

Conference Program of CCHVAC 2015

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Welcome to CCHVAC2015

Dear delegates:

Warmly welcome each of you to Cold Climate HVAC conference 2015, a leading and promising international scientific conference on key technologies to achieve eco efficient buildings and district with a good environmental quality and a minimum use of resources and energy. This is the first time for Cold Climate HVAC coming to China, Dalian with a previous hosting history from 1994 in Finland, Iceland, Japan, Norway, Russia, Greenland and Canada.

China, the hot and concerned country in the world is reported it will become one of the biggest energy consumption countries in 2030. In this conference, we will share the high-level research results from worldwide, especially the key and newest achievements and experience on HVAC technologies for energy efficient buildings and district in cold climate areas in China. Many challenged and excited topics will be presented by the experts with the specific problems met during the booming development. Comprehensive technical solutions for cold climate areas including Dalian and many other cities in the world will be deep discussed among scientists, designers, engineers, manufacturers and other decision makers. All accepted papers will be published in an electronic version of Conference Proceeding to be distributed at the conference (apply for EI index). Selected papers from the conference will be expanded and published in special issues of 4 international journals (SCI index).

The Scandinavian Federation of Heating, Ventilation and Sanitary Engineering Association (SCANVAC) initiated the triennial series of Cold Climate HVAC conference. The Federation of European Heating, Ventilation and Air Condition Associations (REHVA) have been earlier supporting the series of congresses. All the previous hosts have greatly contributed on technologies for cold climate areas in global. Here, I represent the host, Dalian University of Technology and co-organizers Tsinghua University and VTT Technical Research Centre of Finland to sincerely invite you to Cold Climate HVAC Conference 2015, Dalian, China! We try to show something new and innovative in the conference.

Lin Duanmu

Committees

Chairs of International Scientific Committee:

Olli Seppänen (Finland)

Jiang Yi (China)

Members of International Scientific Committee :(Alphabetical sort)

Angui L (China)

Bjarne Olesen(Denmark)

Carl-Eric Hagentoft (Sweden)

Erich Binder (Canada)

Fariborz Haghghat (Canada)

Francis Allard (France)

Frank Mills (UK)

Guohui Feng (China)

Guangyu Cao (Finland)

Gudni A. Jónhannesson (Iceland)

Hiroshi Yoshino (Japan)

Hui Zhang (USA)

Ivo Martinac (Sweden)

Jarek Kurnitski (Estonia)

Jensen Zhang (USA)

Jianing Zhao(China)

John Z. Zhai (USA)

Jorma Railio (Finland)

Karel Kabele (CzechRepublic)

Kari. Sipila (Finland)

Kim Kwang Woo (Korea)

Lars Nilsen (Denmark)

Lin Fu (China)

Marianna Brodach (Russia)

Marten Brunk (Germany)

Miimu Airksinen (Finland)

Natasa Nord(Norway)

Neng Zhu (China)

Qingyan (Yan) Chen (USA)

Per Heiselberg (Denmark)

Risto Kosonen (Finland)

Shi-Ichi Tanabe (Japan)

Sture Holmberg (Sweden)

Vojislav Novakovic (Norway)

Wei Xu (China)
Wenling Jiao (China)
Wim Zeiler (Netherlands)
Xudong Yang (China)
Yang Yao (China)
Yingxin Zhu (China)
Yuguo Li (Hong Kong, China)
Zhaojun Wang (China)

Other invited reviewers

Xiangting Li (China)
Wenxing Shi (China)
Da Yan (China)
Bin Zhao (China)
Qingpeng Wei (China)
Jiangjun Xia (China)
Chao Chen (China)
Hongxing Yang (China)
Yiqiang Jiang (China)
Gang Sun (China)
Quan Jin (Sweden)
Haichao Wang (China)
Zhijiang Liu (China)
Shicong Zhang (China)
Yang Zhao (Netherlands)
Xiling Zhao (China)

International Advisory Committee:

Per Rasmussen (Denmark)
Vojislav Novakovic (Norway)
Signhild Gehlin (Sweden)
Jorma Railio (Finland)
Erich Binder (Canada)

Conference Organizing Committee

Chair of Cold Climate 2015

Lin Duanmu (Dalian University of Technology)

Co-Charis of Cold Climate 2015

Jianjun Xia (Tsinghua University)

Jorma Pietiläinen (VTT, Technology Research Center of Finland)

Secretary of Cold Climate 2015

Haiwen Shu (Dalian University of Technology)

Co-Charis of organizing committee

Xiangli Li (Dalian University of Technology)

Tengfei (Tim) Zhang (Dalian University of Technology)

Guangyu Cao (Norwegian university of technology)

Lin Fu (Tsinghua University)

Member of organizing committee

Jinling Zhao (Dalian University of Technology)

Zongshan Wang (Dalian University of Technology)

Feng Li (Tsinghua University)

Yongming Ji (Dalian University of Technology)

Xin Jia (Dalian University of Technology)

General Information

Emergency

Police: Call 110

Ambulance: Call 120

Fire: Call 119

All emergency issues must be reported to the CCHVAC 2015 Conference Secretariat:

Haiwen Shu(+8613942622413),

Zongshan Wang(+8613940901020)

Dalian University of Technology

NO.2 LingGong Road, Dalian, China, 116024

Email: hvac@dlut.edu.cn

Local Transportation

The following information shows how to reach conference registration place from airports and railway stations. When you take taxi, please show your hotel name in Chinese(大连理工大学国际会议中心, 大连市凌工路 2 号, 理工大学南门) to your taxi driver as he/she may not speak English.

Dalian Zhoushuizi International Airport

Dalian Zhoushuizi International Airport has many direct flights from/to a dozen of Asian countries and regions, such as Tokyo, Osaka, Seoul, and Hong Kong, and hundreds of flights to over 40 domestic destinations. Dalian Airport is a 24-minute ride by taxi to the conference registration

place and the taxi fare is about RMB 30-40 (US\$5 - 7). One should pay the taxi fare according to the fare meter reading.

Dalian Railway Station

There are two railway stations in Dalian. The closer one to the conference venue is Dalian Railway Station (Dalianzhan). The taxi fare from Dalian Railway Station to the conference registration place is about RMB 35. You can also take Bus No.406 or Bus No.23.

The other station Dalian North Railway Station (Dalianbeizhan) could be a little bit far, the taxi fare should be over RMB 50-60. You can also take Fast Track 3 to Dalian Railway Station and then transfer to Bus No.406 or Bus No.23 to conference registration place. You may get off at Ligongdaxue Station. But this way costs too much time.

Hotels

The following hotel is used by CCHVAC 2015 conference participants and their accompanying persons:

DUT International Convention Center –大连理工大学国际会议中心(★★★)

Linggong Road No. 2, Ganjingzi District, Dalian116024, China (the South gate of Dalian University of Technology)

大连市甘井子区凌工路 2 号(理工大学南门)

Tel: +86-411-62628888 Fax: +86-411-84706113 E-mail: hotel@dlut.edu.cn

You can find the detail information at: http://hotel.dlut.edu.cn/index_ch.asp

DUT Expert Building –大连理工大学专家楼(★★★)

Linggong Road No. 2, Ganjingzi District, Dalian116024, China (the South gate of Dalian University of Technology)

大连市甘井子区凌工路 2 号(理工大学南门)



Dalian Bay Shore Hotel –大连星海假日酒店(★★★★★)

Xinghai Square C1 district No.32, Shahekou District, Dalian116024, China

大连市沙河口区星海广场 C1 区 32 号

Tel:+86-411-84677777 Fax:+86-411-84679888 E-mail: bayshore@126.com

You can find the detail information at: <http://www.dalianbayshorehotel.com/INDEX.ASP>

Conference Venue

Bochuan Library, Dalian University of Technology

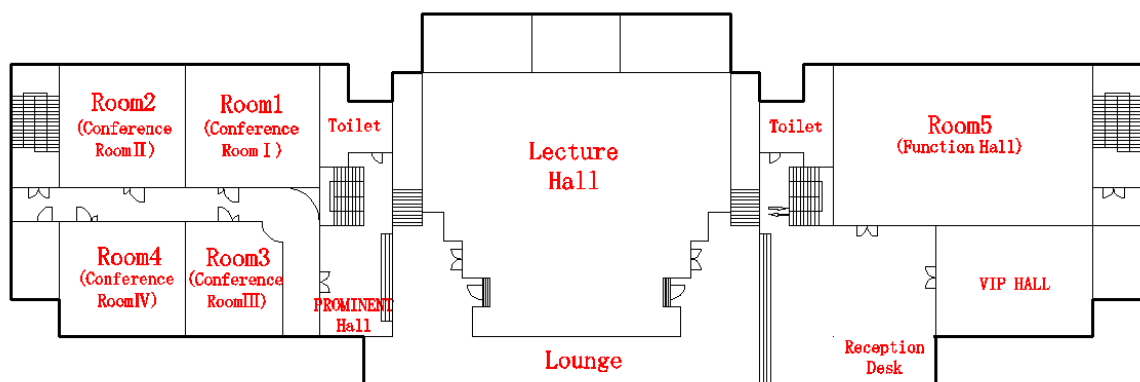
The CCHVAC 2015 will be held in Bochuan library Dalian University of Technology. The library is a 7-minute walk from DUT International Convention Center.



Route from DUT International Convention Center to Bochuan library



Conference Venue, Bochuan Library, Dalian University of Technology



The sketch map of Conference Venue

Conference Venue Floor Plans:

The conference room arrangements are:

Room1: Conference Room I: Parallel sessions/Workshops

Room2: Conference Room II: Parallel sessions/Workshops

Room3: Conference Room III: Parallel sessions/Workshops

Room4: Conference Room IV: Parallel sessions/Workshops

Room5: Function Hall: Parallel sessions/Workshops

Lecture Hall: Opening Ceremony, Closing Ceremony, Keynote Sessions

Lounge: Coffee and Tea Break

Registration Desk: Registration. / Consultation. / Upload PowerPoint File

All the speakers must give their PowerPoint files at least **half a day** prior to their sessions to the **Registration Desk** to ensure they will work properly on COBEE PCs and for inspection of commercialism. No personal laptop from the participants will be allowed for use in the presentations to avoid any potential interruption.

Registration

Registration Hours

The Registration Desk is located at the first floor lobby of DUT International Convention Center and out of the Lecture Hall in Bochuan Library. The open hours are:

DUT International Convention Center

16:00 – 20:00 on Tuesday, October 20

Bochuan Library

8:30 – 17:00 on Wednesday, Thursday, October 21, 22

8:30 – 12:00 on Friday, October 23

On-site Registration Fees

Participant (On site) \$650

Student (On site) \$350

Name Badges

A name badge will be issued to each registered participant. The name badge must be shown for all the conference events.



Route from DUT International Convention Center to Dalian Bay Shore Hotel

Instructions for Speakers:

Oral Presentations in Parallel Sessions

It is highly recommended that an oral presenter practice his/her talk several times prior to the presentation. The presenter must make sure he/she can complete the presentation in **15 minutes** during the practice.

A presenter is kindly requested to be in the meeting room 10 minutes prior to the beginning of the session. The presenter should check if the PowerPoint file works on the computer. Introduce himself/herself to the session chairs and other presenters in the same session. Due to limited time, the introduction by the session chairs for each presenter will be very brief.

When the session chairs ask a presenter to start the presentation, the presenter should please

1. Start the talk immediately on the topic and avoid another introduction by the presenter.
2. Pace the talk to end before the scheduled ending time. This will allow time for questions and discussion.
3. Listen carefully to the questions from audience and answer them briefly. If the presenter cannot answer the questions briefly, ask for a private discussion after the session.
4. Adhere to session chairs' instructions.

Practical Information

Language

The official language of the CCHVAC2015 is English.

Weather

The weather in

Cellular Phone Use Policy

Cellular phone must be switched off during a conference session. Please be considerate for not disturbing your fellow participants. It is not appropriate to answer a phone during a session.

Business Center

The first floor lobby of DUT International Convention Center can help you for most daily business service, including mail delivery.

Currency Exchange

In China, only Chinese Yuan (RMB) is used. However, currency exchange services can be found at airports and banks.

DUT International Convention Center can't change money. You can change money in a nearby bank. The nearest banks are China Construction Bank, Agricultural Bank of China, Industrial and Commercial Bank of China. All of them can change money. You can come out from the South Gate of Dalian University of Technology and go along Lingshui Road for about five minutes and you can see the three banks. You can also get there by the map below.

Dalian Bay Shore Hotel can supply currency exchange services.

Dress Code

Business attire is appropriate for meetings and social events. Casual dress is suggested for the tours.

Electricity

The electrical current in China is 220V 50Hz, and most hotels provide 110V outlets for shavers.

The electric outlets in China will generally work with plugs from North America, Japan, and Korea so no converters are needed. For our European participants, it is recommended that you bring a converter.

Insurance

The registration fee does not include insurance for the participants regarding accidents, sickness or loss of personal property. It is advisable that participants make their own arrangements with respect to health and travel insurance before leaving their countries.

Internet

Free wireless internet of public areas will be provided in conference rooms. Please contact the Registration Desk/Information Desk if you need help.

Lost and Found

Any articles found should be taken to the Registration Desk/Information Desk. Lost property can be claimed at the same place.

Medical service

In case of illness, please contact the Registration Desk. For ambulance, please call 120. The conference secretariat (Shu Haiwen, cell phone +86-15122458261) can help you to find a doctor or hospital. English-speaking physicians at the First Central Hospital and the Third Central Hospital can provide services to foreign visitors.

Message Center

You can post or find messages on the message board located near the Information Desk.

Public Toilets

Many public toilets in Dalian do not provide toilet paper. Please carry some with you when you go outside the hotel and conference center.

Tax

All the prices listed in China include tax, unless the tax is stated explicitly.

Tipping

Tipping is not expected for all the services in China, such as taxi, hotel, restaurants, cinemas, etc. However, a small tip could be left to hotel porters and tour guides for their extraordinary service. The prices in most hotels and restaurants include service charges, unless the service charge is explicitly listed in the hotel bill or restaurant menu.

Social Program

Opening Ceremony

8:30-9:15 on Wednesday, October 21 in Lecture Hall at Bochuan Library of Dalian University of Technology. Name badge is required.

Welcome Dinner

18:00-20:00 on Wednesday, October 21 in the first floor of DUT International Convention Center.

Coffee and Tea Break

Coffee and tea will be served next to the conference session areas.

Lunch

For regular and student participants, lunches will be provided in DUT International Convention Center. Lunches are from 12:00 to 13:30 on October 21-23. Tickets are required.

Chair Dinner

All the session chairs, co-chairs and keynote speakers are invited to the chair dinner at from 18:00 to 20:00 on October 22. The event is by invitation only.

Closing Ceremony

11:05-11:45 on Friday, October 23 in Lecture Hall at Bochuan Library of Dalian University of Technology. Name badge is required.

Tourist Information

Dalian, a famous port in northern China, industry, trade, tourism city, she is the guardian of the gateway to Beijing and Tianjin, the Bohai Rim Economic Zone is the first circle is the North-East Asia trade, finance, information technology, tourism center, known as "Northern Hong Kong "in the world. Dalian is China's first "outstanding tourist city", not only in modern China has rich tourism resources in the humanities and history, there are also many scenic natural tourism resources.

Bin Hai Road stretches along Dalian's famous coastline and is a sightseeing must for visitors to the area. The 35-kilometer-long road borders Xing Hai Square in the west and Dong Hai Park in the east. One side of the road features mountainous areas covered with forests while the opposite side reveals the panoramic coastline and sea. Due to the clear, fresh air and the sea, locals have nicknamed the road the "natural oxygen bar."



The scenery of Bin Hai Road

The Golden Pebble Beach is a national tourist resort located 50 km away from downtown Dalian. It is surrounded by sea on three sides and people can enjoy pleasant weather of warm winter and cool summer year around. Sinian rocks from 600 million years ago have formed into a magnificent landscape of grotesque stones in these areas. The Golden Pebble Beach is known as “The Solidified Animal World”, “The Natural Geological Museum” and “The Magic Sculpture Park”. Scenic spots include the Golden Pebble Waxworks Hall, Stone Collection Hall, Golden Pebble Park, Ten-Thousand Fortune Pot, Chinese Martial Arts Hall, Golden Pebble Discovery Kingdom Theme Park, etc.



The scenery of Golden Pebble Beach

If you need more information, please ask your hotel or the conference secretariat.

General Technical Program Information

Overview of the Technical Program

CCHVAC2015 technical program consists of

- Plenary sessions: Each keynote speaker has 45 minutes for presentation.
- Oral sessions: Each presenter has 15 minutes for presentation, including discussion.
- Workshops: A typical workshop has 90 minutes with several presenters. The workshops discuss broadly important issues of building energy, environment, and equipment. There will be ample time for discussion.

Time Table

TIME	Oct. 20, TUE
16:00-20:00	Registration [First Floor Lobby] DUT International Convention Center

TIME	Oct. 21, WED	Oct. 22, THUR	Oct. 23, FRI
08:30-10:00	Opening Ceremony [Lecture Hall]	Oral Sessions/ Workshops (S10,S6,S12, S4,W4) [Rooms1,2,3,4,5]	Plenary Session II (P2.1, P2.2) [Lecture Hall]
	Plenary Session I (P1.1) [Lecture Hall]		
10:00-10:20	Coffee/Tea Break	Coffee/Tea Break	Coffee/Tea Break
10:20-12:00	Plenary Session I (P1.2, P1.3) [Lecture Hall]	Oral Sessions/ Workshops (S2,S20, S17,W4) [Rooms1,2,4,5]	Plenary Session II (P2.3) [Lecture Hall]
			Closing Ceremony [Lecture Hall]
12:00-13:30	Lunch	Lunch	Lunch
13:30-15:00	Oral Sessions/ Workshops (S8,S13,S5,S24,W1) [Rooms1,2,3,4,5]	Oral Sessions/ Workshops (S14,S22, W5,W6) [Rooms1,2,4,5]	
15:00-15:20	Coffee/Tea Break	Coffee/Tea Break	
15:20-17:00	Oral Sessions/ Workshops (W9,S11,W3, S3) [Rooms1,2,4,5]	Oral Sessions/ Workshops (S18,S1, W8,W7) Rooms1,2,4,5]	
18:00	Welcome Reception (DUT internation convention center)	Chair Dinner (By invitation)	

Session Codes

All the sessions have been assigned a code, such as “WED-P1.1”. The first three letters stand for:

- Tue=Tuesday
- Wed=Wednesday
- Thu=Thursday
- Fri=Friday

The fourth letter stands for:


- P=Plenary session
- S=Oral Session
- W=workshop

The number before the period stands for the sequence number of plenary/oral/workshop session. The number after the period is the sequential number of the corresponding session. For example: “WEN-P1.1” means the first part of plenary session one to be presented on Wednesday.

Plenary Session Summary


Plenary Session I: Prof. Vladimir G. Gagarin (Moscow State-run Architectural Design University, Russia) (P1.1)

Wednesday, October 21, 9:15-10:00, Lecture Hall

Title	Building envelope performance in cold climate Challenges
	<p>Prof. Vladimir G. Gagarin graduated from Electromechanical department of Institute of Water Transport in Leningrad (Saint Petersburg) in 1978. In 1994 he graduated from Macroeconomics department of Economic Academy of Ministry of Economy of Russian Federation in Moscow. Since 1975 he has worked in Laboratory of Electrical Analogy of Thermal Processes of Research Institute of Building Physics. He entered the postgraduate school of Research Institute of Building Physics in 1980 and graduated from it in 1985 as a PhD in HVAC&R specialty in 1985. In 1989 he entered the doctoral of Research Institute of Building Physics and in 1993 he graduated from it. He achieved the rank of Doctor of Technical Sciences on specialty of HVAC&R and building construction in 2000. He works as Head of Laboratory of Building Thermal Physics at Research Institute for Building Physics and Head of HVAC Department at Moscow State University of Civil Engineering. In 2010 he became a corresponding member of Russian Academy of Architecture and Building Sciences. In 2009 he was awarded the Prize of the Russian Government in the field of science and technology.</p>


Plenary Session II: Prof. Yi Jiang (Tsinghua University, China) (P1.2)

Wednesday, October 21, 10:20-11:05, Lecture Hall

Title	District heating in China
	<p>1977 graduated from the building engineering department, Tsinghua Univ., Beijing. After two years work at a Chinese nuclear base, he entered Tsinghua Univ. as a master and then PhD degree student in the department of thermal energy. He obtained PhD degree in thermal physics in 1985. From 1985 he is a faculty member of Tsinghua University. He had worked at Building Research Establishment of the UK for one year from 1988 as an attached research worker. He has involved a number of international collaboration projects such as IEA ECBCS (Energy conservation in Building and Community System) Annex 21, Annex 25,</p>


	<p>and Annex 34 etc. He is currently the vote member of the ECBCS exec. Committee, co-chair of the Annex 53, operation agency of the Annex 59.</p> <p>He is a professor of Tsinghua University and the head of the Building energy research centre, academician of Chinese Academy of Engineer. He is the member of the China energy consultant committee under the State council, the member of the China climate change consultant committee. His major research field is building energy efficiency. He is the chief editor of Chinese building energy efficiency annual report. He has obtained four national science awards for control of district heating system, liquid desiccant air-process, in-directive evaporation cooling and building energy simulation (DeST) respectively.</p>
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Plenary Session I: Prof. M. Norbert Fisch (Technology University of Braunschweig, Germany) (P1.3)
Wednesday, October 21, 11:05-11:50, Lecture Hall

<p>Title</p>	<p>Energy Plus Building – buildings and districts as power plant and filling station</p>
	<p>Prof. Norbert Fisch was born in Friedberg/Hessen, Germany and studied mechanical engineering at the University of Giessen and energy technology at the University of Stuttgart. He received his PhD in 1984 and was involved in the promotion of utilization of solar energy in residential buildings. This engagement with renewable energy has never stopped. Until 1996, Norbert Fisch worked as the director of the department Rational Use of Energy and Solar Technology in the Institute of Thermo Dynamic and Heat Technology at the University of Stuttgart. Afterwards he started working in the Institute of Building and Solar Technology at the Faculty of Architecture at the TU Braunschweig, where he is still today.</p> <p>Prof. Fisch has earned great respect for his achievement in developing long term heat containers and the planning and implementation of energy supply system for residences. With his researches and projects in the fields of solar buildings construction, Prof. Fisch has greatly contributed to the development of CO2-neutral buildings' supply system. Norbert Fisch built up the Steinbeis-Transfer Center</p>


	<p>of Energy-, Building- and Solar Technology in Stuttgart and the network of engineers EGS-plan and energy design Braunschweig.</p> <p>Since 2007 Prof. Fisch has engaged a lot in Asia with the energy design Asia engineer network. For example, energy design Asia accomplished the Wen Yuan Building of Tongji University 2007. It provided a refurbishment concept with a geothermal heat pump.</p>
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**Plenary Session II: Prof. Sven Werner (Halmstad university, Sweden) (P2.1)
Friday, October 23, 8:30-9:15, Lecture Hall**

Title	4th generation district heating
	<p>Sven Werner was born in Vänersborg in 1952. Following on from his Master of Science in Engineering degree obtained from Chalmers in 1977, he worked for a year in the business world before returning to Chalmers for doctoral studies. He defended his PhD thesis in 1984. He returned to the business world again with the Borås Energipublic utility company and the Fjärrvärmebyrå organisation. Now, He worked as a professor of Energy Technology, School of Business and Engineering, Halmstad University, Appointed in 2007. Sven Werner carries out research about district heating for the future needs in both Sweden and Europe. Sven Werner is currently working with the following projects:</p> <ul style="list-style-type: none"> •District heating within the energy system – a framework project concerning the future competitiveness for district heating in Europe and Sweden financed by Fjärrsyn. •Future heat demands – about the development of the interface between customers and the district heating systems financed by Fjärrsyn and with Henrik Gadd as PhD student. •Fourth generation of district heating – about technical development and heat supply for future district heating systems financed by IEA IA DHC, Euroheat & Power, and DSF Denmark through Aalborg University. Urban Persson acting as PhD student. •European textbook about district heating and cooling financed by the Swedish District Heating Association

Plenary Session II: Mr. Evgenij Gasho (Moscow Power Engineering Institute, Russia) (P2.2)

Friday, October 23, 9:15 -10:00, Lecture Hall

Title	District heating-modern requirements and practice
	<p>Mr. Evgenij Gasho graduated from Moscow power engineering institute, Russia and obtained PhD of Industrial thermal energetics. He is an associate professor of MEI (Modern Instruments of Environmental Safety in the Russian Federation) and expert of the Russian Government Analytical Centre. Prof Gasho have published Over 260 publications in Russian and English, including textbooks, international research reports, Russian Standards (GOST R) in Energy Efficiency field etc.</p> <p>Key qualifications:</p> <ul style="list-style-type: none"> ● Development and implementation of national and international projects in energy efficiency monitoring, regional energy saving programmes, promotion of Best Available Techniques (BAT) in industry and energy generation. ● Technical, financial and environmental due diligence for energy supply infrastructure and energy efficiency investments. ● Economic life cycle models for power and heat supply infrastructure projects. ● Broad experience in working with the Ministry for Energetics, Natural Resources, Rosprirodnadzor and Rostekhnadzor (especially at the regional level), regional governments (Moscow and Moscow region, Lipetsk, Voronezh, Belgorod, Bashkortostan, Murmansk, Arhangeljsk, Vorkuta, Kareliya). ● Broad experience in collaborating with industrial companies and associations (Metallurgical plant, Mosenergo, TGKs) and NGOs.

Plenary Session I: Andy Walker (National Renewable Energy Laboratory, USA) (P2.3)

Friday, October 23, 10:20 -11:05, Lecture Hall

Title	Challenges and Solutions to Integration of High Fraction of Renewable Energy with Conventional Utility in Net Zero Energy Buildings
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Andy Walker is a Principal Engineer at the National Renewable Energy Laboratory, where he conducts engineering and economic analysis of energy efficiency and renewable energy projects for Federal agencies such as national parks and military bases and also for commercial and industrial clients. He holds a patent on the Renewable Energy Optimization (REO) method of planning renewable energy projects across a portfolio of properties based on economic value. He has taught in the Mechanical and Architectural Engineering Departments at the University of Colorado at Boulder, Colorado School of Mines, and at Metropolitan State University of Denver. He led the Executive Committee of the American Society of Mechanical Engineers Solar Energy Division; has been an Associate Editor for the Journal of Solar Energy Engineering; and was Technical Program Chair (2009) and General Program Chair (2011) for the ASME Energy Sustainability Conference. Prior to joining NREL, Dr. Walker worked at the Colorado Office of Energy Conservation and at the Solar Energy Applications Laboratory at Colorado State University. As a Peace Corps Volunteer in Nepal, he taught math and science and completed several projects including a passive solar school dormitory and a village-scale biogas generator. He conducts renewable energy training for developing countries for the U.S. Agency for International Development, the UN, and other agencies. Dr. Walker is the author of over 28 book chapters, journal articles, and conference papers including “Solar Energy: Technologies and Project Delivery for Buildings,” a reference book published by John Wiley and chapters in “Green Building; Project Planning and Cost Estimating” now in 2nd edition by RSMeans. He has been recognized with 12 awards from government agencies including certificates from President Ronald Reagan, Colorado Governor Roy Romer, and an award from the Association of Government Communicators for the publication “Procurement of Architectural and Engineering Services for Sustainable Buildings”; and from professional associations including ASHRAE; ASME; IREC; and others. Dr. Walker’s credentials include a B.S., M.S., and Ph.D. in Mechanical Engineering, and he is a registered Professional Engineer in the State of Colorado. Recent interests include integrating increasing amounts of solar energy projects into electric

	grid systems and hardening telecommunications infrastructure using distributed solar energy resources.
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Summary of Oral and Poster Sessions and Workshops

Oral sessions

The oral sessions consisted of peer-reviewed papers/abstracts organized in the following topics, and each topic has its own oral sessions:

No.	Topic name	Oral Sessions
Topic 1	Zero energy building	S1,S2,S3,S4,S5,S6,S14,S17,S20,S22
Topic 2	Sustainable district heating or Non district heating	S13,S18
Topic 3	Renewable energy and low grade energy utilization	S8,S10,S11,S12,S24

There are 17 oral sessions:

- [S1](#) Indoor air quality and indoor environment (Thu-S1)
- [S2](#) Comfort and indoor thermal environment (Thu-S2)
- [S3](#) Building energy efficiency assessment (Wed-S3)
- [S4](#) Building energy consumption (Thu-S4)
- [S5](#) Energy utilization and environment impact (Wed-S5)
- [S6](#) HVAC facilities (Thu-S6)
- [S8](#) Ground source heat pump (Wed-S8)
- [S10](#) Development and evaluation method of heat pump technology (Thu-S10)
- [S11](#) Solar energy (Wed-S11)
- [S12](#) Thermal storage technology (Thu-S12)
- [S13](#) District heating (Wed-S13)
- [S14](#) Building envelope (Thu-S14)
- [S17](#) Air distribution and heat transfer (Thu-S17)
- [S18](#) Heat Source (Thu-S18)
- [S20](#) Cooling medium and HVAC system (Thu-S20)
- [S22](#) Rural energy consumption (Thu-S22)
- [S24](#) Design and operation (Wed-S24)

Workshops

W1 Indoor climate design for nearly Zero Energy Buildings (NZEB) in cold climate
- Thermal comfort, indoor air quality and ventilation criteria

Chair: Hans Martin Mathisen, Risto Kosonen

Key issues

The objective of the workshop is to discuss recent developments on ventilation and air

distribution methods that aim to improve indoor air quality and thermal comfort in NZEB in cold climate.

In EU, all new buildings should be designed as nearly zero energy buildings after 2020. The energy consumption of heating and cooling may be reduced dramatically comparing with most of existing buildings. Due to the tightly insulated building envelope, the provision of sufficient fresh air from ventilation systems for better indoor environment quality becomes extremely more important than ever. Traditional ventilation method may not provide efficient airflow distribution for highly energy performing buildings. Moreover, indoor environmental quality and energy performance of buildings are becoming more and more important in the design and construction of low energy, passive and zero energy buildings. At the same time, improved insulation and air tightness have the potential to resulting in a deterioration of the indoor air quality in such buildings. In this workshop, we will discuss practical recommendations for quantifying ventilation and airflow distribution methods as well as for characterizing the indoor parameters in nZEB. The results of the workshop will be incorporated in a practical guide on quantifying airflow supply associated with indoor air quality and thermal comfort.

W3 Performance of Mixing Ventilation Systems in Non-Isothermal Conditions

Chair: Risto Kosonen, Xianting Li

Key issues

The objective of the workshop is to present the contents of the new REHVA Guidebook on mixing ventilation and discuss the need of the future development work in the area of air distribution in the buildings in respect of indoor air quality, thermal comfort and energy efficiency in non-isothermal conditions. The workshop covers issues related to the performance of mixing ventilation. Also, new alternative air distribution methods are presented.

At present mixing ventilation is mostly used in practice. Although it has been applied for many years, the conditions for its optimal performance in practice are not widely understood. The objectives are to introduce the main factors important for achieving different air distribution patterns in rooms, the airflows generated by artificial and natural way in spaces and their interaction is presented and discussed.

During the last couple of years, some new methods for distribution are introduced. Non-uniform conditions are tested and proofed to improve air quality and energy efficiency in some applications. In this workshop, the performances of air distribution strategies are discussed. Also, case studies on room air distribution are presented and discussed.

W4 Current situation of District Heating system in different countries: technical solution, metering and management

Chair: Yi Jiang, Jianjun Xia

Key issues

The aim of the workshop is trying to bring the information of the state of art District heating system performance in China and the other countries (Russia, Sweden,

Finland, South Korea, Denmark, etc) including heating source, heating network distribution, substation control, terminals, new equipment applications, metering and management. Special attention will be paid to metering and charging issues.

The first section of the workshop will be the presentations of the experts from different countries to present the performance of the district heating system in their countries, or the findings for the district heating system in China.

The second section of the workshop will specific focus on the discussing on the current metering and charging issue for the district heating system in China, which will be chaired by Prof. Yi Jiang.

Most of the audients for the workshop will be the people from the academic field and from the district heating company.

W5 Low Carbon District Heating System

Chair: Xiumu Fang, Zhaojun Wang

Key issues

Novel Flexibly-configured Low Carbon District Heating System; Study and prospect on Smart Heating System; Study and prospect on reliability of heating system; Urban Heat Load Modelling Based on Grey System Theory; Study on Connection between Urban Individual Heating Systems Based on Requirement of Limited-heating; Composite Central Heating System for Rural Areas.

W6 EBC Annex 66: Definition and Simulation of Occupant Behaviour in Buildings

Chair: Bjarne Olesen, Da Yan

Key issues

Buildings consume more than one-third of the world's primary energy. Better understanding and improving the energy performance of buildings is essential to sustainable development and mitigation of global climate change.

This workshop focuses on modelling and simulation of occupant behaviour in buildings, covering measured data collection, mathematical modelling, model validation, and integration with building simulation programs. The IEA Annex 66: Definition and Simulation of Occupant Behaviour in Buildings, will also be introduced. Attendees will discuss the progress of occupant behaviour research in buildings, the experience of addressing problems they have encountered during modelling, and discuss how to achieve rigorous modelling with a well-developed scientific framework, which aims to reach a common agreement on methodologies of occupant behaviour modelling and simulation.

W7 District Heating - Building Level Substations

Chair: Jorma Pietiläinen

Key issues

Finland together with Chinese partners has produced a booklet “Innovation to District heating – Building level Substations” to support the national Heat Reform in China as requested by Ministry of Housing, Urban and Rural Development (MoHURD). In Finland as in many other countries in the world, the building level substations have

appeared an energy efficient solution to provide good heating comfort to buildings. Such substations are not commonly recognized in China yet. Therefore, the booklet and examples of best practice will be introduced to help understand the benefits and requirements.

The Workshop's objective is to help understand the benefits and requirements of the building level substation introduction in China.

W8 Research and Demonstration of Key Technology on Building Energy Saving in Severe Cold Region of Northeast China

Chair: Guohui Feng

Key issues

The objective of the workshop is to decrease the energy consumption of buildings in severe cold area of Northeast China. To make further development of the present energy saving technology and potential energy saving of products, improve the application of building energy saving technology, launch comprehensive engineering demonstration of the integrated technology based on building energy saving through researches on building energy saving design system which is adaptive for the climate of the cold region in northeast China, as well as the studies on architectural characteristics and living habits of residents, building energy conservation suitability technology system, products and technology solutions.

W9 Heat pump system energy efficiency enhancement

Chair: Yang Yao, Haiwen Shu

Key issues

The objective of the workshop is to understand the actual performance of the water source heat pump system, the various factors that impact the energy efficiency and the system optimization methods of the system.

Wednesday, October 21, 2015

Sessions	Time/Titles	Room No.
	8:30-9:15	
	Opening Ceremony	Lecture Hall
	9:15-10:00	
Wed-P1.1	Plenary Session I	Lecture Hall
	10:20-12:00	
Wed-P1.2 Wed-P1.3	Plenary Session I	Lecture Hall
	13:30-15:00	
Wed -S8	Ground source heat pump	1
Wed-S13	District heating	2
Wed -S5	Energy utilization and environment impact	3
Wed-S24	Design and operation	4
Wed-W1	Indoor climate design for nearly Zero Energy Buildings (NZEB) in cold climate - Thermal comfort, indoor air quality and ventilation criteria	5
	15:20-17:00	
Wed-W9	Heat pump system energy efficiency enhancement	1
Wed-S11	Solar energy	2
Wed-S3	Building energy efficiency assessment	4
Wed-W3	Performance of Mixing Ventilation Systems in Non-Isothermal Conditions	5

Thursday, October 22, 2015

Sessions	Time/Titles	Room No.
	8:30-10:00	
Thu-S10	Development and evaluation method of heat pump technology	1
Thu-S6	HVAC equipment performance	2
Thu-S12	Thermal storage technology	3
Thu -S4	Building energy consumption	4
Thu -W4	Current situation of District Heating system in different countries: technical solution, metering and management	5
	10:20-12:00	
Thu -S2	Comfort and indoor thermal environment	1
Thu -S20	Cooling medium and HVAC system	2

Thu -S17	Air distribution and heat transfer	4
Thu -W4	Current situation of District Heating system in different countries: technical solution, metering and management	5
13:30-15:00		
Thu -S14	Building envelope	1
Thu-S22	Rural energy consumption	2
Thu-W5	Low Carbon District Heating System	4
Thu -W6	EBC Annex 66: Definition and Simulation of Occupant Behaviour in Buildings	5
15:20-17:00		
Thu -S18	Heat Source	1
Thu -S1	Indoor air quality and indoor environment	2
Thu -W8	Research and Demonstration of Key Technology on Building Energy Saving in Severe Cold Region of Northeast China	4
Thu -W7	District Heating - Building Level Substations	5

Friday, October 23, 2015

Sessions	Time/Titles	Room No.
8:30-10:00		
Fri-P2.1 Fri -P2.2	Plenary Session II	Lecture Hall
10:20-11:05		
Fri -P2.3	Plenary Session II	Lecture Hall
11:05-11:50		
	Closing ceremony	Lecture Hall

Detailed Technical Program

Tuesday, October 20, 2015

16:00-20:00 Registration

Lobby of International conference center of DUT

Wednesday, October 21, 2015

08:30-9:15 Opening Ceremony

Lecture Hall

Chair: Prof. Lin Duanmu, Chairman of Cold Climate HVAC 2015

Welcome Speech:

Leadership of Dalian University of Technology

Prof. Per Rasmussen, President of SCANVAC

Prof. Wei Xu, President of CCHVAC

Prof. Risto Kosonen, the official representative of REHVA, Aalto University, Finland

Prof. Bjarne Wilkens Olesen, the official representative of ASHRAE, Technical University of Denmark

Preface:

Prof. Yi Jiang Tsinghua University

9:15-10:00 Keynote Session

Chair: Bjarne Olesen, Wei Xu

P1.1: Building envelope performance in cold climate Challenges

Presenter: Prof. Vladimir G. Gagarin (Russia)

10:00-10:20 Coffee/Tea Break

10:20-12:00 Keynote Session

Lecture Hall

P1.2: District heating in the future of China –modern

Presenter: Prof. Yi Jiang (China)

P1.3: Energy Plus Building – buildings and districts as power plant and filling station

Presenter: Prof. M. Norbert Fisch (Germany)

12:00-13:30 Lunch

13:30-15:00 Oral Sessions/ Workshops

Session Wed-S8: Ground source heat pump

Room 1:

13:30-15:00 Wednesday

Chair: Xianting Li

T3-25 A Fast Distributed Parameter Model of Ground-coupled Heat Exchanger Based on Response Factor

Tian You, Wenxing Shi, Wei Wu, Baolong Wang, Xianting Li

T3-14 Study on the Influence of Groundwater Seepage on the Form of the Layout of Soil Source Heat Pump

Li Bai, **CHE Wen-hao**

T3-7 Investigation on CO₂ Ground-coupled Heat Pumping System for Buildings Under Cold Climate

Zhequan Jin, Trygve M. Eikevik, Petter Nekså, Armin Hafner

T3-15 Study on Heat Transfer Calculation Method of Ground Heat Exchangers Based on Heat Pump Unit Operation Characteristics

Wenxin Li, Yong Wang, Yitao Jin

T3-38 Research on Performance of the Coupled Heat and Mass Transfer in Ground Source Heat Pump System

Yaxiu Gu, **Fengfeng Ma**, Wenke Wang

T3-56 Measurement and Analysis of a GSHP System Operation in Winter

Guangming Chu, Yuan Wang, Mengyuan Chu

T3-57 Study on the Representative Borehole in Ground Heat Exchanger Design

Ping Cui, Yun Lin, Zhaohong Fang

Session Wed-S13: District Heating networks

Room 2:

13:30-15:00 Wednesday

Chair: Carl-Eric Hagentoft, Evgenij Gasho

T2-19 Importance of Increased Knowledge on Reliability of District Heating Pipes

Tereshchenko Tymofii

TS-22 Field Measurements on District Heating Pipes with Vacuum Insulation Panels

Axel Berge, Bijan Adl-Zarrabi, **Carl-Eric Hagentoft**

T2-8 Temperature Characteristics of Buried Heating Pipeline Based on Heat Source Fluctuation and Transfer Time Delay

Xiaoyan Liu, Qingxin Xia, Xiaoqing Li, Chuan Ma, Meng Gao

T2-5 Study on Connection between Urban Individual Heating Systems Based on Requirement of Limited-heating

Zhaojun Wang, Ye Tian, Zhigang Zhou, Ying Huang

T1-60 Performance Analysis of Low Temperature Heating in Retrofitting Practice of Existing Swedish Multifamily Houses – An Investigation Including Simulation and Measurements

Qian Wang, Sture Holmberg

TS-12 Exergy Analysis of Network Temperature Levels in Swedish and Danish District Heating Systems

Mei Gong, Sven Werner

T2-1 Analysis on Dynamic Characteristics and Operational Simulations of an Indirect District Heat System based on Dynamic Model under Different Control Strategies

Qingliang Zhao, **Lei Zhao**, Lianzhong Li

Session Wed-S5: Energy utilization and Environment Impact

Room 3:

13:30-15:00 Wednesday

Chair: Takehiro Tanaka, Zhijian Liu

T1-52 Effect of Building Form on Energy Use for Office Buildings in Cold Climate

Lai Wei, Wei Tian, Jian Zuo, Zhiyong Yang, Song Yang, Jitian Song

T1-101 Energy Use in Norwegian Non-residential Buildings: Building Regulations, Calculations and Measurements

Kauko Hanne, Ole Stavset, Michael Bantle, Natasa Nord

T2-26 Energy Cost Models for Air Supported Sports Hall in Cold Climates Considering Energy Efficiency

Nord Natasa, **Hans Martin Mathisen**, Guangyu Cao

TS-10 Analysis on the Carbon Trading Approach in Promoting Sustainable Buildings in China

Yihui Chen, **Ping Jiang**, Wenbo Dong, Beijia Huang

T1-92 Simulation of Construction Facility Systems on the Reliability Growth Model

Hosoyamada Sota, **Takehiro Tanaka**

T1-65 Based on the Green Residential Building Environmental Performance

Evaluation System after Analyzing the Case

Liang Yu, **Ran Ding**, Wei Gao, Siwen Wang, Shuang Chen, Guohui Feng

Session Wed-S24: Design and Operation

Room 4:

13:30-15:00 Wednesday

Chair: Risto Lahdelma, Zhaojun Wang

TS-101 Virtual Testbed for Building Performance – A Web-Platform for Performance Design and Management

M. Norbert Fisch

T1-24 Determination of Possible Increase of R-value of Enclosing Structure Based on the Payback Conditions

Vladimir G. Gagarin, **Alexander Yu. Neklyudov**, Zhibo Zhou

T1-93 Practical Process for Introducing Smart Business Continuity Management of Smart City in Japan

Jingye Li, Takehiro Tanaka

T1-91 Japan's Recent Tendencies of Accidents in Building Facilities and Workers' Accidents in the Environment of Extreme Temperature

Tamura Naoya, Takehiro Tanaka

TS-7 Modelling and Optimization of the Smart Hybrid Renewable Energy for Communities (SHREC)

Haichao Wang, Zhigang Zhou, Elnaz Abdollahi, Risto Lahdelma, Wenling Jiao

Session Wed-W1: Indoor climate design for nearly Zero Energy Buildings (NZEB) in cold climate - Thermal comfort, indoor air quality and ventilation criteria

Room 5:

13:30-15:00 Wednesday

Chair: Hans Martin , Risto Kosonen

W1-01 Objective of the workshop

Presenter: Hans Martin Mathisen & Risto Kosonen

W1-02 HVAC systems for NZEB in Europe

Presenter: Risto Kosonen

W1-03 Indoor climate requirements for NZEB

Presenter: Guangyu Cao

15:00-15:20 Coffee/Tea Break

15:20-17:00 Oral Sessions/ Workshops

Session Wed-W9: Heat pump system energy efficiency enhancement

Room 1:

15:20-17:00 Wednesday

Chair: Yang Yao, Haiwen Shu

T3-13 Effects of the Soil Source Heat Pump Well Spacing and Arrangement on the Field Temperature of Well Group

Li Bai, **CHE Wen-hao**

T3-50 Heat Transfer Performance of a Helical Coil Heat Exchanger for Seawater-source Heat pump in Icy Condition

Wandong Zheng, Tianzhen Ye, Shijun You, Huan Zhang, Jie Yu

TS-9 New Optimized Model for Water Temperature Calculation of River-Water Source Heat Pump and Its Application in Simulation of Energy Consumption

Pengfei Si, Angui Li, Xiangyang Rong, Ya Feng, Zhengwu Yang, Qinglong Gao

TS-24 Analysis on the Transient Heat Transfer Process Inside and Outside the Borehole for a Vertical U-tube Ground Heat Exchanger Under Short-term Heat Storage

Lanhua Dai, Sufen Li, Xiangli Li

T1-108 Modeling and Performance Analysis of the Condenser Using Untreated Sewage Heat Energy

Zhaoyi Zhuang, Yongjie Du, Yingjie Wang

TS-31 Operating Performance in Cooling Mode of Ground Source Heat Pump of a Nearly-Zero Energy Building in the Cold Region of China

Shicong Zhang, Yiqiang Jiang, Wei Xu, Huai Li, Zhen Yu

T3-77 Research on U-tube heat exchanger with shape-stabilized PCM backfill material

Xiangli Li, Liangkan Liu, Lin Duanmu, **Cang Tong**

Session Wed-S11: Solar energy

Room 2:

15:20-17:00 Wednesday

Chair: Andy Walker, Long Ni

T2-21 Energy Performance of Passive Houses in Cold Climate: A Case Study
Serik Tokbolata, Natasa Norda, **Rajnish Kaur Calayc**

T2-20 Investigation and Modelling of the Centralized Solar Domestic Hot Water System in Residential Buildings
Rui Yu, Da Yan, **Xiaohang Feng**, Yan Gao

T3-6 Solar Energy Technologies and Practices – Prospective for Building Integration in Cold Climates (Kazakhstan)
Serik Tokbolat, **Rajnish Kaur Calay**, Sarim Al-Zubaidy

T3-45 The Burning-cave Hot Water Soil Heating System of Solar Greenhouse
Baogang Zhang, **Xinying Fan**, Ming Liu, Wengang Hao

T1-21 Thermal Performance of New Hybrid Solar Energy-phase Change Material-floor Radiant Heating System
Ye Zhang, Chao Chen, DianWei Qi, Rong Wang, Hao Jiao

TS-16 Reliability Verification of a Solar-air Source Heat Pump System with PCM Energy Storage in Operating Strategy Transition
Dehu Qv, Long Ni, Yang Yao

T3-54 Solar Energy Model for an Electrochromic Dome-covered House
Wei Yang, **Yaolin Lin**, Radu Zmeureanu

T3-55 Verification and Validation of a Solar Energy Model for an Electrochromic Dome-covered House
Yaolin Lin, Wei Yang, Radu Zmeureanu

Session Wed-W3: Performance of Mixing Ventilation Systems in on-Isothermal Conditions

Room 4:

15:20-17:00 Wednesday

Chair: Risto Kosonen, Xianting Li

W3-01 Objective of the workshop
Presenter: Risto Kosonen

W3-02 Challenges of mixing ventilation in non-isothermal conditions
Presenter: Risto Kosonen

W3-03 Multi-node ventilation
Presenter: Xianting Li

W3-04 Non-uniform ventilation
Presenter: Guangyu Cao

Session Wed-S3: Building energy efficiency assessment

Room 5:

15:20-17:00 Wednesday

Chair: Dennis Johansson, Guangyu Cao

T1-26 Thermal Performance as the Main Factor of Energy Saving of Buildings in Russia.

Vladimir G. Gagarin

T1-7 Simple Tools for Evaluating Energy Performance in Early Design Stages

Liwei Wen, Kyosuke Hiyama

T1-86 Data Envelopment Analysis (DEA) Approach for Objective Energy Performance Evaluation of Office Buildings

Seong-Hwan Yoon, Cheol-Soo Park

T1-37 Evaluation of a Low-energy Residence for Users with Functional Disorders

Asa Wahlström, **Dennis Johansson**, Ann-Marie Ejlertsson

T1-51 Comparison of Sensitivity Analysis Methods in Building Energy Assessment

Yang Song, Wei Tian, **Lai Wei**

T6-11 (T1-9) Research on Building Energy Efficiency and Index Evaluation System

Naiyan Zhan, Yue Xu, Can Li, Haijiang Lu, Honglei Wang, Hao Lv

TS-2 Energy Cost Models for Air Supported Sport Hall in Cold Climates Considering Energy Efficiency

Natasa Momcilo Nord, **Hans M Mathisen**, Guangyu Cao

18:00-20:00 Welcome reception

DUT internation convention center

Chair: Prof. Lin Duanmu

(Please take your name badge.)

Thursday, October 22, 2015

08:30-10:00 Oral Sessions/Workshops

Session Thu-S10: Development and evaluation method of heat pump technology

Room 1:

8:30-10:00 Thursday

Chair: Shicong Zhang, Hans Martin Mathisen

TS-18 Performance of a Solar Air Composite Heat Source Heat Pump System

Yin Liu, Jing Ma, Chao Zhang, Guanghui Zhou, Wenlei Wan

TS-28 Research and Development of the hybrid Ground-coupled Heat Pump Technology in China

Min Guo, Nairen Diao, **Yi Man**, Zhaohong Fang

TS-4 A Review of Heat Pump Systems for Heating and Cooling of Buildings in China in the Last Decade

Long Ni, Jiankai Dong, Yang Yao, Chao Shen, **Dehu Qv**

TS-5 Investigation on the Feasibility and Performance of Ground Source Heat Pump (GSHP) in Three Cities in Cold Climate Zone, China.

Zhijian Liu, Wei Xu, Cheng Qian, Xi Chen, Guangya Jin

TS-13 Combining Ground Source Absorption Heat Pump with Ground Source Electrical Heat Pump for Thermal Balance, Higher Efficiency and Better Economy in Cold Regions

Wei Wu, Wenxing Shi, Tian You, Baolong Wang, Xianting Li

TS-21 Performance Modeling of Air Cycle Heat Pump Water Heater in Cold Climate

Liang Yang, Han Yuan, Jingwei Peng, Chunlu Zhang

Session Thu-S6: HVAC equipment performance

Room 2:

8:30-10:00 Thursday

Chair: Risto Kosonen, Tianyi Zhao

T1-94 The Moisture Content Distribution Feature of the Room with Radiant Cooling Ceiling and Wall-Attached Jet System

Wufeng Jin, **Jia Lizhi**, Wang Qian, Gao Pan

T2-22 Test of Radiant Panel Integrated with Exposed Chilled Beam in Heating Mode

Risto Kosonen, Panu Mustakallio, Anna Korinkova

TS-25 Numerical Analysis of Temperature Non-uniformity and Cooling Capacity for Capillary Ceiling Radiant Cooling Panel

Dong Xie, Yun Wang, Hanqing Wang, Shunquan Mo, Maili Liao

T3-53 Numerical Simulation and Analysis of the Indoor Environment of a Room with Capillary Radiation Air Conditioning System

Linhua Zhang, Dong Yang, Yan Zhang, Qingmei Wen

T1-35 Cooling Performance Test and Analysis of a Radiant-convective Air-conditioning Terminal Device with Parallel Pipes

Haiwen Shu, **Jing Shi**, Hongbin Wang, Penggang Li, Lin Duanmu, Mingrui Zhu

T1-32 Investigation on Impedance Chip Muffler Performance

Xiaohua Sun, Fei Wang

Session Thu-S12: Thermal storage technology

Room 3:

8:30-10:00 Thursday

Chair: Carl-Eric Hagentoft, Zhigang Zhou

T2-7 Survey and Evaluation of Thermal Storage Technologies with Phase Change Materials Integrated In Building Envelopes

Chao Chen, Haoshu Ling, Yong Guan, Na Li, Mingxing Zhang, Guangya Xie, , Caiwen Ma

T3-64 Study on Heat-Moisture Treatment of Near Space Crew Capsule Based on Phase Change Material

Xun Yang, Xinliang Dong, Yuxi Jiao, Yafeng Bao, Jiyuan Tu, Yong Wang

TS-30 DSC Test Error of Phase Change Material (PCM) and Its Influence on the Simulation of the PCM Floor

Guohui Feng, **Kailiang Huang**, Hailun Xie

T3-60 Feasibility Study of a Novel Soil Thermal Recovery Method for HGSHP System

Pengyuan Shang, Chao Chen, Kang Li, Jie, Lin, Jinshun Wu

T1-20 The Contribution of Thermal Energy Storage to the Energy Efficiency of Combined Cooling, Heating, and Power Systems

Shilin Qu, Xu Ge, Dongxu Wang

T3-52 An Applied Research on the Compound Air Conditioning System of

Ground Source Direct Cooling System and Water Storage Tank System

Jiying Liu, Xiaona Xie, Heming Yun, Fenghua Qin

T2-12 CFD simulations of thermal stratification heat storage water tank with an inside cylinder with openings

Weixing Yuan, **Lingkai Kong**

Session Thu-S4: Building energy consumption

Room 4:

8:30-10:00 Thursday

Chair: Dennis Johansson, Xiaoyan Liu

T1-12 Energy Consumption Test and Analysis of Large Public Buildings Based on Gray Box Model

Xiaoyan Liu, Zhonghua Wang, Chuan Ma, Lijun Liu, Xiaoyan Liu

T1-48 Energy-efficient Building in Greenland: Investigation of the Energy Consumption and Indoor Climate

Katarzyna M. Luc, Martin Kotol, Tove Lading

T1-97 Measurements of Household Electricity in 51 Arctic Apartments as an Aid for Correct Simulations, Design and Optimization of High Performance Residential Buildings

Dennis Johansson, Hans Bagge

TS-21 Identifying Key Design Parameters of the Integrated Energy System for a Residential Zero Emission Building in Norway

Nord Natasa, Live Holmedal Qvistgaard, **Guangyu Cao**

T1-64 Analysis the Influencing Factors Sensitivity of Energy Consumption About Existing Residential Buildings Based on Green Transformation in the Operational Phase

Liang Yu, Siwen Wang, **Ran Ding**, Shuang Chen, Guohui Feng

T1-112 Influence of Air-conditioning Outdoor Unit Arrangement Strategy on Energy Consumption

Ran Duan, Jiagen Liu, Borong Lin

Session Thu-W4: Energy Efficiency Improvement of District Heating System in Cold Climate Zone

Room 5:

8:30-10:00 Thursday

Chair: Jianjun Xia, Yi Jiang

10:00-10:20 Coffee/Tea Break

10:20-12:00 Oral Sessions/ Workshops

Session Thu-S2: Comfort and indoor thermal environment

Room 1:

10:20-12:00 Thursday

Chair: Zhaojun Wang

T1-6 Human Thermal Adaptation in University Classrooms and Dormitories in China Severe Cold Area in Winter

Zhaojun Wang, Xuexiang Zhang, Haoran Ning, Jing Ren, Yuchen Ji

T3-22 Theoretical Analyses and Predictions of Indoor Thermal Environment for Cave Dwelling in Northwest of China

Bin Chen, **Xinying Fan**

T1-82 Dynamic Simulation of the Effect on Indoor Thermal Environment with Intermediate Shade Double - skin Facade in Summer

Hua Yang, **Ying Zhou**, Fengyun Jin, Xin Zhan

T3-21 Simulation Study of Impacts of Radiator Selection on Indoor Thermal Environment and Energy Consumption

Yiwen Jian, Zhaohui Liu, **Zishuai Yu**, Yi Li, Rui Li

T1-117 A Study on Indoor Thermal Environment of Rural Residence in South Liaoning Province

Liangdong Ma, **Nina Shao**, Jili Zhang, Tianjiao Zhang, Meng Xu

Session Thu-S20: Cooling medium and HVAC system

Room2:

10:20-12:00 Thursday

Chair: Da Yan, Minki Sung

T1-25 Path of Optimized Engineering of HVAC Systems

Vladimir G. Gagarin, **Vladimir V. Kozlov**, Kirill I. Lushin, Alexander Yu. Neklyudov

T1-95 Experimental Study: The Effect of Installation Types of Two Sets of Outdoor Machines Installed in Groove on the Thermal Environment Around.

Wufeng Jin, **Lei Xu**, Liyue Ren

T1-68 Efficient Interaction Between Energy Demand, Surplus Heat/Cool and Thermal Storage in Large Hospitals in Cold Climate

Trond Thorgeir Harsem, Janne Grindheim, Bent A. Børresen

T3-30 CFD Study of Ice Slurry Heat Transfer Characteristics in Horizontal Tube

Yanbo Li, Shugang Wang, Jihong Wang, Tengfei Zhang

T1-87 Simulation on Ice Blockage and Prediction of the Optimum Velocity for Ice Slurry in Horizontal Straight Tubes

Shengchun Liu, **Ling Hao**

T3-31 Mathematical Model of Heat Transfer for a Finned Tube Cross-flow Heat Exchanger with Ice Slurry as Cooling Medium

Youwei Long, Shugang Wang, Jihong Wang, Tengfei Zhang

Session Thu-S17: Air distribution and heat transfer

Room 4:

10:20-12:00 Thursday

Chair: Lim JaeHan, Long Ni

T1-1 Drying Potential of Cold Attic Using Natural and Controlled Ventilation in Different Swedish Climates

Carl-Eric Hagentoft

T1-85 Field Measurement & Research on Natural Ventilation Performance of the New East-Main Building of China Academy of Building Research (CABR)

Peizhe Tian, Liu Liang, Zhou Liguang, Zhao Boyuan

T1-8 Performance Comparison of Destratification Fans for Large Spaces

Zhiqiang Zhai(John), Benjamin Brannon

T3-23 Thermal and Moisture Analysis on Performance of Heat Pump System For Tobacco Leaf Flue-curing

Yafeng Bao, Yong Wang

T1-17 Performance Comparison of Three Turbulence Models in Tuyere Jet Numerical Simulation

Yawei Hua, Li Bai, Yan Wang

T1-73 Numerical Study on the Air Leakage from Negative Pressure Room

Jeong-Yeon Park, Minki Sung, Kyu-Nam Lee, Seong-Min Jo

T1-18 Research on the Heat Transfer Rules of Natural Convection in a Building with Single Heat Source

Naiyan Zhan, Di Wang, Yue Xu, Wubo Zhou, Hao Lv

Session Thu-W4: Energy Efficiency Improvement of District Heating System in Cold Climate Zone

Room 5:

10:20-12:00 Thursday

Chair: Jianjun Xia, Yi Jiang

TS-11 An Assessment of District Heating Research in China

Mei Gong, Sven Werner

12:00-13:30 Lunch

13:30-15:00 Oral Sessions/ Workshops

Session Thu-S14: Building envelope

Room1:

13:30-15:00 Thursday

Chair: Seung-Yeong Song, Liangdong Ma

T1-14 Evaluation of the Glazing Systems in Accordance with the Korean Design Standard for Preventing Condensation Risk

Sihyun Park, So Young Koo, Jae Han Lim, Yoon-Bok Seong, Seung-Yeong Song

T1-2 Thermal Performance of Metal-Exterior Curtain Wall Panel Systems with Thermal Bridges in Winter

Jin-Hee Song, Seung-Yeong Song, Jae-Han Lim

T1-45 Policies and Status of Window Design for Energy Efficient Buildings

Sun-Sook Kim, Min-Jung Bae, Young-Don Kim

T1-55 Infiltration and Airflow Assessment of Office Building in Korea

Byung Hee Lee, Hyo Jin Kim, Su Whan Yee, Myoung Souk Yeo, Kwang Woo Kim

TS-3 Study of Dynamic Thermal Performance of Hollow Block Ventilated Wall

Jinghua Yu, Jian Yang, Chao Xiong

TS-102 Airflow due to solar chimney effect: Models revisited for enhancement
Guoqing He

T1-111 Moisture Problems in Highly Insulated Cold Attics
Jesper Arfvidsson, **Carl-Eric Hagentoft**

Session Thu-S22: Rural energy consumption

Room 2:

13:30-15:00 Thursday

Chair: Zhiqiang Zhai

TS-8 Environmental Assessment of Crop Residue Processing Methods in Rural Areas of Northeast China

Jianing Zhao, **Ye Yuan**, Yulian Ren, Haichao Wang

T1-3 Tests Analysis of Heating Energy Consumption and Indoor Air Environment in Northeastern Rural Dwellings of China

Wang Fang, Yanling Wang, HaiYan Wang

T1-13 Evaluation Method for Heating Energy Consumption of Rural Buildings in Cold Climate Zone

Haiyan Wang, Yanling Wang, Fang Wang

T2-3 Heating Energy Consumption Questionnaire and Statistical Analysis of Rural Buildings in China

Yanling Wang, **Fang Wang**, Haiyan Wang

T3-20 Analysis on the Heat Transfer Process of the Burning Cave -- a Traditional Heating System in Rural Houses of Northern China

Bin Chen, **Xueyan Zhang**

T1-109 Analysis on Wind Environment in Winter of Different Rural Courtyard Layout in the Northeast

Meng Huang, Jiao Wang, Hong Jin

T3-63 Study on the Heating Methods of Rural Residential Building in Different Thermal Zones in Northern of China

Pengli Yuan, Zongshan Wang, Lin Duanmu

TS-14 An Evaluation and Model of the Chinese KANG System to Improve Indoor Thermal Comfort in Northeast Rural China - Part-2: Result Analysis

John Zhai, ANDREW P YATES, Lin Duanmu, Zongshan Wang

TS-15 An Evaluation and Model of the Chinese KANG System to Improve Indoor Thermal Comfort in Northeast Rural China - Part-1: Model Development

John Zhai, ANDREW P YATES, Lin Duanmu, Zongshan Wang

Session Thu-W5: Low Carbon District Heating System

Room 4:

13:30-15:00 Thursday

Chair: Xiumu Fang, Zhaojun Wang

W5-01

Presenter: Hua Zhao, Shanshan Cao

Novel Flexibly-configured Low Carbon District Heating System

W5-02

Presenter: Zhigang Zhou#, Xiumu Fang

Study and prospect on Smart Heating System

W5-03

Presenter: Wei Wang

Study and prospect on reliability of heating system

W5-04

Presenter: Peng Wang

Urban Heat Load Modelling Based on Grey System Theory

W5-05

Presenter: Zhigang Zhou#

Study on Connection between Urban Individual Heating Systems Based on Requirement of Limited-heating

W5-06

Presenter: Ye Yuan, Jianing Zhao

Composite Central Heating System for Rural Areas

Session Thu-W6: EBC Annex 66: Definition and Simulation of Occupant Behaviour in Buildings

Room 5:

13:30-15:00 Thursday

Chair: Bjarne Olesen

W6-01 Why is human behaviour important ?

Presenter: B.W.Olesen

W6-02 EBC Annex 66: Definition and Simulation of Occupant Behaviour in Buildings

Presenter: Da Yan

15:00-15:20 Coffee/Tea Break

15:20-17:00 Oral Sessions/ Workshops

Session Thu-S18: Heat Source

Room 1:

15:20-17:00 Thursday

Chair: Sven Werner, Ping Cui

T3-26 The Potential and Approach of Flue Gas Waste Heat Utilization of Natural Gas for Space Heating

Xiling Zhao, Lin Fu, Weixing Yuan, Feng Li

T1-104 Biogas From Organic Waste - A Case Study

M.Y. Mustafa, Rajnish K. Calay, E.Román

T3-61 Research and Application of Flue Gas Waste Heat Recovery in Co-generation Based on Absorption Heat-exchange

Feng Li, Lin Duanmu, Lin Fu, Xiling Zhao

T3-4 Build and Test Research of a Coaxial Parallel-type Hybrid-Power Gas Engine Heat Pump System based on LiFePO₄ Battery

Wenxiu Ji, Liang Cai, Qinkun Men, Xiaosong Zhang

TS-23 Numerical Analysis of the Coupled Heat Transfer Performance of LNG Ambient Air Vaporizer

Shanshan Liu, Wenling Jiao

T1-74 Optimization Design of Capacity and Operation Strategy for Building Level Distributed Energy System

Tao Zhang, Tong Zhu, Naiping Gao, Zhu Wu

T2-13 Modeling and Optimization of Energy Management on Hybrid-power Gas Engine-driven Heat Pump

Qingkun Meng, Liang Cai, Wenxiu Ji, Tao Zhang, Shangzhe Sun, Xiaosong Zhang

Session Thu-S1: Indoor air quality and indoor environment

Room 2:

15:20-17:00 Thursday

Chair: Kwang Woo Kim, Jianjun Xia

T1-96 Experimental Study on the Influence of Ventilated Window on Indoor Air Quality and Energy Consumption

Wufeng Jin, **Ningning Zhang**, Junwei He

T1-63 A Maternity Hospital in Shenyang Indoor Environment Performance Influence Factor Analysis

Liang Yu, Shuang Chen, **Ran Ding**, Siwen Wang, Guohui Feng

T1-50 Assessment Protocol for Energy Efficient Buildings Retrofit in Finland: the Impact on Indoor Environmental Quality and Public Health

Liuliu Du, Virpi Leivo, Mari Turunen, Dainius Martuzevicius, Ulla Haverinen-Shaughnessy

T1-114 Characteristic of Indoor/Outdoor Particulate Matter Concentration by Infiltration in Winter Season

Byung Hee Lee, Su Whan Yee, Ji Min Back, Dong Hwa Kang, Myoung Souk Yeo, Kwang Woo Kim

T1-42 Field and Analysis on Fungal Microorganism Contamination on Filter in Air-conditioning Unit at a Stadium

Chunyang Wang, Yang Lv, Tao Liu, Chenguang Liu

T1-99 Review of Identification Methods for Indoor Pollutant Sources

Shui Yu, **Lianjie He**, Guohui Feng

T1-47 The Survey Study on the Relationship Between Living Environment and Children's Health Problem in DaLian

Shanshan Wei, Yang Lv, Bailin Fu

Session Thu-W8: Research and Demonstration of Key Technology on Building Energy Saving in Severe Cold Region of Northeast China

Room 4:

15:20-17:00 Thursday

China: Guohui Feng, Da Yan

W8-01 Investigation and Modelling of the Centralized Solar Domestic Hot Water System in Residential Buildings

Presenter: Xiaohang Feng

W8-02 (T3-39) Analysis of the Energy consumption and economic for combined heating supply system based on groundwater heat pump and boiler plant

Presenter: Zhiqiang Kang

W8-03 (T1-116) Community energy planning of Liaobin coastal economic zone

Presenter: Chuan Tian

W8-04 Experimental study on soil temperature field of ground source heat pump in cold region

Presenter: Wenhao Che

W8-05 Study on Connection between Urban Individual Heating Systems based on Requirement of Limited-heating

Presenter: Zhigang Zhou

Session Thu-W7: District Heating - Building Level Substations VTT

Room 5:

15:20-17:00 Thursday

Chair: Jorma Pietiläinen (VTT)

W7-01 Heat Reform – next stages

Presenter: Heming Liu

W7-02 Building level substation experience and policy in China

Presenter: Yanqin Song

W7-03 Building Energy Efficiency and District Heating

Presenter: Kari Sipilä

W7-04 Launching a booklet “Innovation to District Heating – Building level Substations”

Presenter: Arto Nuorkivi

18:00-20:00 Chair Dinner

Room:

Chair: Prof. Jianjun Xia

(By invitation only. Please refer to the invitation card for information on transportation to the restaurant.)

Friday, October 23, 2015

08:30-10:00 Keynote Session

Lecture Hall

Chair: Per Heiselberg

P2.1: 4th generation district heating

Presenter: Prof. Sven Werner (Sweden)

P2.2: District heating-modern requirements and practice

Presenter: Mr. Evgenij Gasho (Russia)

10:00-10:20 Coffee/Tea Break

10:20-11:05 Keynote Session

Lecture Hall

P2.3: Challenges and Solutions to Integration of High Fraction of Renewable Energy with Conventional Utility in Net Zero Energy Buildings

Presenter: Andy Walker (USA)

11:05-11:35 Closing Ceremony

Chair: Jorma Pietiläinen

Conference summary: Jianjun Xia

12:00-13:30 Lunch

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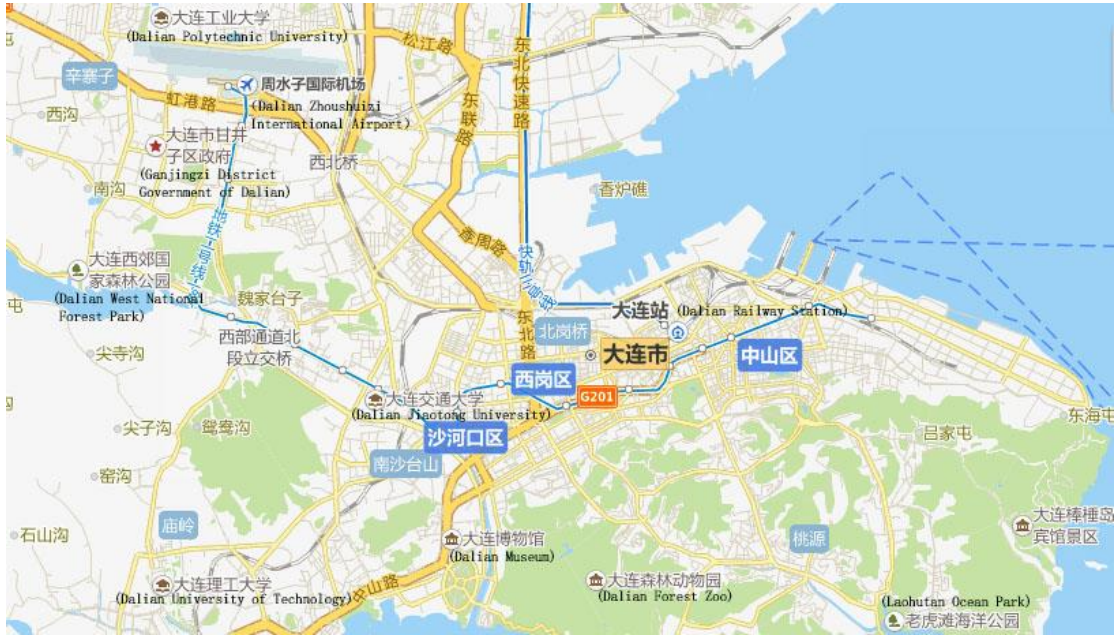
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Additional Helpful Information



Dalian Metro



Map of Dalian Zhoushuizi International Airport, Dalian Railway Station and Dalian University of Technology



Route from Dalian Railway Station to DUT International Convention Center

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