
International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems
DTU
ECOS 2022 35th
3-7 July 2022 CPH Conference | DGI-Byen, Copenhagen, Denmark

Welcome to ECOS 2022

ECOS 2022 is the 35th conference in the series of international conferences that focus on modern aspects of thermal sciences with particular emphasis on thermodynamics and its applications in energy conversion systems and processes. We are happy to welcome you to the first ECOS conference after the COVID pandemic no longer restricts us from meeting for benefitting fully from the opportunities of sharing novel results, thought and ideas in the field – even if some are still limited in participation options.

ECOS is this year held in Copenhagen for the second time. Last time the meeting was here was in 2003. We are happy to see that regular ECOS participants still join the conference, while there is also a large group of the participants, who are joining one of their first ECOS meeting bringing new ideas and approaches to the community.

ECOS 2022 and is hosted by Technical University of Denmark. The strategy of the university is based on three pillars: sustainable transition, digitalization and the best life-long engineering education. These key points are highly aligned with the focus of ECOS and we hope that the conference will contribute a small part to the university succeeding in the quest. We also believe that this focus makes ECOS important for succeeding in the green transition of society worldwide, which is inevitable as a target for fast approaching a sustainable future.

As organizers of ECOS 2022 we welcome all participants and we wish you a fruitful conference and a pleasant stay in Copenhagen.

Conference chairs

Brian Elmegaard, DTU Technical University of Denmark, Lyngby, Denmark
Enrico Sciubba, Niccolò Cusano U., Roma, Italy
Ana M Blanco-Marigorta, Universidad de Las Palmas de Gran Canaria, Spain

Local organizing committee - DTU Technical University of Denmark

Brian Elmegaard
Jonas Kjær Jensen
Mette Rasmussen
Nasrin Arjomand Kermani
René Kofler
Tingting Zhu
Wiebke Brix Markussen
Wiebke Meesenburg

	Sunday 3/7	Monday 4/7			Tuesday 5/7				Wednesday 6/7				Thursday 7/7			
08:00 08:20 08:40		Registration			Registration				Registration				Registration			
09:00 09:20 09:40 10:00 10:20		Opening session (Room A/B)			4A Energy use in the Transportation Sector	4B Industrial Energy Use I	4C Refrigeration and Heat pumps II	4D Process Simulation and Optimization I	8A Energy use in the Residential Sector II	8B Process Simulation and Optimization II	8C Distributed generation	8D Industrial Energy Use II	12A Basic and applied thermo-dynamics II	12B District heating/cooling	12C Energy system analysis	
10:40 11:00		Coffee break			Coffee break				Coffee break				Coffee break			
11:20 11:40 12:00 12:20		1A Biomass, Biofuels	1B Energy storage I	1C Thermo-economics/ Exergo-economics	5A Sustainability & Circular Economy I	5B Energy storage III	5C Refrigeration and Heat pumps III	5D Exergy I	9A Energy use in the Residential Sector III	9B Basic and applied thermo-dynamics I	9C Exergy II	9D Renewable energy - solar, wind, hydro, etc. III	13A Digitalization, big data, artificial intelligence	13B ORC and low grade thermal energy	13C Exergy III	
12:40 13:00 13:20		Lunch			Lunch				Lunch				Lunch			
13:40 14:00 14:20		Plenary session (Room A/B) Poster session (Foyer)			Plenary session (Room A/B)				Plenary session (Room A/B)				Closing session (Room A/B)			
14:40 15:00 15:20 15:40		2A Refrigeration and Heat pumps I	2B Energy storage II	2C Energy use in the Residential Sector I	6A Sustainability & Circular Economy I	6B Energy storage IV	6C Refrigeration and Heat pumps IV	6D Hydrogen use in Energy Systems & Fuel Cells II	10 A Heat and mass transfer I	10B Smart grids and renewables integration I	10C Computational Fluid Dynamics (CFD) I	10D Hydrogen use in Energy Systems & Fuel Cells IV				
16:00 16:20	Registration	Coffee break			Coffee break				Coffee break			ECOS ISC meeting (Room Trianglen)				
16:40 17:00 17:20 17:40	Welcome reception	3A Hydrogen use in Energy Systems & Fuel Cells I	3B Energy policy and planning	3C Renewable energy - solar, wind, hydro, etc. I	7A Hydrogen use in Energy Systems & Fuel Cells III	7B Renewable energy - solar, wind, hydro, etc. II		Panel discussion: Future of exergo-economics	11A Heat and mass transfer II	11B Smart grids and renewables integration II	11C Computational Fluid Dynamics (CFD) II					
18:00 18:20									Walk from CHP Conference (18.30)							
18:40 19:00 19:20 19:40									Copenhagen Canal Tours (Kalvebod Brygge/Bølgen)							
20:00 20:20 20:40 21:00 21:20 21:40 22:00 22:20 22:40 23:00 23:20 23:40 00:00									Gala dinner (Langelinie Pavillonen)							

Room colors
Room Kødbyen/Enghave Plads
Room Vesterbro/Tivoli
Room Hovedbanegården
Room A/B

Keynotes

	Room A/B			
Time	**Presenter**			**Title**
Mon 9:00	Tim	McAloone		Circular design for sustainability: Finding our way
Mon 13:40	Rasmus	Larsen		DTU 2022
Tues 13:ʀ0	Peter Maagøe	Petersen		Successful entrepreneurship for the green transition
Wed 13:40	Jette Bredahl	Jacobsen		Green transition and the role of energy systems: perspectives from the Danish and European policy context

Monday - Session 1 - 11:20-12:40

Session 1A	**Room Kødbyen/Enghave Plads|Biomass, Biofuels|Chair person Giampaolo Manfrida**			
Time	**Presenter**		**ID**	**Title**
11:20-11:40	Gabriel	Gomes Vargas	141	Comparative exergy assessment of residual biomass gasification routes for hydrogen and ammonia production
11:40-12:00	René	Kofler	297	Exergy-based comparison of three wheat straw based biorefineries
12:00-12:20	Alexander	Vallejo	548	* Analysis of the CHP cycle in a sugar industry with a milling capacity of 4,600 ton of cane per day to maximize the electricity generation using a hybrid scheme Biomass-Solar as energy source.
12:20-12:40	Giovanni	Manente	275	Sourcing hydrogen for the production of sustainable aviation fuels

Session 1B	**Room Vesterbro/Tivoli|Energy Storage I|Chair person Lydia Stougie**			
Time	**Presenter**		**ID**	**Title**
11:20-11:40	Adriano	Sciacovelli	66	Performance maximization of thermochemical energy storage reactors through topology optimization
11:40-12:00	Robin	Fisher	526	Thermochemical energy storage coupled with solar PV for increased renewable electricity generation: interplay between thermophysical behaviour and techno-economic performance
12:00-12:20	Gesa	Backofen	371	The Influence of Thermochemical Energy Storages with CaO/Ca(OH)2 on Future Industrial Energy Systems with High Temperature Steam Demand
12:20-12:40	Jannik	Neumann	383	Energy and exergy assessment of renewable energy storage using iron as energy carrier

Session 1C	**Room Hovedbanegården|Thermoeconomics/Exergoeconomics|Chair person Enrico Sciubba**			
Time	**Presenter**		**ID**	**Title**
11:20-11:40	Rodrigo	Guedes dos Santos	389	The introduction of a new exergy disaggregation approach and comparison with the recent thermoeconomic methodologies in an organic rankine cycle powered vapor compression refrigeration system
11:40-12:00	Pedro	Rosseto de Faria	468	On the thermoeconomic modeling of waste cost allocation and diagnosis of malfunctions for environmental aspects assessment
12:00-12:20	Alfonso	Biondi	162	* A preliminary analysis of the effects of state-funded incentives on the primary resource use efficiency of the residential sector
12:20-12:40	Jorge	Torrubia	194	Beyond metal prices: geological scarcity as a physical cost allocation criterion. The case of Rare Earth Element mining.

Monday - Poster Session - 14:00-14:40

Poster	**Foyer**	**Poster Session**		
Time	**Presenter**		**ID**	**Title**
14:00-14:40	Xiang	Li	20	Where is the money ? A decomposition of monetary flows behind fossil fuels?
14:00-14:40	Roger	Padullés Solé	315	Effects of utility steam temperature on the cost of steam systems in industry.
14:00-14:40	Ana Maria	Blanco Marigorta	497	Optimization and estimation processes of the exergetic parameters for onion drying in a multi-stage semi-industrial continuous dryer: A Comparative assessment of RSM and ANFI
14:00-14:40	Rafael	Pinho Furtado	503	Thermodynamic analysis of two oxy-fuel combustion gas cycles.
14:00-14:40	Martin Pihl	Andersen	322	Economic potential of lowering supply temperatures when using industrial heat pumps
14:00-14:40	Xiang	Li	1	Prospective study on the cost evolution for low-carbon technologies
14:00-14:40	M. Carmen	Martín	317	Speed Of Sound Measurements For Renewable Energy Gases

Monday - Session 2 - 14:40-16:00

Session 2A	Room Kødbyen/Enghave Plads|Refrigeration & heat pumps I|Chair Person Wiebke Brix Markussen			
Time	**Presenter**		**ID**	**Title**
14:40-15:00	Michael	Barton	70	* Pilot test of a novel heat pump system with integrated latent heat storage for flexible use of grid electricity
15:00-15:20	Christoph	Höges	61	Optimizing Mixture Composition in Alternative Flow Sheets in Residential Heat Pumps
15:20-15:40	Tingting	Zhu	327	Refrigerant Charge Effect on a Booster Heat Pump and Temperature Profile Matching Analysis: an Experimental Study
15:40-16:00	Matteo	Caramaschi	419	Low Flammability Limits of Natural Refrigerant Mixtures: Theory vs Standards

Session 2B	Room Vesterbro/Tivoli|Energy Storage I|Chair Person Assaad Zoughaib			
Time	**Presenter**		**ID**	**Title**
14:40-15:00	Azd	Zayoud	165	Importing renewable energy to EU via hydrogen and ammonia vectors: levelized cost of energy assessment
15:00-15:20	Giampaolo	Manfrida	265	Exergo-economic and exergo-environmental analysis of a Hydrogen Storage System
15:20-15:40	Van Tien	Giap	80	Nitrogen/Hydrogen as thermochemical energy storage material in NH3 fed reversible solid oxide fuel cell system for electrical energy storage.
15:40-16:00	Kevin	Verleysen	85	Remote ammonia production for the future energy demand of Belgium: Techno-economic optimization of local and remote ammonia production for Belgium under uncertainty

Session 2C	Room Hovedbanegården| Energy use in the Residential Sector I|Chair person Ron Zevenhoven			
Time	**Presenter**		**ID**	**Title**
14:40-15:00	Stephan	Göbel	434	Experimental Investigation of Rule-Based Control Strategies for Hybrid Heat Pump Systems Using the Smart Grid Ready Interface
15:00-15:20	Lazaros	Aresti	590	A cost and environmental impact analysis of Ground Source Heat Pumps in European climates
15:20-15:40	Youssef	Miftah	360	Model Predictive Control approaches for optimal long-term operation of Ground Coupled Heat Pump systems
15:40-16:00	Yousef	Haseli	604	* A Clean Wood Heating System

Monday - Session 3 - 16:40-18:00

Session 3A	Room Kødbyen/Enghave Plads|Hydrogen Use in Energy Systems & Fuel Cells I|Chair personYoshiharu Amano			
Time	**Presenter**		**ID**	**Title**
16:40-17:00	Masashi	Tayama	323	* Economic analysis of Power-to-Gas plant based on optimal operation with PEM electrolysis cell
17:00-17:20	Ron	Zevenhoven	563	The Energy Penalty of Producing Hydrogen-Containing Fuels from Hydrogen
17:20-17:40	Diederik	Coppitters	529	Robust integration of direct air capture in power-to-methane systems: techno-economic feasibility study under uncertainty
17:40-18:00	Lydia	Stougie	67	Assessment of the sustainability of various ways of hydrogen production and supply by applying LCA and exergy

Session 3B	Room Vesterbro/Tivoli|Energy policy and planning|Chair person Silvia Nebra			
Time	**Presenter**		**ID**	**Title**
16:40-17:00	Josh	Eichman	405	* Analysis Of Inter-Community Coordination Strategies And Their Economic And Environmental Impact On Energy Communities.
17:00-17:20	Panagiotis	Varelas	250	Extreme events and climate change: How did wildfires and other stress events affect the social and policy aspects of the energy transition? A mass media article analysis.
17:20-17:40	Elisa	Papadis	245	Effects of the decarbonization of district heating systems on future German electricity prices
17:40-18:00				

Session 3C	Room Hovedbanegården|Renewable Energy - solar, wind, hydro, etc. I|Chair person Nasrin Arjomand Kermani			
Time	**Presenter**		**ID**	**Title**
16:40-17:00	Alexander	Vallejo Díaz	164	* Building-mounted wind energy potential in Santo Domingo, the Dominican Republic, a contribution for resilient decarbonisation.
17:00-17:20	Claudio Zuffi	Talluri	267	Development of simplified models for the individuation of the proper exploitation method for African Geothermal resources
17:20-17:40	Ryosuke	Akimoto	428	Development of small scale ORC for low glade heat source utilization
17:40-18:00	Nishith Babubhai	Desai	430	Comparative analysis of two-phase expansion and sub-critical organic Rankine cycle systems for solar and geothermal applications

Tuesday - Session 4 - 09:00 - 10:40

Session 4A	Room Kødbyen/Enghave Plads|Energy Use in the Transportation Sector|Chair person Silvia Nebra			
Time	**Presenter**		**ID**	**Title**
09:00-09:20	Athanasios	Vallis	471	* Thermo-Economic Analysis and Optimization through Genetic Algorithm of a Dual-Loop Regenerative Supercritical CO2 Brayton Cycle/ORC System Coupled to the Main Diesel Engine of a Bulk Carrier
09:20-09:40	Yu	Yao	127	* Modeling and analysis of refrigerated truck coupled with waste heat recovery system
09:40-10:00	Anastasia	Popiolek	244	Enabling ultra-fast charging with 800V-battery architecture: balance between time spent at stations and charging infrastructure profitability.
10:00-10:20	Chong	Cheng	393	Application of Methanol with an Ignition Additive in a Heavy-duty Turbo-charged CI engine
10:20-10:40	Rafael	Mosquim	349	* Acceleration trends in the Brazilian light-duty vehicle fleet - 1990-2020

Session 4B	Room Vesterbro/Tivoli|Industrial Energy Use I|Chair person Torben Ommen			
Time	**Presenter**		**ID**	**Title**
09:00-09:20	Ana C.	Ferreira	560	*A brief review on decarbonization and energy transition of Portuguese industry: renewable energies incorporation and efficiency measures
09:20-09:40	René	Hofmann	585	How to use Excess Heat in Industry? - Conclusions from international networking within the IETS TCP
09:40-10:00	Chiara	Magni	373	Classification of industrial thermal processes for the assessment of the electrification and flexibility potential
10:00-10:20	Edward	Rightor	589	Industrial Heat Pumps: A Key Solution to Electrify Process Heat
10:20-10:40	Sotirios	Karellas	253	Energy and exergy analysis and thermodynamic optimization of a waste heat recovery trigeneration system based on ORC and ejector cooling cycle

Session 4C	Room Hovedbanegården|Refrigeration & heat pumps II|Chair person Wiebke Meesenburg			
Time	**Presenter**		**ID**	**Title**
09:00-09:20	Antonio	Gallego	498	Thermodynamic comparative analysis between an ejector cooling system and an absorption cooling system in order to improve the fermentation process of the sugar and ethanol production process.
09:20-09:40	Simone	Braccio	240	Energy and exergy analysis of a pilot plant for the combined production of cooling and electricity from a low temperature heat source through an absorption process.
09:40-10:00	Karolina	Grabowska	400	Application of CFD methods in heat transfer analysis of adsorption cooling and desalination systems
10:00-10:20	Mujahid	Naseem	308	A novel concept for maximizing the cooling capacity of an adsorption chiller via process time control
10:20-10:40	Aya	Barakat	347	The efficient exploitation of chemical energy in heat pumps

Session 4D	Room A/B|Process Simulation and Optimization I|Chair person Adriano Sciacovelli			
Time	**Presenter**		**ID**	**Title**
09:00-09:20	Qiao Yan	Soh	246	Stochastic optimal design for large scale rainwater harvesting and detention systems
09:20-09:40	Ryohei	Yokoyama	146	* Day and Time Aggregations for Optimal Design of Energy Supply Systems with Storage Units by a Hierarchical MILP Method
09:40-10:00	Ryohei	Yokoyama	167	* Optimal Operation of a Heat Supply System in Consideration of Discrete and Nonlinear Characteristics Based on a Mixed-Integer Quadratic Model
10:00-10:20	Benedict	Winchester	282	* An Integrated Model for Simulating and Optimising Combined Hybrid Photovoltaic-Thermal (PV-T) and Photovoltaic Systems for Decentralised Rural Hot Water Provision and Electrification
10:20-10:40	Hagen	Seele	197	Optimization-based scheduling of heat-integrated multipurpose batch plants using a discrete temperature grid

Tuesday - Session 5 - 11:20 - 12:40

Session 5A	Room Kødbyen/Enghave Plads|Sustainability & Circular Economy I|Chair person Sotirios Karellas			
Time	**Presenter**		**ID**	**Title**
11:20-11:40	Merlin Sebastian	Triebs	227	Estimating the local renewable potentials for the transformation of district heating systems
11:40-12:00	Xinyi	Wei	313	Environomic Analysis of Different Hydrogen Production Routes
12:00-12:20	Despina	Magiri-Skouloudi	496	Environmental assessment of an industrial power-to-hydrogen-to-power system - towards decarbonization of existing natural gas fueled CHP plants.
12:20-12:40	Mateusz	Proniewicz	513	LCA and LCC framework for special purpose vehicles based on a case study of a mini-tractor for orchard operations

Session 5B	Room Vesterbro/Tivoli|Energy Storage III|Chair person Andrea Lazzaretto			
Time	**Presenter**		**ID**	**Title**
11:20-11:40	Diane	Le Roux	81	Multi-criteria optimisation of an industrial thermocline thermal energy storage
11:40-12:00	Kenny	Couvreur	435	Calibration of a charging time energy fraction model for melting experiments of a high temperature latent heat thermal energy storage system
12:00-12:20	Wim	Beyne	442	The charging time energy fraction method for characterizing latent thermal energy storage heat exchangers
12:20-12:40	Yusuke	Shiga	335	* Impact for CO2 Emission Reduction by Ice Storage Tank in District Cooling System Using Variable Renewable Energy

Session 5C	Room Hovedbanegården|Refrigeration and Heat Pumps III|Chair person Pascal Tobaly			
Time	**Presenter**		**ID**	**Title**
11:20-11:40	Brendon	Raad, de	98	Using Process Change Analysis to assess heat pump performance in a changing biodiesel production plant
11:40-12:00	Jonas Lundsted	Poulsen	459	Model-based analysis of a heat pump cascade system using seawater and ammonia as working fluids
12:00-12:20	Daniel	Florez-Orrego	379	High temperature heat pumps applications for industrial separation and drying processes
12:20-12:40	Hannah	Krützfeldt	314	Analyzing the influence of temperature modeling in heat pump system optimization with mixed-integer linear programming

Session 5D	Room A/B|Exergy I|Chair person Anna Stoppato			
Time	**Presenter**		**ID**	**Title**
11:20-11:40	Valentina	Bonetti	473	Exergy design and energy storage: an experimental heating system for supply-demand decoupling
11:40-12:00	Christian	Wolf	551	Advanced Exergy Analysis: A Case Study of an Absorption Heat Transformer Using a Geothermal Heat Source
12:00-12:20	Volodymyr	Voloshchuk	478	* Exergy-based analysis of heat pump using surplus heat from data centre for medium sized district heating and CO2/propane-based mixtures
12:20-12:40	Mathias	Hofmann	143	Thermal Engineering Systems in Python (TESPy): The implementation and validation of the chemical exergy

Tuesday - Session 6 - 14:40 - 16:00

Session 6A	Room Kødbyen/Enghave Plads|Sustainability & Circular Economy II|Chair person René Hofmann			
Time	**Presenter**		**ID**	**Title**
14:40-15:00	Despina	Magiri-Skouloudi	555	Environmental assessment of biological CO2 capture and utilization (Bio-CCU) applications for the production of platform chemicals from industrial waste gases
15:00-15:20	Xiaoqu	Han	107	* Comparative life cycle analysis of battery energy storage technologies for grid applications: Case study in China
15:20-15:40	Ronelly	De Souza	266	Life Cycle Assessment Applied to an ORC System Operating Under Two Modes: Evaluation of Two LCIA Methods
15:40-16:00	Yoann	Jovet	229	Environmental assessment of electrification of food industry for Denmark and France

Session 6B	Room Vesterbro/Tivoli|Energy Storage IV|Chair person Kurt Engelbrecht			
Time	**Presenter**		**ID**	**Title**
14:40-15:00	Alberto	Benato	385	Thermal Energy Storage System integrating into a PV facility
15:00-15:20	Adriano	Sciacovelli	211	Thermo-mechanical energy storage options for long-duration storage – A techno-economic comparative assessment of established and novel concepts
15:20-15:40	Nishith Babubhai	Desai	431	A pseudo-analytical model based on the enthalpy approach for the simulation of packed-bed rock thermal energy storage systems
15:40-16:00	Mosè	Rossi	92	Thermal Energy Storage (TES) application in an Italian District Heating (DH) network: A Computational Fluid Dynamic (CFD) analysis to assess the operating efficiency

Session 6C	Room Hovedbanegården|Refrigeration and Heat Pumps IV|Chair person Yoshiharu Amano			
Time	**Presenter**		**ID**	**Title**
14:40-15:00	Tetsuya	Wakui	515	* Optimal Operation of Vapor-compression Type Air-conditioning System Based on Hierarchical Utilization of Model Predictive Control and Multiple Feedback Controls
15:00-15:20	Wiebke	Meesenburg	336	Prediction of heat pump evaporator fouling for predictive maintenance
15:20-15:40	Bernd	Windholz	486	Simulation towards demonstration: A Digital-Twin for developing control concepts of an industrial-scale Rotation Heat Pump
15:40-16:00	Mohamed Tahar	Mabrouk	361	Assessment of a data-driven model of a heat pump using synthetic data generated from a physical dynamic model

Session 6D	Room A/B|Hydrogen use in Energy Systems & Fuel Cells II|Chair person Francois Marechal			
Time	**Presenter**		**ID**	**Title**
14:40-15:00	Hye Rim	Kim	223	Performance analysis of a hydrogen-fueled PAFC triple system for high efficiency
15:00-15:20	Konstantina	Peloriadi	530	Solid oxide fuel cell – micro gas turbine (SOFC/MGT) hybrid power system: Techno-economic assessment and potential integration on Patmos Island
15:20-15:40	Kalimuthu	Selvam	463	* Thermodynamic analysis of ultra-efficient ammonia-fed SOFC system.
15:40-16:00				

Tuesday - Session 7 - 16:40 - 18:00

Session 7A	Room Kødbyen/Enghave Plads|Hydrogen use in Energy Systems & Fuel Cells III|Chair person Eden Mamut			
Time	**Presenter**		**ID**	**Title**
16:40-17:00	Assaad	Zoughaib	542	Levelized cost and carbone content of hydrogen produced by electrolysis
17:00-17:20	Saeed	Sayadi	76	Feasibility study of green hydrogen production and export in Iran
17:20-17:40	Jacek	Leyko	273	The influence of HHO gas fuel addition on the efficiency and operation stability of spark ignition engine
17:40-18:00	Alexander	Holtwerth	130	Investigation on the influence of real-world weather and demand forecasts on the model predictive control of a hydrogen-battery energy storage system

Session 7B	Room Vesterbro/Tivoli|Renewable Energy - solar, wind, hydro, etc.II|Chair person Alberto Benato			
Time	**Presenter**		**ID**	**Title**
16:40-17:00	Rafaela	Agathokleous	136	Methods to achieve PV cooling in building integrated photovoltaic (BIPV) systems: An experimental investigation
17:00-17:20	Judit	García Ferrero	183	Techno-economic analysis of Brayton concentrated solar power systems in the context of other power generation technologies
17:20-17:40	Alessandro	Colangelo	185	Towards near-zero Energy Buildings: lessons learnt from the RE-cognition project
17:40-18:00	Mario	Petrollese	490	Energetic benefits and Life Cycle Assessment of a hybrid CSP-biomass power plant

Session 7D	Room A/B|Panel Discussion on the future of Thermoeconomics|Chair person Antonio Valero			
Time	Presenter		ID	Title
16:40-17:00				
17:00-17:20				
17:20-17:40				
17:40-18:00				

Wednesday - Session 8 - 09:00 - 10:40

Session 8A	Room Kødbyen/Enghave Plads|Energy Use in the Residential Sector II|Chair person Ana Maria Blanco Marigorta			
Time	**Presenter**		**ID**	**Title**
09:00-09:20	Edward	O Dwyer	487	Automating the data-driven predictive control design process for building thermal management
09:20-09:40	Dorsan	Lepour	394	Decentralized ICT integration in residential buildings
09:40-10:00	Jan	Richarz	380	Robust optimal multi-year modernization roadmaps for typical existing buildings
10:00-10:20	Abdelatif	Merabtine	465	Direct sun radiation could cause overheating in large glazed buildings in winter season : A case study
10:20-10:40	Gopalakrishna	Gangisetty	451	Selection of nano-particulate material for improved passive cooling skylight performance.

Session 8B	Room Vesterbro/Tivoli|Process Simulation and Optimization II|Chair person Nishith Babubhai Desai			
Time	**Presenter**		**ID**	**Title**
09:00-09:20	Xiaoye	Cai	74	Automated modeling of mode-based control algorithms in a hierarchical fuzzy logic controller described in fuzzy Petri nets
09:20-09:40	Katarina	Simic	534	Commissioning and numerical performance assessment of a hybrid heat pump system for an educational building
09:40-10:00	Meire Ellen Gorete	Ribeiro Domingos	363	Efficient exploration of Pareto-optimal designs of carbon capture units using surrogates models
10:00-10:20	Hamid	Rashidi	395	* An Investigation of the Kinetics of Biomass Gasification in the Literature Using a Pre-Validated Model
10:20-10:40	Ryohei	Yokoyama	166	* Evaluation of Robustness in Multiple Performance Criteria for Designing Energy Supply Systems Based on a Mixed-Integer Linear Model

Session 8C	Room Hovedbanegården|Distributed generation|Chair person Daniel Florez-Orrego			
Time	**Presenter**		**ID**	**Title**
09:00-09:20	Sara	Fakih	332	Optimal planning of renewables and storage systems based on meta-heuristic and optimal power flow models
09:20-09:40	Giulia	Mancò	326	Optimization analysis of a renewable-based multi-energy system for a tertiary building
09:40-10:00	Vittorio	Verda	357	Integration of innovative and conventional renewable technologies in nearly Zero-Energy Buildings
10:00-10:20	Mahdi	Majidniya	153	Optimal scheduling of energy and mass flows based on networked multi-carrier hubs formulation : a general framework
10:20-10:40	Umberto	Tesio	329	Implementation of thermal network simulation in operation optimization of an energy system

Session 8D	Room A/B|Industrial Energy use II|Chair person Mauro Reini			
Time	**Presenter**		**ID**	**Title**
09:00-09:20	Morten	Petersen	519	Electrification of industrial processes with low-to-medium temperature heat demand: Case study of pectin production
09:20-09:40	Rasmus Jelsbak	Knudsen	541	Integration of High Temperature Heat Pump in a brewery
09:40-10:00	Elin	Svensson	180	Targeting excess heat recovery in an oil refinery plant implementing large-scale carbon capture and power-to-hydrogen
10:00-10:20	Ebbe Hauge	Jensen	578	Cost Reductions in CO2 Capture Systems through Systems Optimizations and Integration of Heat Pump Systems: A Case Study for a Power-Only Waste-to-Energy Plant
10:20-10:40	Jierong	Liang	510	Full electrification opportunities of spray dryers in milk powder processes

Wednesday - Session 9 - 11:20 - 12:40

Session 9A	**Room Kødbyen/Enghave Plads|Energy Use in the Residential Sector II|Chair person Tingting Zhu**			
Time	**Presenter**		**ID**	**Title**
11:20-11:40	Joseph	Brisson	374	Sensitivity analysis to assess the robustness of model predictive control of a building heat demand
11:40-12:00	Cédric	Terrier	172	Potential of electric mobility as service to the grid in renewable energy hubs.
12:00-12:20	Natasa	Vulic	517	Optimization of PV installation angles for increased self-sufficiency in residential neighbourhoods
12:20-12:40	Jierong	Liang	514	The potential application of a magnetocaloric heat pump in ultra-low temperature district heating systems

Session 9B	**Room Vesterbro/Tivoli|Basic and applied thermodynamics I|Chair person Nasrin Arjomand Kermani**			
Time	**Presenter**		**ID**	**Title**
11:20-11:40	Bruno	Muniz de Freitas Miotto	509	Sizing, Analysis and Comparison of two WHR Systems Integrated with a Large Internal Combustion Engine for Intake Air Conditioning
11:40-12:00	Efstathios	Michaelides	527	Carbon Capture and Storage – A Thermodynamic Analysis
12:00-12:20	Asfaw	Beyene	218	Computational and Experimental Study of Vortex Cooling Using CFD, 3-D PIV, and Liquid Crystals
12:20-12:40	Asfaw	Beyene	219	Vortex cooling of a gas turbine blade: comparison of single and bidirectional swirl formation

Session 9C	**Room Hovedbanegården|Exergy II|Chair person Jonas Kjær Jensen**			
Time	**Presenter**		**ID**	**Title**
11:20-11:40	Felipe	Godoy Righetto	190	* Exergy analysis of a sugarcane plant: A simple model and first approach to its exergy efficiency
11:40-12:00	Ricardo	Magdalena	187	Identification of critical raw materials and potential bottlenecks in vehicles through a thermodynamic approach
12:00-12:20	Bárbara	Palacino	416	Exergy assessment of soil fertility and erosion
12:20-12:40	Alfonso	Biondi	160	* Thermodynamic analysis driven by BIG-DATA: A Novel approach to the Extended Exergy Analysis (EEA) of Complex Systems - Methodology.

Session 9D	**Room A/B|Renewable energy - solar, wind, hydro, etc. III|Chair person Ali Akbar Eftekhari**			
Time	**Presenter**		**ID**	**Title**
11:20-11:40	Zak	Hawthorne	367	An evaluation of turbulence model suitability for use in Computational Fluid Dynamics of Wells turbines in oscillating water column fluid flow conditions.
11:40-12:00	Eng Jet	Yeo	358	* Site specific optimised tidal current turbine blade design using improved and validated coupled Non-dominated Sorting Genetic Algorithm – Blade Element Momentum Theory
12:00-12:20	Efstathios	Michaelides	457	Electricity Generation by Renewables – Required Infrastructure and Effects on Sustainability Goals
12:20-12:40				

Wednesday - Session 10 - 14:40 - 16:00

Session 10A	**Room Kødbyen/Enghave Plads|Heat and mass transfer I|Chair person Erwin Franquet**			
Time	**Presenter**		**ID**	**Title**
14:40-15:00	Flavia	V. Barbosa	525	*Heat transfer augmentation in solar systems using multiple air jet impingement and porous surfaces
15:00-15:20	Ki-Yeol	Shin	251	Experiments and analytical verification studies on the evaluation of heat dissipation performance according to changes in the thermal properties of LED heat sinks
15:20-15:40	Pascal	Tobaly	602	Upward flow boiling of R134a + R245fa equimolar mixture in plate finned heat exchanger
15:40-16:00				

Session 10B	**Room Vesterbro/Tivoli|Smart grids and renewables I|Chair person Young Duk Lee**			
Time	**Presenter**		**ID**	**Title**
14:40-15:00	Luca	Rava	362	Assessment of Varying Coupling Levels between Electric & Thermal networks at District Level using Co-Simulation and Model-predictive Control
15:00-15:20	Akira	Yoshida	338	Multihorizon Forecasting and Operational Planning Method of Energy Storage Under a Demand Response
15:20-15:40	Dimitrios	Rakopoulos	97	Development of a multi-dimensional Key Performance Indicators' framework for the holistic performance assessment of Smart Grids
15:40-16:00	Gabriele	Volpato	466	A stochastic programming optimization framework to design an energy system and face market stages

Session 10C	**Room Hovedbanegården|Computational Thermo-Fluid Dynamics (CFD) I|Chair Person Sotirios Karellas**			
Time	**Presenter**		**ID**	**Title**
14:40-15:00	Arash	Nemati	520	CFD analysis of a premixed green e-fuel combustion with large eddy simulation: effects of the number of pilot fuel nozzle holes on auto-ignition
15:00-15:20	Jaroslaw	Hercog	500	CFD study of the thermal effects of increasing the share of refuse-derived fuel in a rotary cement kiln
15:20-15:40	Enrico	Sciubba	116	A filter-less LES model based on the local minimization of the entropy generation rate: model description
15:40-16:00				

Session 10D	**Room A/B|Hydrogen use in Energy Systems & Fuel Cells IV|Chair person Asfaw Beyne**			
Time	**Presenter**		**ID**	**Title**
14:40-15:00	Rodolfo	Taccani	572	A MILP multi-objective optimization approach for assessing the optimal decarbonization strategies of industrial port districts under different energy scenarios
15:00-15:20	Tobias	Beckhölter	547	Comparison of optimization-based operation strategies for a hydrogen-based district energy system
15:20-15:40	Rodolfo	Taccani	571	An insight on PEM fuel cells ship propulsion systems waste heat recovery
15:40-16:00	Nicolas	Paulus	11	Field-test economic and ecological performance of Proton Exchange Membrane Fuel Cells (PEMFC) used in micro-combined heat and power residential applications (micro-CHP)

Wednesday - Session 11 - 16:40 - 17:40

Session 11A	**Room Kødbyen/Enghave Plads|Heat and mass transfer II|Chair person Elin Svensson**			
Time	**Presenter**		**ID**	**Title**
16:40-17:00	Markus	Pollak	156	Second Law Analysis of a Membrane Humidifier under Various Operating Conditions
17:00-17:20	Massimiliano	Renzi	215	Exploitation of the hidden hydropower potential downstream a weir
17:20-17:40	Lütfullah	Kuddusi	562	Exact Solution for Heat Transfer Problem in the Entrance Region of Annuli Considering Constant Heat Flux on One Wall and Constant Temperature on Other Wall

Session 11B	**Room Vesterbro/Tivoli|Smart grids and renewables II|Chair person René Hofmann**			
Time	**Presenter**		**ID**	**Title**
16:40-17:00	Elisa	Guelpa	356	Overcoming bottlenecks due to supply temperature reductions in existing district heating
17:00-17:20	Sarah	Henn	377	Community-based local energy markets for residential neighborhoods
17:20-17:40	Andrea	Bartolini	524	A novel methodology and MILP formulation to account for Demand Side Flexibility potential in the scheduling of distributed energy systems.

Session 11C	**Room Hovedbanegården|Computational Thermo-Fluid Dynamics (CFD) II|Chair person Kurt Engelbrecht**			
Time	**Presenter**		**ID**	**Title**
16:40-17:00	Alberto	Benato	387	CFD investigation of a Venturi tube for wastewater treatment applications
17:00-17:20	Joelle	Najib	237	Design Methodology of a Radial Turbine for Series Hybrid Electric Vehicles
17:20-17:40	Chee Meng	Pang	381	* An investigation of array configuration of tidal current turbines in RANS CFD using a hybrid BEM-AD method.

Thursday - Session 12 - 09:00 - 10:40

Session 12A	Room Kødbyen/Enghave Plads | Basic and applied thermodynamics II | Chair person Francois Marechal			
Time	**Presenter**		**ID**	**Title**
09:00-09:20	Michel	Moliere	17	Emerging thermodynamic cycles and thermal power generation
09:20-09:40	Assaad	Zoughaib	535	Assessment of exhaust gas recirculation (EGR) in gas turbines: a thermodynamic approach
09:40-10:00	Somchart	Chantasiriwan	220	Investigation of the Use of Steam-air Preheater to Increase the Overall Efficiency of Thermal Power Plant
10:00-10:20	Yousef	Haseli	605	* Theory of Allam Cycle
10:20-10:40	Nasrin	Arjomand Kermani	592	A systematic review of electrification technologies for Danish food and beverage industry

Session 12B	Room Vesterbro/Tivoli | District heating/cooling | Chair person Elisa Guelpa			
Time	**Presenter**		**ID**	**Title**
09:00-09:20	Manfredi	Neri	238	Unleashing district cooling potential through design optimization
09:20-09:40	Martina	Capone	281	Unlocking Supply Temperature Reduction in existing District Heating infrastructures
09:40-10:00	Jerry	Lambert	334	A Nonlinear Optimization Method for the Topological Design of District Heating Systems
10:00-10:20	Jan	Stock	82	Low-grade waste heat integration into an existing high-temperature district heating system at the research centre in Jülich, Germany
10:20-10:40				

Session 12C	Room Hovedbanegården | Energy system analysis | Chair person Andrea Lazzaretto			
Time	**Presenter**		**ID**	**Title**
09:00-09:20	Nicolas	Campion	184	Quantification of costs and greenhouse gases emissions related to e-fuels production
09:20-09:40	Rafael	Castro-Amoedo	448	An optimization approach for plastic waste management policies in Switzerland
09:40-10:00	Andreas	Hanel	242	Optimized Use of Polygeneration Plants in a Highly Coupled Energy System Model
10:00-10:20	Jorge	Torrubia	557	Ecological, spatial and critical material footprints as limiting indicators of sustainability in a bioregion
10:20-10:40	Jonas	Schnidrig	7	Assessment of the role of infrastructure in high share renewable energy systems

Thursday - Session 13 - 11:20 - 12:40

Session 13A	Room Kødbyen/Enghave Plads | Digitalization, big data, artificial intelligence | Chair person Adriano Sciacovelli			
Time	**Presenter**		**ID**	**Title**
11:20-11:40	Laura	Maier	170	Evaluating the Effect of Using Representative Days for Approximated Model Predictive Control Applications in Heat Pump Systems
11:40-12:00	Phillip	Stoffel	263	An Online Learning Approach for Data-Driven Model Predictive Control in Building Energy Systems
12:00-12:20	Thomas	Schreiber	13	Improving the application of Reinforcement Learning for load shifting in a cooling system through state-of-the-art algorithms and hyper-parameter optimization
12:20-12:40	Jorge	Solis	584	Short-time Forecasting of Electric Energy Production for Housing Cooperative with a Grid Connected PV System

Session 13B	Room Vesterbro/Tivoli | Organic Rankine Cycle (ORC) and low grade thermal energy recovery | Chair person Fredrik Haglind			
Time	**Presenter**		**ID**	**Title**
11:20-11:40	Christopher	Schifflechner	181	Optimal integration of different absorption chillers in geothermal trigeneration systems with Organic Rankine Cycles
11:40-12:00	Diego Antonio	Rodriguez Pastor	546	An ORC–Unglazed Air collectors integration for hybrid distributed microgeneration
12:00-12:20	Florian	Kaufmann	104	Techno-Economic Evaluation of Reversible Organic Rankine Cycles in Geothermal Combined Heat and Power Plants
12:20-12:40				

Session 13C	Room Hovedbanegården | Exergy III | Chair person Anna Stoppato			
Time	**Presenter**		**ID**	**Title**
11:20-11:40	Amanda	Rocha da Silva	254	* Exergy Analysis Applied to Tumor Growth
11:40-12:00	Hideo	Asada	311	Experimental study on differences in human body exergy balance between a person in radiant and convection heating/cooling rooms
12:00-12:20	Ricardo Morel	Hartmann	402	Thermodynamic assessment of Latin American cities applying exergetic efficiency
12:20-12:40	Ali Akbar	Eftekhari	342	Environmental and technical advantages and bottlenecks of carbon dioxide capture and storage from a thermodynamic perspective