International Energy Agency

Energy Conservation in Buildings and Community Systems Programme

Low Exergy Guidebook - Introduction to Heating and Cooling Systems for Sustainable Buildings

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The results of IEA ECBCS Annex 37 ‘Low Exergy Systems for Heating and Cooling of Buildings’ will soon be presented in a booklet of about 40 pages together with the LowEx Guidebook in a CD-ROM format. This user-friendly CD-ROM presents the results visually and interactively. It contains all of the material produced during the project: newsletters; publications; the exergy analysis tools; and the full version of the guidebook (also as a printable pdf version). In addition, a web-site is being assembled which will contain the same information as the CD-ROM, which will be published in June 2004. (See Figure 1.)

The full version of the guidebook will include edited versions of the working papers written during the Annex, some summary tables, and also material which has been written exclusively for the guidebook. The Table of Contents is shown in Figure 2.

The objective of Annex 37 is to create opportunities for saving energy and reducing the emissions from buildings. The group aims to do this by promoting the uptake of low-grade and environmentally sustainable energy sources for heating and cooling.

The efficient utilisation of low-grade energy sources can only be achieved with heating and cooling equipment that works at a temperature which is close to room temperature (i.e., low-exergy systems). These systems (e.g., floor and wall heating

Figure 1: The final products of Annex 37

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components) have life cycles of 40 to 50 years, and so to make the most of low-grade energy sources within the next half century, these systems should be introduced as quickly as possible. The LowEx Guidebook explains how and why this should be done.

BUILDINGS FOR A SUSTAINABLE WORLD

Over the last few years there has been a great deal of discussion about the construction of sustainable houses. There is no doubt that efficient usage of energy within buildings, and of the energy-flows to and from them, is a pre-requisite for sustainability. The key concept of Annex 37 has been to take account of the qualitative aspects of energy, and this has lead to the adoption of the concept of exergy.

EXERGY CONCEPT

The concept of exergy is particularly valuable when trying to identify and quantify potential reductions in energy use. Exergy characterises the degree to which one form of energy can be converted into another. For example, heat which is at, or close to, room temperature has a very limited potential for conversion, and is thus low-grade energy. Electricity derived from fossil fuels or other sources has a high potential for conversion into other forms of energy and is, therefore, high-grade or high-exergy.

Low-exergy heating and cooling systems run on low-grade energy, which can be readily supplied by sustainable energy sources (e.g. heat pumps or solar collectors). The concept of exergy not only enables estimates of energy use to be made, but its potential and quality can also be calculated. The LowEx Guidebook gives an introduction to the concept of exergy for the interested reader.

EXERGY ANALYSIS

A methodology for calculating, analysing and applying the exergy concept to buildings has been developed in Annex 37. The methodology highlights the importance of low-temperature heating and high-temperature cooling systems. The LowEx Guidebook presents the fundamentals for the exergy analysis of buildings, and presents two tools for this purpose.

LOWEX COMPONENTS

When appropriate low-exergy heating and cooling systems are installed, buildings can adapt to changes in fuel supplies, as they are capable of being run from almost any low-temperature energy source. A number of different low-temperature components, systems and technologies are already on the market.

The LowEx Guidebook contains a database of low-exergy heating and cooling systems for buildings. The database consists of 64 information sheets which describe the technologies, their basic principles, technical risks and benefits, advantages, limitations and the state-of-art (commercially available, prototype or innovative concept). The aim is to give a quick overview of the prospects for, and limitations of, the technologies described. The Guidebook explains how to construct heating and cooling systems from low-exergy components. Descriptions of low-exergy systems are also included.

LOWEX BUILDINGS

Using LowEx components, a range of different systems can be assembled to create LowEx buildings. There are examples of LowEx buildings all over the world. These range from newly erected buildings to retrofit projects, from domestic properties to commercial buildings, and also cultural monuments such as churches and castles.

The LowEx Guidebook presents 30 examples of LowEx buildings from 11 countries. These case studies cover a wide variety of applications of low-exergy systems. They also demonstrate the flexibility of the systems with regard to the energy source used in each case. There are examples of low-exergy systems in dwellings and offices, but also in a museum, a church and a concert hall. Some of the systems get their heating or cooling energy from the sun, others from the ground or from district heating networks, while others get theirs from electricity and gas supplies.

The findings from these case studies support those already in the literature - in addition to meeting the desired heating or cooling requirement, low-exergy systems provide occupants with a comfortable, clean and healthy environment.

MARKET POTENTIAL

It is clear from the literature reviews, occupant surveys and case studies that LowEx systems offer benefits beyond simply meeting a given requirement for heating and cooling. They can produce energy savings and improvements in thermal comfort and internal air quality. The potential market for LowEx systems in different countries was evaluated during Annex 37. The findings show that LowEx systems are popular and that the benefits of having them installed are greatly appreciated. On the basis of this evidence, it seems that LowEx systems have the potential to create a sustainable environment both inside and outside the buildings.

Ordering information is on the ECBCS Bookshop Website: www.ecbcs.org

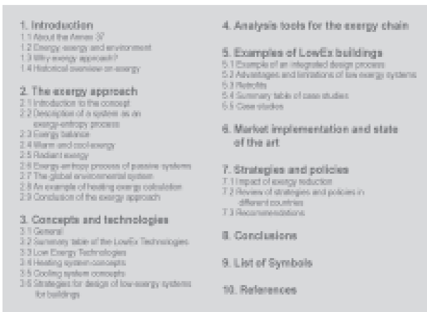
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Figure 2: Guidebook Table of Contents

Energy Efficiency in the Czech Republic

Jan Pouèek, Energy Policy Department, Ministry of Industry and Trade of the Czech Republic

Irena Plockova, Construction Department, Ministry of Industry and Trade, Czech Republic

Josef Snitily, Ministry of Industry and Trade, Czech Republic

The Czech Republic is a country of some 10.3 million people, making it the 12th most populous state in the EU. It is landlocked, with Poland to the north, the Slovak Republic to the east, Austria to the south, and Germany to the west. In 1990, the Czech Republic began the transition from central planning and control, to a liberalised, market economy. The first stage of this economic transformation was marked by a deep recession during which GDP decreased by about 22%. The economy revived in 1995 and much of its subsequent growth has been attributed to industrial restructuring and new investment. In common with other former communist countries, the Czech Republic relies heavily on fossil fuels to meet its energy needs. Electricity generation is primarily from coal which supplied 72% of the total in 2001, and nuclear some 20%. Dependence on solid fuels, such as coal and wood, as primary energy sources is being reduced. Coal is gradually being replaced as a fuel for domestic heating, and is increasingly used for co-generation.

Nevertheless, in 2001, total energy consumption in the Czech Republic was almost twice the average figure for the EU; both for consumption of primary energy and for electricity use. Annual energy consumption is currently 160 GJ per capita, although annual domestic consumption of electricity is 6200 kWh per capita which is lower than in many other EU countries and has remained largely unchanged over the last decade. Currently, the rate of reduction of energy demand fluctuates between 2% and 3% per year. There are a number of reasons why energy consumption in the Czech Republic is significantly higher than in other more advanced EU countries. They include:

Rehabilitation of old social housing - Rumburk

- the structure of the economy,
- lower levels of GDP and Value Added Tax than elsewhere in the EU,
- inefficient use of energy in all sectors of the economy,
- general lack of awareness of the benefits of saving energy (economic, ecological and social) and of opportunities for improving the current position.

ENERGY POLICY AND LEGISLATION

The government has embarked on a major reorganisation of the energy sector which includes the deregulation of prices, privatisation of state-owned energy companies, a greater diversity of energy supply, the promotion of energy conservation and of safer, more efficient, and less polluting forms of energy. The cornerstone of this energy policy has been a legal framework which brings the standards of the Czech energy sector fully into line with those of the EU.

In January 2001 a new Energy Act came into force which established a new framework for the electricity, gas and other related industries. For example, under the terms of the Energy Act, electricity generation, transmission, distribution and trading were redefined as business activities.

Also in January 2001, an Energy Management Act came into force which sets standards for the efficiency with which heat and electricity are produced, transmitted, distributed and used. Under the terms of the Energy Management Act the government was required to formulate a 'National Energy Policy'; a strategic document which sets targets for energy management within the economy, based on economic performance, social development, and on reducing the negative impacts of energy production on the environment.

In the longer-term, strategic targets for energy policy in the Czech Republic include a gradual reduction of the amount of energy and raw materials consumed to levels comparable with those of advanced industrial countries. On the demand side of the economy, in the years up to 2020, the aim is to remove price subsidies, to create competitive markets for electricity and gas, greater freedom of choice for consumers, and ensuring that energy efficiency improves. The National Energy Policy was prepared by the Ministry of Industry and Trade and submitted to the Government for its approval.

The Energy Management Act makes energy auditing obligatory. Every local or national government facility which uses more than 1500 GJ of energy per year must undergo inspection by government-approved auditors. Energy audits are also mandatory for non-government energy users, but the threshold at which this comes into force is much higher at more than 35000 GJ per year. The purpose of these audits is to promote energy conservation and encourage inward investment by foreign energy companies. In addition to these audits, energy passports must be drawn up to verify the energy performance of the buildings involved. State technical standard CSN 73 05 40 sets out the content and form of these passports.

Table 1. Energy Savings Potential and Cost Assessment for their Implementation (in the Year 2005)

		Measures				Total Savings	
			Investment				
	Category		Savings [PJ]	Costs [billion CZK]	Specific costs (CZK/GJ)	[PJ]	%
1	Technical potential	61.4	432.7	2 750.8	6357	494.1	48
2	Economic potential NPV (5 %) > 0		267.9	792	2956	329.3	32
3	Economic potential: NPV (10 %) > 0		266.7	776.3	2911	328.1	32
4	Market potential: Simple payback <= 6 years		103.5	84.3	814	164.9	16
5	Market potential: Simple payback <= 3 years		53.7	37.5	698	115.1	11

POTENTIAL ENERGY SAVINGS

Given the high level of energy demand within the economy of the Czech Republic, there is considerable scope for gradually reducing consumption levels; mainly by implementing measures to increase the efficient use of energy. The National Energy Policy sets targets and provides performance indicators to this end. In order to analyse the potential for savings in the economy, as shown in Table 1, they can be placed within the following categories:

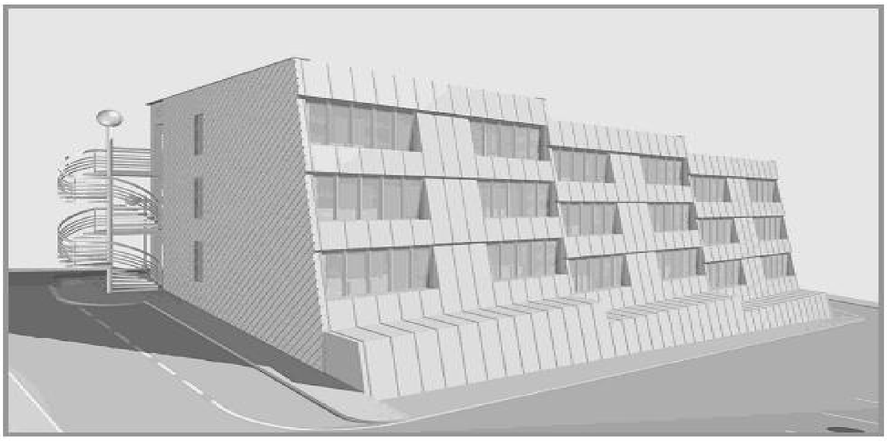
- *Technical potential* – the total saving that is technically possible, ignoring the initial capital investment costs, but taking into account payback costs.
- *Economic potential with a low financial return* – investments which have net present value (NPV) at 5% discount rate.
- *Economic potential with high financial return* – investments which have net present value (NPV) at 10% discount rate.
- *Market potential with medium-term financial return* - investments with a net present value (NPV) less than or equal to 6 years. This is the preferred time horizon for large projects.
- *Market potential with short-term payback* - investments and actions with a net present value (NPV) less than or equal to 3 years.

THE HOUSING SECTOR

In addition to restructuring energy supply and monitoring its use, there is considerable scope for improving the energy performance of the Czech housing. The 2001 Public Census indicates that the housing stock consists of 4.4 million dwellings of which about 1.4% are unfit for habitation (approximately 55 thousand dwellings). In the past ten years, the size of the housing stock has increased by approximately 7.2%. About 1.1 million dwellings, comprising about one third of the Czech residential sector, are prefabricated buildings. Generally, the thermal quality of these buildings is relatively low, with the result that energy demand averages about 240 kWh/m^2 a year.

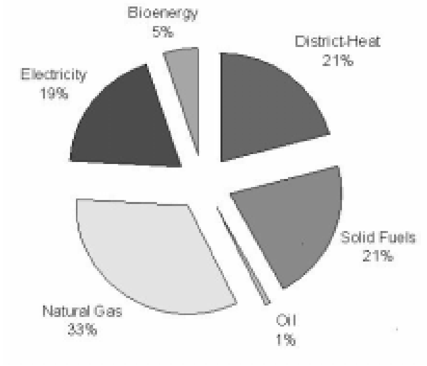
Some 32.4 % of Czech households are connected to a district heating system and together use about by 146 PJ of final energy for space heating, based on figures for 1999. Prices are regulated, with VAT on district heating staying at 5% until 2007. Low cost, low energy housing form an important part of the countries' energy strategy.

In recent years, the Czech Energy Agency has funded a number of low energy housing projects, for example those located in Rumburk, Sušice, and Svitavy.

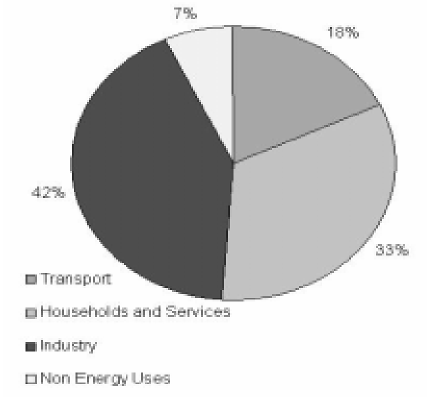


Example of implemented low energy and low energy multifamily housing project - Sušice

Final Energy Demand of the Residential Sector of the Czech Republic, 2001



Final Energy Demand by Sector in the Czech Republic, 2001



Rehabilitation of old social housing – Rumburk

- Outside walls - thermal insulation of front and gable walls were insulated using 70 mm thick polystyrene boards,
- Doors and windows - old windows were replaced by new plastic ones with U = 2.1 $W \cdot m^{-2} \cdot K^{-1}$ with silicon sealing EUROSTRIP, doors have brush insulation.
- Roof – the old flat roof was replaced by double-sloping roof and new flats were built-in. The thermal insulation was constructed using 150 mm thick polystyrene boards.
- Inner space – floor above not heated, while the underground space was insulated using 50 mm thick polystyrene boards.

Example of implemented low energy and low energy multifamily housing project – Sušice

- 9 residential units
- Investment costs fully comparable with regular housing construction
- Energy intensity reduced by 40% - 50% and it is expected to be 49 kWh/m² of heated living area.
- Total energy consumption for space heating 30,278 kWh/year - arranged though central hot water system with gas boiler with output of 20 kW.
- Air ventilation is arranged through forced air ventilation system with waste heat recovery.

Example of implemented low cost low energy housing in Svitavy

- energy houses in Svitavy - cooperation with PRC Bouwcentrum and architects from Delf
- included in this project were 20 houses, including 4 double houses and 2 single houses
- Specific energy consumption for space heating is 79.3 kWh/m²/year, specific energy consumption for tap water heating is 13.7 kWh/m²/year and total specific energy consumption for space and water heating is 93.0 kWh/m²/year.
- Specific costs per square metre of heated area are 22500 CZK.

Example of implemented low cost low energy housing in Svitavy

	Data before rehabilitation	Data after rehabilitation	Difference
Heated total area (m²)	3 612	5 418	1806
Number of flats	66	84	18
Energy consumption for space heating (GJ/year)	2 259	1 860	1085
Specific consumption for space heating (kWh/m²)	174	95	79
Specific consumption for space heating	100%	55%	45%

Integrating Environmentally Responsive Elements in Buildings - New ECBCS Research Project (Annex 44)

Per Heiselberg, Aalborg University, Denmark

A major outcome of the 54th ECBCS ExCo meeting in Prague, in November 2003, was the approval of the preparation phase of a new Annex. The title of this Annex is 'Integrating Environmentally Responsive Elements in Buildings'.

Research into building energy efficiency over the last decade has tended to focus on specific elements of the building envelope, such as walls, roofs and fenestration components. Research has also been directed towards improving the performance of building services functions such as heating, ventilation, air handling, cooling, energy storage and lighting. Significant improvements have been achieved in these areas; and building elements and services offer still further opportunities for efficiency improvements. However, in the years ahead the greatest potential for savings lies with technologies that promote both the integration of responsive building elements and communication between building services.

Against this background, the term *Responsive Building Element* refers to components (like flooring, walls, roof, foundations etc.) which have been specifically designed to be integrated with building services technologies. It is clear that the development and adoption components of this kind will be essential if further significant energy efficiency improvements are to be achieved within the building sector. In projects where such elements have been successfully integrated into one system, this is referred to as an *Integrating Building Concept*. This gives an optimal environmental performance in terms of energy performance, resource consumption, ecological loadings and indoor environmental quality.

With the integration of responsive building elements and building services in this manner, the process of building design completely changes. Instead of individual systems simply being brought together, the requirement is for the fully integrated design of *Whole Building Concepts*, along with 'intelligent' systems and equipment.

Building ventilation is an example of a technology which offers opportunities for the integration of responsive building elements. Growing concerns about environmental impacts of energy production and consumption have brought about an increased awareness of the energy used by fans, heating/cooling coils and other ventilation and air conditioning systems. These concerns, together with the need to reduce annual energy costs, have been the driving forces behind the development of natural and hybrid ventilation strategies. Available data from case studies provided in the international project IEA ECBCS-Annex 35 show that substantial energy savings have been achieved in a number of buildings, and that these were mainly due to very substantial reductions in energy used by fans, and a reduced energy use for cooling. These savings were achieved primarily by exploiting the natural driving forces and the natural cooling potential of outdoor air. Building elements such as embedded ducts, multiple-skin facades and exposed thermal mass were used to preheat and/or pre-cool ventilation air or to reduce the impact of high heat gains. However, little was known about the integrated performance of these elements, or of the ventilation systems involved, or the simulation methods used. So the systems were not fully optimised.

Nevertheless, the development, application and implementation of *Responsive Building Elements* in building integrated ventilation systems is one example of a step towards further energy efficiency improvements in the built environment. As such, they will provide new opportunities for further improvement of environmental performance.

The Annex will address the following objectives:

- Carry out a state-of-the-art review of responsive building elements, of integrated building concepts and of environmental performance assessment methods;
- Improve and optimise responsive building elements;
- Develop and optimise new building concepts with integration of responsive building elements, HVAC-systems as well as natural and renewable energy strategies

- Develop guidelines and procedures for estimation of environmental performance of responsive building elements and integrated building concepts.

The Annex will be divided into the following three subtasks to reach the objectives:

- Subtask A: Responsive Building Elements

  The Subtask will focus on improvement of responsive building element concepts including assessment of the advantages, requirements and limitations. The Subtask will focus on systems that have the potential to be successfully integrated with integrated building concepts.

- Subtask B: Integrated Building Concepts

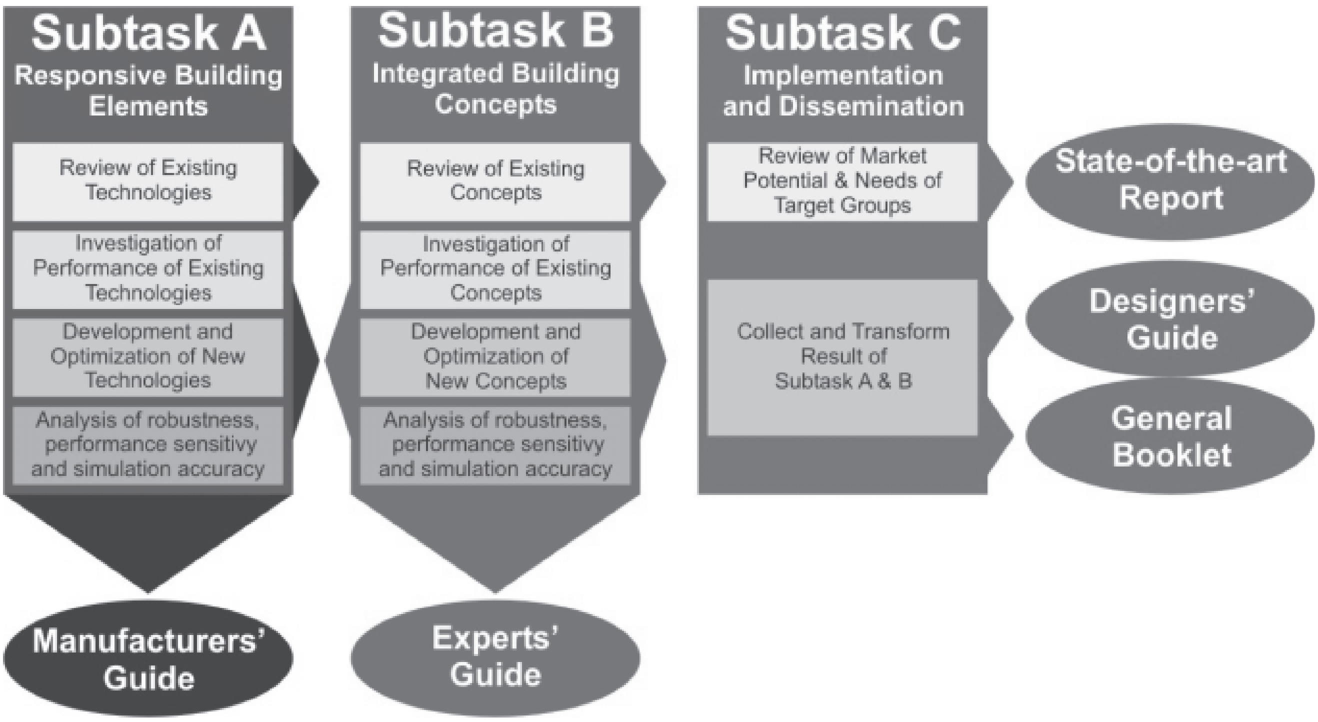
  The Subtask will focus on development of integrated building concepts where responsive building elements, energy systems and control systems are integrated into one system to reach an optimal environmental performance.

- Subtask C: Implementation and Dissemination

  The focus of the Subtask will be to guide, collect, package, transform and disseminate the findings generated in Subtasks A and B. The main target groups are manufacturers of building elements, designers (architects and engineers), but also end-users and building owners.

An Annex preparation workshop was arranged in May 2004 and another one is scheduled for September 2004.

For more information about the Annex and the workshop please contact the Operating Agent, Per Heiselberg (ph@bt.aau.dk), Aalborg University, Denmark.



Annex 40 Co-Hosts the ICEBO 2004 Conference

18th - 19th October 2004

INTRODUCTION

The International Conference for Enhanced Buildings Operation, ICEBO 2004 will take place in the heart of Paris, France, between 18th - 19th October 2004.

Energy and environmental concerns, business evolution and technology development are setting new challenges for the operation of energy systems in buildings.

The 4th International Conference for Enhanced Building Operation (ICEBO 2004) aims at being a leading place for exchanges between engineers, energy managers, state energy agencies, industrial companies, contractors and scientists interested in continuous improvement of existing building energy usage.

Organized in connection with the closing meeting of the International Energy Agency ECBCS-Annex 40 on “Commissioning of Building HVAC Systems for Improved Energy Performance”, it will include the presentation of results from this international research project.

Addressing the question of how to transfer results from research projects to the “day-to-day” practice of building managers will be one of the main emphases of this conference.

The conference will be a joint event organised by CSTB, Texas A&M, University and ECBCS Annex 40.

TOPICS

A. Commissioning for enhanced building operation

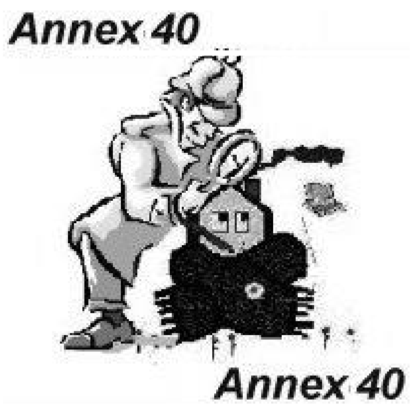
1. New commissioning methods and approaches
2. Tools for improving the commissioning process
3. Cost-effectiveness analysis of commissioning

B. Energy and environment

4. Reducing energy consumption of existing buildings
5. New regulations, certification and best practices approaches for building operation
6. Green building construction and green methods for operating buildings

C. Technologies for enhanced building operation

7. New applications of building automation and control systems



8. Use of simulation tools for enhanced building operation
9. Operation of innovative energy systems

D. New business approaches for building commissioning or operation:

10. New organization, services and contracts for building commissioning or operation
11. Case studies for performance contracting and guaranteed savings
12. Building operation approaches in a deregulated market

CONFERENCE LANGUAGE

The conference language is English and all papers should be prepared in English. Translation services will be provided in French for plenary sessions.

VENUE

The conference venue will be: FIAP Jean Monnet, 30, rue Cabanis, 75014 Paris, France

ADDITIONAL INFORMATION

For additional information, please visit the conference Web site: **http://ddd.cstb.fr/icebo2004**

Energy Retrofit of Educational Buildings (Annex 36) - 25 Case Studies from 9 Countries

Hans Erhorn, Frauhofer Institute of Building Physics, Germany

Educational buildings throughout the IEA countries have much in common in terms of their design, operation and maintenance. The similarities between kindergartens, schools, training centres and universities are such that any experience gained while working on them can often be transferred to projects in other countries. Two of the characteristics of buildings in the educational sector are their high levels of energy consumption and the need to retrofit, or refurbish, many of them. Unfortunately, studies have shown that although retrofitting presents an excellent opportunity to improve the energy performance of educational buildings, this is often overlooked by decision-makers because they are unaware of the financial benefits and other advantages of installing energy saving measures during a refurbishment programme.

The lack of relevant information on the subject often means that decisions are made that take no account of the potential for energy savings. There are no 'rules of thumb' available at the inception of a project to provide decision-makers with a quick and easily obtained estimate of the level of investment required to give useful financial and energy savings. The development of such an 'energy concept adviser' for economical retrofit measures would help them to identify the most efficient and most economic energy saving measures. An adviser could be used throughout the retrofitting phase to ensure that the calculated energy savings and the economic benefits are achieved after the project is completed. Such a tool was developed during the course of the IEA ECBCS Annex 36 "Retrofitting of Educational Buildings - REDUCE". The coordinator of this Annex was the Fraunhofer Institute of Building Physics in Germany, on behalf of the Forschungszentrum Juelich, and the ten countries who participated are: Denmark, Finland, France, Germany, Greece, Italy, Norway, Poland, United Kingdom and the United States of America.

Recently, Annex 36 also published a report containing a collection of 25 case studies of the energy efficient refurbishment of educational buildings. These case studies comprise 18 schools, 6 universities and 1 day care centre. The range of climates, building types, energy conservation principles and technologies described in the report is considerable, which meant that making any generalisations or recommendations was a difficult if not impossible task. However, these case studies provide the reader with a valuable source of information.

The energy savings reported range from 75% to 100% in the upper end to 8-10% in the lower end and can be attributed to three different strategies:

1. implement several technologies as part of a holistic approach aiming at high energy savings and accepting long payback times,
2. focus on the technologies with an immediate return of the investment resulting in fewer savings but obtaining very short payback periods, and
3. focus on the improvement of indoor climate, air quality or lighting comfort and consider energy savings as additional benefits.

The case studies reported provide guidance to decision makers who are seeking solutions based on such strategies. They provide examples of new, advanced technologies for energy conservation during the renovation of educational buildings, such as: preheating of ventilation air, innovative insulation systems, passive solar, atria, a number of passive cooling technologies, advanced HVAC, active solar and PV. Conventional technologies include: insulation, low-e windows, building energy management systems and new lighting systems.

The energy retrofit technologies used in the case studies were categorised as follows: building envelope, heating, ventilation, solar and cooling, lighting and electrical, and management (see Table 3). The number in the last column of this table shows the frequency with which a particular technology has been applied. Not surprisingly, it is the more conventional energy conservation measures which have been applied most often. They are, in no particular order: improved insulation, low-e coated windows, efficient electrical lighting (and control thereof), renewal of the heating system and its controls. However, 'newer' techniques such as natural (hybrid) ventilation and demand-controlled ventilation have been implemented in more than 30% of the projects. In approximately $^1/_3$ of the projects daylighting principles and improved control of the artificial lighting systems have been introduced. For the rest, the preheating of ventilation air, innovative insulation systems, passive solar design, atria, a number of passive cooling technologies, active solar, PV and other measures have been implemented in a few projects.

The distribution of the various technologies shows that those usually recognised as being the most economically viable are most widely used. However, the newer, less well-established technologies that featured in the case studies offer valuable insights with respect to their design, construction and control.

In addition to providing information on potential retrofit measures, costs and payback-times, the different case study reports provide lessons learned when implementing these retrofit technologies and user evaluations of them.

The case study report is also an important part of the main outcome of Annex 36: the Energy Concept Adviser Tool, which will soon be ready as an international version to be distributed to decision makers in public administrations. A Working Group has been set-up to implement the tool within the member states (see below). Its progress is regularly updated on the project home page: www.annex36.com

Ordering information is on the ECBCS Bookshop Website: www.ecbcs.org

Table 3: Energy Technology by Case Study Overview

Energy Technologies		Total
Building Envelope	Windows	15
	Insulation materials & systems	13
	Over-cladding systems	1
	Doors	6
Heating Systems	Heating Installations	8
	Domestic Hot Water Installations	5
	Energy Sources	11
	Control Systems	14
Ventilation Systems	Natural Ventilation Systems	10
	Mechanical Ventilation Systems	8
	Hybrid Ventilations Systems	7
	Control & Information Systems	12
Solar Control & Cooling	Shading & Glare Protections	8
	Cooling Systems	5
	Air-Conditioning Systems	3
	Control Systems	5
Light & Electrical Appliances	Lighting Systems	11
	Electrical Appliances	7
	Daylighting Technologies	8
	Control Systems	10
Management	Energy Auditing Techniques	6
	Commissioning	1
	Education & Training	2
	Non-Investment Measures	2

The Energy Concept Adviser developed in Annex 36 continues in a separate Working Group

The main objective of Annex 36 has been to develop an Energy Concept Adviser (ECA). The participants in Annex 36 suggested that work on the ECA should continue in a separate Working Group which would:

- Pilot-test the ECA with the intended user groups (client bodies such as local education authorities, energy associations, design advisers). This would generate useful feedback and help to identify problems requiring debugging. It would also highlight any gaps in existing knowledge - leading to further improvement and development of the ECA. Testing the ECA in this way would also be an opportunity to elicit testimonials from users for a range of applications.

- Translate the ECA, which will be produced in English and German, into other national languages. Representatives from the following countries have stated that they will seek to have the ECA translated: France, Poland, Finland, and Greece.

At its meeting in Prague in November 2003, the ExCo of the ECBCS agreed to establish an 18 month Annex Extension Working Group.

ECBCS Co-Sponsors Forthcoming Conference

Action for Sustainability - The 2005 World Sustainable Building Conference SB05 Tokyo

27-29 September 2005

INTRODUCTION

The building sector represents a major platform for social and economic activities to create and improve our living environment. Meanwhile, it has a considerable impact on our natural and built environment, as well as on human beings, consuming a significant proportion of limited resources on the earth including energy, raw material, water and land. Sustainability of the built environment and related activities is therefore a key issue to be coped with by all of us to create a sustainable future.

The 2005 World Sustainable Building Conference will be held in Tokyo in September 2005. A large number of building researchers, practitioners, officials, industry representatives and students from all over the world will gather at this conference to exchange the latest knowledge and experience regarding "Sustainable Buildings". ECBCS is a proud Co-Sponsor of this Conference.

BACKGROUND

In 1994, the first international green building conference was held by CIB in the UK. This was followed by an even larger event in Paris in 1997. A somewhat different formulation was later developed for conferences related to the Green Building Challenge (GBC) process.

These have been called the Sustainable Building Conferences, and were co-sponsored by countries participating in the GBC process and CIB. The first event in this new series was held in Vancouver in 1998, and followed by conferences in Maastricht in 2000 and in Oslo in 2002.

This series of international conferences is now seen as the premier international event in the field of Sustainable Buildings. This can be evidenced by an attendance of 600 people in Vancouver, some 800 in Maastricht, and over 1000 in Oslo, comprising a variety of stakeholders such as researchers, designers, engineers, governmental officials, contractors, manufacturers, as well as students.

CALL FOR PAPERS

Abstracts within 500 words and in English for state-of-the-art papers for oral or poster presentations should be submitted by 1st September 2004, to be refereed by the Sub-Committee of the Academic Program.

GENERAL INFORMATION

Date: 27-29 September, 2005

Venue: International Convention Center PAMIR, New Takanawa Prince Hotel, Tokyo, Japan

Host: Japanese Ministry of Land, Infrastructure and Transport (MLIT)

Co-hosts:

- International Council for Research and Innovation in Building and Construction (www.cibworld.nl)
- International Initiative for Sustainable Built Environment (www.iisbe.org)
- United Nations Environment Programme (www.unep.org)

Supporting Organisation:

United Nations University (www.unu.edu)

Language:

The official language of the conference is English.

AWARDS

A series of SB05Tokyo and iiSBE prizes will be awarded to

- The best sustainable building
- The best policy and program for sustainability
- The best innovation for sustainability

FINANCIAL SUPPORT FOR PARTICIPANTS

Financial support for participants from developing regions (100 professionals and 100 students in total) will be provided by the host, according to procedures still to be developed.

EXHIBITION

An exhibition of international sustainable buildings will be organized at the Conference venue in parallel with the oral and poster presentations.

ADDITIONAL INFORMATION

Please visit the conference Web site www.sb05.com for additional information This Web site provides complete information on this conference and will be continuously updated as the planning continues.

GREENTIE – A Global Window of Opportunity for Greenhouse Gas Businesses

GREENTIE is the Greenhouse Gas Technology Information Exchange, one of two programmes operating under the International Energy Agency's EETIC (Energy and Environmental Technologies Information Centres) Implementing Agreement. EETIC is an international collaboration dedicated to sharing information that helps the participating countries to meet their greenhouse gas emission targets. It also provides a platform on which their national energy technologies and expertise can be displayed. (www.eetic.org)

The CADDET (Centre for the Analysis and Dissemination of Demonstrated Energy Technologies) programme, which also operates under EETIC, provides information on demonstrated renewable energy and energy efficiency projects. (www.caddet.org)

Greenhouse gas emissions are an increasing risk consideration for project managers around the world. But where to find the experts and technology suppliers who can help reduce this environmental risk – particularly when the project is overseas?

With 5,000 visitors each month, the GREENTIE Supplier Directory website is a unique and popular information source for locating contractors and partners to design and deliver projects. Over 6,000 businesses offering services which help reduce greenhouse gas emissions are currently listed.

GREENTIE is managed under the International Energy Agency, and up till now only businesses from participating countries could register. For the first time, businesses from non-member countries can be listed on the Directory....and right now there's a promotional offer of up to 25% discount for new suppliers.

With 25 affiliated and member countries, spanning 5 continents, the Directory is truly international with support organisations based in each country to assist project managers and market the GREENTIE service. Two new features have recently added value for project managers -

- Project Broker assists project managers to rapidly search for the expertise they require and puts them in direct contact with the suppliers they select.
- InfoPage is linked to Directory entries and gives suppliers commercial space to expand on their products and services and make web-links to their own sites.

If your business is energy efficiency, renewable energy or carbon mitigation, then widen your window of opportunity - go to www.greentie.org and click in your profile.

For further information contact: Barbara Kitchener, at Future Energy Solutions:

Tel: +44 (0)870 190 6164
Email: enquiries@eetic.org

Recent ECBCS Annex Publications

ECBCS

- ECBCS News, ECBCS ExCo Support Services Unit, 1984 onwards, newsletter published every 6 months.

Annex 5: Air Infiltration and Ventilation Centre (AIVC)

- AIR Newsletter and AIVC CD published every 3 months

Database

- AIRBASE - bibliographical database, containing over 15,000 records on air infiltration, ventilation and related areas, MS Access format, updated every 3 months.

Guides

- Ventilation Modelling Data Guide CD, Orme M and Leksmono N, 2002

Technical Notes

- Acoustics and Ventilation, 2001, Ling M, TN 52
- Occupant Impact on Ventilation, 2001, Liddament M, TN 53
- Residential Passive Ventilation Systems: Evaluation and Design, 2001, Axley J, TN 54

- A Review of International Literature Related to Ductwork for Ventilation Systems, 2002, Malmström T-G, TN 56
- Residential Ventilation, 2002, Concannon P, TN 57
- Reducing Indoor Residential Exposures to Outdoor Pollutants, 2003, Sherman M and Matson N, TN 58

Annotated Bibliographies

- Ventilation System Duct Cleaning, 2000, Limb M, BIB 10
- Balancing Ventilation Systems, 2001, Limb M, BIB 11
- Review of Airflow Measurement Techniques, 2003, McWilliams J, BIB 12

AIVC Conference Proceedings

- Innovations in Ventilation Technology, The Hague, Netherlands, 2000, CP 21
- Market Opportunities for Advanced Ventilation Technology, Bath, UK, 2001, CP 22
- Energy Efficient and Healthy Buildings in Sustainable Cities, Lyon, France, 2002, CP23
- Ventilation, Humidity Control and Energy, 2003, Washington, USA, CP24

Ventilation Information Papers

- Airtightness of ventilation ducts, 2003, Delmotte Ch, VIP 01
- Indoor Air Pollutants – Part 1: General description of pollutants, levels and standards, 2003, Levin H, VIP 02

See www.aivc.org for details of Annex 5 publications.

Annex 19

Low Slope Roof Systems

- Technical Synthesis Report: Annex 19 Low Slope Roof Systems, Palmer J, 2003

Annex 23

Multizone Air Flow Modelling

- Technical Synthesis Report: Multizone Air Flow Modelling (COMIS), by Peter Warren, UK, Coventry, ESSU, 2000

Annex 24

Heat, Air and Moisture Transport

- HAMTIE Technical Synthesis Report, ESSU, 2002.

Annex 27

Evaluation and Demonstration of Domestic Ventilation Systems

- Technical Synthesis Report: Annex 27 Evaluation and Demonstration of Domestic Ventilation Systems, Concannon, P, 2002.
- Simplified Tools and Handbook CD with VENSET, 2002

Annex 28

Low Energy Cooling Systems

- Technical Synthesis Report, M W Liddament, UK, Coventry, Air Infiltration and Ventilation Centre (AIVC), 2001.
- Design Tools for Low Energy Cooling: Technology Selection and Early Design Guidance, Edited by Nick Barnard and Denice Jaunzens UK, BRE Ltd, 2001
- Detailed Design Tools for Low Energy Cooling Technologies, Henk Roel, UK, BRE Ltd, 2000

Annex 30

Bringing Simulation to Application

- Technical Synthesis Report: Annex 30 Bringing Simulation to Application, Warren P, 2002

Annex 31

Energy-Related Environmental Impact of Buildings

- Energy-Related Environmental Impact of Buildings (Highlights), 2002
- Environmental Framework, 2001
- Decision-Making Framework, 2001
- Directory of Tools, A Survey of LCA Tools, Assessment Frameworks, Rating Systems, Technical Guidelines, Catalogues, Checklists and Certificates, 2001
- LCA Methods for Buildings, 2001

See www.annex31.com to download Annex 31 publications.

Annex 32

Integral Building Envelope Performance Assessment

- Building Envelopes in a Holistic Perspective: Methodology, Final report Volume 1 by Leo Hendriks and Hugo Hens ACCO, Leuven, 2000
- Development and Optimisation of Building Envelopes for Existing and New Buildings, Final Report Volume 2 by Sven Svendson, Claus Rudbeck, Horst Stopp and Hannu Mäkelä ACCO, Leuven, 2000
- Advanced Envelopes: Methodology Evaluation and Design Tools, Final Report Volume 3 by Paul Baker, Dirk Saelens, Matt Grace, Takashi Inoue, 2000, published by Belgium, KU Leuven, Laboratorium Bouwfysica, 2000
- Technical Synthesis Report: Annex 32 Integral Building Envelope Performance Assessment, Warren, P, 2003

Annex 33

Advanced Local Energy Planning

- A Guidebook for Advanced Local Energy Planning, edited by Reinhard Jank, Germany, Bietigheim-Bissingen, Fachinstitut Gebaeude Klima e.V. (FGK), October 2000

Annex 34

Computer Aided Evaluation of HVAC System Performance

- Demonstrating Automated Fault Detection and Diagnosis Methods in Real Buildings: Proceedings of VTT Symposium : 217, Arthur Dexter and Jouko Pakanen (eds.) Finland, Espoo, VTT Building Technology , 2001

Annex 35

Control Strategies for Hybrid Ventilation in New and Retrofitted Office Buildings (HYBVENT)

- Principles of Hybrid Ventilation, edited by Per Heiselberg, report and CD, 2002

Annex 36

Retrofitting of Educational Buildings

- Retrofitting of Educational Buildings - Case Study Reports, edited by Morck O, 2003

Annex 37

Low Exergy Systems for Heating and Cooling of Buildings

- Low Temperature Heating Systems - Increased Energy Efficiency and Improved Comfort, brochure, 2002

To download the Annex 37 brochure, see:
www.vtt.fi/rte/projects/annex37

Annex 38

Solar Sustainable Housing

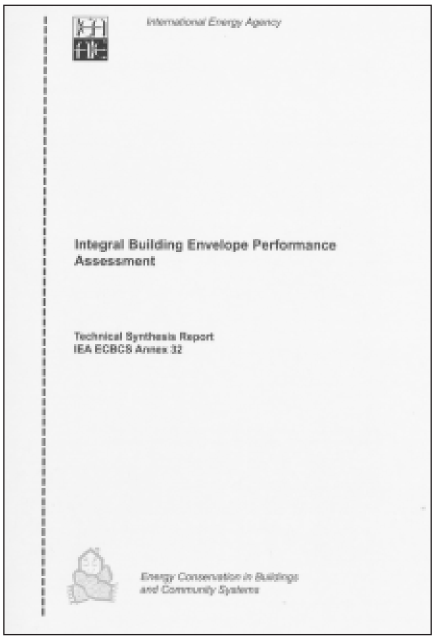
- Sustainable Solar Housing: Marketable Housing For A Better Environment Brochure, 2003
- SIS demonstration housing project in Freiburg, Germany, 2003
- Demonstration house in Monte Carasso, Switzerland, 2003
- Demonstration houses in Kassel, Germany, 2003
- Demonstration houses in Hannover-Kronsberg, Germany, 2003
- Zero energy house, Kanagawa, Japan, 2003
- Sunny Eco-House, Kankyokobo, Japan, 2003

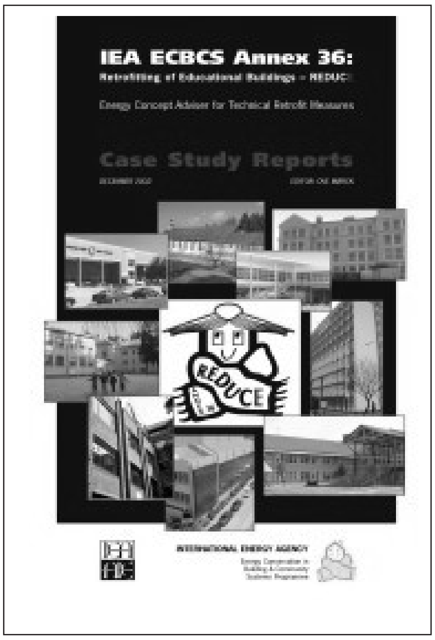
See www.iea-shc.org/task28 to download Annex 38 publications.

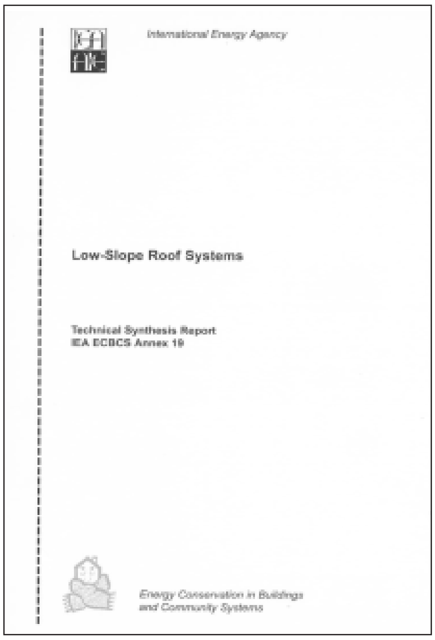
Annex 39

High Performance Thermal Insulation Systems (HiPTI)

- High Performance Thermal Insulation Systems - Vacuum Insulated Products (VIP) Proceedings of the International Conference and Workshop, EMPA Duebendorf, January 22-24, 2001, edited by Mark Zimmermann, Hans Bertschinger Switzerland, EMPA, 2001







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36 Retrofitting in Educational Buildings – Energy Concept Adviser for Technical Retrofit Measures (1998-2004)

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36 Energy Concept Adviser Working Group Annex Extension (2004-2005)

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37 Low Exergy Systems for Heating and Cooling of Buildings (1999-2003)

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38 Solar Sustainable Housing (Solar Heating and Cooling Task 28) (2000-2005)

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39 High Performance Thermal Insulation Systems (2001-)

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40 Commissioning of Building HVAC Systems for Improving Energy Performance (2001-)

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41 Whole Building Heat, Air and Moisture Response (MOIST-ENG)

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42 COGEN-SIM : The Simulation of Building-Integrated Fuel Cell and Other Cogeneration Systems

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43 Testing and Validation of Building Energy Simulation Tools (Solar Heating and Cooling Task 34)

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44 Integrating Environmentally Responsive Elements in Buildings

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45 Energy-Efficient Future Electric Lighting for Buildings

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