



Energy management in public buildings and educational campaign in schools in the city of Maribor *Energy Agency of Podravje, Slovenia*

Summary

One of the major goals of the EU is to save at least 1% of energy per year and to reduce green house gas (GHG) emissions by 20 % by 2020. To reach these goals on a local level, one of the projects of the Energy Agency of Podravje (EnergPa) is oriented towards the field of reducing energy consumption in public buildings and to raise awareness of the importance of energy saving among pupils, teachers and other users of the buildings in Maribor (which is the second biggest city in Slovenia). In a partnership with the Municipality of Maribor, which is also the main source of funding, we have installed the Central Energy Management System (CEMS) in 70 public buildings. CEMS is a software tool, which uses general data from the buildings such as climate characteristics, energy use and consumption (energy bookkeeping). It can take into account saving measures, price of energy, possible savings and CO₂ emissions. The system offers around 2-3 % potential energy saving because of the good monitoring availability and 8% cost saving within the first year of installation because of mistakes that are found (i.e. on the bill and in the metering system). Besides new technologies and advanced systems, user behaviour is today one of the most important ways to achieve energy savings and to reduce GHG emissions. That's why the second part of EnergPa's project is oriented towards an educational campaign focusing on pupils and teachers in primary schools. The two parts are connected in a way that pupils and teachers can see and use the real data of their school and monitor its impact on energy use. With better understanding of energy issues and the potential of energy saving, the pupils can also influence their parents' behaviour.

End-user area

Education
Refurbishment of buildings
User behaviour
Sustainable communities

Target Audience

Utilities
Local and regional authorities
Schools and universities

Technical

Energy efficiency
Solar energy

Context

After EnergPa's establishment in June 2006 the agency started an active information and education campaign, as well as data collection and preparation of an energy strategy. As a result of the campaign, the City Council adopted the local energy concept in January 2009. One of the main required goals with the concept is to save at least 3% of energy in the public sector with special attention to schools. The real energy saving measurement is linked to the school's effort at teaching energy sustainability. To reach the above mentioned goals one of the first proposed activities was energy renovation of public buildings, where approximately 75% of the buildings were not in good conditions when it concerns energy saving. Since schools and kindergartens are fully financed from the public budget and all investments and savings are directly linked to the government, we used this object as a starting point for the project. EnergPa introduced the Central Energy Management System in September 2008. Since 2007 we have organized so called "Energy days" for primary schools with different environmental and energy related workshops for pupils.

Objectives

The aim of the project was to save at least 3% of energy in the public sector and to educate the young population to become more responsible energy consumers. With the use of Central Energy Management System (CEMS) as one of the strategic tools for achieving the target, we are able to identify cost anomalies,



mistakes and weak points in the buildings. By comparing different buildings we determined which building was the most appropriate for retrofitting and other factors. In the future, using the CEMS, we will be able to calculate the economic outcome of different investments regarding energy saving. With energy bookkeeping as a part of the CEMS we would like to achieve higher awareness of the importance of reducing energy consumption among users of the buildings. Furthermore, one of the project objectives was also to reduce CO₂ emissions.

Process

In order to achieve EU goals regarding energy savings and reduction of GHG emissions at the local level, the Energy agency of Podravje launched the project oriented towards the area of reducing energy consumption in public buildings and to raise awareness of the importance of energy saving among pupils in the city of Maribor. The first part of the project was based on the software tool Central Energy Management System (CEMS) developed by the Slovenian company Adesco. It used the general data from the buildings, climate characteristics, energy use and consumption. It can take into account saving measures, price of energy, possible savings and CO₂ emissions. It allows the user to follow the evolution in savings related to the determined performance contracting financing system. Each building has its own system code for data input and for an overview of some individual results. In the first phase, in September 2008, we installed the CEMS in 28 primary schools and 32 kindergartens in the city of Maribor, and we were the first ones in Slovenia to do so. Installation was accompanied by information and educational campaigns for people in different municipal sectors, school headmasters and financial officers. The subjects that were discussed were the importance of energy awareness in public buildings regarding the energy use, energy efficiency, costs, living conditions, GHG reduction and other environmental benefits. Special education about electronic energy bookkeeping and how to use CEMS was also organized. Since January 2009 every school and kindergarten in the city is continually (every month) manually putting in their energy consumption data into the system. EnergaP was collecting and putting in the energy data of the schools and kindergartens for 2007 and 2008 into the CEMS system. EnergaP, as a central point, is able to see all the buildings consumption data and is able to provide the analysis, results and also benchmarking. We can calculate and draw the specific indicators for each school regarding its area, number of pupils, weather conditions, CO₂ emissions, etc. We also provide information on the measurements for saving – nonfinancial and financial ones. The municipality department, that is responsible for financing the schools and kindergartens can, with the help of CEMS, produce the reports of energy cost and future energy needs and use it for budgetary planning. Furthermore, the municipality can use the data for decision on the schools that are the most appropriate for retrofitting.

In December 2009 CEMS's were installed in 10 other public buildings in Maribor (health care, sport facilities, cultural centres). In 2010 EnergaP will set the limits for maximum allowed energy use per building and every three months the maximum energy use will be reduced to push the user to implement the saving measures that will be proposed to them. At the same time we were searching for finance (credits, PPP agreements, and structural funds) and prepared the documentation used to refurbish the buildings. The system was upgraded with the possibility of calculating the economics of different investments regarding their energy saving potential as a base for financial agreements. The second part of the project is oriented towards the educational field. Since 2007 we have been organizing so-called "energy days" for schools, which feature different energy-related workshops where we also included the gathered data from the CEMS. In January 2010 we also started to implement the system in two neighbouring municipalities (20 buildings).

Financial resources and partners

Total project budget is 250 000 EUR over 3 years for renting the software tool and 2 people working – one on the management system and one on educational activities. 75 % of the financial resources were covered by the municipal of Maribor and 25% by the European Commission.

The Energy Agency of Podravje manages the system and provides education and assistance to the users. They are also responsible for the preparation of educational materials and organizing workshops in the schools. CEMS was developed by a Slovenian private company Adesco, who implemented the system in Maribor as a pilot project and showcase for Slovenia. The company acts as CEMS promoter and offers technical support.



They are also responsible for improving and upgrading the system concerning feedback from users and future needs of the municipality and EnergaP.

Results

CEMS enables on-line monitoring, processing, analyzing and verifying of energy data and information. By using CEMS we can identify cost anomalies, mistakes and weak points in the buildings. With a reduction in energy costs we can use these savings for future energy investments. With the help of Central Energy Management System (CEMS) the municipality has already reduce their energy costs by 160 000 EUR annually. This means that the payback period is less than two years. In the first year of operation the reduction in energy use was around 3 % (805 109 kWh and 1365 t CO₂). This reduction is only due to organizational measurements. With the introduction of CEMS and energy bookkeeping, we can assume that the user's awareness of the importance of reducing energy consumption will improve. Furthermore, due to the results of the educational campaigns in schools, teachers and pupils (as well as their parents) will become more responsible energy consumers. Until now EnergaP organized more than 40 workshops for pupils between 6 and 15 years old.

The direct beneficiary of our project is the Municipality of Maribor, all together 70 public buildings out of 120 and more than 25.000 people will be affected. We have had more than 100 meetings with different stakeholders, authorities, politicians, headmasters, users, and children. The City Council is informed annually about the results and with this real data, they can make more realistic decisions about where the biggest saving opportunities lie. By the end of 2010 all public buildings that are financed directly or indirectly from municipal budget will be added to CEMS. The city is responsible for financing the schools, kindergartens and some of the other public buildings, which includes the payment of electricity and heating bills, energy recovery and energy investment costs. CEMS helps in creating a good overview of energy regarding the money, energy saving potentials and investment planning. CEMS offers schools, and other users of public buildings with CEMS installed, an overview of their individual results, it provides a better understanding of energy consumption, gives them information on how to improve their energy use and has an affect on raising awareness about the importance of energy issues.

Lessons learned and repeatability

The introduction of energy management in public buildings is time consuming and difficult but not impossible. We want to showcase our central long distance energy management. With good information and education campaigns we will be able to show the importance of the energy issues in public buildings regarding living conditions, and also inform others about the maintenance costs to the city administration and managers of buildings. The energy costs are somehow lost in the budget because they are kept under different budget lines. With a central energy management system, there is no more work for financial officers in buildings or municipal staff. It helps to have a good overview of energy consumption regarding the costs and investment planning. In the beginning of the project we spent a lot of time explaining to people in different municipal sectors and public buildings about the importance of sustainable energy use and about the benefits of the CEMS. Users viewed the system as additional work that consumed their time. But after using the system for some time they also found the positive aspect and benefits of CEMS. We had similar problems, at the beginning, of organizing workshops for schools because some of the teachers thought that energy issues could not be part of their subject. But during the time of cooperation they found that energy can be part of all subjects and that it offers a lot of space for discussions regarding environmental problems and sustainable development.

We estimate that projects with an energy management tool and educational approach have a very high potential for replication elsewhere in Europe. The software tool for remote energy management presented in this case study could easily be used in any other European public or private sector. In the field of education in energy-related issues, there is a lot of information, case studies and materials available for teachers and pupils, which have recently been developed and a lot of documents are available online.



Case Study 19: Energy Agency of Podravje, Slovenia

The energy savings and more educated and responsible users that will emerge in next few years will be the result of good team work of different stakeholders at a local level. But without an energy agency the system would not yet be implemented, because the agency acts as a central point for energy matters in the public sector in Maribor. In 3 years we were able to become well known in the city in different sectors and targeted groups. With the CEMS we are already known in Slovenia and through new IEE projects we are also showing the case to other EU countries and cities.

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Printed reports or other literature available:

Title: EnergaP yearly report - Implementing the CEMS system in Maribor - study

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