Index and Programme

Friday, 28 April 2017

Plenary Session — Hall Strauss

09:00 Opening remarks

Christoph Chorherr 9
Local Council of Vienna

Michael Ludwig 11
City Councillor of Vienna

Ursula Schneider
Federal Chamber of Architects and Engineer Consultants

Günter Liebel 13
Division Head for Environment and Climate protection at the Federal Ministry of Agriculture, Forestry, Environment and Water Management

Michael Paula 15
Head of the Department of Energy and Environmental Technologies at the Federal Ministry of Transport, Innovation and Technology

10:00 **Helga Kromp-Kolb**
Head of the Center for Global Change and Sustainability of the University of Natural Resources and Life Sciences Vienna

10:35 **Wolfgang Feist** 67
Director of the Passive House Institute and professor at the University of Innsbruck
Passive House – a convincing solution for NZEB

Session 1: Hall Strauss
Passive House examples from Austria

13:00 **Treberspurg, Martin** 79
Future-proof architecture in solar passive house building technique – 25 Years of planning

A brief overview of 20 years building Passive House buildings, focusing on 8 Passive House buildings designed by Treberspurg & Partner Architekten, supported by several scientific studies and accompanying research from the Sustainable Construction research group at BOKU Vienna.

13:25 **Feirer, Martina** 87
Mineroom Leoben PH student dorm in timber construction

The mineroom student dormitory provides 201 international students with a modern home. The building reflects the close links the region and the university have to the natural world and its resources. This project proved that it is possible to construct an energy-efficient and environmentally friendly building with an attractive architectural design.

13:50 **Ploss, Martin** 93
Efficient is economic – results of the Voralberg model project KiNaWo

Taking tender prices for 60,000 design options for a multi-family house as a basis, the KliNaWo model project demonstrates that energy levels have minimal influence on construction costs and that, even without any subsidies, lifecycle costs are lowest when the primary energy values are pursuant to PH levels.

14:15 **Berger, Michael; Hermann, Hubert** 99
Living in Gleisdreieck-2015: The first certified PH dorm in Eastern Austria

Given difficult urban planning conditions in particular, as is the case here, with high neighbouring buildings to the south, a high level of noise and dust emissions and the necessary elevation of the building, a Passive House Standard is best suited to guarantee satisfied users and a sustainable property with lasting value.

14:40 **Kopeinig, Gerhard** 105
Retrofitting and converting a protected fire station into a music school in Velden am Wörthersee, Austria

The challenge faced in this project was to ensure energy efficiency, while also preserving the architectural features of the historical building and meeting the acoustic requirements. This has been and is being confirmed by recording the indoor and outdoor temperatures, airtightness inside, CO2 level of the ambient air every 15 minutes, performing air humidity tests (blower door test), measuring the inside air, and monitoring the materials on-site before they are fitted. This results in extremely low energy consumption, a high level of user satisfaction and receipt of the klima:aktiv Gold certificate.

15:05 **Sonnleithner, Manfred** 111
15 years of living in a Passive House

This paper describes the experience of living in one of the first Passive Houses built in eastern Austria for 15 years. It includes a description of the building, the family's motivation and objectives, and the experiences and insights after the first one and a half decades of living in the Passive House.

Session 2: Hall Stolz 1+2
District renovation

13:00 **Streicher, Wolfgang; Ilmer, Alois; Pfluger, Rainer; Mautner, Petra; Kleewein, Klaus** 119
SINFONIA – introduction to the EU-funded project
The SINFONIA smart city project provides Innsbruck and Bolzano with the opportunity to implement a series of coordinated energy-saving measures consisting of building retrofits and the use of renewable energy sources and industrial waste heat in the energy supply mix.

13:25 **Spiß, Engelbert** 125
EU Projekt Sinfonia – Renovation of residential buildings to the PH Standard
NEUE HEIMAT TIROL is an implementation partner for the EU Sinfonia project, which is currently in its third year. In total, NHT is renovating 580 apartments with a net usable area of over 43,000 m2. The challenges posed by the renovation of tenanted residential buildings are complex. On the one hand, financial reasons lead tenants to adopt a wait-and-see attitude, whilst on the other, considerable persuasion and education is still required as far as Passive House renovation, and particularly ventilation systems, is concerned.

13:50 **Neumann, Werner** 131
Overall energy concept – efficient, renewable, collective
The energy transition needs a comprehensive energy strategy in order to fulfil climate protection and nature conservation objectives. Joint tools are required for the reorganisation of the electricity market and energy industry, if a 100% renewable energy supply is to be regarded as energy efficient.

14:15 **Steiger, Jan; Failla, Maria Chiara** 137
Thermal bridges in the context of international EnerPHit requirements
This contribution provides an overview over ψ-Values to be detected from uninsulated building to a retrofit with 40cm of insulation. Taking into account two typical wall construction types, a 24 cm brick wall and a 12 cm concrete wall, connection details from perimeter connection to roof parapet were entered and evaluated.

14:40 **Malzer, Harald Konrad; Lepp, Laszlo; Weber, Jens Erik** 143
SINFONIA guideline for nearly zero energy neighbourhoods - http://sinfonia.passiv.de

sinfonia.passiv.de - This guideline database is to facilitate the upcoming “nearly zero energy” standard for the building stock, by means of knowledge of already available and implemented best practice standards. Energy efficiency is the key to facilitating integration of energy optimised individual buildings into a intelligent energy network and district design.

Bastian, Zeno 149
EnerPHit Retrofit Plan – step-by-step retrofit with PHPP

A comprehensive plan of all future retrofit steps is needed to perform a successful step-by-step retrofit. The Passive House Institute has developed a template and tools for such a plan in the form of the EnerPHit Retrofit Plan.

15:05 **Ottinger, Oliver; Gressier, Florian; Hohm, Melanie; Peper, Søren** 157
Energy saving advice for households – the next step on the way to NZEB

The reduction of energy consumption in households is an important step towards the realisation of NZEBs. The presented consultation procedure includes the application of a tool to list the individual energy consumers, their usage and power input as well as the measurement of individual appliances.

Session 3: Retrofit examples — Hall Schubert 1-3

13:00 **Fasouli, Myrtia** 161
EnerPHit on London's heritage properties: Adams Row case study
Clever strategies against conservation challenges have allowed Adams Row project to become the oldest EnerPHit home in the UK, showing that historic buildings can be energy efficient. Its Whole Life Cycle study, also highlights the importance of retrofits towards UK's low carbon future targets.

13:25 **Pardo Calderon, Esteban** 167
First EnerPHit experience in Spanish historical heritage buildings
The approach to EnerPHit Standard in historical heritage through a study case of a building located in a plot of the 13th century in Logroño, La Rioja, demonstrates that structural thermal bridges and air leaks can be solved reducing the heating demand by 93.42% with additional costs below 10%.

13:50 **Zakrewski, Stas; Gray, Avery** 173
Strategies to retrofit typical existing US housing stock into Passive House and Passive House Plus
The detached single-family home is a ubiquitous typology in the USA, making up approximately 60% of the current housing stock, but this building type poses unique challenges for EnerPHit renovations. This paper outlines reproducible strategies for renovating this typology to EnerPHit Plus standard.

14:15 **Grünner, Roman; Sternová, Zuzana** 179
Deep renovation of a residential building with approaching to the NZEB standard
After the deep renovation, the building Pavla Horova street 17, 19 in Bratislava, became the first residential building to be refurbished to the NZEB standard, in the Slovak Republic, which demonstrates the use of well-defined measures, restoration of building structures and technical systems.

14:40 **Bianchi Janetti, Michele** 185
Numerical investigation of the moisture risk at beam end s in buildings with internal insulation

Augustin, Martin 187
Retrofit of an 80 years old residential row house to the PH standard in a heritage protected area

The retrofit of a house from 1937 in Prague had to comply with heritage protection requirements. Although state authorities have allowed almost no change of the external shape the project has achieved PH and NZE standards regarding the individual structural components as well as the parameters of the whole building.

McGuinness, Simon 189
Proof of concept: EnerPHit retrofit is viable for widespread application in Ireland

15:05 **Ingui, Michael** 191
Better design & community through PH

Cho, In; Shields, Timothy; D'Silva, Karena; Shea, Maureen 193
A Passive House mosaic for NYC urban infill residential retrofit and extension

Volf, Martin; Lupíšek, Antonín; Hejtmánek, Petr 195
Modular solutions for deep energy retrofitting - introduction to MORE-CONNECT project

A modular system for deep retrofits of residential buildings towards a nearly Zero Energy Building is being developed within the European “MORE-CONNECT” project. The poster presents the design of the multifunctional façade retrofitting modules with integrated air ducts and sensors.

Session 4: Hall Schubert 4-5
Non-residential buildings

13:00 **Selby, Gareth** 199
PH design for future climate change & lifecycle carbon - The Enterprise Centre UEA

13:25 **Bombasaro, Andrea; Nesi, Francesco; Larcher, Marco; Iannone, Ileana** 205
"La Provvidenza" - PH retrofit of a large non-residential building in Italy
Retrofit and extension to the Passivhaus standard of a large non-residential building located in Northern Italy in warm-temperate climate with economic analysis showing the convenience of the Passivhaus approach compared to the minimal requirements imposed by the national regulation.

13:50 **Vallentin, Gernot** 211
Educational institutions in different climate zones-comparison of Estonia, South Korea and China in practice
In the various climates clearly different planning approaches are necessary in order to achieve the passive house standard effectively and conclusively. Building envelope and building services and thus also on the design must always be re-oriented to these requirements.

14:15 **Ryall, William** 217
Artists' Residence, Vermont USA
The Vermont Artists' Residence by Ryall Porter Sheridan Architects is a Passive House residency building. It is set into a south-facing hill for protection from the elements while harvesting solar energy during the cold winter months and encouraging access to the landscape in warm seasons.

14:40 **Mc Carron, Barry** 223
Passive House Research & Development Centre (CREST)
CREST – Centre for Renewable Energy & Sustainable Technologies at South West College is one of the most sustainable buildings in the UK and Ireland, Passive House, BREEAM Excellent and Carbon Neutral building standards. This paper presents an overview of the performance since construction in 2014.

15:05 **Borák, Dalibor; Boráková, Helena; Kučera, Stanislav; Král, Jakub** 229

Municipal art school Karla Malicha - City of Holice (CZ)

The largest Passive House municipal building in the Czech Republic
Built area: 604.5 m², Volume: 9611.9 m³
Building Cost 1.56 mil EUR
The building is a 34.2 x 17.6 m large, five storey building
Walls - ceramic blocks, ETIC mineral wool insulation
Calculated /Real energy consumption: 81.8/62.2 kWh/a

McNally, Paul 231

Ireland's first certified Passive House pharmacy

A pharmacy and apartment replaces the family 100-year old business reducing the carbon emissions of the premises by 91%. This is the third non-residential certified passivhaus project in Ireland. Occupants report exceptional air-quality and comfort increasing productivity and well-being.

Session 5: Hall Strauss
Retrofit projects and components

16:00 **Jähnig, Dagmar; Nocke, Bettina; Fink, Christian; Venus, David** 235
Facade-integrated building services for high-quality renovation of multi-family homes

In the “HVACviaFACADE” project, approaches to solutions are developed for the retrofitting of existing buildings with prefabricated façade modules with integrated building services, and energy supply concepts are analysed by means of energy-related simulations. A demonstration module with integrated heat pump is built and tested.

16:25 **Wolfert, Christian; Österreicher, Doris; Sattler, Stefan; Treberspurg, Martin** 241
Retrofitting under building preservation requirements with Passive House Components

In 1928, a residential building was constructed at a major road junction in what is now the 23rd municipal district of Vienna. The building, which is subject to a preservation order, was fully renovated in 2014 using Passive House components and now meets Nearly Zero Energy House standard with energy savings of over 90%.

16:50 **Worch, Anatol** 247
PH with interior insulation? Influencing variables-systems-possibilities-limits

Even today, the use of interior insulation is primarily associated with the formation of condensation and mould. However, the latest findings show that thicker insulation does not necessarily lead to greater amounts of condensation. Instead, it can even raise energy standards in existing buildings with interior insulation.

17:15 **Freundorfer, Franz** 253
Three at once: envelope, window and ventilation as an EnerPHit innovation

In implementing the retrofit system smartshell reno presented at the Conference on Passive Houses 2016 it was evident that the ventilation units currently known are not suitable for the retrofit. The completely new ventilation system smartvent which is integrated in the window fills this gap.

17:40 **Bastian, Zeno** 259
EnerPHit Retrofit Plan – step-by-step retrofit with PHPP

A comprehensive plan of all future retrofit steps is needed to perform a successful step-by-step retrofit. The Passive House Institute has developed a template and tools for such a plan in the form of the EnerPHit Retrofit Plan.

Session 6: Hall Stolz 1+2
Commissioning and monitoring

16:00 **Horn, Philip; Lindmeier, Ines; Beigelböck, Barbara; Eder, Katharina** 269
Energy consumption, operation and comfort in a PH office building

This paper analyses the monitoring data for two certified passive office buildings in Vienna constructed in succession. Over many years of operation, the 2 buildings consumed extremely low amounts of energy. It is nonetheless clear that using energy from renewable sources is also preferable in Passive Houses.

16:00 **Selke, Tim** 275
Energy consumption, operation and comfort in a PH office building

ENERGYbase was constructed in 2008 as the first Austrian office property to meet the Passive House Standard. The present publication is a reality check relating to the period between 2009 and 2015, in which the high levels of overall energy efficiency in the building services that were predicted are confirmed through long-term monitoring with measurement systems.

16:25 **Rolfsmeier, Stefanie; Simons, Paul** 281
Airtightness measurement for relevant wind and thermal influence in a tall, PH multi-family home

This paper presents the approach and results of measuring airtightness in a 60 m multi-family Passive House building when exposed to difficult wind conditions and temperature influences. Setting up additional measuring points for pressure difference in the building helped fine-tune the measuring process and achieve reproducible results.

16:50 **Tepe, Rainer; Heitland, Christoph** 289
Operational experience with PH systems engineering in “zero:e park”

Research into seven homes in the Passive House housing development zero:e park in Hannover which are fitted with Tecalor combination units showed good results on the basis of the measurement technology funded by proKlima. However, the results also indicated room for improvement, especially with regard to control systems.

17:40 **Peper, Søren; Schulz, Tanja; Hasper, Wolfgang; Ottinger, Oliver** 295
Commissioning and operational optimisation as success factors for energy-efficient buildings

The contribution identifies the conditions and crucial points to be observed to ensure the proper commissioning of a building. A number of checklists is also included. To that end a tool for optimisations of operations is described which enables monthly comparisons with planning values.

18:05 **Schirmer, Stefan** 303
Quality assurance in construction – challenges in implementing PH in China

Passive Houses are highly sought-after in China, but the quality of planning, materials and construction is poor. Through offering intensive training and quality assurance in pilot projects, dena is building Passive Houses which stand the test of time.

Session 7: Hall Schubert 1-3
Warm and hot climates

16:00 **Infante Barbosa, Ernesto; Reyes Bernal, Elena** 307
EcoCasa LAIF: Introducing Social Passive Houses in Mexico
The paper describes how Sociedad Hipotecaria Federal, supported by GOPA-PHI, is implementing EcoCasa SHF-LAIF, the first programme in Latin America to finance the construction of Passive Houses. It will fund at least 600 homes reducing CO2 emissions by 80% for low and middle income households.

16:25 **Mori, Miwa** 313
Measured data of supply air cooling in a PH - solution for hot and humid climates
A pilot project from Japan has shown that relying more (or even 100%) on supply air could solve humidity problem in warm and humid climate zone. Moreover, supply air cooling system has more advantage for the cooling energy distribution and could be as efficient as split unit.

16:50 **Pappas, Ioannis; Pallantzas, Stefan** 319
Passivistas EnerPHit Project in Athens: One year overall measurements, one year of living
Passivistas:TheHouseProject is a stepping stone on the road to the Mediterranean NZEB. This first year of living and using the building showed us that we are on the right way. Adapting the Passive House concept and using the PHPP tool give us all we need to reach the NZEB building of the 2020.

17:15 **Al Falasi, Khalifa** 325
Office building certified in Passive House Classic standard in Dubai (U.A.E.)
The very first PH project in hot & humid climate was designed and realized in 2015-2016 by an Italian team to address Dubai's government vision for more sustainable buildings. The article gives an insight on several aspects, from the envelope to the systems and the monitoring.

17:40 **Faganello, Stefano; Tribus, Michael** 331
Passive House Buildings in warm humid climates - Office building in Pegognaga (Italy)
This paper presents the renovation of a residential building, in order to turn it into an office certified Passive House. They will be described solutions for critical energy problems and the climate control system, made of a mechanical ventilation unit and a sole-brine geothermal integrated system.

18:05 **Schnieders, Jürgen** 337
Proper humidity simulation: measurement validation of moisture simulations
Measurements were taken in two Passive Houses to confirm that the humidity retention process in building components can be accurately modelled using the dynamic simulation programme DYNBIL. Provided the processes on the surfaces of the building components are approached correctly, the simulation results correspond closely with the measurements taken.

Merigo, Alessandro 339
Optimal System for Mediterranean Climates (such as Italy)
Affordable Passive houses need affordable systems. In Mediterranean Climate the building require heating, cooling and dehumidification. Our comparison with 3 systems found the best compromise in the mechanical ventilation with heat pump and multi split. A cheaper and easier solution.

Castaño Salvador, Juan Manuel 341
Low tech PH in one of the hottest places in Europe - warm climate strategies with PHPP
Is it possible to build a Passivhaus in one of the hottest places of Europe, with construction methods available on a rural area in the South of Spain? This article will give answers to these questions. With this family house of 171 m2 of TFA, built with a cavity wall façade, traditional in the area, we will test the improvement of the different warm climate strategies with PHPP. Architectural design, orientation, shadowing, the use of subsoil heat exchangers, and even the effect or airtightness and heat recovery for a real warm climate example.

Session 8:
Methods and tools

Hall Schubert 4-5

16:00 **Goossen, Carl-Peter** 345
Integrated design and BIM for social housing apartment Arnhem Presikhaaf

In order to achieve a transparent and comprehensible design process, Bouwnext applied morphological design engineering. This method juxtaposes all conceivable partial improvements in a matrix, showing all elements of the building that could be insulated and all possible building services systems on the one hand and the expected energy reduction on the other hand.

16:25 **Ottinger, Oliver; Feng, Tianyuan; Rupps, Waldemar; Schulz, Tanja; Grove-Smith, Jessica** 351
Worldwide moisture assessment

As the Passive House Standard spreads around the world, questions are repeatedly raised about the suitability of structures with regard to moisture resistance. This report presents the results of modelling diffusion processes in wall structures at 200 locations around the world, using the method laid out in ISO 13788.

16:50 **Soflete, Marius; Munteanu, Raluca** 357
Teaching Passive House technology and execution in Romania

Teaching passive house concepts to architects in Romania in the framework of the Continuous Professional Development Program developed by the Romanian Chamber of Architects. Theory met practice and the second certified Passive House in Romania was constructed.

17:15 **Cristol, Johan** 363
Importing building information modeling data into the PHPP

Built to Specification (Built2Spec) is a Horizon 2020 EU-funded project involving 20 European partners that seeks to reduce the gap between a building´s designed and as-built energy performance. In this project, the Passive House Institute provides its expertise for the development of the new Built2Spec tools for future-proof construction and quality assurance and simultaneously makes investigations on how to integrate BIM software applications into Passive House quality assurance process and how to implement and transfer required data for PHPP energy calculations from BIM models into the PHPP.

17:40 **Stieldorf, Karin** 367
PH standard as a target criterion in the design education of architects

Students are strongly influenced by their training. There are inclinations, that their ethical attitudes are formed through this. What is recognized as relevant is at best the guiding theme. It is therefore essential to awaken the ability and willingness to deal with climate change and sustainability.

18:05 **Gollwitzer, Esther** 375
Calculation: simplified window installation

The installation of various frame types was investigated by performing comparative calculations using a simplified model and a model with a precise frame geometry. Using the simplified thermal bridge calculation model offers a straightforward means of better determining energy balances according to PHPP, even during the early stages of the planning process.

Edwards, David 379
Determination of shading reduction factors for PHPP/designPH from a 3D computer model

Harrmann, Andre 381
From scribbled cheat sheets to helpful tools

Too many formulas, terminology, acronyms, and symbols and too many different units useful tools are needed to stay focused. Less searching More Passive House.

Paulsen, Monte 383
PHPP Anonymous: Lessons learned from the Vancouver-area PHPP

Rose, Clarence 385
The PHPP as "nZEB tool": building physics are key to tipping point in the Dutch building sector

Saturday, 29 April 2017

Plenary Session — Hall Strauss

08:30 **Lang, Günter** 389
Passive House for all – The road to zero – 500 days since Paris: Time to act

500 days after the Paris climate protection agreement and after the construction of 66,000 Passive house buildings throughout the world, it is time to raise construction standards to Passive Houses level for new builds and to EnerPHit for renovation projects. An analysis of the PH database makes what the “Road to Zero” by 2050 looks like in the building sector around the world.

08:45 **Jedlicka, Günther** 397
Passive Houses for Active Students! A success story

In building the world’s first student dormitory according to the Passive House standard in 2005 OeAD-WV has set an important milestone in ensuring a sustainable trend towards ecological construction. In addition to providing accommodation for 12,000 students a year, OeAD-WV offers two summer programmes on sustainability topics.

09:00 **Bottermann, Heinrich** 403
Sustainability in construction

Foster, Scott
Director of Sustainable Energy at the United Nations Economic Commission of Europe

Session 9: Hall Strauss
Passive House Plus and Premium

10:30 **Ronacher, Herwig** 409
Passive House and plus energy house research projects in rural environments

By way of conclusion it can be stated that the Plus Energy House standard can be achieved in the sphere of rural architecture both for new builds and also for building retrofits with PH Standard (ideally PH Plus) by using optimally oriented, south-facing roof surfaces of sufficient dimensions.

10:55 **Großklos, Marc** 417
Operational experience of a Passive House with energy gains

A 17 dwelling, multi-family house with Passive House Plus designation and renewable heat and power production capability was observed for a period of two years. Unique features of the project include a solar thermal system without antifreeze circulation, an electrical energy store and an electricity allowance for tenants.

11:20 **Steinmüller, Bernd; Wirtz, Rainer; Kandziora, Markus** 423
Steps from a 1950's residential estate house towards EnerPHit-/Passive House Plus

For a sustainable energy transition the energy consumption must be considerably reduced and the remaining energy demand must be met by renewables. The example of a semi-detached house built in the 1950s demonstrates how this can be efficiently achieved in the building stock through a two-phase project divided into sub-steps.

11:45 **Herz, Dieter** 429
Passive House Plus and Premium in practice

12:10 **Kreutzer, Simone** 437
Passive House – here to stay

We are leading increasingly environmentally friendly and sustainable lifestyles. But how does the quality of our buildings fit in to this? Although Passive Houses reduce energy costs and offer a high level of comfort, the concept is still not universally accepted. This will only change if awareness is raised among building owners.

Session 10: Hall Stolz 1+2
Passive House high-rises

10:30 **Bednar, Thomas; Schöberl, Helmut** 445
Renovation of a TU Wien high-rise building achieves Passive House Plus standard for the first time
Measured internal thermal load and weather data of TU Wien's refurbished (Plus-)Plus-Energy Office High-Rise Building is used as input for the Passive House Planning Package. The resulting calculated heating and cooling demand is then compared with the measured energy needs for heating and cooling.

10:55 **Coughlin, Brittany; Love, Christy; Lepage, Robert** 451
Near EnerPHit retrofit of a high-rise residential building in Vancouver
This paper summarizes two case studies in British Columbia, Canada. The first is on a feasibility study of an EnerPHit retrofit for an existing high-rise multifamily building. The second is on post-occupancy monitoring of a new Passive House certified multifamily development.

11:20 **Arena, Lois; Sacks Rosenberg, Arianna; Falk, Luke; Moelis, Deborah** 463
Cornell Tech - High-rise buildings & Passive House
The Cornell Tech high-rise tower is on target to become the tallest PH building in the world. This session will describe the owners' motivation and their journey through the design, bidding, and construction process. The team will share their experiences with conflicts between PH requirements, codes and other sustainability programs.

11:45 **Velázquez Arizmendi, Germán** 469
Tower for 361 Social Housings in Bolueta, Bilbao, SPAIN
This project is for 361 Passivhaus social housing units over 28 floors, with 88m of height. The scheme is located in Bilbao, Spain and the owner is Visesa, the Basque Government. The construction process is advanced, with 22 floors built; completion is expected at the beginning of 2018.

12:10 **Judah, Ilana** 475
Passive House feeling higher: What it takes to make a high-rise passive
This paper presents an FXFOWLE-led study determining the viability of implementing the Passivhaus standard for a tall residential building in New York City. The study includes a viable design for a tall Passivhaus residential building, and analyses its impacts from multiple perspectives.

12:35 **Daly, Rupert** 481

Woodside high-rise: Bridging Thermal Inequality

Exploring the viability of retaining a series of three 1960's high-rise social housing blocks in Glasgow, Scotland and whether these might be refurbished to Passive House Standards.

Session 11: Hall Schubert 1-3
Passive House and the electricity grid

10:30 **Höfer, Richard; Bretzke, Axel** 489
Regenerative heat supply with storage from PH building in the Smart Grid
A simple simulation demonstrates that if Passive Houses with heavy-duty construction and a heat pump are heated by an extra 2 K when surplus wind electricity is available, they require no heating for several days during low pressure winter weather conditions. This approach, which improves grid stabilisation, is rewarded with low-priced electricity to benefit thermal comfort levels.

10:55 **Krick, Benjamin; Feist, Wolfgang** 495
From electricity-based supply concepts to efficient and economic solutions
This contribution compares different methods of heating and of generating hot water. It is possible to install innovative and cost-effective systems for generating heat using a heat pump and direct electric systems, especially in the Passive House. Pellet-based systems can likewise be installed in the Passive House for a small additional cost.

11:20 **Sigg, Ferdinand; Krause, Harald** 505
Modelling and evaluating power-based supply concepts for highly-efficient buildings
It is becoming increasingly commonplace for buildings not only to consume energy, but also to generate energy using photovoltaic installations. This study explores the potential created by linking the combination of PV installations and heat pumps to thermal energy storage and electrical energy storage solutions in the building.

11:45 **Kunkel, Sven; Kübel-Heising, Felix; Mai, Tri; Rädle, Matthias; Steinbächer, Hans-Jürgen; Repke, Jens-Uwe** 511
Innovative energy management system for heating support and BW heating
A new concept has been introduced for producing and storing thermal energy in private households, and an initial prototype presented. The system increases the efficiency of heat pumps by utilising solar radiation using hybrid collectors and a new type of latent heat storage unit.

12:10 **Handler, Simon; Kreč, Klaus** 517
Conditioning and energy storage in PH by means of thermal activation of reinforced concrete ceilings

Simply by activating the concrete ceiling, the PH ensures a high degree of thermal comfort year round. The excellent heat storage capacity allows for heating interruptions of several days without sacrificing comfort. The PH is thus an ideal energy storage system for the public power grid.

12:35 **Gerbut, Maksym** 523
„No-carbon-future“ building technology

PassivDom — autonomous 3D-printed mobile House (Zero Carbon Emission). It use only solar energy for climate control, water generation and air quality control. House frame is produced by 3D-printer robot. Heating demand according to PHPP: 6 kW/(m²a). Generation of renewable energy: 248 kWh/(m²a).

Salman Gürcan, Tugba 525
PH meets with Smart Home - an example for future housing

For the purpose of achieving energy efficiency and comfort level easier, the Passive House standards and Smart Home Technologies integrated into one place as a retrofitting model in a real life project; Ankara Pasif Ev.

Session 12: Hall Schubert 4-6
Passive House international

10:30 **Dobrevski, Svetlin** 529
Climate zones with hot summers and cold winters - build a Passive House!

This article shows the advantages of the integrated design in applying the Passive House Standard. An innovative approach for heating and cooling with air-to-air heat pump, integrated into the MVHR, is used allowing expansion of the boundaries of functional criteria for heating and cooling load.

10:55 **Gavião, João; Marcelino, João** 535
The first certified Passive House in the touristic sector in Portugal

The first certified Passive House in the touristic sector in Portugal was developed by Homegrid, obtained the certification by the Passivhaus Institut and is operating. The Passive House shows a great potential in the touristic sector, an important economic sector in particular in warmer climates.

11:20 **Nagy, Csaba** 541
FairyTaleKindergarten/The first certified PH kindergarten of Hungary

The first Passivhaus certified kindergarten of Hungary means not just tremendously reduced heating and cooling costs, but thanks to creativity, the building sets an iconic milestone of its genre, including ceiling openings, a rooftop playground, implemented and tailored graphics and much more…

11:45 **Szekér, László** 547
New Passive Houses in Hungary

Bonilauri, Enrico 549
Better climate zone mapping for Passive House components in different countries

PHI climate zones are based on the heating/cooling region indicator, a value that has no connection to national climate zones. This method was applied to 89 locations in the US, and to 30 Italian locations, combining national and interpolated data. The resulting proposed conversion between PHI zones and national ones is illustrated.

12:10 **Parry, Clare** 551
Changing the game in Australia - The contractor experience

Bunyesc, Josep 557
Retrofit and extension of a public community centre in Barcelona of zero energy balance

The retrofit and extension of Can Portabella, a public community centre in Barcelona, will be the first “Positive” public building in Catalonia. With a negative CO2 balance, it generates more energy than it needs during the year, keeping the standard budget.

Vicente, Romeu; Oliveira, Rui; Bilelo, António; Figueiredo, António 559
Energy retrofit of a masonry building in Portugal

Building retrofit takes an important role in Near-Zero Energy Buildings goal. The case study herein presented is one of the first EnerPhit case studies in Portugal of a single family building representative of 1970’s. The owners after the intervention acknowledge an impressive comfort improvement.

12:35 **Balla, Chetna** 561
Role of PH principles to improve comfort in tropical climate of Bangalore, India

The hierarchical importance for Passivhaus is established as insulation, shading, window and thermal bridges. Emphasis is given to control humidity with a balanced ventilation system for the tropical climate of Bangalore, India. An increased threshold for overheating meets acclimatization levels.

Mangaroska, Viktorija 563
Green Buildings and PH for the Climate Conditions in Macedonia

Varga, Szabolcs; Petran, Horia; Măgurean, Ancuţa; Petre, Norana; Niculuţă, Marian 569
Thermal bridge free PH foundation design in the Romanian seismic region

Optimised details of a slab on ground in a heated basement, a slab on the ground without basement, and a slab above an unheated basement were assessed. The proposed details are suitable for their use in cost-effective passive house projects, since they are made up of affordable materials, can be locally purchased, and which comply with the rigorous Romanian seismic provisions.

Session 13: Hall Strauss
Mixed-use and non-residential projects

14:15 **Knotzer, Armin** 573
Best practice in a school using of prefab Passive House suitable wood elements

A number of school buildings in Austria and across Europe which were built to Passive House Standard with prefabricated wood modules and retrofitted with Passive House components. An overview is given of the technical solutions, financing and the special features of the retrofitted school buildings.

14:40 **Herz, Dieter** 579
Hotels to the Passive House Standard – a success story

A report on the implementation and propagation of the Explorer Group Passive House hotel buildings: 7 hotels have been certified as Passive Houses since 2010, and more are currently in the process of being certified.

15:05 **Wohlfahrt, Matthias; Schnieders, Jürgen** 587
PH Supermarkets in Hanover – status report from 2 years of operational experience

In 2012, a REWE supermarket in Hanover opened for business and became Germany's first free-standing Passive House supermarket. It was followed by two further Passive House supermarkets from EDEKA and Netto in 2014. The on-going monitoring shows the potential for optimisation and shows a high level of correlation with the demand forecasted.

15:30 **Röthele, Erik** 595
Exclusive yet economic

Retrofitting with Passive House components was shown to be cost-efficient, despite the fact that the existing building already attained the minimum level of heat insulation according to the 1985 German Thermal Insulation Ordinance. There is sufficient renewable energy from geothermal sources to meet the full final energy demand for heating (Qh,f), resulting in a PER factor of 0.70.

15:55 **Schneider, Ursula** 601
Future-proof living:JAspern

JAspern is a co-living project in Vienna, constructed according to the Passive House Standard, which welcomed its first tenants in 2014. It comprises 18 units for living, working and commercial purposes, as well as a range of communal facilities. The most impressive feature of the project is its universally sustainable approach, social concept and climate-sensitive design.

Session 14: Hall Stolz 1+2
Passive House in China

14:15 **Nicholson, Brandon** 609
The ROCIS Initiative: How Buildings Can Protect Occupants from Outdoor Air Pollution

This paper summarizes the ROCIS (Reducing Outdoor Contaminants in Indoor Spaces) Initiative, its prescriptions for mitigating the impact of polluted outdoor air on IAQ, and initial data measured in Pennsylvania. This is then related to a Canadian study of the health benefits of airtightness and filtered HRV ventilation, relevant to Passive House.

14:40 **Kaufmann, Berthold; Schöberl, Helmut; Michulec, Dawid** 615
PH ZhuoZhou: first complete monitoring of a PH in China

As of today, not many Passive House buildings in China have been monitored so far. But the information from measurements are essential to know what the buildings behavior is in reality and if the users are happy with this new building conception and living experience there. This article outlines the data and the experience gained from ZhuoZhou office building.

15:05 **Cunz, Thilo** 621
Passive House standard for high-rise buildings in China

The size of high-rise buildings takes a significant influence in implementing the Passive House concept referring to building geometry, building construction and building services. Additionally local specifics in building use, planning and construction processes and available products can make a first PH adaptation to a challenge. Basis for the following comparison is the experience from two residential high-rise buildings in Tianjin. LUWOGE consult transferred their European Passive House know-how, gained in the BuildTog project, to China and offers consulting services within the framework of a detailed training on the job for all participating local partners.

15:30 **Kaufmann, Berthold; Lepp, Laszlo; Rongen, Ludwig; Tribus, Michael; Vallentin, Gernot** 627
Passive House Technical Experience Center (PHTEC) in Qingdao, China

The office building PHTEC in Qingdao, on the east coast of China, was completed in September 2016. This paper describes the architectural design, building construction and quality assurance, and outlines the discussions held during the planning process and PH certification.

15:55 **Cieslok, Joachim** 633
Technology for the “PH Technology Experience Center“, Sino-German Ecopark Qingdao

Presented here is the building technology used for heating/cooling, ventilation and dehumidification for the first Passive House office building in Qingdao, China. In response to the extreme climate conditions in summer (tropical climate), highly energy-saving technologies, among other things, were realised for the necessary dehumidification of the outdoor air.

16:20 **Ni, Haiqiong** 639
Passive House and Passive House windows in China

This contribution shows that environmental protection and energy saving are very important not just in China. The development of structural engineering up to the Passive House standard is illustrated using examples of new components together with the planning and construction of PH demonstration projects.

Frey, Wolfgang 645
Ecological Passive House – Cultural Park in Zuhuai, China

For the first time ever a total overhaul will be undertaken in the South Chinese city of Zhuhai to meet passive house standards in a subtropical climate. Regarding innovative sustainable technology, ecology and economy, the award-winning concept is a flagship project with a global impact in the area of passive house renovations in temperate climes.

Ni, Xin; Xing, Chao 647
Mobile sun protection in the atrium

Sunshade system is considered as one of the effective passive house techniques and attracts more and more attentions. No doubt the energy consumptions can be greatly reduced in summer season. Ordinary sunshade designs may be convenient for production, but it also has negative effects on building appearance. A fine designed building could lose its “personality” for having an ordinary sunshade system installed on it. This article introduces a practical example and hopes to inspire more designers to deliver creative works that rich in era sensations, and also improve the energy efficiencies of their building.

Session 15: Components and building technology — Hall Schubert 1-3

14:15 **Siegele, Dietmar; Ochs, Fabian; Feist, Wolfgang** 651
Testing of compact devices with speed-controlled compressors and enthalpy transfer agents

14:40 **Cieslok, Joachim** 657
Conserving energy in hydraulic systems

Real examples of heating and ventilation systems are used to demonstrate which measures can be taken to attain the low transport energies required by the Passive House criteria. A standard design was directly compared with an energy-optimised design for each system.

15:05 **Gilliland, Allen** 663
Reducing ventilation system cost and energy use with share air ducts

Sharing Heat Pump and HRV supply air ducts provides a new approach to reduce ventilation system cost significantly while enhancing HRV energy performance, occupant health and comfort. Concept, design, multiple projects implementation, performance data and benefits are presented.

15:30 **Kierulf, Bjørn** 669
The future of PH: more Innovation!

Passivhaus is a driver of innovation in building sector. What are the next innovations we can expect, and how will they impact our work as architects and builders? A overview of the potential of ventilation, heating and cooling, transparent components and a sustainable envelope.

15:55 **Ochs, Fabian** 675
Simulation of a Membrane Energy Recovery Ventilation and Exhaust Air Heat Pump

Air-to-air ERV is increasingly discussed as a solution in residential buildings for reducing the energy consumed for heating/cooling and for improving the indoor air. Because of the complex relations, in particular in combination with an exhaust-air-HP, a recommendation to use a membrane ERV should be derived by means of building simulation.

Ochs, Fabian 677
Modelling and Simulation of Radiant Heat Emission Systems in PH

Infrared-heating systems are increasingly discussed as a cost-effective heating system. Simulation results show, for the same temporal and spatial thermal comfort, within the model accuracy no significant differences in the heating demand can be obtained between a heat emission which is predominantly convective and one which is predominately radiative.

Pfluger, Rainer 679
External plaster as an airtight plane without filling – Testing with mobile differential pressure device

This article describes the development of a testing device for determining the airtightness of exterior plaster. It enables an inspection to be carried out during the retrofit to determine whether the existing plaster can be used as an airtight layer without any rework.

16:20 **Michler, Andrew; Kierulf, Bjørn** 681
Low Impact Envelope Systems in Passive House

With emphasis on the thermal envelope in Passive House special attention should been paid to embodied energy and Cradle to Cradle assessments. Energy saving design and alternative materials can greatly reduce the total environmental impact of a building without added cost or complexity.

Peel, Andrew 683
The first Cold Climate Passive House Production Facility emerges

The LL Headquarters provides 1,400 m2 of production and office space for a growing health products manufacturer. Located in Central Ontario, Canada, the building will be the first Passive House production facility in a cold climate.

Session 16: Hall Schubert 4-6
Passive House international

14:15 **Grant, Nick; Siddall, Mark** 687
Developing summer comfort design guidance for the UK
According to a recent academic paper and national coverage within the UK press, Passivhaus homes are more likely to be subjected to overheating. This paper examines the as-built performance of Certified Passivhaus homes located in the North East of England to determine whether concerns are legitimate.

14:40 **Siddall, Mark; Johnston, David** 693
Long term experience of PH in North East England: Are there overheating risks?
According to a recent academic paper and national coverage within the UK press, Passivhaus homes are more likely to be subjected to overheating. This paper examines the as-built performance of Certified Passivhaus homes located in the North East of England to determine whether concerns are legitimate.

15:05 **Riis Dietz, Søren** 699
PH school in the northern part of Denmark: First analysis of 5 years' consumption
After 5 years of monitoring the passive house school´s heat and electricity consumption, results are analyzed and compared to PHPP final energy calculations with local measures climate data. PHPP results are “on the save side”. Internal heat values are higher than standard values.

15:30 **Paulsen, Monte** 705
Moodyville: A preview of North America’s first Passive House district

15:55 **Hienonen, Markku; Tackett, Eveliina; Räinä, Ilkka; Kauppinen, Timo** 711
Public authority‘s support for performance verification of single-family house
Based on over 15 years of experience it is possible to say, that Public Authority and Building Supervision can greatly influence the quality buildings and families can get houses, they have ordered. Performance verification is important part of quality control.

Mohammadpourkarbasi, Haniyeh 717
The business case for Passive House in the UK

Theoboldt, Ingo 719
CO2mpakthuset - 25m² Passive House as training project and student dwelling

CO2mpakthuset is a tiny Passive House, designed as a teaching program for carpenters' and electricians' apprentices. According to Swedish regulations, it is exempt from needing a building warrant - and can be moved as a whole on the back of a truck. All components have Passive House specifications.

Lewis, Sarah; Barron Smith, Hamson 721
Affordable Passive House homes for Norfolk

In the UK the vast majority of Passivhaus homes have been built for private sale or self-builders. With the standard becoming more popular and well known this paper, through two case studies, addresses the question of how to deliver these high quality homes at an affordable cost for all tenures.

Panel discussion 17:15 – 18:00 Hall Strauss

Wolfgang Feist
Director of Passive House Institute and Professor at University of Innsbruck

Lloyd Alter 725
Editor of TreeHugger
Good air inside and outside

Jürgen Schneider
Head of the Division Economy & Impact at Environment Agency Austria