as well, even though halls are empty during lessons.

So, the modernisation of each school was decided to be done in different scope:

- Katowice school to be supplied with modern fluorescent spill shields,
- Ursynów school to be supplied with a steering system for providing a light in halls - motion sensors switch on the light in that part of the hall where the someone's presence is detected,
- Józefów school to be supplied with modern fluorescent spill shields and the above mentioned steering system, either.

The one thing which is worth pointing out is that, all modernisation was carried out during a school year, without an interruption in lessons.

Since November till March – during one half of the year – we have measured the energy use – before and after the modernisation. Obtained results are quite promising.

In the Katowice school the energy use for lighting decreased by 45% and the energy bill was reduced by 40%. In Ursynów the energy use was lowered by 10% and the bill by 7%. This situation in the Józefów school was correspondingly: lowered by 29% and 25%.

In fact, those mentioned savings are not all of the advantages to that project. The other one is that these modernisation has attracted an interest of the society – school directors, teachers, pupils and municipal authorities. Teachers have prepared special lessons devoted to sources of lighting, the lighting use and its influence on the natural environment. They have just realised, that there is a lack of good teachers' guides allowing the presentation of that subject in modern and interesting way.

On the base of those conclusions, FEWE has decided to popularise in more details this subject in school environment and partially fill in the information and education gap. Aiming at these, FEWE has decided to utilise its contribution to the PELP (Poland Efficient Lighting Project). The PELP is sponsored by the Global Environment Facility and is to help to perform a transformation of the Polish lighting market and sales promotion of the modern compact fluorescent lamps. FEWE has proposed to PELP to carry out a competition among pupils in every stage of education. The main purpose of the project was to attract an interest of pupils and teachers on energy use problems and an activation of school's ecological and environmental groups.

In agreement with the Ministry of Education which became a honouree father of this project, the competition within 5 categories, named „Very simple - snap and light is on” was announced in the beginning of the January:

The categories were following:

1. the "Illumination 1" - addressed to school groups: teacher and pupils - a composition of school energy balance,
2. the "Illumination 2"- for pupils and their parents – a composition of household balance,
3. the 'shadows and lights' a personal contest for pupils for „energy-efficient” poster
4. a journalist contest (an interview, a report, a story) – for pupils
5. a methodological approach to the lesson on energy efficiency and connection with environment – for teachers

Both primary as well as secondary school pupils were invited to the contest. Although the terms of delivery of works were very short – till 5th of April, almost 200 schools took part in the competition. (at the moment the competition is being summed up and its full presentation will be given in a separate report).

Circa 400 fine arts, journalist compositions, school and household balances and methodological lessons were collected. They were, of course, of different quality but the truth is that the main purpose of the project was accomplished. In about 200 schools the energy use problems have become the lesson's subject, they have appeared in talks and discussions.

In many cases they served as a starting point for concrete measures undertaken by school management, teachers and even pupils on their own. Parents were occasionally invited to co-operate and an efficient energy use has been adopted by households.

Within the „Illumination 1” contest – together with balances the conclusions were proposed, which were sometimes abstractive (e.g. the less is dirty clothes – the less washing machine is in use). In many cases they proved to be justified. They pointed out areas where the energy is wasted, showing the ways of improvement – starting from a switching off the light in rooms where people are not present to a replacement of bulbs with fluorescent lamps. Often, economic analyses of these measures and an influence of the energy use on the natural environment were carried out, whereas methodological works suggested varied forms of lessons (a full description will be presented in the separate report).

Now, a special brochure is in the press and it will be ready for the conference. This brochure will include all awarded works, the information about the WWF-FEWE project within lighting modernisation in school buildings, as well as the methodological approach to energy problems for teachers with a special accent on lighting.

Several journalist compositions have attracted an interest of some editorial offices and they promised to publish them. The best scenarios of lessons will be additionally issued in pedagogical periodic.

To sum up, this competition is recognised as a quite useful form of promoting of re-thought environmental behaviour among the youth and adults.

The first competition organised on such a big scale has required a lot of financial sources and has been considerably time consuming. Despite of these facts, people responsible for that project are seriously thinking about its second edition. The first contest was supported by WWF and GEF funds, however it seems to be possible, that the further financing will be collected either from the Ministry of Education, National Fund of Environment Protection or producers of efficient lighting.

Young people are believed to be the best listeners and it is really worth talking to them, as the truth is that 'what is bred in the bone will come out in the flesh...' ●

