

5TH INTERNATIONAL CONFERENCE ON

# Smart Energy Systems

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

10-11 SEPT 2019 • COPENHAGEN



AALBORG UNIVERSITY  
DENMARK

TENTATIVE PROGRAMME [Version 5 JULY]

Tuesday 10 September 2019

#SESAAU2019

08:00-09:00 Registration and breakfast Venue XX

09:00-11:00 1st plenary session Plenary room XX

09:00	Opening speech by Professor Henrik Lund
09:15	Plenary keynote by Professor Jianjun Xia
09:40	Plenary keynote by Kristian Ruby, Secretary General
10:05	Plenary keynote by David Connolly, PhD, CEO
10:30	Questions and discussion

10:45-11:15 Coffee break Venue XX

Parallel sessions 1-6	11:15-13:00 ROOM XX	11:15-13:00 ROOM XX	11:15-13:00 ROOM XX	11:15-13:00 ROOM XX	11:15-13:00 ROOM XX	11:15-13:00 ROOM XX
	<b>Session 1: Smart Energy Systems analyses, tools and methodologies</b>  <b>Session keynote:</b> <b>Dagnija Blumberga</b> Amir Mohammad J. Khoshbaf Borna Doračić Carles Ribas Tugores Ingo Leusbrock Carlo Winterscheid	<b>Session 2: Smart Energy Systems analyses, tools and methodologies</b>  <b>Session keynote:</b> <b>Pierrick Haurant</b> Bernhard Gerardts Jes Donneborg Arthur Clerjon Michael-Allan Millar Mariagrazia Dotoli	<b>Session 3: Integrated energy systems and smart grids</b>  <b>Session keynote:</b> <b>Ralf-Roman Schmidt</b> Behnam Zakeri Akos Revesz Mathieu Vallée Edward O'Dwyer Christian Johansson	<b>Session 4: GIS for energy systems, heat planning and DH</b>  <b>Session keynote:</b> <b>Bernd Möller</b> Eva Wiechers Hermann Edtmayer Marcus Hummel Magda Kowalska Mostafa Fallahnejad	<b>Session 5: Energy Lab Nordhavn</b>  <b>Session keynote:</b> <b>Jan Eric Thorsen</b> Christine Emilie Sandersen Hanmin Cai Henrik Pieper Kevin Michael Smith Rongling Li	<b>Session 6: 4GDH concepts, future DH production and systems</b>  <b>Session keynote:</b> <b>Ingo Weidlich</b> Annelies Vandermeulen Jens Møller Andersen Janette Webb Torben Ommen Helge Averfalk

13:00-14:00 Lunch Venue XX

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## TENTATIVE PROGRAMME Tuesday 10 September 2019 (continued)

<b>Parallel sessions 7-12</b>	<b>14:00-15:45 ROOM XX</b> <b>Session 7: Production, technologies and use of electrofuels in future energy systems</b> <b>Session keynote:</b> Mads Friis Jensen Steffen Nielsen Alessandro Guzzini Andrei David Benedetto Nastasi Jesper Schramm	<b>14:00-15:45 ROOM XX</b> <b>Session 8: Smart Energy Systems analyses, tools and methodologies</b> <b>Session keynote:</b> Gorm Bruun Andresen Egbert-Jan van Dijck Rowan Molony Kun Zhu Kristoffer Steen Andersen Roberto Bricalli	<b>14:00-15:45 ROOM XX</b> <b>Session 9: Planning and organisational challenges for SES and DH</b> <b>Session keynote:</b> Bent Ole Gram Mortensen Christian Thommessen Paolo Leoni Richard van Leeuwen Zhikun Wang Michiel Fremouw	<b>14:00-15:45 ROOM XX</b> <b>Session 10: Smart Energy Systems analyses, tools and methodologies</b> <b>Session keynote:</b> Paula Ferreira Géremi Gilson Dranka Rasmus Elbæk Hedegaard Sara Månsson Shahrooz Abghari Weronika Radziszewska	<b>14:00-15:45 ROOM XX</b> <b>Session 11: 4GDH concepts, future DH production and systems</b> <b>Session keynote:</b> Steen G Olesen David Edsbäcker Dennis Kerkhof Klaus G Lauridsen Sara Kralmark Klara Ottosson	<b>14:00-15:45 ROOM XX</b> <b>Session 12: RES and waste heat sources for district heating</b> <b>Session keynote:</b> Goran Krajačić Hiroyasu Shirato Shalika Walker Allan Oliveira Friederike Stelter Julio Vaillant Rebolgar		
	<b>15:45-16:15 Coffee break</b>							
	<b>Parallel sessions 13-18</b>	<b>16:15-17:45 ROOM XX</b> <b>Session 13: Institutional and organisational change for SES</b> <b>Session keynote:</b> Alessandro Provaggi Ari Laitala Kirsten Hasberg Leire Gorroño-Albizu Max Fette	<b>16:15-17:45 ROOM XX</b> <b>Session 14: Smart Energy infrastructure and storage options</b> <b>Session keynote:</b> Reinhard Haas Keith O'Donovan Tiziano Gallo Cassarino Michael Reisenbichler Joseph Maria Jebamalai	<b>16:15-17:45 ROOM XX</b> <b>Session 15: Electrification of transport, heating and industry</b> <b>Session keynote:</b> Tobias Fleiter Amela Ajanovic Eliana Lozano Timo Kannengiesser Elisa Guelpa	<b>16:15-17:45 ROOM XX</b> <b>Session 16: Smart Energy Systems analyses, tools and methodologies</b> <b>Session keynote:</b> Peter Sorknæs Roberta Roberto Els van der Roest Renee Heller Costanza Saletti	<b>16:15-17:45 ROOM XX</b> <b>Session 17: 4GDH concepts, future DH production and systems</b> <b>Session keynote:</b> Henrik Madsen Igor Krupenski Phil Jones Sabine Jansen Tobias Sommer	<b>16:15-17:45 ROOM XX</b> <b>Session 18: Smart Energy Systems analyses, tools and methodologies</b> <b>Session keynote:</b> Brian Elmegaard Francesco Neirotti Jann Launer Ashish Chawla Tom Prinzie	
		<b>17:45-19:30 Break</b>						
		<b>19:30 Conference dinner Restaurant "GRØFTEN", Tivoli</b>						

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# Smart Energy Systems

4th Generation District Heating, Electrification,  
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AALBORG UNIVERSITY  
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## TENTATIVE PROGRAMME

Wednesday 11 September 2019

#SESAU2019

Parallel sessions 19-24	<b>9:00-10:45 ROOM XX</b> <b>Session 19: Smart Energy Systems analyses, tools and methodologies</b>  <b>Session keynote:</b> <b>Philipp Schütz</b> Hagen Braas Martin Heine Kristensen Michele Tunzi Pierre J.C. Vogler-Finck Andra Blumberga	<b>9:00-10:45 ROOM XX</b> <b>Session 20: 4GDH concepts, future DH production and systems</b>  <b>Session keynote:</b> <b>Alfred Heller</b> Basak Falay Gerald Schweiger Leire Chavarri Richard Büchele Matteo Giacomo Prina	<b>9:00-10:45 ROOM XX</b> <b>Session 21: Integrated energy systems and smart grids</b>  <b>Session keynote:</b> <b>Vittorio Verda</b> Inger-Lise Svensson Monica Arnaudo Olatz Terreros Tijs Van Oevelen Shadie Broumandi	<b>9:00-10:45 ROOM XX</b> <b>Session 22: Smart Energy infrastructure and storage options</b>  <b>Session keynote:</b> <b>Anders Dyrelund</b> Gunnar Preiß Hans Christian Gils Sina Steinle Søren Møller Thomsen Giorgio Cucca	<b>9:00-10:45 ROOM XX</b> <b>Session 23: 4GDH concepts, future DH production and systems</b>  <b>Session keynote:</b> <b>Dietrich Schmidt</b> Hjörleifur G. Bergsteinsson Johannes Oltmanns Johan Dalgren Tobias Ramm Vilhjálmur Nielsen	<b>9:00-10:45 ROOM XX</b> <b>Session 24: Smart Energy Systems analyses, tools and methodologies</b>  <b>Session keynote:</b> <b>Morten Karstoft Rasmussen</b> Etienne Cuisinier Thibaut Résimont Can Tümer Ana Turk Danica Maljkovic
	<b>10:45-11:15 Coffee break</b> <span style="float: right;">Venue XX</span>					
Parallel sessions 25-30	<b>11:15-13:00 ROOM XX</b> <b>Session 25: Smart Energy Systems analyses, tools and methodologies</b>  <b>Session keynote:</b> <b>Henrik Dalsgaard</b> Stefan Holler Johannes Pelda Charlotte Marguerite Johannes Röder Saleh Mohammadi	<b>11:15-13:00 ROOM XX</b> <b>Session 26: 4GDH concepts, future DH production and systems</b>  <b>Session keynote:</b> <b>Tom Brown</b> Anna Volkova Dominik Franjo Dominković Hironao Matsubara Behzad Rismanchi Tetsunari Iida	<b>11:15-13:00 ROOM XX</b> <b>Session 27: Smart Energy Systems analyses, tools and methodologies</b>  <b>Session keynote:</b> <b>Marie Münster</b> Daniel Møller Sneum Sylvain Quoilin Frederik Banis Naoya Nagano Steven de Jongh	<b>11:15-13:00 ROOM XX</b> <b>Session 28: UN District Energy</b>  <b>Session keynote:</b> <b>Morten Jordt Duedahl</b> Dejan Ivezić Nyamtsetseg Ivanov Romanas Savickas Susana Paardekooper Zhuolun Chen	<b>11:15-13:00 ROOM XX</b> <b>Session 29: 4GDH concepts, future DH production and systems</b>  <b>Session keynote:</b> <b>Mei Gong</b> Hanne Kauko Hannes Poier Marco Cozzini René Kofler Maria Jangsten	<b>11:15-13:00 ROOM XX</b> <b>Session 30: Smart Energy Systems analyses, tools and methodologies</b>  <b>Session keynote:</b> <b>Jakob Zinck Thellufsen</b> Ewoud Werkman Kristine Askeland Roberto Vaccaro Salman Siddiqui Isabelle Best
	<b>13:00-14:00 Lunch</b> <span style="float: right;">Venue XX</span>					
<b>14:00-16:30 2nd plenary session chaired by Professor Brian Vad Mathiesen</b> <span style="float: right;">Plenary room XX</span>						
14:00-14:30 Plenary keynote by Poul Skjærbæk, Chief Innovation Officer						
14:30-15:00 Plenary keynote by Jean-Michel Glachant, Director						
15:00-15:30 Plenary keynote by Søren Hermansen, CEO						
15:30-16:00 Questions and discussion						
16:00-16:30 Closing session and award ceremony						

# Tuesday 10 September 2019 - Contents of sessions 1-6 - TENTATIVE

## Session 1: Smart Energy Systems analyses, tools and methodologies

### Session keynote Dagnija Blumberga: Solar Thermal or Solar Electricity, that is the question for 4GDHC

Amir Mohammad J. Khoshbaf: Technical Feasibility Assessment of 4th Generation Solar-Assisted District Heating System in Melbourne

Borna Doračić: Analysis of the integration of heat and electricity prosumers into the existing energy system with the focus on solar technologies

Carles Ribas Tugores: Large-scale solar thermal and storage for district heating in Austria: Results of techno-economic evaluation and detailed simulation studies

Ingo Leusbrock: Lessons learnt and guidelines for large-scale solar thermal and storage applications for district heating in an Austrian context

Carlo Winterscheid: Evaluation of solar district heating opportunities in Lithuania and Bosnia and Herzegovina

## Session 2: Smart Energy Systems analyses, tools and methodologies

### Session keynote Pierrick Haurant: Generation of daily load typology for district heating simulation and optimisation

Bernhard Gerardts: There is no need for complexity in diversifying the district heating sector

Jes Donneborg: Replacing Coal-Fired Plants with Renewable Sources Integrated with Thermal Storage

Arthur Clerjon: Matching intermittent electricity supply and load with energy storage: An optimization based on a time scale analysis

Michael-Allan Millar: Thermal Supply Peak Shaving for Residential Housing Stock in the UK

Mariagrazia Dotoli: Energy Scheduling of a Smart District Microgrid with Shared Photovoltaic Panels and Storage: the case of the Ballen marina in Samsø

## Session 3: Integrated energy systems and smart grids

### Session keynote Ralf-Roman Schmidt: Blockchain Applications and Case Studies in District Energy and Power-to-Heat

Behnam Zakeri: Interconnection of Denmark and UK: A comparative cost-benefit analysis

Akos Revesz: Conceptual design of a large scale 5G district energy network in London

Mathieu Vallée: A techno-economic assessment of combined heating and cooling production plant for district thermal network

Edward O'Dwyer: Coordination of district-level smart energy systems: multi-objective considerations

Christian Johansson: Demand-side management in district heating and cooling: Final overview and conclusions from the Horizon 2020 STORM project

## Session 4: GIS for energy systems, heat planning and DH

### Session keynote Bernd Möller: The scale of district heating based on excess and geothermal heat in Europe

Eva Wiechers: A new basis for heat sector planning in Schleswig-Holstein: development of a regional heat atlas

Hermann Edtmayer: Spatial Agent-based simulation of thermal energy transition pathways in urban environments

Marcus Hummel: Possible synergies of heat planning processes across different cases in Europe. Applying the Hotmaps Toolbox

Magda Kowalska: Application of Hotmaps toolbox in the project DeCarb Supporting the Clean Energy Transition of Coal-Intensive EU Regions

Mostafa Fallahnejad: Determining District Heating Transmission Line Routes and Costs

## Session 5: Energy Lab Nordhavn

### Session keynote Jan Eric Thorsen: Smart operation of ULTDH booster substation for multifamily building

Christine Emilie Sandersen: Flexsumers - smart-energy ready heat customers

Hanmin Cai: Flexibility in integrated energy system: experimental insights from EnergyLab Nordhavn project

Henrik Pieper: The integration of seasonal characteristics of heat sources and sinks in energy planning and their impact on heat pump performance and dimensioning

Kevin Michael Smith: Online MPC of a heat-booster substation for ultra-low temperature district heating

Rongling Li: Heating demand peak shaving in smart homes

## Session 6: 4GDH concepts, future DH production and systems

### Session keynote Ingo Weidlich: Durability of DH pipe systems exposed to thermal ageing and cyclic operational loads

Annelies Vandermeulen: Simulation-based assessment of energy flexibility offered by the thermal capacity in district heating network pipes

Jens Møller Andersen: 4-pipe District heating system

Janette Webb: Heat networks in the UK

Torben Ommen: Economic feasibility of utilising the return pipe in low temperature distribution systems for consumers and prosumers

Helge Averfalk: Heat loss comparison for single pipe, twin pipe and triple pipe configurations

# Tuesday 10 September 2019 - Contents of sessions 7-12 - TENTATIVE

## **Session 7: Production, technologies and use of electrofuels in future energy systems**

### **Session keynote Mads Friis Jensen: Power2liquids – Methanol as Electro fuel in efficient methanol Fuel cell vehicles**

Steffen Nielsen: Assessing the potential of power-to-gas technologies in terms of quantity and costs for a larger geographic region

Alessandro Guzzini: Analysis of the existing barriers and of the suggested solutions for the implementation of Power to Gas (P2G) in Italy

Andrei David: The potential of methanated biogas in the Danish transport sector

Benedetto Nastasi: Power-To-Gas potential for energy flexibility of grid-connected and off-grid geographical islands

Jesper Schramm: Review of ammonia as an electrofuel for Internal Combustion Engines

## **Session 8: Smart Energy Systems analyses, tools and methodologies**

### **Session keynote Gorm Bruun Andresen: Impact of climate change on the most cost-effective technologies for decentralized heating in Europe**

Egbert-Jan van Dijck: Effective use of Stakeholder Management Technology to stimulate system innovation: initial lessons from a multiple case study of 4DHC in NW Europe

Rowan Molony: Development of an Irish energy system model for the analysis of current Irish energy policy and possible alternatives

Kun Zhu: Go or wait? The impact of emission pathways on the European energy system transition under myopic planning

Kristoffer Steen Andersen: To EE or to VE: Interaction between VE and EE in meeting long term climate policy

Roberto Bricalli: Impact of climate change on long-term planning of electrical systems based on renewable sources in Europe

## **Session 9: Planning and organisational challenges for SES and DH**

### **Session keynote Bent Ole Gram Mortensen: Purpose limitation for smart metering data**

Christian Thommessen: An innovative concept to increase the efficiency of existing combined heat and power plants in developing district heating systems

Paolo Leoni: Developing innovative business models for reducing return temperatures in district heating systems: approach and first results

Richard van Leeuwen: Towards municipal heat solution strategies

Zhikun Wang: Sizing of district heating systems based on smart meter data – Understanding aggregated domestic energy demand in Great Britain

Michiel Fremouw: How LowEx can you go? Applying the PLANHEAT toolkit to the Delft University of Technology campus

## **Session 10: Smart Energy Systems analyses, tools and methodologies**

### **Session keynote Paula Ferreira: The importance of demand response for low carbon energy scenarios**

Géremi Gilson Dranka: Demand Response Potential in Brazil: Theoretical Assessment

Rasmus Elbæk Hedegaard: Investigation of the energy flexibility potential of Danish residential building archetypes

Sara Månsson: Validation of fault detection methods for district heating customer installations

Shahrooz Abghari: Data Analysis Techniques for Monitoring District Heating Substations

Weronika Radziszewska: Testing of a price-based decentralized system for power balancing on real-life HVAC installation

## **Session 11: 4GDH concepts, future DH production and systems**

### **Session keynote Steen G Olesen: How to convince the locals to change to LTDH, Østerby example**

David Edsbäcker: Securing a lower grid temperature through increased digitalization—Using heat load forecasting and feedback from the grid

Dennis Kerkhof: Xplorion - energy efficient building using low temperature district heating

Klaus G Lauridsen: Development of a 4th generation District Heating preinsulated piping system

Sara Kralmark: Introduction to COOL DH

Klara Ottosson: Heat driven appliances

## **Session 12: RES and waste heat sources for district heating**

### **Session keynote Goran Krajačić: Techno-economic analysis of upgrading heating systems into sustainable DHS**

Hiroyasu Shirato: Development and Application of New Heat Supplying Systems Utilizing Hot Spring Water in the Northern Island of Japan

Shalika Walker: Analyzing possibilities of using energy from surface and sewage water for the energy transition of the built environment - Study in the Netherlands

Allan Oliveira: Low-Enthalpy Geothermal Heating Systems Modeling: Reducing Risks for Decision Makers and Consumers

Friederike Stelter: Trends of hybrid energy systems with the focus on power-to-heat technologies

Julio Vaillant Rebollar: A framework for energy performance assessment of a large BREEAM certified GEOTABS implemented in Kortrijk

# Tuesday 10 September 2019 - Contents of sessions 13-18 - TENTATIVE

## **Session 13: Institutional and organisational change for SES**

### **Session keynote Alessandro Provaggi: What are the next priorities for innovation in Europe?**

Ari Laitala: Organizational challenges and possibilities for energy efficiency enhancement in the Finnish municipality sector

Kirsten Hasberg: From distribution grid to interaction grid: Fundamental questions of roles and tariffs of distribution grids in 100 % renewable energy systems

Leire Gorroño-Albizu: The local value of wind power. How could a smart energy system ownership approach incentivise citizen investment in wind turbines?

Max Fette: System friendly operation of sector coupling devices: between welfare requirements and business reality

## **Session 14: Smart Energy infrastructure and storage options**

### **Session keynote Reinhard Haas: On the role of storage in smart energy systems**

Keith O'Donovan: gigaTES: Giga Scale Pit Storage as essential part of district heating system

Tiziano Gallo Cassarino: Designing zero emission, least cost, and high renewable energy systems that optimise storage and interconnections

Michael Reisenbichler: Towards large-scale thermal energy storages for renewable district heating systems

Joseph Maria Jebamalai: Influence of centralized and decentralized thermal energy storage on district heating network design: A comparative case study

## **Session 15: Electrification of transport, heating and industry**

### **Session keynote Tobias Fleiter: Deep decarbonisation of the EU industry - A model-based assessment of alternative pathways**

Amela Ajanovic: Prospects for the electrification of passenger cars

Eliana Lozano: Electro-HTL biorefinery for the production of advanced liquid biofuels

Timo Kannengiesser: Design and Evaluation of Flexible Sector-coupling Pathways in Future Urban Energy Supply Systems

Elisa Guelpa: Integration of power to heat technology in thermal networks

## **Session 16: Smart Energy Systems analyses, tools and methodologies**

### **Session keynote Peter Sorknæs: Livø – A micro-scale smart energy system**

Roberta Roberto: Analysis of Smart Energy System approach in local Alpine regions - a case study in Northern Italy

Els van der Roest: Power to X: a novel, reliable, affordable and clean energy and water system for a neighbourhood

Renee Heller: Progress towards 4DHC in different national and regional contexts

Costanza Saletti: A smart controller for small-scale district heating and cooling networks: development and testing

## **Session 17: 4GDH concepts, future DH production and systems**

### **Session keynote: Henrik Madsen: Perspective in Using Meter Data for Temperature Optimization**

Igor Krupenski: Low temperature district heating network energy cascade connection to the return line of a high-temperature district heating network

Phil Jones: 5th Generation Heat Networks - A Roadmap to decarbonising heat using ultra low temperature networks

Sabine Jansen: Designing smart low temperature heat grids based on spatial allocation of demands and sources

Tobias Sommer: The reservoir low temperature network: A new topology for simultaneous heating and cooling

## **Session 18: Smart Energy Systems analyses, tools and methodologies**

### **Session keynote Brian Elmegaard: Accurate modeling of heat pumps and excess heat sources in energy system models**

Francesco Neirotti: Comparison of electricity mixes in generation and demand: the case of heat pumps in Alpine regions

Jann Launer: Open models of optimal system operation in central vs. decentral heat supply

Ashish Chawla: A practical approach to performing Pinch Analysis followed by Heat Exchanger Network retrofit of an oil refinery

Tom Prinzie: Floating Solar Photovoltaic System: Part 2 - Insight on the feasibility and optimal design considering ecosystem thermodynamics

# Wednesday 11 September 2019 - Contents of sessions 19-24 - TENTATIVE

## **Session 19: Smart Energy Systems analyses, tools and methodologies**

### **Session keynote Philipp Schütz: Automated building modelling based on Smart Meter Monitoring Data**

Hagen Braas: Generating DHW load profiles of buildings with realistic simultaneity for DH system simulations using DHWcalc and TRNSYS

Martin Heine Kristensen: Citywide hourly dynamic heat load forecasts using building archetype modelling

Michele Tunzi: Smart double loop network for ultra-low temperature district heating in low-heat density areas

Pierre J.C. Vogler-Finck: Data-driven control for efficient and flexible energy use at building level – field investigations in Denmark

Andra Blumberga: Smart Urban Regeneration in Transition to Positive Energy Block

## **Session 20: 4GDH concepts, future DH production and systems**

### **Session keynote Alfred Heller: HEAT 4.0 – Digitally supported Smart District Heating**

Basak Falay: Enabling large-scale dynamic simulations and reducing model complexity of district heating and cooling systems by aggregation

Gerald Schweiger: 4th Generation District Heating - a SWOT-AHP Analysis

Leire Chavarri: Flexible district heating network model that predicts mass flow, pressure and temperature losses

Richard Büchele: Opportunities and challenges of future district heating portfolios

Matteo Giacomo Prina: EPLANopt optimization model based on EnergyPLAN applied at regional level: the future competition on excess electricity production from renewables

## **Session 21: Integrated energy systems and smart grids**

### **Session keynote Vittorio Verda: Proper modelling approaches for operational simulation and optimization of large district heating networks**

Inger-Lise Svensson: Reducing local energy system CO2 emissions by exploiting differences in district heating and electricity CO2 intensity in a local energy market

Monica Arnaudo: Techno-economic Assessment Of Distributed Heat Pumps Integration Within a Swedish Neighbourhood

Olatz Terreros: Pooling concepts for domestic heat suppliers in Austria

Tijs Van Oevelen: Testing and evaluation of the STORM controller in two demonstration sites

Shadie Broumandi: Residential heat consumption drivers towards 4th generation district heating: An econometric approach for Viborg district heating in Denmark

## **Session 22: Smart Energy infrastructure and storage options**

### **Session keynote Anders Dyrelund: Smart integration of district heating, district cooling, waste water and ground source cooling**

Gunnar Preiß: Improving Effectiveness and Efficiency of Smart Energy System using the Nerve Switch® Technology Stack

Hans Christian Gils: Integrated modelling of the future electricity and gas supply in Germany

Sina Steinle: Time dependent flexibility potential of Heat Pump Systems for Smart Energy System Operation

Søren Møller Thomsen: Smart integration of fluctuating renewable energy into the energy system

Giorgio Cucca: Co-simulation tool for hybrid energy system optimization

## **Session 23: 4GDH concepts, future DH production and systems**

### **Session keynote Dietrich Schmidt: Implementation of low temperature district heating systems - Successful case studies of IEA DHC ANNEX TS2**

Hjörleifur G. Bergsteinsson: Methods for Identifying Critical Temperature for Control of Low-Temperature DH Systems

Johannes Oltmanns: Decreasing the temperature of an existing district heating network

Johan Dalgren: Temperature utilization in Thermal Energy Storage and its system impact on future (4th) Generation of District Heating Systems

Tobias Ramm: Development and investigation of optimised operation strategies for district heating systems with variable temperatures

Vilhjálmur Nielsen: Preparing a school building from 1920's for low temperature district heating while improving indoor climate by use of wireless sensors

## **Session 24: Smart Energy Systems analyses, tools and methodologies**

### **Session keynote Morten Karstoft Rasmussen: Data-driven decision support for optimisation of heat installations**

Etienne Cuisinier: Energy system investment planning: a methodological review towards a new approach at the territorial level

Thibaut Résimont: A multi-period MILP model for the topological optimization of a district heating network

Can Tümer: Challenges in Heat Network Topology Optimization

Ana Turk: Two -stage stochastic day-ahead scheduling for integrated heat, electricity and gas system as MILP model

Danica Maljkovic: Machine learning algorithms for modelling consumption in district heating systems

# Wednesday 11 September 2019 - Contents of sessions 25-30 - TENTATIVE

## Session 25: Smart Energy Systems analyses, tools and methodologies

**Session keynote Henrik Dalsgaard: A pathway to emission free district heating in a world driven by data and electricity – Case: data center waste heat utilization**

Stefan Holler: Methodology to assess the potential of waste heat from industry, service sector and sewage water

Johannes Pelda: sim4dhs – an algorithm to simulate tree and meshed district heating networks dynamically

Charlotte Marguerite: Optimization of flexible electricity loads of a buildings cluster using distributed model predictive control

Johannes Röder: Design of renewable and system-beneficial district heating systems using dynamic emission factors for grid-sourced electricity in optimization models

Saleh Mohammadi: Optimization of temperature levels in decentralized solar feed-in heat grids, A case study of Dutch refurbished building in a residential neighbourhood

## Session 26: 4GDH concepts, future DH production and systems

**Session keynote Tom Brown: The cost-benefit of transmission grid reinforcement in a highly-renewable European smart energy scenario**

Anna Volkova: Scenario development methodology for the district heating regions in Estonia

Dominik Franjo Dominković: A Potential for Interconnecting District Heating Grids: The Case of the Greater Zagreb Region

Hironao Matsubara: Current Status and Issues of Renewable Heating System towards 4DH in Japan

Behzad Rismanchi: Resilience metrics and drivers for energy system planning at the community level

Tetsunari Iida: Issues of renewable energy heat policy and establishment of 4DH forum in Japan

## Session 27: Smart Energy Systems analyses, tools and methodologies

**Session keynote Marie Münster: What is the benefit from sector coupling?**

Daniel Møller Sneum: Evaluating barriers to flexible grid integration of district energy

Sylvain Quoilin: Modeling the flexibility offered by coupling the heating sector and the power sector: an assessment at the EU level

Frederik Banis: Handling Uncertainty in Sector Coupled Systems using Dynamic Programming and Model Predictive Control

Naoya Nagano: Introducing sector coupling to utilize renewable resources for regional decarbonization in Japan

Steven de Jongh: Machine learning based state-estimation in sector coupled energy distribution systems

## Session 28: UN District Energy

**Session keynote Morten Jordt Duedahl: Internal Rate of Return and how it affects development of city wide district heating projects**

Dejan Ivezić: The State and Perspective of Belgrade District Heating System Development

Nyamtsetseg Ivanov: Applicability of Solar-Assisted Heat Pump System for Space Heating in Mongolia

Romanas Savickas: Challenges of Development of Green Field District Heating technologies in Latino America. Temuco city case in Chile

Susana Paardekoooper: Heat Roadmap Europe: Heating typology as a basis for policy recommendations

Zhuolun Chen: Fast Decision Making Tools for District Cooling Project Development in Urban Planning Stage

## Session 29: 4GDH concepts, future DH production and systems

**Session keynote Mei Gong: Enhanced Biomass CHP plants for district heating systems**

Hanne Kauko: Local thermal grids with waste heat utilization: low- or medium-temperature supply?

Hannes Poier: Model-based control of absorption heat pumping systems

Marco Cozzini: Techno-economic scenarios for neutral-temperature district heating and cooling networks based on decentralized heat pumps

René Kofler: Performance analysis of a heat pump system, providing district heating and cooling through gradual heating and cooling

Maria Jangsten: High Temperature District Cooling – Challenges and Possibilities

## Session 30: Smart Energy Systems analyses, tools and methodologies

**Session keynote Jakob Zinck Thellufsen: Benefits to single country modelling: Comparing 14 interconnected individual country models to a single 14-country model**

Ewoud Werkman: Modelling Energy Systems in an interoperable, reusable and comparable way

Kristine Askeland: The impact of geographical resolution of hydropower in energy systems modelling

Roberto Vaccaro: A computational model linking EnergyPLAN with Input-Output analysis for evaluating the economy-wide impact of the transition at regional level

Salman Siddiqui: A novel method for forecasting electricity prices in a system with renewables and large scale grid storage for use in energy system models

Isabelle Best: Systematic investigation of the building envelope's and hot water production systems' influence on the heat load profile of districts