7th	International	Conference on

Smart Energy Systems

4th Generation District Heating, Electrification, Electrofuels and Energy Efficiency

21-22 September 2021, Copenhagen

#SESAAU2021

Tuesday 21 September 2021 at 09:00-11:00

09:00-11:001st plenary session chaired by Professor Poul Alberg Østergaard09:00-09:10Professor Henrik Lund: Opening speech09:10-09:40Keynote: Anders Nordstrøm, Vice President of Hydrogen at Ørsted, Denmark: Title to be confirmed09:40-10:10Keynote: Liliana Proskuryakova, Deputy Head and leading researcher at HSE, Russia: The future of renewable energy and a renewable energy system
in Russia10:10-10:30Questions and debate10:30-11:00Keynote: Claudia Kemfert, Professor and Head of Department at DIW, Germany: Corona crisis: Chance for decentralized energy system
transformation with full supply from renewable energies

Wednesday 22 September 2021 at 13:45-16:00

13:45-16:002nd plenary session chaired by Professor Brian Vad Mathiesen13:45-14:15Keynote: Poul Skjærbæk, Chief Innovation Officer at Siemens Gamesa, Denmark: Unlocking the Green Hydrogen revolution at the sea14:15-14:45Keynote: Dan Jørgensen, Minister for Climate, Energy and Utilities, Denmark (To be confirmed)14:45-15:15Keynote: Rufus Gifford, former U.S. ambassador to Denmark and nominee for Chief of Protocol at the U.S. State Department (To be confirmed)15:15-15:40Panel debate15:40-15:50Best Presentation Award Ceremony by Professor Poul Alberg Østergaard15:50-16:00Closing by Professor Henrik Lund and CEO Glenda Napier





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Smart energy system analyses, tools and methodologies

Thomas Bernard: ML4Heat - Tools for the optimized operation of existing district heating networks based on machine learning methods

Lorenzo Cassetti: Realization and energy assessment algorithm of a Horizontal Packed Bed Regenerator for Thermal Energy Storage

Mostafa Fallahnejad: District heating distribution grid costs: comparison of two approaches

Tao Feng: Companies' acceptance of innovative energy facility: Results of a simultaneous equation approach

Kirstin Ganz: How can energy system modeling electricity prices be adjusted to reflect real price spreads for flexible assets in the future?

Regina Hemm: Optimization of the bidding strategy of a virtual power plant by participating in short-term, balancing- and redispatch markets

Jin Hur: A practical metric to evaluate the ramp events of wind generating resources to enhance the security of Smart Energy Systems

Thanh Huynh: Local Energy Markets for Thermal-Electric Energy Systems considering energy carrier dependency and energy storages

Jiao Jiao: Text Mining based Identification of **Emerging Technologies and Business Models** for Smart Energy Systems

Kevin Knosala: Generic Input Generation for **Residential District Energy System Models** from Open Data for Germany

Lukas Kranzl: The economic potential of district heating under climate neutrality: the case of Austria

Jacopo de Maigret: A multi-objective optimization approach in defining the decarbonisation strategy of a refinery

Hannah Mareike Marczinkowski: Modelling renewable energy islands and their role in energy transitions

Marko Mimica: A stochastic model for smart energy systems analysis

Adrian Ostermann: Forecasting charging station occupancy using supervised learning algorithms

Martin Lindgaard Pedersen: Digital tools for refurbishment planning based on facts and choice of pipe system based on Total Cost of Ownership and CO2 emission

Tim Pedersen: Modeling all alternative solutions for highly renewable energy systems

Matteo Giacomo Prina: Bottom-up method to derive Cost curves for heat savings in buildings for all European countries

Callum Rae: What can past examples teach us about the rollout and scale-up of smart energy systems?

Morten Karstoft Rasmussen: Connecting the DH value chain with smart meter data

Dmitry Romanov: District heating systems modelling: A gamification approach

Costanza Saletti: A hierarchical control algorithm with yearly and daily horizons for optimally managing district energy systems

Salman Siddiqui: District heating and the GB electricity system in a zero-emission scenario

Goran Stunjek: Analysis of hydropower impact in water energy nexus for smart energy systems

Anna Vannahme: General Optimization Guideline for District Heating Networks and its exemplary Application

Volodymyr Voloshchuk: Exergy-based performance degradation diagnosis for use in digital twins of thermal systems



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Smart energy infrastructure and storage options

David Barns: Enabling geoexchange in cities: success factors from UK examples

Morten Vang Bobach: Multi-purpose Pit Thermal Energy Storage in Combination with Heat Pumps

Charles Hansen: Reducing carbon emissions through low temperature district heating zones

Hanne Kauko: Investment analysis of a local energy system with seasonal thermal energy storage

Pietro Lubello: Assessment of hydrogen based long-term electrical energy storage in residential energy systems Andrew Lyden: Seasonal thermal energy storage in smart energy systems to provide flexibility services

Erika Dal Monte: Thermal Storage Integration in a Smart Thermal Grid

Michael Reisenbichler: Methodology development for accelerated generation of thermal energy storage models for transient system simulations

Thomas Riegler: Novel cover design with usable surface for large-scale pit thermal energy storages

Jesper Tange: Improving efficiency and scaling up Pit Thermal Energy Storages (PTES) with unique lid design

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Integrated energy systems and smart grids

Mads R. Almassalkhi: Characterizing the reactive power capability of wind farm collector networks

Anders Bavnhøj Hansen: System scenarios towards climate neutrality by use of smart Energy systems solutions

Andrei David Korberg: Supply chain effects of the extreme hydrogen society

Marie-Alix Dupré la Tour: Flexibility enhancement using heat networks within large scale sector coupling studies

Philip Fosbøl: Title to be confirmed

Oddgeir Gudmundsson: The role of hydrogen in the future heat supply system

David Huckebrink: Coupling and comparison of hydrogen technologies with heat-pumps to decarbonise the residential heating sector **Benedikt Leitner**: Testbed to evaluate digital solutions in integrated district heating and electrical grids: First results

Søren Lyng Ebbehøj: Potential roles for power-to-x and CCUS technologies in Denmark's green transition

Mathias Müller: Future grid load with bidirectional electric vehicles

Henrik Schwaeppe: Analysing systemic advantages of district heating in an integrated transmission and generation expansion planning model

Lu Shen: Multi-energy cluster partition with CHPs for distributed optimization and control of the integrated energy system

Hammam Soliman: Power-to-X / Electricityto-Hydrogen – CAPEX & OPEX Vs. Integrated Production

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Planning and organisational challenges for smart energy systems and district heating

Sara Ben Amer: How successful is municipal energy planning in Denmark quantifying the impact

Nick Bjørn Andersen: District Heating in Copenhagen – challenges and perspectives

Dagnija Blumberga: Smart Heat Tariffs in transition to free market

Claudia Mădălina Dumitru: Optimizing the development process of a hybrid energy supply system based on renewable sources using the LEAN methodology

Britta Kleinertz: Heat Transformation Munich – Analysis and strategy definition for a systemic cost optimal heat supply transformation

Ari Laitala: Understanding the profitability of the energy (efficiency) investments – things to consider before putting billions into game

David Maya-Drysdale: Achieving carbon neutrality in cities: Lessons from a leader

Matteo Pozzi and Alessandro Capretti: Planning large district heating network developments based on Waste Heat Recovery

Alexandra Purkus: Guarantees of Origin for green district heating: An analysis of legal framework conditions and system design options

Kerstin Sernhed: Synthesis of Swedish district heating research (2018-2021)

Daniel Møller Sneum: Discounting assumptions in district energy

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Energy savings in the electricity sector, buildings, transport and industry

Gerald Birngruber: Digital Energy Twins -**Optimised Operation and Design of Industrial Energy Systems**

Johannes Exenberger: Using hybrid cosimulation for deep reinforcement learning: A case study

Marcus Hummel: How cost efficient is energy efficiency in buildings? A comparison of building shell efficiency & heating system change in the European building stock

Philipp Mascherbauer: Investigating the demand side flexibility of the building stock

Nikola Matak: Selection of mitigation actions in Smart SECAPs through comparison of individual and joint implementation

Hironao Matsubara: 100% Renewable Energy Scenario in Tokyo metropolitan area with green recovery by 2050

Andreas Müller: How to decarbonize Munich's district heating production in longterm? Forecasting the space heating demand of Munich

Tobias Reum: Experimental Investigation of a novel Hybrid Heat Pump

Pierre JC Vogler-Finck: Data-driven operation of building heating to support the energy transition at community level - Learnings from field applications

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4th Generation District Heating concepts, future district heating production and systems

Felix Agner: Improving robustness to peak load conditions in district heating networks through scalable control coordination subject to network constraints

Weena Bergstraesser: Transformation of a University Campus District Heating Network towards 100 % Renewable Energy Supply

Jakob Binder: Interconnection and smart control of district heating networks for increased flexibility

Luca Casamassima: A proposed Pathway to future-proof current building stock for upcoming 4th generation district heating in the scope of Positive Energy Districts

Marco Cozzini: Performance measurement and detailed modelling of an existing neutral -temperature district heating network based on decentralized heat pumps

Christian Engel: Green deal impact of DHC networks: how best preforming piping systems make DHC even more attractive

Jonas Gottschald: Data-based multi-criteria operational optimization of district heating supply while reducing balancing energy

Joseph Maria Jebamalai: Design of Two Pipe District Heating and Cooling Networks using Ring and Meshed Network Configuration – A Case Study

Henrik Lund: Transition to 4th Generation District Heating and Motivation Tariffs

Kristina Lygnerud: Implementation of low temperature district heating

Yannis Merlet: Formulation and assessment of multi-objective sizing: application to low temperature District-Heating networks

Ali Moallemi: COOL DH: A Pioneering Project to Implement Low Temperature District Heating (LTDH) Systems As an Integrated Part of Smart Energy Systems

Kevin Naik: A real-life data driven model for district heating

leva Pakere: Pathways toward carbon neutral 4th generation district heating system in Latvia

Rémi Patureau: Comparison of two district heating and cooling designs based on dynamic simulation

Stefan Puschnigg: An analysis of cascaded low-temperature sub-networks in existing district heating networks

Dietrich Schmidt: Low temperature district heating as a proven and market ready technology – Case studies of IEA DHC ANNEX TS2

Artem Sotnikov: Hydrothermal challenges in low-temperature networks with distributed heat pumps

Jan Eric Thorsen: Insights on domestic hot water consumption for multi flat buildings

Marc-André Triebel: Techno-Economic and Ecological Evaluation of Different District Heating Network Generations for two German Districts

Anna Volkova: Competitiveness of individual heat pumps in the Baltic states

Sven Werner: Network configurations for low-temperature district heating

Meng Yuan: District heating in 100% renewable energy systems: Combining industrial excess heat and heat pumps

Dorte Skaarup Østergaard: Combined district heating and cooling – which solutions are available and are they applicable in a Danish context?

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				Cluster A A L BORG UNIVERSITY	
Electrification of transport, heating and industry		cation of transport, heating ustry	Geographical Information Systems (GIS) for energy systems, heat planning and district heating	Renewable energy sources and waste heat sources for district heating	Special Session: IEA DHC Annex TS3
	Annika Bo systems to Georg Bra planning f systems Leif Gusta primary e biofuel an Sajjad Hai pricing mo distributio Kertu Lep units as flo Oliver Rul stabilizes case of hy Kasper T. of modula	 oldrini: On the role of district heating o provide balancing services in the EU andstätter: Efficient area of operation for free-floating electric car sharing avsson: A lifecycle comparison of nergy use and climate impact of id electric cars ider: A novel, decentralized spatial odel for peer-to-peer electricity on to consumers and electric vehicles iksaar: Centralised power-to-heat exible consumers in the power grid hnau: How flexible electricity demand wind and solar market values: The odrogen electrolyzers Therkildsen: Large scale deployment ar pressurised alkaline electrolysers er: Large-scale heat pumps for district Lessons learned from real applications 	 Andra Blumberga: Spatial analyses of smart energy system implementation through system dynamics and GIS modelling Alice Dénarié: An open spatial optimisation model to asses economically sustainable national district heating potential Bernd Möller: An empirical high-resolution geospatial model of future population distribution for assessing heat demands Ulrich Reiter: Decarbonizing the Swiss energy demand from buildings Luis Sánchez-García: A Closer Look at the Effective Width for District Heating Systems Abdulraheem Salaymeh: Assessment of the influence of demographics, refurbishment and the climate on the heat demand in district heating planning 	 Dario Dall'Ara: Solar energy in low temperature district heating: monitoring and simulation of an innovative district in Milan Patrick Geiger: RES-DHC - Transformation of existing urban district heating and cooling systems from fossil to renewable energy sources Eduard Latõšov: CO2 emission intensity of the Estonian district heating sector Aleksandr Ledvanov: Free cooling and district heating supply usage for Tallinn district cooling production Mihai-Rareş Sandu: Analysis and optimisation of a renewable energy hybrid system operation Vladimir Vidović: Solving barriers for effective utilization of Seawater Heat Pumps for heating and cooling in the Adriatic region Jelena Ziemele: Validity assessment of the waste heat integration into a district heating system: Case of the city of Riga 	 Ralf-Roman Schmidt: Integrated District Heating and Cooling Systems: Overview of the results of the international cooperation project IEA DHC Annex TS3 Peter Sorknæs: Energy system synergies of hybrid energy network technologies Edmund Widl: Categorization of tools and methods for modeling and simulating hybrid energy systems Anton Ianakiev: Hybrid Energy Networks - Demo Case studies Dennis Cronbach: On business models and the regulatory framework of hybrid grids