

Best practice examples



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INTRODUCTION

Review of information published on the Internet and in printed form, and a survey via questionnaire were used for data collection and analysis and Status Quo Analysis preparation, alongside interviews with representatives of relevant ministries, institutions, schools and investors.

Below are presented the results of interviews, which together with the best practice examples, provide complete information on the current situation, in Slovakia; i.e. legal environment, and the environment in both construction sector and education are presented.

This document describes 17 best practice examples.

Ministries and institutions

Ministry of Transport, Construction and Regional Development SR (Ministry of Transport SR)

- When creating legal regulations in the field of energy performing buildings, the Ministry of Transport SR cooperates with the following institutions: Ministry of Economy SR, Ministry of Interior SR, Ministry of Education, Science, Research and Sport SR, secondary vocational schools and others
- In 2009, the Ministry of Transport SR initiated establishment of study/training centres at secondary vocational schools for further education and professional qualification of workers in the construction sector
- The Ministry of Education, Science, Research and Sport SR (Ministry of Education SR) is also involved; it carried out a survey on employment of the secondary vocational school graduates
- The key problem is considerable lack of interest in the studies on the side of students
- There are clear advantages for children from socially disadvantaged groups to study at secondary vocational schools
- The required fields of study exist
- Financing is a problem – currently the most important criterion for being awarded a contract and also for participation in tenders, is the price, and therefore construction companies rely upon low labour costs, and often hire unskilled workers at lower wages
- A possible solution is to prefer those who are actively involved in energy performing buildings (application for financial support, offering more favourable banking products to individuals and companies, e.g. lower interest rates on loans, tax benefits)

Ministry of Transport SR, having in mind that the new requirements for energy performing buildings need to be communicated to both professionals and general public, prepares a large information campaign regarding the Act N°555/2005 Coll. on Energy Performing Buildings, which was amended by the Act No. 300/2012 Coll., a new decree and prepared National Plan for construction of buildings with nearly zero energy demand.

National Lifelong Learning Institute

- Closely cooperates with the Ministry of Education SR and the National Institute of Vocational Education
- As an organization acting directly under the Ministry of Education SR, it carries out a project enhancing employment opportunities in the Slovak Republic, in form of an unemployment survey and a survey of demands for individual occupations
- the main activity of the Institute is to prepare seminars focusing primarily on interpretation of new acts and regulations, to the general public
- In relation to the legislative changes and new requirements for energy performing buildings, a seminar for secondary vocational schools principals is under preparation
- At present, seminar fees are paid by participants; seminars are led by experts in the given field
- The largest interest in the seminars is in Eastern Slovakia and the lowest in Nitra, Trnava, and Bratislava and Trenčín regions
- The possible solution for lack of interest in further education is:
 - ü To change the employers' attitude and to allow employees to participate in seminars
 - ü Financing – free further education
 - ü Seminars should more focus on practical skills - closer link of theory with practice

Slovak Standards Institute

- Closely cooperates with the Slovak University of Technology on various projects
- The main specialisation is transposition of the European standards and development of national standards; if a national standard of another country is adequate and is applicable in another country, it is also possible to request for its transposition
- Standards were binding in the past, however, since 2000 these are voluntary, and compulsory are only those referred to in legislation, or certain standards are made binding by agreements
- Closer cooperation of the Slovak Standards Institute with secondary vocational schools in training of their teachers focused on interpretation of standards in construction, providing schools with these so that standards could be included in curricula, could be of benefit
- The Slovak Standards Institute will provide a list of valid standards for construction, for the BUSS project

Secondary vocational schools

Secondary Building School in Nové Zámky

- The Association of Secondary Vocational Schools and the Association for Development of Secondary Vocational Schools, were established to support the development of secondary vocational schools, nevertheless, their activities are mostly formal, and therefore principals work closely together when solving specific practical problems
- Besides the Ministry of Education SR, the school cooperates with professional guilds, the Slovak Chamber of Tradesmen, the Slovak Chamber of Commerce and Industry, and also with construction companies

- currently, the secondary vocational school offers various forms of study: 2-year study– for auxiliary workers; 3-year study-completed with an apprenticeship certificate; 4-year study-completed with a secondary school-leaving examination¹
- The school tries, to a certain extent, to introduce new requirements for energy performing buildings into all fields of study
- Introducing various new fields of study is meaningless, as there is insufficient interest on the side of students in these; there is rather a tendency to combine several fields of study into one, due to the universal workers required by employers at a construction site
- The initiative for establishment of a new field of study is submitted by a secondary vocational school principal to its founder, who submits the application to the Ministry of Education SR for further decision
- Some new fields of study, such as technician for fire equipment, are being introduced
- Due to insufficient funding - schools are financed by the number of students which doesn't take into account the fact there are not more than 10 students a year studying in a specific field of study - schools are forced to seek also other funding sources; practical training of students in construction companies is also paid
- Schools are reconstructing buildings from their own resources and rent these
- During the school year, secondary vocational school organizes several competitions of students (Young craftsman, Young creator, JUVYR exhibition ...), and every year, Trade Union organises a competition and awards the best students of year – another type of support given to students from socially disadvantaged groups by the school
- The school considers it important to publish its activities and those of its students, in order to raise interest in the studies, and organizes Open Days
- The Ministry of Education SR should entrust further education to secondary vocational schools instead of granting accreditations to various private education institutions
- The key barriers for secondary vocational schools:
 - ü low interest in the studies
 - ü low social recognition of occupations in the construction sector
 - ü a big number of students from socially disadvantaged environment
 - ü lack of finances
 - ü lack of support from the appropriate institutions (ministries, associations, etc.)

Investors

Trigranit Development Corporation

- In the last 20 years, they are aware of dynamic development in construction of buildings and a huge shift in the field of land constructions
- Clients ask for new elements leading to energy savings to be introduced into their constructions, though price is still one of the key factors
- Experts from various fields are being consulted regarding the best and most efficient systems to be used

¹ Transl. note: „Maturita“ in Slovak

- Investors use multi-level management, in order to ensure for high quality and to avoid selection of inadequate suppliers; often, previous good experience plays an important role in selecting a supplier; in tenders they try to find a compromise between the price and the quality of work
- they identified a reserve in further education

Summary

Generally, interviews identified language barrier of mobile workers, construction sector fragmentation, inadequate/lacking coordination among crafts and professions, job insecurity, specific difficulties of SMEs in access to training, as problems that may hinder the country to achieve the energy goals by 2020, in the construction sector.

Secondary vocational schools confirmed that at present, they cooperate very closely with production companies from construction sector, which provide training at schools about new materials and technologies; however, no intensive cooperation with construction companies has developed, yet.

All stakeholders see potential for improvement through high quality. As there is no control mechanism enforced at the moment, quality control on the side of relevant authorities needs to be stricter, as well as sanctions imposed to those who don't deliver the required quality, motivating thus construction companies to employ skilled workers. The content and scope of professional training will then reflect the demanding requirements, and thus, quality will be enhanced. Another tool for improvement should be monitoring of employment of secondary vocational school graduates at the labour market.

Secondary vocational schools see a need for universally educated employees in construction companies in future, so that they could adapt to innovations and changing conditions, be able to constantly learn new skills and procedures. A solution to this is not a number of new specialized fields of study, but rather several related fields of study combined into one. Moreover, requirements resulting from the 2020 energy targets should be introduced into curricula.

Secondary vocational schools see their chance to expand through lifelong learning, as the number of students in formal education is constantly decreasing. Lack of public awareness is another identified insufficiency. Another suggestion, and, at the same time an appeal to relevant authorities, is to raise the status of professional organizations and strengthen the position of guilds and associations.

Major problems of vocational education:

- lack of interest in the studies
- insufficient capacities of students - secondary vocational schools are mostly attended by students not enrolled to any other type of school
- lack of funding for development, and lack of support from relevant authorities
- low financial reward of workers (graduates from secondary vocational schools) working at constructions, and low social recognition of occupations in the construction sector
- very strict criteria for selection of pedagogical staff and lack of interest from the side of professionals to teach at secondary vocational schools
- financial rewards for teachers lack motivation, which is resulting in professionals leaving vocational education

1. EKOFOND, non-investment fund, AS THE INITIATOR OF NEW FIELD OF STUDY – TECHNICIAN OF ENERGY EQUIPMENT IN BUILDINGS

Subtitle: The best practice example of cooperation between schools and businesses

Period: 2009 - 2014

Characteristics:

EkoFond, a non-investment fund, was established by its founder SPP, on February 7th 2007, with the aim to support projects focused on effective utilisation of energy, environmental protection, and activities related to education, and awareness increase in these areas. In addition to grant and partnership programmes (more at www.ekofond.sk), EkoFond implemented a number of activities within its own projects. These projects are managed and funded from its own resources.

One of its own projects is called **EkoFond for schools**, which includes a comprehensive package of educational activities in the field of gas industry and energy demand, and includes activities for primary schools (annual competition for the second level of primary schools, online interactive games for students at the first level of primary schools, online multimedia platform on energy, a travelling exhibition on energy), as well as activities for secondary schools, including in particular introduction of a new field of study – technician of energy equipment in buildings.

Based on the situation at the market and suggestions from SPP Alliance partners, as well as based on the results of an analysis, EkoFond initiated and subsequently developed a 4-years field of study completed with secondary school-leaving examination - “technician of energy equipment in buildings” - together with three secondary vocational schools (Secondary Electro-Technical School in Trnava, Secondary Technical School in Prešov and Secondary Building School in Banská Bystrica) and the National Institute of Vocational Education. The study was approved by the Ministry of Education and runs since September 2010. It is the only field of study in Slovakia, which deals with the most widespread forms of energy used by households and small and medium-sized enterprises.

The development of the field of study and cooperation with schools.

- EkoFond received suggestions to develop this field of study from SPP clients who were not satisfied with the availability of quality services in the field of energy provided to households (installation, warranty and post-warranty service of boilers and other equipment for production of heat and hot water in households, energy consultations, etc). SPP has a programme for companies active in the field of design, installation, sale and service of energy equipment - particularly gas equipment; SPP prepared a list of its Alliance partners and actively cooperates with them. Then, a questionnaire survey was carried out among most of the SPP Alliance partners, in order to analyse the quality and availability of the required experts. Also, an analysis of secondary vocational schools was conducted in cooperation with the Slovak Chamber of Tradesmen, in order to identify secondary vocational schools with specialisation best

matching the requirements. In cooperation with the above mentioned three selected schools, a field of study was created which was later accredited by the Ministry of Education SR.

- At the same time, building of professional workshops, training of teachers and masters of technical education, as well as development of new text books for students, commenced.
- EkoFond created a special grant scheme, in cooperation with UNDP, from which the selected schools could obtain funding for financing equipment for professional workshops.

Activities:

- Building of workshops:

EkoFond has been coordinating building of professional workshops for practical training of students in the above mentioned three pilot technical schools. Special workshops/classrooms are equipped with the latest equipment (boilers, solar panels, photovoltaic panels, gas heat pumps, micro-drive, etc.) provided by the Alliance partners, and also with financial contributions from UNDP and EkoFond, these amount 642,731 EUR.

- Development of textbooks:

EkoFond also manages and coordinates the development of new text books for this field of study, in cooperation with the Slovak University of Technology in Bratislava, other Slovak universities, SPP and professional associations. Since this is a field of study in experimental testing, it is difficult to obtain other funds for textbooks preparation, so it will be funded by EkoFond.

- Training of teachers and masters of technical education:

EkoFond also provides training for teachers and masters of technical education for this new field of study. Its topics copy the training programme of the new field of study, while a strong focus is placed on new areas, such as renewable energy, etc. Lecturers are experts from SPP and its Alliance partners who provided equipment for workshops, as well as professors from the Slovak University of Technology, in Bratislava. Training takes place every year and is regularly updated, in order to match the needs of the teachers and masters.

- Communication and promotion:

An integral part of these activities is promotion and communication about this field of study. Schools actively communicate with primary schools in their regions, organize meetings with parents, career and educational counsellors, address regional media, and organize open days. The field of study is promoted through websites of schools and their founders. In addition to activities of schools, EkoFond prepared posters, leaflets and roll-ups, and promotes the field of study at a variety of events, such as the discussion forum on the Corporate Social Responsibility organized by the magazine Trend; a national exhibition of products of secondary vocational school students called "The young creator", etc. At the time when parents and pupils from primary schools make their selection of secondary school, EkoFond runs an annual advertising campaign to support the above mentioned field of study.

Outputs:

Outputs of the project are:



- creation and verification of a new technical field of study
- support of technical education
- fill in "gaps" at the labour market, lack of the technical staff
- support employability
- support cooperation between schools and business entities.

Graduates from this field of study will be able to find employment not only in gas industry but also in the whole energy market by providing consultations and services at purchase, installation, servicing and maintenance of energy equipment in households and small operations that involve energy savings in buildings, eventually could further study at universities.

Awards:

EkoFond, together with the three above mentioned pilot schools, keep receiving one award after another, for the development of the field of study "technician of energy equipment in buildings". On April 17th 2012, TREND CSR Forum organized by TREND (weekly) magazine with the title: "How it looks like when companies really support schools?" was held in Bratislava. Secondary Electro-Technical School in Trnava, Secondary Building School Kremnička in Banská Bystrica and the Secondary Technical School in Prešov were awarded the prize for the most active school in co-operation with companies in the development of educational activities, in the category vocational school, for their cooperation with EkoFond on the development of the field of study 'technician of energy equipment in buildings'.

In the competition for the prize awarded by the Minister of Economy - "The best cooperation of secondary vocational school with employers in preparing students for sectors belonging under the Ministry of Economy" - EkoFond was placed second. The award was handed over to Ms. Eva Guliková, EkoFond administrator and to headmaster of the Secondary Electro-Technical School in Trnava, by Tomáš Malatinský, the Minister of Economy.

The uniqueness of the project lies in the fact that it is based on an analysis of the current needs of customers, addresses the issue comprehensively (development of the secondary field of study, building professional workshops, training of teachers, development of textbooks) and, at the same time, EkoFond specifically involved a large number of entities that may help to secure a long-term sustainability (cooperation of companies and schools, state educational institutions) of this field of study, also without a significant intervention from the side of the Fund.

EkoFond plays the role of an initiator of the project, but also the role of a catalyst - trying to boost education cooperation with entities closely linked to the field of the study, and to ensure its smooth introduction and its sustainability.

EkoFond supported education with an overall amount of €4.2 mill. during the project (since 2008).

2. EKO FOND, non-investment fund established by SPP (www.ekofond.sk)

Subtitle: The best practice example of cooperation between schools and businesses

Period: since 2007 till today

Characteristics:

EkoFond, a non-investment fund, was established by its founder SPP, on February 7th 2007, with the aim to support projects focused on effective utilisation of energy, environmental protection, and activities related to education and enlightenment (public awareness increase) in these areas. EkoFond strives to be a reliable and professional partner for all who have decided to walk the road of energy efficiency and thus want to contribute to creating conditions for a permanently sustainable development of the society.

Having regarded its vision, EkoFond progressively built-up the structure of its activities. The beneficiaries of the results of its activities, as well as grant contributions, are generally "non-commercial entities" - cities, towns, schools and the like.

Activities/Outcomes:

- Grant programmes

The main form of support from the side of EkoFond for the above specified entities is financial contribution to promote energy efficiency. There are 5 grant programmes:

- Programme 01 - Cogeneration and trigeneration on the basis of the natural gas - Support of projects focused on implementation of progressive technologies of combined generation of electric energy, heat and cold, on the basis of natural gas
- Programme 02 - Improving energy performance of buildings - supporting projects to enhance energy performance of buildings through exterior walls insulation, replacement of windows and adjustments of thermal system
- Programme 03 – Support for installation of gas heat pumps - Objective of the programme is to support the broadest possible installation of gas heat pumps, which are a more ecological way of heating and cooling of buildings with low operational costs, and to increase awareness of general public about this type of technology and its economic and environmental advantages
- Programme 04 - Implementation of new progressive technologies on the basis of natural gas - This programme is meant to support projects aiming at applied research and development of progressive technologies on the basis of natural gas, and to support implementation of their pilot projects. The aim of programme is to support applied research and development of progressive technologies using natural gas, and implementation of their pilot projects.
- Programme 05 - Supporting spreading of utilisation of CNG, alternative motor fuel in the Slovak transport - This programme is meant to support activities focused on increased utilisation of CNG (compressed natural gas) for propelling of vehicles.

- Partnership projects

Within its Partnership projects, EkoFond cooperates with other non-profit, and non-investment entities and foundations in their activities and projects that comply with the Fund's objectives. The collaboration may have a form of financial contribution to implement projects, or professional and personnel capacities are provided by the Fund.

- Own projects

In addition to the above mentioned activities, EkoFond implemented a number of activities within its own projects, which are implemented and managed in accordance with the purpose of the Fund and within its own initiative. One of its own projects is also the project **EkoFond for schools**, which includes a comprehensive package of educational activities in the field of gas and energy consumption.

The own project of EkoFond for schools includes:

- activities for primary schools

- Annual competition for second level of elementary schools to motivate teachers to develop creative projects focused on energy efficiency
- Interactive games for students at first degree accessible on Fund's website
- Online multimedia platform on energy for mutual sharing of experience among teachers dealing with subjects related to energy saving and environmental protection
- Interactive travelling exhibition on energy - since September 2011, the exhibition travels across the country

- activities for secondary schools

Based on the situation at the market and suggestions from the SPP Alliance partners and the results of an analysis, EkoFond initiated and subsequently developed a 4-years field of study completed with final secondary school-leaving examination - "technician of energy equipment in buildings" - together with three secondary vocational schools (Secondary Vocational Electro-Technical School in Trnava, Secondary Vocational School in Prešov, and Secondary Vocational Building School in Banská Bystrica) and the National Institute of Vocational Education. The field of study was approved by the Ministry of Education and is opened since September 2010. It is the only field of study in Slovakia, which deals with the most widespread forms of energy used by households and small and medium-sized enterprises. EkoFond built professional learning workshops for practical training of students in the above mentioned three pilot vocational technical schools. Special workshops/classrooms are equipped with the latest equipment (boilers, solar panels, photovoltaic panels, gas heat pumps, micro-drive, etc.) provided by the Alliance partners, and together with financial contributions from UNDP and EkoFond, their value amounts €642,731. EkoFond also manages and coordinates development of a new textbook, training of teachers and masters, for this field of study. Activities related to promotion and communication is an integral part of this project.

3. PROJECT LEONARDO DA VINCI – MOBILITIES: THE YOUNG CARPENTER OF THE 21ST CENTURY

Subtitle: The best practice examples of cooperation with the schools

Period: 2012-2013

Characteristics:

The project is implemented by the Secondary Vocational Building School at Tulipánová N°2, in Žilina. Programme Leonardo da Vinci (LDV) is part of the Lifelong Learning Program of the European Commission, and it aims to promote trans-national mobility of students from secondary vocational schools in order to acquire, increase and expand their work and practical professional experience, skills and competence. LDV mobility is also a great opportunity to become culturally mature EU citizens. The need to prepare various high-quality professionals was also identified after labour market was opened within the European Union.

In the project, students will receive special professional skills in carpentry and strengthen their language skills in the German language, as well as social and intercultural competencies, given that the course participants from different countries will communicate in German language.

Students will link theoretical knowledge from the field of study of carpenter with practical training, as they will go through all phases of the work - from design to final work – i.e. construction of a gazebo for a kindergarten in Žilina; they will get familiar with different technological procedures in wood processing. The aim of their internship is to apply in practice the knowledge acquired in vocational subjects.

Students will create an exercise book in which they will document the individual steps in construction of the product. This exercise book will be a good tool for teaching carpenter technology at school. Last but not least, a small vocabulary of terms used in this field will be created.

Participants will work on the assigned tasks together, in international groups. They may verify their skills, eventually deficiencies, and will be able to assess themselves and others, as well. During mutual communication during the shared professional learning in the vocational education held in the workshops representing real production environment, and also during their joint leisure activities, students will gain a broad cross-cultural competencies, enhance their language skills in German, and experience life in different EU countries.

Since 2009 – 2010, school has been cooperating with partners (Secondary Vocational School in Liberec, Training Centre of Construction in Frankfurt an der Oder, Germany) because they have very good material and technical equipment, and thus, can ensure that our students acquire new knowledge and experience in their field and improve their skills and knowledge leading to their personal growth.

Secondary Vocational School in Liberec has extensive experience with various types of international projects, mostly with Germany. It is an organization with a broad focus - mechanical engineering, construction and transportation.

The Training Centre in Germany was established by the Association of Construction Entrepreneurs of Berlin and Brandenburg. This organization carries out various types of special education in the construction industry - land constructions, civil engineering, reconstructions - including organization of the tests of masters. It is the founder of five training centres for various businesses, which are located at seven places in Brandenburg and comprise very modern training facilities for construction industry.

Activities:

As the mobility takes place in different countries, professional courses and language training courses are organized for participants. In technical subjects, students learn the technology, materials, and tools, in order to be able to successfully participate in the project. Texts focused on special vocabulary for carpenters have been developed for the language course. An intensive training in the workshop is led by experienced professional masters.

An article about promoting the results of the project was published in various newspapers (local newspapers published in Žilina – MY, Kysucké noviny, Učiteľské noviny - newspaper for teachers), and a panel about the school was created. The gazebo will be officially handed over to the kindergarten in Žilina with participation of representatives of Žilina Region.

The project will further deepen the quality of cooperation among all participating organizations, help to make the study at secondary vocational schools more attractive, as the interest in being a good construction craftsman is declining from year to year, which is also proved by the ever lowering number of young people applying for building vocational schools.

At the regional level, its authorities and, in particular the citizens will learn about the school, as active approach and a concrete work of its students will help to enhance the quality of environment for children in kindergartens. Excellent professional skills of our students will also attract the attention of construction companies that provide job opportunities for our young graduates a in their field of study. The project will broaden cooperation with organizations from different EU countries.

The project financing:

25 students and 4 accompanying adults will participate in the project, which received a grant of €45,292 to cover:

● living expenses for students	€30,839
● preparation	€3,080
● organization of mobility	€3,750
● travel costs	€2,266
● total costs for accompanying adults	€ 5,356

4. SECONDARY VOCATIONAL BUILDING SCHOOL IN KREMNIČKA N°10, BANSKÁ BYSTRICA

Subtitle: The best practice examples of cooperation between schools and businesses

Characteristics (Secondary Vocational Building School):

EkoFond - non-investment fund - in cooperation with the Secondary Vocational Building School in Banská Bystrica, two other secondary vocational schools, and the National Institute of Vocational Education, prepared a project for schools - a 4-years field of study completed with secondary-school leaving certificate (“maturita”)– technician of energy equipment in buildings.

The field of study was developed on the basis of labour market survey, suggestions from the SPP Alliance partners and also on the results of the analysis conducted by EkoFond.

Within this cooperation, specialized classrooms for theoretical and practical training of students were built, new study literature is under preparation, and on-going training is provided for teachers and masters in this field of study, and also promotion of the field of study is organised.

Within this project, EkoFond, together with individual companies, provided and installed the following equipment for professional classrooms and workshops for the field of study:

- Viessmann - supply and installation of boilers, solar heating and photovoltaic panels
- Vaillant Group - supply and installation of boilers, solar heating system
- KKH - supply and installation of water storage tanks, samples of the material
- Izamer Ltd. - Supply and installation of control system
- UNDP - supply and installation of micro-cogeneration units and heat pumps

The cooperation with other construction companies continues as well, where students take their practical training, or companies provide construction materials, equipment and teaching aids to schools :

- Kobok-Piesok provides professional training for students of the third year of the apprenticeship field of study Stove builder, directly within the company premises. After completion of their studies, graduates will have an opportunity to get a job in the company for a period of six months, and then they can decide whether to become independent or stay employed.
- Mijas, Ltd. – professional training for students – painters
- Anri Slovakia, Ltd. - Training of students - plumbers
- Tatramat Poprad - Supply of electric and solar storage water heaters
- Herz - Supply of installation material for practical training and literature; and also companies Styk servis - Banská Bystrica, Urapo, Ltd. - Oravská Lesná, Remonta -

Zvolenská Slatina, Hydromont - Banská Bystrica, Medve, Ltd. - Liptovský Mikuláš,
Unions, Ltd. - Zvolen.

Cooperation with guilds:

- Guild of fireplace and stove makers - provides building materials for students, professional practice, visits, work clothing and shoes for students
- Guild of heating, heating technology and installation - provides teachers, and literature, teaching aids and technical advice to students
- Roofers Guild - provides teachings aids and professional seminars
- Guild of chimney-sweepers – technical advice to schools in the construction fields of study

In October 2012, the Centre for lifelong learning in construction sector was established for Banská Bystrica Region.

Currently, the school facilities are being renovated –premises for theoretical and practical education as well as the campus (replacement of windows, insulation of building, restoration of roof and heating system).

Practical education of students seems to be a problem - sending students for practical training to various companies mainly in winter months, when companies face problems to find jobs for their own permanent staff.

Characteristics (the component Secondary Vocational Building School):

The school cooperates with the Slovak Chamber of Civil Engineers, which provides professional lectures for teachers, and annually participates in evaluation of the best students projects.

Furthermore, the school cooperates with the following companies:

- Velux - students participate in an annual competition organized for secondary vocational schools with specialisation in building, where they design a family house – Velux with an attic apartment. When designing external walls, window constructions and roof, they take into account the heat and technical requirements defined in national technical norms.
- Porotherm, Porfix, Smrečina Hofatex, OJSC – cooperate in form of practical consultations, as well as in project design activity. During practical demonstrations of their projects, students have an opportunity to become familiar with new materials, technologies and solutions of construction details. Porfix organizes competitions for students of secondary vocational schools in which students of the Joint Vocational School Kremnička, also participate.
- Rehau, Univenta – deliver teaching aids, training of teacher in the TechCON programme. Students may use the TechCON software for calculating heat loss and design of central heating system with a database of products of mentioned companies.
- Herz – supplied professional literature
- Cros – supplied the budget calculating software “Cenkros” for students, together with manuals. It also provides regular training for teachers in that program. Students have an opportunity to participate in the "Young Budget/Costs estimate Expert"

competition, organized by the company Cros. When successful, students can be granted a certificate in the use of the Cenkros software.

- A-SICE Ltd. - Organizes various professional seminars (e.g. modern building, manufacturers of building materials, heating technology - low temperature and condensing boilers, heat pumps, solar and photovoltaic devices, ...), in which teachers of vocational subjects may participate
- Professional activities of secondary schools - students annually participate in this contest
- In the previous academic year, students of this school were at the 2nd place at the national round of the Professional activity of the Secondary Schools.

Posting students for their 2-weeks practical training seems to be a problem - practical training of students is planned to be held through the so called academic week² and the week when the school leaving exams take place.

This practical training is mostly organized by students themselves - in design or in construction companies.

In the past, cooperation with bigger construction companies was organised, but now many of them closed and small companies are not sufficiently motivated to train students, also their future potential colleagues.

² *Transl. note: a week when students in the last year of study have a week off and prepare intensively for final exams*



5. SLOENERGOOKNO (www.sloenergookno.sk)

Subtitle: The best practice examples in the field of education of the construction workers

Period: since 2008

Characteristics:

The Association Sloenergookno was established as a voluntary association of entities with business activities covering the whole range of issues connected with designing, manufacturing, selling and installing panels for openings in building. Members of the Association are not only manufacturers of windows and doors, but also suppliers of insulation glass, window profiles, as well as various other supplements for these parts of a structure.

One of the basic missions of the Association, is to promote quality domestic products for buildings in production, sale and installation, which comply with the standards, internal regulations and the latest R&D developments trends. Members of the Association produce about 1.5 million windows a year, which represents 70 to 80% market share.

Activities/Output:

- Courses
 - 2010: Connecting joints for windows and doors, in cooperation with the Faculty of Mechanical Engineering of the Slovak University of Technology in Bratislava, October 26th 2010 in Zlaté Moravce - 13 participants from company Fenestra Sk, tests, successful participants received a certificate: PASSPORT for INSTALLATION

Connecting joints for windows and doors, in cooperation with the Faculty of Mechanical Engineering of the Slovak University of Technology in Bratislava, November 9th 2010 in Zlaté Moravce - 16 participants from company Fenestra Sk, tests, and successful graduates received certificate: PASSPORT for INSTALLATION

Connecting joints for windows and doors, in cooperation with the Faculty of Mechanical Engineering of the Slovak University of Technology in Bratislava, November 23rd 2010 in Senec - 10 participants from various companies passed tests, successful graduates received certificates: PASSPORT for INSTALLATION
 - 2011: Technical standards for suspended walls in production and trade, in cooperation with the Faculty of Mechanical Engineering of the Slovak University of Technology in Bratislava, on April 6th 2011, in Bratislava - 20 participants
 - 2012: Technical standards for production and assembly of windows and doors, in cooperation with the Faculty of Mechanical Engineering of the Slovak University of Technology in Bratislava, on February 16th 2012, Bratislava - 20 participants

Connecting joints for windows and doors, in cooperation with the Faculty of Mechanical Engineering of the Slovak University of Technology in Bratislava on January 19th 2012 in Bratislava - 15 participants from various companies, passed tests, successful graduates received certificate: PASSPORT for INSTALLATION

- Seminars
 - 2008: Seminar: Energy-efficient windows and their quality, held in Bratislava on November 19th 2008, one-day seminar, participants from 120 production companies
 - 2009: Seminar: Innovation and quality of window structures, held on April 23rd 2009 in Banská Bystrica, one-day seminar, 50 participants from production companies
 - Energy-efficient windows and their quality- under the same name as a workshop held in 2008, but with another content, October 29th 2008 in Nitra, one-day seminar, 75 participants from production companies
 - 2010: Seminar: Innovation and quality of window structures, with the same name as in 2009, but a different content, June 5th 2009 held in Banská Bystrica, one-day seminar, 50 participants from the production companies
 - 2011: Seminar: Economical and ecological windows, held on November 29th and 30th 2008 in Modra-Piesok, a two-day seminar, 75 participants from production companies
 - 2012: Workshop: Energy-efficient windows and their quality, held on May 29th 2012 in Modra - Piesok, one-day seminar, 60 participants from production companies
- Lectures given during exhibitions (with free entry):
 - CONECO/ RACIOENERGIA Bratislava
 - 2010: Ten ways of correct installation of windows, lectures daily, March 23rd to 27th 2010
 - 2011: Ten ways of correct removal of windows, lectures daily, March 29th 2011 to April 2nd 2011
 - 2012: Economical and ecological production of windows by members of the Association SLOVENERGOokno, lectures daily, March 27th to 31st 2012
 - DOMEXPO in Nitra
 - 2012: Correct installation of windows, April 19th 2012
 - Energy-saving insulating glass and wooden windows, April 20th 2012

6. EDUCATION OF THE INSTALLERS OF EQUIPMENT IN THE FIELD OF RENEWABLE ENERGY SOURCES (RES)

- Period:** since 2012
- Initiator:** Ministry of Economy SR
- Target group:** installers of equipment in the field of RES
- Characteristics:**

According to the Trade Licence Act, professional competences of a trade is demonstrated by a valid apprenticeship certificate or other certificate proving completion of a relevant apprenticeship or field of study, and a reference document (confirming practical experience).

In accordance with the Directive 2009/28/EC, the Decree 133/2012 Coll. issued by the Ministry of Economy, that establishes the scope of vocational education, scope of test, details for establishment and operation of the examination boards, as well as the content of certificates for installers, governs the field of education of installers of equipment in the field of the renewable energy sources, at the moment. Training for installers' is focused on acquisition of theoretical knowledge and practical skills to install:

- biomass boilers and stoves
- photovoltaic systems and solar thermal systems
- shallow geothermal systems and heat pumps

Vocational education for installers in the above mentioned areas can be considered existing best example practices example in the field of education regarding the use of renewable energy in buildings in Slovakia.

The scope of the vocational education (activities):

- Installation of biomass boilers and stoves

Depending on the applicants' education, he/she can get a certificate of practical skills in the following fields of study:

- plumber, technician for energy equipment in or buildings or in the similar field of study focused on installation of heating and thermal technology for jobseekers with secondary vocational education
- University graduates – technical systems for buildings or similar area

As a minimum, practical part of training includes installation of heating and thermal technology, cutting pipes and leak testing.

The theoretical part of the training includes:

- biomass energy use
- Description of the biomass market, transport and storage
- Biomass combustion and its products, emissions and environmental protection

- Design, installation and maintenance of biomass boilers and furnaces
 - Hydraulics
 - Measurement and control
 - Fire protection
 - Economy of operation, investments, overhead costs, RoE, grants and other support schemes
 - Technical regulations in the field of biomass boilers and stoves
 - Generally binding regulations for biomass boilers and stoves
 - European Union legislation in the field of biomass boilers and stoves
- Installation of photovoltaic systems and solar thermal systems

Depending on the applicants' education, he/she can get a certificate of practical skills in the following fields of study:

- applicants with completed secondary education - installer, technician of energy equipment, or in a similar field focusing on installation of heating and thermal equipment installation or installation of electrical equipment,
- University graduates – technical systems for buildings or similar area

As a minimum, practical part of training includes installation of heating and thermal technology, installation of electrical equipment, roofing and basic knowledge about roof materials, sealing methods, methods to cover cracks, cutting pipes, soldering pipe joints, gluing pipe joints, sealing of fittings and leak testing.

Theoretical part of training includes:

- Types and characteristics of photovoltaic systems and thermal solar systems,
- The availability and quality of the systems and components at the market
- Environmental impacts of installation
- Design, installation and maintenance of photovoltaic systems and solar thermal systems, in particular:
 - ü Identification of active and passive systems and their components
 - ü design of components and systems configuration, and their inclusion into existing electrical systems, heating or hot water generation
 - ü Determination of required surface, orientation and gradient of the photovoltaic panels or thermal solar collectors
 - ü Assessment of installation adequacy regarding the building's energy demand and climate conditions
 - ü Size of electrical conductors and connection design breakers
 - ü Selection of appropriate method for installation depending on roof type
 - ü Identification of installation risks
 - ü Hydraulic connection of solar thermal systems
 - ü Measurement and control
 - ü Fire protection
 - ü Economy of operation, investments, overhead costs, RoE, grants and other support schemes
 - ü Technical regulations for selected technical equipment,
 - ü Generally binding regulations in the field of photovoltaic systems and solar systems
 - ü European Union legislation in the field of photovoltaic systems

- Installation of shallow geothermal systems and heat pumps

Depending on the applicant's previous education, it is possible that he/she receives a certificate of practical skills:

- applicants with completed secondary education - installer, technician of energy equipment, or in a similar field focusing on installation of heating and thermal systems, cooling and geothermal systems or electrical equipment
- University graduates – technical systems for buildings or similar area

As a minimum, practical part of training includes installation of heating and thermal technology, installation of cooling or geothermal systems or electrical equipment, with the knowledge on cutting of pipes, soldering pipe joints gluing pipe joints, sealing of fittings and leak testing.

Theoretical part of training includes:

- Geothermal resources in different regions, temperature of resources, thermal conductivity identification for soil and rock
- types and characteristics of heat pumps
- availability and quality of systems and components at the market
- environmental impact of installation
- Design, installation and maintenance of heat pumps in buildings, in particular:
 - ü Components and their functions within the heating circuit including compressor, expansion valve, evaporator, condenser, fixtures and fittings
 - ü Lubricating oils and coolants
 - ü Overheating, under-cooling and cooling with heat pump
 - ü Selection and calibration of components for a typical installation
 - ü Determining typical values of heat load for different buildings
 - ü Determination of heat pump performance according to heating and cooling demand of buildings
 - ü Assessment of electricity supply of for a heat pump
 - ü Accumulation of heat and cold in building, including the recommendation of necessary components
 - ü Hydraulic connection of heat pumps
 - ü Measurement and control
 - ü Fire protection
 - ü Economy of operation, investments, overhead costs, RoE, grants and other support schemes
 - ü Technical regulations for selected technical equipment
 - ü Generally binding regulations in the field of heat pumps and shallow geothermal drills
 - ü European Union legislation in the field of heat pumps and shallow geothermal drills

7. PUBLISHING COMPANY EUROSTAV

Characteristics:

Publication activities of the EUROSTAV publisher are also intended for students and teachers of secondary vocational schools, secondary apprentice schools, as well as graduates from these schools who are already working in various professions in construction sector.

Publishing company EUROSTAV is focused on publishing professional periodical and non-periodical publications in the field of construction industry and architecture. Among others, it publishes a professional magazine EUROSTAV. Since 2009, the content of the magazine is focused especially on energy conservation and energy efficiency. In addition to technical and technological innovations in the field of energy performing buildings, it provides specific examples regarding design, construction and operation of energy performing buildings. This is a good source of information for various blue-collar professions, as well as for students who want to learn more about energy performing buildings.

Publishing company EUROSTAV has also published a number of scientific publications about energy performing buildings, which have a broader educative character. Furthermore, since 2010, it regularly organizes specialised international conference "Sustainability in architecture and construction," which addresses a broader professional community with examples of practical and theoretical knowledge and widens theoretical knowledge on energy efficiency and sustainability in architecture and construction.

Finally, it is worth to mention the publication entitled "Quality control at construction sites – Part 1 and Part 2", which was designed also for construction site managers. This book, in particular its Part 2 – Shell Construction, provides specific guidelines and procedures to control the quality of work carried out at a construction site. Shell construction quality is linked to energy consumption in buildings, as well. Well-built structure reduces, for example, future energy need for heating, heat loss, etc. Thorough and regular work control during construction of buildings carried out in compliance with instructions provided in the book and on the CD, including the so-called checklists, will enhance quality of construction and increase energy performance of new buildings.

8. CENTER OF VOCATIONAL EDUCATION IN BANSKÁ BYSTRICA REGION

Subtitle: The best practice examples in the field of education of the construction companies

Period: since 2012

Characteristics:

On 20th of September 2012, the Centre for Vocational Education and Training was opened at the Secondary Vocational Building School Kremnička N°10, in Banská Bystrica, which should serve to and cover the needs of construction sector in Banská Bystrica region, as well as for vocational and apprentice building education from other regions, and in particular for two types of schools: Secondary Vocational Building School and Secondary Apprentice Building School. The main objective is to link theory with practice. The first step is modernisation of existing classrooms and workshops, training of trainers of the vocational subjects, practical training in construction companies and various forms of lifelong learning.

Activities:

- formal education of students in vocational fields of study and apprentice subjects of study
- in cooperation with professional organizations, training and retraining courses in construction-related subjects of study
- professional qualification tests and examinations
- organization of business days, trainings, workshops
- close cooperation with construction companies

Outputs:

- to obtain a final secondary school leaving certificate (“Maturita”) and an apprenticeship certificate
- to obtain certificates on specialised skills
- to help school graduates to find a job
- staff and students of the school will obtain information about the latest building technologies and materials
- to increase the employability of graduates in construction and civil engineering

9. LICENCE FOR INSTALLING EXTERNAL THERMAL INSULATION COMPOSITE SYSTEMS (ETICS)

Subtitle: Example of good practice relating to increase energy performance and protect the environment

Period: since 1992 continuously with a fundamental change since May 1st 2008

Characteristics:

In 1992, training of workers carrying out insulation of external walls of a building using the contact thermal insulation systems (at present market as ETICS) commenced, alongside with implementation of the pilot project for reduction of energy consumption in buildings with the first use of thermal insulation of building surface. The training was carried out by companies bringing these new technologies. Licences were issued by the Building Testing and Research Institute, following the valid regulation. Licences are granted to companies carrying out insulation of building surfaces since 1992, taking into account the changing demands on businesses, as well as the license issuing body.

Nowadays, the Slovak technical standard STN 73 2901: 2008 regarding carrying out External Thermal Insulation Composite Systems (ETICS) was made binding in Slovakia through Art.43g of the Building Act. Art. 3.3 of this standard stipulates: "In order to carry out ETICS, a company is required a to be granted a Qualified Manufacturer Certificate issued by an inspection body of type A. Building Testing and Research Institute holds the accreditation required for an inspection body of type A for verification of construction works quality at construction site. The license is bound to a specific ETICS for which a European Technical Approval (ETA) or National Technical Certificate was issued. In order a licence to be issued to a company, training of its employees who will carry out the works is needed from a company granted the technical certificate."

When selecting a company to carry out ETICS, a license from the Building Testing and Research Institute is required, and thus, the property owner chooses also a concrete thermal insulation system. Work quality of company carrying out ETICS is controlled by an independent body, while the system of insulation needs to be used for which the Certificate of Concordance was issued pursuant the Act No. 90/1998 Coll. on construction products, as amended. List of licensed companies is available at: <http://www.tsus.sk/stavebné-prace/zatepovanie-budov>. Since 2009, the qualification is required for reconstruction of residential buildings under the Act on State Fund for Housing Development, and also for system defects (defects typical for residential buildings built by standard construction systems in 1948 - 1992), unless the failure is removed by the thermal insulation.

Activities:

In this project, the Building Testing and Research Institute issues licenses, and maintains a publicly accessible register, performs regular inspections at construction sites. Thus, it establishes a solid assumption that technological procedure and regulations for the given construction are obeyed by companies, the so called technology discipline is observed, and thus, the overall quality of construction and the whole work, which should also be reflected in the energy performance of buildings.

Building Testing and Research Institute, non-profit organisation, together with the Association for Insulation of Buildings annually organizes workshops for representatives of manufacturers, in order to inform them about new legal and technical regulations related to thermal protection using ETICS, but also about insufficiencies detected in audits of thermal insulation of buildings. Information is also provided in relation to conditions for issuing a licence. Conditions for issuing licences for ETICS are published by the Building Testing and Research Institute on the website www.tsus.sk. Since February 1st 2013, the License Conditions N°5 is effective, which also include critical, essential and not significant insufficiencies. Any insufficiencies found during an audit/inspection may result in imposing a deadline for their removal, and may also lead to revoke the licence.

Outputs:

By 31st December 2012, there were 49 manufacturers of thermal systems ETICS, who hold altogether 119 ETA (European Technical Approval) or National Technical Certificates for ETICS, for which licenses were issued to companies that work with these. As of the same date, 579 companies were granted a licence to carry out construction works through thermal insulation of the perimeter wall of buildings.

10. EKOFOND – PROGRAMME 01: COGENERATION AND TRIGENERATION ON THE BASIS OF THE NATURAL GAS

Subtitle: The best practice example relating to decreasing the energy performance and protecting the environment

Period: since 2009, ongoing

Characteristics:

Within the Programme 01 Cogeneration and Trigeneration on the Basis of the Natural Gas, EkoFond, non-investment fund, in accordance with its public purpose, supports activities focusing on implementation of progressive technologies for combined generation of electricity, heat and cold, on the basis of the natural gas - with performance up to 1 MWh. The aim of the programme is to create a framework of actually implemented technologies that are actually in operation, and with proven results, which will serve as a reference for other potential clients.

Cogeneration is promoted successfully for a long time in Western Europe, and has found its use also in our country, anywhere where the energy costs reduction is required. An important argument in favour of cogeneration is environmental protection. Where less fuel is needed to generate the same amount of energy, the volume of generated emissions is adequately lower.

Activities:

Within the programme, it is possible to apply for a grant for purchase and installation of cogeneration, tri-generation or micro-cogeneration. Cogeneration is used in industry, municipal sector, hotels, hospitals, swimming pools, office buildings and even in family houses.

Within this programme, EkoFond supports cogeneration projects, and also the so-called micro-cogeneration projects focusing on the use of small cogeneration units, which are still considered a new technology in Slovakia. Tri-generation, or combined production of electricity, heat and cold, are also innovative technologies used e.g. in hospitals and swimming pools.

Outputs:

So far, only 3 applications were approved within the framework of the Programme 01 Cogeneration and Trigeneration on the Basis of the Natural Gas, in overall amount of €305,905. There are still available funds of €500,000 within the programme.

11. EKOFOND – PROGRAMME 02: IMPROVEMENT OF THE ENERGY ECONOMY OF BUILDINGS

Subtitle: The best practice example related to improvement of energy performance and environmental protection

Period: since 2009 ongoing

Characteristics:

Within Programme 02 Improvement of Energy Performance of Buildings, there is support provided to public buildings built before 1984, supposing that majority of their energy needs for heating must be based on natural gas. There must be a functional and used heat source in a building used for heating from natural gas. Towns and municipalities are eligible for financial support from this programme that are founders of schools, school facilities and social service institutions. They may receive a financial contribution to implement energy efficiency measures in these facilities. With the help of EkoFond, they may insulate buildings using thermal insulation and replace original windows, and thus, to create conditions for a safe and energy-efficient operation of these facilities.

Activities:

By providing support to implement energy efficiency measures in schools and other public buildings, EkoFond wishes the examples of good treatment of energy became visible, increase public awareness about the long-term environmental and economic benefits these bring to users.

Applications may be submitted within two sub-programmes divided according to the type of the applicant – Public buildings and Schools and educational facilities:

- C1/D1: insulation of perimeter walls, roof/ceiling above the last heated floor (saddle roof with unused loft), ceiling above a non-heated space and other partition walls between heated and non-heated premises, and/or
- C2/D2: replacement of windows – new windows need to include a ventilation slot in order the air is exchanged also when the window is closed

Outputs:

Overview of insulated buildings and replaced windows, and estimated energy savings

Title	Building type	Number of requests	Exchange of the aperture structures	Insulation	Estimated energy savings kWh/year
A	Family houses	31.00	0	5,691.98	665,805.26
B	Blocks of apartments	8.00	0	29,999.95	2,238,398.00
C	Commercial buildings	21.00	2,883.29	21,099.11	23,982.41
D	Schools	60.00	16,560.99	68,283.40	8,846,470.99
Total		120.00	19,444.28	125,074.44	11,774,656.66

12. EKOFOND – PROGRAMME 03: SUPPORT OF INSTALLATION OF GAS HEAT PUMPS

Subtitle: The best practice example related to improvement of energy performance and environmental protection

Period: since 2011 ongoing

Characteristics:

Objective of the programme is to support the broadest possible installation of gas heat pumps, which are a more ecological way of heating and cooling of buildings at low operational costs, and to increase awareness of general public about this type of technology and its economic and ecological advantages.

Widespread use of gas heat pumps in public buildings, social facilities, as well as in residential buildings will be an inspiring example for partners from both private and institutional environment, and will help to increase public awareness about economic and environmental benefits of this innovative device.

Support from the programme is mainly directed to municipalities in Slovakia, which may purchase a gas heat pump at 60% of the total price (€19,200) with this financial contribution, and thus, be environmentally friendly and get a long-term benefit from energy consumption saving. Support for the installation of one or more gas heat pumps may be provided.

Activities:

The programme is divided into two sub-programmes:

- 03/A Gas heat pumps used for heating (e.g. in schools, blocks of apartments, hospitals)
- 03/B Gas heat pumps used for heating and cooling (e.g. in schools, blocks of apartments, or hospitals).

In order to be involved in the grant scheme, applicant shall be obliged to participate in personal consultation with the Fund representatives, which may be held at any stage during the development of the project.

Outputs:

Currently, there are no applications approved, as it is a relatively new grant scheme, announced by EkoFond at the end of 2011.

13. EKOFOND – PROGRAMME 04: IMPLEMENTATION OF NEW PROGRESSIVE TECHNOLOGIES ON THE BASIS OF THE NATURAL GAS

Subtitle: The best practice example related to improvement of energy performance and environmental protection

Period: since 2008 ongoing

Characteristics:

Built on the existing EkoFond activities focusing on students' abilities to link theoretical knowledge and practice, this programme entitled "Implementation of new progressive technologies on the basis of the natural gas", supports projects of young scientists and researchers-authors of innovative R&D projects with results applicable in Slovakia, and joint projects carried out together by research institutions and entities not running a business, which, however, may benefit from the project.

Activities:

The program supports projects in the field of applied research and development of advanced technologies based on the natural gas, innovative methods and processes related to the use of natural gas, or development of technologies or prototypes that will contribute to improved safety of gas equipment and offtake points, and projects to increase natural gas transport and distribution safety, which will help to improve environment and ensure for a safe life.

Project outcomes need to be usable in the process of education, and need to realistically be applicable in the Slovak Republic. The amount of funds intended to support this scheme is €200,000, while one project can receive funding up to €70,000.

Outputs:

Seven applications were approved within the programme 04 with a total amount of €617,663, since 2008 to 2012.

14. GUILD DAYS

Subtitle: The best practice example in education of construction workers

Period: 2004 - 2013

Characteristics:

The Slovak Roofers Guild is a professional organisation that brings together carpenters, insulators, plumbers and roofers. The Guild was established in accordance with the Act No. 83/1990 Coll³. on 27th February 1997, and was registered with the Ministry of Interior on April 9th 1997.

Its membership is voluntary and could be collective or individual – traders, legal persons, vocational schools and other institutions dealing with the design, roofs, production, distribution and financing of materials. It also comprises individuals - leading experts in the field of roof structures. The guild is a non-profit association, not set up for doing business.

The Slovak Roofers Guild represents its members externally, in discussions with other economic and social institutions in Slovakia, international organizations and other bodies abroad. It creates optimal conditions for dissemination of technical information, to its members. It mediates and organizes courses, seminars and workshops for professional development not only for its members, but also for other professionals and the general public. Furthermore, it submits comments and suggestions to the state and local authorities to address the legitimate interests of its members, distributes professional publications to its members. In addition, it provides expert advisory and consultancy services in the field of roof structures, organizes professional, cultural, social and sporting events.

The Slovak Roofers Guild was established mainly to protect and improve the quality of work on roofs. This simply looking sentence requires a lot of changes and work. First of all, training of those involved in the design and construction of roofs. Educate - that means also to inform about the latest trends in construction of roofs, about the new technologies at the market, and also to pay attention to education of young craftsmen. Everyday experience shows a lot of errors companies are making - these are not just mistakes that companies make while carrying out works, but often, inadequate design, and composition, and last but not least, inadequate and incorrect solution of details. All this negative experience emphasised the need of well educated, technically and also manually skilled professionals who know how to deal with all the pitfalls of such a complex structures as roofs generally are. Roof is rarely perceived as the fifth facade of a building, which, nevertheless, significantly affects the overall environment in a building, being also a large element that contributes to it significantly.

On the basis of this, the Guild together with its partner members decided to organize Guild Days – professional seminars on roofs, in 2004. In 2013, seminars will be held already for the tenth year. At each seminar, 6 companies present their latest products in the segment of roofs. Each year, seminars take place in three or four cities, in order to be made available to all interested parties. Topics of each year respond flexibly to the current problems in the area.

³ Transl. note: the Slovak Code

Seminars are designed for contractors, designers, architects and authorized engineers, investors, building managers, building owners, facilities managers, teachers at vocational school, i.e. for the entire construction sector and for everyone who wishes to learn more about the latest trends in roofing. The Guild secretariat distributes invitations to the event to approximately three thousand recipients.

The seminar is free, the event is paid by contributions from presenting companies. For the last ten years the “Guild Days” were visited by more than 5,000 participants.

15. RETRAINING COURSES

Subtitle: The best practice example of education of construction workers

Period: 2009 - 2013

Characteristics:

The Slovak Roofers Guild is a professional organisation that brings together carpenters, insulators, plumbers and roofers. Its membership is voluntary and could be collective or individual. The Guild creates optimal conditions for the dissemination of technical information to its members. It mediates and organizes courses, seminars and workshops for professional development not only for its members, but also for a professionals and general public.

In the last decade, there was a sharp decline in the number of students of roofing trades. Therefore, the Guild leaders considered that the Guild itself would educate craftsmen for the roofer profession. It might not seem a good idea to train your own competitors. The Guild Board, however, decided that it will be good if the Guild will be actively involved in dissemination of information and knowledge. In 2009, taking into account its mission, the Guild submitted to the Ministry of Education an application for accreditation of retraining courses for roofers, carpenters, plumbers and insulators. For the last three years, 120 participants from the whole Slovakia graduated from the retraining courses of the Roofers Guild.

Target group

- unemployed secondary school graduates
- applicants for trade licence in this field
- unemployed

Extent (duration) of the course:

- 350 h (theory 30 h + practical training 320 h), duration: 3 months.

Required previous education:

Completion of a three-years apprenticeship finished with the final apprenticeship exam and a higher level of education (retraining course doesn't provide training in general subjects, only in specialized subjects - both theoretical and practical).

Education:

Training is usually provided through individual or group consultations lead by qualified instructors, which are held in the Guild premises, at Ivánska cesta N°27, in Bratislava. Students attend 30 hours of theory in form of consultations. Practical education is generally replaced by a confirmation of practical training attended nearby the student's residence.

Final examination:

Courses are completed with a final exam consisting of final practical work and theory. The theoretical part consists of a test and an interview. The course is paid by the candidates or employers.

16. „LIVING LABS“

Subtitle: Protecting the ozone layer of the Earth, commenting legislation, mobilizing the critical investor (consumer) to reduce greenhouse gas emissions and raising awareness

Period: 2007 - 2012

Characteristics:

The project "living labs" comprehensively addresses the use of all relevant energy efficiency measures in the residential sector, with emphasis on the use of renewable energy sources for heating and domestic hot water (reducing energy consumption). Location of the project is in Prešov Region, and it tries to solve the following issues:

- Social and economic issues:
 - the highest long-term unemployment rate
 - the lowest growth of the GDP per person in Slovakia
 - development of the region is stagnating, and the differences are constantly deepening
 - the lowest wage compared to other regions of Slovakia
 - paradoxically, higher energy price for population (less consumption means higher unit prices)
 - social structure of house owners is different and often involves a combination of:
 - economically active population
 - long-term unemployed
 - elderly

This indicates also their level of education, financial means for investments, as well as the ability to understand the need for energy investments with the possibility to choose the most appropriate investment.

- The allocation of support funds is often pushed into the wrong sector of the economy, and very often, these are not awarded transparently.

- Environmental issues:

The current situation with apartments in Prešov in terms of energy efficiency and heat protection of structures:

- majority of apartments were built before 1993, and has poor thermal characteristics (energy class D - H), and thus also
- inefficient production of thermal energy from the central heat supply
- losses in thermal energy distribution and at primary energy carriers
- raising awareness about measurable indicators of sustainable development (ecological print)

- Implementation issues:



Each participant of the investment process (investor - designer - supply system) is failing.

- Establishment of new construction companies (no experience)
- poor quality of construction materials (questionable imports)
- Construction Management (site manager - construction supervision)
- Conservative attitude of designers
- Educational problems:
 - Biased attitudes of authorities in the field of energy. Often, they are not objective, and are on the side of lobbying groups, which strongly influences investors and distorts the information of the most vulnerable participant at the energy market - (the end user)
 - Low interest in vocational and technical education in professions (plumber, insulator,)
 - Practical training doesn't exist (investors use these technologies only scarcely). It is very difficult to get practical experience in renewable energy sources technologies in Slovakia.
 - Language barriers (translation and guidelines to use new technologies).
- Raising awareness
 - Very few good applications and practical experience
 - Start of building of the IVth pension pillar " Eco Pension" - Garant OZON XXI
 - Low awareness on the side of the key investor - the end user

In each of the sub-projects of "Living labs", there was a significant saving of primary energy sources reached and also greenhouse gas emissions were reduced. Minimal savings were ranging from 60% up to 80% of the original consumption. Despite the high capital inputs, each of these projects was successful in saving funds sufficient for repayment of loan. Tab. 1,2,3,4. show the projects results

Tab. 1 - Solar technology used for hot water heating

Block of apartments / (address)	Solar panels absorption surface	Notes:
Pri Mliekarni“	12 m ²	Put into operation in 2008
Mukačevská N°7	56 m ²	Put into operation in 2008
Mirka Nešpora N°61-67	30 m ²	Put into operation in 2008
Oravská N°4,5,6	30 m ²	Awarded by EBRD and Slovak Ministry of Economy. Put into operation in 2007
Vansovej N°1,2,3	30 m ²	Put into operation in 2009
Šmeralova N°19,21	15 m ²	Put into operation in 2009
Šrobárova N°18,19	30 m ²	Put into operation in 2010
Štefánikova N°2,4	18 m ²	Put into operation in 2011
Ekocentrum Mirka Nešpora N°41-45	30 m ²	Put into operation in 2011

Tab. 2- Electric heat pump:

Block of apartments / (address)	Installed performance	Notes:
„Pri Arme“	90 kW	Funded by GEF UNDP

Tab. 3 - „Gas heat pumps“

Block of apartments / (address)	Installed performance	Notes:
Prostějovská N°45-55	320 kW	To be completed by 30 June 2012
„Pri Univerzite“	45 kW	To be completed by 30 June 2012
Mirka Nešpora N°69-77	240 kW	To be completed by 30 October 2012

Tab. 4 – Cogeneration

Block of apartments / (address)	Installed performance	Notes:
Ekocentrum	El. 7 kW heat 18 kW	Building permission issued in 2003
Železničarska N°1,2,3	El.30kW heat 62 kW	Building permission issued in 2012

The cogeneration project (Železničarska N°1,2,3) has added value - recharging station for electric vehicles in the interior part of the building, i.e. it is generating thermal energy for heating, for hot water heating, electricity for own consumption and a surplus energy for mobility.

17. POST-GRADUAL STUDY ON FACILITY MANAGEMENT

Subtitle: The best practice examples in the area of education

Period: since 2009

Characteristics:

The Post Graduate Diploma in Management Facility is being organized for students of the Civil Engineering Faculty - Bachelors from the Civil Engineering Faculty and for professionals. It includes a comprehensive program on facility management. Postgraduate studies take the form of lectures both in the field of facility management (in-depth familiarity with the processes of facility management services, their links and relations, possibility to improve these), as well as lectures on building maintenance, as one of the most important factors to extend the lifespan of buildings and their technical and technological equipment. Lectures on Quality Management provide guidance on how to achieve quality. Energy management is an important part of facility management. It also includes human resource management, which are discussed within other lectures.

The development of the field of study:

Together with increased awareness about facility management, supported by professional conferences on FACILITY MANAGEMENT organized annually by the Slovak Society for Environmental Technology, also requirements for more skilled and educated staff increased - to improve their professional skills in the field of facility management. An initiative to organize postgraduate studies resulted from the requirement on the facility management services quality offered to customers, and a higher level of knowledge about facility management on the side of customers.

Postgraduate lectures take place at the Faculty of Civil Engineering twice a year - in spring and autumn semesters of the academic year. Postgraduate studies are finished by a Thesis, in which graduates - professionals - apply their knowledge gained during the course. Graduates receive a Certificate on the course completion, and a Quality Management Certificate.

Communication and promotion:

The course is promoted on the website of Faculty of Civil Engineering, as well as of the SAFM⁴, and via announcements in professional journals.

Outputs:

- Support of education and training in facility management
- delivering skilled facility managers to the labour market
- Employment support

Graduates from the postgraduate studies in Facility Management may find a job not only in management of buildings, but also in a wide range of facility management services both in organizations that provide facility management services, as well as client organizations.

⁴ Transl. note: Slovak Association of Facility Management