



Monday 26 September 2016 · Programme

14:00-17:00

4DH Technical Tour - District Heating in North Denmark
Pick-up and drop-off at First Hotel, Rendsburggade 5, Aalborg

Experience one of the world's largest solar thermal plants and meet some of the manufacturers.

The tour will visit Dronninglund District Heating, which in 2013 invested in a renewable energy system to phase out the annual fossil fuel consumption. The plant supplies 1,350 households and 50% of the annual production is provided by a solar thermal system consisting of 37,573 m² of 2,982 solar panels.

The tour is organised by FleksEnergi.

14:00-17:00

STORM Workshop
NORDKRAFT, Teglgårds Plads 1, Aalborg, room 3.3.17, level 3

Workshop on controllers for district heating and cooling networks organised in the framework of the STORM H2020 project.

The goal of this technical workshop is to bring together technical speakers to highlight the challenges and opportunities of today's and the future control of district heating and cooling networks. The speakers will present the state-of-the-art of controlling of DCH networks and the status of the next generation controllers based on self-learning algorithms, the first implementation results of the STORM project and the benefits of these controllers to DHC operators. Furthermore, the workshop will discuss the future solutions needed for a wider application/replication of these controllers.

The workshop is organised by VITO.



Tuesday 27 September 2016 · Overall programme

08:00-09:00 Registration and breakfast

"KEDELHALLEN" GROUND FLOOR, LEVEL 1

09:00-10:30 EUROPEAN DISTRICT HEATING DEVELOPMENTS - 1st plenary session chaired by Brian Vad Mathiesen

09:00 Opening speech by Henrik Lund

09:15 Plenary keynote by Paul Voss: 4DH and the European Energy Transition: A Match Made in Brussels?

09:45 Plenary keynote by David Connolly: Heat Roadmap Europe: Moving from European to Member State Heating and Cooling Strategies

10:15 Questions and discussion

PLENARY ROOM 6.1-6.3, LEVEL 6

10:30-11:00 Coffee break

ROOMS 6.1 and 6.3, LEVEL 6

Parallel sessions 1-5
11:00-12:30 ROOM 4.3.02, LEVEL 3
Session 1: Smart Energy Systems
Chair: Anders Dyrelund
Session keynote and co-chair:
Fabian Levihn
 Katarzyna M. Luc
 Peter Sorknæs
 Peder Vejsig Pedersen
 Hongwei Li

11:00-12:30 ROOM 6.2, LEVEL 6
Session 2: Future district heating production and systems
Chair: Anders N. Andersen
Session keynote and co-chair:
Stefan Holler
 Miika Rämä
 Kenneth Hansen
 Jan-Bleicke Eggers
 Patrick Reiter/Hannes Poier

11:00-12:30 ROOM 6.3, LEVEL 6
Session 3: Energy planning and planning tools
Chair: Ralf-Roman Schmidt
Session keynote and co-chair:
Neven Duić
 Alessandro Capretti/Matteo Pozzi
 Ivar Baldvinsson
 Xavier Dubuisson
 Richard P. van Leeuwen

11:00-12:30 ROOM 6.1, LEVEL 6
Session 4: Low-temperature district heating grids
Chair: Tom Diget
Session keynote and co-chair:
Steen Schelle Jensen
 Giorgio Bonvicini
 Robert Schneider
 Christian Engel
 Christian S. Jørgensen

11:00-12:30 ROOM 6.8, LEVEL 6
Session 5: Low-temperature district heating and buildings
Chair: Dagnija Blumberga
Session keynote and co-chair:
Erik Ahlgren
 Yasameen Al-Ameen
 Peter Heßbrüggen
 Luyi Xu
 Jelena Ziemele

12:30-13:30 Lunch

"KEDELHALLEN" GROUND FLOOR, LEVEL 1

Parallel sessions 6-10
13:30-14:45 ROOM 4.3.02, LEVEL 3
Session 6: Smart Energy Systems
Chair: Anders Dyrelund
Session keynote and co-chair:
Gorm B. Andresen
 Charlotte Marguerite
 Sebastian Bykuć
 David Drysdale

13:30-14:45 ROOM 6.2, LEVEL 6
Session 7: Future district heating production and systems
Chair: Sven Werner
Session keynote and co-chair:
Oliver Martin-Du Pan
 Gunnar Lennermo
 Henrik Pieper
 Richard Büchele

13:30-14:45 ROOM 6.3, LEVEL 6
Session 8: Energy planning and planning tools
Chair: Ingo Weidlich
Session keynote and co-chair:
Bernd Möller
 Lars Grundahl
 Malte Schwanebeck
 Pablo Puerto

13:30-14:45 ROOM 6.1, LEVEL 6
Session 9: Low-temperature district heating grids
Chair: Carsten Bojesen
Session keynote and co-chair:
Peter Jorsal
 José Castro Flores
 Soma Mohammadi
 Sofia Akhlaghi/Sofia Carlson

13:30-14:45 ROOM 6.8, LEVEL 6
Session 10: Low-temperature district heating and buildings
Chair: Svend Svendsen
Session keynote and co-chair:
Jan Eric Thorsen
 Maria Jangsten
 Martin Crane
 Xiaochen Yang

Tuesday 27 September 2016 · Overall programme (continued)

14:45-15:15 Coffee break

ROOMS 6.1 and 6.3, LEVEL 6, and 4.3.02, LEVEL 3

Parallel sessions 11-15	<p>15:15-16:30 ROOM 4.3.02, LEVEL 3 Session 11: Smart Energy Systems</p> <p>Chair: Erik Ahlgren Session keynote and co-chair: Karin Ericsson Danica Maljkovic Jakob Zinck Thellufsen Gerald Schweiger</p>	<p>15:15-16:30 ROOM 6.2, LEVEL 6 Session 12: Future district heating production and systems</p> <p>Chair: Peter Jorsal Session keynote and co-chair: Julio Vaillant Rebollar Magnus Dahl Mikko Wahlroos Nazdaneh Yarahmadi</p>	<p>15:15-16:30 ROOM 6.3, LEVEL 6 Session 13: Energy planning and planning tools</p> <p>Chair: Louise Trygg Session keynote and co-chair: Marie Münster Ryota Ii Amalia Pizarro-Alonso Melissa Carina Gabert</p>	<p>15:15-16:30 ROOM 6.8, LEVEL 6 Session 14: Low-temperature district heating and buildings</p> <p>Chair: Jan Eric Thorsen Session keynote and co-chair: Anton Ianakiev Dorte Skaarup Østergaard Marko Cosic Rasmus Pedersen</p>	<p>15:15-16:30 ROOM 6.1, LEVEL 6 Session 15: Smart Energy Systems</p> <p>Chair: Anders Bavnhøj Hansen Session keynote and co-chair: Henrik Wenzel Abid Rabbani Stefan Blomqvist Jeppe Mols/ Ulrik Jørgensen</p>
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16:30-18:00 Break - exercise or nap time

18:00-19:00 World premier on the new 4DH Smart Heating Europe video

Hosted by Brian Vad Mathiesen and Henrik Lund

Guest speaker:

Tore Duvold, Deputy Director, Innovation Fund Denmark

AALBORG UNIVERSITY, AUDITORIUM 3.107, Rendsburggade 14

19:30 Conference dinner

MUSIKKENS HUS, Musikkens Plads 1



Wednesday 28 September 2016 · Overall programme

08:00-09:00 Coffee

ROOMS 6.1 and 6.3, LEVEL 6

Parallel sessions 16-20

09:00-10:30 ROOM 4.3.02, LEVEL 3
Session 16: Smart Energy SystemsChair: Jesper Møller Larsen
Session keynote and co-chair:
Philipp Geyer
Dmytro Romanchenko
Hanne Kauko
Jens Carlsson
Roland Baviere09:00-10:30 ROOM 6.2, LEVEL 6
Session 17: Future district heating production and systemsChair: Poul Østergaard
Session keynote and co-chair:
Louise Trygg
Lisa Brange
Daniel Møller Sneum
Kristian Christoffersen/Allan Bjerg
Knut Bernotat09:00-10:30 ROOM 6.3, LEVEL 6
Session 18: Energy planning and planning toolsChair: Bernd Möller
Session keynote and co-chair:
Poul Erik Grohnheit
Stefan Petrović
Pierrick Haurant
Heinz-Uwe Lewe
Wiet Mazairac09:00-10:30 ROOM 6.8, LEVEL 6
Session 19: Low-temperature district heating and buildingsChair: Anton Ianakiev
Session keynote and co-chair:
Ivo Pothof
Jeroen Soenens
Kasper Qvist
Rasmus Lund
Maksym Kottenko09:00-10:30 ROOM 6.1, LEVEL 6
Session 20: Organisation, ownership and institutionsChair: Frede Hvelplund
Session keynote and co-chair:
Ralf-Roman Schmidt
Tina Lidberg
Søren Djørup
Kerstin Sernhed
Tanja Groth/Ian Manders

10:30-11:00 Coffee break

ROOMS 6.1 and 6.3, LEVEL 6, and 4.3.02, LEVEL 3

Parallel sessions 21-25

11:00-12:30 ROOM 4.3.02, LEVEL 3
Session 21: Smart Energy SystemsChair: David Connolly
Session keynote and co-chair:
Anders Bavnhøj Hansen
Olatz Terreros
Marta Kierek
Benedetto Nastasi
Tomasz Z. Kaczmarczyk11:00-12:30 ROOM 6.2, LEVEL 6
Session 22: Future district heating production and systemsChair: Poul Østergaard
Haichao Wang
Torben Ommen
Susana Paardekooper and
Andrei David
Hans Christian Gils11:00-12:30 ROOM 6.3, LEVEL 6
Session 23: Energy planning and planning toolsChair: Neven Duić
Session keynote and co-chair:
Romanas Savickas
Kevin Vervuurt
Agris Kamenders
Line P. Pedersen
Ashreeta Prasanna11:00-12:30 ROOM 6.8, LEVEL 6
Session 24: Low-temperature district heating and buildingsChair: Tetsunari Iida
Session keynote and co-chair:
Dagnija Blumberga
Nguyen Le Truong
Rasmus Aaen
Pedro Pattijn
Tommy Rosén11:00-12:30 ROOM 6.1, LEVEL 6
Session 25: Energy planning and planning toolsChair: Marie Münster
Session keynote and co-chair:
Björn Karlsson
Nikola Marinov Botzov
Hanne Kauko
Sara Ben Amer-Allam
Raffaele Salvucci

12:30-13:30 Lunch

"KEDELHALLEN" GROUND FLOOR, LEVEL 1

12:30-13:00 Steering Committee Meeting (4DH SC members only)

ROOM 6.8, LEVEL 6

13:30-15:00 GLOBAL DISTRICT HEATING DEVELOPMENTS - 2nd plenary session chaired by Henrik Lund

13:30 Plenary keynote by Tetsunari Iida: 4DH concept, reality and possibility in Japan

14:00 Plenary keynote by Lily Riahi: Meeting our UN Sustainable Development Goals - the role of UNEP's District Energy in Cities Initiative

14:30 Questions and discussion

15:00-16:00 Coffee and closing ceremony

Best Presentation Awards to Senior and PhD Fellow, funded by Danfoss and Kamstrup

PLENARY ROOM 6.1-6.3, LEVEL 6

Tuesday 27 September 2016 · Content of Sessions

Session 1: Smart Energy Systems

Fabian Levihn: CHPs and HPs to balance renewable power production: Lessons from the district heating network in Stockholm

Katarzyna M. Luc: Energy demand flexibility in district heating systems and buildings – a review

Peter Sorknæs: Simulation method for investment analysis of pit thermal storages in district heating

Peder Vejsig Pedersen: Smart Active House Building

Hongwei Li: Load Management in District Heating System Operation

Session 2: Future district heating production and systems

Stefan Holler: Integration of solar thermal systems in existing district heating systems

Miika Rämä: Comparison of distributed and centralised integration of solar heat in a district heating system

Kenneth Hansen: The role of solar thermal in European high-renewable energy systems

Jan-Bleicke Eggers: Energy economical perspectives of solar heat in urban energy supply systems

Patrick Reiter/Hannes Poier: BIG Solar Graz: Solar District Heating – 500,000 m² for 20% solar fraction

Session 3: Energy planning and planning tools

Neven Duić : Energy planning of future district heating systems using heat mapping: Case study for the city of Velika Gorica

Alessandro Capretti and Matteo Pozzi: Decision support system for district heating network development optimization

Ivar Baldvinsson: Planning of district heating networks: A Geographic Information-Based Mixed Integer Linear Programming Model

Xavier Dubuisson: Planning the energy transition with local communities in Ireland and shaping the national energy debate

Richard P. van Leeuwen: Low temperature district heating and renewable energy supply for Meppel-Nieuwveenselanden

Session 4: Low-temperature district heating grids

Steen Schelle Jensen: You cannot optimise what you do not measure

Giorgio Bonvicini: Performance evaluation of large scale innovative systems of waste heat recovery from urban facilities to improve efficiency of district heating and cooling systems in cities

Robert Schneider: Superior system efficiency : Case studies and concepts from a German smart-system approach for next generation district heating

Christian Engel: Barriers and solutions for implementing 4th generation district heating

Christian S. Jørgensen: A study of the feasibility of low-temperature district heating solutions for Aarup comparing booster and electrical cartridges for boosting the temperature for domestic hot water use

Session 5: Low-temperature district heating and buildings

Erik Ahlgren: Heat supply to low energy building areas - modelling economically optimal solutions

Yasameen Al-Ameen: Effective use of Renewable Energy and Ground Thermal Energy Storage in Low Temperature Home Heating Applications

Peter Heßbrüggen: Use Case of Sustainable Generation Model methodology: Infrared Heating in combination with indoor multi reflection insulation systems to overcome lock in effects for low enthalpy sources

Luyi Xu: A review of modeling approaches for analyzing building energy demand in district energy systems

Jelena Ziemele: Development of heat saving platform in the system dynamics model for transition to 4th generation district heating

Session 6: Smart Energy Systems

Gorm B. Andresen: Grid integration of solar PV and electrical vehicles for multi-apartment buildings

Charlotte Marguerite: Assessment of alternative heat source and storage integration in the district heating network of Aarhus using dynamic network simulations

Sebastian Bykuć: Optimal heat sources for cooling buildings using absorption chiller technology

David Drysdale: Clarifying the role of the Danish building stock in the future 100% renewable energy system

Session 7: Future district heating production and systems

Oliver Martin-Du Pan: Exergy Meters in District Heating Systems

Gunnar Lennermo: Feed-in from distributed heat sources in district heating systems

Henrik Pieper: Modeling and analyzing solar heating plants to predict thermal performance

Richard Büchele: Comparison of two methods for finding least cost solutions for heat saving and heat supply

Session 8: Energy planning and planning tools

Bernd Möller: A Pan-European Thermal Atlas for urban and rural heat supply strategy development

Lars Grundahl: Comparison of heat mapping methodologies – an investigation of the performance of top-down and bottom-up approaches

Malte Schwanebeck: Mapping of heat demands and district heating potential for the federal state of Schleswig-Holstein, Germany as part of a project to integrate underground energy storage options into spatial planning

Pablo Puerto: Methodological review of co-simulation approaches for complex urban energy system planning

Session 9: Low-temperature district heating grids

Peter Jorsal: Secure the lowest Total Cost of Ownership in District Heating networks

José Castro Flores: Techno-economic assessment of Thermal Energy Storage integration into Low-Temperature District Heating networks

Soma Mohammadi: Presenting a thermal-dynamic modelling tool for district heating networks - toward low-temperature district heating

Sofia Akhlaghi/Sofia Carlson: Possibilities of low-temperature district heating in Malmö, Sweden

Session 10: Low-temperature district heating and buildings

Jan Eric Thorsen: Impact of increased thermal length of heat exchangers for district heating substations by case example

Maria Jangsten: Survey of Radiator Temperatures in Buildings Supplied by District Heating

Martin Crane: Individual house substation testing – development of a test and initial results

Xiaochen Yang: Different electric supplementary heating approaches for domestic hot water supply with ultra-low-temperature district heating

Session 11: Smart Energy Systems

Karin Ericsson: Potential for power-to-heat in balancing the Swedish electricity system

Danica Maljkovic: Modelling the impact of installation of heat cost allocators in DH systems using decision tree model

Jakob Zinck Thellufsen: Modelling Smart Energy Systems in Different Energy System Analysis Tools

Gerald Schweiger: A framework for model predictive control of hybrid district heating systems

Session 12: Future district heating production and systems

Julio Vaillant Rebollar: Sensitivity analysis of heat losses in collective heat distribution systems using an improved method of EPBD calculations

Magnus Dahl: Applications of a heat load forecast with dynamic uncertainties

Mikko Wahlroos: Utilizing data center waste heat in district heating – impacts on energy efficiency and prospects for low-temperature district heat networks

Nazdaneh Yarahmadi: Determination of degradation pathways influencing service life of polyurethane insulation in district heating pipes

Session 13: Energy planning and planning tools

Marie Münster: Implications of different future energy systems on optimal waste treatment and use for energy

Ryota Ii: District heating and cooling using heat supply from WTE facilities in Japan

Amalia Pizarro-Alonso: Smart use of waste-to-energy: impacts of modelling storages and geography

Melissa Carina Gabert: Waste and Energy System Integration – The Role of Refused Derived Fuel in Future District Heating

Session 14: Low-temperature district heating and buildings

Anton Ianakiev: Innovative Delivery of Low-Temperature District Heating System in Nottingham, UK

Dorte Skaarup Østergaard: Experiences from a practical test with low-temperature district heating for space heating in 5 existing single-family houses from the 1930s

Marko Cosic: Creating 5th generation actively managed residential heat networks

Rasmus Pedersen: Direct and indirect district heating network energy savings from building retrofit

Session 15: Smart Energy Systems

Henrik Wenzel: Prioritizing the use of agricultural straw in the Renewable Energy system – comparing biogas and 2G bio-ethanol

Abid Rabbani: An integrated gas grid model for upgraded biogas in future renewable energy system

Stefan Blomqvist: System benefits of introducing ground surface heating

Jeppe Mols/ Ulrik Jørgensen: A study of possible district heating solutions for the Aarup area

Session 16: Smart Energy Systems

Philipp Geyer: Thermo-chemical technology for smart district networks

Dmytro Romanchenko: Thermal energy storage in district heating systems: A case study of Göteborg, Sweden

Hanne Kauko: Thermal Storage Control of a Local Energy Supply System Acting as District Heating Prosumer

Jens Carlsson: Control of buildings utilised as thermal energy storage

Roland Baviere: Presentation of an innovative thermal loop combining phase change material thermal storage, solar energy and demand-side management

Session 17: Future district heating production and systems

Louise Trygg: District heating - a key element in a fully balanced renewable energy system

Lisa Brange: Bottlenecks in district heating networks and how to eliminate them

Daniel Møller Sneum: Framework conditions for flexibility options in the district heating–electricity interface: A comparative study of the district heating sectors in the Nordic and Baltic countries

Kristian F. Christoffersen/Allan Bjerg: Industrial Waste Heat Utilization for Low-Temperature District Heating

Knut Bernotat: The challenge to integrate the growing fluctuating RES-E power at different vertical entries in the energy system with a focus on DH

Session 18: Energy planning and planning tools

Poul Erik Grohnheit: Modelling district heating infrastructure in global optimisation models

Stefan Petrović: District heating and heat savings in the future Danish energy system – insights from TIMES-DTU model

Pierrick Haurant: Modelling the effect of the transmitted information quality on the management of 4th generation district heating

Heinz-Uwe Lewe: Combining Monte-Carlo simulation and energyPRO – an approach towards sustainable energy planning

Wiet Mazairac: Optimization of the Transition Towards a Sustainable Integrated Multi-Carrier Energy Network

Session 19: Low-temperature district heating and buildings

Ivo Pothof: Transformation of conventional district heating system to mid-temperature district heating system using model-predictive control

Jeroen Soenens: Step-by-step design for a low-temperature network at the Schipperskaai in Ghent

Kasper Qvist: Increasing District Heating efficiency with Ultra Low Supply Temperature (35 °C)

Rasmus Lund: Energy System Benefits of Low-Temperature District Heating

Maksym Kotenko: Drag reducing additives in low-temperature district heating

Session 20: Organisations, ownership and institutions

Ralf-Roman Schmidt: Tackling key challenges of Austrian district heating networks within the STRATEGO project

Tina Lidberg: Techno-economic contradictions of energy efficient refurbishment investments within a district heated area

Søren Djørup: Allocation and coordination in the transition to a 100 % renewable energy system

Kerstin Sernhed: Customer preferences on district heating price models

Tanja Groth and Ian Manders: The PipeCo: an alternate approach to financing heat networks

Session 21: Smart Energy Systems

Anders Bavnhøj Hansen: A Smart Energy System designed to be compliant with COP21 visions for fast CO₂ reduction

Olatz Terreros: Operational and design optimisation of a hybrid energy grid case study

Marta Kierek: Influence of the capacity of heat storage on identifying an optimal mix of heating technologies using a research centre building in Poland as a case

Benedetto Nastasi: Power-to-Gas and Power-to-Heat interaction in the transition towards future Smart Energy Systems

Tomasz Z. Kaczmarczyk: The impact of changes in the geometry of a radial microturbine stage on the efficiency of the micro CHP plant based on ORC

Session 22: Future district heating production and systems

Haichao Wang: Using heat pump to recover waste heat from thermal power plants for district heating

Torben Ommen: Performance evaluation of utility plant and booster heat pumps in ultra-low-temperature district heating system at varying flow temperatures of the network

Susana Paardekooper and Andrei David: Heat pumps in British cities – assessing optimal scales of implementation

Hans Christian Gils: Potential contribution of advanced district heating and electric heat pumps to the integration of renewable power generation in Germany and Europe

Session 23: Energy planning and planning tools

Romanas Savickas: Smart 4th generation energy management: online interactive building actual energy consumption class map

Kevin Vervuurt: FP7 Ecodistr-ICT tool: a model for sustainable energy retrofit at district scale

Agris Kamenders: Energy efficiency in buildings and impact on heating energy demand in Latvia

Line P. Pedersen: The Socio-Economic Perspective of Conversion of Individual Heating to District Heating

Ashreeta Prasanna: Modelling, design and assessment of a decentralised energy system in Switzerland

Session 24: Low-temperature district heating and buildings

Dagnija Blumberga: Some aspects of low-temperature DH systems: solar energy share and integration of historical buildings

Nguyen Le Truong: Energy efficient building blocks and low-temperature district heating

Rasmus Aaen: Energy + Communities

Pedro Pattijn: LATENT : low-temperature energy grid evaluation tool

Tommy Rosén: Active management of heat customers towards lower district heat return water temperature

Session 25: Energy planning and planning tools

Björn Karlsson: A critical analysis of the current primary energy assessment

Nikola Marinov Botzov: Renewable energy alternatives for small district heating plants

Hanne Kauko: Modelling local low-temperature heating grids: a case study for Norway

Sara Ben Amer-Allam: Modelling of low-carbon municipal heat supply: lessons learnt from a Danish and Czech case

Raffaele Salvucci: Production of future district heating and cooling – applying TIMES models on six European countries

2nd International Conference on
Smart Energy Systems and 4th Generation District Heating

26-29 September 2016 · Aalborg



AALBORG UNIVERSITY
DENMARK

Thursday 29 September 2016 · Programme

08:45-13:00

4DH Technical Tour - District Heating in Aalborg City

Pick-up and drop-off at First Hotel, Rendsburggade 5, Aalborg

Experience district heating in Aalborg City and meet some of the manufacturers.

The tour will visit Aalborg Heating, which supplies environmentally friendly district heating in their supply area. Aalborg is the fourth largest city in Denmark with a population of about 205,000. Aalborg Heating has a connection rate of 99% of households in Aalborg; 85 employees and an annual revenue of approximately 100 million EURO. Aalborg Heating provides heat from three major manufacturers consisting of Nordjyllandsværket, which is a coal-fired plant, Aalborg Portland, which supplies excess heat, and Reno Nord, a waste to energy plant, which we will also visit.

The tour is organised by FleksEnergi.