

THE 25th INTERNATIONAL CONFERENCE ON
efficiency, cost, optimization and simulation
of energy conversion systems and processes



Perugia June 26th 29th, 2012

ECOS
2012



JUNE 26

opening ceremony

GENERAL INFORMATION

On our website, we read that "ECOS is a series of international conferences that focus on all aspects of Thermal Sciences, with particular emphasis on Thermodynamics and its applications in energy conversion systems and processes". Well, ECOS is much more than that, and its history proves it!

The idea of starting a series of such conferences was put forth at an informal meeting of the Advanced Energy Systems Division of the American Society of Mechanical Engineers (ASME) at the November 1985 Winter Annual Meeting (WAM), in Miami Beach, Florida, then chaired by Richard Gaggioli. The resolution was to organize an annual Symposium on the Analysis and Design of Thermal Systems at each ASME WAM, and to try to involve a larger number of scientists and engineers worldwide by organizing conferences outside of the United States. Besides Rich other participants were Ozer Arnas, Adrian Bejan, Yehia El-Sayed, Robert Evans, Francis Huang, Mike Moran, Gordon Reistad, Enrico Sciubba and George Tsatsaronis.

Ever since 1985, a Symposium of 8-16 sessions has been organized by the Systems Analysis Technical Committee every year, at the ASME Winter Annual Meeting (now ASME-IMECE). The first overseas conference took place in Rome, twenty-five years ago (in July 1987), with the support of the U.S. National Science Foundation and of the Italian National Research Council. The name ECOS was used for the first time in Zaragoza, in 1992: it is an acronym for **Efficiency, Cost, Optimization and Simulation** (of energy conversion systems and processes), keywords that best describe the contents of the presentations and discussions taking place in these conferences. Some years ago, Christos Frangopoulos inserted in the official website the note that "ècos" (**οίκος**) means "home" in Greek and it ought to be attributed the very same meaning as the prefix "Eco-" in environmental sciences.

The last 25 years have witnessed an almost incredible growth of the ECOS community: more and more Colleagues are actively participating in our meetings, several international Journals routinely publish selected papers from our Proceedings, fruitful interdisciplinary and international cooperation projects have blossomed from our meetings. Meetings that have spanned three continents (Africa and Australia ought to be our next targets, perhaps!) and influenced in a way or another much of modern Engineering Thermodynamics. In this spirit, we welcome you in Perugia, and wish you a scientifically stimulating, touristically interesting, and culinarily rewarding experience. In line with our 25 years old scientific excellency and friendship!

Umberto Desideri, Giampaolo Manfrida, Enrico Sciubba

26 June 2012 h. 9:30-12:30
SALA DEI NOTARI – PERUGIA CITY HALL

Chair Prof. Umberto Desideri - University of Perugia

Greetings: Mr. Silvano Rometti
Minister of the Environment of the Umbria Region
Prof. Francesco Bistoni
Rector of the University of Perugia
Prof. Gianni Bidini
Dean of the School of Engineering of the University of Perugia

Welcome address from the Conference Chair: Prof. **Umberto Desideri**

Keynote speeches: Dr. Sebastiano Serra
Head of Secretariat - Italian Ministry for the Environment and Territory and Sea
Prof. Maurizio Cumo
"Sapienza" University of Rome
Prof. Carlo Andrea Bollino
University of Perugia

Closing remarks: Mrs. Lorena Pesaresi
Deputy Chief of Energy Policy of the City of Perugia



JUNE 26

room: sax

Session: THERMOECONOMIC ANALYSIS OF RENEWABLE ENERGY SOURCES

Session Chair: George Tsatsaronis - TU-Berlin, Germany

14.30 - 16.00

Wojciech Stanek, Lucyna Czarnowska, Jacek Kalina:

Thermo-Ecological Evaluation of Biomass Integrated Gasification Combined Cycle Cogeneration Plant

Duccio Tempesti, Daniele Fiaschi, Filippo Gabuzzini:

Thermo-economic assessment of a micro CHP systems fuelled by geothermal and solar energy

Emanuela Peduzzi, Laurence Tock, Guillaume Boissonnet, François Marechal:

Thermo-economic evaluation and optimization of the thermochemical conversion of biomass into methanol

Elizabeth Cortés Rodríguez, Felipe de Jesús Ojeda Cámara, Isaac Pilatowsky Figueroa:

Thermoeconomic analysis and optimization of a hybrid solar-electric heating in a fluidized bed dryer

Massimo Rivarolo, Andrea Greco, Francesca Travi, Aristide Fausto Massardo:

Influence of renewable generators on the thermo-economic multi-level optimization of a poly-generation smart grid

Session: THERMOECONOMIC ANALYSIS OF POWER PLANTS

Session Chair: Andrea Lazzaretto - University of Padua, Italy

16.30 - 18.00

Daniel Czaja, Sebastian Lepszy, Tadeusz Chmielniak:

Thermodynamic and economic comparison analysis of combined gas-steam and Gas Turbine Air Bottoming Cycle

Philipp Habl, Ana M. Blanco-Marigorta, Berit Erlach:

AExergoeconomic comparison of wet and dry cooling technologies for the Rankine cycle of a thermal power plant

Ireneusz Szczygieł, Wojciech Stanek, Lucyna Czarnowska, Marek Rojczyk:

Thermo-Ecological optimization of heat exchanger with application of empirical modelling

Elizabeth Cortes, Jose Castilla, Claudia Ruiz, Wilfrido Rivera:

Thermoeconomic analysis and optimization in a combined cycle power plant including a heat transformer for energy saving

S. Khamis Abadi, Mohammad Hasan Khoshgoftar Manesh, M. Baghestani, H. Ghalami, M. Amidpour:

Comparison of Nuclear and Conventional Steam Power Plants through Energy Level and Exergoeconomic



JUNE 26

room: trumpet 3

Session: PROCESS INTEGRATION FOR ENERGY SAVING

Session Chair: Jiri Klemes - University of Pannonia, Hungary

14.30 - 16.00

Jiri Jaromír Klemeš, Andreja Nemet, Petar Sabev Varbanov, Zdravko Kravanja:

Maximising the Use of Renewables with Variable Availability

Philip Voll, Carsten Klaffke, Maike Hennen, André Bardow:

Automated Superstructure Generation and Optimization of Distributed Energy Supply Systems

Alexandros Arsalis:

Design, modeling and optimization of a 1 kWe PBI-based micro- CHP system using process integration techniques

Anna Volkova, Vladislav Mashatin, Aleksander Hlebnikov, Andres Siirde:

Methodology for optimisation of large district heating network

M. H. Khoshgoftar Manesh, S. Khamis Abadi, H. Ghalami, M. Amidpour:

Retrofit of Site Utility System Using Process Integration Techniques and Exergoeconomic Optimization

Session: PROCESS INTEGRATION IN INDUSTRIAL PROCESSES

Session Chair: Monica Carvalho - Laurentian University, Canada

16.30 - 18.00

Maria Luiza Grillo Renó, Rogério José da Silva, Mirian de Lourdes Noronha Motta Melo,

José Joaquim Conceição Soares Santos:

A multiple-objective stochastic optimization technique for co-processing in the cement production

Monica Carvalho, Dean Lee Millar: **Optimal Mine Site Energy Supply**

John Jairo Ortiz, Juan Camilo González, Jorge Enrique Preciado, Rocío Sierra, Gerardo Gordillo:

Modelling to estimate Synthesis Gas Production from Steam Oxygen Gasification of Colombian Bituminous Coal using Aspen Plus®

René Cornelissen, Geert van Rens, Jos Sentjens, Henk Akse, Ton Backx, Arjan van der Weiden, Jo Vandenbroucke:

The integral approach, a new method for industrial energy saving

Johanna Jönsson, Karin Pettersson, Simon Harvey, Thore Berntsson:

**Comparison of options for debottlenecking the recovery boiler at kraft pulp mills
Economic performance and CO2 emissions**



JUNE 26

room: trumpet 1

Session: NOVEL COMBUSTION TECHNOLOGIES IN INDUSTRY

Session Chair: Zornitza Kirova-Yordanova - Burgas Prof. Assen Zlatarov University, Bulgaria

14.30 - 15.30

Martin Halmann, Aldo Steinfeld, Michael Epstein, Enrico Guglielmini, Irina Vishnevetsky:
Vacuum Carbothermic Reduction of Alumina

Jörg Leicher, Anne Giese:
Flameless Oxidation as a Means to Reduce NO_x Emissions in Glass Melting Furnaces

Joern Benthin, Anne Giese:
Development of a concept for efficiency improvement and decreased NO_x production for natural gas-fired glass melting furnaces by switching to a propane exhaust gas fired process

Session: NOVEL COMBUSTION TECHNOLOGIES FOR POWER GENERATION

16.30 - 17.50

Haftor Orn Sigurdsson, Søren Knudsen Kær:
Methane steam reforming over nickel based wire-mesh catalyst in single channel reformer for small scale hydrogen production

Borivoj Stepanov, Ivan Pešenjanski, Biljana Miljković:
Baffle as a cost-effective design improvement for volatile combustion rate increase in biomass boilers of simple construction

Vincenzo Moccia, Jacopo D'Alessio:
Characterization of CH₄-H₂-air mixtures in the high-pressure DHARMA reactor

Fagner Luis Goulart Dias, Marco Antonio Rosa do Nascimento, Lucilene de Oliveira Rodrigues:
Analysis of reference area in the thermal behavior of flame in a gas turbine tubular combustion chamber of 600kW, burning natural gas



JUNE 26

room: piano

Session: RESOURCES, MATERIALS AND WASTES

Session Chair: Enrico Sciubba - University of Rome "La Sapienza", Italy

14.30 - 15.50

Alicia Valero Delgado, Sergio Usón Gil, Jorge Costa Sorolla:
Exergy analysis of the industrial symbiosis model in Kalundborg

Alicia Valero Delgado, Antonio Valero:
What is the cost of losing irreversibly the mineral capital on Earth?

Adriana Domínguez, Alicia Valero, Antonio Valero, Gavin Mudd:
Global gold mining: is technological learning overcoming the declining in ore grades ?

Richard A Gaggioli:
The Dead State

Session: IMPACT OF MAN AND TRANSPORTATION MEANS

Session Chair: Stefan Goessling-Reisemann - Universitaet Bremen, Germany

16.30 - 18.00

Candeniz Seckin, Enrico Sciubba, Ahmet Rasit Bayulken:
Resource Use Evaluation of Turkish transportation Sector via Extended Exergy Accounting Method

Asfaw Beyene, David MacPhee, Ron Zevenhoven:
Anthropogenic Heat and Exergy Balance of the Atmosphere

Carlos Eduardo Keutenedjian Mady, Cyro Albuquerque Neto, Tiago Lazzaretti Fernandes, Arnaldo Jose Hernandez, Paulo Hilário Nascimento Saldiva, Jurandir Itizo Yanagihara, Silvio Oliveira Junior:
Exergy based indicators for cardiopulmonary exercise test evaluation

Carlos Eduardo Keutenedjian Mady, Silvio Oliveira Junior:
Human body exergy metabolism

Matteo Muratori, Emmanuele Serra, Vincenzo Marano, Michael Moran:
Personal Transportation Energy Consumption



JUNE 26

room: cool jazz

Session: FLUID PROPERTIES

Session Chair: Daniele Fiaschi - University of Florence, Italy

14.30 - 15.50

Giovanni Manente, Andrea Lazzaretto:

Compressibility factor as evaluation parameter of expansion processes in Organic Rankine Cycles

Alejandro Moreau, José Juan Segovia, M. Carmen Martín, Miguel Ángel Villamañán, César R. Chamorro, Rosa M. Villamañán: **Excess Enthalpies of Second Generation Biofuels**

Ricardo Richard Páez-Hernández, Pedro Portillo-Díaz, Delfino Ladino-Luna, Marco Antonio Barranco-Jiménez: **Local stability analysis of a Curzon-Ahlborn engine considering the van der Waals equation state in the maximum ecological regime**

M. Aslam Siddiqi, Burak Atakan:

Binary Alkane Mixtures as Fluids in Rankine Cycles

Session: INNOVATION IN THERMODYNAMICS

Session Chair: Ozer Arnas - United States Military Academy at West Point, USA

16.30 - 17.50

Federico Fionelli, Giovanni Molinari:

Argon-Steam closed gas cycle

Andrej Kitanovski, Jaka Tusek, Alojz Poredos:

The magnetocaloric energy conversion

Hu Lin, Hongguang Jin, Lin Gao, Rumou Li:

A novel polygeneration system for methanol and power production based on coke oven gas and coal-based syngas

Julian Gonzalez Ayala, Fernando Angulo-Brown:

Some Remarks on the Carnot's Theorem





JUNE 27

room: sax

Session: THERMOECONOMIC ANALYSIS OF CHP SYSTEMS

Session Chair: Andrea Toffolo - Lulea University of Technology, Sweden

9.00 - 10.30

Audrius Bagdanavicius, Nick Jenkins, Robert Sansom, Goran Strbac:

Economic and exergoeconomic analysis of micro GT and ORC cogeneration systems

Marouf Pirouti, Audrius Bagdanavicius, Jianzhong Wu, Janaka Ekanayake:

Optimization of the supply temperature along with mass flow rate for a district heating system

Akira Yoshida, Yoshiharu Amano, Noboru Murata, Koichi Ito, Takumi Hashizume:

A comparison of optimal operation of residential energy systems using clustered demand patterns based on Kullback-Leibler divergence

Dario Buoro, Melchiorre Casisi, Alberto de Nardi, Piero Pinamonti, Mauro Reini:

Multicriteria optimization of a distributed trigeneration system in an industrial area

Vittorio Verda, Albana Kona: **Thermoeconomic approach for the analysis of low temperature district heating systems**

Session: EXERGY AND ENVIRONMENTAL ANALYSIS

Session Chair: Noam Lior - University of Pennsylvania, USA

11.00 - 12.40

Sergio Usón, Antonio Valero, Alicia Valero, Jorge Costa:

Thermoeconomic Fuel Impact Approach for Assessing Resources Savings in Industrial Symbiosis. Application to Kalundborg Eco-Industrial Park

Javier Uche Marcuello, Amaya Martínez Gracia, Beatriz Carrasquer Álvarez, Antonio Valero:

Advances in the distribution of environmental cost of water bodies through the Exergy concept in the Ebro river

Fontina Petrakopoulou, Yolanda Lara, Tatiana Morosuk, Alicia Boyano, George Tsatsaronis:

The relationship between costs and environmental impacts in power plants: an exergy-based study

Tatiana Morosuk, George Tsatsaronis, Christopher Koroneos:

On the effect of eco-indicator selection on the conclusions obtained from an exergoenvironmental analysis

David C Bligh, V. Ismet Ugursal:

Extended Exergy Analysis of the Economy of Nova Scotia, Canada



JUNE 27

room: sax

Session: GENERAL THERMOECONOMIC THEORY

Session Chair: Jens Buchgeister - Karlsruhe Institute of Technology, Germany

14.30 - 16.00

Cesar Torres, Antonio Valero: **The Fuel Impact Formula Revisited**

Ryohei Yokoyama, Shuhei Ose:

Optimization of Energy Supply Systems in Consideration of Hierarchical Relationship Between Design and Operation

José Joaquim Conceição Soares Santos, Atilio Lourenço, Julio Mendes da Silva,

João Donatelli, José Escobar Palacio:

Exergy disaggregation as an alternative for system disaggregation in thermoeconomics

Abraham Olivares-Arriaga, Alejandro Zaleta-Aguilar, Rangel-Hernández V. H, Juan Manuel Belman-Flores:

Exergoeconomic Diagnosis. A Thermo-characterization Method by using Irreversibility Analysis

Marco A. Barranco-Jiménez, Norma Sánchez-Salas, Israel Reyes-Ramírez, Lev Guzmán-Vargas:

Local stability analysis of a thermoeconomic model of an irreversible heat engine working at different criteria of performance

Session: THERMOECONOMIC ANALYSIS OF ADVANCED ENERGY SYSTEMS

Session Chair: Richard Gaggioli - Marquette University, USA

16.30 - 18.00

George G. Dimopoulos, Chariklia A. Georgopoulou, Nikolaos M.P. Kakalis: **The introduction of exergy analysis to the thermo-economic modelling and optimisation of a marine combined cycle system**

Siron Kemble, Giampaolo Manfrida, Adriano Milazzo, Francesco Buffa:

Thermoeconomics of a ground-based CAES plant for peak-load energy production

Guillaume Becquin, Sebastian Freund:

Comparative Performance of Advanced Power Cycles for Low Temperature Heat Sources

Atilio Barbosa Lourenço, José Joaquim Conceição Soares Santos, João Luiz Marcon Donatelli:

Application of an alternative thermoeconomic approach to a two-stage vapor compression refrigeration cycle with intercooling

Cesar Adolfo Rodriguez Sotomonte, Carlos Eymel Campos, Marcio Leme, Electo Silva Lora, Osvaldo José Venturini:

Thermoeconomic analysis of organic Rankine cycle cogeneration for isolated regions in Brasil



JUNE 27

room: trumpet3



JUNE 27

room: trumpet3

Session: LOW TEMPERATURE SOLAR THERMAL SYSTEMS

Session Chair: Francesco Calise - University of Naples "Federico II", Italy

9.00 - 10.30

Guillaume Anies, Pascal Stouffs, Jean Castaing-Lasvignottes:

Modeling and experimental validation of a solar cooling installation

Daniele Fiaschi, Giampaolo Manfrida:

Model of vacuum glass heat pipe solar collectors

Renzo Tosato, Anna Stoppato:

Energy saving by a simple solar collector with reflective panels and boiler

Soteris A. Kalogirou:

Exergy Analysis and Genetic Algorithms for the Optimization of Flat-Plate Solar Collectors

Gianfranco Rizzo:

A model for simulation and optimal design of a solar heating system with seasonal storage

Session: CSP

Session Chair: Ana M. Blanco-Marigorta - Universidad de Las Palmas de Gran Canaria, Spain

11.00 - 12.20

Alessandro Corsini, Domenico Borello, Franco Rispoli, Eileen Tortora:

A small-size renewable co-powered CSP system for electric and thermal power load matching and water desalting

Wattana Ratismith, Anusorn Inthongkhum:

A Novel Non-Tracking Solar Collector for High Temperature Application

Fouad Khaldi:

Energy and exergy analysis of the first hybrid solar-gas power plant in Algeria

Mohammad Zamen, M. Amidpour, S.M. Soufari:

Theoretical and Experimental Study of Multi-Stage Solar Humidification-Dhumidification Desalination Process

Session: NOVEL CONCEPTS FOR SOLAR ENERGY UTILIZATION

Session Chair: David Chiaramonti - University of Florence, Italy

14.30 - 16.00

Noam Lior: **Mirrors in the sky: status and some supporting materials experiments**

Kim Trapani, Dean Lee Millar:

Proposing Floating Offshore Photovoltaic (PV) Technology to the Energy Mix of the Maltese Islands

Maxime Perier-Muzet, Pascal Stouffs, Jean-Pierre Bedecarrats, Jean Castaing-Lasvignottes: **Numerical parametric study for different cold storage designs and strategies of a solar driven thermoacoustic cooler system**

Yuanyuan Li, Na Zhang, Ruixian Cai:

Low CO2 emission hybrid solar CC power system

Lucía Mónica Gutiérrez, P. Quinto Díez, L. R. Tovar Gálvez:

Design of Solar Heating System for Methane Generation

Session: PV SYSTEMS

Session Chair: Jim McGovern - Dublin Institute of Technology, Ireland

16.30 - 18.00

Francesco Calise, Laura Vanoli: **High Temperature Parabolic Trough Photovoltaic/ Thermal Collectors for Solar Heating and Cooling Systems: dynamic simulation and economic assessment**

Riccardo Secchi, Duccio Tempesti: **PV module cooled by air: evaluation of the influence of the back surface roughness on the annual performance**

Matteo Bosi, Claudio Ferrari, Francesco Melino, Michele Pinelli, Pier Ruggero Spina, Mauro Venturini:

Thermophotovoltaic Generation: A state of the art review

Francesco Calise, Laura Vanoli:

Design and Simulation of a Novel Concentrating Parabolic Trough Photovoltaic/ Thermal Collector

Elisa Moretti, Paolo Fratini, Elisa Belloni:

Energy and economic evaluation of solar photovoltaics plants: influence of different input parameters



JUNE 27

room: trumpet 1

Session: NOVEL CONCEPTS FOR CCS

Session Chair: Giuseppe Girardi - ENEA, Italy

9.00 - 10.30

Sheng Li, Hongguang Jin, Lin Gao:

A novel coal-based polygeneration system cogenerating power, natural gas and liquid fuel with CO2 capture

Antonio Calabrò, Stefano Cassani, Leandro Pagliari, Stefano Stendardo:

Project commissioning of the ZECOMIX experimental platform

Surekha Gunasekaran, Nicholas David Mancini, Alexander Mitsos:

Design and Optimization of ITM Oxy-combustion power plant

Konstantinos Atsonios, Kyriakos D. Panopoulos, Angelos Doukelis, Antonis Koumanakos, Emmanuel Kakaras:

Cryogenic Method H2 and CH4 recovery from a rich CO2 stream in pre-combustion CCS schemes

Beatrice Castellani, Mirko Filippini, Sara Rinaldi, Federico Rossi:

Capture of carbon dioxide using gas hydrate technology

Session: CARBON CAPTURE BY MINERALISATION

Session Chair: Ron Zevenhoeven - Åbo Akademi University, Finland

11.00 - 12.40

Hannu-Petteri Mattila, Inga Grigaliūnaitė, Arshe Said, Sami Filppula, Carl-Johan Fogelholm, Ron Zevenhoven:

Process efficiency and optimization of precipitated calcium carbonate (PCC) production from steel converter slag

Stefano Stendardo, Antonio Calabrò: Influence of regeneration condition on cyclic CO2 capture using pre-treated dispersed CaO as high temperature sorbent

Inês Sofia Soares Romão, Matias Eriksson, Experience Nduagu, Johan Fagerlund, Licínio Manuel Gando-Ferreira, Ron Zevenhoven: Carbon dioxide storage by mineralisation applied to an industrial-scale lime kiln

Experience Ikechukwu Nduagu, Inês Romão, Ron Zevenhoven:

Production of Mg(OH)2 for CO2 Emissions Removal Applications: Parametric and Process Evaluation

Felice Alfieri, Peter J Gunning, Michela Gallo, Adriana Del Borghi, Colin D Hills:

Monitoring of carbon dioxide uptake in accelerated carbonation processes applied to air pollution control residues



JUNE 27

room: trumpet 1

Session: OXY-COMBUSTION FOR CCS

Session Chair: Na Zhang - Chinese Academy of Sciences, China

14.30 - 16.00

Marco Gambini, Michela Vellini:

Oxy-combustion for CO2 capture in advanced power plants fed by coal

Janusz Kotowicz, Sebastian Stanisław Michalski:

Thermodynamic analysis of a supercritical power plant with oxy type pulverized fuel boiler, carbon dioxide capture system (CC) and four-end high temperature membrane air separator

Janusz Kotowicz, Sebastian Stanisław Michalski:

Analysis of four-end high temperature membrane air separator in a supercritical power plant with oxy-type pulverized fuel boiler

Janusz Kotowicz, Adrian Balicki:

Method to increase the efficiency of supercritical coal-fired power plant with oxy-type fluidized bed boiler and high-temperature three - end membrane for air separation

Marcin Liszka, Jakub Tuka, Grzegorz Nowak, Grzegorz Szapajko:

Analysis of potential improvements to the lignite-fired oxy-fuel power unit

Session: PRE- AND POST-COMBUSTION CCS

Session Chair: Michela Gallo - University of Genoa, Italy

16.30 - 17.58

Ron Zevenhoven, Johan Fagerlund, Thomas Björklöf, Magdalena Mäkelä, Olav Eklund:

Carbon dioxide mineralisation and integration with flue gas desulphurisation applied to a modern coal-fired power plant

Piotr Henryk Lukowicz, Lukasz Bartela:

Concept of a "capture ready" combined heat and power plant

Marcin Liszka, Tomasz Malik, Michał Budnik, Andrzej Ziębik:

Comparison of IGCC and CFB cogeneration plants equipped with CO2 removal

Gang Xu, Yongping Yang, Shoucheng Li, Wenyi Liu and Ying Wu:

Analysis and Optimization of CO2 Capture in a China 's Existing Coal-fired Power Plant



JUNE 27

room: piano



JUNE 27

room: piano

Session: IMPACT OF POWER GENERATION AND USE OF ENERGY SOURCES

9.00 - 10.20

Lydia Stougie, Hedzer van der Kooi, Rob Stikkelman:

Electricity production from renewable and non-renewable energy sources: a comparison of environmental, economic and social sustainability indicators with exergy losses throughout the supply chain

Ruben Laleman, Ludovico Balduccio, Johan Albrecht:

The role of biomass in the renewable energy system

Thomas Bloethe, Stefan Goessling-Reisemann:

Low Exergy Solutions as a contribution to climate adapted and resilient power supply

Holger Schlör, Wolfgang Fischer, Jürgen-Friedrich Hake:

The impact of higher energy prices on socio-economic inequalities of German social groups

Session: BUILDING ENVELOPE DESIGN AND OPTIMIZATION

Session Chair: Claudia Toro - University of Rome "La Sapienza", Italy

11.0 - 13.00

Livia Arcioni, Umberto Desideri, Daniela Leonardi:

Analysis of different typologies of natural insulation materials with economic and performances evaluation of the same buildings

Milorad Bojić, Marko Miletić, Vesna Marjanović, Danijela Nikolić, Jasmina Skerlić:

Optimization of thermal insulation to save energy in buildings

Cinzia Buratti, Elisa Moretti, Elisa Belloni:

The influence of glazing systems on energy performance and thermal comfort in non-residential buildings

Alexandre Hugo and Radu Zmeureanu:

Residential solar-based seasonal thermal storage system in cold climate: building envelope and thermal storage

Christos Tzivanidis, Kimon Antonopoulos, Eleutherios Kravvaritis: **Effects of insulation and phase change materials (PCM) combinations on the energy consumption for buildings indoor thermal comfort**

Christos Tzivanidis, Kimon Antonopoulos, Foteini Gioti: **Adjustment of envelopes characteristics to climatic conditions for saving heating and cooling energy in buildings**

Session: DESIGN OF LOW ENERGY CONSUMPTION BUILDINGS

Session Chair: Abel Hernandez-Guerrero - University of Guanajuato, Mexico

14.30 - 16.00

Umberto Desideri, Livia Arcioni, Daniela Leonardi, Luca Cesaretti, Perla Perugini, Elena Agabiti, Nicola Evangelisti: **Design of a multi-purpose building "to zero energy consumption" according to European Directive 2010/31/CE: Architectural and plant solutions**

Mark Gerard Jennings, Nilay Shah, David Fisk:

Assessing financing strategy in large refurbishment/regeneration projects by use of mathematical programming

Stefania Proietti, Umberto Desideri, Paolo Sdringola, Elisa Vuillermoz:

Feasibility study and design of a low-energy residential unit in Sagarmatha Park (Nepal) for environmental impact reduction of high altitude buildings

Raul R. Flores-Rodriguez, Abel Hernandez-Guerrero, Cuauhtemoc Rubio-Arana, Consuelo A. Caldera-Briseño:

Fire and Smoke Spread in Low-Income Housing in Mexico

Keramatollah Akbari, Jafar Mahmoudi:

Numerical Simulation of Radon Transport and Impacts of Indoor Air Conditions

Session: INTEGRATION OF RENEWABLE ENERGY SYSTEMS IN BUILDINGS

Session Chair: Yong Li - Shanghai Jiaotong University, China

16.30 - 18.00

Claudia Toro, Enrico Sciubba, Marta Cianfrini: **An exergy analysis of the optimal integration of a building and its energy plant. Part 1: comparison of domestic heating systems based on renewable sources**

Eftychios Vardoulakis, Dimitrios Karamanis: **The effect of shading of building integrated photovoltaics on roof surface temperature and heat transfer in buildings**

Shu Yoshida, Koichi Ito, Yoshiharu Amano, Shintaro Ishikawa, Takahiro Sushi, Takumi Hashizume:

Effect of Initial Systems on the Renewal Planning of Energy Supply Systems for a Hospital

Y. Li, J. Xu, R. Z. Wang:

Thermal Analysis of a Greenhouse Heated by Solar Energy and Seasonal Thermal Energy Storage in Soil

Augusto Sanchez, Sergio Quezada, Tanya Moren:

Analysis of the Use Renewable Energy at Hotels of Mexico



JUNE 28

room: sax



JUNE 28

room: sax

Session: EXERGY ANALYSIS OF HEAT EXCHANGERS

Session Chair: Soteris Kalogirou - Cyprus University of Technology, Cyprus

9.00 - 10.30

Jose-Luis Zuniga-Cerroblanco, Abel Hernandez-Guerrero, Carlos A. Rubio-Jimenez, Cuauhtemoc Rubio-Arana, Sosimo E. Diaz-Mendez: **Optimization and Design of Pin-Fin Heat Sinks Based on Minimum Entropy Generation**

Adina Teodora Gheorghian, Alexandru Dobrovicescu, Bogdan Popescu, Claudia Ionita:
A comparative analysis of cryogenic recuperative heat exchangers based on exergy destruction

Jim McGovern, Georgiana Tirca-Dragomirescu, Michel Feidt, Alexandru Dobrovicescu:
A Critical Exploration of the Usefulness of Rational Efficiency as a Performance Parameter for Heat Exchangers

Giorgio Giangaspero, Enrico Sciubba:
Application of the entropy generation minimization method to a solar heat exchanger: a pseudo-optimization design process based on the analysis of the local entropy generation maps

Omer Emre Orhan, Oguz Uzol: **Comparison of entropy generation figures using entropy maps and entropy transport equation for an air cooled gas turbine blade**

Session: EXERGY ANALYSIS OF HEAT PUMPS

Session Chair: Silvio de Oliveira - University of Sao Paulo, Brazil

11.00 - 12.40

Alexandru Dobrovicescu, Ciprian Filipoiu, Emilia Cerna Mladin, Valentin Apostol, Liviu Drughean:
Comparative analysis of ammonia and carbon dioxide two-stage cycles for simultaneous cooling and heating

Torben Ommen, Brian Elmegaard:
Exergetic evaluation of heat pump booster configurations in a low temperature district heating network

Mehmet Mete Ozturk, Berrin Latife Erbay:
Performance analysis of compressor of an air source heat pump water heaters by Exergy destruction

Argyro Papadaki, Athina Stegou - Sagia:
Exergy analysis and comparison of CO2 heat pumps

Ronan Killian McGovern, Kartik Bulusu, Mohammed Antar, John H. Lienhard V:
One-dimensional Model of an Optimal Ejector and Parametric Study of Ejector Efficiency

Session: EXERGY ANALYSIS OF ENERGY SYSTEMS

Session Chair: Asfaw Beyene - San Diego State University, USA

14.30 - 16.00

Andrzej Ziębik, Paweł Gładysz:
System analysis of exergy losses in an integrated Oxy-Fuel Combustion power plant

David MacPhee, Ibrahim Dincer, Asfaw Beyene:
Energy and exergy analyses of the charging process in encapsulated ice thermal energy storage

Andrej Ljubenko, Alojz Poredoš, Tatiana Morosuk, George Tsatsaronis:
Performance analysis of a district heating system

Ligang Wang, Yongping Yang, Tatiana Morosuk, George Tsatsaronis:
Conventional and advanced exergetic evaluation of a supercritical power plant

Gabriele Casseti, Emanuela Colombo: **Comparison between Traditional Methodologies and Advanced Exergy Analyses for Evaluating Efficiency and Externalities of Energy Systems**

Session: EXERGY ANALYSIS OF INDUSTRIAL PROCESSES

Session Chair: Tatiana Morosuk - TU-Berlin, Germany

16.30 - 18.00

Julio Augusto Mendes da Silva, Maurício Sugiyama, Claudio Rucker, Silvio Oliveira J:
Exergy Intensity of Petroleum Derived Fuels

Marit Takla, Leiv Kolbeinsen, Halvard Tveit, Signe Kjelstrup:
Exergy Analysis of the Silicon Production Process

Danahe Marmolejo-Correa, Truls Gundersen:
A new procedure for the design of LNG processes by combining Exergy and Pinch Analyse

Mari Voldsund, Wei He, Audun Røsjorde, Ivar Ståle Ertesvåg, Signe Kjelstrup: **Evaluation of the Oil and Gas Processing at a Real Production day on a North Sea Oil Platform Using Exergy Analysis**

Zornitza Vassileva Kirova-Yordanova: **Energy Integration and Cogeneration in Nitrogen Fertilizers Industry: Thermodynamic Estimation of the Efficiency, Potentials, Limitations and Environmental Impact. Part 1: Energy Integration in Ammonia Production Plants**

Daniel Rønne Nielsen, Brian Elmegaard, C. Bang-Møller: **Thermodynamic Analysis of a Standard Size Brewery**



JUNE 28

room: trumpet 3

Session: BIOGAS PRODUCTION

Session Chair: **Francesco Di Maria** - University of Perugia, Italy

9.00 - 10.20

Francesco Di Maria, Giovanni Gigliotti, Alessio Sordi, Caterina Micale, Luisa Massaccesi:
Start Up of a Pre-Industrial Scale Solid State Anaerobic Digestion Cell for the Treatment of Zootechnical and Agricultural Residues

Steven MacLean, Eren Tali, Anne Giese, Jörg Leicher:
Investigations on the Use of Biogas for Small Scale Decentralized CHP Applications with a Focus on Stability and Emissions

Francesco Di Maria, Giovanni Gigliotti, Alessio Sordi, Caterina Micale, Claudia Zadra, Luisa Massaccesi:
Experimental analysis of inhibition phenomenon management for Solid Anaerobic Digestion Batch process

Francesco Zepparelli, Umberto Desideri, Livia Arcioni, Ornella Calderini, Francesco Panara:
Feasibility study to realize an anaerobic digester fed with vegetables matrices in central Italy

Session: BIOGAS UPGRADING

Session Chair: **Jean-Pierre Bédécarrats** - Université de Pau et des Pays de l'Adour, France

11.00 - 12.40

Martina Wikström, Per Alvfor:
Biogas or Electricity as Vehicle Fuels Derived from Food Waste - the Case of Stockholm

Mimmi Magnusson, Per Alvfor:
Biogas from pulping industry - potential improvement for increased biomass vehicle fuels

Lidia Lombardi, Renato Baciocchi, Ennio Antonio Carnevale, Andrea Corti, Giulia Costa, Tommaso Olivieri, Alessandro Paradisi, Daniela Zingaretti:

Investigation of an innovative process for biogas up-grading – pilot plant preliminary results

Isabella Pecorini, Tommaso Olivieri, Donata Bacchi, Alessandro Paradisi, Lidia Lombardi, Andrea Corti, Ennio Carnevale:
Evaluation of gas in an industrial anaerobic digester by means of biochemical methane potential of organic municipal solid waste components

Katherine Starr, Xavier Gabarrell Durany, Gara Villalba Mendez, Laura Talens Peiro, Lidia Lombardi:
Biogas upgrading: environmental comparison of conventional and innovative technologies



JUNE 28

room: trumpet 3

Session: BIOFUELS

Session Chair: **Silvia Azucena Nebra** - University of Campinas, Brazil

14.30 - 15.50

Matteo Prussi, David Chiaramonti, Lucia Recchia, Francesco Martelli, Fabio Guidotti:
Alternative feedstock for the biodiesel and energy production: the OVEST project

Reynaldo Palacios-Bereche, Adriano Ensinas, Marcelo Modesto, Silvia Azucena Nebra: **Ethanol production by enzymatic hydrolysis process from sugarcane biomass - the integration with the conventional process**

Alessandro Corsini, Valerio Giovannoni, Stefano Nardecchia, Franco Rispoli, Fabrizio Sciulli, Paolo Venturini:
Performances of a common-rail Diesel engine fuelled with rapeseed and waste cooking oils

Ricardo Morel Hartmann, Nury Nieto Garzón, Eduardo Morel Hartmann, Amir Antonio Martins Oliveira Jr, Edson Bazzo, Bruno Okuda, Joselia Piluski: **Vegetable Oils of Soybean, Sunflower and Tung as Alternative Fuels for Compression Ignition Engine Using Conversion Kits**

Session: BIOMASS GASIFICATION

Session Chair: **Francesco Fantozzi** - University of Perugia, Italy

16.30 - 18.00

Marta Trninic, Mirjana Stamenic, Tomislav Simonovic, Nikola Tanasic, Goran Janek: **Industrial scale demonstration plant with downdraft gasifier coupled to pebble bed regenerative heater for CHP**

Jacek Kalina:
Performance analysis of downdraft gasifier - reciprocating engine biomass fired small-scale cogeneration system

Fabrizio Strobino, Alessandro Pini Prato, Diego Ventura, Marco Damonte:
Energy recovery from MSW treatment by gasification and melting technology

Tomasz Iluk, Aleksander Sobolewski, Janusz Kotowicz:
Research of Integrated Biomass Gasification System with a Piston Engine

Sandra Yamile Giraldo, Ana Lisbeth Galindo Noguera, Rene Lesme-Jaén, Vladimir Melian Cobas, Rubenildo Viera Andrade, Electo Silva Lora:
Experimental study of tar and particles content from syngas produced in a double stage downdraft gasifier



JUNE 28

room: trumpet 1

Session: MICRO CHP SYSTEM

Session Chair: Marcin Liszka - Polytechnica Slaska, Poland

9.00 - 10.30

Giampaolo Manfrida, Giovanni Ferrara, Alessandro Pescioni:

Model of a small steam engine for renewable energy domestic CHP system

Ana C Ferreira, Manuel L Nunes, Senhorinha F Teixeira, Luís B Martins:

A Review of Stirling Engine Technologies applied to Micro-Cogeneration Systems

Qiang Chen, Jianjiao Zheng, Wei Han, Jun Sui, Hongguang Jin:

Primary energy and energy level analysis of a combined cooling, heating and power system driven by a small-scale gas turbine

Pietro Capaldi:

A natural gas fuelled 10 kW electric power unit based on a Diesel automotive internal combustion engine and suitable for cogeneration

Giovanni Cinti, Umberto Desideri, Gabriele Discepoli, Elena Sisani, Daniele Penchini:

SOFC micro-CHP integration in residential buildings

Session: ORGANIC RANKINE CYCLES

Session Chair: Giampaolo Manfrida - University of Florence, Italy

11.00 - 12.20

Sergio Usón, Wojciech Juliusz Kostowski:

Integrating an ORC into a natural gas expansion plant supplied with a co-generation unit

Markus Preißinger, Florian Heberle, Dieter Brüggeman:

Exergetic analysis of biomass fired double-stage Organic Rankine Cycle

Roberto Bracco, Stefano Clemente, Diego Micheli, Mauro Reini:

Experimental tests and dynamic modelization of a domestic-scale Organic Rankine Cycle

Giovanni Manente, Andrea Toffolo, Andrea Lazzaretto, Giovanni Manente, Marco Paci:

An Organic Rankine Cycle off-design model for the search of the optimal control strategy



JUNE 28

room: trumpet 1

Session: ENERGY SYSTEMS FOR POWER GENERATION AND INDUSTRY

Session Chair: : Renè Cornelissen - CCS Energie-Advies, The Netherlands

14.30 - 15.50

Sotirios Karellas, A.D. Leontaritis, Georgios Panousis, Evangelos Bellos, Emmanuel Kakaras:

Energetic and Exergetic analysis of waste heat recovery systems in the cement industry

Luis Enrique Acevedo, Sergio Usón, Javier Uche, Patxi Rodríguez:

Modelling and exergy analysis of a plasma furnace for aluminum melting process

Wenyi Liu, Yongping Yang, Weide Zhang, Gang Xu, and Ying Wu:

A Novel Coal-fueled Compressed Air Energy Storage System for China's Situation

Dimitrios T. Hountalas, Antonis K. Antonopoulos, Nikolaos Sakellariadis, George N. Zovanos, Efthimios G. Pariotis,

Roussos Papagiannakis: **Computational Investigation of the Effect of Ambient Conditions on the Performance of Turbocharged Large Scale Marine Diesel Engines**

Session: LOW TEMPERATURE ENERGY RECOVERY

Session Chair: Michael J. Moran - Ohio State University, USA

16.30 - 18.00

Daniele Fiaschi, Giampaolo Manfrida, Duccio Tempesti:

Using Absorption Heat Transformers (AHT) as a way to enhance low enthalpy geothermal resources

Camille Favarel, Jean-Pierre Bédécarrats, Tarik Kousksou, Daniel Champier:

The influence of operating parameters and occupancy rate of thermoelectric modules on the electricity generation

Carlos Eymel Campos Rodriguez, José Carlos Escobar Palacios, Cesar Adolfo Rodríguez Sotomonte, Marcio

Leme, Osvaldo José Venturini, Electo Eduardo Silva Lora, Vladimir Melián Cobasa, Daniel Marques dos Santos,

Fábio R. Lofrano Dotto, Vernei Gialluca:

Exergetic and economic analysis of Kalina cycle for low temperatures geothermal sources in Brazil

Jorrit Wronski, Morten Juel Skovrup, Brian Elmegaard, Harald Nes Rislå, Fredrik Haglind:

Design and Modelling of a Novel Compact Power Cycle for Low Temperature Heat Sources

Samer Maalouf, Elias Boulawz Ksayer, Denis Clodic:

Effect of auxiliary consumptions on Organic Rankine Cycle system with low temperature waste heat



room: piano

Session: FUEL CELLS

Session Chair: Umberto Desideri - University of Perugia, Italy

9.00 - 10.20

Alexandros Arsalis:

Integration of a heat pump subsystem to a residential HT-PEMFC-based fuel cell system

George G. Dimopoulos, Iason C. Stefanatos, Nikolaos M.P. Kakalis:

Exergy analysis and optimisation of a steam methane pre-reforming system

Liqiang Duan, Kexin Huang, Xiaoyuan Zhang and Yongping Yang:

Comparison Study on of different SOFC hybrid System with Zero-CO2 emission

Domenico Borello, Sara Evangelisti, Eileen Tortora:

Modelling of a CHP SOFC power system fed with biogas from anaerobic digestion of municipal wastes integrated with a solar collector and storage units

Session: SUSTAINABLE RENEWABLE ENERGY SYSTEMS

Session Chair: Christos Frangopoulos - National Technical University of Athens, Greece

11.00 - 13.00

Francesco Di Maria, Alessandro Canovai, Federico Valentini, Alessio Sordi, Caterina Micale: Energetic and Environmental Benefits from Waste Management: Experimental Analysis of the Sustainable Landfill

Alessandro Franco, Maurizio Vaccaro: Design strategy of geothermal plants for water dominant medium-low temperature reservoirs based on sustainability issues

Candeniz Seckin, Ahmet Rasit Bayulken:

Determination of environmental remediation cost of municipal waste in terms of extended exergy

Luca Valori, Giovanni Luca Giannuzzi, Tiziano Squartini, Diego Garlaschelli, Riccardo Basosi:

Complex systems approach to the Italian photovoltaic energy distribution scenario

Paula Ferreira, Jorge Cunha:

On the use of MPT to derive optimal RES electricity generation mixes

Vladimir Mijakovski, Vangelce Mitrevski, Nikola Mijakovski: Possibilities and perspectives for Utilization of Municipal Solid Waste (MSW) as Renewable Energy Source in the Republic of Macedonia



room: piano

Session: ENVIRONMENTAL ISSUES OF CONVENTIONAL ENERGY SYSTEMS

Session Chair: : Gordana Stefanović - University of Nis, Republic of Serbia

14.30 - 15.50

Goran Stupar, Dragan Tucaković, Titoslav Živanović, Miloš Banjac, Srđan Belošević, Vladimir Beljanski,

Ivan Tomanović, Nenad Crnomarković, Miroslav Sijerčić:

The Influence of Primary Measures for Reducing NOx Emissions on Energy Steam Boiler Efficiency

Fernando Ribeiro, Paula Ferreira, Madalena Araújo:

A Multi-Criteria Decision Aid (MCDA) tool for supporting electricity scenario analysis

Raksanai Nidhiritdhikrai, Bundhit Eua-arporn:

Impact of Nuclear Power Plant on Thailand Power Development Plan

Elena Poplavskaya, Valery Korobeynikov, Alexander Egorov:

Analysis of Russian nuclear energy scenarios in the context of sustainability development

Session: SUSTAINABLE CITIES AND LIVING

Session Chair: Holger Schloer - FZ Julich, Germany

16.30 - 18.00

Federico Zullo, Enrico Sciubba:

Stability and limit cycles in an exergy-based model of population dynamics

Luca Giaccone, Alessandra Guerrisi, Paolo Lazzeroni and Michele Tartaglia:

Energy Networks in Sustainable Cities: temperature and energy consumption monitoring in urban area

Gianfranco Rizzo, Giancarlo Savino:

Application of a Linear Programming model to the optimal assessment of Sustainable Energy Action Plan in the city of Salerno

Predrag M. Živković, Mladen A. Tomić, Ivan T. Cirić:

Specific system for continuous air quality monitoring of the city of Niš

Jakob Wachsmuth, Andrew Blohm, Stefan Gößling-Reisemann, Tobias Eickemeier, Rebecca Gasper, Matthias

Ruth, Sönke Stührmann: How will future energy systems be affected by climate change? – The case of a metropolitan region in Northwest Germany



JUNE 29

room: sax



JUNE 29

room: trumpet 3

Session: CONTROL AND OPERATION OF ENERGY SYSTEMS AND INDUSTRIAL PROCESSES

Session Chair: Ryohei Yokoyama - Osaka Prefecture University, Japan

8.30 - 10.00

Uroš Puc, Andreja Abina, Anton Jeglič, Pavel Cevc, Aleksander Zidanšek:
Advanced electromagnetic sensors for sustainable monitoring of industrial processes

Vojislav Filipović, Novak Nedić, Saša Prodanović:
Reduced energy cost through the furnace pressure control in power plants

Lorenzo Damiani, Giampaolo Crosa, Angela Trucco:
A control oriented simulation model of a multistage axial compressor

Anna Stoppato, Alberto Mirandola, Alberto Benato: Assessment of stresses and residual life of plant components in view of life-time extension of power plants

Nickey Van den Bulck, Mathias Coomans, Lieve Wittemans, Kris Goen, Jochen Hanssens, Kathy Steppe, Herman Marien, Johan Desmedt: Energetic evaluation of a smart controlled greenhouse for tomato cultivation

Session: CONTROL AND OPERATION OF SYSTEMS FOR HEAT AND POWER UTILIZATION IN BUILDINGS

Session Chair: Vittorio Verda - Polytechnic of Turin, Italy

10.30 - 12.10

Salvador Acha, Nilay Shah, Jon Ashford, David Penfold: Optimal Lighting Control Strategies in Supermarkets For Energy Efficiency Applications Via Digital Dimmable Technology

Liviu Ruieneanu, Mihai Paul Mircea:
Adapting the operation regimes of trigeneration systems to renewable energy systems integration

Tetsuya Wakui, Ryohei Yokoyama:
Optimal Structural Design of Residential Cogeneration Systems Considering Their Operational Restrictions

Zoi Sagia, Constantinos Rakopoulos:
Control Strategy for minimizing the electric power consumption of Hybrid Ground Source Heat Pump System

Ryohei Yokoyama, Ryosuke Kato, Tetsuya Wakui, Kazuhisa Takemura:
Performance Estimation and Optimal Operation of a CO2 Heat Pump Water Heating System

Session: ENERGY FROM WIND

Session Chair: Francesco Castellani - University of Perugia, Italy

8.30 - 9.30

Francesco Castellani, Emanuele Piccioni, Lorenzo Biondi, Marcello Marconi:
Wind energy conversion performance and atmosphere stability

Sérgio Pereira, Paula Ferreira, A. Ismael Freitas Vaz:
Short-term scheduling model for a wind-hydro-thermal electricity system

Jin Yang, B. Chen, Enrico Sciubba:
Exergy-based sustainability evaluation of a wind power generation system

Session: HEAT TRANSFER

Session Chair: Cinzia Buratti - University of Perugia, Italy

10.30 - 12.10

Efstathios E Michaelides, Zhigang Feng:
A DNS method for the particle motion and heat transfer during coal gasification

Yusuke Asakuma:
Theoretical Study for Effective Thermal Conductivity with convection and radiation in Packed Bed and Porous Material

Luciano Andrea Catalano, Riccardo Amirante, Stefano Copertino, Paolo Tamburrano, Fabio De Bellis:
Towards the development of an efficient immersed particle heat exchanger: particle transfer from low to high pressure

Adriano Sciacovelli, Vittorio Verda, Flavio Gagliardi:
Thermofluiddynamic model for control analysis of latent heat thermal storage system

Daniel Florez, Walter Arias, Diego Lopez, Hector Ivan Velasquez:
Experimental and CFD study of a single phase cone-shaped helical coiled heat exchanger: An empirical correlation

Session: STEAM GENERATORS

Session Chair: Wojciech Stanek - Silesian University of Technology, Poland

8.30 - 9.50

Sotirios Karellas, Aggelos Doukelis, Grammatiki Zannie, Emmanuel Kakaras:

Repowering of the Greek lignite Power Plants. An energetic and exergetic analysis

Raphael Miyake, Alvaro Restrepo, Fábio Kleveston Edson Bazzo, Marcelo Bzuneck:

Thermodynamic and Heat Transfer Analysis of Rice Straw Co-firing in a Brazilian Pulverised Coal Boiler

Stefano Bracco:

Dynamic simulation of combined cycles operating in transient conditions: an innovative approach to determine the steam drums life consumption.

Panagiotis Vounatsos, Konstantinos Atsonios, Mihalis Agraniotis, Kyriakos D. Panopoulos, George Koufodimos, Panagiotis Grammelis, Emmanuel Kakaras:

Characterisation and classification of Solid Recovered Fuels (SRF) and development of a novel thermal utilization concept**Session: INTERNAL COMBUSTION ENGINES**

Session Chair: Sotirios Karellas - National Technical University of Athens, Greece

10.30 - 12.10

Simona Silvia Merola, G. Valentino, C. Tornatore, L. Marchitto, F. E. Corcione:

Effects of fuel composition on combustion and emissions formation in an optical high swirl CI engine

Ezio Mancaruso, Luigi Sequino, Bianca Maria Vaglieco:

GTL and RME Combustion Analysis in a Transparent CI Engine by means of IR Digital Imaging

Zoran Stevan Jovanovic, Zoran Masonicic, Miroljub Tomic:

Some aspects concerning fluid flow and turbulence modeling in 4-valve engines

Andrea Dai Zotti, Massimo Masi, Marco Antonello:

Experimental measure and fluid-dynamics computation of in-cylinder flow in a high-speed motorbike engine

Dimitrios T. Hountalas, Georgios C. Mavropoulos, Christos Katsanos:

Efficiency optimization of a 2-stroke Diesel engine power plant from the recovery of exhaust gas energy using a Rankine cycle**Session: USING LCA TO ASSESS ENERGY SYSTEMS AND TECHNOLOGIES**

Session Chair: Riccardo Basosi - University of Siena, Italy

8.30 - 9.50

Jens Buchgeister:

Comparison of sophisticated Life Cycle Impact Assessment Methods for Assessing Environmental Impacts in a LCA Study of Electricity Production

Maria Laura Parisi, Adalgisa Sinicropi, Riccardo Basosi:

Life cycle assessment of thin film non conventional photovoltaics: the case of dye sensitized solar cellsMarcio Montagnana Vicente Leme, Mateus Henrique Rocha, Electo Eduardo Silva Lora, Osvaldo José Venturini, Bruno Marciano Lopes, Claudio Homero Ferreira: **Environmental assessment of municipal solid waste electricity recovery technologies through Life Cycle Assessment (LCA): A case study of Brazil**Carlo Strazza, Adriana Del Borghi, Michela Gallo: **Development of Product Category Rules for the application of Life Cycle Assessment to Carbon Capture and Storage****Session: SUSTAINABLE TRANSPORTATION SYSTEMS**

Session Chair: Gianfranco Rizzo - University of Salerno, Italy

10.30 - 12.10

Fabio Burel, Rodolfo Taccani, Nicola Zuliani:

Improving sustainability of shipping through utilization of Liquefied Natural Gas (LNG) for propulsion

Roberto Capata, Enrico Sciubba:

The Lethe@ city car of the University of Roma 1: Final proposed configuration

Mladen A. Tomić, Ivan T. Cirić, Predrag M. Živković, Dušan J. Marković:

Neuro-fuzzy estimation of traffic induced air pollution levels

Michela Vellini, Marco Gambini, Gennaro Damiani:

LCA methodology application for comparison of high performance two-wheel sport vehicles

Emilio Font de Mora, César Torres, Antonio Valero, David Zambrana:

Defossilisation assessment of biodiesel life cycle production using the ExROI indicator



PROGRAM AT A GLANCE

| TIME SLOT | SAX | TRUMPET 3 | TRUMPET 1 | PIANO | COOL JAZZ |
|----------------------------------|--|---|--|--|------------------------------|
| 26/06/2012 14.30-16:00 | Thermoeconomic analysis of renewable energy sources | Process integration for energy saving | Novel combustion technologies in industry | Resources, materials and wastes | Fluid properties |
| 26/06/2012 16.30-18:00 | Thermoeconomic analysis of power plants | Process integration in industrial processes | Novel combustion technologies for power generation | Impact of man and transportation means | Innovation in thermodynamics |
| 27/06/2012 9.00-10:30 | Thermoeconomic analysis of CHP systems | Low temperature solar thermal systems | Novel concepts for CCS | Impact of power generation and use of energy sources | |
| 27/06/2012 11.00-13:00 | Exergy and environmental analysis | CSP | Carbon capture by mineralisation | Building envelope design and optimization | |
| 27/06/2012 14.30-16:00 | General thermoeconomic theory | Novel concepts for solar energy utilization | Oxy-combustion for CCS | Design of low energy consumption buildings | |
| 27/06/2012 16.30-18:00 | Thermoeconomic analysis of advanced energy systems | PV systems | Pre- and Post-combustion CCS | Integration of renewable energy systems in buildings | |
| 28/06/2012 9.00-10:30 | Exergy analysis of heat exchangers | Biogas production | Micro CHP systems | Fuel cells | |
| 28/06/2012 11.00-13:00 | Exergy analysis of heat pumps | Biogas upgrading | Organic Rankine Cycles | Sustainable renewable energy systems | |
| 28/06/2012 14.30-16:00 | Exergy analysis of energy systems | Biofuels | Energy systems for power generation and industry | Environmental issues of conventional energy systems | |
| 28/06/2012 16.30-18:00 | Exergy analysis of industrial processes | Biomass Gasification | Low temperature energy recovery | Sustainable cities and living | |
| 29/06/2012 8.30-10:00 | Control and operation of energy systems and industrial processes | Energy from wind | Steam generators | Using LCA to assess energy systems and technologies | |
| 29/06/2012 10.30-12:00 | Control and operation of systems for heat and power utilization in buildings | Heat Transfer | Internal combustion engines | Sustainable transportation systems | |
| 29/06/2012 12.00-13:00 | Closing Ceremony | | | | |



Poster session date: **27/07/2012**

Time: **16.00 - 17.00**

Jaqueline Saavedra Rueda, María Del Rosario Perez, Dionisio Laverde, Diego Bonilla, Jorge Rodríguez, Laura Diaz, Angélica Carreño

"Physicochemical Evaluation of the Properties of the Coke Formed at Radiation Area of Light Hydrocarbons Pyrolysis Furnace in Petrochemical Industry."

Johannes Persson

"Simultaneous production of domestic hot water and space cooling with a heat pump in a Swedish Passive House."

Vincenzo Rizzica, Paolo Petroni, Michela Spagnoli, Chiara Durastante, Jörg Wirfs

"Entropy generation in secondary flow around a gas turbine first-stage rotor blade: a numerical study."

Till Zimmermann

"Assessing repowering and update scenarios for wind energy converters."

Majid Saffar-Avval, Navid Zehtabiyen-Rezaie

"Technical and Economic study of Turboexpander Installation in Pressure Letdown Stations of Natural Gas Network."

Stefan Blume, Till Zimmermann

"WECs today and tomorrow - an LCA approach."

Jasmina Blagoje Milovanov

"Concept of training drivers of flammable goods."

Elkin Ivan Gutiérrez, Marco A. R. Nascimento

"Design Optimization Assessment of a Centrifugal Compressor Impeller Based on an In-House Algorithm."

Juan C. Chimal-Eguia, Norma Sánchez-Salas, Marco A. Barranco-Jiménez

"A variational optimization of a finite-time thermal cycle with a Stefan-Boltzmann heat transfer law."

Biljana Miljkovic

"Numerical modelling of straw combustion in a moving bed combustor."

Vishal Seeburrun, Ramzy Gouda Abdel-Gayed

"Simulation of a Turbocharged Gasoline Direct Injection Engine for Commercial Vehicle Application."

Michele Manno, Giuseppe Leo Guizzi

"Kinetic energy recovery system for sailing yachts."

Pierfrancesco Palazzo

"Technip initiatives in renewable energies and sustainable technologies."

Aroussia Jaouahdou, Mohamed Safi, Hervé Muhr

"Study of the phase change in a binary alloy."

Goran Vuckovic, Gradimir Ilić, Mića Vukić, Milan Banić, Gordana Stefanović

"CFD Simulation of Entropy Generation in Pipeline for Steam Transport in Real Industrial Plant."

Luca Moliterno, Claudia Toro

"Modeling and simulation of a large-size boiler unit for steam power plants."

Jaqueline Saavedra Rueda, Lourdes Isabel Meriño Stand, Francisco Javier Perez Trujillo, Harbey Alexi Escobar, Juan Carlos Amezcua, Luis Eduardo Navas

"Mechanism of damage by high temperature of the tubes, exposed to the atmosphere characteristic of combustion of a furnace of pyrolysis of ethane for ethylene production in the petrochemical industry."

ORGANIZING COMMITTEE

Umberto Desideri
University of Perugia

Giampaolo Manfreda
University of Florence

Enrico Sciubba
"Sapienza" University of Rome

ADVISORY COMMITTEE

Track Organizers

Building, Urban and Complex Energy Systems
V. Ismet Ugursal - Dalhousie University, Nova Scotia, Canada

Combustion, Chemical Reactors, Carbon Capture and Sequestration
Giuseppe Girardi - ENEA-Casaccia, Italy

Energy Systems: Environmental and Sustainability Issues
Christos A. Frangopoulos
National Technical University of Athens, Greece

Exergy Analysis and Second Law Analysis
Silvio de Oliveira Junior
Polytechnical University of Sao Paulo, Sao Paulo, Brasil

Fluid Dynamics and Power Plant Components
Sotirios Karellas
National Technical University of Athens, Athens, Greece

Fuel Cells
Umberto Desideri - University of Perugia, Perugia, Italy

Heat and Mass Transfer
Francesco Asdrubali, Cinzia Buratti - University of Perugia, Perugia, Italy

Industrial Ecology
Stefan Goessling-Reisemann - University of Bremen, Germany

Poster Session
Enrico Sciubba - "Sapienza" University of Rome, Rome, Italy

Process Integration and Heat Exchanger Networks
Francois Marechal - EPFL, Lausanne, Switzerland

Renewable Energy Conversion Systems
David Chiamonti - University of Florence, Florence, Italy

Simulation of Energy Conversion Systems
Marcin Liszka - Polytechnica Slaska, Gliwice, Poland

System Operation, Control, Diagnosis and Prognosis
Vittorio Verda - Polytechnic University of Turin, Italy

Thermodynamics
A. Özer Arnas
United States Military Academy at West Point, U.S.A.

Thermo-Economic Analysis and Optimisation
Andrea Lazzaretto - University of Padova, Padova, Italy

Water Desalination and Use of Water Resources
Corrado Sommariva - ILF Consulting M.E., U.K

SCIENTIFIC COMMITTEE

Riccardo Basosi, University of Siena, Italy

Gino Bella, University of Roma Tor Vergata, Italy

Asfaw Beyene, San Diego State University, USA

Ryszard Bialecki, Silesian Institute of Technology, Poland

Gianni Bidini, University of Perugia, Italy

Ana M. Blanco-Marigorta, University of Las Palmas de Gran Canaria, Spain

Olav Bolland, University of Science and Technology (NTNU), Norway

Renè Cornelissen, Cornelissen Consulting, The Netherlands

Franco Cotana, University of Perugia, Italy

Alexandru Dobrovicescu, Polytechnical University of Bucharest, Romania

Gheorghe Dumitrascu, Technical University of Iasi, Romania

Brian Elmegaard, Technical University of Denmark, Denmark

Daniel Favrat, EPFL, Switzerland

Michel Feidt, ENSEM - LEMTA University Henri Poincaré, France

Daniele Fiaschi, University of Florence, Italy

Marco Frey, Scuola Superiore S. Anna, Italy

Richard A Gaggioli, Marquette University, USA

Carlo N. Grimaldi, University of Perugia, Italy

Simon Harvey, Chalmers University of Technology, Sweden

Hasan Heperkan, Yildiz Technical University, Turkey

Abel Abel Hernandez-Guerrero, University of Guanajuato, Mexico

Jiri Jaromir Klemeš, University of Pannonia, Hungary

Zornitza V. Kirova-Yordanova, University "Prof. Assen Zlatarov", Bulgaria

Noam Lior, University of Pennsylvania, USA

Francesco Martelli, University of Florence, Italy

Aristide Massardo, University of Genova, Italy

Jim McGovern, Dublin Institute of Technology, Ireland

Alberto Mirandola, University of Padova, Italy

Michael J. Moran, The Ohio State University, USA

Tatiana Morosuk, Technical University of Berlin, Germany

Pericles Pilidis, University of Cranfield, United Kingdom

Constantine D. Rakopoulos, National Technical University of Athens, Greece

Predrag Raskovic, University of Nis, Serbia and Montenegro

Mauro Reini, University of Trieste, Italy

Gianfranco Rizzo, University of Salerno, Italy

Marc A. Rosen, University of Ontario, Canada

Luis M. Serra, University of Zaragoza, Spain

Gordana Stefanovic, University of Nis, Serbia and Montenegro

Andrea Toffolo, Luleå University of Technology, Sweden

Wojciech Stanek, Silesian University of Technology, Poland

George Tsatsaronis, Technical University Berlin, Germany

Antonio Valero, University of Zaragoza, Spain

Michael R. von Spakovsky, Virginia Tech, USA

Stefano Ubertini, Parthenope University of Naples, Italy

Sergio Ulgiati, Parthenope University of Naples, Italy

Sergio Usón, University of Zaragoza, Spain

Roman Weber, Clausthal University of Technology, Germany

Ryohei Yokoyama, Osaka Prefecture University, Japan

Na Zhang, Institute of Engineering Thermophysics, Chinese Academy of Sciences, China

ECOS 2012

PERUGIA CENTRO CONGRESSI - PERUGIA, ITALY

JUNE 26th 29th, 2012

www.ecos2012.org



SAPIENZA
UNIVERSITÀ DI ROMA



main sponsor



CARISPO
CASA IN RISPARMIO E SPORTELO

under patronage



MINISTERO DELL'AMBIENTE
E DELLA TUTELA DEL TERRITORIO E DEL MARE



Ministero delle Sviluppo Economico



Regione Umbria



Provincia di Perugia



Città di Perugia



perugiassisi 2019

partner



Multiutility
S.p.A. - Energia