

The 6th AIGE/IIETA International Conference and 15th AIGE 2021 Conference

on "Energy Conversion, Management, Recovery, Saving, Storage
and Renewable Systems" will be held in
Ancona, Italy on July 8 – 9, 2021

**6th AIGE
IIETA**
International Conference

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15th AIGE
Conference



**8 - 9
July 2021
ANCONA**

**Energy Conversion,
Management, Recovery,
Saving, Storage and
Renewable Systems**

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"ANCONA" opera di Andrea Agostini





UNIVERSITÀ
POLITECNICA
DELLE MARCHE



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CONFERENCE PROGRAM

JULY, 8 2021

9:00 – 9:30 Registration at Conference Desk

9:30 – 10:00 Opening Cerimony

10:00 – 10:40 Keynote Lecture: “A Flash in History and Current Challanges for Nuclear Technology”, Prof. Francesco D’Auria, University of Pisa

10:40 – 11:00 Coffee Break

11:00 – 13:00 Round Table: “New strategies for sustainable mobility and energy planning during pandemics”

13:15 – 14:30 Lunch

14:30 – 16:20 Session 1 and Session 2

16:20 – 16:35 Coffee Break

16:35 – 17:30 Session 3 and Session 4

17:45 – 19:00 AIGE Board Meeting

19:00 Bus departure from Faculty of Engineering

20:00 Bus departure from Hotels

21:00 Social Dinner

JULY, 9 2021

9:30 – 11:30 Poster Session

11:30 – 11:45 Coffee Break

11:45 – 12:30 Keynote: “Heat Pipes for Aeronautic and Aerospace Applications”, Prof. Fabio Bozzoli, University of Parma

12:30 - 13:00 Plenary talk: “New challenges in HPC and how to access to resources in Italy and Europe”, Dr Massimiliano Guarrasi, CINECA

13:15 – 14:30 Lunch

14:30 – 17:30 Session 5 and Session 6

JULY, 8 2021 (14:30 – 16:20)

SESSION1 – THERMODYNAMICS AND HEAT TRANSFER (5 papers)

Chair: prof. Dario Ambrosini, University of L'Aquila

HMT-001 Multi-scale numerical modelling for predicting thermo-physical properties of phase-change nanocomposites for cooling energy storage.

Alessandro Ribezzo, Matteo Fasano, Luca Bergamasco, Luigi Mongibello, Eliodoro Chiavazzo

HMT-002 Novel Simplified Approach for the Thermal Characterisation of Triple Tube Heat Exchangers

Pamela Vocale, Matteo Malavasi, Luca Cattani, Fabio Bozzoli, Sara Rainieri

HMT-003 Silanes and Siloxanes thermal conductivity in the liquid phase: a critical review and an improved prediction method

Giovanni Latini, Giorgio Passerini

HMT-004 Thermal behaviour of a cylindrical Li-Ion battery: a IR thermography approach

Luca Giammichele, Valerio D'Alessandro, Matteo Falone, Renato Ricci

HMT-005 Combined multi-physics and machine learning approach to forecast SEI decomposition in LIBs

Paolo De Angelis, Vitaliy Yurkiv, Pietro Asinari, Farzad Mashayek

JULY, 8 2021 (14:30 – 16:20)

SESSION 2 - ENERGY CONVERSION AND MANAGEMENT part I - (5 papers)

Chair: prof. Adriana Greco, University of Napoli "Federico II"

EC-001 Experimental assessment of an air-to-water heat pump driven by a Demand Response strategy

Gianluca Coccia, Alice Mugnini, Lorenzo Romanucci, Fabio Polonara, Alessia Arteconi

EC-002 Thermal Characterization of Different Insulating Materials via Experimental Analysis in a Guarded Hot Box

Tullio de Rubeis, Giovanni Pasqualoni, Domenica Paoletti, Dario Ambrosini

EC-003 Definition of probability that energy production differs from demand, a statistical approach.

Federico Rossi, Alberto Maria Gambell, Andrea Presciutti

EC-004 Toward the First Italian Elastocaloric Device: Projecting and Developing Steps

Luca Cirillo, Adriana Rosaria Farina, Adriana Greco, Claudia Masselli, Federico Scarpa, Luca Antonio Tagliafico

EC-005 Biorefinery via catalytic upgraded fast pyrolysis of biomass

Ferruccio Trifirò

JULY, 8 2021 (16:35 – 17:30)

SESSION 3 - RENEWABLE ENERGY (5 papers)

Chair: prof. Stefano Piva, University of Ferrara

RE-001 A Calculation Model to Estimate the Electrical Performance of a Photovoltaic Panel
Mario A. Cucumo, Vittorio Ferraro, Dimitrios Kaliakatsos, Francesco Nicoletti, Albino Gigliotti

RE-002 Correction procedures for temperature and irradiance of photovoltaic modules: determination of series resistance and temperature coefficients by means of an indoor solar flash test device
Silvia Luciani, Gianluca Coccia, Sebastiano Tomassetti, Mariano Pierantozzi, Giovanni Di Nicola

RE-003 Constant-volume vapor-liquid equilibrium for thermal energy storage: proposal of a new storage system for Concentrated Solar Power plants
Abdullah Bamoshmoosh, Gianluca Valenti

RE-004 Increasing the Sustainability of a Fruits and Vegetables Market in South of Italy through Combined Solar Power Production and Byproducts Valorization
Simone Pedrazzi, Enrico Morini, Marika Nasti, Simone Pizzileo, Alberto Muscio, Paolo Tartarini

RE-005 Opportunity for revamping/repowering of a large photovoltaic plant, a case study in Sicily
Stefano Aneli, Arena Roberta, Antonio Gagliano, Guido Sciuto

JULY, 8 2021 (16:35 – 17:30)

SESSION 4 – EFFECTS OF THE PANDEMIC ON ENERGY SYSTEMS (3 papers)

Chair: Chair: prof. Renato Ricci, Marche Polytechnic University

EP-001 The Lockdown and Smart Working Effects on Electric Energy Consumption: the Analysis for a Group of Employees
Samuele Branchetti, Carlo Petrovich, Giuseppe Nigliaccio, Fabrizio Paolucci

EP-002 Ventilation system operation to minimize the COVID-19 airborne transmission in schools
Luca Stabile, Antonio Pacitto, Giorgio Buonanno, Marco Dell'Isola

EP-003 Impact of sodium chloride crystallization on saliva droplets spreading
Valerio D'Alessandro, Matteo Falone, Luca Giammichele, Renato Ricci

JULY, 9 2021 (9:30 – 11:30)

POSTER SESSION

P-001 Interpretation of Manufacturing Sustainability-Assessment through Hybrid Exergetic and Life-Cycle Metrics

Valeria Selicati, Nicola Cardinale

P-002 Thermoeconomic analysis of Alessandria district: A case study for an engineering thermodynamic indicator for sustainability

Giulia Grisolia , Umberto Lucia

P-003 Composite Thermal Control Systems with Phase Change Material in Metal Foam for Lithium Batteries Cooling

Bernardo Buonomo, Oronzio Manca, Ferdinando Menale, Francesco Moriello, Sergio Nardini

P-004 Entropy Generation Analysis on Heat Exchanger in Aluminum Foam

Bernardo Buonomo, Anna di Pasqua, Oronzio Manca, Sergio Nappo

P-005 Analysis of the Urban Heat Island in Rome (Italy): extent and effects on the building energy performance simulations

Gabriele Battista, Luca Evangelisti, Marta Roncone, Roberto De Lieto Vollaro

P-006 Transient Simulation of a Whey Drying Plant Assisted by Solar Energy

Bernardo Buonomo, Vincenzo Ceraso, Oronzio Manca, Sergio Nardini, Renato Elpidio Plomitello, Silvio Vigna

P-007 Influence of Climatic Conditions on Dynamic Performance of Solar Hybrid Heating and Cooling Systems Integrating Seasonal Borehole Thermal Energy Storages: Application to School Buildings in the Campania Region of Italy

Antonio Rosato, Antonio Ciervo, Renata Concetta Vigliotti, Roxana Adina Toma, Rossana Pellegrino, Giovanni Ciampi, Michelangelo Scorpio, Sergio Sibilio

P-008 IWC Analysis of Turbulent Plume Fires

Francesco S. Ciani, Paolo Bonfiglio, Stefano Piva

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SESSION 5 – ENERGY IN BUILDINGS AND ENVIRONMENT (7 papers)

Chair: prof. Fabio Polonara, Marche Polytechnic University

EB-001 Selecting insulating materials for building envelope: a life cycle approach
Sonia Longo, Maurizio Cellura, Maria Anna Cusenza, Francesco Guarino, Ilaria Marotta

EB-002 Microclimatic and ventilation conditions in existing healthcare facilities. A study in the waiting room-testing centre of a Florentine historic hospital
Carla Balocco, Gerardo Lorenzo Petrone

EB-003 Hygrothermal analysis of CLT-based retrofit strategy of existing wall assemblies according to EN 13788 Standard
Vincenzo Costanzo, Gianpiero Evola, Antonio Gagliano, Luigi Marletta, Francesco Nocera

EB-004 CFD Modelling of Naturally Ventilated Double Skin Façades: Comparisons among 2D and 3D Models
Camilla Lops, Nicola Germano, Sabino Matera, Valerio D’Alessandro and Sergio Montelpare

EB-005 Use of an outdoor swimming pool as seasonal heat source in heat pump application
Giuseppe Emmi, Alessia Natali, Silvia Cesari, Patrizio Fausti, Michele Bottarelli

EB-006 Improving the passive energy performance of the buildings’ envelope in the Southern European area: a study on the integration of a tensile material
Giovanni Ciampi, Yorgos Spanodimitriou, Niloufar Mokhtaru, Michelangelo Scorpio, Antonio Rosato, Manuela Almeida, Sergio Sibilio

EB-007 Numerical analysis of the performance of an innovative daylighting system named Modified Double Light Pipe.
P. Zazzini, A. Di Crescenzo, R. Giammichele

EB-008 How to improve the liveability in cities: the effect of urban morphology and greening on outdoor thermal comfort
Guglielmina Mutani, Valeria Todeschi, Simone Beltramino

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SESSION 6 - ENERGY CONVERSION AND MANAGEMENT part II – (8 papers)

Chair: prof. Giorgio Pagliarini, University of Parma

EC-006 Variable-load heat pumps: impact of the design and control parameters on the actual operation conditions
Alice Mugnini, Gianluca Coccia, Fabio Polonara, Alessia Arteconi

EC-007 On the effect of complex permeability and thermal material properties for 3D-CFD simulation of PEM fuel cells

Alessandro d'Adamo, Giuseppe Corda, Stefano Fontanesi, Massimo Borghi

EC-008 CFD-based Safety Assessment of a Novel Concept of a CNG Ship

Andrea Greppi, Luca Battaglia, Alberto Clarich, Rosario Russo, Zhongli Wen, Enrico Nobile

EC-009 Preliminary Numerical Investigation on the optimization of a single bunch of elastocaloric elements to be employed in an experimental device

L. Cirillo, A.R. Farina, A. Greco, C. Masselli

EC-010 Application of the ITS-UCD Model for the Assessment of CO₂ Compression and Transport Costs for the Simeri Crichi - Botricello1 Route in a Theoretical CCS Retrofit Project of the Simeri Crichi Thermal Power Plant

Luca Rosati, Angelo Spina, Fedora Quattrocchi

EC-011 A methodology for assessing environmental benefits from LNG transition: the case of Regione Sardegna.

Davide Borrelli, Francesco Devia, Corrado Schenone, Federico Silenzi, Federico Sollai, and Luca A. Tagliafico

EC-012 Design, assembly and testing of a mobile laboratory based on a VTOL scale motor glider

Marco Ottaviani, Luca Giammichele, Renato Ricci

EC-013 The evaluation of energy efficiency policies in the building sector: a regional analysis based on the Stochastic Frontier Approach and on the Energy Environmental Kuznets Curve (EKC) and policy implications.

Pietro Falconi