AIR INFORMATION REVIEW

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New AIVC contributed report

Indoor air quality in French dwellings

AIVC CR 12, 2009, 30pp
S. Kirchner et al.

Our lack of understanding of the health risks related to air pollutants exposure in buildings is seen as a major deficiency, even though 80% of our time is spent indoors. In this context the Observatory on Indoor Air Quality (OQAI) was set up by the French authorities to collect data on population exposure to indoor pollutants in various indoor environments (dwellings, schools, offices, sports and leisure centers, etc.) to be used for public policies development. Accordingly, OQAI undertook a national survey on indoor air quality in dwellings with a four-fold objective:

1. to compile a descriptive inventory of indoor air quality in dwellings
2. to identify high-risk situations by estimating the exposure of populations occupying these premises
3. to draw up an initial list of parameters influencing the presence of this pollution (sources, type of housing, ventilation, human activities, seasons, geographical situation, etc.)
4. to generate advice and guidelines in order to improve indoor air quality in dwellings.

A large amount of information was collected from 567 dwellings (1612 individuals questioned), representative of dwellings in France. This snapshot of indoor pollution focuses on more than 30 variables (chemical, biological and physical).

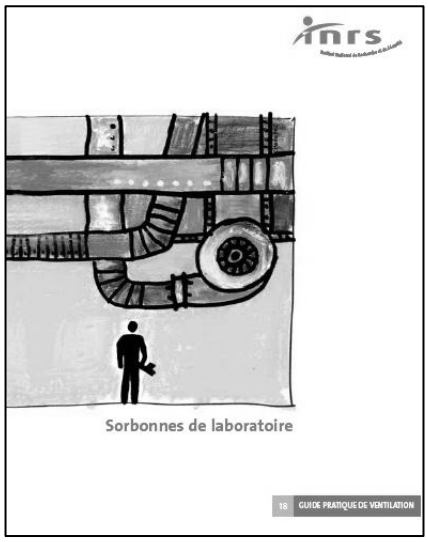
The first results show differences between indoors and outdoors. Most of the target compounds were found in most of the dwellings surveyed. Pollution in homes is not homogeneous: some homes had indoor pollutant concentrations much higher than the median concentrations observed. Approximately one dwelling in 10 had simultaneous high concentrations of several volatile organic compounds (VOC), while inversely 45% of dwellings had low concentrations of all target VOCs. Attached garages had higher VOC levels than the dwellings themselves. House dust mites constitute the most frequent source of allergens.

AIVC Online Download the full report at www.aivc.org

Laboratory fume hoods: a new guide

F. Durier, CETIAT, France

This new guide from the French institute INRS (Institut National de Recherche et de Sécurité) is intended to be used as a reference document by people and organisations involved in design, selection, installation, use, maintenance and control of fume cupboards (hoods) for the reduction of a person's exposure to chemical or toxic fumes in laboratories.



This very clear and didactic guide offers the following content: definitions and description of laboratory fume cupboards, regulations and standards, specifications related to safety, selection criteria, installation, commissioning and maintenance, improvement of existing fume cupboards.

An annex describes the testing methods according to the series of European standards EN 14175.

Click here to download this guide (in French).

Implementation of the EPBD in EU member states

Reports now available from the EU Concerted Action

E. Maldonado, FEUP, Portugal

EU Member States (MS) faced many options and difficulties to implement the Energy Performance of Buildings Directive (EPBD). Adopted in December 2002, the EPBD had to be fully transposed by MS by 4 January 2006 and fully implemented by 4 January 2009. To help MS in their transposition and implementation efforts, the European Commission (EC), through its Intelligent Energy for Europe Programme, and upon a request from the MS in 2003, established a Concerted Action whereby national officials in charge of the technical work to produce national legislation and regulations could freely exchange ideas and help one another towards finding the best solutions. In the processes, MS converged on a reduced set of alternative solutions for implementation of the EPBD. The first Concerted Action took place during 2005-2007, and its continuation, more focused in the evaluation of the implementation results and lessons to be learned, is now in place until November 2010.

After a period of detailed evaluation by EC officials, a final public report of the first Concerted Action has just been released. It describes the main issues that MS addressed for the four main topics in the EPBD:

- Certification of Buildings
- Inspections of Boilers and Air-Conditioners
- Training of Experts and Inspectors
- Procedural aspects for Energy Performance Characterization of buildings

The report lists the available alternative solutions for the various issues as well as its relative advantages and disadvantages. It presents the main conclusions that were reached and the main difficulties that MS faced (and is still facing) to correctly implement the EPBD.

AIR Information Review is the quarterly newsletter of the AIVC, the Air Infiltration and Ventilation Centre.
This newsletter reports on air infiltration and ventilation related aspects of buildings, paying particular attention to energy issues. An important role of the AIVC and of this newsletter is to encourage and increase information exchange among ventilation researchers and practitioners worldwide.

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This report provides valuable insights for interested persons to understand the reasoning behind the options that MS selected, and it helps explain why there is not one single common solution for every issue throughout Europe, as local constraints play a fundamental role that cannot be ignored.

The report consists of a summary report (available in English, French and German) and 6 annexes that describe in more detail the issues relating to each of the four topics listed above, as well as two special reports, one describing Summer requirements in the new national regulations adopted after the EPBD, and the other discussing software issues for EPBD implementation in the EU MS. This report (summary report and 6 annexes) can be freely downloaded from the Concerted Action website, under the section "downloads" (www._____).

In addition, the currently ongoing Concerted Action produced a compilation of national implementation reports in every MS as of 2008, including listings of national legislation, a summary of minimum requirements, certification methodologies, status of inspections of boilers and air-conditioners, training and qualifications for inspectors and experts, national information campaigns, etc. This compilation can also be obtained from the CA website, downloads section (www.). It provides a clear picture of the situation in each country, what is already in place and plans for further developments in the near future.

Aldehyde concentrations in early childhood day-care buildings - importance of ventilation

F. Durier, CETIAT, France

Formaldehyde and acetaldehyde concentrations measurements in the indoor air of 50 infant schools and child-care centres have been performed by five registered organisations for monitoring and information on air quality of the French Region Rhône-Alpes, all members of the "Atmo-RhôneAlpes" grouping.

Results cover 150 rooms in which 4 series of measurements were operated on 4.5 consecutive days between June 2006 and March 2007.

Mean indoor air formaldehyde concentrations have been found 8 times higher than outdoors (3.5 times for actetaldehyde).

In almost all cases (98% for infant schools, 83% for child-care centres), formaldehyde levels exceed the limit value for long term exposition of 10 µg/m³ and are higher in the hot season than in the cold period.
Rooms with mechanical ventilation systems show mean formaldehyde levels 40 to 45% lower than rooms without mechanical ventilation.

Such results point out the importance of air renewal to decrease indoor pollutants concentrations. The report concludes that mechanical ventilation is the most efficient solution but that opening windows may also be considered.

Click here to download this report (in French).

Click here to download this summary (in French).

Atmo Rhône-Alpes

The sorptive properties of building materials for healthy Indoor air quality in residential building

Yun-Gyu Lee, KICT, Korea

Newly constructed residential buildings maintain relatively higher concentrations of VOCs and HCHO until 3-6 months after construction. Thus, residential buildings in their early stages of move-ins are more likely to cast a negative impact on the health of the residents because the indoor air is polluted by the high-concentration harmful chemical substances emitted from newly installed building materials and furniture.

This calls for the need of ventilation - therefore energy loss due to ventilation must also increase as a consequence. Having said that, we would be able to maintain a comfortable indoor air quality and reduce the energy required for ventilation by using building materials that emit less harmful chemical substances while adsorbing and eliminating indoor air pollutants at the same time, instead of using building materials that simply emit less.

Most sorptive building materials feature fine pores on the surface responsible for adsorbing harmful chemical substances, which may include loess, charcoal, diatomite, ash, zeolite, and so on.

However, there is still a lack of a method that can evaluate the performance of the sorption and elimination of harmful chemical substances and so ISO/TC146/SC6 is making efforts to standardize a performance evaluation method as follows.

After using the above evaluation method for reduction performance by chemical sorption to evaluate the decrease in the harmful chemical substances performed by sorptive building materials, we found that a building material indicated over 80% reduction rate for a specific chemical substance after 168 hours had elapsed.

Similar sorptive building materials are being developed and put into use as of late, where GREENGUARD is promoting a certification system that certifies products that reduce HCHO by at least 80% after 168 hours of experiment.

Also, The Korea Air Cleaning Association is looking to pursue a certification system for sorptive building materials that have the following guidelines:
In order for such sorptive building materials to improve indoor air quality and reduce ventilation rates, they must continue to remove harmful chemical substances for at least 3 months after construction. Also, the material must not reemit substances once it has adsorbed them.

We have yet to identify many sorptive building materials that sustain a certain level of performance for at least 3 months after installation. However, given that performance developments for sorptive building materials continue going forward, we believe that they will contribute as an alternative to effective reduction of ventilation rates and the securing of comfortable indoor air quality.

Grade[1)]	Sorptive ratio after 7 Days (%)	Total amount of sorption after 7 days (μg/m³)		Note
		Toluene	Formaldehyde	
1	Over 80	Over 30,000	Over 6,500	Outstanding sorptive performance
2	Over 65 ~ Below 80	Over 24,000 ~ Below 30,000	Over 5,000 ~ Below 6,500	Quality sorptive performance
3	Over 50 ~ Below 65	Over 20,000 ~ Below 24,000	Over 4,000 ~ Below 5,000	Moderate sorptive performance

Guidelines for performance certification of sorptive building materials, KACA, Korea

No.	Test methods
ISO/DIS 16000-23(2008)	Performance test for evaluating the reduction of formaldehyde concentrations by sorptive building materials
ISO/DIS 16000-24(2008)	Performance test for evaluating the reduction of volatile organic compounds and carbonyl compounds without formaldehyde concentrations by sorptive building materials
GREENGUARD(2008)	Applicable to process or product designed to reduce free formaldehyde release or generation of free formaldehyde

Test method of evaluating sorptive performance of building materials

Airtightness of building envelopes: a practical guide

F. Durier, CETIAT, France

The purpose of this guide from CETE de Lyon (France) is to provide the reader with elements about the issues and physical principles linked to the airtightness of buildings. It helps in the understanding of the contents of airtightness measurements reports. General information about building' airtightness is given, as well as detailed explanations about measuring methods and instruments. The guide also describes some theoretical bases, useful to compare buildings between them and tools for the analysis of on site measurements.

This guide in French was edited in October 2006. It has been recently made available for free download at: www._____
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Perméabilité à l'air de l'enveloppe des bâtiments - Généralités et sensibilisation – CETE de Lyon

Combustion Product Concentrations of Unvented Gas Fireplaces

P. W. Francisco, J. R. Gordon,
W. B. Rose, University of Illinois, USA

Millions of unvented gas-fired heating appliances have been sold in the United States since 1980. These appliances have the benefits of not losing any heat via a flue, they can be placed anywhere in the home, and they are easy to install. At the same time, they have been controversial since all of the combustion products are released into the living space. Few studies have been done on these appliances, with the majority of studies being done in laboratory conditions on new units or using computer modeling.

In 2005 a study was undertaken to measure the indoor combustion product concentrations in 30 homes that used unvented hearth-type appliances regardless of maintenance history or usage patterns, as well as do modeling, laboratory measurement, and conduct a national survey on heater selection and usage patterns. Only the field study results are summarised here; more detail on the field study as well as the other facets of the project can be found in the final report (see list of other project publications).

Methodology

Testing was done during two consecutive winters, with 15 homes tested each winter. The residents were asked to use them as they normally would. A portable instrumentation cart was prepared for on-site measurement of CO, CO_2, NO_x, NO, NO_2, O_2 (depletion), and water vapor, each at one-minute intervals. The analyzers were calibrated with known gas concentrations for each placement (except for the water vapor probe), and were in operation for 3-4 days at each home. The CO and CO_2 measurements were made using non-dispersive infrared (NDIR) technology; the NO_x, NO, and NO_2 measurements were made using chemiluminescence technology; the O_2 measurements were made with a paramagnetic sensor integral to the NO_x analyzer; and the water vapor measurements were made with a capacitance-type probe.

The measured data were compared to published standards and guidelines for CO, CO_2, NO_2, O_2, and water vapor by averaging the data over the period specific to the threshold.

For water vapor the results were also converted to dew-point and an assessment for the potential for condensation was done assuming a double-pane window and using the indoor and outdoor temperatures.

In addition, portable passive CO and RH/temperature sensors were distributed throughout the home in 5 locations, including 3 in the room containing the unvented appliance (mantel, mid-room, far-room), in an adjacent room, and in a distant room (often a bedroom).

Sample Selection

The 30 homes in the sample were a sample of convenience, located within a one-hour drive of Champaign, Illinois and recruited primarily through a University of Illinois campus-wide e-mail newsletter. The homes ranged in size from 111 m^2 to 279 m^2 (mean of 181 m^2) and in airtightness from 5.6 air changes at 50 Pa (ACH50) to 26.3 ACH50 (mean of 12.0 ACH50, median of 11.4 ACH50).

CO	(1-hr)	CO (8-hr)	CO_2 (long)	NO_2 (1-hr)	O_2 (min.)	RH (max.)
Threshold	35 ppm	9 ppm	3500 ppm	250 ppb (110 ppb)	19.5%	60%
Source	U.S. EPA	U.S. EPA	Health Canada	Health Canada (WHO)	NIOSH	ASHRAE
Mean	6.5	4.5	1189	273	20.3	38.7
Median	4.3	3.4	1077	200	20.3	39.9
# Exceed	0	6	0	13 (24)	1	0
% Exceed	0	20	0	43 (80)	3	0
Mean of # Exceeded	N/A	10.	7	N/A	446 (313)	19.4	N/A
Median of # Exceeded	N/A	10.	0	N/A	360 (300)	19.4	N/A
Max. of # Exceeded	N/A	14.	2	N/A	1269	19.4	N/A
N/A: Not Applicable							

Results

The table shows the overall results of the study. The first section of the table specifies the standards and thresholds to which the results were compared, and their source. In the second section of the table the summary results are presented, showing both the mean and median concentration for the 30-house sample for each gas, the number of cases for which each threshold was exceeded, and the mean and median amount by which the threshold was exceeded for that subset of cases. For CO_2, which was listed as a "long-term average", the average results for the entire test period were used for the comparison.

These results show that NO_2 is clearly the combustion product that is most likely to exceed published thresholds, exceeding the Health Canada levels in just under half of the homes and exceeding the WHO levels in 80% of cases. Carbon monoxide occasionally exceeded the 8-hour threshold of 9 ppm, usually by less than 1 ppm. There were no cases of exceeding the thresholds for 1-hour CO, for CO_2, or for relative humidity. It should be noted when viewing these results that winters in Central Illinois are dry. There was one home that saw the oxygen get depleted to a level just below the NIOSH maximum, but otherwise the O_2 levels rarely dropped below 20%.

When viewed as dew-point and assessing the potential for condensation, in only one home was condensation potential identified. This home used the fireplace as its sole source of heat, and rooms further from the fireplace were cold.

It was in these rooms that a condensation potential was identified. There were no homes in which a condensation potential was identified within the room in which the appliance was located, since the appliance also warmed the surfaces.

The full report can be found at https://_____.

Papers on aspects of this work that have been published to date include:

- Gordon J.R., P.W. Francisco, W.B. Rose. "Indoor Concentrations of Combustion Gases from the Use of Unvented Gas Fireplaces in 30 Homes". Presented at Indoor Air 2008, The 11th International Conference on Indoor Air Quality and Climate, August 17-22 Copenhagen, Denmark.
- Francisco P.W., J.R. Gordon, and W.B. Rose. In press. "An Analysis of the Decay Rate of Combustion Gases in U.S. Homes Using Unvented Gas Fireplaces". Presented at The First International Conference on Building Energy and Environment (COBEE), July 13-16, 2008 Dalian, China.
- Francisco, P.W., J.R. Gordon, and W.B. Rose. 2007. "Indoor Combustion Product Concentrations Resulting from the Use of Unvented Gas Fireplaces". IAQ2007: Sustainability and Human Health. October 2007, Baltimore MD.
- Francisco, P.W., J.R. Gordon, and W.B. Rose. 2009. "Indoor Moisture in 30 Homes Using Unvented Gas Fireplaces." Accepted for publication in ASHRAE Transactions, Summer 2009, Louisville, KY.

Workshop on compliance and control of energy performance regulations

Brussels
1-2 September 2009

The issue of compliance and control of energy performance regulations is considered a major point in need of attention. Therefore, an international workshop will be held in Brussels on 1 and 2 September 2009.

This workshop will take place in the framework of the SAVE ASIEPI project. There will be at least 13 presentations on the country status and also several presentations by European organisations. Moreover, 4 synthesis presentations are foreseen. The normal registration fee is 300 € (+ VAT) but participation is free of charge for the participants of the Concerted Action.

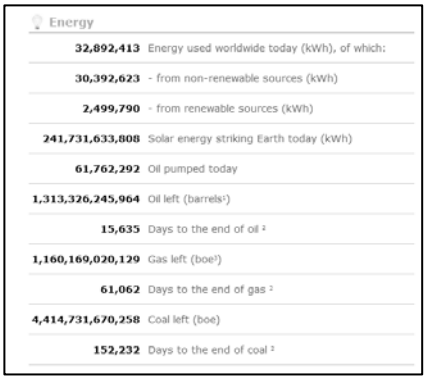
Please contact Erika Malu (erika.malu@bbri.be).
More information can be found on www.asiepi.eu.

Worldometers

worldometers
world statistics updated in real time

Worldometers is part of the Real Time Statistics Project, which is managed by an international team of developers, researchers, and volunteers with the goal of making world statistics available in a time relevant format to a wide audience around the world.

According the authors, sources are carefully selected to include only data published by the most reputable organisations and statistical offices in the world.



The counters that display the real-time numbers are based on Worldometers' algorithm that processes the latest and most accurate statistical data available together with its estimated progression to computer the current millisecond number to be displayed on each counter based on the specific time set on each visitor's computer clock.

Energy use is one of the topics, other topics are world population, government and economics, society and media, environment, food, water and health.

Visit www._____

Greek Action plan for energy efficiency in the building sector - Role of ventilation

Buildings represent one of the most important economic sectors in Greece offering employment to more than 300.000 people (National Statistical Service, 2003). Moreover, buildings account for about 36% of the national energy use while during the period 2000-2005 they increased their energy demand by 24%. One major issue that indicates the significant margin for energy efficiency in the Greek building sector is the fact that almost 70% of the building stock have limited or no insulation, since they were constructed before the Insulation Regulation of 1980.

The aim of the Action Plan for Buildings' Energy efficiency is to support the implementation of energy efficiency measures in the tertiary and residential sector which represents almost 60% of the total building stock.

The proposed energy efficiency measures are categorised into short, medium and long term based on the time frame that will be implemented to the target buildings. Another classification (tabulated in Table 1 for the residential sector) is performed based on the target of the energy efficiency measure (i.e. envelope, ventilation, heating and cooling systems, etc). The measures are selected using the following selection criteria: (a) the energy efficiency (b) economic viability and (c) easiness of implementation.

It is anticipated using simulation techniques that almost 60% energy efficiency can be achieved in the residential sector through the short term measures. This percentage is considerably increased to 65 % and 71% for the medium and long term measures.

More specifically, the ventilation measures proposed are:

(a) Reduction of infiltration and cracks that can contribute to 5% reduction of the energy consumption;
(b) Installation of ceiling fans to reduce the cooling load;
(c) Promotion of night ventilation especially for warm periods;
(d) Installation of ventilation heat exchangers;
(e) Promotion of hybrid ventilation.

	Short term	Medium term	Long term
Envelope			
Reflective Coatings	3 - 7 %		
Solar Shading	10-20%	10-20%	
Thermal Insulation	35-60%		
Frames	12 - 20 %		
Green roof			5-10%
Heating systems			
Boiler	15 - 20 %		
Pipe insulation	2-4 %		
Thermostatic control			
Automation systems	4 - 7%		
Triode valve	5 - 10 %		
Hybrid		40-70%	
Renewables			40-80%
Ventilation-IAQ-Cooling			
Reduction of air infiltration	2-5%		
Ceiling fans			
Night ventilation			
Replacement of RAC 15 years	25%		
Heat exchangers			
Replacement of RAC 10 years		20%	
Replacement CAC			
Use of humidifiers			10-40%
Hybrid ventilation systems			10-20%
Renewables			
Solar thermal	90-100%		
Photovoltaics		5-10%	
Hybrid solar		20-40%	
Biomass geothermal			20-40%
Lighting			
Bulbs replacement	4-6%		
Simple sensors		4-6%	
Building Management Systems			4-8%
TOTAL	**47-84%**	**48-78%**	**53-93%**
Average target value	**50**	**65**	**75**

Table 1
Energy efficiency measures for the residential sector and the estimated reduction of the energy use

The Action Plan will be implemented in three Phases in order to guarantee the gradual realisation of the energy efficiency measures and the success of each phase. The implementation methodology is crucial for the overall success of the Action Plan and for the citizens' increase of awareness. The results of each phase will be forwarded and exploited by the next phase.

The Pert diagram of the Action Plan and the Phases' interrelation is depicted in Figure 1. Starting from a small building sample of 10.000 residential buildings in the framework of Phase 1, the Plan will be expanded to all building stock of the residential and tertiary sector in the framework of Phase 3.

Consequently during Phase 1 a pilot implementation of the short term measures will be performed for 1000 buildings of the residential sector. Priority will be given to residential buildings that are constructed before 1980 or buildings that have no insulation.

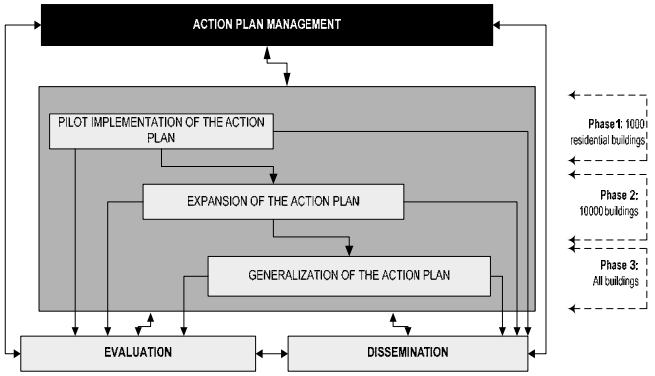


Figure 1 - The Pert diagram of the Action Plan

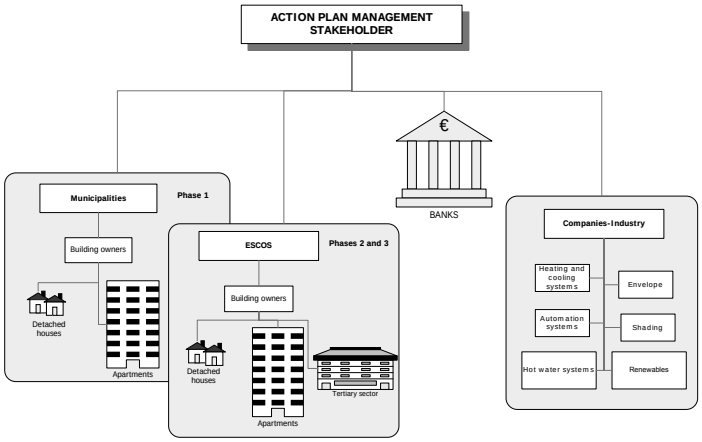


Figure 2 - The stakeholders of the Action Plan

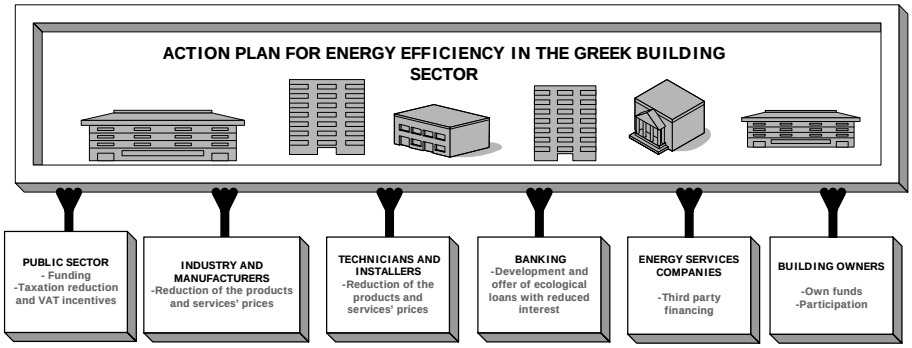


Figure 3 - Action Plan's supporters

This pilot approach will be used to ignite and disseminate the effectiveness of the Action Plan since the proposed measures will definitely contribute to both the reduction of the energy consumption and the improvement of the indoor comfort. In the framework of Phase 1, apart from the energy efficiency, the Action Plan will invest on the promotion of the measures' effectiveness in order to facilitate the 2nd Phase.

Phase 2 includes the implementation of short term measures to 10000 residential and tertiary buildings. In this phase priority will also be given to non-insulated dwellings. Finally Phase 3 is a generalisation of the Action Plan and is targeting all buildings and all types of measures.

This 3-phase approach provides priority to the implementation of measures with the maximum energy efficiency and to the buildings with the poorest energy performance.

Using advanced simulation techniques, the energy and the economic efficiency of the overall Action Plan was estimated.

The energy efficiency simulation was performed for each specific measure per building, per climatic zone and per the overall building stock.

The impact of the energy measures on the overall building stock concerning cooling load is given in Table 2.

The implementation procedure of each phase will be supported by the following incentives and policy initiatives:

- Elaboration of voluntary and long term agreements between the various stakeholders.
- Provision of financial incentives for the citizens through the reduction of manufacturers' products and services.
- Funding schemes from the public sector.
- Attractive mortgages and eco loans with reduced or funded interest from the banking sector.
- Third Party Financing Schemes by the Energy Services Companies.

The involved stakeholders are depicted in Figure 2.

The Action Plan's success will largely depend on the effective coordination of the stakeholders' activities and will be financially supported by the six groups depicted in Figure 3.

The cost of each phase depends upon the building type (detached or apartment, residential or tertiary) and on the energy measure selected by the owners. For a detached house the average cost for the energy efficiency measures during the 1st Phase can be between 800-25.000 € while for the apartments, is fluctuating among 1.000-8.000 € per apartment. Therefore the average cost per building in the 1st Phase is estimated to be about 10.000...15.000 € and the total cost for 1000 residential buildings is 10.000.000-15.000.000€. Considering the reduction of the energy use per building the payback period for each building in the 1st Phase is estimated at less than 7 years. For Phase 2 the total cost is anticipated almost 150 Million € over a period of 2 years and for Phase 3 is almost 16 Billion € for a period of 8 to 10 years.

Climatic Zones	1946-1980	Detached houses (1000 m²)	Total Energy Consumption (MWh)	Total Energy Consumption with the implementation of the Action Plan (MWh)	Energy savings (MWh)	Reduction of energy use
A: Southern Greece	104.375	10.270	246.492	157.652	88.839	36 %
B: Central Greece	568.356	48.423	1.210.598	691.009	519.588	43%
C: Northern Greece	230.033	20.702	331.247	190.881	140.366	42%
D: Northern Greece	17.261	1.594	20.733	11.020	9.713	47%
Total	**920.025**	**80.992**	**1.809.071**	**1.050.563**	**758.507**	**42%**

Table 2 - Energy efficiency for cooling including ventilation strategies

30th AIVC conference
Trends in High Performance Buildings and the role of Ventilation
&
4th International Symposium on Building and Ductwork Air tightness (BUILDAIR)

Berlin, Germany - 1-2 October 2009

Scope

The combined conferences 30th AIVC conference "Trends in high performance buildings and the role of Ventilation" and "4th International Symposium on Building and Ductwork Airtightness" aim to focus on 2 key aspects of the present ventilation challenges. – Since 1980, the AIVC conferences have been the meeting point for presenting and discussing interesting developments and results regarding ventilation in buildings. For each conference a specific theme is selected and a substantial part of the presentations relate to this theme.

There are several reasons for selecting these 2 themes:

- Building and ductwork airtightness – Minimising energy use for ventilation while maintaining (or even improving) the indoor climate is a growing concern. The achievement of a good building airtightness can substantially contribute to a reduced energy use. There are many interesting issues for presentations and discussions, e.g. measurement techniques, new product and system developments, measurement results in situ, predicting techniques, standards and regulations, economic aspects, extreme levels of building airtightness, use of infrared thermography …
- There is a rapidly increasing interest in high performance buildings, whereby a large scale application is planned and even started in many countries. A major challenge is the achievement of energy efficient ventilation while guaranteeing a good indoor climate (air quality, summer comfort ...). Issues of concern include the overall energy performance of high performance buildings, the comparison of energy performance requirements for those buildings with national requirements and specific ventilation issues such as heat recovery, demand controlled ventilation, source control, building airtightness, night ventilation, …

Topics of the conference

Contributions are invited regarding interesting work in the areas of research, development, application and market implementation of high performance buildings.

Preference will be given to abstracts focusing on one of the following topics:

- Treatment of building and ductwork air-tightness in standards and regulations, legal aspects
- Parameters and limit values for building air-tightness
- The role of air tightness in individual countries
- Measuring instruments for building and ductwork airtightness
- Airtightness of the building envelope and of duct work – measuring practice, interpretation of measuring results, test reports, special measurements
- Certification of measuring devices and teams, sealing compounds and buildings
- Planning of building airtightness and air-tightness concepts
- Airtightness measurement and building thermography
- Airtight building envelope and building ventilation
- Airtightness – energetic and economic efficiency
- Building airtightness and mould – structural damages
- Handling of ventilation in high performance buildings and handling of the energy performance regulations
- Energy for transport of air
- Innovative ventilation systems and energy performance regulations
- Impact of regulations on the ventilation market
- Good indoor climate and energy performance
- Commissioning and inspection of ventilation systems
- Ventilation related challenges for the existing building stock
- Ventilation aspects in warm and cold climates
- Economics of indoor climate
- Trends for high performance buildings and their measured or calculated energy performance
- Comparison of energy performance requirements for high performance buildings with national requirements

Venue

The conference will be held in Berlin.
Best Western Premier Hotel Steglitz International
Albrechtstraße 2 - 12165 Berlin
www.si-hotel.com

Dates

The Conference will start on 1 October and will end on 2 October.
A welcome reception is foreseen on Wednesday evening 30 September.
Technical visits and a social programme are foreseen on 3 October 2009.

Conference secretariat

Energie- und Umweltzentrum am Deister GmbH
Energie- und Umweltzentrum 1
31832 Springe, Germany
E-mail: bildung@e-u-z.de
Contact: S. Schneider, B. Rosenthal

Additional information

www.buildair.de and www.aivc.org

An exhibition is organised during the AIVC-BUILDAIR conference in Berlin.

Interested companies should contact Mrs. Hollmann - bildung@e-u-z.de to obtain more information.

IEA Energy Efficiency Policy Recommendations

The imperative to implement energy efficiency policy remains a priority for all governments. Recent meetings of G8 Heads of State (2005 Gleneagles, 2006 St Petersburg, 2007 Heiligendamm and 2008 Hokkaido) reaffirmed the critical role that improved energy efficiency can play in addressing energy security, environmental and economic objectives.

The IEA aims to assist governments with their implementation of energy efficiency policy. To this end, the IEA has recommended a set of 25 priorities across seven areas: cross-sectoral activity, buildings, appliances, lighting, transport, industry and power utilities.

All of the actions in this package seek to:
- save large amounts of energy at low cost;
- tackle existing market imperfections or barriers;
- address significant gaps in existing policy;
- obtain international consensus.

Implementation of IEA energy efficiency recommendations can lead to substantial cost-effective energy and CO_2 savings. The IEA estimates that if implemented globally without delay, the proposed actions could save around 8.2 $GtCO_2$/yr by 2030. This is equivalent to one fifth of the global reference scenario energy-related CO_2 emissions in 2030. Taken together, these measures set out an ambitious road map for improving energy efficiency on a global scale.

AIVC Online Download the full report at www.aivc.org

French IAQ policies in the frame of the "Grenelle Environnement"

C. Mandin, INERIS, France

The French Government launched in summer 2007 a concerted action for the identification of key points regarding environment, and especially environment and health, the socalled Le Grenelle Environnement. The results were presented in October 2007 and included three points aimed at improving indoor air quality (IAQ):

- mandatory labelling of volatile organic compound (VOC) emissions from building and decoration products, and the ban of carcinogenic, mutagenic and toxic for reproduction substances in categories 1 and 2 (according to 67/548/CEE Directive classification) in these products;
- setting IAQ monitoring systems and providing corresponding information in public buildings, especially in those hosting vulnerable populations (e.g. schools, kindergartens, hospitals, etc.). For dwellings, the feasibility to develop home visits through indoor environment counsellors in every department will be studied;
- establishing a second National Environment and Health Action Plan (NEHAP) with ambitious initiatives dedicated to IAQ.

These initiatives are presented hereafter.

Reduction of emissions from building and decoration products

So far, information on VOC emissions from building products is not easily available in France and it is very difficult to select low emission products during building design or rehabilitation. Voluntary incitation was proposed in the first French National Environment and Health Action Plan (NEHAP) 2004–2008. A protocol for the health-related evaluation of VOC and formaldehyde emissions from building products was proposed by the French Agency for Environmental and Occupational Health Safety in 2006 (AFSSET, 2006). However the ambitious objective to reach 50% of products labelled according to this protocol by 2010 was not achieved. Thus in the framework of Le Grenelle Environnement, the mandatory labelling of emissions from building and decoration products has been decided and will be presented very soon in 2009. It should be then mandatory from January 2012.

Secondly, the ban of carcinogenic, mutagenic and toxic for reproduction substances from categories 1 and 2 (according to 67/548/CEE Directive classification) in building and finishing products was decided. A short list of substances was defined in 2008. On the basis of current available knowledge concerning use and emissions, and on potential health risks to consumers, some volatile and semi-volatile compounds were finally selected.

Notification to all European Member States is going on at present for four substances (benzene, trichloroethylene, di(2-ethylhexyl)phthalate – DEHP and di-n-butyl phthalate – DBP).
Finally, in addition to what will be covered by the "Grenelle Environnement Law", it is also proposed to study the possibility to extend the labelling of VOC emissions to other sources of indoor pollution in private or public buildings (e.g. furniture, air fresheners, cleaning products, etc.). Furthermore the next NEHAP (see below) proposes to limit the use of some carcinogenic, mutagenic and toxic for reproduction substances from category 3 (according to 67/548/CEE Directive classification) in building and finishing products (e.g. ban of wood-based panels with E2 formaldehyde emissions).

Indoor air quality in French buildings: monitoring in public buildings

Because of the known health impact, radon indoor concentrations are to date regularly monitored in public buildings in 31 French priority departments and compared to guideline values. On the basis of this example, it is planned to build a national monitoring system in indoor environments, especially with vulnerable populations such as children or the elderly, for example. A pilot survey conducted in a limited number of establishments will be carried out in the second semester in 2009. Formaldehyde and CO_2 concentrations will be measured in schools and day-care centres; a fungal index will be calculated based on a specific VOC fingerprint for fungal development (Moularat et al. 2008).

Moreover, on the basis of health-based guidelines values proposed by the AFSSET for specific indoor pollutants (Mandin et al. 2009), the French Committee for Public Health will establish management values in 2009. Contrary to health-based guidelines values, management values take into account technical, social, political and/or economical aspects. These values can remain indicative or become mandatory.

In 2010 and the years after, a larger monitoring programme could be elaborated, enlarged to more buildings (up to 300 schools) and/or to other types of indoor environments.

Concerning the private sphere, it is planned to promote the development of indoor environment counsellors after a test phase in 2009. Input from housing and health counselling services is advisable when a patient's health seems to be impaired by housing conditions. Each visit includes a questionnaire to assess respiratory as well as non-respiratory indoor risk factors, mite-allergen content sampling in mattress dust, mould sampling and, when appropriate, air sampling for measurement of VOCs and aldehydes. The results of these home-based environmental interventions are positive (De Blay et al. 2003; Charpin-Kadouch et al. 2008), but a cost-benefit analysis still needs to be carried out.

A second National Environment and Health Action Plan (NEHAP)

The first NEHAP (2004–2008) was presented in June 2004. It was divided into 45 actions (including 12 high priority actions) aimed at providing good air and water quality, preventing environmentally based pathologies (including cancer), providing better public information and protecting susceptible populations. Another conclusion of Le Grenelle Environnement (2007) and a requirement within the associated law were to prepare a second French NEHAP for 2009–2013. This new plan was presented in April 2009 (Plan National Santé Environnement, 2009).

In addition to the support of the measures previously described here, this second NEHAP stresses a common approach between IAQ policies and performance building design. Energy efficiency in the building sector is now considered as a top priority. As Le Grenelle Environnement (2007) defined very ambitious objectives in terms of energy saving for this sector, it is necessary to point out simultaneously the importance of IAQ issues (providing efficient ventilation conditions, selecting low emission products). Technical recommendations should be provided to professionals and the public in the frame of rehabilitation. Ventilation must be part of the building design in new constructions.

Finally, to be exhaustive, it should be mentioned that this second NEHAP also recommends the use of low emission products in the buildings hosting children by 2013.

Conclusion

Presently, the transposition of those actions into the French regulation is under progress. The corresponding law (so-called "Grenelle Environnement 1" Law) is under discussion between French Chambers (Assembly and Senate) and technical texts (decrees) are under preparation.

With the first NEHAP in 2004, Le Grenelle Environnement represents a major step for indoor air quality in France. The main challenge is now to implement a common and coherent approach with energy saving, in the larger frame of climate change and environmental health major global issues.

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Cool materials for summer comfort – a valuable contribution for more effective night time ventilation

Achieving summer comfort with low or no energy consumption for cooling requires the minimisation of heat gains, storage and heat dissipation as much as possible. The minimisation of heat gains includes proper solar control for openings, minimisation of internal gains and minimisation of solar gains through opaque components. Storage has to do with the thermal capacity of the building structure and the evacuation of heat can be performed by means of night ventilation.

In order to achieve acceptable indoor comfort when using night ventilation, a minimisation of solar gains through opaque components is important. An energy efficient and cost effective way to do this is by the use of cool materials on the building envelope. Cool materials (paints, tiles, shingles etc.) can reject solar heat, remaining cooler under the sun. This is due to their two main properties: high solar reflectance and high infrared emittance. At the building scale, the use of cool materials results in lower energy consumption for cooling, improved thermal comfort and a lower carbon footprint. These effects are far more important if the building is poorly or not insulated. Using cool materials at large scale results in improving the urban microclimate by mitigating the heat island effect and its negative consequences.

In order to promote this technology in the EU, a project called COOL ROOFS has been launched. The objective is to create and implement an Action Plan working on four axes: technical, market, policy and end-users. In the framework of this project the EU Cool Roofs Council (EUCRC) has been created with important participations from the industry and other relevant stakeholders.

For more information or if you are interested in joining the EUCRC please visit the following sites:
Cool Roofs project website: www._____
EU Cool Roofs Council website: http://_____

AIVC's Interview with David Grimsrud

You are many talents and wear many hats in the areas of energy and indoor climate. Can you list for us some of the key roles you play? Who is David Grimsrud?

I am currently Professor Emeritus in the Dept of Bioproducts and Bioscience Engineering at the University of Minnesota (U of MN). That means that I am retired but continue to participate at a reduced level in faculty and professional activities. I currently teach one course during the fall semester and will soon complete a study of air quality and ventilation in stores of a large retailer in the United States, Target Corp. I have a PhD in physics from the U of MN, was a staff scientist at Lawrence Berkeley Laboratory (LBL) in Berkeley, CA from 1977-89, then became director of the Minnesota Building Research Center (MnBRC) at the U of MN and continued that activity until 1997. Along the way I was the founding editor of the Indoor Air Journal (1991) continuing that activity until 2001, am active in activities of the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) and was chair of the ASHRAE Standard 62.2 committee (Ventilation and Acceptable IAQ in Low-Rise Residential Buildings).

You have done a lot of research related to ventilation, indoor air quality and airtightness over the years. What do you look on as some of your key accomplishments? And what are the most exciting projects you see others doing?

An important early project was the development of the LBL Infiltration model in which I assisted Max Sherman's theoretical development with field measurement support. Other field measurement projects include those targeting residences (existing, retrofitted, new, energy-efficient), schools, hospitals, retail stores, University campus buildings.

It is exciting to see results continue to emerge from large well-funded studies of buildings such as the Building Assessment Survey and Evaluation Study (BASE) of commercial buildings in the US.

The US is starting to appreciate the value of energy efficient buildings. Where is the US today and what are the major trends you have seen in the US market - especially relating to airtightness and ventilation systems?

The world-wide recession weighs on everything. Green building prospects have taken off following the US election. Global warming issues finally are acknowledged by the US policy-makers. There continues to be an uneasy balance between reducing ventilation for conservation and increasing ventilation for improved IAQ. One way of moving forward on this long-term issue is to appreciate the advantages of low-level continuous ventilation.

As a researcher, what areas are you the most interested in? What are you most proud of? What things should young researchers be looking for?

My interest and training has always been on the experimental side of the science. We in the buildings research community do a poor job of assessing the actual performance of buildings after they are built. Measuring performance of buildings is essential to improving their performance. New technologies make building assessment easier but interpreting results remains a challenge. I am pleased with the results of many field surveys of building performance that I participated in with colleagues at LBL and MnBRC. Working with young researchers is a delight. There is so much to explore and they contribute so much with their enthusiasm and expertise with digital equipment. Young researchers also must learn the importance of writing about their results – sharing their discoveries with their peers – and reading what others have been doing. A common problem in this research area, which has never received massive funding support, is completing a project, scrambling to secure funding for the next project, and not taking the time required to adequately write and share the results of the previous project with one's peers.

It is a joy to read a good paper (e.g. Waring and Siegel (2007), An evaluation of the IAQ in bars before and after a smoking ban in Austin, TX, *J Exp Sci and Env Epi*, 17, 260-8). A Paper such as this, and others of comparable quality, move the field forward.

Global Climate change, increased energy demand, indoor climate, and ever-decreasing availability of fossil fuels are key drivers for sustainability. What is the outlook for the building sector generally and what in particular do you see as the role for IAQ, ventilation and airtightness in moving forward?

There has always been a tension between ventilation used for human health and comfort (more is better) and the energy cost of that ventilation (reduce as much as possible). As people recognize the severity of the global warming issue and the difficulties in changing a world-wide pattern of increasing production of global warming gasses the imperative to reduce the amount of ventilation used in buildings and improve its efficiency has increased.

In addition to being a researcher, you have been a teacher in the field. What are the challenges and rewards in teaching? How do you see the status of education in the field?

The rewards of teaching are rewards of personal interactions with a group of people at a major transition point in their lives. Simply getting to know them is a great experience. Awakening ideas by posing questions – pushing them to develop their own ideas – awakening possibilities for their careers – each is a fulfilling adventure with students. Education in this field is scattered in many areas throughout traditional education systems. Since the field of indoor air quality encompasses so many diverse disciplines team-teaching a course with others having different specializations can be particularly rewarding.

The AIVC is one of IEA's information centers. You were involved in the AIVC at its inception. Can you tell us about that and the successes and failures during its early years?

The International Energy Agency (IEA) announced the intention to support an information center devoted to infiltration and ventilation in 1978. LBL and the Building Research Establishment (BRE) submitted proposals to house the center. I was involved in preparing the LBL proposal. We did not win the competition. However, the work that we did in assembling the proposal and understanding the progress that had been made in Europe in the infiltration area, provided many paths that we explored during the following decade. The LBL infiltration model was an explicit product of the field measurements and theoretical modeling that resulted from that effort. The AIVC evolved from a narrow focus on infiltration to become a repository for ventilation and indoor air quality information for all classes of buildings in North America, Europe and Asia.

The AIVC has evolved over the almost 30 years of its existence. Looking forward, does it still serve a purpose in the global community? What should the AIVC be doing to be most useful to the global community? Where would you like to see it go?

The AIVC has always provided a forum for research cooperation among nations who participate. Problems differ in various countries because of the different building traditions that exist in different countries. However, the physics of building operation and the biological and chemical interactions of the buildings and their occupants know no boundaries. I would like to see the AIVC continue and expand its outreach to underdeveloped areas of the world – perhaps microfinancing development of improved household equipment in these areas.

As an expert who understands both the policy and technical aspects of the complex subjects we deal with, what final message would like to give our readers?

Understanding building operation and delivering improved energy efficiency and indoor environments has never been more important than it is now. It is an exciting time to be working in this rewarding field.

As someone near the end of my career I will also paraphrase the comments that Atul Gawande made in his book, *Better* (*Gawande, A (2007) Better: a surgeon's notes on performance,* New York, Henry Holt and Co.) -- continue to "write something". It may be large, or small, but it focuses the mind and maintains your position as someone who is part of the larger world.

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7th Conference on Emissions and Odours from Materials

7-8 October 2009

The 7th Edition of the Emissions and odours from materials Conference for producers and end users will take place in Brussels, Belgium, from 7 to 8 October 2009.

The following topics will be discussed:

- Standards and regulatory issues: updating EU-legislation and labelling schemes.
- Comfort and impact on health (IAQ, workplace environment, odours and VOCs, off-flavours…)
- State of the art for measurement and evaluation (sampling, analysis and sensory evaluation).
- Remediation: optimisation of manufacturing and compounding processes, storage and transport conditions, new barrier properties…
- Recent developments in the packaging, building and automotive industry.

In addition to the oral presentations, company exhibitions and poster presentations provide an active forum for discussions among the participants of the workshop. During the breaks attendees can browse through tabletop displays presented by suppliers of equipment dedicated to emissions testing or new low emitting grades of products. Interested suppliers can contact _____.

CERTECH
Centre de Ressources TEchnologiques en CHimie

This conference is organised by CERTECH, a research and development centre based in Seneffe, Belgium. It was created in 1996 by the Catholic University of Louvain (U.C.L), to support the chemical industry in the field of polymers, catalysis and air quality.

The synergy of polymer sciences with air quality competencies has led to the development of a R&D area in CERTECH: odours and emissions from materials. The centre studies gaseous emissions produced by materials in confined volumes such as institutional, industrial, residential, transportation environments and packaging media. In this context, CERTECH as a Belgian independent lab, can offer support from the materials emissions assessment to low emission products developments.

The announcement can be downloaded at www._____

Building Simulation '09 Conference

University of Strathclyde, Glasgow, Scotland
30-27 July2009

Building Simulation 2009 University of Strathclyde, Glasgow 27th - 30th July

Registration is open for IBPSA's Building Simulation 2009 Conference in Glasgow. Over 300 final papers have been received after a thorough review by the Scientific Committee, and the detailed session planning is currently underway.

The website contains the latest information about the conference: details of the location, travel and accommodation options, the exhibition, prizes and awards information, conference fees, etc. There is also a full programme of evening events in addition to the scientific part of the conference.

There is, for the first time, an Applications Day (click on the Applications Day link on the conference website). This is a unique opportunity for practitioners involved in building design and performance assessment to relate their experiences using simulation software, to hear what others are up to, and to interact with the worldwide community of software developers. The day features a varied programme including practitioner presentations, keynote speakers from within the industry and software vendor presentations. There will also be an accompanying exhibition, running for the duration of the conference. A special one- day registration is available for this day if you cannot attend the whole conference.

The keynote speaker for the Applications Day is Bill Bordass of William Bordass Associates, a building performance troubleshooter and advisor on usable building design. He will kick off the day with a keynote talk, reflecting on the current experience of practitioners in the use of building simulation, and challenging the audience to find new and better ways to work together on improving buildings of the future.

This will be followed by parallel sessions of applications-related papers interspersed with simulation tool vendors who will present their latest developments, features and capabilities during five short plenary sessions.

We will round off the day in plenary session, with papers from four eminent speakers. The plenary topics include the role of simulation in regulatory compliance, future developments in simulation technology, and the needs of architectural and M&E practices for dynamic simulation tools.

In the main academic conference, keynote presentations will be given by Professors Tom Maver and Joe Clarke.

Conference themes are:

1. advances in building physics
2. human aspects of the indoor environment
3. building services
4. commissioning and operation
5. energy capture and conversion
6. advances in applications
7. validation and calibration
8. software issues
9. simulation in design practice
10. regulation/code compliance

Lastly, there are a number of training courses available at the end of the conference on leading building simulation programs.

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Information on AIVC supported conferences and events

IBPSA Conference and Exhibition, Glasgow, 27-30 July 2009

The 11th International Building Performance Simulation Association (IPBSA) Conference and Exhibition will take place in Glasgow, Scotland, from 27-30 July 2009. The conference highlights building simulation and one day of the conference will be devoted to practical applications, particularly focussing on simulation in practice with illustrative case studies.

More information: www._____

Read more on page 14

International workshop on compliance and control on regulations, Brussels, 1-2 September 2009

The main purpose of this workshop is to present and discuss the evolutions in the national regulations with specific attention to compliance and control issues.

This workshop is organised in close collaboration with the European EIE-ASIEPI project. It is expected that this workshop will result in a better understanding of the various approaches for compliance and control, as well as opportunities for improvements.

More information: sd@bbri.be

30th AIVC conference and BUILDAIR, Berlin, 1-2 October 2009

The combined conferences "30th AIVC conference and Buildair – Trends in high performance buildings and the role of Ventilation" and "International Conference on Building and Ductwork Airtightness" aim to focus on key items of the present ventilation challenges.

More information: www.aivc.org and www.buildair.de

Read more on page 9

Ventilation 2009, Zurich, 18-21 October 2009

The 9th International Conference on Industrial Ventilation Clean Industrial Air Technology Systems for Improved Products and Healthy Environments

More information: www._____