

2011 HIGHLIGHTS

SHC Task 40 / ECBCS Annex 52 Towards Net-Zero Energy Solar Buildings

THE ISSUE

Energy Use in buildings worldwide accounts for over 40% of primary energy use and 24% of greenhouse gas emissions. Several International Energy Agency (IEA) countries have adopted a vision of so-called 'net zero energy buildings' as a long-term goal of their energy policies. However, what is missing is a clear definition and international agreement on the measures of building performance that could inform 'zero energy' building policies, programmes and industry adoption around the world.

OUR WORK

The objective of the Task is to study current net-zero, near net-zero and very low energy buildings and to develop a common understanding, a harmonized international definitions framework, tools, innovative solutions and industry guidelines. A primary means of achieving this objective is to document and propose practical NetZEB demonstration projects, with convincing architectural quality. These projects aim to equalize their small annual energy needs, cost-effectively, through building integrated heating/ cooling systems, power generation and interactions with utilities. These examples and the supporting sourcebook, guidelines and tools are viewed as keys to industry adoption. The Task will build upon recent industry experiences with net-zero and low energy solar buildings and the most recent developments in whole building integrated design and operation. The joint international collaborative activity will address concerns of comparability of performance calculations between building types and communities for different climates in participating countries. The goal is solution sets that are attractive for broad industry adoption.

Task 40 is a five-year collaborative project with the IEA ECBCS Programme and will be completed in September 2013.

Task Date 10/2008 - 09/2013
Task Leader Mr. Josef Ayoub
CanmetENERGY, Natural Resources, Canada
Email jayoub@nrcan.gc.ca
Website <http://www.iea-shc.org/task40/index.html>

PARTICIPATING COUNTRIES

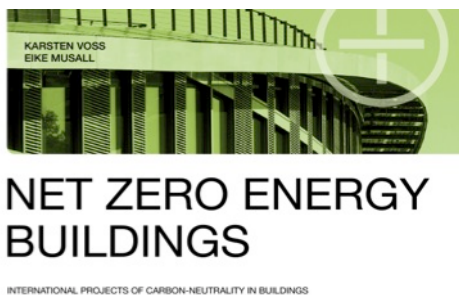
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KEY RESULTS OF 2011

Net-ZEB Definitions Framework, Grid Interaction and Implications

An internationally agreed understanding on NZEBs based on a common methodology.

The major highlight of 2011 was the publishing of Volume I of the NetZEB Source Book by a well-known German publisher in English as well as German-language editions. Volume I deals with the history, theory and project experiences from all building types, including projects in North American and European countries, taking into account all projects of architectural & conception relevance. By 201 year-end, about 1400 German copies and another 650 English were sold.



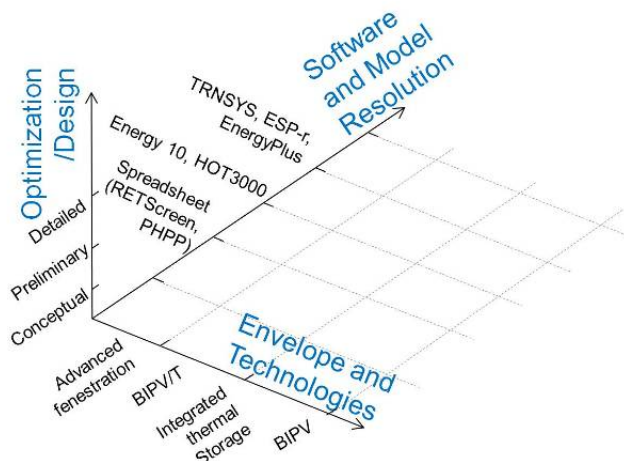
Purchase of the book: http://www.detail.de/rw_5_Kaufen_En2_HoleArtikelID_1166_ArtikelDetails.htm

Review of the book: <http://www.detail.de/GreenNetZeroEnergyBuildings/blaetterkatalog/index.html>

NetZEB Design Processes and Tools

Identify and refine design approaches and tools to support industry adoption.

The Design Process & Tools Matrix



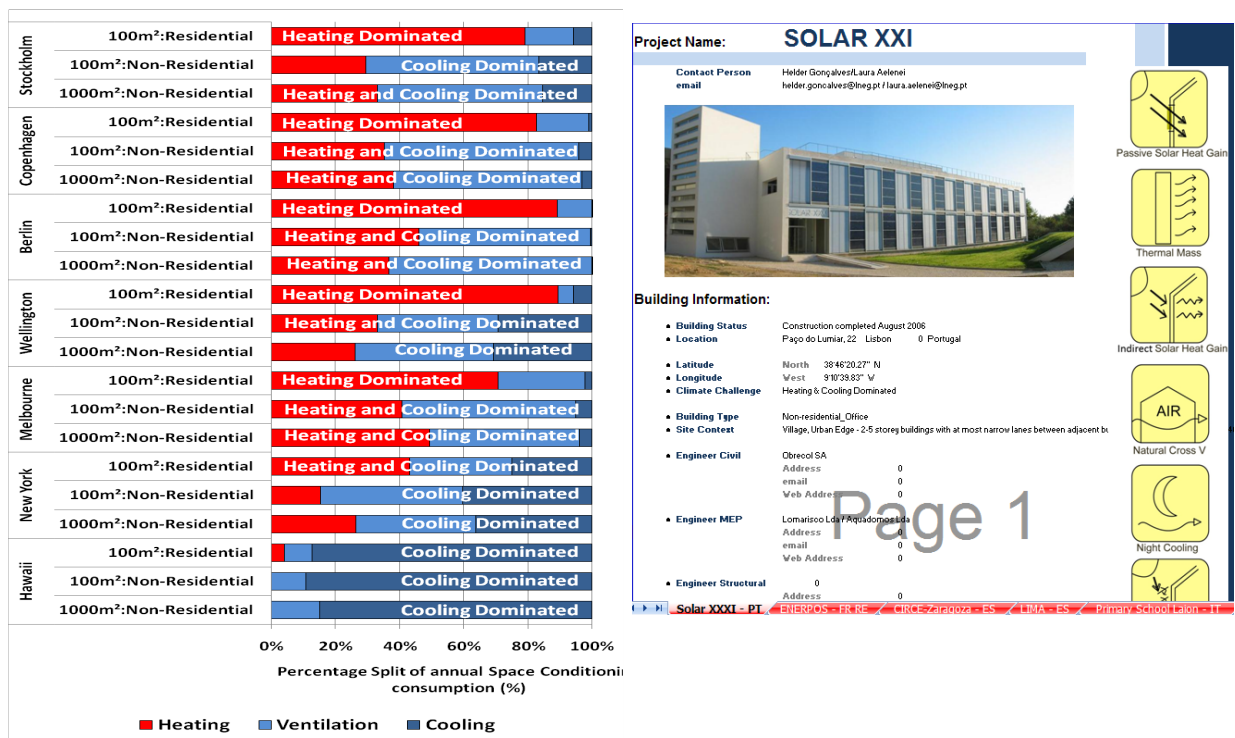
During 2011 work continued in the four major R&D streams; in documenting and analyzing processes and tools currently being used to design NetZEBs and under development by participating countries; in assessing gaps, needs and problems to inform simulation engine and detailed design tools developers of priorities for NetZEBs; in qualitative and quantitative benchmarking of selected tools; and in selecting six case study buildings (detailed analysis of simulated/

vs. actual performance), and proposing the redesign/optimization of these buildings.

NetZEB Solution sets (design, engineering and technologies)

Develop and test innovative, whole building net-zero solution sets for different climates with exemplary architecture and technologies that would be the basis for wide industry uptake.

During 2011, further analysis of the about 50 projects of NetZEB buildings worldwide was undertaken to come up with solution sets that could inform industry adoption. Drafts of case study factsheets detailing the different passive and non-passive approaches to designing NetZEBs have been initiated. An analysis matrix of solutions sets categories (passive approaches and envelope, energy efficient systems, and renewable energy) and climate type (cooling dominated, heating dominated, cooling & heating dominated) as per the figure below was developed to document the various projects.



NetZEB Dissemination and Outreach

Support knowledge transfer and market adoption of NetZEBs on national and international levels.

The first PhD training workshop to provide specialist training to PhD students participating in the Task was held in Montreal, Canada, from June 20 - 25, 2011 in conjunction with the ASHRAE 2011 summer conference. This was joint activity with SHC Task 41 targeting current PhD students and advanced Master's students to provide them an opportunity to gain a thorough understanding of NetZEBs and their fundamental principles. The wide-reaching scope filled gaps for both engineers and architects in subject areas of engineering and mathematical theories, modeling (methods and tools), and design and architectural perspectives.

