Annex 36 Newsletter

Improving the Learning & Teaching Environment

International Energy Agency - Energy Conservation /Buildings and Community Systems (ECBCS)

http://www.annex36.bizland.com

Volume 4, Issue 2 **October 2002**

Improving Educational Facilities Through Energy Upgrades Is Universal

Annex 36 members have been identifying school projects in their countries which are examples of how energy improvements should and can be made to existing buildings which will result in an improved teaching and learning environment while reducing energy use and costs. To-date 24 case studies have been written to illustrate what can be accomplished in the retrofitting of educational facilities in Germany, Denmark, Finland, Italy, Poland, Norway, United Kingdom, Greece, United States and France.

One United States project upgrades a university gymnasium lighting system saving annually over 8000 Euros in electricity costs using new T-5 lighting

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IEA Annex Meets April 17-20, 2002 Oulu, Finland

Sixteen members from nine member countries attended the 6th meeting of the Annex 36 held at the VTT in Oulu, Finland. Oulu, is the home of Nokia the world leader in mobile communications. Although Oulu is only about 100 kilometers from the Arctic Circle the weather was very mild for that time of year. So mild, a trip to the SnowCastle in Kemi had to be cancelled due to ice melting.

IEA Annex Members

During the meeting discussion centered on the development of the Concept Advisor and reports from the different subtasks that support its development.

A visit was made to **Oulujoki Primary School** in the Oulu area where

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improvements were made to the HVAC system providing improvement of the Indoor Air Quality. A teacher in the school accompanying the tour of the building commented that when the new HVAC system became operational, he noticed change in the attentiveness and the awareness of the students in his class was vastly improved.

Oulujoki Primary School

On Saturday, three schools were visited in Tallinan, Estonia. The first school visited, Rocca la Mare School, about two years old, is modern in design and incorporates many energy efficient technologies.

Rocca la Mare School

The second school visited, Tehnikagumnasium, was built during the Soviet era. It was undergoing renovation. The contrast between the old, energy inefficient, portions of the school and the newer, energy efficient, portions of school was significantly noticeable.

Tehnikagumnassium, Tallinan, Estonia

The third school visited was in downtown Tallinan. It was originally built in the 1880's and had recently been renovated. This building was the second structure in Estonia built as a school. ◄

Reaalkool, Tallinan

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technology and automated lighting controls.

Upgrading of the heating, lighting, and building systems can reduce energy costs and improve the overall learning and teaching environment.

A United State project changes and upgrades the Heating, Ventilation and Cooling System and reduces heating costs by over 65,000 Euros annually and improves the indoor air quality by over 300%.

A project in Denmark improves the indoor air quality through the incorporation of natural ventilation technology into a kindergarten/primary school that resulted in energy savings of over 38,500 kWh annually.

Projects in Germany illustrate how improving the insulation and heating and ventilation systems of schools built during a period of inexpensive construction and limited concern on energy use or indoor air quality, can significantly reduce overall energy use and costs while improving the environment where teaching and

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the teaching and learning environment.

More details can be found about these and other case studies by accessing the Annex 36 web site, www.annex36.bizland.com and clicking on the bullet labeled Case Studies. ◄

Case Study Grove House Thames Valley University

A 4-storey office building was converted into a lecture theatre, computer labs and offices.

Heating is by low-pressure hot water perimeter radiators. A Building Management System operates the heating system together with energy saving boiler controls. All radiators have local thermostatic valves. A roof mounted solar panel (evacuated tube system) is used for preheating the domestic hot water. The hot water system now incorporates a single 3 kW boost electric immersion heater, running two hours per day in winter. The electricity used for this system has reduced from £50 to £5 per week, giving a calculated payback period of 2.5 years. There has been an 8-10% reduction in gas consumption for heating.

Improved working environment

The high temperatures 100F(38°C) + used to crash the main laboratories' computer monitors, but this has been eliminated with reduced temperatures.

The system has removed the stagnant air that was present before refurbishment. Complaints of irritation, general discomfort, headaches and difficulty concentrating were common before the refurbishment. No such complaints have been made since the work has been completed.

Bronze tinted glazing has been used but little effect on internal lighting levels.
No draught problems, air introduced at high level into the ceiling void in most cases. The porch entrance to the building reduced draughts and energy losses.◄

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Visit the IEA Annex 36 website

http://www.annex36.bizland.com

Upcoming Meetings

Date	***Location***
Fall 2002	Greece
May 2003	Denmark
Fall 2003	Germany

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French IEA Annex 36 representative

Richard Cantin

With 20 years of urban and civil engineering management experience in the Ministry of Public Works in France, Richard Cantin is a civil engineer and holds a Ph.D. in civil engineering and design of buildings from the INSA-Lyon Scientific and Technical University.

He is a teacher-researcher at the LASH (Habitat Science Laboratory), one laboratory of the ENTPE, and one of the units of the Construction Civil Engineering Department, Research Unit affiliated with the CNRS (D1652). In this group, he participates in research and development projects within French and International programs.

His research experiences are in the fields of energy performance and indoor climate in buildings, environmental quality in sustainable building, prospective methods and decision making in urban and civil engineering.

Gérard Guarracino

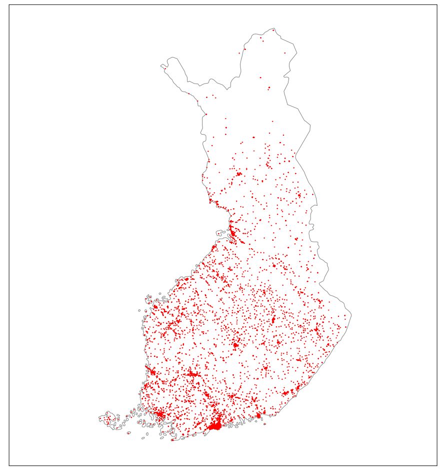
Gérard Guarracino is the director of the LASH (Habitat Science Laboratory), one laboratory of the ENTPE, and one of the units of the Construction Civil Engineering Department, Research Unit affiliated with the CNRS (D1652).

He holds a Ph.D. in civil engineering from the INSA - Lyon Scientific and Technical University and he works on acoustics and energy building.

Laboratory is involved in European programs (JOULE, SAVE, ALTENER, ENERGY) and in IEA Task 21 and Annex 21 "Daylight in buildings", in IEA Annex 35 "Hybrid Ventilation in New and Retrofitted Office Buildings", and in IEA Annex 36 "Retrofitting of Educational Buildings".

Country Profile

FINLAND

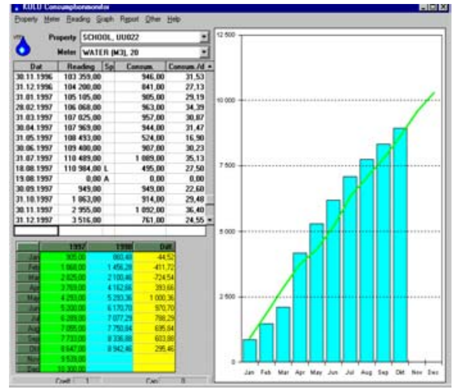


In Finland there are about 5000 school buildings located all over the 1300 kms long country. In the figure 1. central points of each school are plotted on the map based on the co-ordinates (longitude/latitude) in the national building register. Major part of schools are owned and run by municipalities, where school buildings account for a significant share of the total energy and water consumption of public buildings. Thus school buildings play an important role in the overall development of energy efficiency in municipal buildings.

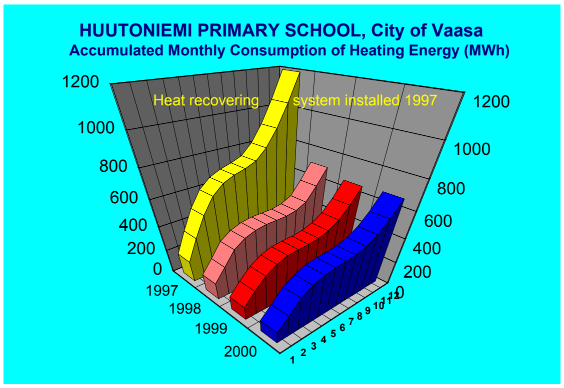
Besides sound planning and implementation of technical retrofitting measures also the operation and maintenance phase has very important influence on the energy use and efficiency. This fact is often undervalued and forgotten like the role of the users of building too. Because of their function schools have a very special role in the promotion of energy efficiency. When aiming at energy savings and sustainable development in general teachers and pupils and their values and knowledge are in key position especially in longer term. That's why one part of Annex activities in Finland will focus on the simple tools and practices, which could be used not only by the technical people responsible for retrofitting, operation and maintenance of school buildings but also in the daily educational activities of schools. In order to support teachers in this work an ***End Users´ Energy Guidebook for Schools*** has been developed in an European collaborative project co-ordinated by Motiva, Finnish Information Centre for Energy Efficiency and Renewable Energy Sources. The guidebook in pdf-format can be downloaded in Motiva´s web site (http://www.motiva.fi/english/index.html) but it´s available via the web site of the Annex too (http://www.annex36.bizland.com).

Important prerequisite for any successful energy saving action is the reliable knowledge about realised energy usage. This information is needed in the planning of saving measures as well as when verifying the prospective impacts and savings achieved. Consumption data forms basis also for information dissemination and feedback activities for users, designers, decision makers etc. In order to support the production of this kind of essential information VTT Building and infrastructure is developing tools for energy monitoring, targeting and management. Tools will be used during annex in hundreds of municipalities and educational buildings in Finland.

Support for all the languages of the countries, which are participating in the Annex36 will be added to the standard version of software and it will be utilised in case study monitoring in other annex countries as well.



Some results of this development are described in the following web site (www.vtt.fi/kulu). Based on user friendly software energy consumption data can be collected in schools and the development of energy and water usage can be controlled and analysed even by pupils. The **Learn-Manage-Act-principle** described in the Guidebook mentioned before can be followed and the school building itself can be utilised as part of environmental etc. education. Later on benchmarking and reporting services will be organised in internet and information on the real effects of implemented retrofitting measures can be produced. Utilising of internet and www in consumption monitoring and information dissemination will be investigated and tested in practice - hopefully in collaboration with international annex partners as well.



For example in the biggest municipalities of Finland like in the City of Helsinki and City of Espoo monthly energy consumption data of several hundreds of schools will be collected and used in Finnish sub-project. Similar data from all campus areas of Helsinki University and Helsinki University of Technology will be available too.

Comparisons and analyses among Finnish educational buildings can be carried out on the basis of continuously updated meter readings. Big consumers and prodigals (saving potential) can be easily found out. Real impacts of energy saving technologies utilised in retrofittings can be visualised in a new way and information on succesful saving measures and best practices can be disseminated effectively.

At the moment major part of meter readings are collected and updated manually or semi-automatic using a portable barcode scanner. Also Latest ICT will be tested in the collaboration with Finnish high-tech companies like Lonix (www.lonix.com) and Comsel (www.comsel.com) in order to develop new type automated meter reading (AMR) solutions. More information: Jorma Pietiläinen, Senior Research Scientist, VTT Building and Transport (jorma.pietilainen@vtt.fi).