Monday 1/7/2024

9:00	**Opening Ceremony (Sotirios Karellas)**
9:20	
9:40	**George Tsatsaronis: The ECOS Conferences: A short history from a personal perspective**
10:00	**Emmanuel Kakaras: Technologies to enable energy transition**

10:40	**Coffee break/Refreshments**

		1A Storage I
		Chair: Xiaoqu Han, Co-chair: Emiliano Borri
11:00	20	Performance of packed-bed systems and coupling with Brayton cycles. *David Pérez-Gallego, Julian Gonzalez-Ayala, Antonio Calvo Hernández and Alejandro Medina*
11:20	27	An underground cistern as thermal storage for a supermarket within the IWER building in Pamplona. Pablo Moreno Pestaña, Gonzalo Diarce Belloso, *Olatz Irulegi Garmendia and Alba Juncal Arias*
11:40	45	Advanced exergy analyses for pumped thermal energy storage systems. *Sergio Tomasinelli, Mathias Hofmann, Francesco Witte and George Tsatsaronis*
12:00	92	On the operational behavior of packed-bed thermal energy storage: A second-law of thermodynamics approach to determine the instantaneous energy content. *Ignacio Calderón-Vásquez, José M. Cardemil and F. G. Battisti*
12:20	134	Numerical modeling and design optimization of a micro-CAES system. *Dario Tumminello, Tommaso Bacci and Bruno Facchini*
12:40	185	Experimental tests on a thermochemical energy storage prototype for efficient coupling of thermal and electric grids. *Valeria Palomba, Andrea Frazzica, Vincenza Brancato, Davide La Rosa, Fabio Costa, Gabriele Penello and Walter Mittelbach*

		1B Energy systems I
		Chair: Yoshiharu Amano, Co-chair: Jerry Lambert
11:00	405	Design of urban systems considering the renewable energy hubs concept. *Christoph M.N. Pabsch, Catarina G. Braz, Luc Girardin and François Maréchal*
11:20	429	Techno-economic and life cycle assessment of a solar-biomass driven cogeneration system integrated with MED-RO-MD: A case study for the Canary islands. *Mohammad Hasan Khoshgoftar Manesh, S.A. Mousavi Rabeti, Ana M Blanco-Marigorta and Beatriz del Río Gamero*

11:40	17	Waste heat recovery in remote renewable energy hubs. *Liam Dauchat, Victor Dachet and Damien Ernst.*
12:00	436	Multi-objective optimization of integrated energy systems based on life-cycle composite technical, economic and environmental indices. *Zepeng Han, Wei Han, Na Zhang, Xinyang Song and Jun Sui.*
12:20	348	Unsupervised and supervised machine learning techniques for timeseries aggregation in the design and operation optimization of multi-energy systems. *Gabriele Volpato, Edoardo Bregolin, Enrico Dal Cin, Gianluca Carraro, Piero Danieli and Andrea Lazzaretto.*
12:40	440	Design of optimal rule-based control for sector-coupled energy systems through rule extraction methods under consideration of price signals. *David Wackerbauer, Thomas Schreiber, Dirk Müller and Hauke Sobottka*

		1C Carbon capture I
		Chair: Ron Zevenhoven, Co-chair: Ahmed Elkafas
11:00	43	Coupling of an amine-based carbon capture unit to a municipal solid waste incineration plant – an analysis of the dynamics. *Florian Hüting and Christoph Wieland*
11:20	81	Exergy analysis of a "SO-O_2" process for high-purity oxygen generation. *Colin Fischer, Hamid Rachidi and Christoph Wieland*
11:40	91	Techno-economic analysis of chemical looping processes with biomass resources for energy production and CO_2 utilization. Comparison of CLC and CLOU technologies. *Arturo Cabello, Alberto Abad, Margarita de Las Obras Loscertales, Yldeney Silva Domingos and Teresa Mendiara*
12:00	191	Developement of CO_2 capture system based on phase change for LNG marine fuelled engines. Techno-energetic study. *Rafael D'Amore-Domenech, Carlos López-Trabado, Vladimir L. Meca, Antonio Villalba-Herreros and Teresa J. Leo*
12:20	212	The Pedersen process with CO_2 Capture via calcium looping: an alternative route for cleaner alumina production. *Javier Sáez-Guinoa, Luis M Romeo and Eva Llera-Sastresa*
12:40	214	Decarbonisation strategies in alumina production. Energy and economic considerations.*Inés Senante, Javier Sáez and Luis M Romeo*

		1D Hydrogen energy I
		Chair: Lucrezia Manservigi, Co-chair: Massimo Rivarolo
11:00	21	Multi-resource integration associated with the deployment of hydrogen and derivatives in an industrial hub. *Nguessan Charles Tano, Assaad Zoughaib, Solène Le Bourdiec and Louis-Marie Malbec*
11:20	292	Multi-objective operational optimization of multi-energy Liquid Air Energy Storage in a novel hydrogen-based green energy hub. *Alessio Tafone, Stefano Mazzoni, Davide Pivetta, Federico Del Mondo, Rodolfo Taccani and Alessandro Romagnoli*
11:40	93	Predictive controller for optimal renewable hydrogen injection into the natural gas network. *Carlo Carcasci, Michele Francesconi, Agostino Gambarotta, Gabriele Guzzo, Emanuela Marzi, Mirko Morini and Costanza Saletti.*
12:00	138	Techno-economic analysis and optimization of a hydrogen refueling station integrated in a renewable-based microgrid. *Roberta Tatti, Mario Petrollese and Giorgio Cau*

12:20	147	Optimized design and scheduling of a hydrogen-based micro-grid: towards full integration of renewable sources. *Francesca Carolina Marcello, Antonio Sanchez, Mariano Martin and Vittorio Tola*
12:40	169	How much hydrogen do we need and where? A spatially detailed estimation of the potential hydrogen demand in the future Italian energy system. *Francesco Mezzera, Giuseppe Muliere, Fabrizio Fattori, Mario Motta and Giulia Novati*

13:00		**Lunch**

		1E Energy systems II
		Chair: Umberto Desideri, Co-chair: Spyridon Gkousis
14:30	384	Co-optimization of resilient airport energy hubs for flight electrification and hydrogen propulsion. *Stavros Vouros, Kreshnik Margaritari and Konstantinos Kyprianidis*
14:50	509	Performance of a solar-biomass powered thermodynamic cycle incorporating the Hygroscopic Cycle Technology (HCT). *Andrés Meana-Fernández, Roberto Martínez-Pérez, Francisco Javier Rubio-Serrano and Antonio José Gutiérrez-Trashorras*
15:10	142	A review of smart energy practices at airports: challenges and opportunities for sustainable aviation. *Mirko Morini, Costanza Saletti and Agostino Gambarotta*
15:30	585	Techno-economic simulation model for optimization of Power-to-X green hydrogen systems involving several energy sources: *A case study. Javier Navarro Hinojosa, Diego Manuel Toscano Cruz and Isidro Torres Moreno*

		1F Storage II
		Chair: Ryohei Yokoyama, Co-chair: Gabriel Zsembinszki
14:30	114	Dynamic modeling and experimental validation of an electrical water heater with a double storage tank configuration. *Nicolas Leclercq, Simon Marichal, Sylvain Quoilin and Vincent Lemort*
14:50	115	Analysis of geometric parameters of cold packed bed energy storage for liquid air energy storage systems. *Afshin Mashayekh, Nishith Babubhai Desai and Fredrik Haglind*
15:10	262	Capacity optimization of advanced energy storage technologies in new power system for peak shaving and frequency regulation based on economic and carbon-mitigation co-benefit. *Lu Nie, Yanxin Li, You Gan, Xiaoqu Han, Tong Wang and Junjie Yan*
15:30		

		1G Marine applications
		Chair: Rafael d'Amore-Domenech, Co-chair: Sven Klute
14:30	538	Development of a numerical platform for techno-economic assessment of decarbonising technologies in vessels. *Tryfon Roumpedakis, Odysseas Kallis, Platon Pallis, Amalia Steinchauer, Christopher Schifflechner, Ahmed G. Elkafas and Sotirios Karellas*
14:50	118	Techno-economic assessment of an advanced integration between SOFC and ICE onboard a short-distance ferry. *Ahmed G. Elkafas, Massimo Rivarolo, Stefano Barberis and Aristide F. Massardo*
15:10	32	The energy systems analysis with a multi-criteria design tool to decarbonize maritime transport. *Giaime Niccolò Montagna, Simone Piccardo, Massimo Rivarolo, Daria Bellotti, Matteo Passalacqua and Luca Mantelli*
15:30		

		1H Solar thermal
		Chair: Rosa Christodoulaki, Co-chair: Andreas Olympios
14:30	40	Sensitivity analysis of a pressurized solar volumetric receiver. heat transfer fluids and pressure ratio comparison. *Judit García-Ferrero, Rosa Pilar Merchán, María Jesús Santos, Alejandro Medina and Antonio Calvo-Hernández*
14:50	57	A comprehensive analysis of solar heating for industrial processes (SHIP) integration in a Mexican food industry. *Eduardo González-Mora, María Dolores Durán-García and Álvaro Lentz-Herrera*
15:10	121	Concentrating solar air heater and packed bed thermal energy storage for medium temperature industrial processes heat: Energetic and economic analysis. *Antonio Famiglietti, Ignacio Calderón-Vásquez and José Miguel Cardemil*
15:30	150	Numerical analysis of heat transfer enhancement and flow patterns of a solar air heater channel-type with mounted louvered-winglets. *Rafael Duarte, Rodrigo Pinto, Wallace Ferreira and Daniel Dezan*

15:50		**Coffee break/Refreshments**

		1I District Heating I
		Chair: Christopher Schifflechner, Co-chair: Ludwig Irrgang
16:10	8	A two-phase optimization method for the expansion planning of district heating systems using different discretization techniques. *Jerry Lambert and Hartmut Spliethoff*
16:30	182	Integration of renewable energy sources and thermal energy storage in district heating network design. *Amedeo Ceruti and Hartmut Spliethoff*
16:50	37	How to maximize the sustainability impact of data center waste heat utilization in district heating? *Seela Tervo, Pauli Hiltunen and Sanna Syri*

17:10	72	A Model for integrated design of district heating networks. *Mazarine Roquet and Pierre Dewallef*
17:30	87	Leveraging neural networks in a hybrid model predictive control framework for district heating networks. *Dubon Rodrigue, Mohamed Tahar Mabrouk, Bastien Pasdeloup, Patrick Meyer and Bruno Lacarrière*

		1J Industrial decarbonization I
		Chair: José M. Baranda Ribeiro, Co-chair: Michael Rath
16:10	498	Superstructure-based approach to assess the heat pumping and renewable energy integration potential in the sugar industry. *Muhammad Salman, Daniel Flórez-Orrego, François Maréchal and Grégoire Léonard*
16:30	522	Energy resource efficient industrial supply systems for decarbonization - Adaption of mixed integer design and operation optimization models for discretized heat recovery assessment and process adaptions. *Matthias Traninger, Sophie Knöttner and Anton Beck*
16:50	532	Technologies for defossilisation of process heat: an analysis and overview of industrial processes and temperature requirements. *Carlota von Thadden del Valle, Gunnar Frey, Mathias van Beek and Marcus Budt*
17:10	608	Decarbonization of industrial reheating furnaces: A techno-economic assessment of an inductive preheating use case in the Austrian steel sector. *Nicolas Neubauer and Christoph Zauner*
17:30	30	Industrial process steam generation from deep geothermal reservoirs. *Sven Klute, Marcus Budt and Mathias van Beek*

		1K Expanders/ Compressors / Turbomachinery
		Chair: Daniele Fiaschi, Co-chair: Nicolas Leclercq
16:10	23	Piston compressor performance with ternary mixtures. machine learning surrogate models. *Alexandra Welp, Ilyas Adaköy and Burak Atakan*
16:30	42	Mild hybrid vehicle energy systems: expander design and comparison for bottom on-board ORC system. *Roberto Capata and Alfonso Calabria*
16:50	143	A thermodynamic non-equilibrium model for the expansion of a real gas in a turbine cascade. *Enrico Sciubba and Federico Zullo*
17:10	193	Dynamic modelling approach of a thermal compressor and validation based on experimental tests. *Ali Salame, Rabah Ibsaine, Vincent Lemort, Pascal Dufour and Madiha Nadri*
17:30	307	Optimal design of centrifugal compressors in small-size High-Temperature Brayton Heat Pumps. *Guido Francesco Frate, Matteo Benvenuti, Francesco Chini and Lorenzo Ferrari*

		1L Buildings I
		Chair: Irene Koronaki, Co-chair: Petros Polykarpopoulos
16:10	216	Real option analysis applied on residential energy systems using least squares monte carlo simulation. *Sebastian Glombik and Felix Fromme*

16:30	227	Economic evaluation of residential energy systems using MILP design optimization combined with a real option approach. *Lena Rosin, Pierre Krisam, Sebastian Glombik and Eva Schischke*
16:50	294	Case study of a desiccant evaporative cooling system in a danish office building : system modeling from long-term monitoring data. *Alanis Zeoli, Samuel Gendebien, Hicham Johra and Vincent Lemort*
17:10	298	Economic assessment of a novel system based on solar and biomass energy for residential applications in continental climates. *Sören Baumgarten, Emiliano Borri, Gabriel Zsembinszki, Antonios Charalampidis, Sotirios Karellas, Oliver Opel and Luisa F. Cabeza*
17:30	289	Simulating cold load pickup in houses after a prolonged power outage: A gray-box modelling approach. *Seyed Matin Abtahi, Andreas Athienitis and Benoit Delcroix*