

Tagung der Alpenkonferenz
Réunion de la Conférence alpine
Sessione della Conferenza delle Alpi
Zasedanje Alpske konference

XIV

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**ECHANGE D'EXPERIENCES DES PAYS ALPINS SUR LES
BATIMENTS A FAIBLE EMISSION (CONFERENCE SUR LES
CONSTRUCTIONS ALPINES)**

A Rapport de la Présidence

B Proposition de décision

Annexe

- I. Documentation relative à la première Conférence sur les constructions alpines
« Bâtiments à faible émission – Développement et innovations dans les pays
alpins », 16/17 mars 2016, Garmisch-Partenkirchen**

A Rapport de la Présidence

I. Contexte

En mars 2009, les Parties contractantes de la Convention alpine ont adopté un Plan d'action sur le climat dans les Alpes lors de la X^e Conférence alpine d'Évian.

Le 18 mai 2010, le Parlement européen a approuvé la nouvelle version de la Directive sur la performance énergétique des bâtiments. Tous les États membres doivent adapter leurs normes de construction afin que seuls des bâtiments à consommation d'énergie quasi nulle soient construits à compter de 2021. Les bâtiments construits par les administrations propriétaires devront déjà respecter cette norme à partir de début 2019. Les bâtiments existants aussi devront, dans la mesure du possible, être adaptés à ces nouvelles règles. Les États membres de l'Union européenne se sont attelés à l'adoption de plans nationaux afin de mettre en œuvre cet objectif et d'introduire le standard de construction dans le cadre réglementaire. Les pays européens non membres de l'Union européenne promeuvent eux aussi des projets modèles et des initiatives visant à définir les normes auxquels les bâtiments à consommation d'énergie quasi nulle seront soumis.

Ces mesures apportent une contribution essentielle à la lutte contre le changement climatique. Le domaine des constructions doit fournir d'autres solutions pour diminuer les émissions. L'adoption et la mise en œuvre à long terme de nouvelles normes pour les bâtiments, comme les bâtiments à consommation d'énergie quasi nulle et les bâtiments à énergie positive (*Effizienzhaus Plus*), apporteront une contribution déterminante en ce sens.

C'est dans ce contexte que s'est tenu les 23 et 24 juillet 2015 à Merano (Haut-Adige) un séminaire organisé par la Présidence et intitulé « Échange d'expériences des pays alpins au sujet des bâtiments à faible émission ». Ont pris part à ce séminaire des participants provenant des Parties contractantes suivantes : Allemagne, France, Italie, Autriche, Suisse et Slovénie, ainsi que des représentants du Secrétariat permanent de la Convention alpine, et de deux organisations ayant le statut d'observateurs, CIPRA et Club Arc Alpin.

Les résultats de ce séminaire de deux jours ont apporté une importante contribution à la préparation de la première Conférence sur les constructions alpines organisée les 16 et 17 mars 2016 à Garmisch-Partenkirchen et intitulée « Towards Net Zero Energy Buildings (NZEB) ». Plus de 250 participants issus des Parties contractantes de la Convention - Allemagne, France, Italie, Liechtenstein, Autriche, Suisse et Slovénie - y ont pris part, ainsi que des re-

présentants du Secrétariat permanent de la Convention alpine et des organisations ayant le statut d'observateur (CIPRA et Club Arc Alpin). Des représentants venus de Slovaquie et de Grande-Bretagne étaient également présents.

II. Résultats de la Conférence

Les contributions des Parties contractantes de la Convention alpine et les communications présentées par les experts de rang international ont permis d'aborder, dans le cadre de la Conférence, les thèmes des « bâtiments à consommation d'énergie quasi nulle » et des « quartiers durables », en tenant compte des spécificités de l'espace alpin et de la culture des constructions spécifique à cette région. De plus, ces aspects ont été discutés avec les participants. On a tout particulièrement encouragé les échanges multidisciplinaires entre les décideurs du secteur social et économique d'une part, et les architectes, aménageurs, ingénieurs et chercheurs d'autre part.

Les participants à la Conférence ont pris part à des tables rondes sur les questions susmentionnées.

Les thèmes d'actualité suivants ont été approfondis tout particulièrement :

- efficacité énergétique et énergies renouvelables / concepts intégrés d'isolation des bâtiments / exigences spécifiques des constructions dans les régions alpines
- stratégies pour les quartiers climatiquement neutres / analyses d'efficacité et considérations sur l'empreinte carbone
- efficacité énergétique et réhabilitation des bâtiments / maintien de normes élevées dans le domaine de la culture des constructions
- critères de droit public auxquels les bâtiments résidentiels et non résidentiels doivent répondre / concepts pour le contrôle des résultats
- constructions utilisant des matériaux locaux / considérations sur le cycle de vie / l'énergie grise

III. Bilan

La première conférence sur les constructions alpines - consacrée aux bâtiments à faible consommation d'énergie - a montré que les pays alpins sont intéressés par l'instauration d'un échange d'expériences permanent sur les constructions durables et énergétiquement performantes, ainsi que sur la culture des constructions. Ceci constituera la première pierre pour

la tenue de futures Conférences sur les constructions alpines, qui aborderont périodiquement le thème des constructions et de l'architecture.

Le 61^{ème} Comité permanent a proposé à la Présidence de présenter à la XIV^e Conférence alpine un rapport concernant la première Conférence sur les constructions alpines. Les résultats de la Conférence de Garmisch-Partenkirchen et les recommandations d'actions des participants à cette manifestation pour la poursuite des échanges d'expériences sont résumés dans la documentation jointe en annexe.

B Proposition de décision

La Conférence alpine

1. constate qu'au vu des changements climatiques actuels et du « Plan d'action sur le changement climatique dans les Alpes » adopté par la X^e Conférence alpine d'Évian en 2009, les Parties contractantes doivent renforcer leur coopération dans le domaine des constructions ;
2. prend note du rapport de la Présidence au sujet de la première Conférence sur les constructions alpines 2016, remercie la Présidence allemande pour son initiative et se félicite de la proposition de la Présidence visant à réitérer la Conférence sur les constructions alpines en tant que manifestation de la Convention alpine ;
3. invite les Parties contractantes à continuer d'encourager les échanges d'expériences entre les pays alpins dans le domaine des constructions durables et énergétiquement performantes, ainsi que de la culture des constructions, et à réaliser des activités communes telles que les Conférences sur les constructions alpines.

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ANLAGE/ANNEXE/ALLEGATO/PRILOGA

1

First Alpine Building Conference "Towards Net Zero Energy Buildings" (NZEB) 16/17 March 2016 in Garmisch-Partenkirchen

Conference on net zero energy buildings –
Developments and innovations in Alpine countries

Final Report



Research programme

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Chair of Energy Efficient and Sustainable Design of Building, Technical University of Munich

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1 Introduction

The Alpine Convention is an international treaty between the eight Alpine countries Germany, France, Italy, Liechtenstein, Monaco, Austria, Switzerland and Slovenia, plus the European Union. The convention's aim is to promote and support sustainable development in the Alpine region.

At the XIIIth Alpine Conference in Turin on 21 November 2014, the Federal Republic of Germany took over the presidency of the Alpine Conference from Italy. Germany's presidency will end with the XIVth Alpine Conference on the island of Herrenchiemsee on 13 October 2016. The First Alpine Building Conference: Towards Net Zero Energy Buildings (NZEB) was held on 16-17 March 2016 as part of the German presidency's programme. The conference was jointly organised by the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), the Bavarian Chamber of Architects (Bayerische Architektenkammer ByAK), and the Technical University of Munich (TUM) with the support of the Permanent Secretariat of the Alpine Convention.

The conference was envisaged as a platform to present and discuss net zero energy buildings and sustainable neighbourhoods in the context of building in the Alps. The aim is to inspire further cooperation on building between Alpine countries and to give fresh impetus to the national implementation of net zero energy building standards. In light of the unique and specific characteristics of the Alps, the conference explored in particular topography, climate, culture, materials and local craftsmanship, taking into account the diverse traditional building cultures already present in the Alpine region.

The conference offered Alpine countries the opportunity to hold a fundamental dialogue about their own experiences and best practice examples in connection with both new building projects and the modernisation and refurbishment of the existing stock. Another focus was future-oriented planning both for the restructuring of existing neighbourhoods and for new housing development. Especially relevant topics included:

- Energy efficiency and renewable energy / integrated concepts for building envelopes / specific building needs in the Alps
- Strategies for climate-neutral neighbourhoods / efficiency and carbon-footprint analyses
- Energy efficiency in building refurbishment / maintaining the high standard of building culture
- Legal requirements for residential and non-residential buildings / plans for monitoring success
- Building with local materials / life-cycle approaches / embodied energy

The presentations of the Alpine Convention's member countries introduced strategies and solutions that support the implementation of net zero energy buildings and neighbourhoods which are in keeping with the local building culture. Along with presentations from internationally recognised experts, the event promoted interdisciplinary dialogue between decision-makers from civil society and politics, architects, planners and engineers as well as representatives of the scientific community. In the framework of this broadly conceived discussion forum, the conference participants played an active role in the analysis and discussion of this range of topics.

2 Conference

2.1 Conference opening



Figure 1: from left: Andreas Kronthaler, Hans-Dieter Hegner, Rudolf Scherzer and Markus Reiterer; Werner Lang

Hans-Dieter Hegner, head of division at the BMUB, opened the conference. He pointed to the importance of the conference in light of the revised version of the EU Energy Performance of Buildings Directive (EPBD), which requires all new buildings to be nearly zero energy and must be fully implemented from 2021, or 2019 in the case of public buildings. He noted that the focus of the conference was on new build and modernisation. In this context, Hegner stated that the topic of net zero energy buildings could not be viewed separately from building culture. He expressed hope that the conference will initiate a long-term conversation about these issues.

Markus Reiterer, Secretary-General of the Alpine Convention, brought up the fact that building has had an important role in discussions since the launch of the Alpine Convention and is an established topic in the area of energy issues. In his view, there is great potential for improvement with regard to sustainable building in the Alps, which is the main focus of the conference. Raised public awareness, achieved through competitions and prizes, could help harness this potential. He looked forward to animated discussion among experts and expressed the hope that the event will continue in the years to come.

Andreas Kronthaler, of Bavaria's supreme building authority (Oberste Baubehörde Bayern), used his welcome address to highlight Bavaria's current outstanding initiatives and fully realised projects in the area of energy-efficient building. He went on to note that energy issues play an important role in support programmes for housing construction and urban construction as well as in special building programmes. He pointed out that public administration is leading the way in this regard. Many public buildings meet the passive building standard and the administration has exclusively been using renewable energies since 2011. With regard to the implementation of the new energy standards, Kronthaler would like to see the complex body of regulations simplified significantly.

Rudolf Scherzer, vice-president of the Bavarian Chamber of Architects, underscored in his speech that implementation of the EPBD has made energy-efficient building a more pressing issue. He noted a need for discussions on developing assessment methods and urged participants to ask whether the Energy Saving Ordinance (Energieeinsparverordnung, EnEV) has proven itself and whether it should be continued in its current form. He pointed out that this discussion must particularly consider the inclusion

of infrastructure, the surrounding environment, embodied energy and user influence in legislation. The Alps, a region with cultural and infrastructural complexity, could provide a good basis for this discussion.

Werner Lang, from TUM, emphasised how important it is in the Alpine region to find individual, locally-tailored solutions on a range of scales. In view of the future availability of renewable energies, Lang suggested that the conference participants should discuss the extent to which norms like the passive building standard should and can be applied. He also highlighted the need to discuss not only new build but also the refurbishment of existing buildings and suitable instruments. The topic areas for the conference, the keynote presentations and the five sessions were chosen with this in mind.

2.2 Keynotes



Figure 2: from left: Thomas Auer; Thomas Auer und Hermann Kaufmann; Hermann Kaufmann

2.2.1 High Comfort – Low Impact

Thomas Auer, of Transsolar in Stuttgart, began his presentation by calling on stakeholders to also focus on the user. He noted that a glance at the history of building culture in the Alps shows that energy aspects have always influenced buildings. Due to scarcity of resources, the building user has automatically been a focal point. Thus, for example, floor plans divided buildings into areas for the family to live and for animals to be kept. This enabled them to use the body heat of livestock to warm the rooms. Today the question is how the next step in the direction of net zero energy buildings can be taken without forgetting Alpine building heritage.

By comparing climate data from different locations in the Alps, it becomes clear that new structures have to be adapted to their locations. Auer said this plays a central role. In higher altitude locations, for example, temperatures drop and there is less humidity. Therefore, passive solar buildings make a lot of sense. At lower altitudes, in contrast, active solar use is more suitable. Auer introduced the mirror project of the Italian community Viganella. The mirror reflects solar rays into the village, which is in the valley and frequently in shadow.

He also cited the project of a Ricola warehouse to underscore the significance of material properties of façades in relation to the stress placed upon them by the climate. Clay structures like this warehouse have a strong dehumidifying effect; in this way, expensive technological solutions can be avoided. At this point, Auer brought up an urgent problem concerning energy plans and certification – they neglect the issue of embodied energy. An energy balance over the course of 100 years for the Ricola warehouse showed, for example, that the clay construction performed better overall than another

warehouse with an insulated façade. Auer also remarked how important it is for buildings to be able to react to their surroundings, now and in future. This applies all the more due the extreme climate conditions in the Alpine region.

2.2.2 Contextual Architecture

Hermann Kaufmann, of the TUM, explained in his keynote that, when building in the Alps, analysing and engaging with the location must take first precedent. He went on to note that this was not just a matter of materials and resources, but primarily about developing a connection to the Alpine culture and achieving integration with the landscape. In Kaufmann's view, existing buildings function as a showcase for building culture and the skills of local craftspeople. In the past, the primary goal was to construct good buildings with sensible energy costs and consumption. These pragmatic principles, coupled with use of ornamentation allowed by construction constraints, led to a very distinct aesthetic and readily visible functionality. In addition, erecting buildings in line with the topography and cardinal points led to a landscape that has a harmonious quality.

Now it is time to develop this building culture further. Kaufmann proposed neither copying the historical elements nor radically breaking with them. He appealed for a new tradition of Alpine building, a traditional building with modern touches, applying this also to energy efficiency. For example, high thermal storage mass and excellent heat insulation can be achieved using solid timber. In the Alps, he noted, it is imperative to address climate conditions using construction techniques and materials.

Kaufmann named multiple examples that show the advantages of building with simple timber constructions. Among these advantages is the fact that the raw materials can be produced and processed in the Alps. Using the example of the Olpererhütte, an Alpine hut, Kaufmann made it clear that complex technology does not have to be used everywhere. Instead, it is important to consider the whole lifecycle of the building, including a sustainable process for dismantling the structure.

Kaufmann expressed his certainty that it is possible to meet energy efficiency requirements with simple structures. In addition, he noted that not only energy efficiency but other key factors such as protection of the biological and geological environment have to be taken into account.

2.2.3 Building in the Alps – Sustainable Regionality



Figure 3: Andreas Hempel; Andreas Hempel und Oliver Heiss (Bayer. Architektenkammer)

Andreas Gottlieb Hempel, architect from Brixen, drew the audience's attention to the charm of older, traditional Alpine building styles by presenting numerous examples of built environments. He pointed out that all of the architectural elements that visitors perceive as "romantic" or that are widely imitated derive from climate-related necessities. Hempel named as examples the cozy tiled stoves that were the sole source of heat for all adjacent rooms, and the shutters that characterised building façades which protected against weather, cold and sun. Other examples include attics as both thermal buffer zones and areas for drying foods.

However, current building activity in the rapidly changing Alpine region does not reflect these values. Hempel noted the increasing urbanisation of the landscape, growing influence of tourism and transport on the region and the proliferation of a careless architecture that smacks of globalised modernity with a hint of Alpine character. In Hempel's view, the neglect of regional building culture is a great loss. He then highlighted positive counterexamples such as the prize-winners of the "Constructive Alps" and "Klimahaus" initiatives. These winning examples combine thoughtful, sensitive architecture with outstanding energy performance.

Hempel closed his presentation by calling for the use of a circumspect yet modern architectural style in the hopes of overcoming "Tyrolean ornamental kitsch", "ugly engineering works", "town eyesores" and "*Lederhosen* architecture". He added that it is time for Alpine architecture to focus on elements such as locality, the ensemble of existing buildings, and natural landscapes.

2.3 Report from Jakob Dietachmair

Jakob Dietachmair of CIPRA gave a short address describing the activities and work areas of the International Commission for the Protection of the Alps (CIPRA).

He opened with this simple equation: Alpine conservation + Alpine living = sustainable development in the Alps.

In order to safeguard this, CIPRA has planned numerous programmes for sustainable development in the Alpine region. For example, the commission supports conserving and promoting biodiversity in the Alps. In the area of mobility, the focus has been on making transit travel through the area ecologically sound. CIPRA is active at political level and envisages programmes to bring youth into the discussion.

Dietachmair emphasised the importance of dialogue with younger generations on sustainability, noting that this is a basic principle of the sustainable development concept. Beyond this, through its sustainable building initiatives CIPRA is active in the areas of climate action, adaptation to climate change and energy. In this work, particular importance is attached to transparent communication.

Using the production of Swiss cheese as an analogy, Dietachmair called on planners to put natural ingredients, love of detail and experience into their buildings, in order to ensure successful sustainable development in the building sector.

Dietachmar presented CIPRA's six-point plan as a means of implementing this call to action on sustainable development:

- Organise an opening event
- Provide support for initial planning
- Provide support during the invitation to tender and contract award process
- Provide support in the building planning phase
- Carry out quality inspections
- Conduct maintenance and monitoring.

2.4 Sessions

2.4.1 Session A – Net Zero Energy Buildings and Building Culture



Figure 4: from left: Peter Büchel, Helmut Krapmeier, Bernardo Bader

Helmut Krapmeier from the Vorarlberg Energy Institute explained in the opening of his presentation that Europe has about 3000 square metres of forest per person, but that not even this amount would be enough to cover current per capita energy requirements. The use phase of buildings is particularly relevant. Using diagrams, Krapmeier showed that renewably-sourced wood alone cannot heat even a timber house with 60 centimetres of insulation. He called on building planners to consider additional measures to reduce energy consumption. Solar-powered support for hot water or the installation of heat exchangers in the ventilation system could, for example, contribute to sustainable construction design. Reduction in the space required per person is also a key factor in per capita energy consumption.

Krapmeier gave a brief introduction of "klimaaktiv", the Austrian Climate Initiative, and its activities in the building sector. He emphasised the importance of good architecture in connection with sustainable development. The Austrian State Prize for Architecture and Sustainability links the two topics, taking a holistic approach to high-quality design and sustainable thinking. Krapmeier pointed out that the conjunction "and" between "architecture" and "sustainability" is of particular significance because it indicates that both elements, architecture and sustainability, are equally important and are considered independently from each other.

Finally, Krapmeier concluded by demonstrating the success of this holistic approach by presenting numerous examples of intelligent architecture and winning projects of the Austrian State Prize for Architecture and Sustainability. He closed with a direct appeal for sophisticated sustainable thinking.

Peter Büchel of the Swiss mountaineering organisation Club Arc Alpin provided the audience with an insider's view on energy balance in Alpine huts.

Aside from the basic consensus that energy has to be very carefully managed in Alpine huts, Büchel posed a variety of questions crucial to the energy balance of the huts: What altitude is the building at? What requirements do the visitors have with regard to indoor room temperatures or meals? How is the energy supply of the hut managed? Is it on or off the grid? Is there a direct lift connection to towns in the valley? How long do visitors stay on average? Is the hut in use in the winter?

It quickly became clear that usual energy balance methods are not applicable to Alpine huts because the energy supply and the use of the huts is very different from those of more conventional dwellings.

Büchel delineated the importance of energy storage systems and individual energy planning based on careful assessment of local conditions for each hut. He contended that the energy balance of Alpine huts should ideally be calculated in terms of heat requirement per sleeping place. Based on this approach, when comparing energy requirements, huts operated year-round should be dealt with separately from huts operated exclusively in the summer. This also results in different recommendations for the energy standards. Passive building principles are recommended for huts operated year-round. Seasonal huts could make do with somewhat less insulation, although this would require regular inspections for damp.

Büchel ended his presentation with the statement that energy efficiency is a central issue for Alpine huts, but that it has to be approached individually for each hut.

Bernardo Bader, an Austrian architect, advanced the hypothesis that architecture cannot be separated into categories of sustainable or unsustainable. In his presentation "Place and People", he proposed that architecture is shaped through issues relevant to the location and the local people – and a sustainable building culture is the result.

In the context of "Bauen am Land" (building in the country), methods of planning and building have been demonstrated that are in close harmony with local people and places. Communication and cooperation with local residents, craftspeople and professionals play a key role here. Above all, the principle of "Finden statt Erfinden" (discovery instead of invention) is important for building. Solutions do not need to be reinvented every time, but can be discovered in local examples. To illustrate this, Bader showed a picture of a farmhouse in the Bregenz Forest. The entrance to the house unlocks the "in-between" space in a self-explanatory way and a similar solution could also be an excellent asset for a modern dwelling. Furthermore, in Bader's view there is great potential in the idea of working with craftspeople and in adding value within the community. In this context, the use of local materials is a key to gaining the support of residents for new building projects.

Using two of his architecture firm's projects, Bader illustrated how modern architecture that is tailored to the location inevitably addresses all aspects of sustainable development. These examples showed, in particular, how the early involvement of clients in decisions about building materials can free both the architect and the client from unrealistic wishful thinking and make natural and local solutions possible.

Bader closed his presentation with a strong expression of his desire to continue forgoing the use of thermal insulation composite systems, as has been his practice for many years.

2.4.2 Session B – Sustainable Building Refurbishment



Figure 5: from left: Peter Haimerl and Muck Petzet; Cédric Delahais; Lauranne Marcel

Muck Petzet, an architect working in Munich and Berlin, adapted the term “New Architecture” to coin a name for his proposed “New Rchitecture” – a sustainable architecture that respects existing building stock as the starting point for any new development. The “R” in “Rchitecture” stands for the planning principles reduce, reuse, recycle.

Petzet’s presentation included many images illustrating his argument that increased efficiency cannot be the sole objective. Efficiency-mindedness is often followed by a rebound effect – an increase in consumption as a result of efficiency measures.

Petzet pointed out actual problems that have to be tackled: Sustainability certification does not take into account interventions in the environment or existing built structures. Energy balances also neglect the embodied energy of the building stock. Discussions gloss over population growth in developing countries, even though it is precisely these countries where high building demand can be expected.

Using a range of arguments, Petzet advocated following an effective strategy for energy saving rather than rigidly focusing on maximising energy efficiency. He indicated the importance of a pragmatic approach, the Pareto principle (80/20 rule). It is important to remember that 80% of a result is achieved with 20% of the total effort. Conversely, 80% of the effort goes into achieving the remaining 20% of the result. With this rule and similar principles, Petzet maintained that attention, analysis and respect for already existing structures should be the most important part of an architect’s work. He suggested that effective environmental protection measures are the only way to identify and influence the pivotal factors for a sustainable future.

Petzet ended his talk by exhorting planners once again to change their thinking and to engage with existing building stock in an in-depth and respectful way.

Cédric Delahais and **Lauranne Marcel** gave a two-part presentation showcasing studies by the French research institute Cerema (Centre d’études et d’expertise sur les risques, l’environnement, la mobilité et l’aménagement).

Delahais provided an introduction to the historical context in Normandy in order to give an impression of the local building stock and engender awareness for the region’s reconstruction-era architectural heritage.

Delahais’s study analysed Normandy’s building stock to identify building types for the purpose of determining energy refurbishment measures for each building type. Potential energy weak points in the building stock were ascertained with the help of in-situ analyses, thermography, and thermal simulations, allowing researchers to identify possibilities for upgrades. The study found that main energy weak points in building stock were due to:

- lack of insulation
- loss of heat via outer walls, windows and ceilings

- uncontrolled and high loss of heat when ventilating rooms via windows

In addition, the study developed possible refurbishment measures for the identified building types. In the development of the measures, maintaining the architecture of the building stock was a high priority. Finally, building refurbishment measures were carried out and data recorded according to the study's recommendations.

In the second part of the presentation, Lauranne Marcel presented "Prebat", a study on the effect building users have on the energy balance of buildings.

For the study, two test buildings were equipped with comprehensive measuring sensor systems in order to record energy consumption and thermal conditions inside them. In addition, interviews with the building users were carried out. The purpose of the study was to compare the actual energy consumption with the calculated energy demand in order to assess the effects building users had on the buildings' respective energy balances.

According to Marcel, key issues in the study included:

- problems with the measuring sensor systems
- unexpectedly high internal and solar heat generation, even in winter
- frequent, complex and expensive maintenance of the technical equipment of the buildings
- decreasing airtightness of the building envelope over the years
- the importance of insulated pipes
- the great potential for energy savings presented by seasonal heat storage and use of heat exchangers

In her summary, Marcel emphasised the significant influence the building users had on the buildings' energy balances. In addition, she noted that, as "Prebat" was to be continued, further results and areas of inquiry could be expected.

Peter Haimerl, an architect from Germany, called for existing building stock to be viewed in the context of its past and to grant these buildings a right to continuing existence, using Goethe's famous phrase: "Stay awhile" ("Verweile doch").

In his presentation, an old farmhouse served as an illustration of various points. First and foremost, Haimerl asserted that the future of buildings is always an echo of the past. This view lets the gap between past styles and the future fall away. Haimerl took the position that each building tells its own story. He also made a further provocative point: anyone who has the use of an old building has no need for artists. This is because, in Haimerl's view, old buildings always have a graphic or pictorial character – be it thanks to historical constructions or natural processes of weathering – and can therefore be seen as artistic elements.

With a very singular approach, Haimerl showed how the needs of an old building can be administered. He created a photo story about the building; this story became Haimerl's basic idea for the building's refurbishment. His aim was to maintain the graphic and pictorial elements of the building after the refurbishment, even where these elements no longer could fulfil their original functions. Rather, they fulfil a new function as art.

Haimerl then extended the photo story of the old farmhouse, using historical and religious elements in his photographs, which depicted the house owner living in a freshly refurbished, idyllic farmhouse with exposed concrete elements, sharing the sunny space with goats, chickens and calves.

2.4.3 Session C – Strategies for Climate Responsive Neighbourhoods



Figure 6: from left: Christian Wagner and Mark Michaeli; Josef Mathis; Mark Michaeli

Christian Wagner, professor at the University of Applied Science (HTW Chur), gave a talk entitled "Places – Values – Visions", in which he delved into the idea that a village first needs a vision in order to find sustainable solutions.

In Switzerland this is particularly true for the Alpine region, which is facing serious challenges due to current economic and climate conditions. Taking the community of Fläsch as a case study, Wagner explained how a high-quality municipal development plan was launched after a village concept, "Weindorf Fläsch" (vintner's village Fläsch), emerged in the course of multiple discussions.

The major challenge in energy developments, Wagner suggested, comes when they conflict with preserving the unique characteristics of local building culture. Solar installations present one such challenge because they disrupt the uniform look of neighbourhood roofs. Such considerations need to be taken into account.

Mark Michaeli, professor at the Technical University of Munich, titled his presentation "Towards Sustainable Alpine Cities". Using Switzerland as an example, his talk explored the large-scale context, which is a decisive factor for discussions about sustainable building in the Alps.

Finding the right location for a building has a great influence on its overall energy balance. The more suburban an area is, the more traffic it will generate. What has to be considered, Michaeli noted, is that in the Alps in particular spatial differences impact social logic – so the focus should be on differentiated neighbourhood development. Overarching strategies like EUSALP, in contrast, have a tendency to homogenise development. According to Michaeli, infrastructure plays a special role as a steering instrument for reducing land use.

Because certain topics cannot be planned either at (supra-)national or grassroots level, the regional scale has to come to the fore. Finally, Michaeli noted the importance of improving the coordination of sector policies.

Josef Mathis of Vorarlberg held a presentation with the title "Building Culture". He showcased the community of Zwischenwasser as an example of the importance of involving the public in village development processes.

In Mathis's view, building culture requires a culture of dialogue. Zwischenwasser obtained a high rank in the e5-programme for energy-efficient communities thanks to its culture of dialogue. Decades ago, for instance, a solar-powered school and housing quarter were built with great public support.

Zwischenwasser has been successful in promoting building culture by establishing a design advisory board and free building consultation services.

Michaeli went on to stress the importance of rewarding good examples rather than punishing bad ones. This can be done in the form of prizes for excellence in building. The municipal administration itself is committed to acting as a role model in sustainable building. This is one way to start a snowball effect that enables joint projects. Building culture can thus become a catalyst for villages of the future.

2.4.4 Session D – Reinventing Alpine Communities



Figure 7: from left: Emil Müller; Markus Berchtold-Domig; Etienne Vienot

Peter Zoderer, a partner at feld72, presented several of his South Tyrol architecture studio's projects in his talk "Different but Familiar". These projects foregrounded social factors alongside the ecological.

In Zoderer's view, building culture means that projects are developed together with the community. Low energy concepts can be easily integrated into communally developed projects. This made it possible for feld72 architects to create architecturally sophisticated buildings with low-energy features and the capacity for urban density, even in small towns. Creating density in small communities requires keeping in mind the quality of collective open spaces. These open spaces have an important status as social spaces and meeting spots.

Zoderer concluded by emphasising his idea that the essence of architecture is, in fact, something other than architectural.

Markus Berchtold-Domig and **Etienne Vienot's** discussion with the audience about harmonisation and European strategies stood at the centre of their presentation "CESBA and EUSALP Strategy".

They gave a short report explaining that the Common European Sustainable Building Assessment (CESBA) has been working for quite a while on establishing transnational indicators for implementing the varying assessment methods of the different countries in the Alpine region. They noted that the question here is whether there is room for local and regional differentiation in spite of the European regulations.

During the course of the discussion, it was remarked that the concept of "harmonisation" is difficult to define. Sophisticated opinions about harmonisation can only be formulated once the concept is clearly defined. Berchtold-Domig and Vienot underscored this key point: "We have to bring the regional and local specialities to Brussels." In order to do so, it first has to be possible to compare the sustainability of buildings at regional level. CESBA's goal is to develop a process for this in dialogue with local people.

Emil Müller, mayor of Zerne, gave a presentation entitled "Project Zerne Energia 2020", in which he detailed the planning and implementation of an energy plan for a whole municipality. Project Zerne Energia 2020 was developed with the ETH Zürich. An overall energy strategy was drawn up based on a precise snapshot-analysis of the building stock. The initial aim was to eventually meet the entire energy demand using renewable energy. All of the residents pay into an energy fund that finances the project.

Müller made it clear that implementation of the project has been hampered by problems and that its success cannot be guaranteed. Low oil prices, for example, have made the switch to more sustainable heating systems difficult. He also noted that for some locals, not even the substantial subsidies seemed enough of an incentive to carry out energy upgrades.

2.4.5 Session E – Holistic Building Design and Certification Systems



Figure 8: from left: Nadège Vetterli; Simone Magdolen; Stefano Prosseda

Simone Magdolen, associate at the University of Applied Sciences Munich, highlighted various approaches to assessing sustainability in the building sector in her presentation.

She noted that one major benefit of sustainability certification systems in the building sector is quality assurance achieved through auditing processes, through the steering functions of the systems (e.g. checklists), and through a recently established prize for sustainable building. In addition, comprehensive documentation helps to market buildings and establish building sector benchmarks.

Following an introduction of the established certification systems of the German Sustainable Building Council (DGNB) and the Bewertungssystem Nachhaltiges Bauen (BNB), Magdolen explained the need for additional certification systems for small apartments. The demand for an additional 2.9m apartments by 2025 shows why it is worthwhile to think about the market for energy-efficient small apartments. The challenge in this is making assessment for certification as practical, quick and inexpensive as possible.

Magdolen introduced the assessment system "Sustainable small apartment building construction" (BNK) as a starting point for implementing a certification system. The system is derived from that of the DGNB and has only 19 indicators. Furthermore, it does without larger rating categories such as the rating of technical quality and the building location.

Magdolen concluded her talk by reporting on the outlook for additional certification systems in development, in particular for buildings in the Alps.

Stefano Prosseda of the TIS Innovation Park clarified the importance of entrepreneurial innovation for sustainable building in his presentation about sustainability planning.

Prosseda opened by asking how many of the Alpine Building Conference participants were from the business community; the response demonstrated the low participation of companies in sustainable building. He noted that the drivers behind sustainable development in the building sector are almost exclusively planners and architects.

He presented a four point action plan describing how IDM Südtirol, the province chamber of commerce, is promoting entrepreneurial innovation. Firstly, IDM Südtirol has begun a dialogue in newly-founded working groups such as the working group "FACE" (façade experts) which has 22 participating institutions.

Secondly, in the area of fostering innovation, IDM Südtirol has been organising projects for professors and students in which they conduct research in small businesses and become points of interface between the market and businesses. Thirdly, IDM Südtirol also supports the founding of start-ups in order to foster new innovative businesses in the South Tyrol region. Lobbying in committees on regulations and rules is the IDM Südtirol's fourth area of action for promoting innovative enterprises.

Prosseda ended his presentation with the statement that mutual readiness for innovation, on the part of both planners and entrepreneurs, can enable comprehensive implementation of the principles of sustainable development in the building sector.

Nadège Vetterli presented her work on buildings as systems, completed at the University of Lucerne. As examples for system approaches to buildings, Vetterli cited the Monte Rosa Alpine hut and the Suurstoffi project.

In the case of the Alpine hut, the building required complete energy independence because it is not connected to any public energy grid. Comfortable room temperatures, healthy air quality, drinking water supply, hot water and wastewater treatment had to be achieved in one overall system for the standalone hut. Vetterli thoroughly explained the intelligent implementation of the system. Photovoltaic systems, solar thermal systems and a microbiological wastewater treatment system were installed for the energy system.

In contrast, she pointed out that networking multiple buildings via public infrastructure is a completely different kind of challenge. The research project Suurstoffi investigates how buildings can be networked together to supply and consume energy; most buildings today are supplied directly from central system operators. Seasonal heat storage in the form of geothermal probes or low temperature networks working in tandem with thermal pumps serve as affordable systems for networked energy supply. Vetterli noted the urgent need to record actual energy consumption and compare it with calculated projections by analysing data from the Suurstoffi project.

Vetterli closed her talk by calling for further research and additional solutions that view buildings, whether energy-independent or wholly networked, as energy systems.

3 Statements by Session Chairs



Figure 9: from left: Jakob Dietachmair; Martin Ploss, Oliver Heiss; Nadja Häupl; left to right: Jakob Dietachmair, Martin Ploss, Oliver Heiss, Roberto Lollini

Martin Ploss summed up Session A in four main points. The first point is the question of how architecture, local planning and energy efficiency can work together. The real estate sector prefers deregulation and is somewhat critical of design advisory boards. The main issue at stake here is defusing the conflict between real estate as a market force on the one hand and as architecture and part of a community's character on the other. Ploss identified the second major topic as the relationship between the energy quality of a building and the needs of building users. In this regard, it is important to think and act more in accordance with the principle of sufficiency, to take into account the seasonal operation of Alpine huts and to learn from the extreme conditions in the Alpine region. The third issue the session engaged with concerned the influence of the energy market on individual buildings as well as the influence of individual buildings on the overall energy market. Capping electricity demand requires buildings with high energy quality. Energy saving measures are imperative because there is simply not enough land available to generate sufficient renewable energy to cover current electricity demand. Finally, Ploss addressed costs and savings as the fourth key topic. He noted that the quest to minimise costs is a barrier to many measures. Therefore cost-benefit analyses are needed that include all phases of a building's lifecycle. These analyses would make it clear that energy-saving building, for example in accordance with the passive house standard, is worth the expenditure.

Oliver Heiss summarised Session B, highlighting the fact that extreme construction situations are the major issue in the Alpine region. These conditions require different solutions than those employed in other areas. Despite this, there are technological and constructive concepts that make buildings with outstanding energy profiles achievable, including buildings that conform to the energy-plus standard. Heiss suggested this is why Muck Petzet examined the issue of system boundaries. Petzet emphasised that existing stock must be included in assessing energy balances, and that the main concern should not be efficiency but rather effectiveness. Lauranne Marcel and Cédric Delahais from France found solutions by creating a local and very detailed typology. Their presentation made clear that users play a significant role and must be included in energy balance calculations, and the question to be asked here is whether it is technology helping the user or the user helping technology. Finally, Peter Haimerl stressed that every building deserves to be viewed in the context of its past. Haimerl advocated a revised approach that remedies the neglect of a building's history, location and users in assessment systems.

Jakob Dietachmair provided an account of Session C, noting that the session was composed of local, state and national representatives, allowing the session to point to new correlations. Dietachmair presented the three main issues discussed. The first is the importance of communication and its early

integration into drafting processes. Measures in the town of Zwischenwasser could be taken as an example of successful communication. Energy placards and village festivals were among the means of communication used. As Josef Mathis put it: "There is no project so small that it can't be celebrated with a festival." Secondly, both communities and regions need a vision behind their plans. Projects always have to be reviewed against this underlying vision. Thirdly, the session's presenters underscored the importance of using synergies and taking into account the various project-specific user groups. When these are kept in mind, Dietachmair noted, it can contribute to a positive perception of the culture and the landscape.

Nadja Häupl recognised that the variety of backgrounds of the presenters in Session D – from architects to observers and mayors – spanned the breadth of the overall topic. Peter Zoderer addressed the topic of energy efficiency and made clear that land use and user density also have to be factored in. Zoderer raised the question of whether single-family homes could ever truly be sustainable. From Zoderer's point of view, the Alps are in need of more cooperative apartment construction, although this must be supplemented by high quality public open spaces. Markus Berchtold-Domig and Etienne Vienot tackled the core question of whether and how standards can be harmonised and which indicators and spatial measures should apply. Their talk shed light on how much more still remains to be discussed with regard to the appropriate degree of harmonisation. The presentation by Emil Müller from Zernez focussed on involving the public in implementing an energy plan. He felt simple means of communication were important in motivating citizens. Häupl particularly noted Müller's observation that irrespective of backing and subsidies, the success of a project is determined by economic and political conditions such as hydropower or heating oil prices.

Roberto Lollini recapped Session E in a list of brief points about the implementation of sustainable development measures. Naturally, climate factors are important, as are resources. But in addition, businesses have a significant role to play, as Stefano Prosseda demonstrated. How, for example, can innovation processes be set in motion and where can businesses invest? Session E also showed that the complexity of assessment methods makes implementation more difficult. Assessment has to be developed based on the context, and convenience should also be considered. Services need to be developed that cover certification and initial phases in particular. High quality construction requires this kind of support in connection with energy topics. In closing, Lollini named six key areas for improvement that were identified in Session E.

1. Simplicity, i.e. systems and process must be made intelligible. Maintenance also has to be included in assessments.
2. Robustness.
3. Flexibility with regard to the intended purpose of a building and with regard to the climate.
4. Feasibility, i.e. balance between time and use. Business models for energy efficiency could contribute to this.
5. Testability. Projects should be tested with theoretical models but also with monitoring in order to find the best solutions.

A multidisciplinary approach to conceptualising and working and the inclusion of all stakeholders in participatory processes are essential for the development and implementation of low energy measures.

4 Summary of the stakeholder statements



Figure 10: from left: Florent Moretti, Wolfgang Thaler, Saša Galonja, Peter Büchel; Florent Moretti; from left: Wolfgang Thaler, Saša Galonja, Peter Büchel, Günther Hoffmann

Florent Moretti, of the French Ministry for Housing, Territorial Equity and Rural Areas, began with a summary of climate policy goals in France. Reducing nuclear power generation is the top priority, with other goals focusing on lowering general electricity demand and promoting energy-plus buildings.

Moretti pointed out that heating energy requirements are not the only significant factor for investments in the buildings sector, noting that networking urban buildings is just as important as the energy efficiency of individual buildings. He highlighted that the CO₂ balance of construction materials must also be taken into account. Moretti saw a high potential in biogenic materials for building in future.

Moretti raised three aspects he considered important for measures relating to the energy refurbishment of the building stock:

- Consultancy and renewed lobbying should be used to create platforms for informing people on sustainable building.
- Financing models should be established to facilitate sustainable building.
- In future, user behaviour should take on a more important role in the selection of energy systems.

Moretti's statement provided insight into climate policy goals for the buildings sector and urged active involvement in the energy transition.

Wolfgang Thaler, from the Italian Chamber of Architects, began his statement with a presentation of Bolzano and South Tyrol province.

With regard to energy efficiency measures in buildings, Thaler named concrete steps towards energy-efficient building in Italy, highlighting the CasaClima initiative in particular.

Considering the issues of cultivated land and regional planning in Bolzano, Thaler noted the huge potential for the energy refurbishment of the building stock in the province. For South Tyrol he felt this could be achieved particularly through adding extensions or floors to buildings. He pointed out that building owners would not even have to invest heavily, but simply allow the enlargement of their buildings.

Thaler saw a further means of promoting environmental protection in the building sector in the use of recyclable materials. In his view, a law stipulating that 15% of all construction materials used in new build must be recyclable would help promote a sustainable building culture in South Tyrol.

Saša Galonja, from the Slovenian Ministry of the Environment and Spatial Planning, gave insights into Slovenian building culture and the related legislation.

He described legal requirements for thermal building envelopes and the use of renewable energy in buildings, remarking that the requirement to use wood in building projects has been instrumental in generating a trend towards timber construction. Galonja noted that this requirement is particularly interesting because traditional Slovenian architecture depended almost entirely on wood as a building material. After around 200 years of other building methods, a return to timber structures is becoming apparent.

Galonja explained that climate data had been recorded and evaluated in Slovenia in order to create building simulations and for research purposes. The data revealed a noticeable increase in temperatures over the past 30 years. Supported by the Fund for Energy-Efficient Building, the number of building modernisations has risen in Slovenia, especially in apartment buildings. Nevertheless, Galonja also highlighted the problems in Slovenia's energy transition. For instance, it is primarily affluent building owners that are making investments. Lower income households should be given more support for building refurbishment, said Galonja. He also pointed out the difficulties in communicating the concept of sustainable building, since people have always understood sustainable development and energy efficiency to mean the same thing.

Galonja named the following areas as important for the special conditions in the Alpine region:

- Refurbishment of the building stock
- Educating the public about sustainable development and energy efficiency
- Promoting timber buildings
- Keeping people in the region
- Expanding telecommunications
- Promoting energy self-sufficiency for Alpine buildings.

Peter Büchel from Club Arc Alpin e.V. gave a talk on Alpine huts, in which he proposed that the mountain and valley could learn from each other. He focused particularly on the range of technology in the valleys and the robustness and flexibility of alpine huts. Büchel stressed the importance of interdisciplinary exchange.

Büchel saw the Alpine Building Conference as an excellent platform to learn from each other through a discussion of different specialist areas. He noted that Alpine huts are a good example of interdisciplinary planning: For transport reasons, they are constructed mainly of wood, the building expertise comes from the valleys. The Monte Rosa hut epitomises the principle of sufficiency in the building sector.

He furthermore called for honesty from planners, in particular with regard to the discussion on passive and active building components. He said that a single principle was not necessarily the answer, and that active and passive components can, and sometimes must, function together extremely well.

Büchel went on to give a very clear picture of how to think energy-effectively. In Alpine huts, for instance, the energy supply for the building is only 1% of the total energy visitors need for their recreational activities. He noted that a car in the valley accounted for at least 90% of this energy consumption.

Günther Hoffmann, Head of the Directorate-General for Building at the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, gave a closing statement confirming the choice of topic - net zero energy buildings - as the right focus for the Alpine Building Conference.

He remarked that it was evident that the debate was not only about technical questions, but also addresses other issues. Hoffmann called for the discussions on climate action, sustainable development, energy efficiency and circular economy to continue, and in particular to explore further lifecycle aspects and embodied energy in more detail.

According to Hoffmann, the Alpine region could take a leading role in sustainable building, because it is considered an extreme region. He said that the discussion underway among Alpine countries addressed problems head on and delivered solutions.

Noting that good examples should be talked about and bad examples not concealed, Hoffmann praised the statements by the preceding speakers. He summed up by urging all stakeholders to help combat climate change by continuing to create living space and to take a systematic, resource-efficient and cost-conscious approach to building.

Hoffmann concluded his statement by encouraging the participants to carry on talking, carry on thinking, and carry on acting!

5 Discussion



Figure 11: Panel responds to questions from the audience; pinboards with questions and comments

The statements were followed by a discussion addressing questions from the public in greater detail. The main topics of the discussion were:

Mobility and urban encroachment in the Alpine region

The extensive and widely dispersed settlement in the Alps means that there is high energy consumption for mobility. Consideration of this issue raised the question of whether relocation was an option. The panellists were adamant that systematic relocation was unacceptable. Moving populations to more central locations would be fatal for the Alpine infrastructure, since the existence of transit routes and overnight accommodation facilities hinges completely on settlements. Small communities generate communications, energy supply and security networks. Consequently, villages and communities are absolutely vital for mobility. Moreover, it was pointed out that settlement in the Alps has a high cultural value. Mobility-related energy consumption could be reduced more effectively through infrastructure projects, centralised supply points (e.g. schools), heat generation and other areas. A number of initiatives in this field are already underway.

Sufficiency as a key concept for development in the Alpine region

The discussion went on to question whether it is at all morally defensible to consider major changes to address energy issues, since after all it concerns the very existence of those living in these areas. A member of the audience asked whether the Alps really needed more dams or more areas set aside for energy infrastructure, or whether such projects did not damage the sense of locality for many residents. The question was warmly greeted as relevant. Both panellists and audience felt that tourism in particular was concerned in this issue. It was felt that the leap must be made from mass tourism to quality tourism. This led to a discussion on sufficiency and the reflection that "less is more" can also apply to Alpine tourism. The group concluded that this would require visitors to the region to rethink their own expectations of the Alps as a tourism destination.

The reference to sufficiency raised the question of how to communicate the principle of sufficiency more effectively in future, since the term always implies the idea of "less".

The solution to this problem was seen in convincing the public. Residents of the Alps and holidaymakers alike must be made aware that reduction and deceleration can also be gains. The discussion returned again to the term quality tourism.

Legal provisions conflicting with new developments

A member of the audience noted that planners, building owners, institutions etc. often push the boundaries of what countries themselves have established as legal and asked what could be changed to improve the system of standards.

Two approaches were discussed. One noted that in Italy many instruments relating to surveying, registering and certifying construction projects and energy-related issues had changed over the past 60 years. In this sense, it is not new regulation that is needed, but different application of existing instruments. New measuring instruments deliver new solutions. The second approach considered was to use communication as a lever for change. One example mentioned in this context was an association of South Tyrol-based Chambers of Architects that is promoting a dialogue which could have a fresh influence on regulation.

The needs of the user conflicting with energy optimisation

Another major concern among the audience was that occupants or users of buildings must be taken into greater account as the actual reason for erecting a building in the first place. It is evident that conflicts of use and interest can certainly arise, in particularly in relation to buildings with an optimal energy-efficiency design. Examples mentioned included emotional and health aspects which might deter some people from installing photovoltaic systems on the roof of the house they live in. In addition to investigating other building characteristics that might be detrimental to health, such as sick building syndrome in mechanically ventilated rooms, there were also calls for further investigation into the consequences of a "solar power plant" located in the direct vicinity of the sleeping area. It was clear from the discussion that both panellists and audience attached particular importance to this topic and that, on matters of energy efficiency, the debate should centre around the people concerned.

General comments on the conference

In the course of the discussions, the notably small number of women among the panellists was remarked upon. It was agreed that a more balanced gender representation would be of interest in future, as this could provide an additional perspective for the discussions.

Moreover, it was proposed that the next Alpine Building Conference should place greater focus on the Alpine context in relation to buildings. Not only rural or urban design is relevant in this regard, but also local skills, infrastructures and mobility. For instance, a closer look at the 2000 years of building history in Garmisch might allow projections to be made about developments in the city over the next 40 years.

Annex .

A Summary of the report

1. Preliminary comments

The Alpine Convention is an international treaty between the eight Alpine countries Germany, France, Italy, Liechtenstein, Monaco, Austria, Switzerland and Slovenia, plus the European Union. The convention's aim is to promote and support sustainable development in the Alpine region.

At the XIIIth Alpine Conference in Turin on 21 November 2014, the Federal Republic of Germany took over the presidency of the Alpine Conference from Italy. Germany's presidency will end with the XIVth Alpine Conference on the island of Herrenchiemsee on 13 October 2016. The First Alpine Building Conference: Towards Net Zero Energy Buildings (NZEB) was held on 16-17 March 2016 as part of the German presidency's programme. The conference was jointly organised by the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), the Bavarian Chamber of Architects (Bayerische Architektenkammer ByAK), and the Technical University of Munich (TUM), with the support of the Permanent Secretariat of the Alpine Convention.

The conference was envisaged as a platform to present and discuss net zero energy buildings and sustainable neighbourhoods in the context of building in the Alps. The aim is to inspire further cooperation on building between Alpine countries and to give fresh impetus to the national implementation of net zero energy building standards. In light of the unique and specific characteristics of the Alps, the conference explored in particular topography, climate, culture, materials and local craftsmanship, taking into account the diverse traditional building cultures already present in the Alpine region.

The conference offered Alpine countries the opportunity to hold a fundamental dialogue about their own experiences and best practice examples in connection with both new building projects and the modernisation and refurbishment of the existing stock. Another focus was future-oriented planning both for the restructuring of existing neighbourhoods and for new housing development. The presentations of the Alpine Convention's member countries therefore introduced strategies and solutions that support the implementation of net zero energy buildings and neighbourhoods which are in keeping with the local building culture.

Along with presentations from internationally recognised experts, the event promoted interdisciplinary dialogue between decision-makers from civil society and politics, architects, planners and engineers as well as representatives of the scientific community. In the framework of this broadly conceived discussion forum, the conference participants played an active role in the analysis and discussion of this range of topics.

The 1st Alpine Building Conference was attended by 250 participants from Germany, Austria, Switzerland, Italy, France, Liechtenstein, Slovenia, Slovakia and Great Britain.

The findings and recommendations from the first Alpine Building Conference are summarised in a separate report.

2. Opening

Hans-Dieter Hegner, head of division at the BMUB, opened the conference. He pointed to the importance of the conference in light of the revised version of the EU Energy Performance of Buildings Directive (EPBD), which requires all new buildings to be nearly zero energy and must be fully implemented from 2021, or 2019 in the case of public buildings. He noted that the focus of the conference was on new build and modernisation. In this context, Hegner stated that the topic of net zero energy buildings could not be viewed separately from building culture. He expressed hope that the conference will initiate a long-term conversation about these issues.

Markus Reiterer, Secretary-General of the Alpine Convention, noted in his welcome address that building has had an important role in discussions since the launch of the Alpine Convention and is an established topic in the area of energy issues. In his view, there is great potential for improvement with regard to sustainable building in the Alps. Raised public awareness, achieved through competitions and prizes, could help harness this potential. He looked forward to animated discussion among experts and expressed the hope that the event will continue in the years to come.

Andreas Kronthaler of Bavaria's supreme building authority (Oberste Baubehörde Bayern), used his welcome address to highlight Bavaria's current outstanding initiatives and fully realised projects in the area of energy-efficient building. He noted that energy issues play an important role in support programmes for housing construction and urban construction as well as in special building programmes.

Rudolf Scherzer, vice-president of the Bavarian Chamber of Architects, underscored in his speech that implementation of the EPBD has made energy-efficient building a more pressing issue. He pointed out that this discussion must particularly consider the inclusion of infrastructure, the surrounding environment, embodied energy and user influence in legislation. The Alps, a region with cultural and infrastructural complexity, could provide a good basis for this discussion.

Werner Lang, from TUM, emphasised how important it is in the Alpine region to find individual, locally-tailored solutions on a range of scales, both for new build and the existing stock. The topic areas for the conference, the keynote presentations and the five sessions were chosen with this in mind.

3. Presentations / Sessions

3.1 Keynote: High Comfort – Low Impact by Thomas Auer, Transsolar

Stuttgart, Germany

Thomas Auer explained how it can be seen from the history of building culture in the Alps that energy aspects have always influenced buildings. Scarcity of resources meant that efficient solutions had to be found which used available materials and took the local climate into account. Intelligent floorplans and an interior space tailored to the needs of the user allowed survival in extreme conditions over centuries. Today the question is how the next step in the direction of net zero energy buildings can be taken without losing sight of Alpine building heritage.

3.2 Session A – Net Zero Energy Buildings and Building Culture

Session Chair Martin Ploss summed up Session A in four main points. The first point is the question of how architecture, local planning and energy efficiency can work together. The real estate sector prefers deregulation and is somewhat critical of design advisory boards. The main issue at stake here is defusing the conflict between real estate as a market force on the one hand and as architecture and part of a community's character on the other.

Ploss identified the second major topic as the relationship between the energy quality of a building and the needs of building users. In this regard, it is important to think and act more in accordance with the principle of sufficiency. Moreover, energy and operation plans need to take into account the seasonal operation of Alpine huts, and planners must learn from the extreme conditions in the Alpine region.

The third point Ploss noted was the influence of the energy market on individual buildings as well as the influence of individual buildings on the overall energy market. Capping electricity demand requires buildings with high energy quality. Energy saving measures are imperative because there is simply not enough land available to generate sufficient renewable energy to cover current electricity demand.

Finally, Ploss addressed costs and savings as the fourth key topic. He noted that the quest to minimise costs is a barrier to many measures. Therefore cost-benefit analyses are needed that include all phases of a building's life cycle. These analyses would make it clear that energy-saving building, for example in accordance with the passive house standard, is worth the expenditure.

3.3 Session B – Sustainable Building Refurbishment

In his summary of Session B, Oliver Heiss highlighted the fact that extreme construction situations are a major issue in the Alpine region. These conditions require different solutions than those employed in other areas. There are technological and constructive concepts that make buildings with outstanding energy profiles achievable, including buildings that conform to the energy-plus standard.

It was in this context that architect Muck Petzet had examined the issue of system boundaries. Petzet emphasised that existing stock must be included in assessing energy balances, and that the main concern should be effectiveness rather than efficiency.

In Heiss's view, Lauranne Marcel and Cédric Delahais from France found approaches for zero energy buildings by creating a local and very detailed typology. They made it clear that users play a significant role and must be included in energy balance calculations. The question to be asked here is whether it is technology helping the user or the user helping technology.

Finally, Peter Haimerl stressed that every building deserves to be viewed in the context of its past. Current calculation systems leave history, location and users completely out of the picture. Haimerl therefore advocated a revised approach and new assessment of existing buildings.

3.4 Session C – Strategies for Climate Responsive Neighbourhoods

Reviewing Session C, Jakob Dietachmair noted that the session was composed in particular of local, state and national representatives, allowing the session to point out new correlations.

Dietachmair presented the three main issues discussed. The first is the importance of communication and its early integration into drafting processes. Measures in the town of Zwischenwasser could be

taken as an example of successful communication. These included energy placards and village festivals.

Secondly, communities and regions need a vision behind their plans. Each new project needs to be reviewed against this vision.

Thirdly, the session's presenters underscored the importance of using synergies and taking into account the various project-specific user groups. When these are kept in mind, Dietachmair noted, it can contribute to a positive perception of the culture and the landscape.

3.5 Session D – Reinventing Alpine Communities

Nadja Häupl recognised that the variety of backgrounds of the presenters in Session D – from architects to observers and mayors – spanned the breadth of the overall topic.

Peter Zoderer addressed the topic of energy efficiency and made clear that land use and user density also have to be factored in. Zoderer raised the question of whether single-family homes could ever truly be sustainable. From Zoderer's point of view, the Alps are in need of more cooperative apartment construction, although this must be supplemented by high quality public open spaces.

Markus Berchtold-Domig and Etienne Vienot tackled the core question of whether and how standards can be harmonised and which indicators and spatial measures should apply. Their talk shed light on how much more still remains to be discussed with regard to the appropriate degree of harmonisation.

Emil Müller from Zernezz focussed on involving the public in implementing an energy plan. He felt simple means of communication were important to motivate citizens.

3.6 Keynote: Contextual Architecture by Hermann Kaufmann, Schwarzach, A

Hermann Kaufmann, of the TUM, explained in his keynote that, when building in the Alps, analysing and engaging with the location must take first precedent. He went on to note that this was not just a matter of materials and resources. In fact, he suggested that the main concern had to be to develop a connection to the Alpine culture and to achieve integration with the landscape. In Kaufmann's view, existing buildings function as a showcase for building culture and the skills of local craftspeople.

Now it is time to develop this building culture further. Kaufmann proposed neither copying the historical elements nor radically breaking with them. He appealed for a new tradition of Alpine building, a traditional building with modern touches, applying this also energy efficiency. For example, high thermal storage mass and excellent heat insulation can be achieved using solid timber. In the Alps, he noted, it is imperative to address climate conditions using construction techniques and materials. In addition, he pointed out that not only energy efficiency, but other key factors such as protection of the biological and geological environment also have to be taken into account.

3.7 Keynote: Building in the Alps – Sustainable Regionality by Andreas Gottlieb Hempel, Brixen, I

Andreas Hempel drew attention to the charm of older, traditional Alpine building styles by presenting numerous examples of built environments. He pointed out that the traditional architectural elements derive solely from climate-related necessities.

However, current building activity in the rapidly changing Alpine region does not reflect these values. He said that this is becoming noticeable in the increasing urbanisation of the landscape, the growing influence of tourism and transport on the region and the proliferation of a careless architecture that smacks of globalised modernity with a hint of Alpine character. In Hempel's view, the neglect of regional building culture is a great loss. He added that it is time for Alpine architecture to focus on elements such as locality, the ensemble of existing buildings and natural landscapes.

3.8 Session E – Holistic Building Design and Certification Systems

Roberto Lollini recapped Session E in a list of brief points about the implementation of sustainable development measures. How, for example, can innovation processes be set in motion and where can businesses invest? The complexity of assessment methods makes implementation more difficult. Furthermore, assessment of alternative measures for promoting energy performance of buildings has to be derived from the context. Convenience needs to be taken into account and services developed.

Six key areas for improvement were identified in Session E:

1. Simplicity, i.e. systems and process must be made intelligible. Maintenance also has to be included in assessments.
2. Robustness.
3. Flexibility with regard to the intended purpose of a building and with regard to the climate.
4. Feasibility, i.e. balance between time and use. Business models for energy efficiency could contribute to this.
5. Testability. Projects should be tested with theoretical models but also with monitoring in order to find the best solutions.
6. A multidisciplinary approach to conceptualising and working and the inclusion of all stakeholders in participatory processes are essential for the development and implementation of low energy measures.

4 Statements by the stakeholders

Florent Moretti, of the French Ministry for Housing, Territorial Equity and Rural Areas, began with a summary of climate policy goals in France. Reducing nuclear power generation is the top priority, with other goals focusing on lowering general electricity demand and promoting energy-plus buildings.

Moretti pointed out that heating energy requirements are not the only significant factor for investments in the buildings sector, noting that networking urban buildings is just as important as the energy efficiency of individual buildings. He highlighted that the CO₂ balance of construction materials must also be taken into account. Moretti saw a high potential in biogenic materials for building in future.

Moretti raised three aspects he considered important for measures relating to the energy refurbishment of the building stock:

- Consultancy and renewed lobbying should be used to create platforms for informing people on sustainable building.
- Financing models should be established to facilitate sustainable building.
- In future, user behaviour should take on a more important role in the selection of energy systems.


Wolfgang Thaler, from the Italian Chamber of Architects, described the huge potential for energy upgrades of the building stock in Bolzano. For South Tyrol this could be achieved in particular through building extensions and floor additions. Building owners would not even have to finance this, they would simply have to agree to adding floors to their building.

Thaler saw a further means of promoting environmental protection in the building sector in the use of recyclable materials. In his view, a law stipulating that 15% of all construction materials used in new build must be recyclable would help promote a sustainable building culture in South Tyrol.

Saša Galonja, from the Slovenian Ministry of the Environment and Spatial Planning, gave insights into Slovenian building culture and the related legislation.

He described legal requirements for thermal building envelopes and the use of renewable energy in buildings, remarking that the requirement to use wood in building projects has been instrumental in generating a trend towards timber construction. Supported by the Fund for Energy-Efficient Building, the number of building modernisations has risen in Slovenia, especially in apartment buildings. Building refurbishment support should focus more on lower income households. Galonja noted that this also comprised educating the public on sustainable development and energy efficiency, and promoting timber buildings.

Peter Büchel, from Club Arc Alpin e.V., gave a talk on Alpine huts, in which he proposed that the mountain and valley could learn from each other. He focused particularly on the range of technology in



the valleys and the robustness and flexibility of Alpine huts. Büchel stressed the importance of interdisciplinary exchange and noted that Alpine huts were a successful example of this.

He furthermore called for honesty from planners, in particular with regard to the discussion on passive and active building components. He said that a single principle was not necessarily the answer.

Büchel urged the need for a holistic approach. In Alpine huts, for instance, the energy supply for the building is only 1% of the total energy visitors need for their recreational activities. Energy consumption for transport in the valley was far higher.

Günther Hoffmann, Head of the Directorate-General for Building at the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, gave a closing statement confirming the choice of topic - net zero energy buildings - as the right focus for the Alpine Building Conference.

He remarked that it was evident that the debate was not only about technical questions, but also addresses other issues. Hoffmann called for the discussions on climate action, sustainable development, energy efficiency and circular economy to continue, and in particular to explore further lifecycle aspects and embodied energy in more detail.

According to Hoffmann, the Alpine region could take a leading role in sustainable building, because it is considered an extreme region. He said that the discussion underway among Alpine countries addressed problems head on and delivered solutions. Noting that good examples should be talked about and bad examples not concealed, Hoffmann praised the statements by the preceding speakers. He summed up by urging all stakeholders to help combat climate change by continuing to create living space and to take a systematic, resource-efficient and cost-conscious approach to building.

Hoffmann concluded his statement by encouraging the participants to further pursue the debate initiated at the first Alpine Building Conference.

5 Discussion


The statements were followed by a discussion addressing questions from the public in greater detail. The main topics of the discussion were:

Mobility and urban encroachment in the Alpine region

The extensive and widely dispersed settlement in the Alps means that there is high energy consumption for mobility. Consideration of this issue raised the question of whether relocation was an option. The panellists were adamant that systematic relocation was unacceptable. Moving populations to more central locations would be fatal for the Alpine infrastructure, since the existence of transit routes and overnight accommodation facilities hinges completely on settlements. Small communities generate communications, energy supply and security networks. Consequently, villages and communities are absolutely vital for mobility. Moreover, it was pointed out that settlement in the Alps has a high cultural value. Mobility-related energy consumption could be reduced more effectively through infrastructure projects, centralised supply points (e.g. schools), heat generation and other areas. A number of initiatives in this field are already underway.

Sufficiency as a key concept for development in the Alpine region

The discussion went on to question whether it is at all morally defensible to consider major changes to address energy issues, since after all it concerns the very existence of those living in these areas. A member of the audience asked whether the Alps really needed more dams or more areas set aside for energy infrastructure, or whether such projects did not damage the sense of locality for many residents. The question was warmly greeted as relevant. Both panellists and audience felt that tourism in particular was concerned in this issue. It was felt that the leap must be made from mass tourism to quality tourism. This led to a discussion on sufficiency and the reflection that "less is more" can also apply to Alpine tourism. The group concluded that this would require visitors to the Alps to reconsider their own expectations and demands.



The reference to sufficiency raised the question of how to communicate the principle of sufficiency more effectively in future, since the term always implies the idea of "less".

The solution to this problem was seen in convincing the public. Residents of the Alps and holidaymakers alike must be made aware that reduction and deceleration can also be gains. The discussion returned again to the term quality tourism.

Legal provisions conflicting with new developments

A member of the audience noted that planners, building owners, institutions etc. often push the boundaries of what countries themselves have established as legal and asked what could be changed to improve the system of standards.

Two approaches were discussed. One noted that in Italy many instruments relating to surveying, registering and certifying construction projects and energy-related issues had changed over the past 60 years. In this sense, it is not new regulation that is needed, but different application of existing instruments. New measuring instruments deliver new solutions. The second approach considered was to use communication as a lever for change. One example mentioned in this context was an association of South Tyrol-based Chambers of Architects that is promoting a dialogue which could have a fresh influence on regulation.

The needs of the user conflicting with energy optimisation

Another major concern among the audience was that occupants or users of buildings must be taken into greater account as the actual reason for erecting a building in the first place. It is evident that conflicts of use and interest can certainly arise, in particularly in relation to buildings with an optimal energy-efficiency design. Examples mentioned included emotional and health aspects which might deter some people from installing photovoltaic systems on the roof of the house they live in. In addition to investigating other building characteristics that might be detrimental to health, such as sick building syndrome in mechanically ventilated rooms, there were also calls for further investigation into the consequences of a "solar power plant" located in the direct vicinity of the sleeping area. It was clear from the discussion that both panellists and audience attached particular importance to this topic and that, on matters of energy efficiency, the debate should centre around the people concerned.

General comments on the conference

In the course of the discussions, the notably small number of women among the panellists was remarked upon. It was agreed that a more balanced gender representation would be of interest in future, as this could provide an additional perspective for the discussions.

Moreover, it was proposed that the next Alpine Building Conference should place greater focus on the Alpine context in relation to buildings. Not only rural or urban design is relevant in this regard, but also local skills, infrastructures and mobility.

6 Recommendations for action

Preliminary comments

The Alpine Convention is an international treaty between the eight Alpine countries Germany, France, Italy, Liechtenstein, Monaco, Austria, Switzerland and Slovenia, plus the European Union. The convention's aim is to promote and support sustainable development in the Alpine region.

At the XIIIth Alpine Conference in Turin on 21 November 2014, the Federal Republic of Germany took over the presidency of the Alpine Conference from Italy. Germany's presidency will end with the XIVth Alpine Conference on the island of Herrenchiemsee on 13 October 2016. The First Alpine Building Conference: Towards Net Zero Energy Buildings (NZEB) was held on 16-17 March 2016 as part of the German presidency's programme. The conference was jointly organised by the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), the Bavarian Chamber of Architects (Bayerische Architektenkammer ByAK) and the Technical University of Munich (TUM), with the support of the Permanent Secretariat of the Alpine Convention.

The conference was envisaged as a platform to present and discuss net zero energy buildings and sustainable neighbourhoods in the context of building in the Alps. The aim is to inspire further cooperation on building between Alpine countries and to give fresh impetus to the national implementation of net zero energy building standards. In light of the unique and specific characteristics of the Alps, the conference explored in particular topography, climate, culture, materials and local craftsmanship, taking into account the diverse traditional building cultures already present in the Alpine region.

The conference offered Alpine countries the opportunity to hold a fundamental dialogue about their own experiences and best practice examples in connection with both new building projects and the modernisation and refurbishment of the existing stock. Another focus was future-oriented planning both for the restructuring of existing neighbourhoods and for new housing development. The presentations of the Alpine Convention's member countries introduced strategies and solutions that support the implementation of net zero energy buildings and neighbourhoods which are in keeping with the local building culture.

The following recommendations were derived from the presentations and statements of the speakers at the conference and the participants in the closing discussions:

- The planning and construction of net zero energy buildings must always take the local building culture, topography and climatic conditions into account and make use of locally available material and energy resources.
- Due to the unique geography, culture, climate and biology of the Alps, building has a key role to play in the sustainable development of the region. Its traditional buildings are a testament to the outstanding building culture and the high standards of craftsmanship in the use of locally available materials.
- The negative impacts of unbalanced developments in building and settlement are felt particularly strongly in the Alpine region, since both landscape and biodiversity are especially sensitive to urban encroachment, land sealing, pollution and unbridled resource consumption.
- The impacts of advancing climate change are particularly evident in the Alps.

- As a complex region in terms of infrastructure and culture, the Alps provide a good starting point for discussing the above named challenges. It is therefore crucial to develop future-proof plans for elaborating and implementing sustainable strategies for achieving net zero energy buildings and neighbourhoods.
- In the implementation of the EU Buildings Directive, any potential for an energy infrastructure based on renewable energy and tailored to the respective area must be tapped.
- The share of embodied energy in total energy consumption must be taken into account.
- In the context of a holistic approach to developing future-proof solutions, a life cycle analysis plays an important role. This must take equal account of ecological, economic and socio-cultural aspects.
- As well as supporting research and development measures and the implementation of relevant strategies, another core element is an intensive exchange of knowledge and experience among experts from the scientific community, industry and politics.
- This must be flanked by activities to raise public awareness for sustainable building.
- In planning decision-making processes and considering user behaviour, the discussions need to focus more closely on the needs and concerns of building users.
- There are already a large number of interesting and sustainable approaches to planning, financing and implementing holistic net zero energy designs for buildings and neighbourhoods, both for existing stock and new build.
- Intensive and targeted communication is vital. This should involve experts from the scientific community, building and urban design, representatives from municipalities, districts, regions, Länder and national bodies, as well as representatives from associations. Only a broad spectrum of stakeholders can jointly develop viable ideas for a sustainable building culture in the Alps, which take energy, resources, culture, landscape, flora, fauna and the needs of local people into equal account.
- The Alps can take on a leading role, since building-related problems are dealt with head on in that region and the solutions found can also be effective elsewhere.
- In this context, not only technical aspects should be discussed, but also social, economic and cultural issues.
- In addition to discussing building-related issues, future talks should take a closer look at mobility.
- In this regard, 'sufficiency' could be brought more to the forefront of the debate as a key concept for the sustainable development of the Alpine region.
- It is strongly recommended that the Alpine countries continue their exchange of experience on sustainable and energy-efficient building and building culture.

B Programme

» DAY 1 – March 16, 2015	
11:00 – 12:00	Doors Open / Registration
12:00 – 12:45	Conference Opening Hans-Dieter Hegner , Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, Berlin, Germany Markus Reithner , Secretary General, Permanent Secretariat of the Alpine Convention, Innsbruck, Austria Andreas Krosthalet , Bavarian Ministry of the Interior, for Building and Transport, Munich, Germany Rudolf Scherzer , Bavarian Chamber of Architects, Munich, Germany Werner Lang , Technical University of Munich, Germany
13:00 – 13:45	Keynote 1 "High Comfort – Low Impact" Thomas Auer , Transsolar, Stuttgart, Germany <i>What is the meaning and content of sustainability in architectural design in the Alps – beyond the requirements of strong systems? Particularly materiality – local and natural – climate responsiveness and an architectural excellence have a great history in this region. How can this cultural heritage be translated into a contemporary design?</i>
13:45 – 14:15	Session A (English) <i>Open space</i> Net Zero Energy Buildings and Building Culture "Austrian State Prize for Architecture and Sustainability" Reinold Kasperner , Energy Institute Vorarlberg, Dornbirn, Austria "CAA Project – Energy Efficiency for Alpine Huts" Peter Blaser , Club-Alpe-Alpin e.V., Wankaroden, Switzerland "Place and People" Bernardo Godes , Architect, Dornbirn, Austria Session Chairman: Martin Plass, Energy Institute Vorarlberg, Dornbirn, Austria
14:15 – 14:55	Session C Strategies for Climate Responsive Neighbourhoods "Places – Values – Values" Christian Wagner , University of Applied Sciences HTW Chur, Chur, Switzerland "Towards Sustainable Alpine Cities" Mark Michael , Technical University of Munich, Germany "Building Culture – Shaped by People like You and Me" Josif Matija , former Mayor of Znojmo, Austria Session Chairman: Jakob Dietschmann, Commission Internationale pour la Protection des Alpes, Schaan, Liechtenstein
15:15 – 16:30	Coffee Break Including Group Photograph
16:30 – 17:45	Session B (English) Sustainable Building Refurbishment "Towards a New Architecture" Mark Polzer , Architect, Munich, Germany "Monitoring of Low Consumption Buildings" Laurence Marrel , Centre d'études et d'expertise sur les risques, l'environnement, la mobilité et l'aménagement, Le Grand-Quevilly, France "Energy Efficiency for the Reconstruction Heritage of Normandy" Gabriel Delahais , Centre d'études et d'expertise sur les risques, l'environnement, la mobilité et l'aménagement, Le Grand-Quevilly, France "Remember the Future!" Peter Haimel , Architect, Munich, Germany Session Chairman: Oliver Heiss, Bavarian Chamber of Architects, Munich, Germany
18:00 – 17:45	Session D "Reinventing Alpine Communities" "Different but Familiar" Peter Zoderer , Architect, Vienna, Austria "CESDA and the EUSALP-Strategy" Markus Berchtold-Döring , German European Sustainable Built Environment Assessment, Schwabenberg, Austria Thomas Voser , Bundesenergie Umwelt, Wilkibach, France "Project Zermatt Energie 2020 from Idea to Implementation" Emil Müller , Mayor of Zermatt, Switzerland Session Chairwoman: Nadja Hügel, Technical University of Munich, Germany
18:00 – 18:45	Keynote 2 "Contextual Architecture" Hermann Kurbann , Architect, Schwarzach, Austria <i>Building in the Alpine region implies knowledge of the local climate, local resources, historical roots, principles of local typologies and the consideration of local social structures. The traditional architecture reveals that the rules for sustainable construction were written long ago.</i>
18:45 – 19:30	Summary and Acknowledgements Werner Lang , Technical University of Munich, Germany
19:30 – 23:00	Get-Together at the "Bayerhalle" (Bus Transfer) Bavarian Evening
» DAY 2 – March 17, 2015	
8:15 – 8:45	Doors Open / Registration
8:45 – 9:30	Opening and Summary Day 1 Werner Lang , Technical University of Munich, Germany
9:30 – 9:45	Statement From the Point of View of the International Commission for the Protection of the Alps Jakob Dietschmann , Commission Internationale pour la Protection des Alpes, Schaan, Liechtenstein
9:15 – 10:30	Keynote 3 "Building in the Alps – Sustainable Regionality" Andreas Gattlieb Hempel , Architect, Bolzano, Italy <i>In the past, uniform buildings have sprung up all over the Alpine regions as part of a misunderstood modernism. Without connection to the regional context of the Alps, these buildings are missing the traditional values, durable construction techniques and regional quality. Examples for a new approach towards a sustainable regionalism will be shown, which meet the conditions of the regional ecology, economy, social values and culture with modern means.</i>
10:30 – 10:45	Coffee Break
10:50 – 12:30	Session E Helvetic Building Design and Certification Systems "Sustainability Assessment Tools and Life Cycle Approaches – From Buildings up to whole Alpine Regions" Natalie Ebig , Munich University of Applied Sciences, Germany "Sustainability Concepts: Innovation, Cooperation and Certification" Stefano Prosser , Techno Innovation South Tyrol K&G, Bolzano, Italy "Sustainable Design and Operation – Experiences with Buildings and Districts" Nadège Verdel , University of Lausanne, Switzerland Session Chairman: Roberto Lollini, EURAC, Bolzano, Italy
12:30 – 13:00	Lunch Break
13:30 – 14:15	Statements by Session Chairs Nadja Hügel , Technical University of Munich, Germany Jakob Dietschmann , Commission Internationale pour la Protection des Alpes, Schaan, Liechtenstein Martin Plass , Energy Institute Vorarlberg, Dornbirn, Austria Oliver Heiss , Bavarian Chamber of Architects, Munich, Germany Roberto Lollini , EURAC, Bolzano, Italy
	Statements by Stakeholders Florent Moretti , Ministry for housing, territorial equity and rural areas, Pétionville, France Wolfgang Thaler , Chamber of Architects Bolzano, Italy Sala Galonja , Ministry of the Environment and Spatial Planning, Ljubljana, Slovenia Session Chairman: Werner Lang, Technical University of Munich, Germany
14:15 – 15:00	Discussion of Future Strategies for NZEB in Alpine Regions with Stakeholders, Session Chairs and Audience Moderator: Werner Lang, Technical University of Munich, Germany

C List of participants



Figure 12: Group photo of some of the participants, speakers and organisers of the first Alpine Building Conference

surname	first name	city/town/region	surname	first name	city/town/region
Aichner	Dorothea	Bruneck	Franke	Laura	Munich
Auer	Thomas	Munich	Freifrau	Alexandra	Neubiberg
Bader	Bernardo	Dornbirn	Loeffelholz von		
Bannert	Stefan	Munich	Colberg		
Baumann	Wolfgang	Nuremberg	Freistätter	Roman	Munich
Baumgärtner	Sandra	Garmisch- P.	Fuchs	Johannes	Chieming
Becker	Klaus	Mering	Gadelhak	Mahmoud	Munich
Berchthold-	Markus	Schwarzenberg	Galonja	Saša	Ljubljana
Domig			Gayer-Lesti	Florian	Pfronten
Berten	Peter	Berlin	Gemsjäger	Maximilian	Munich
Bongio	Icaro	Traona	Georgi-Tomas	Andrea	Darmstadt
Bornemann	Vera	Innsbruck	Goerres	Johannes	Munich
Botzler	Sebastian	Munich	Gomes da	Flavia Elisa	Munich
Brasche	Julia	Munich	Silva		
Brauner	Lilly	Munich	Gonzalo	Roberto	Munich
Brückl	Thomas	Pettendorf	Gonzalo	Susana	Munich
Brunner	Robert	Garmisch-P.	Gramm	Rafael	Munich
Büchel	Peter	Weinfeldern	Grasegger	Peter	Garmisch-P.
Cao	Zulue	Munich	Greulich	Birgit	Munich
Cédric	Delahais	Grand Quevilly	Grißhammer	Stefan	Munich
Dehio	Romuald	Munich	Hach	Uli	Munich
del Barba	Oscar	Morbegno	Haimerl	Peter	Munich
Dietachmair	Jakob	Schaan	Halstenberg	Michael	Düsseldorf
Dillis	Carolin	Munich	Hanuscak	Michal	Bratislava
Dotzler	Christina	Munich	Hartung	Horst	Gräfelfing
Eberhardt	Tim	Ottobrunn	Hasler	Johannes	Munich
Eberl	Sebastian	Penzberg	Haß	Sebastian	Bergen
Egold	Christine	Wolfratshausen	Häupl	Nadja	Munich
Eßig	Natalie	Munich	Haupt	Aurèle	Gilching
Fichtner	Silvia	Aalen	Heese	Roland	Hannover
Fischer	Peter	Oberstdorf	Hegner	Hans-Dieter	Berlin
Flatz	Michael	Alberschwende	Heider	Katharina	Seeshaupt
Forth	Kasimir	Munich	Heiss	Oliver	Munich

surname	first name	city/town/region	surname	first name	city/town/region
Heißler	Karl-Martin	Munich	Mencin	Tanja	Ljubljana
Held	Thomas	Innsbruck	Meusburger	Thomas	Kempten
Hemmerle	Claudia	Munich	Mianowicz	Tomasz	Munich
Hempel	Andreas	Bressanone/Brixen	Michaeli	Mark	Munich
Hitzler	Hermine	Bernried a. S.	Modell	Gert	Garmisch- P.
Höbinger	Roman	Vienna	Morelle	Nathalie	Innsbruck
Hodapp	Marc	Munich	Moretti	Florent	Paris La Defense
Hoffmann	Günther	Berlin	Mueller	Andreas	Munich
Högenauer	Josef	Gernlinden	Müller	Emil	Susich
Hohenadl	Anton	Marktoberdorf	Müntener	Garry	Munich
Hohndorf	Maurice	Tübingen	Musselmann	Burkhard	London
Holzer	Christian	Wolfratshausen	Nagelschmiedt	Peter	Hall in Tirol
Huß	Wolfgang	Munich	Negri	Paolo	Trento
Iandolino	Astrid	Miesbach	Neuberger	Christine	Fellbach
Izlakar	Samo	Maribor	Neuner	Christine	Garmisch-P.
Jarolin	Michael	Hall in Tirol	Niemann	Anne	Munich
Joas	Martin	Innsbruck	Niggel	Tobias	Kempten
Kapferer	Roland	Innsbruck	Otter	Barbara	Ebersberg
Kappelt	Heike	Munich	Paap	Angela	Gstadt
Kargl	Franz	Murnau	Paillet	Isabelle	Paris La Defense
Kaufmann	Hermann	Schwarzach	Patz	Christina	Munich
Keltsch	Michael	Munich	Peter	Theo	Münsing
Kierdorf	Daniel	Munich	Petzelt	Muck	Munich
Knoll	Konrad	Schongau	Pfanzelt	Alexander	Lechbruck a.S.
Köbler	Kalle	Munich	Pfeil	Andrea	Berlin
Köhler	Florian	Kochel am See	Pfoh	Sandro	Munich
Kortyka	Thomas	Dietramszell	Plata Gröber	Mariano	Munich
Krapmeier	Helmut	Dornbirn	Ploß	Martin	Dornbirn
Krönert	Simon	Augsburg	Pohl	Ingrid	Munich
Kronthaler	Andreas	Munich	Pollak	Michael	Erlangen
Lang	Werner	Munich	Prosseda	Stefano	Bolzano/Bozen
Lange	Tobias	Rosenheim	Reich	Karin	Munich
Langenberg	Jana	Munich	Reiterer	Markus	Innsbruck
Larass	Stefan	Munich	Reuß	Fabian	Munich
Laszlo	Zsolt	Kempten	Reyzbikh	Ekaterina	Munich
Ledinek	Branko	Race	Richter	Norman	Bad Aibling
Leitgeb	Andreas	Beinwil am See	Rinn	Annette	Munich
Lenz	Daniel	Garmisch-P.	Ritter-Staller	Annegret	Unterschleißheim
Lichtblau	Florian	Munich	Röger	Christine	Munich
Liebetanz	Kai	Munich	Rose	Arnd	Bonn
Lohde	Martin	Fürstenfeldbruck	Salfner	Simone	Munich
Lollini	Roberto	Bolzano	Scharf	Philipp	Munich
Lux	Andreas	Grünwald	Schelker	Kaja	Munich
Mack	Ingeborg	Baldham	Schelle	Rupert	Munich
Magdolen	Simone	Munich	Scherzer	Rudolf	Munich
Marcel	Lauranne	Le Grand Quevilly	Schneider	Nori	Gräfelfing
Mathis	Josef	Zwischenwasser	Schneider	Thomas	Miesbach
Mayser	Friederike	Munich	Schröck	Franz	Kempten / Allgäu
Meier	Georg	Dachau	Schweiger	Jakob	Munich



surname	first name	city/town/region
Seifert	Peter	Munich
Stauch	Michaela	Munich
Stefanova	Kristina	Munich
Steidl	Johannes	Munich
Steinhauser	Bernhard	Munich
Stetter	Markus	Sonthofen
Stoll	Marlene	Munich
Stumpf	Wolfgang	Vienna
Thaler	Wolfgang	Bolzano/Bozen
Varges	Johannes	Hall
Vetterli	Nadège	Horw
Viénot	Etienne	Villeurbanne
Vogler	Waltraud	Munich
Vollmann	Brigitte	Munich
von Fürsten- berg	Andreas	Munich
von Vegesack	Sandra	Munich
Wagner	Christian	Chur
Wagner	Angela	Starnberg
Wagnerberger	Sebastian	Chieming
Wankerl	Xaver	Munich
Wankner	Kristina	Günzenhausen
Wei	Shaochen	Freiburg
Well	Friederike	Munich
Wissel	Paul	Munich
Wolfertstetter	David	Munich
Wollbrink	Anke	Stuttgart
Wu	Niao	Munich
Zang	Johannes	Freising
Zimmermann	Patrick	Munich
Zimmermann	Liselotte	Sauerlach
Zoderer	Peter	Vienna

D Publication data

Organisation:

Presidency of the Alpine Convention for the period 11/2014-10/2016

Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety

Director-General Günther Hoffmann

Head of Division Hans-Dieter Hegner

Andrea Pfeil

Bavarian Chamber of Architects

Rudolf Scherzer

Oliver Heiss

Technical University of Munich

Werner Lang

Jutta Bergmann

Franziska Grimm

Michael Keltsch

Jana Langenberg

Sandro Pfoh

Fabian Reuß

Student assistants

Garry Müntener

Lilly Brauner

Kasimir Forth

Rafael Gramm

Philipp Scharf

Marlene Stoll

Sandra v. Vegesack

Friederike Well

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ediundsepp Gestaltungsgesellschaft mbH

Florian Hugger

Nadine Mollien

Anja Voit

Juli Drehobel

Astrid Eckert Photographie

Astrid Eckert

Kongresszentrum Garmisch-Partenkirchen

Stephanie Bierprigl

Adlwärth Gastronomie GmbH & Co KG

Gaby Adlwärth

Volkstrachtenverein Garmisch

Josef Karg

E Participating institutions



Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Stresemannstraße 128 - 130 | 10117 Berlin

Tel.: +49 (0)30 18 305-0

E-mail: BI5@bmub.bund.de

**Bayerische
Architektenkammer**



Bavarian Chamber of Architects

Waisenhausstraße 4 | 80637 München

Tel.: +49 (0)89 13 98 80-35

E-mail: info@byak.de



Technical University of Munich

Institute of Energy Efficient and Sustainable Design and Building

Arcisstr. 21 | 80333 München

Tel.: +49 (0)89 289 23990

E-mail: sekretariat.enpb@lrz.tum.de



Alpine Convention – Permanent Secretariat
Office Innsbruck

Herzog-Friedrich-Straße 15 | 6020 Innsbruck,
Austria

Tel.: +43 (0)512 588589-0

Email: info@alpconv.org | www.alpconv.org

First Alpine Building Conference "Towards Net Zero Energy Buildings (NZEB)"

16/17 March 2016 in Garmisch-Partenkirchen

Conference on net zero energy buildings –
Developments and innovations in Alpine countries

Recommendations for Action



Research programme

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Chair of Energy Efficient and Sustainable Design of Building, Technical University of Munich

Recommendations for action

1 Preliminary comments

The Alpine Convention is an international treaty between the eight Alpine countries Germany, France, Italy, Liechtenstein, Monaco, Austria, Switzerland and Slovenia, plus the European Union. The convention's aim is to promote and support sustainable development in the Alpine region.

At the XIIIth Alpine Conference in Turin on 21 November 2014, the Federal Republic of Germany took over the presidency of the Alpine Conference from Italy. Germany's presidency will end with the XIVth Alpine Conference on the island of Herrenchiemsee on 13 October 2016. The First Alpine Building Conference: Towards Net Zero Energy Buildings (NZEB) was held on 16-17 March 2016 as part of the German presidency's programme. The conference was jointly organised by the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), the Bavarian Chamber of Architects (Bayerische Architektenkammer ByAK) and the Technical University of Munich (TUM), with the support of the Permanent Secretariat of the Alpine Convention.

The conference was envisaged as a platform to present and discuss net zero energy buildings and sustainable neighbourhoods in the context of building in the Alps. The aim is to inspire further cooperation on building between Alpine countries and to give fresh impetus to the national implementation of net zero energy building standards. In light of the unique and specific characteristics of the Alps, the conference explored in particular topography, climate, culture, materials and local craftsmanship, taking into account the diverse traditional building cultures already present in the Alpine region.

The conference offered Alpine countries the opportunity to hold a fundamental dialogue about their own experiences and best practice examples in connection with both new building projects and the modernisation and refurbishment of the existing stock. Another focus was future-oriented planning both for the restructuring of existing neighbourhoods and for new housing development. The presentations of the Alpine Convention's member countries introduced strategies and solutions that support the implementation of net zero energy buildings and neighbourhoods which are in keeping with the local building culture.

The following recommendations were derived from the presentations and statements of the speakers at the conference and the participants in the closing discussions:

- The planning and construction of net zero energy buildings must always take the local building culture, topography and climatic conditions into account and make use of locally available material and energy resources.
- Due to the unique geography, culture, climate and biology of the Alps, building has a key role to play in the sustainable development of the region. Its traditional buildings are a testament to the outstanding building culture and the high standards of craftsmanship in the use of locally available materials.

- The negative impacts of unbalanced developments in building and settlement are felt particularly strongly in the Alpine region, since both landscape and biodiversity are especially sensitive to urban encroachment, land sealing, pollution and unbridled resource consumption.
 - The impacts of advancing climate change are particularly evident in the Alps.
 - As a complex region in terms of infrastructure and culture, the Alps provide a good starting point for discussing the above named challenges. It is therefore crucial to develop future-proof plans for elaborating and implementing sustainable strategies for achieving net zero energy buildings and neighbourhoods.
 - In the implementation of the EU Buildings Directive, any potential for an energy infrastructure based on renewable energy and tailored to the respective area must be tapped.
 - The share of embodied energy in total energy consumption must be taken into account.
 - In the context of a holistic approach to developing future-proof solutions, a life cycle analysis plays an important role. This must take equal account of ecological, economic and socio-cultural aspects.
 - As well as supporting research and development measures and the implementation of relevant strategies, another core element is an intensive exchange of knowledge and experience among experts from the scientific community, industry and politics.
 - This must be flanked by activities to raise public awareness for sustainable building.
 - In planning decision-making processes and considering user behaviour, the discussions need to focus more closely on the needs and concerns of building users.
 - There are already a large number of interesting and sustainable approaches to planning, financing and implementing holistic net zero energy designs for buildings and neighbourhoods, both for existing stock and new build.
 - Intensive and targeted communication is vital. This should involve experts from the scientific community, building and urban design, representatives from municipalities, districts, regions, Länder and national bodies, as well as representatives from associations. Only a broad spectrum of stakeholders can jointly develop viable ideas for a sustainable building culture in the Alps, which take energy, resources, culture, landscape, flora, fauna and the needs of local people into equal account.
 - The Alps can take on a leading role, since building-related problems are dealt with head on in that region and the solutions found can also be effective elsewhere.
 - In this context, not only technical aspects should be discussed, but also social, economic and cultural issues.
- In addition to discussing building-related issues, future talks should take a closer look at mobility.
- In this regard, 'sufficiency' could be brought more to the forefront of the debate as a key concept for the sustainable development of the Alpine region.
 - It is strongly recommended that the Alpine countries continue their exchange of experience on sustainable and energy-efficient building and building culture.