7th International Conference on

Smart Energy Systems

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

21-22 September 2021, Copenhagen

#SESAAU2021

PRELIMINARY ONLINE PROGRAMME

LIVE SESSIONS

energy CLUSTER DENMARK

AALBORG UNIVERSITY

Tuesday 21 September 2021 at 09:00-11:00 — LIVE SESSION

09:00-11:00 1st plenary session chaired by Professor Poul Alberg Østergaard

09:00-09:10 **Professor Henrik Lund:** Opening speech

09:10-09:30 **Keynote (online): Claudia Kemfert, Professor and Head of Department at DIW, Germany:** Corona crisis: Chance for decentralized energy system transformation with full supply from renewable energies

09:30-09:40 Questions and debate

09:40-10:10 **Keynote: Anders Nordstrøm, Vice President of Hydrogen at Ørsted, Denmark:** *Title to be confirmed*

10:10-10:40 **Keynote: Poul Skjærbæk, Chief Innovation Officer at Siemens Gamesa, Denmark:** Unlocking the Green Hydrogen revolution at the sea

10:40-11:00 Questions and debate

Wednesday 22 September 2021 at 13:45-16:00 — LIVE SESSION

13:45-16:00 2nd plenary session chaired by Professor Brian Vad Mathiesen

13:45-14:15 **Keynote: Liliana Proskuryakova, Deputy Head and leading researcher at HSE, Russia:** The future of renewable energy and renewable energy systems in Russia

14:15-14:30 Questions and debate

14:30-15:00 **Keynote: Rufus Gifford, former U.S. ambassador to Denmark and nominee for Chief of Protocol at the U.S. State Department (To be confirmed)**

15:00-15:40 Questions and debate

15:40-15:50 Best Presentation Award Ceremony by Professor Poul Alberg Østergaard

15:50-16:00 Closing by Professor Henrik Lund and CEO Glenda Napier

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SESSIONS OPEN 17-24 SEPTEMBER 2021

energy CLUSTER DENMARK

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Smart energy system analyses, tools and methodologies

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

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

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

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

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: Potential for CCS and CCUS electrification towards reducing impact of climate change

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

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

Thomas Natiesta: Testbed to evaluate digital solutions in integrated district heating and electrical grids: First results

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 / Electricity-to-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

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

Tore Friis Gad Kjeld: District Heating in Copenhagen – challenges and perspectives

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

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

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

Daniel Møller Sneum: Discounting assumptions in district energy

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

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

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 long-term? Forecasting the space heating demand of Munich

Tobias Reum: Experimental Investigation of a novel Hybrid Heat Pump

Daniel Trier: Large-scale heat pumps for district heating – Lessons learned from real applications

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

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

Ieva 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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Electrification of transport, heating and industry

Annika Boldrini: On the role of district heating systems to provide balancing services in the EU

Georg Brandstätter: Efficient area of operation planning for free-floating electric car sharing systems

Leif Gustavsson: A lifecycle comparison of primary energy use and climate impact of biofuel and electric cars

Sajjad Haider: A novel, decentralized spatial pricing model for peer-to-peer electricity distribution to consumers and electric vehicles

Kertu Lepiksaar: Centralised power-to-heat units as flexible consumers in the power grid

Oliver Ruhnau: How flexible electricity demand stabilizes wind and solar market values: The case of hydrogen electrolyzers

Kasper T. Therkildsen: Large scale deployment of modular pressurised alkaline electrolysers

Geographical Information Systems (GIS) for energy systems, heat planning and district heating

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

Renewable energy sources and waste heat sources for district heating

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-Rareș Sandu: Analysis and optimisation of a renewable energy hybrid system operation

Peter Verboven: R-ACEs: fRamework for Actual Cooperation on Energy on Sites and Parks

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

Special Session: IEA DHC Annex TS3

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

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THURSDAY 23 SEPTEMBER 2021

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AALBORG UNIVERSITY

Online side event: Geothermal District Heating and Cooling

Thursday 23 September 2021

09:30 – 11:00 (9:30 - 11 am)

Geothermal District Heating and Cooling is an online side event organised by IRENA and EGEC in the framework of the International Conference on Smart Energy Systems and under the Umbrella of the of the Global Geothermal Alliance.

IRENA and EGEC co-organise this event to promote the deployment of geothermal energy for heating and cooling. The event will promote the development of district energy networks as a means to increase the share of renewables, including geothermal energy in the heating of buildings and the supply of domestic hot water. It will facilitate sharing of experiences and best practices as well as highlighting supportive tools, methodologies and options.

The event will be held virtually over the IRENA zoom platform for a duration of 1h 30 minutes.

Read more about the side event and register via IRENA.

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