BUMA Project

Prioritization of BUilding MAterials as indoor pollution sources

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Project Coordinator

A Project Funded by European Commission DG SANCO

University of West Macedonia
Environmental Technology
Laboratory

ENVIE Workshop

Brussels, 5 – 6 March, 2008

Partnership

- **University of West Macedonia – Greece**
- **General State Laboratory – Cyprus**
- **Institute of Health and Consumer Protection – JRC**

The Project is monitored by a European Group of Experts :

- **Prof P Carrer (IT)**
- **Dr S Dimitroulopoulou (UK)**
- **Prof A Kettrup (D)**
- **Dr J McLaughlin (IR)**
- **Prof P Wolkoff (DK)**

BUMA
The main objectives

I. **Formation of a comprehensive database containing up-to-date quantified emitted compounds by construction products and other building materials.**

II. **Classification and prioritization of building materials from the developed database with respect to hazardous compounds emission factors and the relevant exposure levels.**

III. **Indoor exposure expert modeling system linked to the above mentioned data base.**

IV. **Relevant guidelines for policy-making actions.**

Project main activities

- ✓ **Collect and review existing emission factors from construction products covered by the CPD and other building materials used in Europe.**
- ✓ **Create a data base giving quantified building material emissions and exposure data**
- ✓ **Classify the major emissions, from building materials, in the indoor environment according to their potential risk and health consequences**

Project main activities *continuous…*

- ✓ **Refine or/and enrich the present data base by executing selected laboratory experiments in a high volume environmental chamber to characterize individual material emissions, focused on aromatics (benzene and its homologues), carbonyl compounds (aldehydes and ketones e.g. Formaldehyde, acetaldehyde), and terpenes (e.g. limonene, α-pinene).**
- ✓ **Perform carefully designed indoor environment campaigns at selected sites (houses, schools and public buildings) to assess the exposure and health risk.**
- ✓ **Create an expert modelling system to estimate exposure based on the abovementioned database**
- ✓ **Produce relevant guidelines**

BUMA Progress on key activities

- ✓ **The BUMA Website**
- ✓ **The BUMA Data Base**
- ✓ **The Field Campaigns**
- ✓ **The Laboratory Tests**
- ✓ **The Exposure Modeling Expert System**
- ✓ **The Interaction with the Stakeholders**
- ✓ **The Prioritization Scheme**
- ✓ **The Best Practice Advice and Guidelines**

BUMA Progress on key activities
The BUMA website

The BUMA site is in full operation
http://www.buma-project.eu

The web site is continuously updated

BUMA Project Information - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://www.buma-project.eu/index.html

Getting Started

Google Search PageRank Check AutoLink AutoFill Subscribe Options

Prioritizitation of BUilding MAterials as indoor pollution sources (BUMA)

- Home
- Documents
- Newsletters
- Partners
- Events
- Links
- Contacts
- Discussion Forum

Partners Area

Username

Password

Login

*** Call for the end-user community ***

Project Description

Indoor organic compounds are released from a variety of building materials including vinyl tiles and coving, carpets, particleboards, wood products, paints, adhesives etc. VOCs associated with paints, varnishes, sealing cailks, adhesives, carpets and other materials are likely to be a major cause of health complaints associated with indoor air in new buildings. Certain parts of the population may be at greater risk, for example the infants and the elderly, those already suffering from respiratory diseases, hyper-responders and people exercising.
The BUMA project aims to thoroughly assess the human exposure to air hazards emitted by building materials commonly used in Europe. The project aspires to gain a better understanding of the sources of hazardous compounds existing in the indoor environment and play a key role in the determination of the well-being and comfortable living of the occupants. The outputs of the BUMA project will be subsequently used by policy makers, health professionals and building material producers in the enlarged European Union.

The project main objectives are

I. The formation of a comprehensive database containing up-to-date quantified emitted compounds by construction products and other building materials.

II. The classification and prioritization of building materials from the developed database with respect to hazardous compounds emission factors and the relevant exposure levels.

III. The creation of an Indoor exposure expert modeling system linked to the above mentioned data base.
IV. The production of relevant guidelines for policy-making actions.

The main activities of the BUMA project include:

1. The collection and review of the existing emission factors from construction products covered by the CPD and other building materials used in Europe.
2. The creation of a data base giving quantified building material emissions and exposure data
3. The classification of the major emissions, from building materials, in the indoor environment according to their potential risk and health consequences.
4. The refinement or/and enrichment of the present data base by executing selected laboratory experiments in a high volume environmental chamber to characterize individual material emissions, focused on aromatics (benzene and its homologues) and carbonyl compounds (aldehydes and ketones e.g. Formaldehyde, acetaldehyde, acetone). Create an expert modelling system to estimate exposure based on the abovementioned database
5. The performance of carefully designed indoor environment campaigns at selected sites (houses, schools and public buildings) to assess the exposure and health risk.
6. The Production of relevant guidelines

(Buma is partly funded by the European Commission, DG Sanco Public Health Programme 2003 - 2008. Contract no.: 2005307 (2006-2009). Coordinator: University of Wedt Macedonia, UOWM © 2006 - Developed by TWIN Net Ltd)

BUMA Progress on key activities
The BUMA Data Base

- The BUMA database is integrated into the web-site and it is under Consultation and Improvements
- The current version contains more than 200 materials, 250 emitted substances and 2000 emission data

The BUMA Data Base … *continue*

- **Building Materials**
- **Emitted Compounds**
- **Emission rates**
- **Background Information**
- **Frequency of Use Information**

Logout

Building Products Categories

Categories | Emissions | Materials | Compounds | Background Info

Main Categories | Secondary Categories

Categories

Buma Category (Report) Reset Create

Search Display 10 Go

Details	CPD	Category	Comments
	Y	Adhesives	
	Y	Floorings	
	Y	Gypsum Products	
	Y	Internal & External Wall Ceiling Finishes	
	Y	Thermal Insualtion Products	
	Y	Wood Based Panels	
	N	Carpets	
	N	Paints & Varnishes	

Spread Sheet

1 - 8

Hints

- Click on a **Description** link to see the list of Materials that belong to this Category.
- ADMIN Only: Click on the "Details" icon of a Category to see its detailed information.

Tasks

Enter a new Emission
Search Emissions
Enter a new Compound
Enter a new Material

Main categories

ADMIN

BUMA is partly funded by the European Commission, Contract no.: 2005307 (2006-2009). Coordinator: University of West Macedonia, UOWM
BUMA Database developed by TWIN Net Ltd

The BUMA Field campaigns

The sites

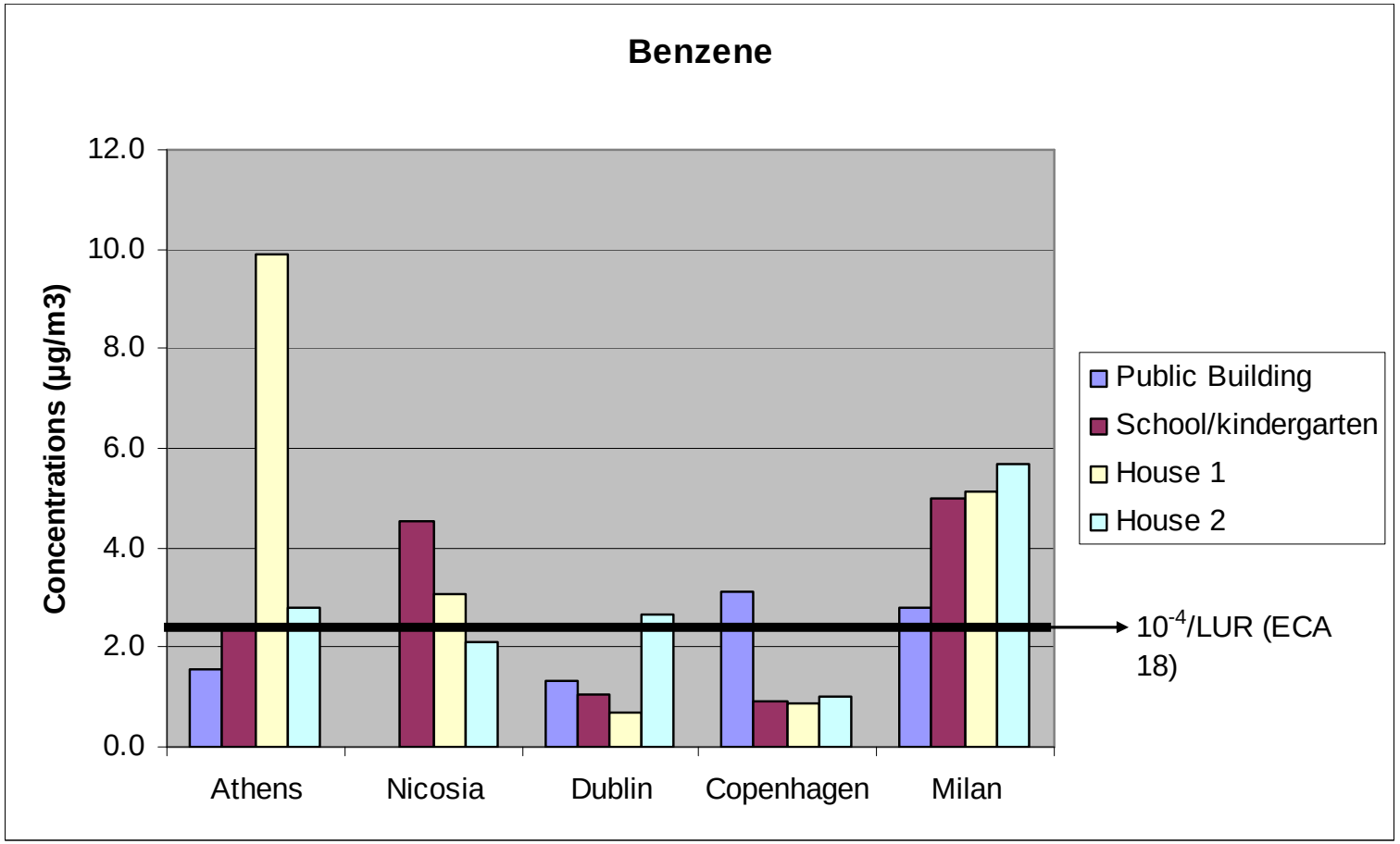
- Five European cities (Nicosia, Athens, Dublin, Copenhagen, Milan)
- Two houses + two public buildings
- Weekly campaigns [S(summer)+W(winter)]
- The Nicosia(W) and Athens(W), Dublin(S) and Copenhagen(S), Milan (W) have been completed.

The BUMA Field campaigns

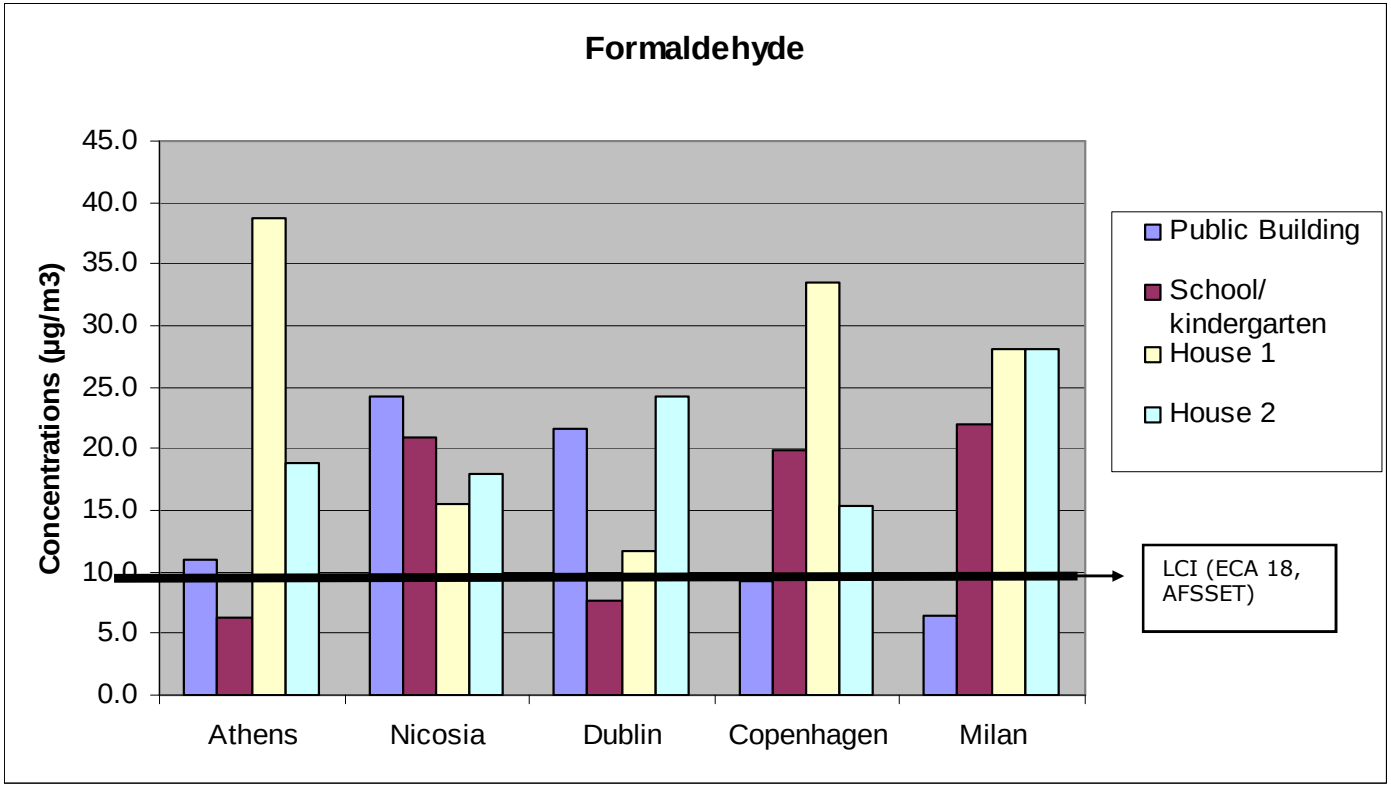
The measurements

- Passive sampling for a weekly period, with Radiello cartridges, in two sites inside the building and one outside.
- Indoor and outdoor active sampling with low volume air flow pumps, every four hours for one week, at public buildings (8:00, 12:00, 16:00 and 20:00)
- Temperature and relative humidity recording with data loggers
- Ventilation measurements using a tracer gas technique wherever possible.

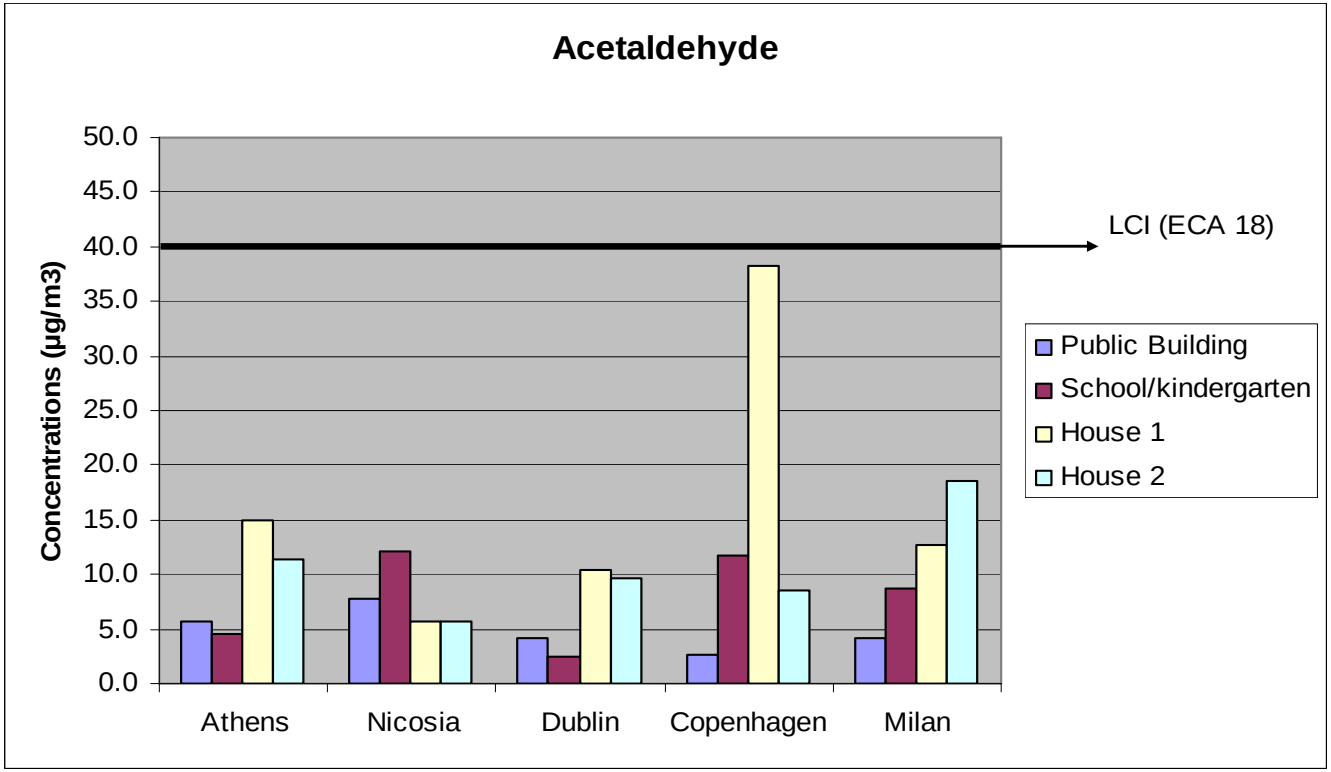
The Field campaigns. Some Results-I



The Field campaigns. Some Results-II



The Field campaigns. Some Results-III



BUMA Progress on key activities

The Laboratory Tests

The laboratory tests are in progress in JRC INDOORTRON facilities.

The first set of material under testing :

- Gypsum Board
- Paint: white plastic water-based paint
- Linoleum
- Particle Board and Melanine

New materials under consideration:

- *Wall to wall carpet*
- *Ceiling panel*
- *Carpet and/or flooring adhesive*
- *MDF*

The Exposure Modeling Expert System (BEMES)

The system is under construction.

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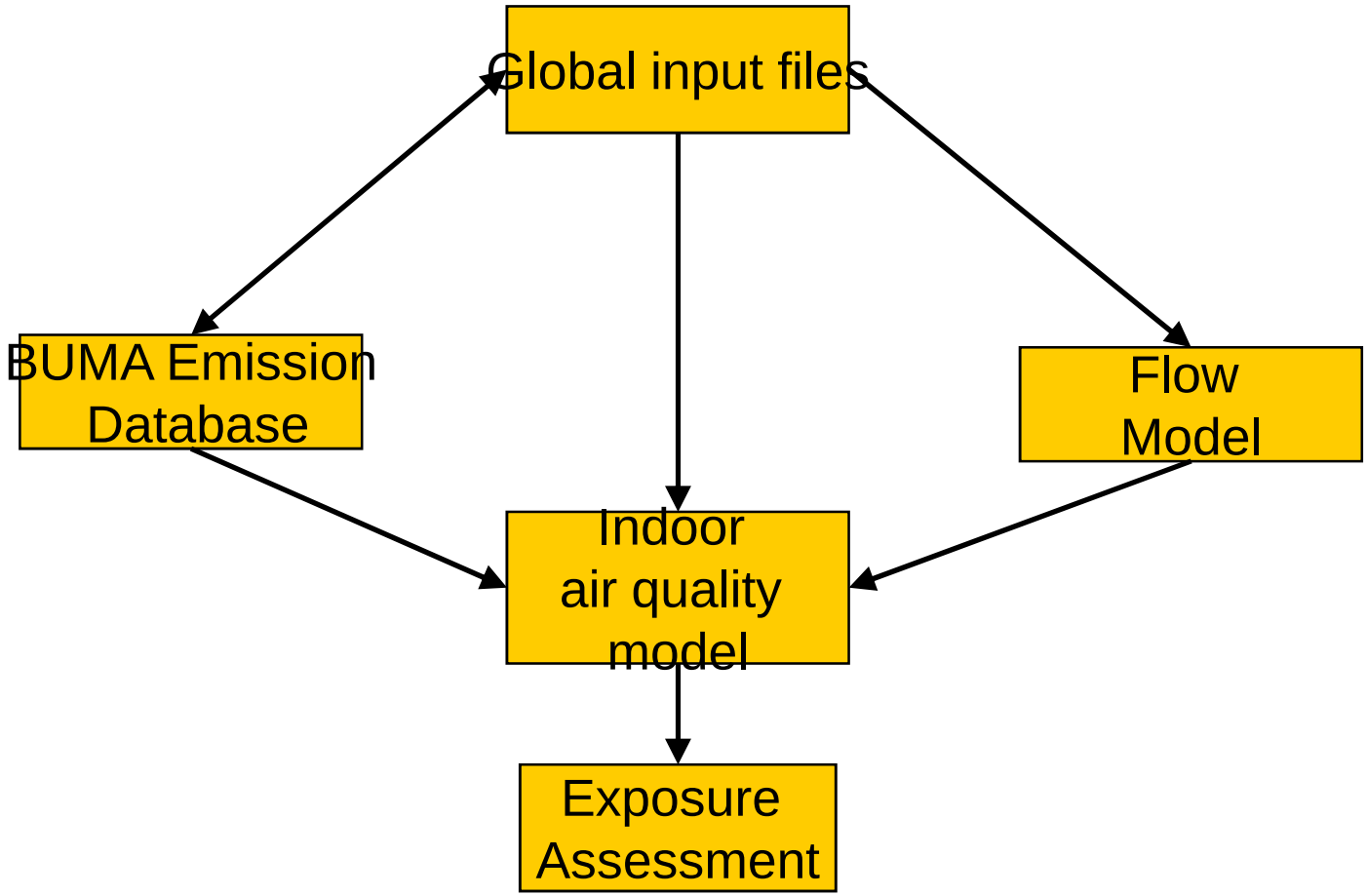
The Exposure Modeling Expert System (BEMES)

- **A tool that:**
  - **Contains comprehensive database on emissions**
  - **Search and queries from the database per compound and CPD / other building material**
  - **Conduct ventilation simulation**
  - **Estimate emissions and exposure in reference conditions**
  - **Browse properties and health effects of chemicals**

BEMES


Global input files
BUMA Emission Database
Flow Model
Indoor air quality model
Exposure Assessment

The Interaction with the stakeholders

A Project transparent to stakeholders.

The End-user Questionnaire

- Was created during the 1st year of BUMA
- Its aim is to initiate a discussion forum of European stakeholders (e.g. policy makers, health professionals, industry members) and to address specific issues related to emissions of building materials.

The End-users questionnaire

Some Results

- Strong demand for BUMA key deliverables
- The prioritization of building material a serious issue
- Interaction with the stakeholders
- Lack of comprehensive information about building materials
- Strong demand of a comprehensive database
- Strong interest regarding the contribution of building materials to Indoor Air
- Need of prioritization of building materials regarding public health protection
- Strong interest about the progress of BUMA project mainly from industry

Health Indicators and BUMA Project

- **Indoor Exposure to VOC Hazardous substances(Benzene,Formaldehyde)**

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Some Current Results Summary

- **The frequently used materials in the selected buildings were found to be water based paint, plaster and particleboards.**
- **The concentrations of VOCs show a considerable diversity due to the different indoor emission sources and outdoor environments concentrations.**
- **The priority compounds comprise a large proportion of the TVOC in the majority of tested buildings.**
- **The indoor excess concentrations of formaldehyde, acetaldehyde, acetone and d- limonene, indicate relatively significant emission sources of these substances in all buildings. These emission sources in some buildings were exclusively coming from building material.**
- **Present data indicate that emissions of hydrocarbons such as BTEX and terpenes from building materials could be insignificant after sometime. The finding needs further investigation.**
- **Emissions of high priority substances (benzene, formaldehyde) is better not to be ignored in indoor living and working environments**
- **Exposure to indoor ozone seems to be negligible in living and most of the working environments**

Closing Remarks - I

- **A comprehensive database –the BUMA database- containing up-to-date quantified emitted compounds from construction products and other building materials has been designed developed and uploaded in BUMA web-site.**
- **The BEMES expert modelling system under construction linked to the BUMA data base will provide an integral tool to assess human exposure from indoor emission sources.**
- **The BUMA database is further enriched with targeted laboratory measurements on building material emissions.**
- **The project is providing further insight to indoor air quality and emission sources across Europe**

Closing Remarks - II

- **BUMA Project in good progress**
- **Strong demand for BUMA key deliverables**
- **The prioritization of building material a serious issue**
- **Interaction with the stakeholders**

Thank you for your attention