

European design education for sustainability



Professor J Owen Lewis

UCD Energy Research Group

50 Years On –Resetting the Agenda for Architectural Education

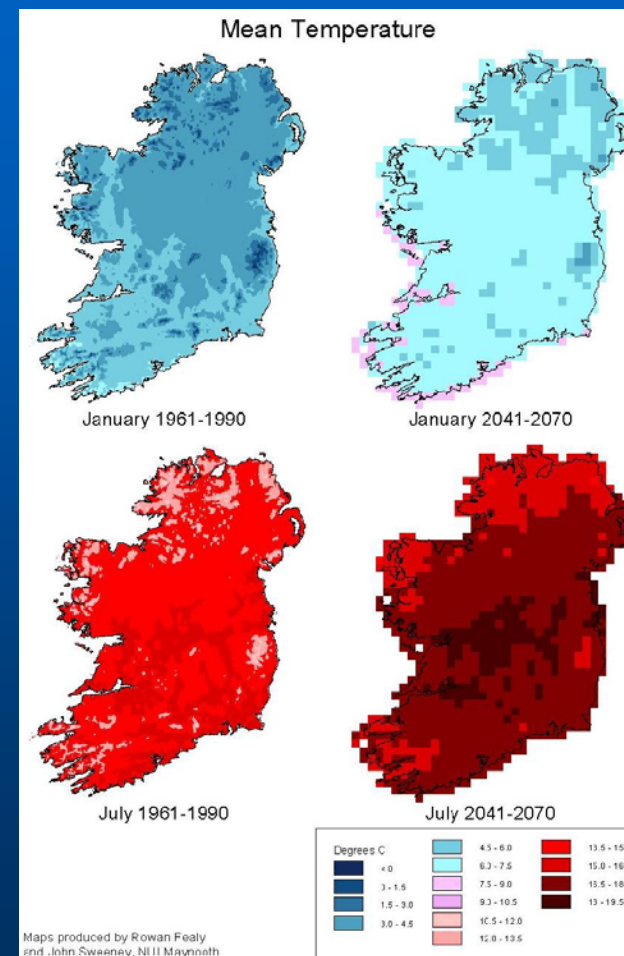
The Oxford Conference, July 2008

Climate change

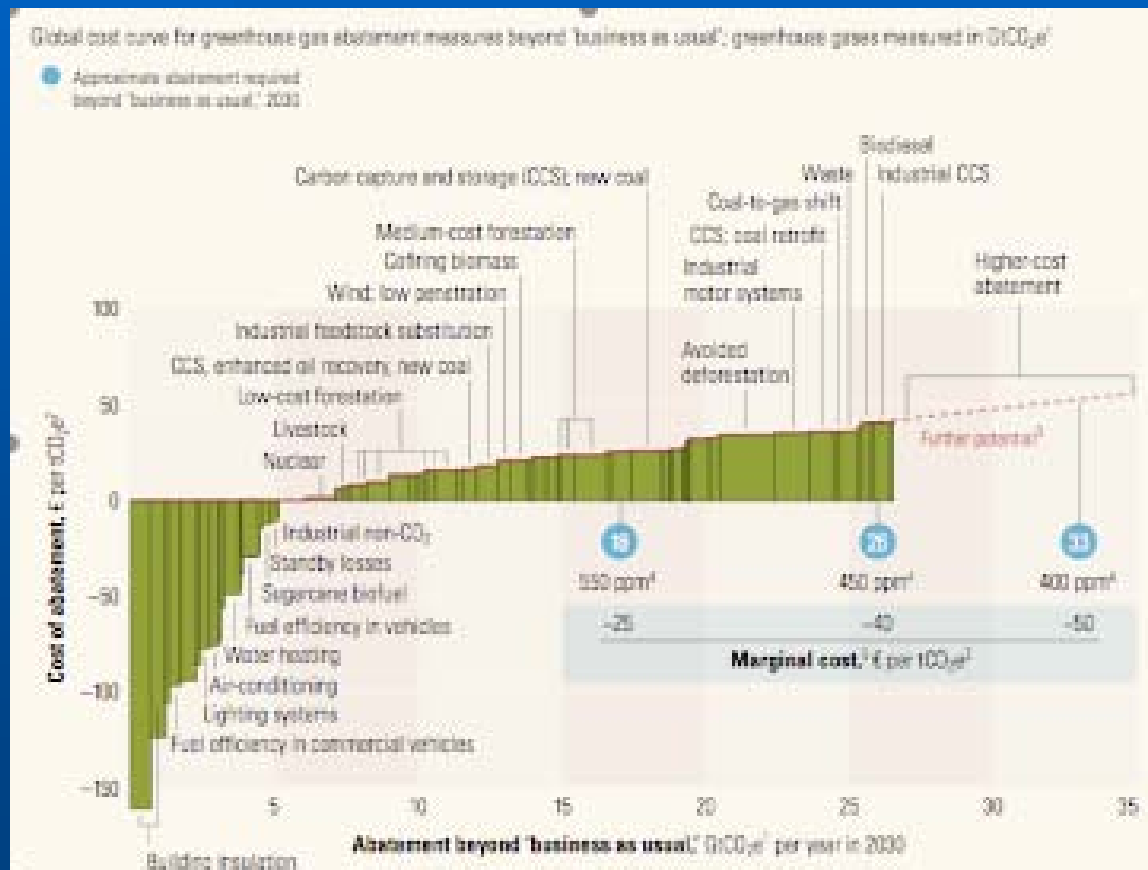
- Wetter, warmer autumns and winters
- Hotter, dryer summers
- Regional changes elusive
- But also more unpredictable weather patterns

Mitigation

Adaptation

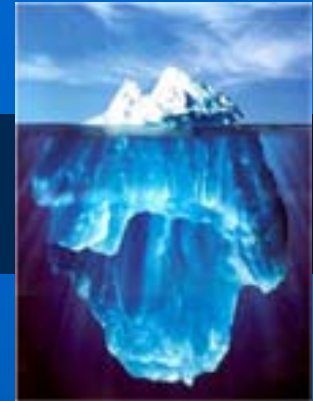


Costs of abatement strategies



Source
 Enkvist et al
 A cost curve for greenhouse gas reduction
 McKinsey Quarterly Feb 2007

Sustainable building



Risks: aspirational, vagueness, ambiguity

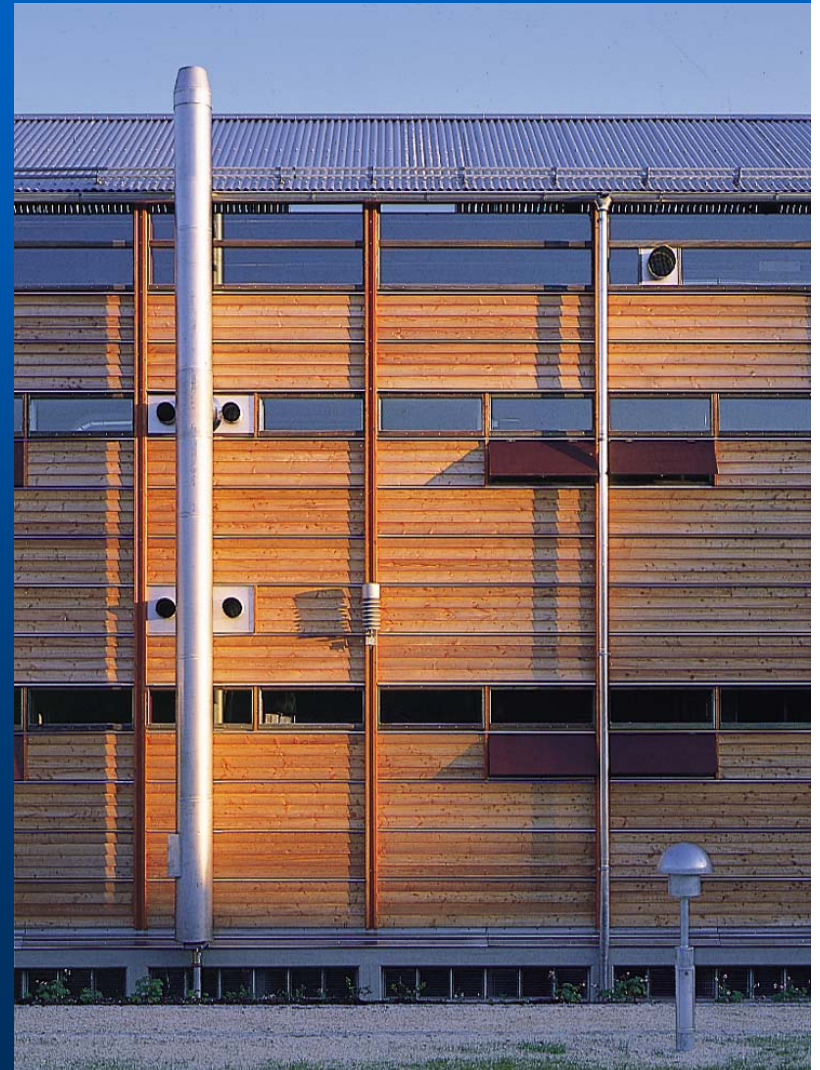
- Environmental emphasis, plus economic
- New relationship nature : architecture
- Spectrum
 - Traditional vernacular -sustainability by default
 - Existing-building-made-more-sustainable
 - Environmental determinism
 - Symbiotic relationship with natural environment



Towards concern with addressing all dimensions

Construction Materials

- Sustainable sources
- Extraction, processing, manufacture
- Embodied energy
- Transport, assembly
- Life cycle maintenance
- Emissions
- Recycling, disposal
 - NB Composite materials



Environmental Rating Methods

LEED

Sustainable Sites
Water Efficiency
Energy & Atmosphere
Materials & Resources
Indoor Environmental Quality
Process & Design Innovation

BREEAM

Energy
Transport
Pollution
Materials & Resources
Water Efficiency
Land Use & Ecology

GBTool

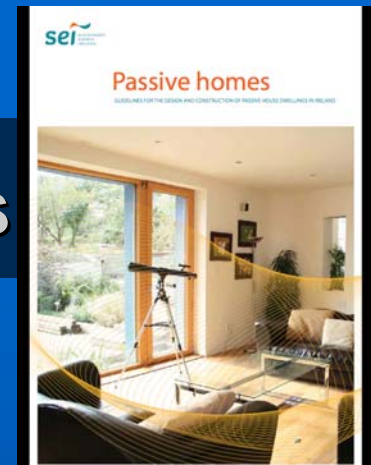
Site, Project & Development
Resource Consumption Energy
Environmental Loadings
Indoor Environmental Quality
Functionality & Building Systems
Long-Term Performance
Health & Well Being Social & Economic Aspects

Other assessment tools include:

Green Star & NATHERS (**Australia**)
Athena (**International**)
EcoEffect (**Sweden**)
HOE (**France**)
Olympics BEE Certification (**China**)
CASBEE (**Japan**)
EcoQuantum (**The Netherlands**)
Verde (**Spain**)



Zero energy / carbon-neutral buildings



"The first development of passive houses in Ireland, currently being constructed in The Village at Grange, Killerig, Co. Carlow, were fabricated in Austria and erected in Killerig by German craftsmen"



Out of the Blue
Co Wicklow
MosArt Architecture

SOLINFO

EC DG Research 1990s

Three multimedia resource packages distributed to all EU Schools of Architecture

- Education, Residential, Tertiary buildings
- Content

history of building type
design strategies
detail design
contemporary case studies
bibliography

Architecture et Climat, Louvain
AA Graduate School, London
UCD ERG, Dublin



Vital Signs

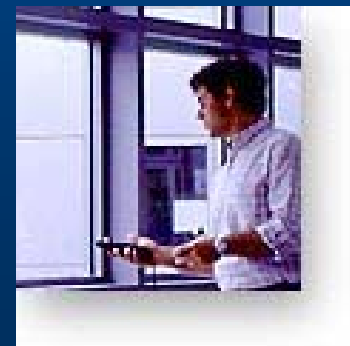
USA Energy Foundation, PG&E, NSF 1990s

Curriculum Materials project addressing 'a secret life of buildings, one related to physical performance'

- Modular Resource Packages on physical building performance issues
- Investigation techniques used in Building Case Studies involving field evaluation of existing buildings
- Instrumentation package

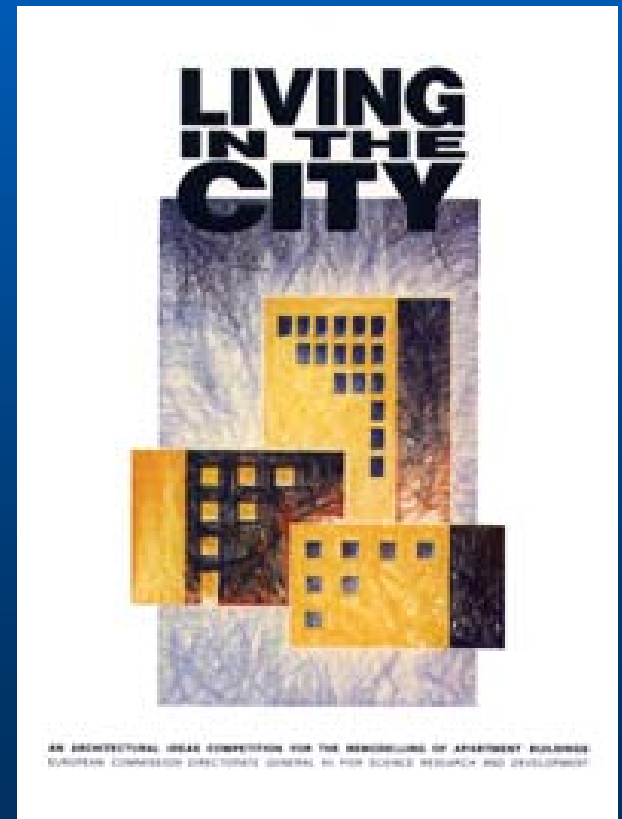
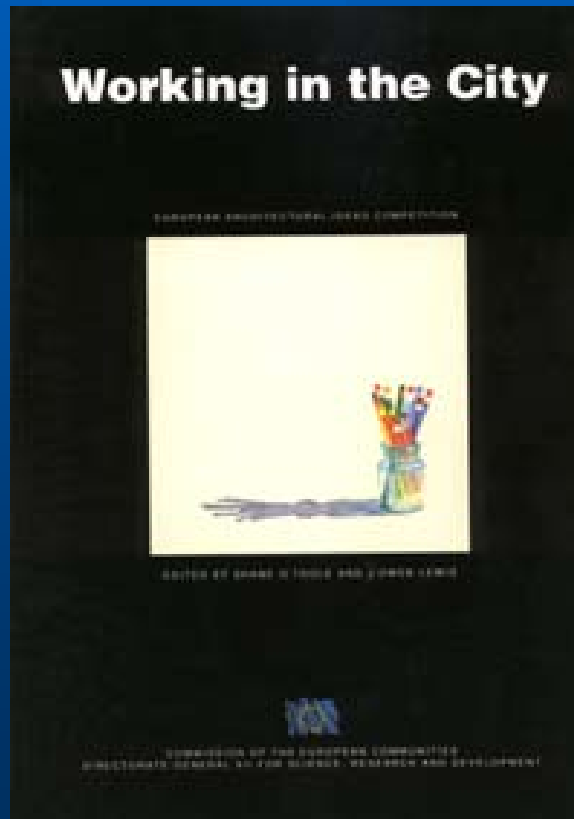
Center for Environmental Design Research at the University of California, Berkeley with SBSE

Agents of Change: University of Oregon 2000-'05



Ideas competitions

EC DG Research 1980-'96





Mid-Career Education:
**SOLAR ENERGY IN EUROPEAN
OFFICE BUILDINGS**

Partners

Architecture et Climat, Centre de Recherches en Architecture,
Université Catholique de Louvain

Central Institution for Energy Efficiency Education (CIENE),
Department of Applied Physics, University of Athens

UCD Energy Research Group, Co-ordinator

Esbensen Consulting Engineers, Copenhagen

Target audience

Experienced professionals, and mid-career education providers

EC DG Energy and Transport 2000

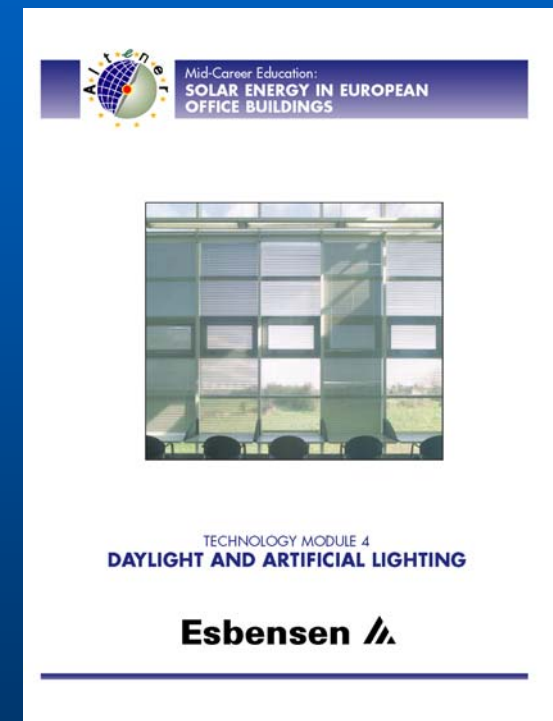
Content

General Introduction

Set of Technology Modules

- Office Building Typology
- Passive Solar Heating
- Natural Cooling and Ventilation
- Daylight and Artificial Lighting
- Active Solar Heating and Photovoltaics
- Auxiliary Energy Services
- Retrofitting
- Design Tools

http://erg.ucd.ie/mid_career/mid_career.html



Additional material

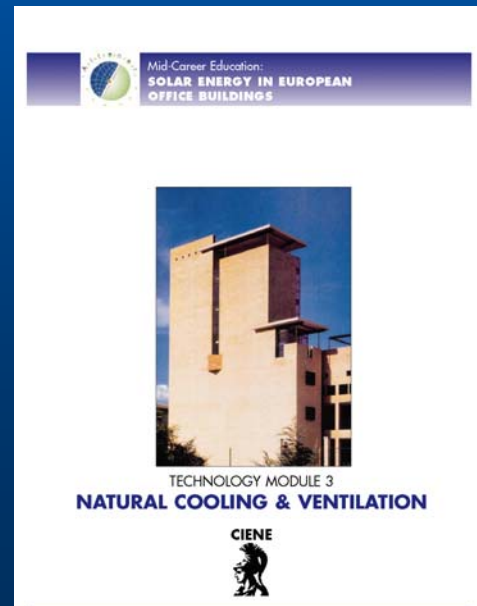
A set of Case Study Modules

- Meletitiki Building, Athens
- Royal Life Assurance Company, Peterborough
- Sukkertoppen, Copenhagen
- Dept of Trade and Industry HQ, London

A set of Instructor's Modules

SUMMER-BUILDING software

O/H masters for each Technology Module

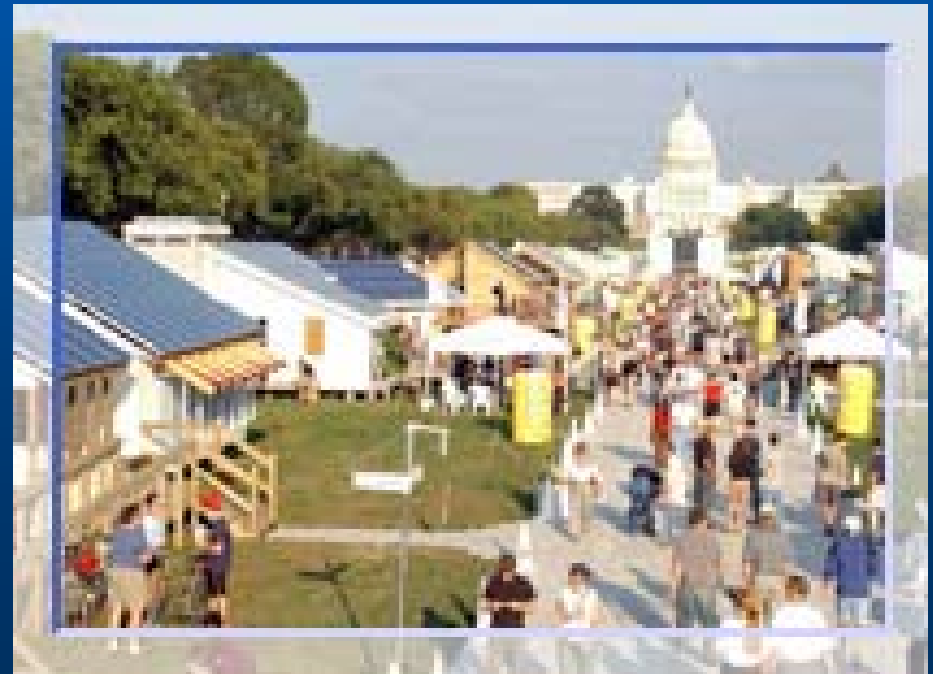


Initiatives

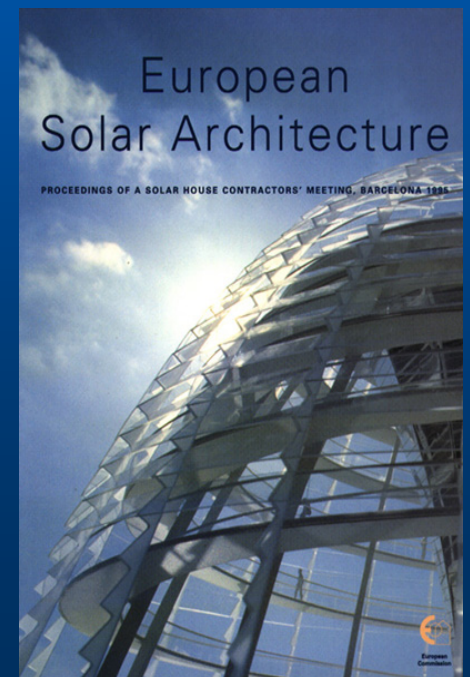
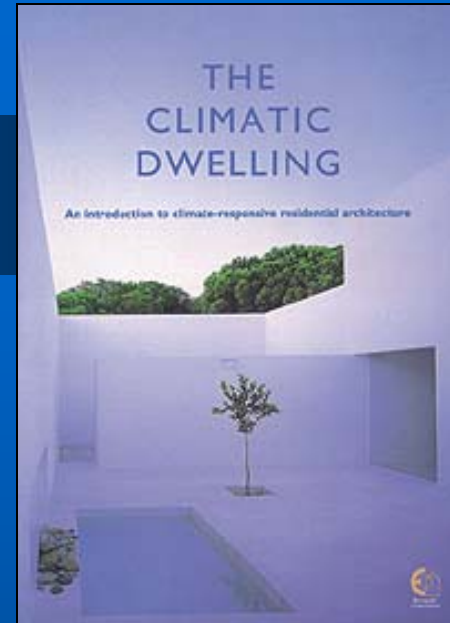
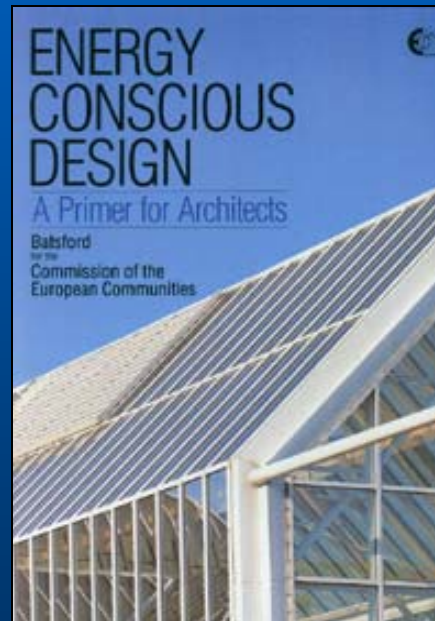
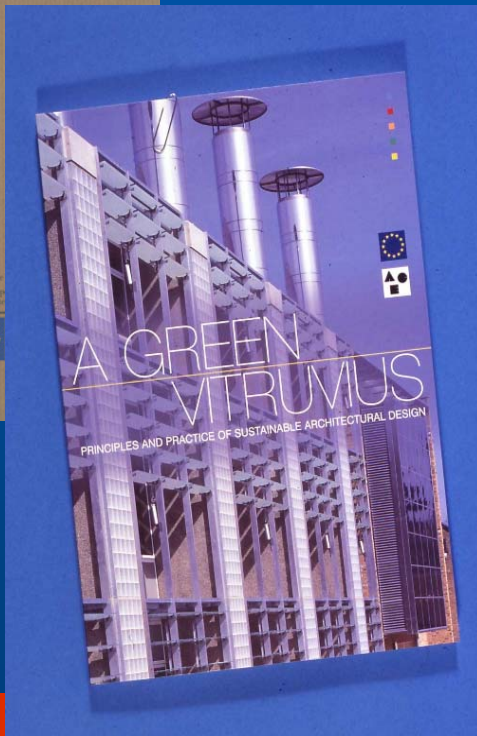
Teaching Architecture
TIA

Society of Building
Science Educators
SBSE

US Dept of Energy
Solar Decathlon



EC outputs



RTD Framework programmes

EC, DG Research and DG Energy & Transport

Joule, Thermie, FP5, FP6, FP7

ECO-BUILD Project <http://www.ecobuild-project.org/>

FP6 project providing

- overview of advanced concepts / technologies to achieve high energy-efficiency
- best practice solutions for implementing these concepts
- assessment of the potential of and problems faced by different sets of policy measures adopted at the European and national level

The logo for 'eco buildings' features the word 'eco' in a purple font with a yellow sun-like graphic behind the 'o', followed by the word 'buildings' in a white font on a purple rectangular background.

<http://ecobuildings.info/>

Common website for four FP6 demonstration projects:
SARA, Eco-Culture, Demohouse and BRITA in Pubs

Intelligent Energy Europe

European Commission, DG Energy & Transport (TREN)

EACI –Executive Agency for Competitiveness and Innovation

Renewable Energy

Transport

Integrated initiatives

Energy efficiency

Developing countries

400 projects

2007 Call projects starting

previously

SAVE II, ALTENER II programmes

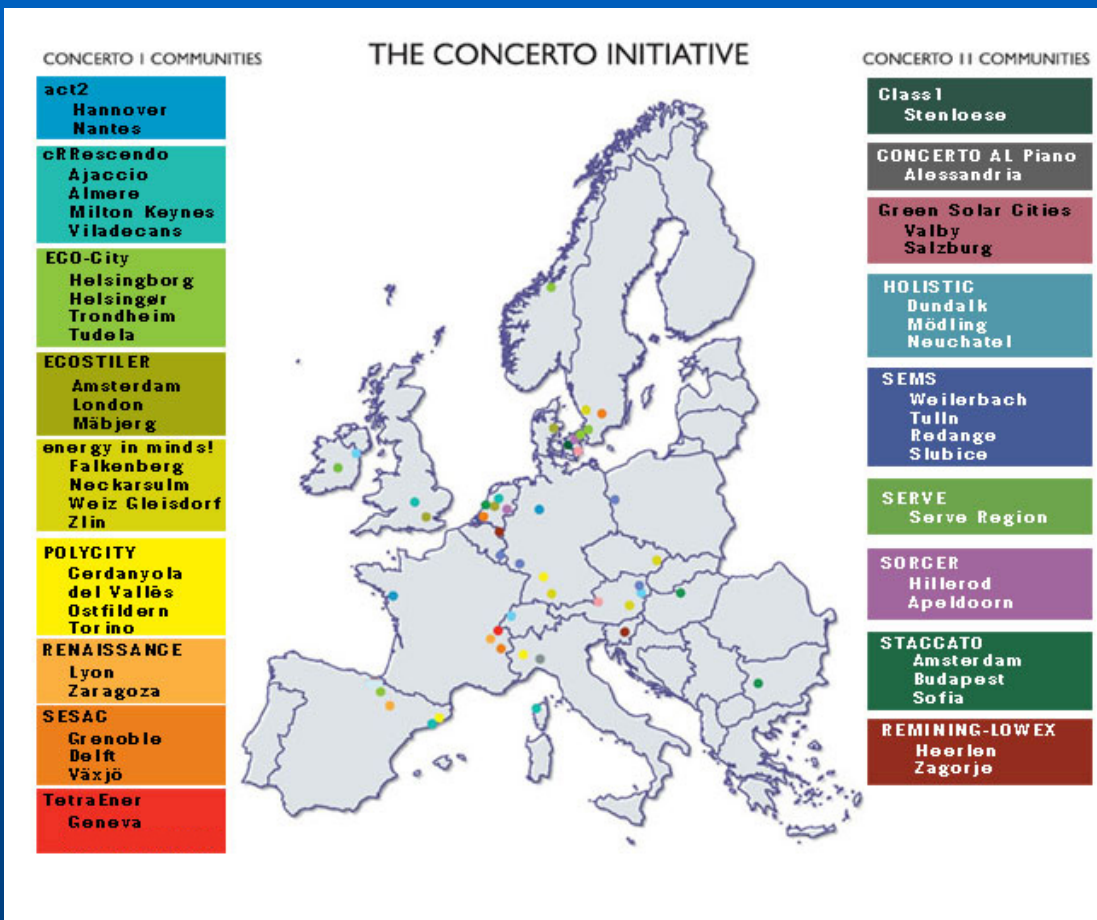


Fingal County Offices
Bucholz McEvoy Architects

600 projects

CONCERTO

A Commission initiative for sustainable energy in local communities

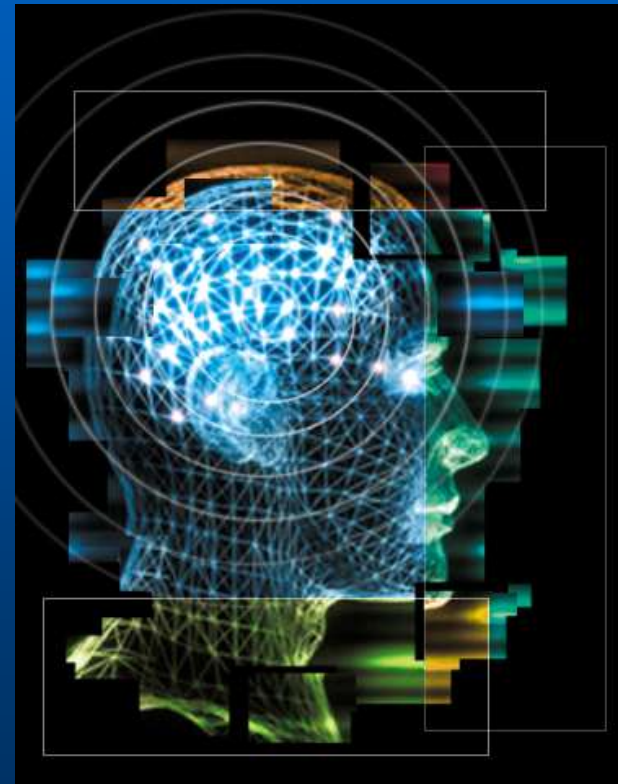


<http://concertoplus.eu/>

EC DG Energy & Transport

Challenges for architectural education?

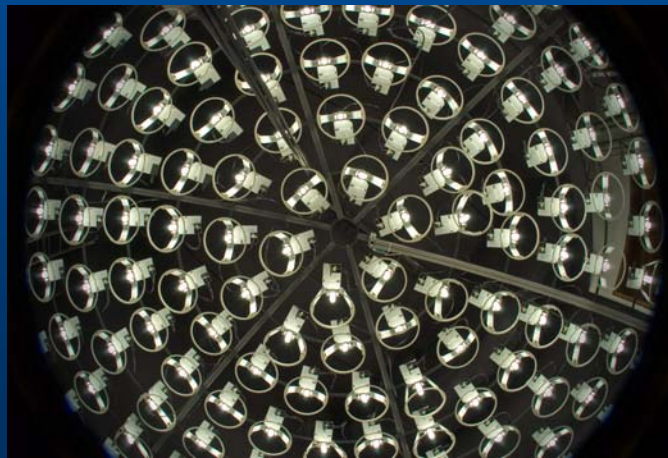
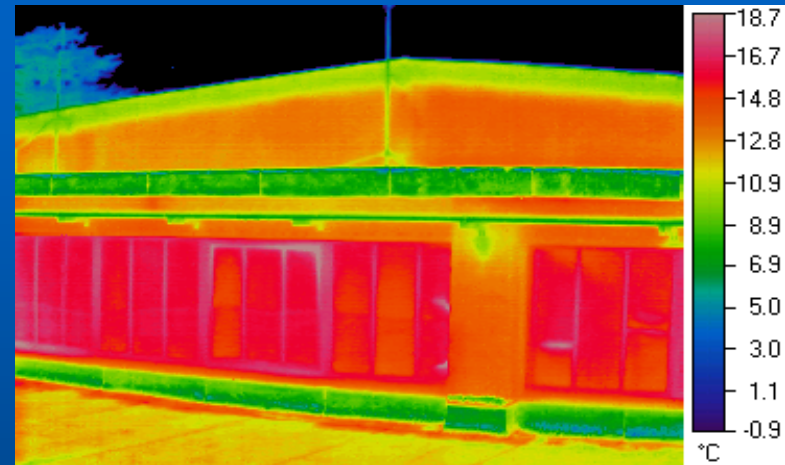
- Integrated Design Processes
- Evidence-Based Design
- Total Quality Management
- Value Engineering
- Risk Analysis
- Automation and Intelligent Buildings
- Agile Buildings- flexible, adaptable...
- Pre-acceptance Testing Protocols
- Continuous Commissioning
- Post Occupancy Evaluation



Research

UCD Energy Research Group at Urban Institute Ireland

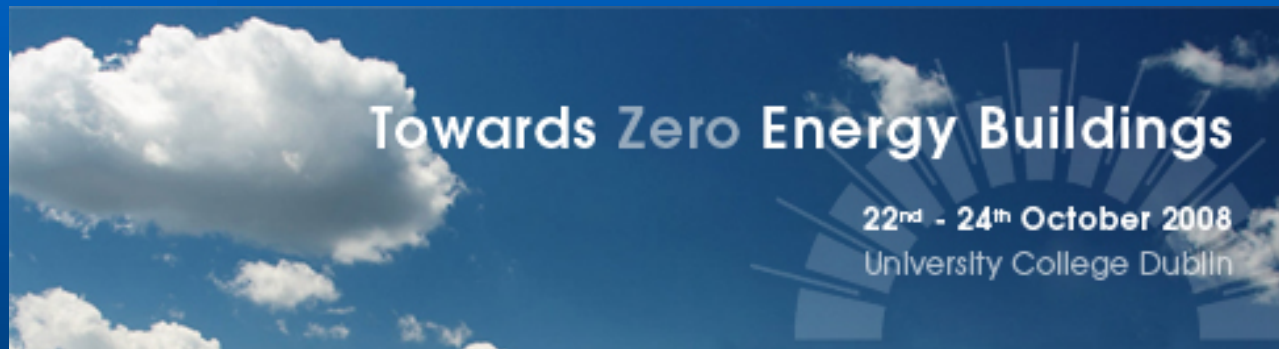
- Capacity-building
- Skills and knowledge
- Science v Craft
- Controlling risk
- Performance, quality
- Driving innovation
- World-class industry





Go raibh maith agaibh

Thank you



International Conference * Passive and Low Energy Architecture www.plea2008.org