WORLD SUSTAINABLE BUILDING 2014
BARCELONA CONFERENCE

Sustainable Building: RESULTS
Are we moving as quickly as we should?
It's up to us!

CONFERENCE CONCLUSIONS
VOLUME 2

This is the second of four volumes of the World SB14 Barcelona Conference Conclusions, which took place in Barcelona on the 28th, 29th and 30th October 2014.

The Conference was organised by GBCe (Green Building Council España), co-promoted by iiSBE, UNEP-SBCI, CIB and FIDIC, and counted on the participation of World GBC*.

This volume gathers the conclusions from the oral sessions from the Conference area "Creating New Resources", presented at World SB14 Barcelona on the morning of day 2 of the Conference. All the papers in these sessions were double blind peer reviewed by the Scientific Committee of World SB14 Barcelona.

- If you wish you search for session content by author or paper title, please use the Conference programme search engine.
- If you wish to search for session content by topic you can guide yourself by the topic labels that you will find at the top of the Conference programme search engine.

All papers from World SB14 Barcelona have been granted the ISBN number 978-84-697-1815-5.

These Conclusions are published by GBCe, in Madrid, in January 2015.

Green Building Council España
Paseo de la Castellana 114, 4º 7, puerta 7
28046 Madrid

***iiSBE:** International Initiative for a Sustainable Built Environment
UNEP-SBCI: United Nations Environment Programme - Sustainable Buildings and Climate Initiative
CIB: Conseil International de Batîment
FIDIC: International Federation of Consulting Engineers
World GBC: World Green Building Council

INDEX

DAY 2 - MORNING

Session 47
Is embodied energy in materials the barrier to achieve ZEB? If so, how can we overcome it? 1

Session 48
What role can renewable materials play in sustainable construction? 2

Session 49
Regulations, processes and systems to support Energy Efficiency in buildings: Are there contradictions between theory and practice? 3

Session 50
What role must new technologies play in sustainable urban transformation strategies? 4

Session 51
New tools, more information…what are the key needs for the future? 5

Session 52
Which are the limits of life-cycle assessment as a rating tool to evaluate sustainability in building? (I) 6

Session 53
What impact does good ventilation have in energy efficiency? 8

Session 63
Which are the keys to have energy efficient office buildings? 9

Session 64
Which should the main goals in building renovation be? 10

Session 66
Does innovation really exist in the Spanish construction sector? 12

Session 68
Energy efficiency and life quality: on what scale? 14

Session 69

What criteria should be considered to define benchmarks? 15

Session 70
Which are the limits of life-cycle assessment as a rating tool to evaluate sustainability in building? (II) 16

ISBN: 978-84-697-1815-5

Session 47:

Is embodied energy in materials the barrier to achieve ZEB? If so, how can we overcome it?

Chairperson:

Tenorio, José Antonio

Responsable de la Unidad de Calidad en la Construcción. Instituto de Ciencias de la Construcción Eduardo Torroja. CSIC

Speakers:

Title: Sustainability and Building Materials within BNB-Evaluation, Tools and Database
Brockmann, Tanja
Head of Division, Federal Institute for Research on Building, Urban Affairs and Spatial Development within Federal Office for Building Regional Planning. Berlin.Germany.
Title: Design strategies for low embodied energy greenhouse gases in buildings: analyses of the IEA Annex 57 case studies
Malmqvist, Tove
Royal Institute Of Technology (KTH). Stockholm.Sweden.
Title: Assessment of embodied impacts – Incorporation of the approaches of IEA Annex 57 into the overall context of environmental performance assessment
Balouktsi, Maria
Karlsruhe Institute Of Technology. Karlsruhe.Germany.
Title: Introduction of Annex 57 -Evaluation of Embodied Energy and Carbon Dioxide Emissions for Construction in the Worldwide

Oka, Tatsuo

Laboratory Of Environment Design. Tokyo.Japan.

Conclusions:

Embodied energy is not a barrier for NZEB concept, especially when focusing only on the use phase of the building. It would be possible using appropriate tools and databases. Some conclusions are:

- It is important to reduce CO_2 emissions related with construction embodied energy
- Annex 57 (and also Annex 56) of IEA works can help to answer the question about embodied energy
- Indicators chosen could be energy and embodied gas emissions in all life cycle. Consumption of primary energy, renewable and total.
- To evaluate embodied energy is necessary to develop databases of impacts. Using values based on standards (EN 15978) EN 15804 or Input-Output analysis.
- Different methodologies are available to help in design stage
- Use right materials at the right place to reduce the embodied energy
- Role of building products is crucial. Information available is needed to calculate. Databases like wecobis can help to use alternative materials to NZEB.
- Embodied emissions should be included in NZEB definition and also in regulations.

ISBN: 978-84-697-1815-5

Session 48:

What role can renewable materials play in sustainable construction?

Chairman:

laudy, Sander Cornelius

Architect, B01 Arquitectes

Speakers:

Title: Bamboo Reinforcement - A Sustainable Alternative to Steel
Heisel, Felix
ETH Zurich / Future Cities Laboratory Singapore. Singapore.Singapore.
Title: Lignin based Sandwich System for load bearing insulation
Krombholz, Andreas
Fraunhofer Institute For Mechanics Of Materials IWM. Halle.Germany.
Title: Applicability of a vapor-open wooden building envelope for subtropical regions in global context
Goto, Yutaka
Chalmers University Of Technology. Gothenburg.Sweden.
Title: Technological innovation within 'villas miserias' (SLUMS)

Michelena Valcárcel, Emiliano Cruz

DIST - Politecnico Di Torino. Torino.Italy.

Conclusions:

In the first place they will reduce the ecological footprint of construction. Then, applied in a holistic way, they can, to a great extent, shift the production of construction materials to a more context specific situation; a more local perspective.
They will surely be a catalyser for technological innovation and if the perseverance of professionals is enough it will be shown that there will be economical benefits as well.

ISBN: 978-84-697-1815-5

Session 49:

Regulations, processes and systems to support Energy Efficiency in buildings: Are there contradictions between theory and practice?

Chairperson:

de Santiago, Eduardo

Consejero Técnico. Subdirección General de Urbanismo. Subdirección General de Urbanismo. Ministerio de Fomento. Gob. España

Speakers:

Title: Traffic Problems in the Core Area of Historic City of Casbah, Algiers: from urban conservation to sustainable development

Dilmi, Djamel

Gtu. M'Sila.Algeria.

Title: Australian residential energy efficiency regulations – success, shortcomings and learnings

Ambrose, Michael

Commonwealth Scientific And Industrial Research Organisation. Highett.Australia.

Title: Development of a decision-making framework for the analysis of incentive schemes within the context of sustainable building

Hipwood, Tara

School of Planning and Geography, Cardiff University. Cardiff.United Kingdom.

Conclusions:

Some of the contradictions identified are related to the application of general theoretical frameworks to particular conditions without taking enough consideration to local specificities context.

Other findings focus on the contradictions between theoretical or "a priori" expectations, and real results obtained after implementation. Some other contradictions found are related with the identification of triggers that engender behaviour change, so that it is important to solve these contradictions from the root.

ISBN: 978-84-697-1815-5

Session 50:

What role must new technologies play in sustainable urban transformation strategies?

Chairperson:

Todd, Joel Ann

Environmental Consultant

Speakers:

Title: Photovoltaics in Italian historical city centers: do PV products and building codes have a meeting point?

Paparella, Rossana

Department Of Civil, Environmental And Architectural Engineering, University Of. Padova.Italy.

Title: The Empowered Policy on Kaohsiung City¡¦s Green Building Self-Governance Regulation for Skyline Transformation by photovoltaic Roofs

Li, Yen-Yi

ShuTe University / IiSBE-Taiwan. Kaohsiung.Taiwan Republic of China.

Title: Barriers and drivers for energy efficient upgrade of single-family housing in Norway

Hauge, Åshild L

SINTEF Building And Infrastructure. Oslo.Norway.

Title: Retrofitting Russian cities; Addressing housing conditions in the regional masterplan for Berezniki, Solikamsk and Usolye.

King, Sara

KK Architects. Berlin.Germany.

Conclusions:

New technologies play an important role in urban transformation. They will be most effective when there is a master plan + integrated approach. Not only can new technologies address environmental issues, but can also contribute to addressing social and economic issues, improving quality of life. Lack of information is a barrier to adopting new technologies and we need better understanding of how best to provide information to overcome barriers - social science research is needed for this. Finally, more research is needed on applying new technology (e.g. PV) in historic areas to preserve cultural values.

ISBN: 978-84-697-1815-5

Session 51:

New tools, more information…what are the key needs for the future?

Chairperson:

Salat, Serge

President Urban Morphology and Complex Systems Institute

Speakers:

Title: New tool to identify enviromental impacts on the construction works. BEDEC & TCQGMA

Alfaro, Licinio

Instituto De Tecnologia De La Construcción De Cataluña. Barcelona.Spain.

Title: SOFIAS - Creation of a database of quantitative and reliable environmental information of construction products

Gazulla, Cristina

UNESCO Chair In Life Cycle And Climate Change (ESCI-UPF). Barcelona.Spain.

Title: CESBA - Common European Sustainable Building Assessment

Berchtold-Domig, Markus

Network Enterprise Alps (NENA). Schwarzenberg.Austria.

Conclusions:

The session stressed the need to derive from databases, tools that can help designers and decision makers to take optimization decisions at early design steps. From impact of materials tools it appears that 3 big contributors are responsible of 90% of building impacts, which allow to derive simplified tools from use with database tools.

The session stressed the need for further European standardization and increasing use.....of available EPDs.

The session stressed the need to move from a 1% assessment now to a mass assessment with 100% buildings evaluated while expecting optimal .....

New tools should harmonize from existing tools, be lowest, affordable and open source. Instinctive .... drive from public factors ....with a sort of incentives (such as FAN increase) for stakeholders to assess and increase levels of performance. Assessment should be linked to more policies.

ISBN: 978-84-697-1815-5

Session 52:

Which are the limits of life-cycle assessment as a rating tool to evaluate sustainability in building? (I)

Chairperson:

Macías, Manuel

Profesor/Responsable del área de Investigación. Universidad Politécnica de Madrid/GBCe

Speakers:

Title: Survey of Allocation Methods in Life Cycle Assessments of Wood Based Products

Dolezal, Franz

Holzforschung Austria. Vienna.Austria.

Title: Resource efficiency of buildings – a model for the assessment throughout the life cycle and implementation in a real case study

Eberl, Sebastian

Fraunhofer IBP / Technische Universität München. Munich.Germany.

Title: Climate renovation can pay off - A Life Cycle Cost analysis conducted as part of the LichtAktiv Haus experiment confirms the economic viability of modernising a 1950s settler house

Trinius, Wolfram

Ingenieurbüro Trinius GmbH. Hamburg.Germany.

Title: The Application of LCA calculation methods in building certification systems in Austria

Passer, Alexander

Graz University Of Technology. Graz.Austria.

Conclusions:

- Harmonisation between energy and environmental simulation adaptation to non LCA expert.
- Productivity of studies.
- Difficulty of analysis and use of the results.
- Conflicts between theory and practice. EPD/LCA.
- Limitations.
- Conflicts: practice/research.

ISBN: 978-84-697-1815-5

- Available data.
- Methodoloy
- 5% of the energy indicators.
- How the EDD support the LCA.
- Uniformity with the different concepts.
- Chair information between communities' experience.

ISBN: 978-84-697-1815-5

Session 53:

What impact does good ventilation have in energy efficiency?

Chairperson:

Baillon, François

Commercial Director, International Federation of Consulting Engineer (FIDIC), Geneva, Switzerland

Speakers:

Title: Computerized Numerical Analysis on Stipulations of Taiwan's Localization Design Principles of a Sustainably Built Environment

Chou, Po-Cheng

Dept. Of Interior Design, SHU-TE University. Kaohsiung.Taiwan.

Title: Cross ventilation CFD Modeling: Characterization and study of different façade opening configurations at the refurbishment of a residential building in Málaga (Spain)

Gallo,Izaskun

Grupo Sostenibilidad en la Construcción y en la Industria, Departamento de Construcción. Madrid.Spain.

Title: Evaluation of ventilative cooling in a single family house - Characterization and modelling of natural ventilation

Dupin, Nicolas

Velux. Morangis.France.

Title: Convertion from CAV to DCV with reuse of existing ductwork

Mysen, Mads

SINTEF Building & Infrastructure. Oslo.Norway.

Conclusions:

The need for alternative ventilation to air conditioning is explored in this session via natural ventilation and cross ventilation, as well as via use of demand control ventilation. The impact of those alternatives is clearly reducing or even replacing the use of air conditioning with an average temperature reduction of 5ºC.

The systematic implementation of natural ventilation should use CFD modelling to include this approach in the design process. The need for a simple and adaptable modelling tool will be the key element to adopt natural ventilation worldwide and replace air conditioning to increase energy efficiency.

ISBN: 978-84-697-1815-5

Session 63:

Which are the keys to have energy efficient office buildings?

Chairperson:

Sauer, Bruno

Director Técnico GBCe, socio Bipolaire Arquitectos. Profesor Universidad Europea de Valencia

Speakers:

Title: Carbon Reduction of Office Building Retrofit Packages

Seo, Seongwon

Csiro. Highett.Australia.

Title: Rating and Environmental Certification of Buildings in the Life Cycle Assessment Tool "SOFIAS"

Zabalza, Ignacio

CIRCE - Research Centre For Energy Resources And Consumption. Zaragoza.Spain.

Title: Sustainability paradigm of high-rise office buindings in Barcelona: Auditori Tower of Iberdrola.

Moreno, Víctor

Isolana Ahorro Energético. L´Hospitalet de Llobregat.Spain.

Title: Life cycle analysis as tool for environmental assessment of office and administration buildings – a critical review and evaluation of the LCAs practical feasibility for a future roadmap

Neururer, Christoph

University Of Natural Resources And Life Sciences, Vienna - IKI. Vienna.Austria.

Concusions:

Three of the four speakers of this session 63 clearly showed results from a practice based research project. Several active elements that can help to improve energy efficiency were valued in their specific context. They presented clarifying data on the energy balance of different techniques: glazing, split system retrofitting, lightening, etc. The fact that all cases where contextualized in the different stages of evolution in a LCA process, made it even more accurate. The presentation of the Sofias Assessment Tool was a clear example how to look to all these LCA stages and how every stage has its impact on the global evaluation.

ISBN: 978-84-697-1815-5

Session 64:

Which should the main goals in building renovation be?

Chairperson:

Miguel Mitre, Emilio

GBCe, Madrid, Spain

Speakers:

Title: Solutions for energy efficiency and renewable energy use in buildings: Basics and results of a stakeholder-oriented economic assessment

Stengel, Julian

French-German Institute For Environmental Research, Karlsruhe Institute of Techn. Karlsruhe.Germany.

Title: Interventions in old city centres: assessing the sustainability of rehabilitation actions

Ramos, Ana

Polytechnic Institute Of Castelo Branco. Castelo Branco.Portugal.

Title: Is building renovation truly sustainable? The need for applying a multi-criteria assessment through life cycle approach.

Pombo, Olatz

Universidad Politécnica de Madrid. Madrid.Spain.

Title: Sustainable Renovation of Buildings

Staniaszek, Dan

Buildings Performance Institute Europe. Brussels.Belgium.

Conclusions:

The main goal is aligned with the theme of WSB14 Barcelona: to progress more quickly in deep energy renovation. In order for that to happen:

- The understanding from the user is poor, so a better communication is needed, but the users are different, and need different communication formats.
- The situations vary a lot, needing different assessment methods in cases such as city centres
- Workable multicriteria instruments have to be developed so that the right decisions are taken
- Deep energy renovation is excessively sensitive to the price of energy.

ISBN: 978-84-697-1815-5

- Transparency is a must.
- Politically, there is a trend pushing this direction, but the governments must be more ambitious, and support a development that is not going to take place on its own.
- It is necessary to make the benefits more clear, so that a demand appears.

ISBN: 978-84-697-1815-5

Session 66:

Does innovation really exist in the Spanish construction sector?

Chairperson:

Oteiza, Ignacio

Instituto de Ciencias de la Construcción Eduardo Torroja- CSIC

Speakers:

Title: Sustainable low energy buildings using innovate heat storage solutions.

Salmeron Lissen, Rafael

Grupo de Termotecnia, Escuela de Ingenieros de Sevilla. Sevilla.Spain.

Title: Housing prototypes: Industrialized and efficient with renewable energy

García Marín, Alberto

Escuela Técnica Superior De Arquitectura Universidad De Málaga. Málaga.Spain.

Title: Thermal energy storage in sustainable buildings: passive and active systems

Castell, Albert

University Of Lleida. Lleida.Spain.

Title: Success factors for the multi-comfort house standard in warm climates: Last generation products and solutions to archieve a better energy performance, economial and management tools on job-side.

Pallarés Pallarés, Ana Isabel

Saint-Gobain Isover. Azuqueca de Henares.Spain.

Conclusions:

Si nos comparamos con otros sectores industriales y con otros países desarrollados, nuestro esfuerzo de I+D+innovación es realmente muy bajo e insuficiente en España

Debe haber un apoyo público a la I+D+innovación mayor en la construcción, actualmente ha habido una reducción de los presupuestos de I+D+i en España.

El sector de la construcción (que somos todos, constructores, profesionales, usuario, deben hacer también un mayor esfuerzo en el apoyo a la innovación en la construcción

La crisis inmobiliaria en España debe ser un punto de inflexión para un mayor aporte en la innovación en la construcción, unido a los requerimientos europeos:

1. Edificios: eficiencia energética 20/20/20

ISBN: 978-84-697-1815-5

2. Confortables
3. Industrializados

La innovación de la construcción en la rehabilitación de edificios debe ser prioritaria si se quiere cumplir con los objetivos europeos 2020.

Debe haber más apoyo gubernamental a través de permitir a las autoridades en los diferentes ayuntamientos que promuevan la aplicación de las innovaciones de la construcción, en las construcciones nuevas y por rehabilitar.

ISBN: 978-84-697-1815-5

Session 68:

Energy efficiency and life quality: on what scale?

Chairperson:

Cárdenas, Luz

University Of Chile Faculty of Architecture & Urbanism, Santiago, Chile

Speakers:

Title: Evaluation of reduced energy use resulting from a DHC network in the Shinjuku DHC area

Hashidate, Daisuke

Kogakuin University, Tokyo, JAPAN. Tokyo.Japan.

Title: Green design strategies for urban heat island mitigation in a solar optimized access Eixample via IMM® methodology.

Lobaccaro, Gabriele

NTNU - Norwegian University Of Science And Technology - Department of||Architectural Design, History and Technology Faculty of Architecture and Fine||Art. Trondheim.Norway.

Title: Towards near zero energy buildings: Energy storage, demand side regulation and renewable energy integration. "The Autonomus Office" case study

San Juan, Cristina

Ove Arup & Partners, Madrid (Spain). Madrid.Spain.

Title: Study on the Establishment of Indoor Environmental Health Housekeeper System--Using Environmental Sensing and Consultation as an Example

Chen, Nientsu

Tungfang Design Institute. Kaohsiung City.Taiwan Republic of China.

Conclusions:

Presentations focus on building and blocks at district levels. Conclusions regarding the above question were:

- Neighbourhood scale as a step forward because many studies have been developed on building.
- Another point of discussions was the question itself. It is not a matter of scale but interactions between scales.
- Education of the users to manage in a simple way value range from information technology.

ISBN: 978-84-697-1815-5

Session 69:

What criteria should be considered to define benchmarks?

Chairperson:

Larsson, Nils

Executive Director. IISBE

Speakers:

Title: Building sustainability assessment and rating system in Italy: The definition of Benchmark Values

Moschetti, Roberta

Politecnico Di Milano. Milano.Italy.

Title: Guidance value of the total environmental impact for buildings

Wyss, Franziska

Treeze Ltd., Uster, Switzerland. Uster.Switzerland.

Title: Evaluation of sustainability aspects and the use of local materials in the housing construction in Colombia

Morales-Pinzón, Tito

Universidad Tecnológica De Pereira. Pereira.Colombia.

Title: Monitoring dwelling stock efficiency through energy performance register: Trends Dutch social housing

Majcen, Daša

OTB Research Institute, Delft University Of Technology. Delft.The Netherlands.

Conclusions:

- Benchmarks are necessary for any type of assessment or rating.
- Benchmarks should be transparent.
- Benchmarks should use local data in national or international frameworks.
- KPIs should be emphasized because of compactness and clarity.
- Benchmarks are based on many assumptions (occupancy, hours of operation, etc.).

ISBN: 978-84-697-1815-5

Session 70:

Which are the limits of life-cycle assessment as a rating tool to evaluate sustainability in building? (II)

Chairperson:

Macías, Manuel

Profesor/Responsable del área de Investigación. Universidad Politécnica de Madrid/GBCe

Speakers:

Title: Building Life Cycle Assessment (LCA): results sensitivity to the choice of LCA data and reference service lives of construction products

Hallouin, Thibault

Bouygues Construction. Saint-Quenting-En-Yvelines Cede.France.

Title: Study on Life Cycle Carbon Minus House Part 1: Summary of project (Best Papers SB13 Oulu)

Seike, Tsuyoshi

The University Of Tokyo. Chiba.Japan.

Title: Study on Life Cycle Carbon Minus House Part 2: Design concept of the LCCM demonstration house (Best Papers SB13 Oulu)

Murata, Ryo

Tokyo Institute Of Technology. Tokyo.Japan.

Title: Survey on LCA results analysis, interpretation and reporting in the construction sector

Sibiude, Galdric

Cstb. Saint Martin d'Hères.France.

Conclusions:

- Limits concluded.
- LCA data are sensitive to the geographical and technological situations.
- LCA is also sensitive to social and health impacts.
- Needs for clearer information between countries in Europe.

LCA limits:

- Non-coherence with thermal simulations.
- No friendly results to analyse and communicate.
- Complexity/public consultation highly important.
- Other thematic as sustainable social and economics.