

Dear Reader,

Green roof policies are one of the basic key factors for the successful development of a green roof market. Longstanding experiences and case studies from different countries and municipalities are available and can be adapted and modified according to the needs of the local green roof stakeholders. The current issue of "Green Roof News" deals with examples from Germany, Austria, Denmark and the US. Green roof projects from the UK, Greece, the US and Germany complete the picture. Not forgetting a feature about the outstanding Skyrise Greenery Conference in Singapore in just a month's time. A not-to-be-missed event.

Stay connected with the Green Roof Community!

Wolfgang Ansel  
Director IGRA

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## Save the Date:

# Skyrise Greenery Conference Singapore (1st – 3rd November)

Over 30 internationally renowned industry leaders from 10 countries will be sharing their insights at the inaugural International Skyrise Greenery Conference (ISGC). The conference is the first of its kind in the Asia-Pacific region that will cover not only rooftop gardens and green roofs, but also vertical green walls – a growing trend around the globe. ISGC will feature multiple award-winning experts such as Emilio Ambasz (Emilio Ambasz & Associates, USA), Patrick Blanc (French National Centre for Scientific Research, France), Dr. Ken Yeang (Llewelyn Davies Yeang UK), Prof. Manfred Köhler (University Neubrandenburg, Germany), Roland Appl (International Green Roof Association) and John Alschuler (Friends of the Highline, New York).

The theme "Surfaces of Creativity: Spaces of Delight" celebrates the creativity in greening urban surfaces and recognises the positive impact of these new surfaces to the city and its inhabitants. Gain a better understanding of current and new trends, technical and design considerations as well as the advantages of skyrise greenery from an international audience of experts and practitioners. Organised by the National Parks Board (NParks), the Centre for Urban Greenery and Ecology (CUGE), and the International Green Roof Association (IGRA), the conference will also feature a trade exhibition showcasing related products and services from around the world, some of which are innovations not yet available in many markets. On the last day, delegates will be treated to technical tours of six skyrise greenery sites in Singapore.



Marina Bay Sands – a new icon of green roof architecture



Delegates will not only be granted exclusive access to sites that are not usually open to the public, they will also learn firsthand from site architects about the projects. One such site is Gardens by the Bay, which is slated to open end 2011 and Marina Bay Sands. The three 55-storey hotel towers of Marina Bay Sands anchor the district and are connected at the top by the one hectare SkyPark. An engineering marvel 200 m above the sea, the SkyPark spans from tower to tower and cantilevers 65 m beyond. It accommodates a public observatory, gardens, a 151 m swimming pool, restaurants and jogging paths and offers sweeping panoramic views, a formidable resource in a dense city like Singapore. Shielded from the winds and lavishly planted with 250 trees and 650 types of plants. The SkyPark celebrates the notion of the "City in a Garden" that has been the underpinning of Singapore's urban design strategy.

### Conference Statements

Mr Poon Hong Yuen, Chief Executive Officer, NParks, said: "Skyrise greenery is a fast-growing phenomenon and has become an integral part of urban greening strategies around the world. Indeed, it is a key strategy for Singapore to achieve our 'City in a Garden' vision. As skyrise greenery takes off, we hope that the Conference will facilitate timely sharing of knowledge and experience in this promising field. With the trade exhibition component already oversubscribed, we anticipate keen interest for this international conference."

Mr Wolfgang Ansel, Director of IGRA, said: "The strong lineup of world-renowned speakers from so many countries and disciplines is impressive and makes

this a much anticipated event. No other element in sustainable architecture has seen technical innovations develop so fast as in the field of rooftop greening and green walls. Singapore is also well-placed with its world-class architectural projects and several flourishing installations of skyrise greenery. No other place in the world offers a more suitable venue for this event."

Dr Ken Yeang, one of the keynote speakers at the event, shared: "This is a unique event and Singapore, which is dedicated to greening on many levels, is an ideal venue. Besides reducing heat island effects and creating habitats for enhancing biodiversity, urban greening also has biophilic benefits to the city dwellers. This is a must-attend event for all those whose work involves architecture and the environment."

No doubt Singapore has everything that is necessary to make the Skyrise Greenery Conference 2010 a unique and exciting event:

- An impressive list of world-renowned speakers from various disciplines
- An interactive congress programme with lectures and workshops
- A number of world class architectural projects

And of course an ongoing process of implementing rooftop greening and green walls into all aspects of modern urban planning which makes Singapore a prime example for other metropolises all around the world. Gain insights from the World's Best at the Inaugural International Skyrise Greenery Conference in Singapore! A must attend event for all academias, architects, planners, building material producers, city planners, engineering and contracting services, government officials, horticulturists, landscape architects, park owners and managers, project consultants, real estate and property developers, and estate and facility managers.

More information about registration, accommodation and travel arrangements can be found on: <http://www.skyrisegreeneryconference.com>

**Members of the IGRA network can apply for a 40 % discount on the registration fee.**

### A Snapshot of the Speaker Programme

**Emilio Ambasz, USA** (hailed as "The Messiah" of green architecture)

*Topic: Architecture and Nature – Towards a Pact of Reconciliation*

The modern movement in architecture advanced the ideal of urban redemption by proposing "the House IN the Garden", but where each one remains distinct and separate from the other. Emilio seeks to design a "pact of reconciliation" whereby both, "the House AND the Garden", i. e. 100 % of the house and 100 % of the garden, are organically integrated.

**Dr Patrick Blanc, France** (Inventor of the vertical greenery concept)

*Topic: The Vertical Garden – From Nature to Cities*

The Vertical Garden is no longer a vertical panel; it is now possible to freely create it on various structures like columns, spirals, slopes or even vegetal ceilings.



Since more than half the human population is now living in cities, the façades of the high rise building must be seen as a valuable place for bringing back the nature into the cities.



**Andrew Grant, UK** (Leader of a number of high profile award winning projects)

*Topic: Gardens by the Bay, Singapore*

A presentation of the scope and content of the Gardens by the Bay project with particular reference to the innovative use of vertical planting and ecological management systems. The talk will describe some of the key features of the project including the 18 "Supertrees" that provide a framework for vertical gardens rising 25 to 50 m above the ground. It will also describe the strategies for sustaining planting within the cooled conservatories and the specific designs for the 40 m high "mountain lattice" within the cool moist conservatory.



**Ms Linda Velazquez, USA** (Founder and Editor of greenroofs.com)

*Topic: The 2010 Top 10 Hot Trends in Green-roof & Greenwall Design*

Greenroofs.com's Top 10 List of Hot Trends in Greenroof & Greenwall Design showcases important, newsworthy, and exciting projects from around the world. This presentation will look beyond just the function of green roofs and walls and instead focus on the hottest architectural trends in vegetated surface design! Out-of-the ordinary applications, special designs and even bizarre projects on the boards will be highlighted. This year's list promises to dazzle, boggle the mind, and push our conception of design limits even further!



**Mr Roland Appl, Germany** (President International Green Roof Association)

*Topic: The Development of Green Roofs – A Look Behind the Scenes*

Green roofs show an amazing diversity in terms of their construction and plant selections. This diversity is a result of technical responses to different climatic conditions, roof typologies, functions, technical constructions and other local conditions and considerations. With his wealth of knowledge gathered as a green roof engineer for many years, Roland Appl will take you behind the scenes of many green roof projects to explore the key considerations behind their implementations from planning to installation.

### Maximize the knowledge transfer with:

Dr John H. Alschuler, Jr., President of Hamilton, Rabinovitz & Alschuler, Inc. USA – "The Highline Project, New York", see page 12.

Kai-Uwe Bergmann, Bjarke Ingels Group (BIG) Denmark – "Yes is More"

Prof Dr Wolfgang Dickhaut, HafenCity University of Hamburg, Germany – "Green Roof Policies and Storm Water Management – The German Experience"

Prof Hitesh Doshi, Ryerson University, Toronto, Canada – "The Toronto Green Roof Bylaw and the Green Roof Construction Standard"

Dr Michael Henze, European Landscape Contractors Association, Germany – "Structural Survey, Development and Perspectives of Companies in the Landscape Gardening Industry, especially in Roof Gardens, in Europe"

Ho Wan Weng, IGRA Representative (Singapore) ZinCo Singapore – "Sustainable Green Roof in Tropical Asia – Beyond the Horizon"

Prof CY Jim, Department of Geography, The University of Hong Kong, Hong Kong – "Pump-Priming and Reinforcing the Green Roof Movement in Hong Kong"

Dr Nirmal Kishnani and Ms. Lim Yinghui Astee, Department of Architecture, National University of Singapore, Singapore – "Sky Farms in Singapore – Exploring the Feasibility of Vegetable Cultivation on Rooftops of Public Housing Estates"

Prof Dr Manfred Köhler, University Neubrandenburg, Germany – "Vertical Greenery and Urban Water Management"

Er Lau Joo Ming, Managing Director, HDB Building Research Institute, Housing Development Board (HDB), Singapore – "A Holistic Approach in Enhancing Greenery in HDB Estates"

Mr Jaron Lubin Associate Safdie Architects, Somerville USA – "The Skypark at the Marina Bay Sands"

Dr Tan Puay Yok, Deputy Director Centre for Urban Greenery and Ecology (CUGE), National Parks Board, Singapore – "The Greening of the Highrise Environment in Singapore – An Overview of Policy and Projects"

Ms Susan Weiler, Architect, Olin Partnership, USA – "A Land Ethic: Replenishing our Diminishing Resources"

Dr Wong Yun Chii, Associate Professor, Department of Architecture, National University of Singapore, Singapore – "History of Skyrise Greenery in Singapore"

## Effectiveness of Green Roof Policies in Germany and Austria: A Fact Finding Trip for the UK Green Roof Code

In early May 2010, five delegates from the LIFE+, UK Green Roof Code Project undertook a fact finding trip to Stuttgart (Germany) and Linz (Austria), to see first-hand the impact that local government policy can have on increasing green roof coverage. It provided the chance to speak with people at the cutting edge of green roof legislation; to understand more about best practice techniques and the challenges for installing the technology.

On arriving in Stuttgart, we were met by Wolfgang Ansel from the International Green Roof Association to see our first green roof scheme of the day which was "Hohlgrabenacker" – a new housing development on the outskirts of Stuttgart nestling in-between the tree covered district of Zuffenhausen. On route Wolfgang told us about IGRA and his work championing green roofs. He spoke enthusiastically about ecology and landscape, and of the incentives offered by local government to encourage green roof implementation and sustainable design more generally.

At "Hohlgrabenacker", we were greeted by the civil engineer for the stormwater management system; Freddy Diem. As we started to walk around the site, Freddy explained that to minimise the environmental impact of the development, a number of design criteria had been set including the requirement for green roofs, storm water retention and sustainable infiltration. The planners requested that the development achieve the ambitious target of only 20 % impervious surfacing, primarily to address the lack of capacity within the existing drainage system. Freddy and his team had achieved this target and were justifiably proud of their efforts. Freddy and Wolfgang continued to show us the rest of the development, pointing out permeable road surfacing, pavements and green roofs. Green roofs (totalling 18,300 m<sup>2</sup>) are requested on approximately 80 % of the dwellings and must have a substrate depth of 120 mm in order to achieve the runoff coefficient of 0.3. Best practice in the UK is only 80 mm so the findings from Hohlgrabenacker are particularly useful as minimum standards will be drafted as part of the LIFE+ project.



Green roofs and renewable energies are mandatory at the building site Hohlgrabenacker.

On Wednesday, we sped off on a tram towards Scharnhausen, an ex army base, which is now home to over 6000 residents. The site utilises a combined urban water management system complete with green roofs. As we left the city behind, we were amazed at how green the landscape suddenly became – even the tram tracks had low-growing grasses in between them. We stepped off the train to be met by a city planner, who had been heavily involved in developing Scharnhausen and then embarked on a walking tour of the estate. Wolfgang and his colleague helpfully explained the different design features including green roofs, drainage details, swales and gullies. Despite what felt like sub zero temperatures, we braved the outdoors for several hours eager to see and hear how the site had been developed using a fully integrated sustainable urban drainage system with rainwater feeding ponds and children's play areas.



The UK fact finding visit group in Scharnhausen



View from the town hall in Scharnhausen – All flat roofs are landscaped

We ended the tour inside the town hall, which itself has an extensive green roof. Wolfgang led us out onto the town hall roof, for amazing views of green roofs stretching as far as the eye could see – they covered a variety of buildings from schools, to supermarkets and offices. In the afternoon we were invited by the municipality of Stuttgart, and here Wolfgang gave a presentation on how the green roof strategy had evolved in Stuttgart and the aims of the IGRA. We talked about the difficulties and challenges for maintaining quality assurance and the importance of providing incentives to install green roofs wherever possible. Next, Wolfgang gave us an overview of the different green roof policies within different German cities – emphasising the importance of locally specific policy drivers. This was extremely useful for our Environment Agency delegate (Tim Andrews), who explained the increasing focus on flood and water management within the Environment Agency’s remit. Wolfgang’s presentation also included valuable information about how the water runoff coefficients are generated within the FLL guidelines. Interestingly, unlike the UK, biodiversity is not a big driver for green roofs in Germany. Wolfgang was very keen to know more about the biodiversity aspect of our work and The UK Green Roof Code, so we agreed to send him further information about the roofs we have in the UK. Finally we were introduced to a local Green Party Cllr, who discussed the importance of having a mandatory green roof policy in order to make a real difference in practice.

On Thursday afternoon, after yet another impressive journey by public transport, we arrived in Linz raring to go. We were met by Edmund Maurer, a senior planner within the Municipality of Linz, who has been instrumental in leading the city’s green roof policy. Early on the Friday morning we climbed into the minibus, and were driven to our first site visit of the day. The first stop was to see one of Linz’s oldest green roofs – an intensive rooftop garden complete with an allotment and a variety of fruit trees and plants.



Roof garden in Linz, Austria

The roof was on top of a 1950’s block of flats, and across the road from a new housing complex. All these new homes had extensive green roofs and there were even green roofs on the raised entrances to underground car parks – in one case the gardens for the surrounding dwelling sat over the underground car park. Edmund highlighted the difficult issue of policing the quality of green roof installation, pointing to several of the new green roofs which looked stressed and dried out. Again the issue of substrate depth was discussed, and similarly to Stuttgart, Linz is now recommending a deeper substrate of around 110 mm.

Next we went to see Linz’s biggest extensive green roof – over 14,000 m<sup>2</sup> spanning a furniture assembly factory owned by the Schachermayer company, in the industrial heartlands. The factory owner generously allowed us to visit the roof area and we roamed across the vast expanse of sedum, while the building’s facility manager explained the major driver for the company installing the roof had been the cooling benefits for the space below and reduced air-conditioning requirements.



Industry and Ecology in combination:  
The green roof at the Schachermayer company

Before leaving the industrial area of Linz, Edmund took us to a nearby Combined Heat and Power plant, which housed a 300 metre tall chimney. Edmund explained that the chimney provided an excellent viewing point from where we could see the effects of Linz's green roof policy on the ground below. Initially we thought Edmund was joking, however we soon found ourselves ascending in a tiny rickety elevator towards the tower's viewing platform. At the top we nervously climbed out from the elevator and braced ourselves against the winds to peer over the railings. Once the scary feeling of being 300 metres above the ground had subsided, it was possible to see the impact of the green roof policy immediately.

Due to the incremental nature of development within the industrial area, one could effectively draw a line between developments pre 1985 i. e. prior to the green roof policy and those post 1985 i. e. after the policy's introduction. The Schachermayer's green roof stood out like a green sea against the backdrop of grey factories and smoking chimney stacks.

After taking in the skyline of the city, we descended and were driven to the Bindermichl Motorway. The Motorway had previously cut through a residential estate – effectively dividing the communities on either side. The housing in the area had grown increasingly

undesirable as air and noise pollution from the motorway grew. As the quality of life for local people declined, pressure was put on the local government to address the situation. The response from the local politicians was radical and on a grand scale; the construction of a park over the motorway. On visiting the park – it looks and feels just like any other park; there are no obvious signs that a dual-level motorway runs beneath the grass and trees. This site visit was perhaps the most inspirational of all highlighting both the potential for green roofs and the positive outcomes that occur when there is strong political backing for a solution.

We came away feeling enthused and motivated by our time spent in Stuttgart and Linz – the findings are of great assistance to the LIFE +, UK Green Roof Code project. The results of robust green roof policies were clearly evident in the developments we saw and the trip gave us valuable insights for developing both green roof policy and minimum standards back in the UK. The trip also emphasised the benefits of joint working between Member States, and highlighted how the experiences and learning can be exchanged.

Wendy Bussey  
Project Manager, Groundwork Sheffield



The Bindermichl park

## Pioneering Green Roof Policies in the US: Portland's Ecoroof Strategy

The City of Portland, Bureau of Environmental Services (BES) uses the Portland "watershed approach" to plan and implement sustainable projects. The watershed approach assures that the bureau operates and maintains Portland's storm and sewer systems in a way that enhances watershed health. Sustainable stormwater management is an important feature of the watershed approach, and ecoroofs are one of the measures Portland uses to manage stormwater sustainably (in Portland, extensive green roofs are referred to as ecoroofs). Test results from Portland show that ecoroofs manage rain and reduce stormwater runoff.

Portland's ecoroof program began in 1996 when city employee constructed an experimental ecoroof on his garage. From this small start, the program has grown and now there are more than 200 ecoroofs citywide. Portland has a total of 24 acres of green roofs (extensive and intensive roofs). Portland uses a combination of policies, incentives, and education to promote ecoroofs.

### Policies

**Direct Financial Subsidy:** In 2008, Portland Mayor Sam Adams launched the Grey to Green Initiative (G2G). The term grey to green refers to the trend away from traditional piped stormwater systems to vegetated stormwater systems. The G2G Initiative provides funding for ecoroof construction. The G2G ecoroof goal is to construct 43 acres (17 hectares) of new ecoroof between 2008 and 2013. BES has set aside \$6 million for the ecoroof program. The funds are primarily for ecoroof construction, and the city offers \$5 per square foot (€ 40 per square meter) as incentive grants.

**Portland Green Building Policy:** The Green Building Policy (GBP) applies green building requirements to city-owned facilities. When an existing facility is re-roofed or a new facility is constructed, the GBP requires at least 70 percent of the roof to be covered with an ecoroof. The remaining roof area must be covered with high reflectance roofing materials.



A City of Portland building with an ecoroof

**Floor Area Ratio Bonus:** The City of Portland has special zoning and design guidelines that regulate land uses and building and site design for Portland's downtown and nearby areas. The zoning provisions include a set of development bonuses called floor area ratio (FAR) bonuses. The ecoroof FAR bonus can earn a developer a larger development footprint or additional floor area than otherwise allowed by zoning codes if their building includes an ecoroof that meets specific requirements. The amount of FAR bonus allowed to a developer depends on the percentage of ecoroof covered in relation to the overall roof area.



A G2G incentive funded ecoroof at the University of Portland



A building which used the FAR green roof bonus

**Local Regulation:** The City of Portland Stormwater Management Manual (SWMM) requires stormwater runoff from new development to be managed on-site and as close to the source as possible. The SWMM includes ecoroofs one of way to manage stormwater from new development. When using an ecoroof, developers get credit for reducing the amount of impervious area and can downsize other stormwater management facilities.

**Reduced Stormwater Fees:** In 2006, the city started its Clean River Rewards Program, which provides a discount on stormwater utility fees to ratepayers that manage stormwater on their property.

**Public Relations and Education:** Ecoroofs are relatively new to the United States. BES conducts classes, tours, and other events to increase awareness and encourage the use of ecoroofs including:

- Technical seminars for building industry professionals
- “Ecoroof Portland 2010” was a two-day event for practitioners and building owners. The event featured tours, presentations, and a trade show. The keynote speakers this year were Linda Velasquez, from greenroofs.com and Ed Snodgrass from Emory Knoll Farms and co-author of Green Roof Plants: A Resource & Planting Guide.
- The ecoroof blog has technical and program information:  
<http://www.portlandonline.com/bes/ecoroofblog>
- The Portland-based rock band, Reporter, was recorded playing an original song on the Metro building ecoroof. You can see the video at:  
<http://www.thepennyjam.com/2010/01/12/reporter-at-metros-ecoroof/#one>
- The Portland City Council designated March 2010 as Ecoroof Month. A charrette was conducted to design a biodiverse ecoroof for a new factory in Portland. Visiting green roof expert, Dusty Gedge from livingroofs.org, provided guidance on designing for biodiversity.

Technical manuals and reports are available online at: [www.portlandonline.com/ecoroof](http://www.portlandonline.com/ecoroof)

- The Ecoroof Handbook provides basic information about ecoroofs and their components.
- The Ecoroof Plant Report evaluates ecoroof plants in Portland, and gives guidance on plant selection for different ecoroof site conditions.
- The Cost Benefit Analysis of Ecoroofs 2008 quantifies the private and public values ecoroofs provide.
- The 2008 Stormwater Management Facilities Monitoring Report provides the results of monitoring three ecoroofs and other sustainable stormwater facilities in Portland.



BES created this poster for the Ecoroof Portland 2010 event to promote ecoroofs

**Ambitious:****City of Copenhagen Adopts Mandatory Green Roof Requirements**

Copenhagen has set itself the ambitious target of becoming the world's first carbon neutral capital by 2025. To meet this ambitious goal we need ambitious measures. Therefore we have now decided to adapt to harsher weather by making new requirements for getting grass on top of as many buildings as possible (Mayor of Technical and Environmental Administration, Bo Asmus Kjeldgaard).

It's now mandatory in Copenhagen that all new flat roofs with up to 30° slope in storey buildings, and in private and public buildings have to be vegetated. If old roofs need to be retrofitted and the building owner has received financial support by public authorities the city requires the installment of a green roof.

The city has set up five requirements and two of these have to be implemented if the green roof is to be approved. Buildings with green roofs should be able to fulfill at least two of the following requirements:

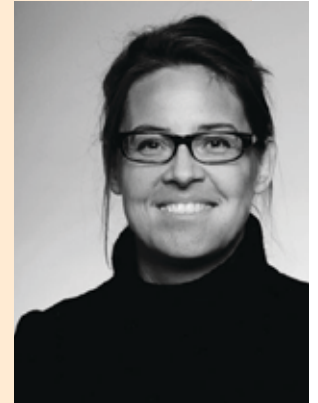
- absorb 50–80 % of the precipitation that falls on the roof.
- provide a cooling and insulating effect on the building and reduce reflection.

- help make the city greener, reducing the urban heat island effect. So as to counteract increased temperature rises in the cities.
- contribute to a visual and aesthetic architectural variation that has a positive effect on the quality of life.
- double the roof life as roofing membrane is protected against UV ray's reactive power.

The success of the green roof policy in Copenhagen is strongly connected with the work of Dorthe Rømø, project manager at the Parks and Nature department. Dorthe received the IGRA award 2009 at the International Green Roof Congress in Nürtingen/ Germany for her efforts in raising awareness of Green Roofs in the municipal administration. We are very happy that her ambitious work finally led to this big success and that we could contribute to this process by sharing information about technical and ecological issues of green roofs.

A proof of concept is of course the new development in North Harbour that offers potential for nearly 1,000,000 m<sup>2</sup> of green roofs.

*Finn Hansen, ZinCo Denmark A/S*



Dorthe Rømø, project manager at the Parks and Nature department



The Copenhagen Climate plan promotes green roofs as a climate adaption initiative

**Project in the UK:****Green Roof Chosen for Award-Winning Healthcare**

An extensive ZinCo green roof from Alumasc is a key design feature on a new award-winning mental health facility near St Albans. The Oak and Beech units at Harperbury were built within a green belt environment, to a design by Dransfield Owens De Silva Architects. The project has since gone on to win a prestigious Building Better Healthcare Award for Best Mental Health Design. Planted courtyards and green roof areas were incorporated into the design after service-users and staff identified the therapeutic qualities of green outside space. The sloping green roofs were installed by Approved Alumasc Installer Letchworth Roofing, over a layout of complex levels around the courtyards, ensuring the green sedum aspects were visible from ground level.

With their relatively shallow substrate, extensive green roofs are ideal for lightweight decks, inaccessible roofs and flat or sloping roof areas. Their versatile and

economic design provides a “back to nature” solution offering strong ecological benefits, perfectly suited to the site's green-belt location. The roofs at Harperbury support self-sustaining sedum plants that require minimal irrigation and are highly wind, frost and drought resistant. The roofs were installed over Derbigum single layer waterproofing, also supplied by Alumasc. Derbigum is a tried and tested roofing solution suitable for warm roofs with metal, concrete or plywood decks and inverted roofs with concrete deck.

*Nicola Perrins, Presto*





### Inspirational:

## Urban Life on Roofs in Athens

The increasing desire and evolving need to occupy and inhabit urban spaces that have never been used before has brought us to the use of the building rooftops. Landscape architecture intends to make the best use of these spaces, to provide inspiring solutions and thus contribute to the dynamic evolution of the contemporary city. The project presented is a green roof garden on an office building in Athens, the capital of Greece. The site is in a former industrial area, on an important urban axis, Piraeus Avenue. The garden is strictly for private use.

**The Site:** The main characteristics of the project context are the great dispersion of the urban tissue, the heavy traffic and the lack of structure and continuity. The project intends to single out from this context by introducing clarity, great scale and coherence.

**The Concept:** The three surfaces that structure the building are the key elements of the project. There is a curved surface enclosing the company headquarters. The form, resembling a fabric, is dynamic and reveals a sense of motion. The second surface is vertical and plain, it is covered with glass linear elements that reflect and render the light. The horizontal surface, which is covered with the green roof, provides a common reference for the other two. It combines the hint of motion of the "fabric" façade and a perpetual interaction with light and time like the glass façade. One of the images that was inspiring for this project was the linearity of agricultural cultivation. They are open air "constructions" that create organized and geometrical landscapes. The green areas on the green roof are formed by one meter wide plantation stripes. The plantation stripes run the surface from one side to the other. Among the planted areas emerge open spaces that are used as places of gathering and events. Groups of two to three trees planted in cubic planter boxes have been placed as landmarks to create shaded open space. The planted areas are interrupted by circulation corridors that connect the open spaces. To the east side the green roof continues in an inclined surface that faces the building's main lobby. The inclined green roof presented a special challenge and it therefore required special construction build up to accommodate for vegetation.

The building is owned by a clothing import company and the green roof will be used for fashion events and shows. *Therefore there is an area especially designed to host an open-air catwalk.*

**The vegetation:** The selection of the species was made bearing in mind the climatic conditions, the temperature fluctuations, the pollution of the urban environment and low water consumption. The variation of colour and texture all year round was also a crucial factor for this selection. The stripes are planted with grasses, each one hosting one species to underline the linearity of the design. The four selected species are *Pennisetum orientale* (oriental fountain grass), *Miscanthus sinensis* "Morning light", *Pennisetum setaceum* "Rubrum" and *Nassella tenuisima*. The selected trees are of medium size. They are deciduous trees with interesting red leaves during the spring. The tree species are: *Cercis siliquastrum*, *Prunus amygdalus* and *Prunus cerasifera* "Pissardi nigra".

**The ecology:** The advantages of green roofs are numerous, from environmental to economic and social benefits. The green roof creates natural habitats for animals and plants, as well as living spaces for people. Green roofs minimize the "Urban Heat Island" effect. Large scaled urban green roofs, as the presented project, can reduce localized ambient temperature significantly. The green roof also reduces carbon emissions, since it reduces energy consumption of air conditioning systems and contributes to pollution reduction. Furthermore, the green roof protects the waterproofing from UV exposure and temperature fluctuations, thus increases the life expectancy of the roof. The increasing use of green roofs can significantly reduce the risk of flooding, as 50–90% of rainfall is retained in the substrate to evaporate slowly. The natural evaporation cools the air and reduces smog levels. Green roofs can maximize environmental and energy saving benefits with up date technological solutions, therefore green roofs can play a key role to sustainable urban planning.

*Architects: Kk Kokinou&Kourkoulas*

*Landscape Architects: H. Pangalou & Associates*

## Roofs in Germany:

# Green Roofs Provide a Win-Win Situation in Berlin

**A win-win situation, in the classical sense, means a project where both partners profit. Apart from the tenants and the investors, the allotment gardens over the roofs of Berlin have two further winners – the city climate and the environment.**

Building renovation does not normally leave architects much scope for design. However, that there is an exception to every rule was proved by the architect Carlos Zwick's complete renovation plans for a co-operative settlement in Berlin dating from the twenties. After demolishing the old gable roof in 2004 a whole floor was added using a steel frame construction. What makes this so unique is that the green area over the housing space allows one to live close to nature, have a garden and a view which is closed to further construction, and this right in the middle of the city.

### The Investor: Profit through increased realty worth

The decision to carry out the extensive renovation work definitely paid off for the investor, the non-profit housing corporation "GeWoSüd". The heightening of the building provided 17 new apartments totalling more than 2000 m<sup>2</sup> floor space at no extra property cost. In Berlin not only the size, but also the quality of a property play an important role. And here the occupancy rates of the last few years speak loud and clear: the word "vacancy" has never been used. The penthouse apartments with roof garden holdings are so sought after that the new tenants are literally streaming in.



Easy access to the garden via the rooftop studio

### The Tenant: Garden paradise over the rooftops of Steglitz

The penthouse apartments offer tenants on the 4th floor a unique comfort. A simple connecting stair brings them out into nature. The garden not only provides a fantastic view over Steglitz and the nearby Teltow canal, but also a playing area for children and for one's own creative use. Bad weather is no obstacle to being in nature because all of the gardens have their own rooftop studio. What is more, the fact that the rooftop gardens are not included in the rent

means that families with children can afford them too. The apartments also perform well as far as incidental costs are concerned. The 25 cm thick substrate layer acts as natural insulation, thus saving energy, and also prevents the typical penthouse heat accumulation in the summer.



Far from the turmoil of the city and traffic – the rooftop paradise offers regeneration for the whole family.

### The Environment: A stepping stone biotope in an asphalt desert.

The federal capital Berlin has a degree of surface sealing exceeding 35 %. Some parts of the city lie closer to the 70 % mark. The negative effects of this on quality of life and the environment are well known. Cities become real urban heat islands in the hot summer months. Green areas of any size are welcome as they cool the city climate and improve the air quality. Green plots are also essential for biotope cross linking. The roof gardens of the cooperative settlement score in this area too. Over the years the original uniform vegetation has developed from rolling lawns and low hedges into a colourful plant mosaics which reflect the various garden dreams and life styles of the tenants. Nature also benefits from this because the multiplicity of small biotopes provides food and shelter for numerous birds and insects.

### The Upshot

"Nature" plays an important role in living conditions and quality of life for city dwellers, not only as far as leisure and regeneration is concerned, but also as far as other environmental factors such as city climate, urban drainage and biodiversity are concerned. Redensification and redevelopment measures which integrate green roof concepts offer a unique chance to counter the outward flow of young families and nature lovers from the cities as well as further urban sprawl development.

Wolfgang Ansel  
International Green Roof Association

## The "Longest Green Roof in the World": The High Line Park in New York



**New York's Central Park faced a major competitor last year: The "High Line Park". Since June 2009 New Yorkers have been able to go for walks, sit in the sun and enjoy views of the Empire State Building and the Statue of Liberty where freight trains once ran – and all that while strolling above the streets. High Line welcomed its 2,000,000th visitor at the beginning of April 2010.**

The New York High Line was developed around 1930 which allowed rail traffic and its inherent high accident risks to be removed from on the streets to over the streets.

The tracks were built between buildings on stilts ranging from five to nine meters high and nine to eighteen meters wide. Freight trains travelled the nearly 2.5 km long stretch between today's Javits Convention Center and Gansevoort Street for nearly fifty years. In 1980 the last train ran, carrying frozen turkeys for Thanksgiving. Then the line was closed and forgotten.

A lot has changed since then. The grim industrial district of Chelsea has become an art district with the largest concentration of galleries in the world. And the former butcher and meatpacking district is now home to boutiques of the likes of Stella McCartney and other stars and designers.

While this was happening, vegetation was allowed to grow wild for twenty years high up on the tracks, brought in by the wind and the birds. Then a group of private property owners from under the elevated railway lobbied to have it demolished. "We cannot allow this", stated Robert Hammond, co-founder of "Friends of the High Line" in 1999. He himself lived in Chelsea and wanted to keep the High Line in his neighbourhood. The "Friends of the High Line" now have over 10,000 supporters, including many celebrities. And they had clout. In 2001 the then mayor Rudy Giuliani had arranged for the High Line's demolition. In December 2002 the High Line was placed under preservation order by the new mayor, Michael Bloomberg.

Demolition plans were no longer on the agenda. Quite to the contrary: the best architects and

landscape gardeners bid for a "Floating Gardens" contract. The international open ideas competition "Designing the High Line" was won in 2003 by a team made up of the landscape architect James Corner and his firm "Field Operations", the architects Diller Scofidio + Renfro and the horticultural expert Piet Oudolf, who was responsible for projects like planting the Millennium Park in Chicago.

Their concept included elements common to other parks such as ponds and benches. Vantage points provided views of the Hudson River, the Empire State Building and the Statue of Liberty. Access to the High Line via stairs and lifts, similar to train stations, were planned at regular intervals. The new urban park was to be as spacious as the former tracks were: wide enough for two freight trains to pass each other. No kiosks or other commercial outlets were to be built. The park was to be watched over by employees of the City of New York and it would be shut at night.

The planners aimed to keep the character of the natural flora and wilderness which had evolved there over the past twenty years. The tracks were also to remain visible in order to keep the historical beginnings alive. "Field Operations" developed the so-called "modular planking" system to achieve this: a pathway created from smooth, tapered concrete planks designed to blur the hard and soft surfaces after planting. A total of 210 plant species were chosen, including many bushes and trees, which now flourish on an average 45 cm of substrate.

The construction process for the first phase of the High Line started in 2006. In June 2009 the first 12 of the in total 22 blocks of the stretch were opened between Gansevoort Street and 20th Street. The second phase of the project, which is currently under construction, should be open to the public in 2011. The project is costing an estimated 170 million dollars, some of which is being made available by private investors and some by the City of New York.

*Roland Appl  
President, International Green Roof Association*

## Events:

## Review and Outlook

## 13 May 2010: Green Roof Conference Athens

**Green Roofs in Greece – The current state and future trends**

This half-day conference in Athens was impressive proof that green roofs are on the rise in the Mediterranean region. The conference, which was organized by the International Green Roof Association (IGRA) in cooperation with the Greek Ministry of the Environment, the Panhellenic Association of Landscape Architects, the School of Architecture in Athens and the local IGRA member EGREEN, attracted more than 150 attendants. The lineup of topics included basic green roof issues (planning criteria and standards) as well as new trends and innovations. A special focus was laid on local experiences concerning the climate, plant selection and political support. Architects, landscape architects, planners and researchers shared their experience with the audience. Although the country is struggling with economic problems, the need for environmental-friendly and sustainable building concepts makes common sense.

## 30 November – 2 December 2010: Waterproof Membranes 2010, Cologne, Germany

**Trends and technical developments in the international roofing and geomembrane liner industry**

AMI's Waterproof Membranes 2010 Conference is the place to network with top professionals from the waterproofing industry. This event provides a forum to debate the latest developments in membrane applications and production. The markets will be reviewed by an international panel of specialists. On the first evening there is a welcome cocktail reception and registration, followed by a 2-day programme of expert presentations. A small specialist exhibition runs alongside the conference. IGRA Director Wolfgang Ansel will speak about "Safety first" – basic considerations for the installation of green roofs". The presentation will cover guidelines that have been published to guarantee the smooth transition between the work of the roofers and subsequent installation of the landscaped areas by the gardeners.

For more information please visit:  
<http://www2.amiplastics.com/Events/>

## 15 – 16 September 2010:

**World Green Roof Congress London**

„Green roofs for a changing climate“ – this was the title of the Green Roof Congress held in London this year for the second time after 2008. Some 250 visitors seized the opportunity to learn about the significance and different development stages of green roofs in the various regions worldwide. Information was given in a total of 50 lectures split up over three parallel running sessions and many exhibition stands. The congress had again been organized by Livingroofs.org and CIRIA who had been able to win a great number of sponsors and supporters. Support was also given by IGRA promoting the event and IGRA President Roland Appl leading one session and giving a lecture worked out by Wolfgang Ansel titled „Green Roofs in Germany – A Technical and Policy Review“. As one of the highlights the Congress Evening Reception was held in the roof garden overlooking the City of London and being situated on the 10th floor of the centrally located „One Bishop Square“ building where the congress took place in the basement.

**The next IGRA-newsletter will feature the following topics:**

- Roofers and Landscape Contractors: Working Hand in Hand for Green Roofs?
- Green Roofs and Biodiversity – Design Criteria
- Photovoltaic and Green Roofs – New Case Studies

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The International Green Roof Association (IGRA) is a global network for the promotion and dissemination of Green Roof topics and Green Roof technology.

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