*ibpsa*NEWS

volume 15 number 2
October 2005

www.ibpsa.org

The journal of the International Building Performance Simulation Association

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The International Building Performance Simulation Association (IBPSA) exists to advance and promote the science of building performance simulation in order to improve the design, construction, operation and maintenance of new and existing buildings worldwide.

President's message

IBPSA Members and Friends,

Building Simulation 2005 in Montréal has come and gone! It was a good time to see friends old and new, enjoying some of the unique Montréal restaurants, pleasant weather, and interesting architecture, not to mention the interesting technical presentations and discussions. About 270 participants enjoyed the conference. I would like to thank the conference organizers, headed up by Michel Bernier, assisted by Radu Zmeureanu of Concordia University and Stanislaw Kaj of École deTechnologie Supérieure, for their hard work in organizing the conference. Also, a sincere thank you goes to Ian Beausoleil-Morrison for heading up the executive scientific committee, supported by the many members of the scientific committee, who put in many hours reviewing abstracts and papers.

It was my pleasure at the conference to give the 2005 IBPSA Distinguished Service Award to Fred Winkelmann and the 2005 IBPSA Outstanding Young Contributor Award to Michael Wetter. Fred has recently retired from the Simulation Research Group at Lawrence Berkeley National Laboratory after an illustrious career spent developing and managing the development of DOE-2 and EnergyPlus. Michael is the developer of GenOpt and recently finished his PhD at the University of California-Berkeley; he now works at the United Technologies Research Center. Both awards were richly deserved - congratulations!

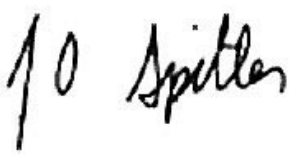
The IBPSA Board of Directors met before and after the conference. Much of the board meeting focused on routine business - finances, planning, status of regional affiliates, etc. One highlight from the meeting was approval of IBPSA Switzerland as a regional affiliate. They join IBPSA Germany as our second new regional affiliate of 2005.

Plans for Building Simulation 2007 were announced at the opening plenary session. Building Simulation 2007 will be held September 3-6 in Beijing. Please watch www.bs2007.org.cn for details and start making your plans. The board engaged the Building Simulation 2007 organizers from Tshinghua University in Beijing in discussions on the conference planning. We look forward to another great conference in an interesting location.

What else is coming up for IBPSA? Several things - first, by the time this newsletter is out, you should have received your ballot for election of a new board. Another ballot to make some by-laws revisions should be coming out soon. The board is also hoping to make a decision on BS'09 early next year and has asked that interested parties submit proposals before the end of 2005. If you are interested in submitting a proposal, please contact me.

Many of the regional affiliates are planning conferences for 2006 - I hope to see many of you at one of these meetings.

Best wishes,



A Tribute To Gint Mitalas
1928 - 2005

Photo courtesy of the NRC Canada

Gintautas "Gint" Povilas Mitalas was born in Lithuania in April 1928. He passed away in Ottawa, Canada on 13 May 2005. Gint leaves behind his wife, two children and six grandchildren. Our sincere condolences go to his family and loved ones, as we now pause to offer this tribute to his life and his work in the building research community. Recognition also goes to Don Stephenson, Research Scientist Emeritus of the NRC Canada, for contributing the main substance of this article.

During World War 2, as Lithuania was overrun first by the German army and subsequently by the USSR army, the Mitalas family was displaced and moved to Hamburg, where Gint completed high school. In 1947, the family moved to Canada under a program to resettle Displaced Persons (D.P.) He first went to work in a lumber camp in Northern Ontario, after which he attended a technical college for a course in motor mechanics and spent five years as an apprentice in a garage in Thunder Bay, Ontario. In 1953 he went to the University of Toronto to study mechanical engineering, graduating with a BASc in 1957 and an MSc in1959.

Gint joined the staff of the National Research Council of Canada in 1959 to work in the Division of Building Research, where he was part of a small group that was exploring ways to improve the accuracy of the calculation of heat transfer through walls. In the early 1960s he used an analog computer to simulate the heat flow through walls and roofs. Later he shifted his effort to using digital computers for calculating heat gain through walls and roofs. This led to the Response Factor approach, and finally to the

Z -Transfer Function method that was adopted by ASHRAE. He became a member of ASHRAE in 1966.

Gint presented two papers at the highly successful "First international symposium on the use of computers for environmental engineering related to buildings" that was held in Washington, DC in 1970. He also participated in the Third Symposium in Banff (1978), and the Fourth Symposium in Tokyo (1983.) He presented numerous papers at ASME and ASHRAE meetings and prepared materials that were published in the ASHRAE Handbook of Fundamentals as well as ASTM Standards. These included the Solar Heat Gain Factor tables and the tables of Transfer Function Coefficients for walls and roofs that were included in the 1972 edition of the ASHRAE Handbook.

Starting in 1968, Gint collaborated with Dr. Ken-ichi Kimura (a visiting scientist from Waseda University in Japan) on a major project to determine the cooling load caused by lights. This involved the design and construction of a full scale calorimeter room surrounded on all sides by thermal guard spaces. Gint completed this project after Dr. Kimura returned to Japan. The results were published in ASHRAE Transactions in 1973.

Later, in the 1970s, he worked on modeling the heat loss from basements, and established appropriate ways to insulate basement walls.

Gint has been no stranger to our IBPSA organization. IBPSA makes awards for outstanding work in the building performance simulation field. The senior award, entitled "IBPSA Award for Distinguished Service to Building Simulation," recognizes an individual who has a distinguished record of contributions to the field of building performance simulation over a long period. It was first awarded in 1991 to Gint Mitalas for his outstanding service and lifetime accomplishments in building simulation.

Toward the end of his career at the NRC, Gint collaborated with Dr. M. K. Kumaran, a Principal Research Officer at the NRC, to model the movement of moisture through fibrous insulation. This led to a chapter in an ASTM manual on Moisture Control in Buildings, in 1994.

A recurring heart problem led to his retirement in 1992, and ultimately to his death in 2005.

Gint made many significant contributions in the fields of building technology and building simulation, and his varied and comprehensive abilities have even extended his impacts beyond the buildings realm. His name is on at least one U.S. patent issued in 2002 for an "environment control system for aircraft interior condensation problem reduction, cabin air quality improvement, fire suppression and fire venting functions." The invention includes means for supplying a flow of dry ventilation air to the aircraft body to prevent condensation. His career trajectory from his days as a D.P. in the wake of WW2 to a scientist with a world wide reputation reflects his character as a remarkable achiever. He will be sorely missed by all of us in the entire building science community.

from Larry Degelman, IBPSA Newsletter Chairman

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IBPSA Website

For full information on how to order IBPSA's publications, or to look at Proceedings of past IBPSA Building Simulation conferences or past IBPSA Newsletters, please look on the IBPSA Website at: **www.ibpsa.org**.

Long-range conference site coordination

For potential future conference hosting, contact:
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IBPSA Regional affiliates

For information on joining IBPSA, please contact your nearest regional affiliate. If there is no affiliate in your region, join IBPSA by using the Central membership form, available at **www.ibpsa.org/m_membership.asp**.

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IBPSA Board of Directors

IBPSA Board of Directors Election

IBPSA Members are asked to vote on the nominees for the Board of Directors for the next 2-year term beginning in January 2006. All IBPSA members should have received a notification and solicitation to vote via e-mail. If you haven't received a ballot and you wish to vote, please contact Veronica Soebarto (IBPSA-Australasia) at **veronica.soebarto@arch.adelaide.edu.au** and ask for a ballot. **Votes will be counted in December 2005.**

The IBPSA Board is made up of four (4) elected officers, four (4) elected members-at-large, the past President, plus a member elected from each of the IBPSA Affiliates.

As is standard procedure, the IBPSA Board has nominated a new slate of eight Board Members to serve the next 2-year term. The nominees are listed below along with their respective offices. Following each name is the nominee's company affiliation and IBPSA Affiliation. If the nominee has an additional appointment (function) within IBPSA, this is also added following the name. Regional Affiliate Representatives are elected by their respective Affiliate members and are not part of this election. It should be pointed out that voters are free to add write-in names to the ballot if the nominee is a member of IBPSA and agrees to the nomination.

Executive Officers (elected positions):

President: Jan Hensen (Eindhoven University of Technology, Netherlands)
Vice-President: Ian Beausoleil-Morrison (Natural Resources Canada, Canada) - Conference Liaison
Secretary: Drury Crawley (U.S. Department of Energy, USA), Regional Affiliate Liaison
Treasurer: Charles "Chip" Barnaby (Wrightsoft Corporation, USA)

Immediate Past President: Jeffrey Spitler (Oklahoma State University, USA) - Conference location coordinator (This position is automatic.)

Members-at-large (elected positions):

Larry Degelman (Texas A&M University, USA) - Newsletter chairperson
Karel Kabele (Czech Technical University in Prague, Czech Republic) - Affiliate development officer
Roberto Lamberts (Universidade Federal de Santa Catarina, Brazil) - Website editor
Jonathan Wright (Loughborough University, UK) - Membership development officer

Ex-Officio appointed positions - no voting:

Lori McElroy (Scotland) - Honors and awards
Jeff Haberl (USA) - Membership services
Marion Bartholomew (UK) - Newsletter Editor

Reminder: IBPSA mailing list

As announced in the last IBPSA News, the IBPSA mail list has now been discontinued and consolidated under an existing listserver known as BLDG-SIM. BLDG-SIM is a mailing list for users of building energy simulation programs worldwide, including weather data and other software support resources. BLDG-SIM is intended to foster the development of a community of those users. Experienced and inexperienced users of building energy simulation programs are welcome and are expected to share their questions and insights about these programs. **IBPSA-related notices have been moved to the BLDG-SIM list**. To ensure that you receive future important IBPSA and other news related to simulation announcements and discussions (including announcements of *ibpsa*NEWS releases), please heed the following instructions so you will be included in the BLDG-SIM mail list:

To subscribe to the list,	send a blank message to: **bldg-sim-subscribe@gard.com**
To unsubscribe from the list,	send a blank message to: **bldg-sim-unsubscribe@gard.com**
To send a message to all subscribers to the list,	address your message to: **bldg-sim@gard.com**

Questions: If you have any questions, please contact the list owner:

Jason Glazer at **jglazer@gard.com** or +1-847-698-5686
This list is made possible courtesy of GARD Analytics, Inc., Ridge Park, IL, USA.
For further information about this list server, see the web page located at:
www.gard.com/ml/bldg-sim.htm

Getting more information about IBPSA

- About IBPSA: **www.ibpsa.org/m_about.asp**
- Conferences and papers online: **www.ibpsa.org/m_events.asp**
- Membership: **www.ibpsa.org/m_membership.asp**
- Mailing lists: **www.ibpsa.org/m_lists.asp**
- Regional affiliate web sites and contact persons: **www.ibpsa.org/m_affiliates.asp**
- Downloads/links: **www.ibpsa.org/m_downloads.asp**

IBPSA Sustaining Members and sponsors of BS2005

Sustaining members of IBPSA are those individuals or organizations that provide financial support to IBPSA at the level of US$500 or more per year. To learn about sustaining membership, please contact one of the IBPSA officers shown in this newsletter.

US - DOE United States Department of Energy **1985-2007 and BS2005**	ASHRAE American Society of Heating, Refrigerating and Air-Conditioning Engineers **2003-2007 and BS2005**
REHVA Federation of European Heating and Air-Conditioning Associations **2003-2007 and BS2005**	Agence de l'efficacité énergétique Québec Vous économisez. L'environnement y gagne aussi. **2005-2007 and BS2005**
Montréal Chapter **2005-2007 and BS2005**	CMHC SCHL **2005-2007 and BS2005**
Concordia University Real education for the real world **2005-2007 and BS2005**	École Polytechnique Montréal **2005-2007 and BS2005**
Université du Québec École de technologie supérieure **2005-2007**	Natural Resources Canada / Ressources naturelles Canada **2005-2007**
IRC Institute for Research in Construction **2005-2007 and BS2005**	Itron **2005-2007 and BS2005**
International Energy Agency Energy Conservation in Buildings and Community Systems Programme **2005-2007 and BS2005**	Hydro Québec **BS2005**

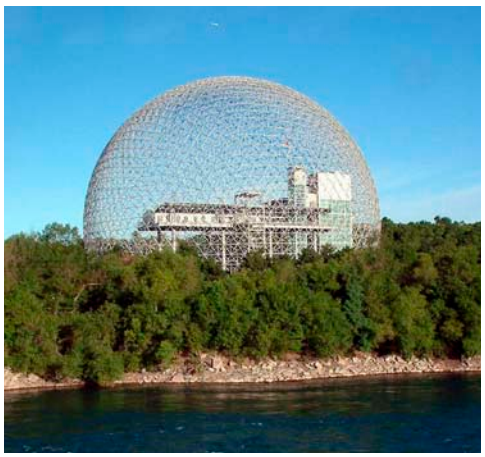
A report on the ...

Ninth International IBPSA Conference

Building Simulation

Montréal Canada, 15-18 August

Another highly successful Building Simulation Conference (BS2005, the 9th IBPSA Conference) was held in Montréal, 15-18 August 2005. Our heartfelt gratitude goes to the conference chair Michel Bernier of École Polytechnique de Montréal and the scientific committee chair Ian Beausoleil-Morrison of NRC Canada as well as to the wonderful staff from the host city.

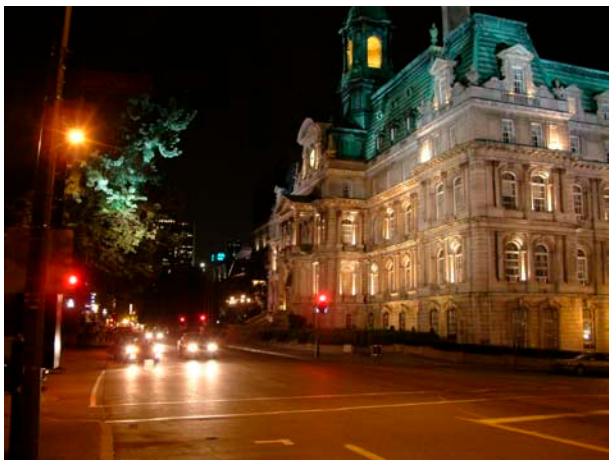


The conference had four keynote speakers, 188 papers (including 62 at poster sessions), 14 different simulation software demonstrations, and a long to be remembered dinner banquet at the chalet du Mont-Royal overlooking beautiful downtown Montréal. The night lights were spectacular. Attendance was at 270 participants, more than at any previous IBPSA conference.

IBPSA-Canada held post-conference one-day short courses on Energy+, Esp-r, and TRNSYS. A total of approximately 28 individuals (12, 5, and 11 respectively) registered for the three courses.

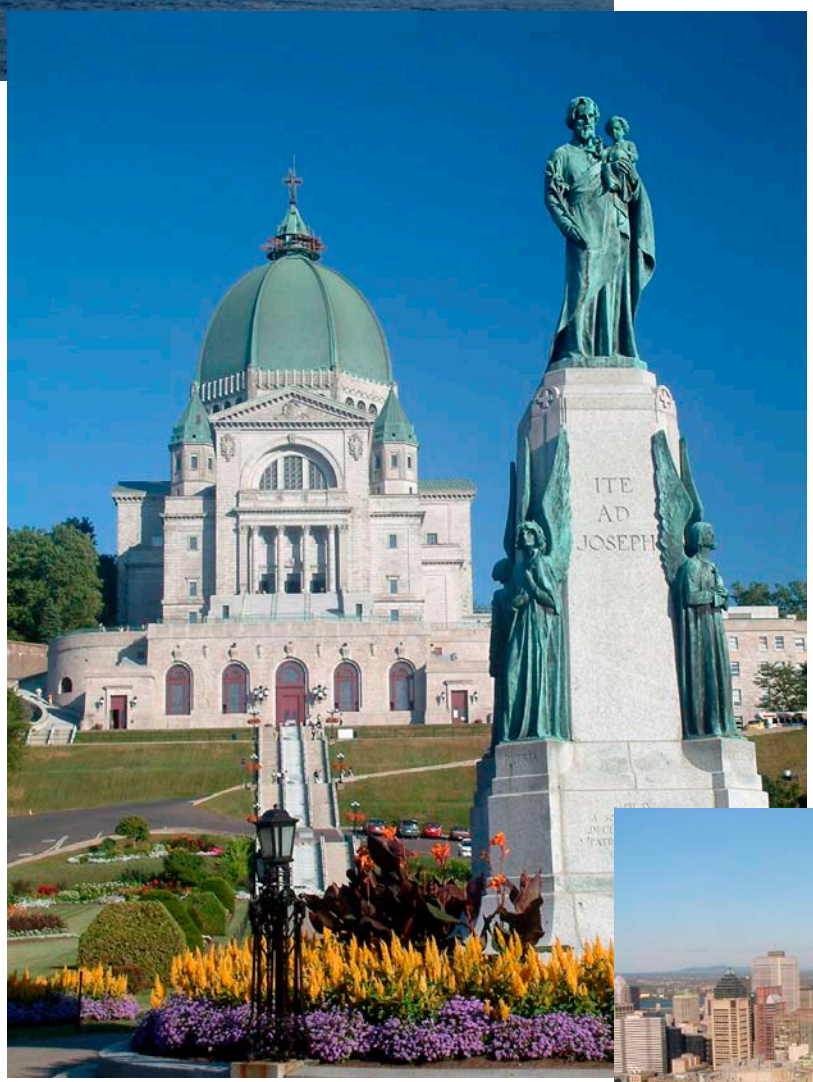
There was also a pre-conference workshop on Radiance in Montréal the week prior to BS2005.

Fernando Simon Westphal, of IBPSA-Brazil, did a remarkable job of assembling the paper and CD-ROM proceedings. The proceedings on CD are available from IBPSA and/or the conference host.



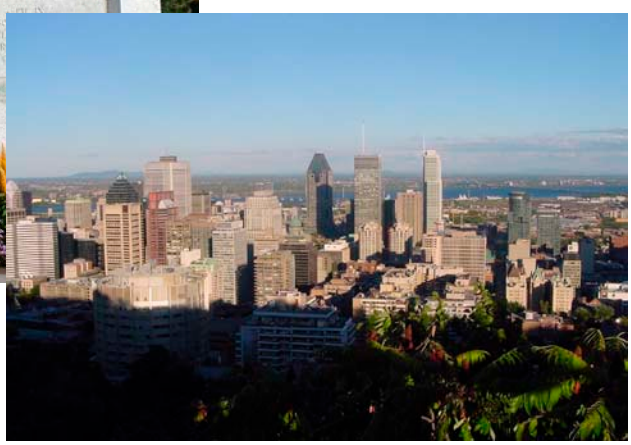
The conference had no less that 17 sponsors and exhibitors, all of whom are listed in this issue of the news.

Here and on the next page are samples of the sites and happenings surrounding the conference.



BS2005 SPONSORS & EXHIBITORS

- Agence de l'efficacite energetique Quebec
- ASHRAE
- ASHRAE Montreal chapter
- CMHC-SCHL
- Concordia Univeristy
- École Polytechnique Montréal
- École de Technologie Supérieure, Université de Quebec
- Natural Resources Canada
- Institute for Research in Construction
- Itron
- IEA ECBCS Programme
- REHVA
- US DOE
- Hydro Québec
- IES
- Square One
- Vabi



IBPSA Awards

Fred Winkelmann receives the Distinguished Service Award

IBPSA Award for Distinguished Service to Building Simulation was awarded to Dr. Fred Winkelmann, Staff Scientist of the Lawrence Berkeley National Laboratory. This award recognizes an individual who has a distinguished record of contributions to the field of building performance simulation, over a long period.

Fred holds a B.S. and a Ph.D. in Physics from the Massachusetts Institute of Technology.

Professional Experience

1976 - 2004 (retired in 2004): Leader and Principal Investigator of Simulation Research Group, Environmental Energy Technologies Division, Lawrence Berkeley Laboratory

Besides being a prime mover in the development of DOE-2 and EnergyPlus, as a technical manager Fred was willing to encourage new and innovative simulation techniques. As a result, ideas that originated at IBM were given a home in the Simulation Research Group and resulted in SPARK. Similarly a visitor with good ideas and a lot of energy was made welcome and supported in SRG resulting in the GenOpt package.

1982 - 1983: Visiting Scientist, University of Paris, Orsay

Monitoring and computer analysis of apartment buildings retrofitted for energy efficiency. Development of sunspace/atrium model for DOE-2.

1968 - 1975: Research Associate in experimental physics, M.I.T, Stanford University, and Lawrence Berkeley National Laboratory

History

In 1976, Fred Winkelmann was hired by Art Rosenfeld to manage the development of CalERDA, the precursor of DOE-2. This was a new field of endeavor for Fred - previously he had been a high energy physicist. By 1978 the initial version of the program had been released and a new era of building energy simulation had begun. Fred was always happiest working as a researcher, though he served several times and and for extended periods as group leader of the Simulation Research Group at LBNL. After the initial release of DOE-2 it became clear that using a predefined set of room weighting factors was not adequate for simulating many buildings. In 1980, Fred, along with Jerry Kerrisk at LANL, was the principal researcher involved in developing the custom weighting factor calculation that was incorporated into DOE-2.1. Fred, in the ensuing years, was reponsible for developing the daylighting modeling capabilities of DOE-2 and for moving the window calculations in DOE-2 from rudimentary U-factor/ Shading Coefficient models to fully developed physical models of the window system.

By 1995 the simulation community consensus was that a new simulation tool was needed. Fred performed a vital role as a technical leader and co-manager in merging the DOE-2 and BLAST development teams in a combined effort to produce EnergyPlus. Technically, Fred was the author of the window and daylighting modules in EnergyPlus. As a manager he helped ensure that the team working style would be "less ego, more code."

Professional Society Activities

ASHRAE Committees	TC 4.7 Energy Calculations TC 4.5 Fenestration
IBPSA	Member, Research Committee

Awards

EnergyPlus	2004 Lawrence Berkeley National Laboratory Excellence in Technology Transfer Award 2004 IBPSA-USA Lifetime Achievement Award 2003 R&D Magazine's R&D 100 Award 2002 Federal Laboratory Consortium Award For Excellence In Technology Transfer 2001 U.S. Dept. of Energy, Information Technology Quality Award for Technical Excellence
DOE-2	1989 Federal Laboratory Consortium Special Award for Excellence in Technology Transfer

Publications

Besides making presentations and publishing papers at numerous international conferences, Dr. Winkelmann has authored over 80 reports and publications through the Lawrence Berkeley national Laboratory report series.

Michael Wetter receives the Outstanding Young Contributor Award

Until recently, Michael was a Graduate Student Research Assistant, in the Building Simulation Group, at the Lawrence Berkeley National Laboratory (LBNL), CA, USA. During his stay at the laboratory, Michael completed a PhD in the field of building simulation and optimization at UC Berkeley. Michael's contribution to the field of building simulation (and its application), can be summarized as being:

- The development of GenOpt (Wetter, 2001), a generically applicable optimization program. GenOpt can be used with any building simulation program that operates with ASCII input-output files; GenOpt also allows for the implementation of any optimization algorithm, with several different algorithms being included in the distribution. GenOpt was conceived and developed solely by Michael, who also obtained funding for its development. The use of building optimization tools is likely to increase in the future, with recent growth in their use being evident by the number of papers on the topic at Building Simulation 2003. GenOpt is freely available from LBNL, and has a growing user base (**http://gundog.lbl.gov/**).

IBPSA President Spitler presenting the award

- An analysis of the performance of different optimization algorithms in solving non-smooth, unconstrained, building optimization problems (Wetter and Wright, 2004), this study providing guidance to both researchers and practitioners.

- The development of the first adaptive precision control algorithm for building simulation and its use in the efficient and robust solution of building optimization problems (Wetter and Polak, 2003). This was the topic of Michael's PhD research, the application of which is encapsulated in BuildOpt, a new breed of building simulation program (Wetter, 2004; Wetter et al, 2004).

- The development and implementation of HVAC component models for EnergyPlus and TRNSYS. While at LBNL, Michael also maintained the Linux version of EnergyPlus.

To date, Michael's career has been focused on buildings, building simulation, and building optimization. Michael is currently a Senior Research Scientist at the United Technologies Research Center, where he continues to conduct research in the field of building simulation. Michael's current research is concerned with the use of Medelica for building and HVAC modeling within the "Integrated Concurrent Design of High Efficiency Commercial Buildings" (NIST, 2002).

Michael is enthusiastic about his research in building simulation and optimization and applies an unsurpassed degree of rigour to everything that he does. Michael has already made an outstanding contribution to the field of building simulation and is likely to do so throughout the rest of his career.

Publications

NIST, 2002, **http://jazz.nist.gov/atpcf/prjbriefs/prjbrief.cfm?ProjectNumber=00-00-5641**.

Wetter M, 2001, "GenOpt - A Generic Optimization Program", Proceedings of IBPSA 2001, 601-608.

Wetter M, and Polak E, 2003, "A Convergent Optimization Method Using Pattern Search Algorithms with Adaptive Precision Simulation", Proceedings of IBPSA 2003, 1393-1400.

Wetter M, 2004, "BuildOpt - A New Building Energy Simulation Program that is Built on Smooth Models", **http://gundog.lbl.gov/dirpubs/54657.pdf**.

Wetter M, Polak E, and Carey V, 2004, "BuildingOpt 1.01 Validation", **http://gundog.lbl.gov/dirpubs/54658.pdf**.

Wetter M, and Wright J A, 2004, "A Comparison of Deterministic and Probabilistic Optimization Algorithms for NonSmooth Simulation-based Optimization", Building and Environment, 39, 989-999 ISSN: 0360-1323.

Building Simulation 2007 to be held in Beijing, China

The 10th IBPSA Conference and Exhibition will be held in Beijing, 3-6 September 2007, and will be hosted by Tsinghua University. Details were agreed between the conference chair, Yi Jiang, and the IBPSA board at the board meeting in Montréal. IBPSA President Spitler and Conference Chair Yi Jiang signed the agreement papers at the meeting. Conference details are available at the web site **www.bs2007.org.cn**.

CALENDAR

Second Announcement	15 Apr 2006
Deadline for submitting an abstract	**15 Sep 2006**
Notification of abstract acceptance/rejection	30 Nov 2006
Deadline for submitting a full paper manuscript based on accepted abstract	**15 Feb 2007**
Notification of result of review on first draft of paper	30 Apr 2007
Deadline for submitting revised papers which were conditionally accepted	15 May 2007
Deadline for final formatted papers	25 May 2007
Final acceptance notification	31 May 2007
Deadline for pre-registration for the conference	20 Jun 2007
Building Simulation 2007	**3-6 Sep 2007**

Forthcoming events calendar

There are more details of events highlighted in blue on subsequent pages.

Date(s)	Event	Information
2005		
6-20 October 2005	EPBD National Calculation Method, Strathclyde, Glasgow	Iain Macdonald, **iain@sesg.strath.ac.uk**
21-23 October 2005	Passive House Happening 2005, Aalst, Belgium	**www.passivehouse.be**
24-26 October 2005	ESM2005, European Simulation & Modelling Conference, Porto, Portugal	**http://biomath.rug.ac.be/~eurosis/conf/esm/esm2005/**
2-4 November 2005	IKK 2005 Int'l HVAC Trade Fair, Hanover, Germany	**www.ikk-online.com**
3-4 November 2005	CSTB Matlab/Simulink workshop, Sophia Antipolis, France	**www.cstb.fr/frame.asp?URL=implantations/implantations.htm**
9-11 November 2005	Greenbuild International Conference, Atlanta, Georgia, USA	**www.greenbuildexpo.org**
16-20 November 2005	The Big 5 Show, Dubai	Reza Rabbani , **rabbani@sympatico.ca**
30 November - 1 December 2005	Int'l HVAC&R Conference, Belgrade, Serbia	Branislav Todorovic, **todorob@eunet.yu**
2006		
21-26 January 2006	ASHRAE Winter Meeting, Chicago, USA	**www.ashrae.org**
3-5 May 2006	eSim2006, Toronto, Canada	**www.esim.ca**
2-4 Aug 2006	SimBuild 2006, Boston, USA	**www.ibpsa.us**
6-8 September 2006	PLEA 2006, Geneva, Switzerland	**www.plea2006.org**
7 October 2006	US National Solar Tour Day	**www.ases.org/tour/**

21-23 October 2005
Aalst, Belgium
www.passivehouse.be

Passive House Happening showcases comfortable buildings without heating. Demonstration projects show that passive houses are currently feasible in Europe and beyond. Suitable concepts and technology can be used to provide cost-efficient buildings. Building simulation and Excel calculations provide scientific support for the construction and certification of buildings that use four times less energy. To illustrate this Passiefhuis-Platform is organising a 3-day event full of technical information starting on 21 October 2005.

Passive House Happening 2005

Passiefhuis-Platform vzw

Passiefhuis-Platform vzw, a non-profit organization founded by leading actors and institutions from the building industry in Belgium, is holding its third annual Passive House Happening at Katholieke Hogeschool Sint-Lieven in Aalst, Belgium on 21-23 October 2005.

SYMPOSIUM

The symposium on Friday, October 21 offers up-to-date technical and scientific information for specifiers (constructors, building companies, government institutes etc), designers (architects, engineers, consultants, knowledge institutes etc), contractors, and material and component manufacturers. We also welcome people from outside the industry who are interested in passive houses.

TECHNOLOGY FORUM

On Saturday, October 22 everybody is welcomed on the third passive house technology forum in the Katholieke Hogeschool Aalst. Can I build a passive house? Which technology can I use? What are the latest developments in energy efficient technology? How can I improve insulation, ventilation, air tightness of my building? What calculation tools can I use? In addition to opportunities to find out about the latest products and technologies, the forum offers insightful information, discussions and presentations. Suppliers will be on hand all the time to offer information about their products and services. Entry to the forum is free of charge.

VISIT A PASSIVE HOUSE

On Sunday, October 23 you can experience how comfortable passive houses really are and how they are being built and visit a passive house free of charge at the Open House Day organised in collaboration with Bond Beter Leefmilieu Vlaanderen.

More information about the event is available from **www.passivehouse.be** or from:

Passiefhuis-Platform vzw
Gitschotellei 138
B-2600 Berchem
Tel: +32 (0)3 235 02 81
Email: **info@passiefhuisplatform.be**

24-26 October 2005
Porto, Portugal
http://biomath.rug.ac.be/~eurosis/conf/esm/esm2005/

2005 European Simulation and Modelling conference

Eurosis/ Ghent University

The 2005 European Simulation and Modelling conference (ESM '2005) will be held in Porto, Portugal, on 24-26 October 2005, hosted by the University of Porto.

ESM '2005 is the new international conference concerned with state of the art technology in modelling and simulation. It aims to provide an overview of academic research in the field of computer simulation. A number of major themes of simulation research will be presented, together with specific workshops which capture the art and science of present-day simulation research.

All submissions have been peer reviewed by three members of the International Program Committee. Accepted papers will be published in the conference Proceedings (both print and electronic format on the web), which will be copyrighted and widely disseminated.

TOPICS

- Methodology and Tools
- Simulation and AI
- High Performance and Large Scale Computing
- Simulation in Education and Graphics Visualization Simulation
- Simulation in the Environment, Ecology, Biology and Medicine
- Analytical and Numerical Modelling Techniques
- Web Based Simulation
- Agent Based Simulation
- Workshop Simulation with Petri Nets
- Modelling and Simulation with Bondgraphs
- DEVS Workshop
- Fluid Flow Simulation Modelling Workshop
- SIMULA Workshop

TUTORIALS

There will be tutorials in three topic areas:

- T1- Introductory tutorials
- T2- State of the Art Tutorials
- T3- Software and Modelware Tutorials

POSTER SESSION

The poster session only features work in progress. As well as being presented, posters will feature as short papers in the Proceedings.

STUDENTS SESSION

This session is for students who want to present their work in progress or part of their doctoral thesis as a paper. Student

papers are denoted by the fact that only the name of the student appears on the paper as an author. They will be published as short papers in the Proceedings.

EXHIBITION

A special exhibition will be held during the conference focused on simulation tools. For more information please contact Philippe Geril at EUROSIS: **Philippe.Geril@biomath.ugent.be.**

REGISTRATION FEES

	Authors	EUROSIS Members	Other Participants
Pre-registration before October 1	485 € (Euro)	485 € (Euro)	545 € (Euro)
Registration after October 1	Pre-registration required	545 € (Euro)	595 € (Euro)

The registration fee includes one copy of the Conference Proceedings, coffee and tea during the breaks, all lunches, a welcome cocktail and a conference dinner.

For additional information about the venue, please contact:

Philippe Geril
Ghent University
Ghent-Zwijnaarde, Belgium
Email: **philippe.geril@biomath.ugent.be.**

For up to date information see:
www.eurosis.org or http://biomath.rug.ac.be/~eurosis/conf/esm/esm2005/.

3-4 November 2005
Paris, France
www.cstb.fr/frame.asp?URL=implantations/implantations.htm

3rd Workshop Matlab/Simulink Building and HVAC simulation

CSTB

Following the success of its first two workshops on Building and HVAC simulation using Matlab-Simulink and related toolboxes in 2003 and 2004, CSTB has organised a third. Aimed at academics, professionals and practitioners, actual or future users of these tools, and anyone else with an interest in the field, the workshop will be held in Paris on 3-4 November 2005. The workshop language will be English.

Use of the mathematical programming tool Matlab is increasing in a large number of fields. Together with its dynamic simulation toolbox Simulink, originally developed for control and automation applications, Matlab has become a powerful tool that is suitable for a large number of applications. Many other Matlab toolboxes exist, and

can be combined — on optimisation, control, CFD or even virtual reality, for example. The range of possible applications of the tool is very large and is still increasing; the tool is already being used in many fields of dynamic simulation and mathematical programming, such as cars and engines.

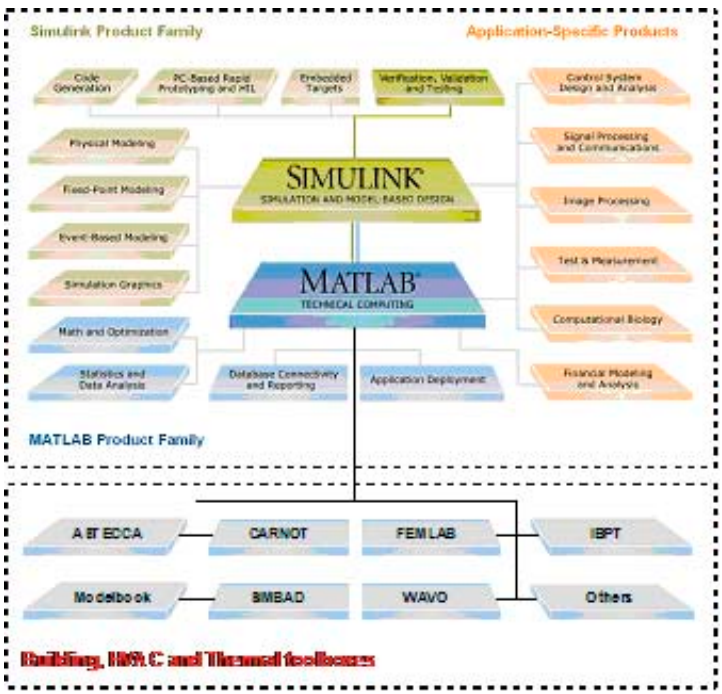
In the field of building and HVAC, the number of users of Matlab/Simulink has also been increasing rapidly in recent years. The tool is suitable for many applications in this field, including the study of energy consumption, control strategies, hydraulic and air flow studies, IAQ, comfort, and sizing problems.

So far there has been very little exchange of know-how and other information between users about modelling techniques or simulation techniques. CSTB's workshops aim to fill this gap by demonstrating the use of the tool, facilitating the exchange of know-how between users, encouraging cooperation and the sharing of developments, and defining and optimising links to other simulation tools..

In the 2005 workshop, there will be presentations on:

- Modelling and structuring in the graphical environment
- Simulation and emulation (IAQ, comfort, control, energy consumption, ventilation)
- Visualisation techniques
- Coupling with other Matlab toolboxes (CFD, Optimisation, control, virtual reality etc.)

and software demonstrations. Abstracts and Presentations will be published on the workshop homepage.



The workshop fee is 175 € (Euro), including lunch and a social event in the centre of Paris.

The venue is:
CSTB
4, av. du Recteur Poincaré
75782 Paris Cedex 16
France.

To register and for further information, please visit **www.cstb.fr/frame.asp?URL=implantations/implantations.htm** or contact:

Peter Riederer
CSTB-DDD
Route des Lucioles - BP 209
06904 Sophia Antipolis Cedex, FRANCE
Phone : +33(4)93-95-64-42
Fax : +33(4)93-95-64-31
Email : **p.riederer@cstb.fr**

16-20 November 2005
Dubai International Exhibition Centre, UAE
www.dmgdubai.com

The BIG 5 Show

The BIG 5 Show in Dubai is the Middle East's main annual trade fair for construction and building related products and services - and futuristic Dubai is an architect's paradise (as highlighted in The San Diego Union Tribune, August 21, 2005 issue). The show serves seven major industry sectors: building and building materials, water technology & environment, air conditioning and ventilation, cleaning & maintenance, glass & metals, bathrooms & ceramics, and marble & machinery. Most major countries organise national pavilions, and last year, the show attracted 1,644 exhibitors representing over 2,000 companies from 54 countries.

ICYNENE Inc. of Canada (**www.icynene.com**) is presenting a technical paper on *The System Approach to Thermal Performance in Buildings* at The Big 5 Show from November 16 - 20, 2005. The Icynene presentation will highlight developments in building science with an emphasis on the use of soft foam insulation and its relationship to the durability and air quality problems that many buildings seem to be experiencing. Soft foam insulation is a 'green' product which reduces energy consumption and greenhouse gas emissions while promoting improved indoor air quality. The benefits of air barrier foam for hospital intensive care units, museums, and libraries will be discussed.

Additional information about the Big 5 Show is available from the official web site at **www.dmgdubai.com**/. Click on "The Big 5". Some related information is at **http://tradeshow.alibaba.com/trade_shows/220282/Big_5_Show.html**.

For information about ICYNENE, Please contact Reza Rabbani at **rabbani@sympatico.ca**.

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30 November-2 December 2005
Belgrade, Serbia and Montenegro

International Congress on HVAC&R

The 36th international conference and exhibition will be in Belgrade on 30 November, 1 and 2 December, covering HVAC&R, energy issues including simulations and measurements of building behaviour. Speakers are expected from the USA, Europe and Asia. The conference is sponsored by ASHRAE and REHVA, and the presidents of both of the sponsoring associations are invited guests. For further information, pleasse contact the president of organization committee, Branislav Todorovic, at **todorob@eunet.yu**.

3-5 May 2006
Toronto, Canada
www.esim.ca

eSim 2006
IBPSA-Canada

The bi-annual conference of IBPSA-Canada is being organized to bring together professionals, academics and students interested in building performance simulation issues and applications. It will be held in Toronto, Canada on May 4 and 5, 2006 (pre-conference workshops May 3, 2006) at the Faculty of Architecture, Landscape, and Design (al&d) located within the downtown campus of the University of Toronto.

The themes of the conference are:

- Recent developments for modelling the physical processes relevant to buildings (thermal, air flow, moisture, lighting).
- Algorithms for modelling conventional and innovative HVAC systems.
- Methods for modelling the whole-building performance, including integrated resource management, renewable energy sources and combined heat, cool and power generation.
- Building simulation software development and quality control approaches.
- Use of building simulation tools in code compliance and incentive programmes.
- Moving simulation into practice. Case studies of innovative simulation approaches.
- Validation of building simulation software.
- User interface and software interoperability issues.
- Architectural and engineering data visualization and animation.
- Optimization approaches in building design.

For more information, please visit **www.esim.ca.**

IMPORTANT DEADLINES

28 October 2005	Deadline for submission of abstracts (1 page max.), English or French
25 November 2005	Deadline for indicating interest for presenting a software
2 December 2005	Abstract acceptance/rejection
16 January 2006	Paper submission, English or French
17 February 2006	Comments on papers from review committee
10 March 2006	Final paper submissions.
31 March 2006	Deadline for early registration

The Conference Chair is Dr. Ted Kesik, University of Toronto **ted.kesik@utoronto.ca** and the Chair of the Scientific Committee is Dr. Alan Fung, Ryerson University **alanfung@ryerson.ca**.

2-4 August 2006
Boston, USA
www.ibpsa.us

SimBuild 2006
IBPSA-USA

IBPSA-USA will hold its second national SimBuild conference August 2-4, 2006 on the campus of the Massachusetts Institute of Technology. The format will be similar to the successful 2004 conference held at the University of Colorado, Boulder. Technical sessions over two days will feature presentations on a wide range of topics related to the simulation of HVAC equipment, airflow in buildings, energy usage, and the visual and acoustic environment in buildings, as well as demonstrations of simulation software and of hardware and software needed to emulate or measure the performance of buildings. Friday will be a practitioner day, offering case studies, hands-on software demonstrations and other presentations, aimed at giving practicing architects and engineers the information they need to be more informed collaborators with simulation experts. The practitioner day will be coordinated with local US Green Building Council chapters and affiliates.

Conference housing will be offered on campus in dormitories and in nearby hotels. MIT has a growing number of architecturally significant buildings that participants can visit, including recent work by Frank Gehry, Steven Holl, and Kevin Roche, and earlier projects by I.M. Pei, Eero Saarinen, and Finnish master Alvar Aalto. Harvard University and Harvard Square are a short distance away.

The meeting is open to all, world-wide. Boston is a convenient destination for travelers from major cities in the U.S. and in many other countries. It is a historic and compact city, easily explored on foot and via public transportation. Conference participants may want to stay longer and explore New England's mountains and Atlantic coast, including Cape Cod, Martha's Vineyard and Nantucket. More information and a request for presentation abstracts will soon be posted on the IBPSA-USA web site at **www.ibpsa.us**.

6-8 September 2006
Geneva, Switzerland
www.plea2006.org

PLEA 2006: 23rd International Conference on Passive and Low Energy
PLEA

Next year's annual PLEA conference takes as its title Clever design, affordable comfort: A challenge for low energy architecture and urban planning.

The topics covered will include:

- Lessons from traditional architecture
- Design strategies and tools
- Comfort and well-being in indoor and outdoor spaces

- Indoor comfort in glazed buildings
- Research and technology transfer
- Strategies and tools for renovation
- Architectural education for sustainable design
- Examples of low energy design at the urban scale
- Case studies

For more information, please visit the conference website at **www.plea2006.org** or email **contact@plea2006.org**.

The call for papers will be issued shortly on the conference website.

IMPORTANT DEADLINES

September 2005	Call for Abstracts
31 December 2005	Deadline for abstracts
31 January 2006	Notification of acceptance (Abstracts)
31 March 2006	Full papers submission
15 May 2006	Notification of acceptance (Full papers)
15 June 2006	Deadline for full papers final versions
30 June 2006	Definitive notification for oral or poster presentation

September - November 2006
various venues, USA
www.ases.org

11th US National Solar Tour Day

Tours of low-energy houses are held each year in many US States (43 in 2005) during September - November, particularly centred on the first Saturday in October, 'National Solar Tour Day'. All but a few tours for 2005 are now over (see **www.ases.org/tour/** for this year's schedule), but look again in the run-up to next year's National Solar Tour Day which is on Saturday 7 October 2006.

Software news

Building Energy Tools Directory

Dru Crawley, DOE

The web-based Building Energy Tools Directory at **www.energytoolsdirectory.gov** contains information on more than 301 building-related software tools from more than 20 countries around the world. Haven't visited lately? Recent additions include EEM Suite, FENSIZE, AnTherm, SPACER, VIP+, and RadOnCol.

For each tool in the directory, a short description is provided along with information about technical expertise required, users, audience, input, output, validation, computer platforms, programming language, strengths, weaknesses, technical contact, availability and cost. A link is also provided for directly translating the web pages into more than 8 languages.

If you know of a tool (yours?) that isn't in the directory, visit **www.energytoolsdirectory.gov/submit.cfm** or contact Dru Crawley at **Drury.Crawley@ee.doe.gov**.

Comparison of 20 Building Energy Simulation Programs

A new report is now available contrasting the features and capabilities of twenty building energy simulation programs: BLAST, BSim, DeST, DOE-2.1E, ECOTECT, Ener-Win, Energy Express, Energy-10, EnergyPlus, eQUEST, ESP-r, IDA ICE, IES <VE>, HAP, HEED, PowerDomus, SUNREL, Tas, TRACE and TRNSYS. This comparison is based on information provided by program developers and users in the following categories: general modeling features; zone loads; building envelope, daylighting and solar; infiltration, ventilation and multizone airflow; renewable energy systems; electrical systems and equipment; HVAC systems; HVAC equipment; environmental emissions; economic evaluation; climate data availability; results reporting; validation; and user interfaces, links to other programs, and availability.

The almost 60-page report, jointly published in July 2005 by the U. S. Department of Energy, University of Strathclyde, and University of Wisconsin-Madison, is available for download (585 KB) from:

www.energytoolsdirectory.gov/pdfs/contrasting_the_capabilities_of_building_energy_performance_simulation_programs_v1.0.pdf

[Or visit the Tools Directory at **www.energytoolsdirectory.gov** and look for the Comparison report under Additional Resources on the lower right side.]

EnergyPlus Version 1.2.3 Available October 2005

Dru Crawley, DOE

The next release of the EnergyPlus building energy simulation program, Version 1.2.3, became available in early October 2005. In addition to many new features, we have updated and extended capabilities throughout the existing building envelope, daylighting, and HVAC equipment and systems portions of the program. The new features include:

INPUT

- Example input files for all new features (More than 200 example files available)
- All example input files have been updated and new documentation of features added
- More than 100 new international weather locations including data for India, Portugal, Brazil, China, Ethiopia, Ghana, Kenya, and Nepal in the EnergyPlus/ESP-r weather format (more than 900 locations available worldwide)
- Revised design days to accommodate "enthalpy" and "humidity ratio" as potential humidity indicating types based on 2005 ASHRAE Fundamentals.
- Updated all design conditions to match new 2005 ASHRAE Fundamentals data in the weather files and associated design day data.

ZONE MODEL

- User-definable room air model

HVAC

- Steam loop, steam coil, steam boiler
- Simple Water to Water GSHP
- Packaged Terminal Heat Pump
- Heat Pump Water Heater
- Branch pumps
- Desuperheater Water Heating Coil
- Demand limiting controls
- Return air bypass
- Restructured plant loop modeling to support branch pumps and future headered pumps and extensions of controls simulation

ON-SITE ENERGY SUPPLY

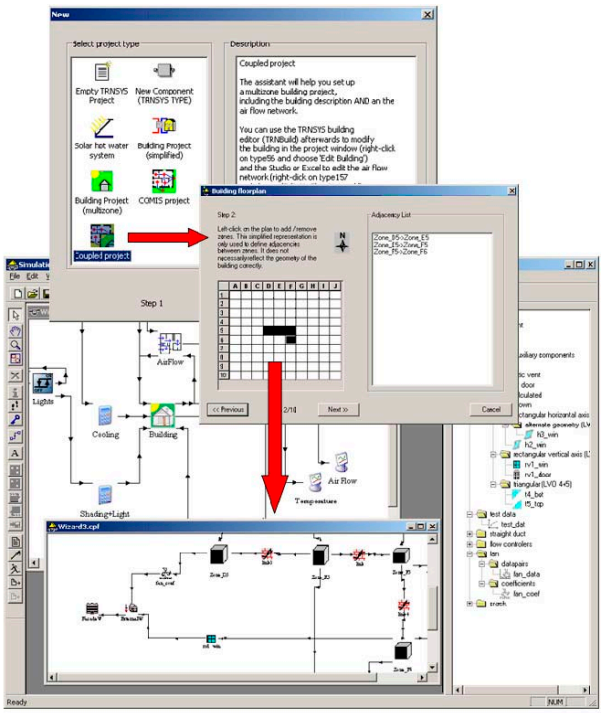
- Research-only Solid Oxide Fuel Cells model

Input/Output Reference and Engineering Reference updated and extended for all new features and updates, bringing total documentation to more than 2200 pages.

And many other enhancements and speed improvements throughout.
More information on these and other new features in this version is available on the EnergyPlus web site, **www.energyplus.gov**.

COMIS 3.2 available 1 November

Andreas Weber, EMPA, Werner Keilholz, Paul Sette & Sabine Taristas, CSTB



A new version of the COMIS multi zone airflow and pollutant transport simulation software will be released in autumn 2005.

The latest version of this simulation environment, *COMIS 3.2 Simulation Studio*, features a completely new graphical user interface, based on CSTB's Simulation Studio technology. This user interface is also available for the popular TRNSYS simulation program, and an integrated version of the COMIS project editor, allowing for simplified coupled air flow and thermal simulation, will also available with TRNSYS 16.1.

The new Simulation Studio graphical user interface features assistants (so-called wizards) allowing for quick simulation project creation based on simplified, step-by-step user interaction. Once a simulation project has been automatically created by the wizard, it can be run immediately, and the full power of the simulation environment is available to the user to modify, refine and extend it.

The kernel of COMIS 3.2 includes new and improved large opening types and a thermostatic vent air flow component contributed by Peter Schild of NBRI. COMIS 3.2 also features an updated and revised User Guide and an extended tutorial for first-time users.

More information is available at **http://software.cstb.fr.**

Design tool software news from ALware

Dipl. Phys.-Ing. Andreas Lahme, ALware

SIMULATION-MANAGER

The building simulation software center

The Simulation-Manager is a launch environment for desktop building simulation. Any tool the user requires for performing building simulations can be added, and started quickly. Working time can be saved by the Simulation-Manager's archive function: any of the file used in a simulation project can be shown at the push of a button. Additionally, for all ALware tools, updates can be done automatically.

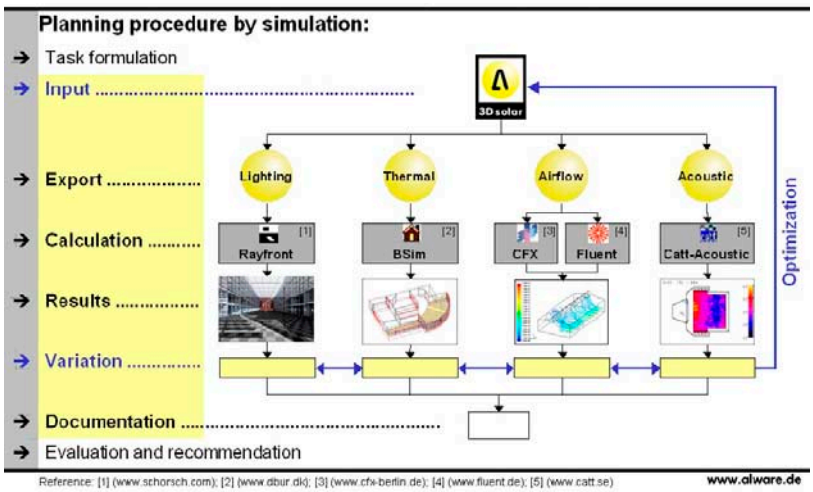
Advantages and features:

- Integration of all simulation programs into one user interface
- Quick launch of simulations for integral analysis of buildings
- Working time savings by archiving of simulation projects
- Administration of projects and variations of any documents and simulation models used for a project
- Automatic update and upgrade function for ALware planning tools

3DSOLAR - VERSION 1.5.5

Easy and flexible 3D geometry input for simulation

3Dsolar is a 3D geometry builder for creating simulation models. The unique conception of adding and modifying geometric objects makes 3Dsolar an easy and flexible 3D input tool: the parametrized geometry enables very quick changes to models for creating variations. 3Dsolar enables the user to construct even complex 3D geometries quickly, and to relocate, reinsert, or resize both single and whole building parts later.



Data export

The input simulation model can easily be exported from 3Dsolar to internationally respected and scientifically correct working calculation engines for building simulation:

- For simulation of daylight and artificial lighting, the model can be exported to Rayfront with Radiance.
- For simulation of thermal room behavior, the model can be exported to BSim with tsbi5.
- For CFD simulations, the model can be exported to Fluent or CFX (under construction).
- For simulation of room acoustics, the model can be exported to CATT-Acoustic.

Design tools

3Dsolar is a central part of ALware's suite of tools by for the integral analysis of buildings using simulation. With 3Dsolar you build up parameterized 3D geometry

which can easily be varied afterwards. 3Dsolar creates optimal inoput data for use in dedicated calculation engines for simulating lighting, thermal, airflow and acoustic performance. Additional tools enhance the efficiency of the software package and optimize workflow. The tools are suited for the typical design procedure: Task formulation — Input — Variation — Calculation — Results — Documentation — Evaluation — Recommendation.

Easy geometry assembly by tree structure

Efficiency

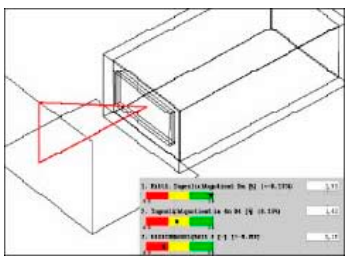
Creating simulation models by 3Dsolar saves a lot of working time compared with conventional CAD applications. Changes in geometry can be made easily and quickly, and existing geometries are adapted automatically. This saving in the working time involved in creating simulation models is especially important in the early design and planning phase of buildings where the building structure is revised again and again. 3Dsolar therefore offers the quick setup of variations of the building which are necessary for successive optimization. This makes it possible to assess building performance efficiently and economically from the earliest design stage onwards.

Advantages of 3Dsolar in summary:

- Easy-to-learn handling
- Fast assembly of three-dimensional parameterized simulation models from the earliest stage of design
- Quicker modifications to building geometry than with conventional CAD programs
- Fast and reliable answers to your questions about building performance
- 3Dsolar creates optimal data for each calculation engine
- Further tools optimize your workflow, save working time and provide planning security so that designers can concentrate entirely on design
- Design procedure: Task formulation — Input — Variation — Calculation — Results — Documentation — Evaluation — Recommendation
- You use calculation engine you trust — right from the beginning
- Developed by users for users.

SIMULATION-WIZARD

Evaluation: daylight factors in just one second



- Analysis of daylight amount in inner-rooms
- Eight preset standard room types for the most common cases in practice
- Fast adaption of the geometry to the task formulation
- Illustration of the geometry as sketch view
- Validated results including evaluation in just one second
- Development of sensitivity for the influence of the input values on the results
- Avoidance of wasteful lighting simulations as pre-considerations, enabling targeted construction of variations of lighting simulation projects
- Lossless transfer to 3Dsolar/3D Lighting.

Background

The calculation of daylight values with Simulation-Wizard is based on the rigorous science of F Sick's PhD dissertation *Einfluss elementarer architektonischer Maßnahmen*

auf die Tageslichtqualität in Innenräumen. Regression equations for a number of simple geometric cases have been programmed into Simulation-Wizard. These are derived from lighting simulations carried out using the internationally-respected calculation engine Radiance, combined using formal statistical methods for experimental design.

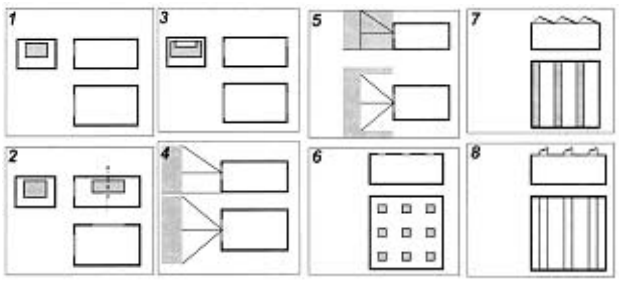
Application

This stand-alone tool can be applied without any further software skills: the room to be examined is parametrized via the user interface, and results can be seen instantly.

Data models

The following data records are available for daylight evaluation with Simulation-Wizard:

- Daylight case 1: The single-sided daylit room without obstruction
- Daylight case 2: Two-sided over corner daylit room without obstruction
- Daylight case 3: Two-sided opposite daylit room without obstruction
- Daylight case 4: The single-sided daylit room with opposite obstruction
- Daylight case 5: The single-sided daylit room at an atrium
- Daylight case 6: From above daylit room via single skylights
- Daylight case 7: From above daylit room via roof sheds
- Daylight case 8: From above daylit room via roof lanterns.



New feature: daylight autonomy

A new feature has been added to the tool to calculate the adequacy of daylight and energy savings in artificial lighting in rooms being studied, based on the daylight factor, hourly diffuse solar radiation and a day profile for the usage. This facility is particularly useful for economic analysis in the early design process of buildings.

MORE INFORMATION ON 3D LIGHTING

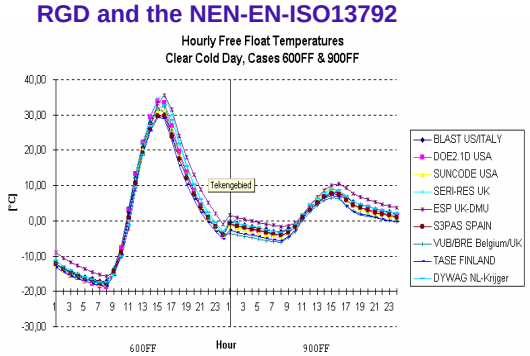
More information about the ALware tools is available in IBPSA news 13-2, Software News pages 27 - 29, 2003.

FURTHER INFORMATION

For further information on the planning tools and other products and services by ALware in both English and German visit **www.alware.de** or email **info@alware.de**.

Complies with the control mark RGD and the NEN-EN-ISO13792

DYWAG



The thermal simulation model DYWAG : a computer program which determines energy consumption, heating & cooling loads, heat flows and temperatures in a building by using an hourly calculation of the total heat and moisture distribution in the building and/ or the zones.

Characteristics:

- 9 zone model, which means that nine zones can be calculated simultaneously.
- Calculation based on the HX-diagram, which implies that the temperature- as well as the moisture balance are calculated.
- Variable external climate, e.g. VRJ, 1964.
- Fully integrated with the BINK software libraries (e.g. the materials from SBR 9, ISSO 6 and the 'Bouwfysisch Tabellarium').
- Constructions can contain a maximum of 99 layers of material.
- Adjustable calculation accuracy (homogeneous, 4 junctions per material layer)
- Rotation of the building as a whole

The DYWAG model allows variable parameters (hourly or dependent on other parameters) for e.g. Internal load, Inner temperature, Ventilation (infiltration, open windows, etc), Air treatment (VAV, LBK, etc), Sun protection, Light admittance and Climate control

NEN-EN ISO 13792

Thermal performance of buildings–Calculation of internal temperatures of a room in summer without mechanical cooling. DYWAG took part of the foundation of this European standard. DYWAG answers completely to this standard!

This is a product from:
BINK software BV, PO Box 500, 3300 AM, Dordrecht (NL)
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e-mail: info@binksoftware.nl
internet: www.binksoftware.nl

Announcements

Lawrence Berkeley National Laboratory online newsletter

Lawrence Berkeley National Laboratory (LBNL) publishes a bi-monthly on-line newsletter — the Building Energy Simulation User News. You can subscribe free or check out the July/August 2005 and other past issues and download PDF versions at: **http://SimulationResearch.lbl.gov/un.html**.

This issue includes:

Section 1

- news and features

Section 2

- listings of EnergyPlus and DOE-2 consultants
- sources of complementary software for EnergyPlus and DOE-2
- calendar of future meetings and conferences

Send email to **klellington@lbl.gov** if you want to be listed as an EnergyPlus or DOE-2 consultant.

Kathy Ellington, editor
Simulation Research Group MS: 90R3147
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Berkeley, CA 94720-0001 USA

Feature articles

Building performance simulation — A success story for energy efficiency in Belgrade's UŠĆE Tower reconstruction

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Fig 1 General view of the USCE Tower in Belgrade

USCE TOWER'S ENVELOPE ENERGY EFFICIENCY OPTIMISATION

The EC - Euro Construction's UŠĆE Tower (23.000 square meter office building) is one of a number of new important developments on the entire site in Belgrade (**Fig 1**). Its reconstruction (it has been seriously damaged during bombing in 1999) has been designed by the UK's project delivery service company HOK (Hellmuth, Obata + Kassabaum, Inc.). Its envelope/construction — particularly its facades multifunctional optimization, thermal behavior and thermal load control, daylighting and solar thermal as well as eventually PV electricity production — is of significant importance for the further city energy efficiency improvement. Design Implementation of building performance simulation in rational planning, entailing the matching of energy demand and supply in order to assist sustainable energy management development based on energy efficiency and renewable energy technologies implementation, has resulted in recently finished reconstruction of the UŠĆE Tower (**Fig 2**, next page).

Fig 2 General view of the tower's site

It has been demonstrated that effective demand side integrated resource planning, encompassing integrated energy efficient — sustainable building planning, combining new urban segments, implementing renewable energy/materials sources, creative energy conscious solutions, offer excellent opportunities for demonstration of the principles of sustainable development in the urban areas. Thus, in addition to its very distinct importance for the UŠĆE building and site sustainability development, this project and finished reconstruction have more general impact: promotion of the integrated building engineering approach, efficient energy use and resources conservation, as well as environment protection at the Belgrade City and regional level. Additionally strategic objectives addressed are the reduction of greenhouse gases and pollutant emission, and the security of energy supply.

To approach energy optimization of the UŠĆE Tower, different options/models of its envelope and construction have been studied by BPS — Building Performance Simulations. Analyzed are: its dynamics of thermal behaviour, energy loads, predicted total and specific energy consumption, daylighting and artificial lighting, PCM thermal storage, energy efficiency, and energy related costs. The results of the energy optimization study of the UŠĆE Tower envelope and construction (early results had been presented at the IBPSA Meeting in Chicago). Simulations had been performed using EnergyPlus, TRNSYS, and Adeline.

The results of the UŠĆE Tower envelope and construction energy optimization study are given here. Three main constructions options have been analyzed: Scenario I: Façade without parapet, Scenario II: Façade with parapet, and Scenario III: Advanced Construction of the Scenario I with the Façade/HVAC System's Energy Efficiency Improvements Measures. The final level optimization covered 5 different wall structure/façade glazing combinations, which have been selected through preliminary screened 11 models. These glazing types are as follows: MScheme Design; M01 Standard double glazed; M02-1-1 Pilkington 66/33 on one façade and 50/25 on other façade; M02-2 Pilkington 50/25; and M02-4 Glaverbel-Azur Planibel TOP N.

After detailed comparison of all results, as the most prospective, with significantly reduced installed capacities, as well as reduced energy consumption for both heating and cooling, are selected models MO2-1-1, MO2-2 and MO2-4.

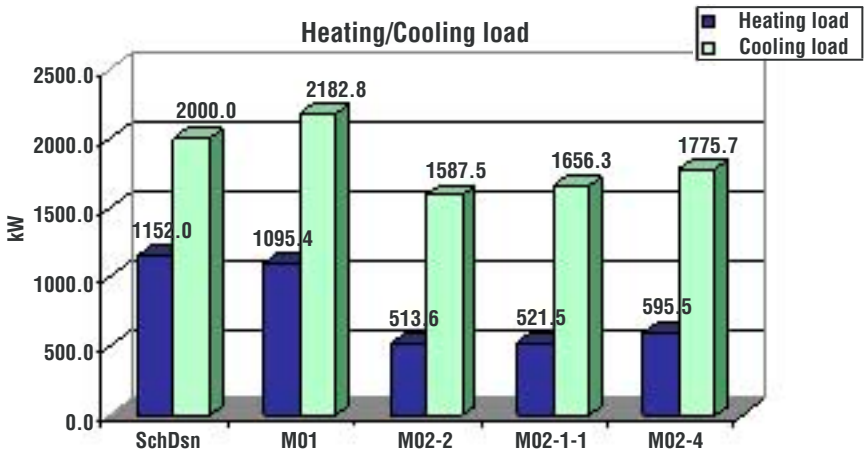

Fig 3 Predicted peak cooling and heating loads

To elucidate differences and easily focus on optimal solution, there is graphic presentation in a form of diagrams for comparative analysis presented in Figs 3 and 4.

Percentage reductions in heating loads/heating energy usage from the original Scheme Design are for models MO2-2, MO2-1-1, and MO2-4, which are 55.4/73.8, 54.7/73.7, and 48.3/73.4 respectively.

Reductions in cooling loads/cooling energy usage for the same models are respectively 20.6/32.4, 17.2/27.4 and 11.2/24.6 and the total energy savings are also respectively 50.7, 47.65 and 46.22%.

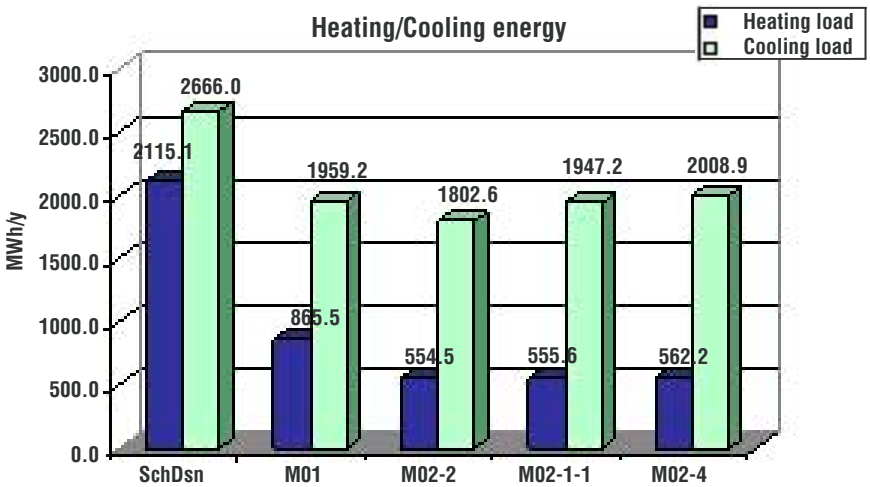

Fig 3 Predicted annual cooling and heating energy usage

Fig 5 USCE Tower view from river

Fig 6 HOK's design night vision of USCE Tower

SUMMARY

The UŠĆE Tower energy efficiency optimization did confirm that commercial office buildings use the most of energy supply for air-conditioning systems, ventilation and lighting systems. Controlling daylighting and window's or glazing solar heat gains, enabled creation of extraordinary comfortable and "productive" indoor environment beside important energy savings and improvement of building's energy efficiency. Obtained savings both in loads and annual energy use, encouraged other investers to apply similar BPS approach in their project development.

Two new very important complex buildings are currently in development implementing BPS, Energoprojekt Headquarters in New Belgrade and Terazijska Terasa in Belgrade downtown center.

A simulation methodology to estimate NOx emissions reductions from the implementation of the 2000 IECC/IRC Conservation Code in Texas

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ABSTRACT

The 77th Texas Legislature, in 2001, established Senate Bill 5 (SB-5), which addressed NOx emission reductions by establishing programs to reduce vehicle emissions and the use of renewable energy sources. The 78th Texas Legislature further expanded SB-5 into code certification for building code officials and "above code" programs by passing the Texas Emissions Reduction Plan (TERP), to reduce ozone levels by encouraging the reduction of emissions of NOx by sources that are currently not regulated by the state. An important part of this legislation is the State's energy efficiency program, which includes reductions in energy use and demand in buildings that are associated with the adoption of the 2001 IECC. This represents one of the first times that the EPA is considering emissions reductions credits from energy conservation - an important new development for building efficiency professionals, since this could pave the way for documented procedures for financial reimbursement for building energy conservation from the state's emissions reductions funding.

This paper is an abridged version of previously published papers that detailed the procedures that have been used to calculate the electricity savings and NOx reductions from residential construction using the eGRID database. The previous papers by Haberl et al. (2003b, 2004) present results from the application of the methodology that is described in this paper.

BACKGROUND

Four areas in Texas have been designated by the United States Environmental Protection Agency (EPA) as **non-attainment areas** because ozone levels exceed the National Ambient Air Quality Standard (NAAQS) maximum allowable limits. These areas face severe sanctions if attainment is not reached by 2007. Four additional areas in the state are also approaching national ozone limits. These are called "**affected areas**." By 2003 forty-one counties in Texas were designated by the EPA as either non-attainment or affected areas -- sixteen non-attainment and twenty-five affected counties, accounting for 14 million of the state's 22 million population. (See **Figure 1** and **Table 1**, next page.)

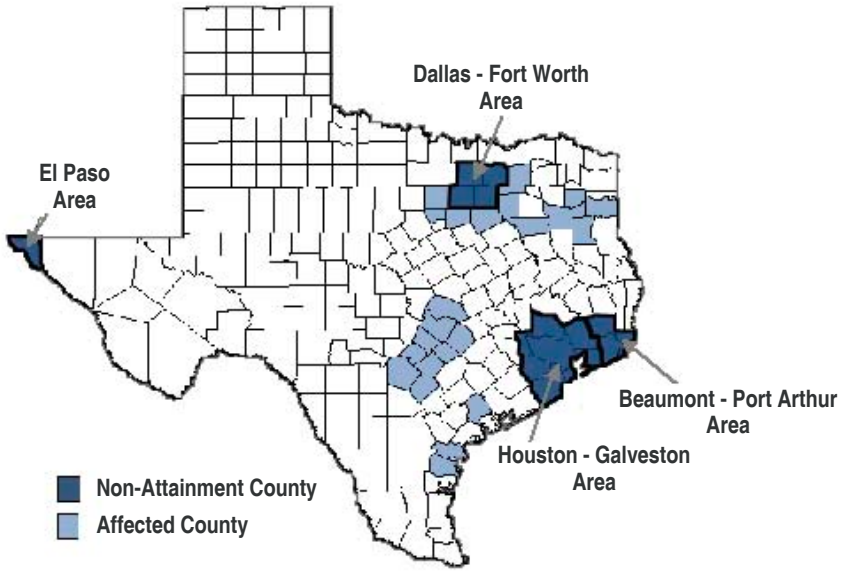


Fig 1 EPA Non-Attainment (Dark Shade) and Affected Counties (Light Shade)

Table 1 1999 Texas County Population for the Non-Attainment and Affected Counties

County	Population	Housing Units	Permits (Single)	Permits (Multi)	Total Permits
Harris	3,250,404	1,273,565	16,055	9,807	25,862
Dallas	2,062,100	840,374	8,392	6,545	14,937
Tarrant	1,382,442	554,145	8,785	1,969	10,754
El Paso	701,908	221,244	3,472	724	4,196
Collin	456,612	184,781	7,704	4,396	12,100
Denton	404,074	162,280	5,222	1,511	6,733
Fort Bend	353,697	114,678	1,148	12	1,160
Montgomery	287,644	108,573	4,493	426	4,919
Galveston	248,469	108,802	1,627	480	2,107
Jefferson	241,332	101,465	581	54	635
Brazoria	234,303	88,543	1,717	266	1,983
Orange	85,240	34,607	218	3	221
Liberty	67,161	26,146	310	52	362
Hardin	49,684	19,815	33	2	35
Waller	28,070	11,668	29	40	69
Chambers	23,993	10,027	213	0	213
25 Other **Affected** Counties	**4,216,206**	**1,665,918**	**24,684**	**14,494**	**39,178**
TOTAL	14,093,339	5,526,631	84,683	40,781	125,464

METHODOLOGY

The Energy Systems Laboratory at Texas A&M was charged with quantifying the NOx reductions from Energy Efficiency/Renewable Energy (EE/RE) measures by county and assisting cities and counties to determine the impact of code amendments that they planned to adopt. In order to calculate the statewide NOx reductions from the implementation of the 2000 IECC on residential construction, a series of methodologies were developed for calculating the annual and peak-day energy use (electricity and natural gas consumption) for buildings built to representative pre-code construction and comparing these to code-compliant construction for prototypical buildings that represent average construction practices in each county. These savings were then assigned to specific counties in the state and the electricity use traced back to the power plants that supplied the electricity use using the EPA's eGRID database[1].

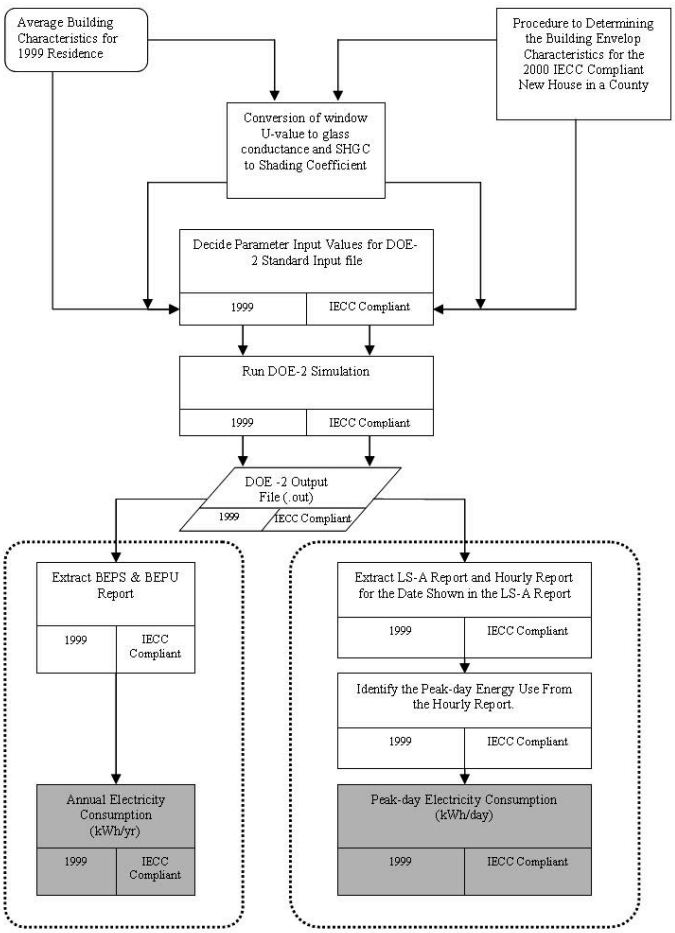


Fig 2 Procedures for the annual and peak-day energy use calculations for 1999 residence and 2000 IECC complaint residences

[1] E-GRID, Ver. 2, is the EPA's Emissions and Generation Resource Integrated Database (Version 2). This publicly available database can be found at www.epa.gov/airmarkets/egrid/.

Calculation of Annual and Peak-day Electricity Savings in New Residential Construction

Figure 2 shows the overall procedure for performing the energy savings calculations. In the first step, the building characteristics for the pre-code (i.e., 1999) and the code-compliant house were identified. The characteristics of the 1999 house were collected using the baseline construction data from the annual survey of the National Association of Home Builders (NAHB 2000). These 1999 data were assumed to represent the pre-code construction practices for each county. Next, the building characteristics for the code-compliant house were defined by determining the appropriate building envelope characteristics for the 2000 IECC compliant new house for a particular county. For the 1999 and code-compliant data, the windows U-value and the SHGC were converted to the DOE-2-required glass conductance and the Shading Coefficient (SC) values[2]. The 1999 and code-compliant building characteristics were then input separately into the standard DOE-2 input file as PARAMETERS. Two simulations, one for the 1999 house and one for the code-compliant house, were then performed using the DOE-2.1e simulation program with the appropriate TMY-2 weather data assigned to the county. A view of the residential one-story code compliant building is shown in **Figure 3**. This illustrates the typical shading and other features of the house.

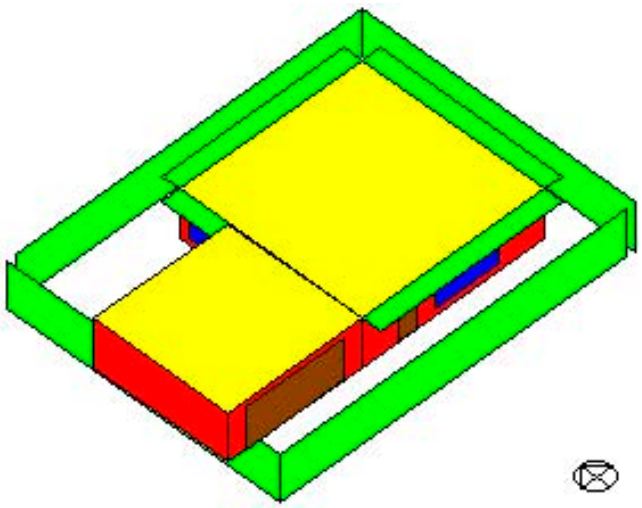


Fig 3 Code Compliant Residential House

From the output files of the DOE-2 simulations for the 1999 and the code-compliant houses, annual electricity, natural gas use, peak-day electricity use, and natural gas use on the peak-day for electricity were identified. To calculate annual electricity and natural

[2] The DOE-2 program has several methods for entering window properties, including the two digit Window type, four digit window type (which calls library files previously prepared by the WindowX program, and a method that uses the glass conductance, and shading coefficient. Although the four digit window entry routine is recognized to yield more accurate values for high efficiency windows, it cannot be used in a general purpose simulation where only the U-value and shading coefficient are known, because the four digit method relies on window properties read from library files, which were previously created with the WindowX program that used characteristics from an actual window, including size and shape of the window.

gas savings, DOE-2's BEPS and BEPU reports were extracted from the DOE-2.1e output files. The Building Energy Performance Summary reports in energy units (BEPS) and in utility units (BEPU) contain the simulated annual building energy performance summary. From these reports, the total annual energy use (Btu), and total annual electricity (kWh) and natural gas (therms) use were identified for both the 1999 and code-compliant houses.

To calculate the peak-cooling electricity and natural gas savings, another procedure was required. First, the DOE-2 Space Peak Loads Summary report (LS-A) was extracted from the output files for the 1999 house. This LS-A report makes it possible to identify the time and date of the peak cooling load for the pre-code house. Using the same peak day from the report LS-A for the 1999 pre-code house, the electricity and gas use of the pre-code and the code-compliant house for the same peak-cooling day were extracted from the hourly report. The peak-day electricity and gas savings were then calculated by comparing the pre-code values against the code-compliant values for each county using data from the hourly report[3]. This procedure is illustrated in **Figure 4**.

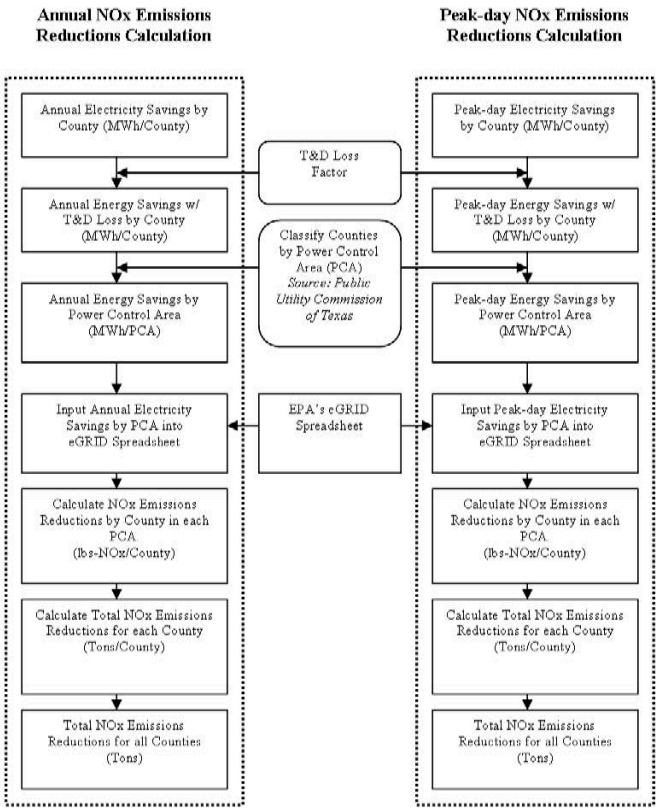


Fig 4 Annual and peak-day NOx emission reductions calculation

[3] The dates for these peak-cooling days across the 41 counties are non-coincident, which is assumed to give results that are the most consistent with the measured weather data for the EPA's episode days for 1999 (Dallas-Ft. Worth), and 2000 (Houston, Galveston, Beaumont, Port Author). Use of coincident peak across different TMY-2 weather files gives lower temperature values.

Calculation of NOx Emissions From Code Implementation in New Residential Construction Using eGRID

The next steps in the methodology involved multiplying the DOE-2-calculated electricity and gas savings (annual and peak day) from the comparison of the pre-code to code-compliant construction times the number of new units in each county to obtain the county-wide electricity and gas savings (annual and peak.) Next, the county-wide electricity savings were then adjusted to account for transmission and distribution (T&D) losses[4]. A utility company was then assigned to each county using the Texas Public Utility Commission's (PUCT) listing of utility providers[5]. Next, all counties were grouped according to utility (i.e., PCA.) This grouping was performed to allow for the total utility electricity savings to be input into the EPA's eGRID database.

For a given region, eGRID produces a matrix such as that shown in **Table 4**, which shows the pounds of NOx per MWh produced by a specific utility in each county[6]. Though **Table 4** shows only seven sample counties, the right column of the table gives the total lbs-NOx/MWh for each utililty summed across all counties, which represents the NOx emissions from all the utility plants that serve that utility. Each individual column in Table 4 gives the lbs-NOx/MWh produced in each county, which includes the emissions from all utilities that have plants located in that county. A large value in a given cell of a row for a utility provider indicates large power generation facility. The values in eGRID are assembled for a given period of time and represent the measured NOx emissions for a given utility divided by the total power production for a given plant.

Table 4 Sample from EPA's eGRID table: County-wide NOx reductions for EE/RE implemented in each listed PCA (Based on data received from US EPA, November 2002)

County-wide NOx reductions in pounds per MWh for EE/RE implemented in selected PCAs								
Sample County	Bexar	Brazos	Dallas	Denton	Harris	Tarrant	Travis	Total of all counties
Sample PCA								
American Elec. Power West (ERCOT)	0.06		0.06		0.05	0.04		2.90
Austin Elec.	0.09	0.01	0.06	0.01	0.07	0.04	0.46	2.56
Brownsville Public Utility Board	0.04		0.04		0.04	0.03		2.24
Lower Colorado River Auth.	0.16	0.01	0.09	0.01	0.02	0.06	0.05	3.16
Reliant Energy, HP&L			0.03		0.41	0.02		2.50
San Antonio Elec. Coop	2.00		0.01		0.09	0.01		2.65
South Texas Elec. Coop	0.08	0.03	0.09	0.04	0.04	0.05		3.28
Texas Municipal Power Pool	0.01	0.11	0.30	0.15	0.02	0.18		3.22
Texas-New Mexico Power Co.			0.09		0.03	0.06		1.59
TXU Electric		0.01	0.51	0.01	0.04	0.33		3.66

[4] These T&D losses were assumed to be 20% for the 2003 calculations.

[5] For the calculations performed for the 2003 Annual report, the first utility listed for each county was assumed to be the only utility for that county.

[6] The information shown is from the November 2002 edition of the eGRID database, provided by Art Diem at the USEPA.

Before the eGRID database could be used it needed to be modified. Some of the counties did not contain electric utility generation facilities according to the list in the November 2002 version of eGRID[7]. Accordingly, these were added to the matrix with 0.00 lbs-NOx/MWh values. After all 41 counties had been added to the modified eGRID database, each column of eGRID was expanded to include a multiplier that was used to calculate the lbs-NOx/MWh for each MWh saved by the utility. Calculation of the annual NOx reductions and peak-day NOx reductions by county[8] was then accomplished by adding across each row, which yields the Total NOx reductions, which was placed in the far right column of the table. The values in this column were then used to report the NOx reductions for each county, resulting in **Figure 5**.

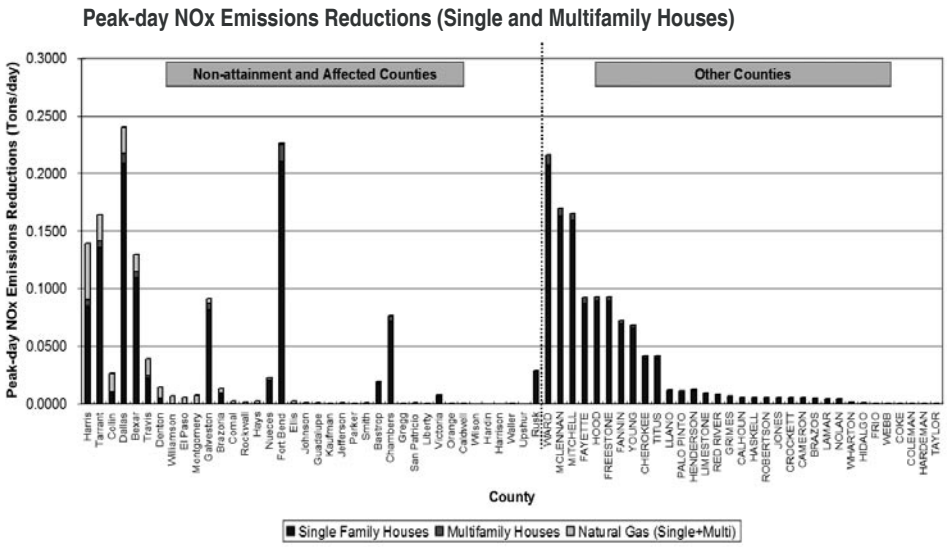


Fig 5 **2003 peak day NOx reductions from electricity and natural gas savings due to the 2000 IECC for single-family and multi-family residences by county**

Calculation of Peak Day Electricity Savings Calculated From Monthly Utility Billing Data

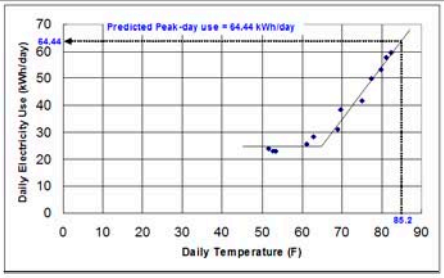
In the Texas Emissions Reduction Plan (TERP), political subdivisions (i.e., city and county governments) are required to establish a goal to reduce their electricity consumption by 5 percent per year beginning January 1st, 2002. Unfortunately, savings were then reported to the Texas State Energy Conservation Office as kWh/year, which were then divided by 365 to estimate average daily NOx reductions. For savings

7 The utilities listed in the 2002 eGRID include: American Electric Power (AEP), Austin Energy, Brownsville Public Utility Board, Lower Colorado River Authority (LCRA), Reliant Energy, San Antonio Public Service, South Texas Electric Coop, Texas Municipal Power Pool, Texas-New Mexico Power Company, and TXU.

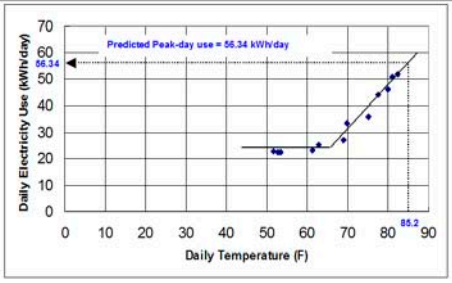
8 The calculation of annual NOx reductions required the input of annual savings of MWh/utility in the bottom row of the table. Similarly, the peak-day NOx reductions required the input of peak-day savings in MWh/utility in the bottom row of the table.

associated with cooling-related loads, this can lead to severe undercounting, which has been shown to be as much as 100% in residences[9].

To improve the reporting of peak-day NOx reductions from utility billing data, a method was developed to extract peak-day electricity reductions from monthly utility billing data as shown in **Figure 6** and **Table 5**. In **Figure 6** the simulated electricity use is shown for two identical single-family residences, with the exception that one is built to the NAHB's pre-code specifications, and one built to code-compliant specifications[10]. In **part (a)** of **Figure 6** the simulated monthly electricity use of the pre-code house is plotted versus average monthly temperature with a three-parameter, weather-dependent model shown super-imposed over the data. This three-parameter model, which was calculated with ASHRAE's Inverse Model Toolkit (IMT) (Kissock et al. 2003, Haberl et al. 2003), is used to predict the house's peak-day electricity savings using the model's daily coefficients (shown directly below the plot) times the peak daily temperature. In **part (b)** of **Figure 6** the simulated monthly electricity use of the code-compliant house is plotted versus average monthly temperature with a three-parameter, weather-dependent model shown super-imposed over the data.



Part a. 1999 Standard House:
$Daily\ Elec.Use = 24.7609 + 1.9200\ x\ (85.2 - 64.5360)^{+} = 64.44$



Part b. IECC House:
$Daily\ Elec.Use = 24.1879 + 1.7063\ x\ (85.2 - 65.7680)^{+} = 56.34$

Fig 6 Estimation of peak-day electricity use from monthly utility billing data using ASHRAE's IMT

Table 5 contains a comparison of the peak-daily electricity use extracted using the described method versus the actual peak-daily electricity from the DOE-2 simulation

[9] For more information about the 2:1 differences in the peak-day NOx reductions versus average daily NOx reductions see the report by Haberl, J., Culp, C., Yazdani, B., Fitzpatrick, T., and Turner, D. 2002. "Texas Senate Bill 5 Legislation for Reducing Pollution in Non-attainment and Affected Areas: Annual Report", submitted to the Texas Natural Resources Conservation Commission, Energy Systems Laboratory Report ESL-TR-02/07-01, Texas A&M University, 116 pages, (Revised: September).

[10] For more information about the pre-code and code-compliant simulations see the report by Haberl, J., Culp, C., Yazdani, B., Fitzpatrick, T., Turner, D. 2003b. "Energy Efficiency/Renewable Energy Impact in the Texas Emissions Reduction Plan (TERP): Volume 1: Summary Report", Energy Systems Laboratory Report No. ESL-TR-05/03/12-03, Texas A&M University (December).

of the pre-code and code-compliant house. According to the simulation, the peak day on the TMY-2 Houston weather file was July 29th, which had an average temperature of 85.2 F. On this day the DOE-2 simulation calculated an electricity use of 65.74 kWh/day for the 1999 pre-code house, which was well matched by the monthly regression model that predicted 64.44 kWh/day (1.98% difference). In a similar fashion, the DOE-2 simulation calculated an electricity use of 56.78 kWh/day for the code-compliant house, which was also well matched by the monthly regression model that predicted 56.34 kWh/day (0.76% difference). The electricity savings predicted by the hourly DOE-2 simulation was 8.96 kWh/day, which was also well matched by the monthly regression that predicted 8.10 kWh/day (9.5% difference), which is acceptable considering that hourly data are not available for most existing buildings. Therefore, this method is being proposed for use in improving the peak-daily electricity savings from buildings that report their savings with utility billing data.

Table 5 Comparison of peak-day electricity savings from 2000 IECC for simulated vs. estimation using monthly utility billing data analyzed with ASHRAE's IMT

	Peak Day (DOE-2 LS-A Report)	Daily Temperature for the Peak Day (F)	Daily Electricity Use for the Peak Day (kWh/day) (DOE-2 Hourly data)	Daily Electricity Use for the Peak Day (kWh/day) (IMT 3PC Model)	Difference (DOE-2 Hourly vs. IMT Monthly)
1999 Standard House	Jul 29	85.2	65.74	64.44	1.98%
IECC House	Jul 29	85.2	56.78	56.34	0.76%
Peak-day Savings			8.96	8.10	9.5%

SUMMARY

This paper has presented a detailed discussion of the procedures that have been used to calculate the electricity savings and NOx reductions from residential construction in non-attainment and affected counties in Texas. These procedures use the EPA's eGRID database, as well as utility supplier data from the Texas PUC to translate county-wide electricity savings to power plant NOx reductions. A procedure has also been presented that extracts peak-daily electricity savings from monthly utility billing data, including a comparison of the method versus simulated peak-daily electricity savings for a house built to pre-code and code-compliant specifications. Results of the application of these procedures are reported in papers by Haberl et al. (2003b, 2004).

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News from Affiliates

IBPSA-Australasia

Veronica Soebarto, IBPSA-Australasia

IBPSA Australasia and Building Workshop are holding a one-day seminar on November 16th, 2005, at the School of Architecture and Design, Victoria University of Wellington, Wellington, New Zealand, in conjunction with the ANZAScA Architectural Science Association 2005 conference.

The seminar will consist of 5 sessions throughout the day each led by an expert in the topic. These sessions are a chance for the participants to learn more about simulation and to have round-table discussions with the experts. There will be an evening Continuing Professional Development (CPD) lecture run in conjunction with IPENZ and the NZIA. The seminar will include presentations on various topics as follows:

- Experience in teaching simulation by Veronica Soebarto (University of Adelaide)
- Using simulation for building rating schemes by Paul Bannister (Exergy Australia)
- Simulation and reality check by Mike Donn, (Victoria University of Wellington)
- Weather Files by Albrecht Stocklein (BRANZ) & Patrick Arnold (Building Workshop)
- Acoustical simulation by Micklin Halstead
- Lighting Simulation by Tomas Sandoval
- Modeling Smokefree Environments by Henry Skates (Victoria University of Wellington).

Further information can be obtained from Quentin Jackson from Building Workshop, Wellington, NZ, **ibpsa@ibpsa-australasia.org**.

IBPSA-Japan

Yasuo Utsumi, Institutes of National Colleges of Technology, Japan

IBPSA-Japan has started to collaborate with two related organizations, the Architectural Institute of Japan (AIJ) and The Society of Heating, Air-Conditioning and Sanitary Engineers of Japan (SHASE), on a regular basis. The collaboration has already produced two events.

The first of these was a session on 'The Direction of HVAC simulation - The Trend of World and Japan toward Energy Conservation' during the annual meeting of SHASE in

www.shasej.org/English/index.html

Teine, Hokkaido, on 2005 August 9. Planned by Dr. Nobuo Nakahara, this included an introduction to the role and activities of IBPSA and seven other presented papers:

- HVAC system simulation - trend of the world and its tasks *N. Nakahara*
- Usability and development trends in programs related to Energy Plus and its user interface *S. Yasutomo et al*
- The status of Dest and China *S. Hang, et al*
- The trend and role of HASP/ACSS related simulation programs *T. Ino-oka, et al*
- Present status of user environment and utilizing of dynamic simulation *T. Watanabe, et al*
- The trend of research and development activity of IBPSA and related institutes in Japan *Y. Utsumi, et al*
- Commissioning and system simulation *Y. Akashi, et al*, and
- HVAC system simulation for LCEM (Life Cycle Energy Management) tool *E. Niwa, et al*.

The session was attended by around 70 people.

www.aij.or.jp/aijhome.htm

The second event was a workshop on heat flow and thermal environment simulation held in Nagoya on 2005 September 17. This was organised in conjunction with AIJ working groups which have an interest in the topic. Around 25 people attended and five made presentations, speaking on:

- The calculation modeling of windows for indoor air temperature and heat load simulation *M. Udagawa*
- The status of vacuumed insulation building materials *A. Iwamae*
- The measurement of surface heat balance of planted roof and low emission painted surface *H. Takebayashi*
- Simulation tool of building environment concerning to heat and air *Y. Utsumi*, and
- The unity of building energy simulation tools - HASP/BECS/FACES *T. Ino-oka*.

A half hour time slot for each title allowed for lively discussion.

IBPSA-Japan is continuing to develop its structure and widen its activities: elections are underway, a newsletter will be published shortly, and IBPSA-Japan will hold its annual conference later in the (fiscal) year.