

AiCARR 50th International Congress

Beyond NZEB Buildings

Energy Procedia Volume 140

Matera, Italy
10 – 11 May 2017

Editors:

Francesca Romana d'Ambrosio
Livio Mazzearella
Piercarlo Romagnoni

ISBN: 978-1-5108-5664-6

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© by Elsevier B.V.
All rights reserved.

Printed by Curran Associates, Inc. (2018)

For permission requests, please contact Elsevier B.V.
at the address below.

Elsevier B.V.
Radarweg 29
Amsterdam 1043 NX
The Netherlands

Phone: +31 20 485 3911
Fax: +31 20 485 2457

<http://www.elsevierpublishingsolutions.com/contact.asp>

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

EDITORIAL	1
<i>Francesca Romana D'Ambrosio Alfano, Livio Mazzarella, Piercarlo Romagnoni</i>	
AIR COOLED HEAT PUMP COUPLED WITH HORIZONTAL AIR-GROUND HEAT EXCHANGER (HAGHE) FOR ZERO ENERGY BUILDINGS IN THE MEDITERRANEAN CLIMATE	2
<i>Cristina Baglivo, Paolo Maria Congedo, Domenico Laforgia</i>	
RADIATION PROTECTION CONSIDERATIONS ON RADON AND BUILDING MATERIALS RADIOACTIVITY IN NEAR ZERO ENERGY BUILDINGS	13
<i>Giada Gandolfo, Luigi Lepore, Andrea Pepperosa, Romolo Remetti, Daniele Franci</i>	
OBTAINING A NZEB IN MEDITERRANEAN CLIMATE BY USING ONLY ON-SITE RENEWABLE ENERGY: IS IT A REALISTIC GOAL?	23
<i>Diana D'Agostino, Concetta Marino, Francesco Minichiello, Francesco Russo</i>	
ANALYTICAL MODELLING OF BREATHING WALLS: EXPERIMENTAL VERIFICATION BY MEANS OF THE DUAL AIR VENTED THERMAL BOX LAB FACILITY	36
<i>Andrea Alongi, Adriana Angelotti, Livio Mazzarella</i>	
INSIGHTS INTO THE EFFECTS OF OCCUPANT BEHAVIOUR LIFESTYLES AND BUILDING AUTOMATION ON BUILDING ENERGY USE	48
<i>Valentina Fabi, Verena M. Barthelmes, Marcel Schweiker, Stefano P. Corgnati</i>	
TRADE-OFF BETWEEN SOUND INSULATION PERFORMANCE AND COST-OPTIMALITY IN A RESIDENTIAL NZEB	57
<i>Jean-Christophe Vallée, Maria Ferrara, Arianna Astolfi, Enrico Fabrizio</i>	
A HIGH PERFORMANCE HOME IN THE MEDITERRANEAN CLIMATE: FROM THE DESIGN PRINCIPLE TO ACTUAL MEASUREMENTS	67
<i>Francesco Causone, Marco Pietrobon, Lorenzo Pagliano, Silvia Erba</i>	
STUDY OF INNOVATIVE SOLUTIONS OF THE BUILDING ENVELOPE FOR PASSIVE HOUSES IN MEDITERRANEAN AREAS	80
<i>Roberto Bruno, Natale Arcuri, Cristina Carpino</i>	
OCCUPANT BEHAVIOUR LIFESTYLES AND EFFECTS ON BUILDING ENERGY USE: INVESTIGATION ON HIGH AND LOW PERFORMING BUILDING FEATURES	93
<i>Verena M. Barthelmes, Cristina Becchio, Valentina Fabi, Stefano P. Corgnati</i>	
IMPACT AND RELIABILITY OF EPCS IN THE REAL ESTATE MARKET	102
<i>Ramón Pascual Pascuas, Giulia Paoletti, Roberto Lollini</i>	
TOWARD NZEB BY OPTIMIZING HVAC SYSTEM CONFIGURATION IN DIFFERENT CLIMATES	115
<i>Cristina Becchio, Stefano Paolo Corgnati, Michele Vio, Giulia Crespi, L. Prendin, M. Ranieri, Davide Vidotto</i>	
ENERGY REFURBISHMENT IN EXISTING BUILDINGS: THERMAL BRIDGE CORRECTION ACCORDING TO DM 26/06/2015 LIMIT VALUES	127
<i>Stefano Bergero, Paolo Cavalletti, Anna Chiari</i>	
FROM HIGH-ENERGY DEMANDS TO NZEB: THE RETROFIT OF A SCHOOL IN CATALONIA, SPAIN	141
<i>Umberto Berardi, Mauro Manca, Pau Casaldaliga, Felipe Pich-Aguilera</i>	
NEW STRATEGIES TOWARDS NEARLY ZERO ENERGY IN EXISTING BUILDINGS: THE ABRACADABRA PROJECT	151
<i>Giovanni Semprini, Annarita Ferrante, Elena Cattani, Anastasia Fotopolulou</i>	
THERMAL AND MECHANICAL CHARACTERIZATION OF PANELS MADE BY CEMENT MORTAR AND SHEEP'S WOOL FIBRES	159
<i>Tiziana Cardinale, Giuseppe Arleo, Franco Bernardo, Andrea Feo, Piero De Fazio</i>	
CRITERIA AND STRUCTURE OF A HARMONISED DATA COLLECTION FOR NZEBs RETROFIT BUILDINGS IN EUROPE	170
<i>Delia D'Agostino, Barbara Cuniberti, Isabella Maschio</i>	
FAÇADE RETROFITTING: FROM ENERGY EFFICIENCY TO CLIMATE CHANGE MITIGATION	182
<i>Paola Lassandro, Silvia Di Turi</i>	
NZEB TARGET FOR EXISTING BUILDINGS: CASE STUDY OF HISTORICAL EDUCATIONAL BUILDING IN MEDITERRANEAN CLIMATE	194
<i>Fabrizio Ascione, Rosa Francesca De Masi, Filippo De Rossi, Silvia Ruggiero, Giuseppe Peter Vanoli</i>	

EFFECTS OF LOUVERS SHADING DEVICES ON VISUAL COMFORT AND ENERGY DEMAND OF AN OFFICE BUILDING. A CASE OF STUDY	207
<i>Francisco Fernández Hernández, José Manuel Cejudo López, José Miguel Peña Suárez, M Carmen González Muriano, Simón Carrillo Rueda</i>	
NZEB, COST- AND COMFORT-OPTIMAL RETROFIT SOLUTIONS FOR AN ITALIAN REFERENCE HOTEL	217
<i>Tiziana Buso, Cristina Becchio, Stefano P. Corgnati</i>	
INTEGRATED SMART SYSTEM FOR ENERGY AUDIT: METHODOLOGY AND APPLICATION	231
<i>Lorenzo Belussi, Ludovico Danza, Francesco Salamone, Italo Meroni, S. Galli, Sandra Dei Svaldi</i>	
ENERGY SAVING CONCEPT DEVELOPMENT FOR THE MORE-CONNECT PILOT ENERGY RENOVATION OF APARTMENT BLOCKS IN DENMARK	240
<i>Ove Christen Mørck</i>	
CRITICALITIES IN THE NZEB RETROFIT OF SCHOLASTIC BUILDINGS: ANALYSIS OF A SECONDARY SCHOOL IN CENTRE ITALY	252
<i>Daniele Testi, Michele Rocca, Elena Menchetti, Simona Comelato</i>	
INFLUENCE OF COMFORT EXPECTATIONS ON BUILDING ENERGY NEED	265
<i>Francesco Madonna, Pietro Quaglia, Vincenzo Corrado, Lorenzo Croci</i>	
PROPOSAL OF A METHODOLOGY FOR ACHIEVING A LEED O+M CERTIFICATION IN HISTORIC BUILDINGS	277
<i>E. Mazzola, T. Dalla Mora, F. Peron, P. Romagnoni</i>	
COST-OPTIMAL MEASURES FOR RENOVATION OF EXISTING SCHOOL BUILDINGS TOWARDS NZEB	288
<i>T. Dalla Mora, A. Righi, F. Peron, P. Romagnoni</i>	
APPLICATIONS OF AN INTEGRATED DESIGN METHODOLOGY FOR REGENERATIVE PROCESS OF THE EXISTING BUILDINGS	303
<i>Renata Morbiducci, Clara Vite</i>	
COST-OPTIMAL APPROACH TO TRANSFORM THE PUBLIC BUILDINGS INTO NZEBs: AN EUROPEAN CROSS-COUNTRY COMPARISON	314
<i>Simona Paduos, Vincenzo Corrado</i>	
A NEW PROCEDURE OF ENERGY AUDIT AND COST ANALYSIS FOR THE TRANSFORMATION OF A SCHOOL INTO A NEARLY ZERO-ENERGY BUILDING	325
<i>Vincenzo Corrado, Ilaria Ballarini, Simona Paduos, Lidia Tulipano</i>	
THE INFLUENCE OF DAYLIGHTING IN BUILDINGS WITH PARAMETERS NZEB: APPLICATION TO THE CASE STUDY FOR AN OFFICE IN TUSCANY MEDITERRANEAN AREA	339
<i>Cristina Carletti, Gianfranco Cellai, Leone Pierangioli, Fabio Sciarpi, Simone Secchi</i>	
HOW TO CONTROL THE INDOOR ENVIRONMENTAL QUALITY THROUGH THE USE OF THE DO-IT-YOURSELF APPROACH AND NEW PERVASIVE TECHNOLOGIES	351
<i>Francesco Salamone, Lorenzo Belussi, Ludovico Danza, Matteo Ghellere, Italo Meroni</i>	
ENERGY SAVING POTENTIAL WITH A DOUBLE-SKIN ROOF VENTILATED BY NATURAL CONVECTION IN DJIBOUTI	361
<i>Abdoul Idris Omar, Joseph Virgone, Etienne Vergnault, Damien David, Abdoukader Ibrahim Idriss</i>	
AN ADAPTIVE NEURAL NETWORK MODEL FOR THERMAL CHARACTERIZATION OF BUILDING COMPONENTS	374
<i>R. Baccoli, L. Di Pilla, A. Frattolillo, C. C. Mastino</i>	
BUILDING MONITORING SYSTEM IN A LARGE SOCIAL HOUSING INTERVENTION IN NORTHERN ITALY	386
<i>Elisa Sirombo, Marco Filippi, Antonio Catalano, Andrea Sica</i>	
DEVELOP AND EXPERIMENTAL VALIDATION OF A MODEL FOR ENERGY RECOVERY	398
<i>Marco Tarantini, Domenico Laforgia</i>	
DUAL SOURCE SOLAR ASSISTED HEAT PUMP MODEL DEVELOPMENT, VALIDATION AND COMPARISON TO CONVENTIONAL SYSTEMS	408
<i>Lorenzo Croci, Luca Molinaroli, Pietro Quaglia</i>	
ON THE OPTIMAL MIX BETWEEN LEAD-ACID BATTERY AND THERMAL STORAGE TANK FOR PV AND HEAT PUMP SYSTEMS IN HIGH PERFORMANCE BUILDINGS	423
<i>Alessandro Prada, Elena Bee, Maurizio Grigiane, Paolo Baggio</i>	
PERFORMANCE EVALUATION OF A BUILDING INTEGRATED PHOTOVOLTAIC (BIPV) SYSTEM COMBINED WITH A WASTEWATER SOURCE HEAT PUMP (WWSHP) SYSTEM	434
<i>Mustafa Araz, Arif Hepbasli, Emrah Biyik, Mehdi Shahrestani, R. Yao, E. Essah, L. Shao, A. Oliveira, O. Ekren, Hüseyin Günerhan</i>	

MODELLING AND CONTROL OF A FREE COOLING SYSTEM FOR DATA CENTERS	447
<i>Alessandro Beghi, Luca Cecchinato, Giuseppe Dalla Mana, Michele Lionello, M. Rampazzo, Enrico Sisti</i>	
EXPERIMENTAL INVESTIGATIONS ON EVAPORATIVE CONDENSERS PERFORMANCE	458
<i>Maria Fiorentino, Giuseppe Starace</i>	
INDIRECT EVAPORATIVE COOLING SYSTEMS: AN EXPERIMENTAL ANALYSIS IN SUMMER CONDITION	467
<i>Stefano De Antonellis, Cesare Maria Joppolo, Calogero Leone, Paolo Liberati, Samanta Milani</i>	
INDIRECT EVAPORATIVE COOLING SYSTEMS: MODELLING AND PERFORMANCE ANALYSIS	475
<i>Paolo Liberati, Stefano De Antonellis, Calogero Leone, Cesare Maria Joppolo, Yakub Bawa</i>	
LIFE CYCLE ENERGY PERFORMANCES OF A NET ZERO ENERGY PREFABRICATED BUILDING IN SICILY	486
<i>Giovanni Tumminia, Francesco Guarino, Sonia Longo, Marina Mistretta, M. Cellura, D. Aloisio, Vincenzo Antonucci</i>	
RETROFITTING UNDER PROTECTION CONSTRAINTS ACCORDING TO THE NEARLY ZERO ENERGY BUILDING (NZEB) TARGET: THE CASE OF AN ITALIAN CULTURAL HERITAGE'S SCHOOL BUILDING.	495
<i>Simone Ferrari, Carlo Romeo</i>	
Author Index	