

## 2012 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, programs 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.

#### PARTICIPATING COUNTRIES

Australia  
Austria  
Belgium  
Canada  
Denmark  
Finland  
France  
Germany  
Italy  
South Korea  
New Zealand  
Norway  
Portugal  
Singapore  
Spain  
Sweden  
Switzerland  
United Kingdom  
United States

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

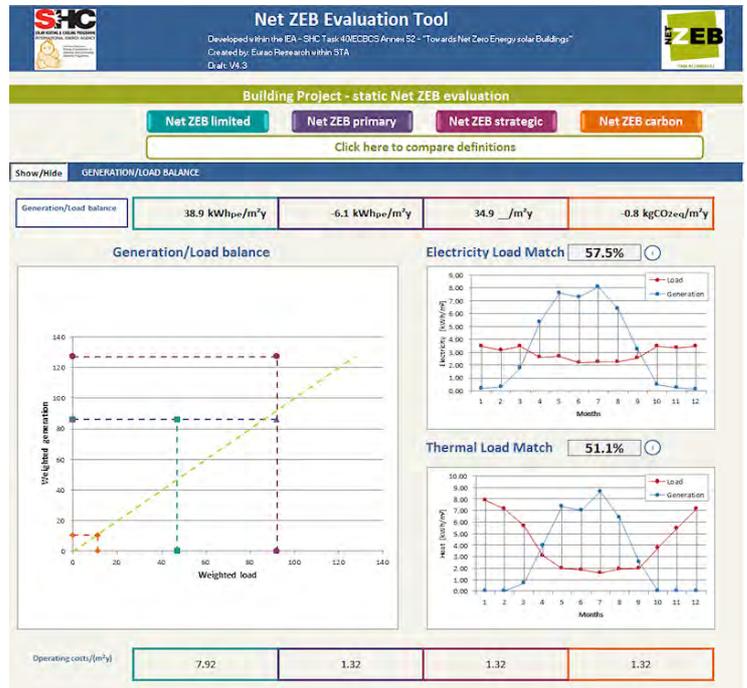
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## KEY RESULTS OF 2012

### Net-ZEB Definitions Framework, Grid Interaction and Implications

#### *Internationally agreed understanding on NZEBs based on a common methodology*

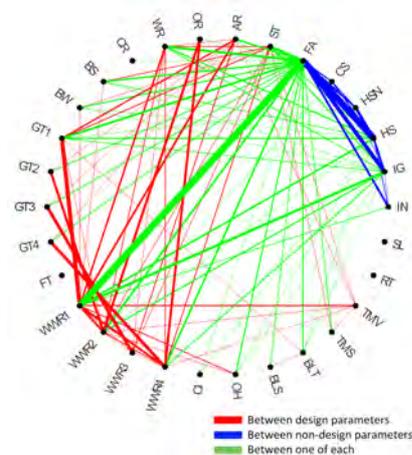
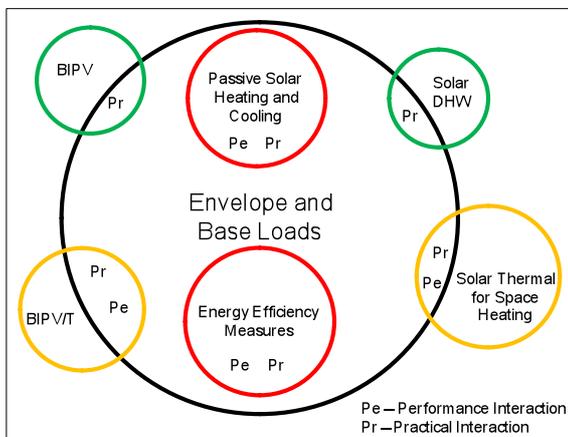
One of the key highlights of 2012 was the completion of the NetZEB Evaluation Tool – an Excel-based platform tool that enables energy balance, operating cost and load match index calculation for predefined selected definitions of net-zero energy buildings. It aims at evaluating solutions adopted in building design with respect to different NetZEB definitions (for building designers), assessing the balance in monitored buildings (for energy managers), and assisting the upcoming implementation process of NetZEBs within the national normative framework (for decision makers). The Tool and supporting material can be downloaded from the Task website at: <http://task40.iea-shc.org/net-zeb>



### NetZEB Design Processes and Tools

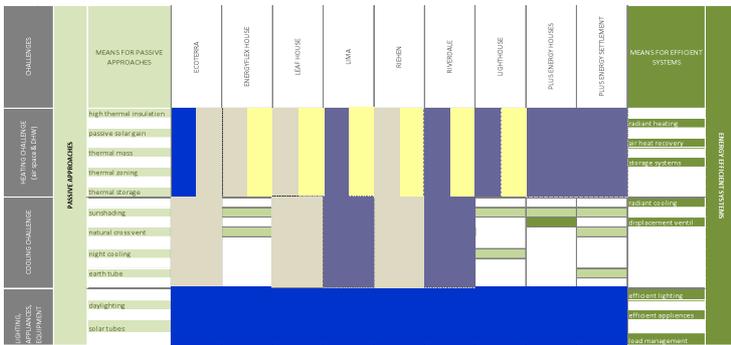
#### *Identify and refine design approaches and tools to support industry adoption*

The key highlight of this work was preparations to publish Volume 2 of the source book, “Modeling, Design, and Optimization of Net-Zero Energy Buildings” by Ernst & Sohn publishers in Berlin (a Wiley & Sons company). Work also continued in the four major R&D streams 1) documenting and analyzing processes and tools being used and under development to design NetZEBs, 2) assessing gaps, needs and problems to inform simulation engine and detailed design tools for NetZEBs, 3) qualitative and quantitative benchmarking of selected tools, and 4) investigating four case study buildings (detailed analysis of simulated/designed vs. actual performance), and proposing their redesign/optimization.



## 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



Also for this activity, the highlight in 2012 was preparations to publish Volume 3 of the source book, “Solution Sets for Net-Zero Energy Buildings: Feedback from 30 NZEBs Worldwide”. Another key highlight is the ongoing work to develop a series of fact sheets documenting key energy performance information of monitored NetZEBs from different regions in the world.

## NetZEB Dissemination and Outreach

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

The 2<sup>nd</sup> PhD training workshop on NetZEBs was held at the Institut d’Etudes Scientifiques des Cargese (IESC) in Cargese, Corsica from September 24 – 29, 2012 and was attended by 18 PhD students from seven member countries. The workshop focused on using case studies to develop solution sets and provided participants 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 modeling (methods and tools), design and architectural perspectives as well integration and optimization of renewable energy systems into NetZEBs.



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Towards Net Zero Energy Solar Buildings  
<http://www.iea-shc.org/task40>



2<sup>nd</sup> PhD Summer School  
on Net Zero Energy Buildings :

Innovative Solution Sets, Case studies



September 24 – 28, 2012  
Institut d’Etudes Scientifiques de Cargèse  
Corsica, France

