College of Architecture
ILLINOIS INSTITUTE OF TECHNOLOGY

IIT Building Energy Analysis Seminar 6
BIM & Sustainability using eQUEST & ECOTECT
Two Day Seminar, March 11-12, 2010

Location: 3410 Bldg, Computer Lab (Rm 110)
Address: 3410 S. State Street, Chicago IL 60616

Schedule

<Mar 11: First Day>
Morning - INTRODUCTION
09:00 – 09:30 Registration and Opening Remark
09:30 – 10:45 BIM and Sustainability – GBS, ECOTECT, eQUEST
11:00 – 12:00 What is Green Building XML?
; How to use it for BIM, Green Building Studio, ECOTECT and eQUEST
Lunch Break

Afternoon – BIM & ECOTECT
13:00 – 14:45 ECOTECT's tool (Weather Tool, Solar Tool)
15:00 –16:30 Sun & Shadow Analysis, Sun-Path Diagram
16:30 – 17:00 Q&A, Discussion

<Mar 12: Second Day>

Morning – BIM & ECOTECT
09:00 – 10:00 Solar Radiation
10:00 – 10:45 Daylighting Analysis
11:00 – 12:00 Case-Studies using BIM & ECOTECT (**SOM**, **BlackBox Studio**)

Lunch Break

Afternoon – eQUEST & DOE2.2
13:00 – 14:15 Envelope, Systems, Plants, Utilities
14:30 – 15:30 Case Studies & ASHRAE Std.90
15:45 – 16:30 Special Topics – LCCA, Weather, User Libraries, etc.
16:30 – 17:00 Q&A, Discussion

Lecturers

Varkie Thomas, Ph.D., P.E., CEM, **IIT**
Dong-Hwan Ko, Ph.D., LEED AP, **IIT**
Heechan Shin, BlackBox Studio, **SOM**

Coordinators

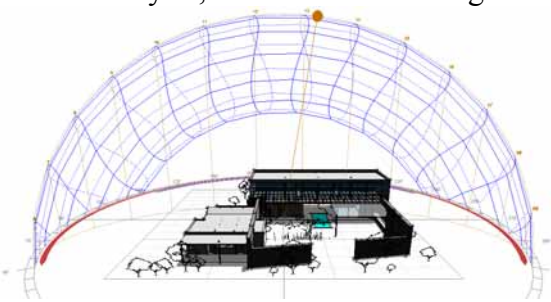
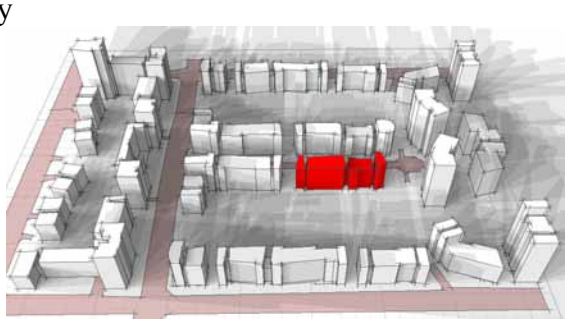
Payam Bahrami, Ph.D Administrative Assistant, arch_phd@iit.edu or 312.567.3930
Soeun Lee, LEED AP**,** Adrian Smith + Gordon Gill, soeunlee@smithgill.com

In this seminar, you will learn:

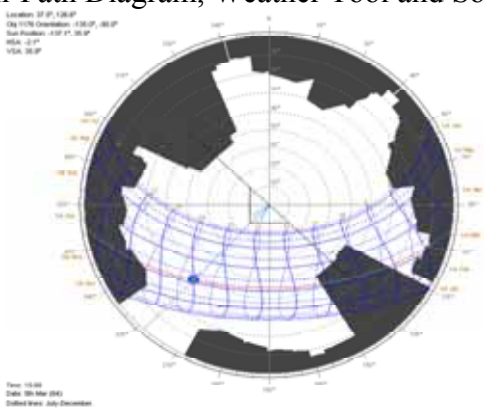
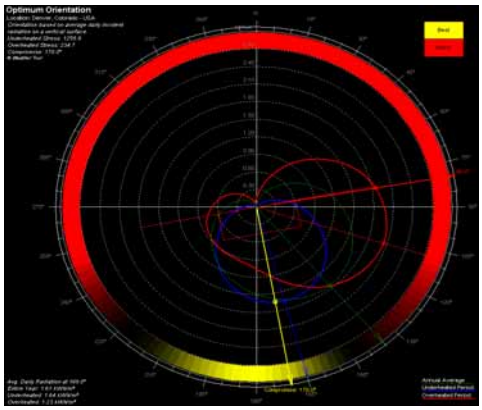
- How to evaluate your BIM model (REVIT, ArchiCAD) using Autodesk ECOTECT, eQUEST for LEED certification
- How to use ECOTECT, eQUEST and GBS programs that will help you make better design decisions
- The purpose and benefits of BIM, ECOTECT, eQUEST modeling
- When to use BIM, ECOTECT and eQUEST for improving green and sustainable design
- How can we evaluate our BIM's Sustainability using eQUEST, ECOTECT ?
- What is the most simple file conversion method for BIM and Sustainability ?
- Our new mandatory requirements (Job, Career) for BIM, GREEN Building and LEED
- How to interpret and report their results
- To understand the techniques and design principles for low energy buildings and the review of energy-efficient design strategies
- To understand the interdependence of design, location, weather, and scientific factors in developing energy-efficient buildings
- To acquire the simulation skills to research weather and contexts in the schematic design process and run simulation programs to analyze building performance
- Energy Conservation Measures (ECMs) for Building Types (Office, Hotel, Retail)
- Evaluation of Passive Design ECMs
- Evaluation of Renewable Energy ECMs
- Evaluation of Envelope, Systems & Plant ECMs
- Hourly Reports from DOE2 to Excel for Further Analysis
- Saving User Libraries for Utility Rates and Building Components in DOE2.2
- Using Excel Programs - LCCA, *bin Weather Analysis, Stair Pressurization, etc.

Participants will learn (ECOTECT):

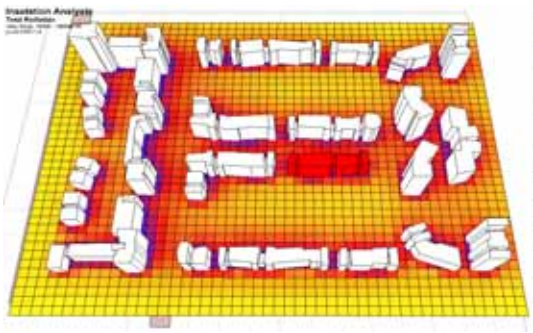
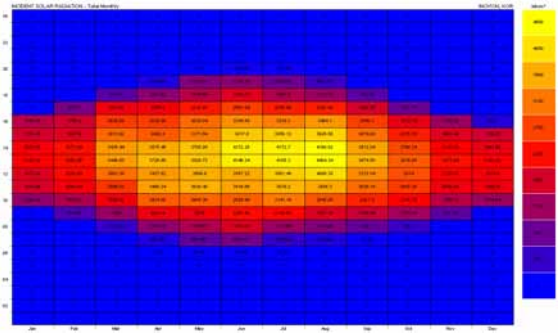
- Solar Analysis, Shadow and Shading Study

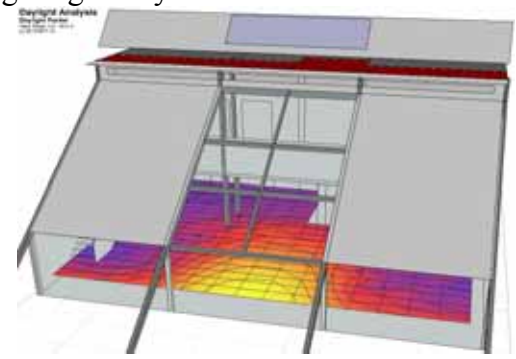
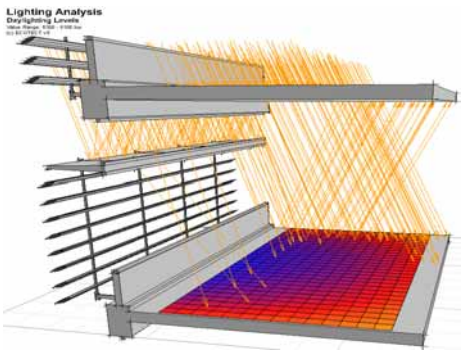
- Sun-Path Diagram, Weather Tool and Solar Tool

- Solar Radiation Analysis

- Lighting Analysis

Participants will receive (eQUEST and DOE2.1E):

●A copy of the eQUEST® training manual developed by Marlin Addison (printed and on CD).

● Detailed modeling instructions for simple office building

● The executable eQUEST® and DOE2.1E Input Files of the Case Studies that they can use later as reference and templates for their future projects (on CD only)

● Short executable Excel programs for quick estimates (on CD only)

The following Case Studies (eQUEST & DOE2.1E) will be provided on CD.

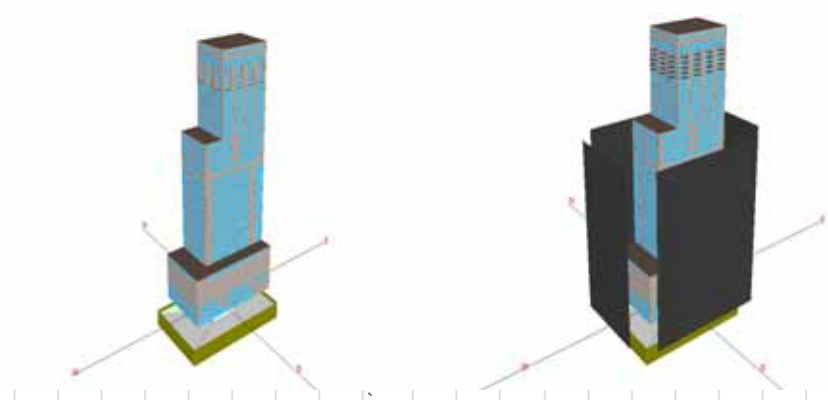
● Energy Conservation Measures (ECMs)

● Midwest Center for Green Technology (MCGT)

● Middle School & Community Center

● High-Rise Mixed-Use Building (retail, office, hotel, restaurant)

Example: High-Rise Mixed-Use Building



High-Rise, Mixed Use Building

M-btuh to kwh = 293

ECO-	Energy Conservation Option (ECO) Descriptic	M-BTUH / T Electr Lighti	M-BTUH / T Electr Equi	M-BTUH / T Electr Heati	M-BTUH / T Gas Heati	M-BTUH / T Electr Cooli	M-BTUH / T Electr Ht-Rj	M-BTUH / T Electr Pumps	M-BTUH / T Electr Fans	M-BTUH / T Electr DHW	M-BTUH / T Gas DHW	M-BTUH / T Electr Elev	M-BTUH / T Electr Total	M-BTUH / T Gas Total
ECO-1	Base (zoo design criteria) CumEd Rate 6L General Servic	26,952	20,592	85,045		7,291	1,306	3,869	18,606	3,816		3,546	171,022	
ECO-2	ECO-1+Replace Electric Space Heating and DHW with Micor G	26,952	20,592	3,490	113,383	7,291	1,306	5,024	18,606		3,928	3,546	86,805	117,311
ECO-3	ECO-1+CumEd Rate Rider 25 Discount for Winter Electric H	26,952	20,592	85,045		7,291	1,306	3,869	18,606	3,816		3,546	171,022	

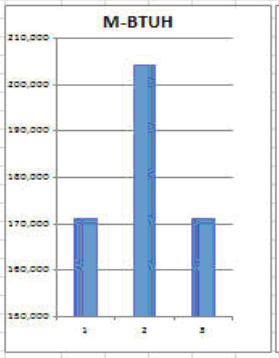
High-Rise, Mixed Use Building

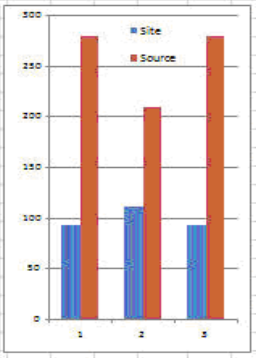
M-btuh to kwh = 293

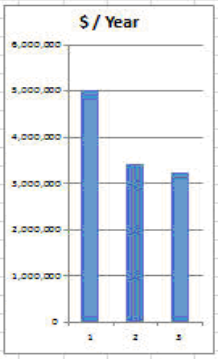
ECO-	Energy Conservation Option (ECO) Descriptic	MBTUH E + G Total	% MBTUH Saved	KWH E + G Total	Site K-btu/ SF/YR	Source K-btu/ SF/YR	Dollars per Year $ Electr	$ Gas	$ Total	% $ Saved
ECO-1	Base (zoo design criteria) CumEd Rate 6L General Servic	171,022	0	50,126,548	93	279	5,032,355		5,032,355	0
ECO-2	ECO-1+Replace Electric Space Heating and DHW with Micor G	204,116	-19	59,826,341	111	203	2,565,242	860,060	3,425,302	32
ECO-3	ECO-1+CumEd Rate Rider 25 Discount for Winter Electric H	171,022	0	50,126,548	93	279	3,251,751		3,251,751	35

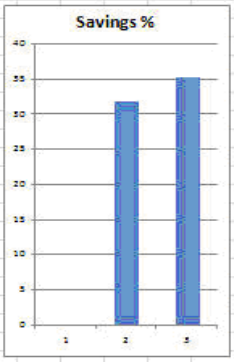
ECO-1 has Electric Hot-Water Boiler (System PreHeat and Heating Coils) and Electric Zone Heating | Baseline U-Values (Std90): Wall = 0.084, Roof = 0.065, Glass = 0.46

ECO-2 has Natural Gas Hot-Water Boiler (System PreHeat and Heating Coils) and Hot-Water Zone Heating Coils



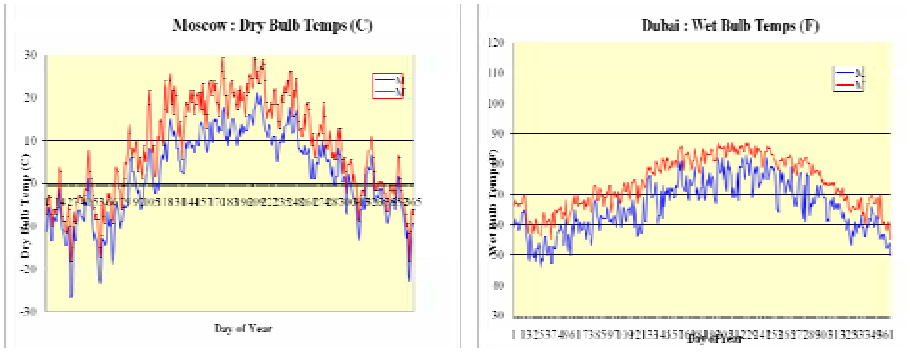






The Short Excel Programs that will be provided on CD include.
● DOE2 Weather Evaluator (NCDC *dat to *.bin to IP-SI Tables & Charts)
● Life Cycle Cost Analysis (LCCA)
● LCCA-Economics Tables Generator
● Photo-Voltaic (PV) Solar Radiation Estimator
● Design Weather Generator
● Pump-Fan Analysis ● Stair Pressurization for Fire Control
● Pipe Sizing Data ● Compression Tank Sizing

Example: DOE2 Weather Evaluator



How to register
- Online via credit card
- Via check: Download the registration form here, print, attach payment, and mail to the address below. Make check payable to Ph.D. Seminar.

Registration and Fees
- **$400** for Regular registration (including Seminar Workbook and Lunch)
- **$200** for IIT Faculty members (including Seminar Workbook and Lunch)
- **$100** for Full-time students Only, ID & Registration Status Information required, (including only Lunch, No Seminar Workbook)

Continuing Education Units (CEUs)
Every participant will be issued a certificate from the Dean of College of Architecture, IIT, as a document to report the continuing education of your professions. College of Architecture, IIT, is a registered AIA/CES provider. According to AIA/CES guideline, Building Energy Analysis Seminar 6 is considered the HSW (Health, Safety and Welfare) subject area. AIA members will receive up to 6 AIA/CEUs per day.

Questions?
To register for the IIT Seminar 6 or to request additional information, please contact one of the following:
- Payam Bahrami, Ph.D Administrative Assistant, arch_phd@iit.edu or 312.567.3930
- Soeun Lee**,** LEED AP**,** Adrian Smith + Gordon Gill, soeunlee@smithgill.com
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