Second Holcim Awards
Regional and global Holcim Awards competitions for sustainable construction projects and visions 2008/2009
Second Holcim Awards
“Numbers are the essence and principal of all things,” stated Greek mathematician and philosopher Pythagoras of Samos over 2,500 years ago. From this belief followed theories of mathematical proportions – and the model of the golden ratio, considered the ideal proportion, “the noblest and most irrational of all numbers.”

In the golden ratio, also known as the golden mean or golden section, a length is divided such that the proportion between the two segments is equal to the...
proportion between the longer segment and the total length: \( a:b = (a+b):a \). The ratio of \( a \) to \( b \) is approximately 1.618 to 1 – usually denoted by the Greek letter \( \phi \).

The icosahedron is the most complex of the five platonic solids. The faces of these solids are regular polygons, arranged congruently to each other. An equal number of these polygons intersect at every corner – the solids are therefore fully symmetrical.

From the icosahedron a figure can be derived whose elements display the proportions of the golden ratio. This figure was chosen for the Holcim Awards.

To form the symbol of the Holcim Awards, three pairs of opposing edges from among the many edges of the icosahedron are selected so that these pairs define three congruent rectangles. This forms a sort of “skeleton” of the icosahedron. The sides of these three rectangles correspond to the golden ratio: they are sides (or diagonals) of regular pentagons that relate to each other in the golden ratio.

The balanced proportionality of the golden ratio symbolizes the objectives of sustainable construction, which always strives for a harmonious balance between today and tomorrow, between resources and consumption, between needs and opportunities.

No figure represents the golden ratio as ideally as the “reduced” icosahedron – the symbol of the Holcim Awards which is presented to the main winners of the regional and global Holcim Awards competitions in recognition of their projects.
Indian architect Ashok B. Lall, head of the jury for Asia Pacific, at the Holcim Awards ceremony in New Delhi.

Contents

Second competition cycle
Global Holcim Awards 2009

Regional Holcim Awards 2008

Holcim Foundation
# Introduction by Markus Akermann and Rolf Soiron

- Jury meeting and appraisal
- Gold award: Morocco
- Silver award: Vietnam
- Bronze award: China
- "Innovation" prize: USA

<table>
<thead>
<tr>
<th>Further nominated projects by region</th>
<th>Europe</th>
<th>North America</th>
<th>Latin America</th>
<th>Africa Middle East</th>
<th>Asia Pacific</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>122</td>
<td>146</td>
<td>162</td>
<td>186</td>
<td>202</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Europe</th>
<th>46</th>
<th>Jury appraisal by project</th>
<th>50</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td>60</td>
<td>Jury appraisal by project</td>
<td>64</td>
</tr>
<tr>
<td>Latin America</td>
<td>74</td>
<td>Jury appraisal by project</td>
<td>78</td>
</tr>
<tr>
<td>Africa Middle East</td>
<td>90</td>
<td>Jury appraisal by project</td>
<td>94</td>
</tr>
<tr>
<td>Asia Pacific</td>
<td>106</td>
<td>Jury appraisal by project</td>
<td>110</td>
</tr>
</tbody>
</table>

- "Target issues" for sustainable construction

- 210
Is it the right time to publish this book, which presents inspiring examples from the field of sustainable construction?

The world today is a much changed place from what we considered it to be just a year ago. The ramifications of the global financial crisis continue – economies worldwide are under pressure. Against this backdrop where it is increasingly difficult for enterprises to obtain credit, it is understandable that aspects of sustainability have slipped down the priority list.

For many, reacting directly to these immediate issues consumes their attention completely. Such behavior is understandable and often justified. But it is also dangerous.

If the current situation demonstrates anything, it is that long-term thinking – sustainability thinking – pays off.

The understanding of what sustainable development, and therefore sustainable construction, means has grown over the years. This growing awareness has principally been due to the dedicated efforts of engaged stakeholders across a vast range of specialties. It would be a significant loss to relegate the topic to the shadows when we are seeking a light at the end of the tunnel.

The light at the end of the tunnel has a name – innovation. In the context of sustainability, innovation also means accepting past mistakes, learning from them, and moving on – by developing and multiplying new ideas and solutions.

Inspiring examples of this capacity for innovation have been captured in the second cycle of the Holcim Awards competition for sustainable construction projects and visions. The call for entries went out in June 2007. By the submission deadline in February 2008, almost 5,000 entries had been submitted – designs for sustainable buildings, exciting urban planning concepts, state-of-the-art engineering proposals – an abundance of visionary construction ideas.

Five regional award ceremonies were held in 2008 at which a total of 52 projects received Awards, Acknowledgement or “Next Generation” prizes. Arranged by region, jury comments and images for all winning projects are presented in this publication from page 46.

Regional Gold, Silver and Bronze winners – 15 projects in all – qualified for the Global Holcim Awards 2009. This book opens with the four winning entries in the global phase of the competition on page 14 –
Holcim Awards Gold, Silver, Bronze and the “Innovation” prize recipients. All other nominated projects, and their authors, are presented in detail from page 122.

Sustainability is of critical importance to building and construction in every region of the world. In this competition cycle, projects from 120 countries were received – project authors themselves represented 90 different nationalities. An inspiring result from any perspective – particularly when the rise in the number of project teams which spanned beyond national borders is considered. The challenges of our world demand solutions that stretch across all regions, all cultures, all landscapes.

Also inspiring was the increase by almost 50% on submissions received compared to the first Awards cycle as well as the growing proportion of interdisciplinary project teams which clearly illustrates the collaborative nature of finding sustainable approaches for the built environment. Integrated solutions document societal and environmental needs met and improve economic performance where technologies are combined to lower consumption, maintenance, costs, and ecological footprints.

Yet in the face of this optimism, we must acknowledge that setbacks occur. Whether because of the current economic situation or other conflicting priorities, some of these excellent projects may be postponed, reworked or even abandoned. Such things will not discourage us. The innovations conceived by the authors, and shared with peers from around the world, transcend the initial project and cannot be lost.

They have developed new knowledge and demonstrated what is possible and how it can be applied in a tangible way. They have envisioned a more sustainable future.

The Holcim Foundation’s third competition cycle is ahead – the call for entries will be made in 2010 and in the following two years projects will again be evaluated by independent jury panels and awarded. We are convinced that the trend already established will be maintained – new and exciting ideas in sustainable construction will continue to be presented to our juries – and shared with a growing community around the globe.

So, did we publish this book at the right time? In our opinion, absolutely! Time does not stand still – visionary ideas are needed now, innovation is needed now. With thanks to the authors of these outstanding projects, we wish the readers of this publication many moments immersed in the inspiring field of sustainable construction.
Global jury meeting

Zurich, Switzerland  March 5/6, 2009

Members of the jury from right to left:
Charles Correa, (Head), Principal and founder, Charles Correa Associates, Mumbai, India; A. Farwell Bemis Professor, School of Architecture and Planning, Massachusetts Institute of Technology (MIT), Cambridge, USA
Hans-Rudolf Schalcher, Chair of Planning and Management in Construction, Swiss Federal Institute of Technology (ETH Zurich); Member of the Management Board and Head of the Technical Competence Center, Holcim Foundation for Sustainable Construction, Zurich, Switzerland
Saskia Sassen, Robert S. Lynd Professor of Sociology, Member of the Committee on Global Thought, Columbia University, New York, USA; Centennial Visiting Professor, London School of Economics, London, United Kingdom
Peter Head, Director and Head of Planning and Integrated Urbanism, Arup, London, United Kingdom
Rolf Soiron, Chairman of the Advisory Board of the Holcim Foundation for Sustainable Construction, Zurich, Chairman of the Board of Directors, Holcim, Rapperswil-Jona, Switzerland

Not pictured:
Enrique Norten, Principal and founder, TEN Arquitectos; Member of the Advisory Board, Holcim Foundation for Sustainable Construction; New York, USA and Mexico City, Mexico

Excused:
Achim Steiner, Undersecretary-General, United Nations; Executive Director, United Nations Environment Programme (UNEP), Nairobi, Kenya
Jury report excerpts

Gold award: River remediation and urban development scheme, Fez, Morocco
This is a multi-sited, multi-functional project that is centered upon the recovery of a river. Work on restoring it triggers a range of interventions in the Medina. Core components are the rehabilitation of the old city’s architecture, revitalizing public spaces and traditional tanneries, and creating new pedestrian zones.
Page 14

Silver award: Low-impact greenfield university campus, Ho Chi Minh City, Vietnam
A new campus for an architectural university aspires to achieve harmony with all elements of the surrounding ecosystem in the middle of the Mekong River Delta: the waters of the river and the flooding of the rice fields, the mangroves, the winds and their patterns as well as with the seasonal changes of light and shadow.
Page 22

Bronze award: Sustainable planning for a rural community, Beijing, China
This project intelligently addresses the more efficient use of precious land by gradually lifting quality of life and living density, improving the living conditions for rural families as a harmonious and balanced response to urban development, and reducing the ecological footprint by improved resource management and use of renewable energy sources.
Page 30

“Innovation” prize: Self-contained day labor station, San Francisco, USA
This is a minimal physical urbanistic intervention with maximum social equity and neighborhood enhancement effects. The project is a small structure that functions as a labormarket and service delivery platform for day laborers who wait for casual work every morning at customary gathering points.
Page 38
The medina of the Moroccan imperial city of Fez is a UNESCO World Heritage Site. However, its continuing decline threatens this prestigious title. Remediating the medina’s historic lifeline, the heavily polluted and barely visible river Fez, will return to this ancient ailing heart its dynamic soul.
Water is life – it is as simple as that. But when this precious resource is in short supply, as in the desert lands of the Mahgreb, people are especially conscious of its value. “Water is a central part of our culture,” Moroccan architect Aziza Chaouni explains. Indeed, such an important role does the symbolic purity of water play in religious life that a well or fountain is a feature of the majority of houses in Fez. For many people who call this north Moroccan city home, there is nothing more beautiful than the sound of running water.

**Built on water**

Locating the city of Fez in the fertile basin of a large river was no accident. The “Medinat Fas” was established by Idris I in the year 789 on the right bank. Twenty years later came “al-Aliya” on the left. During the Middle Ages, the two merged into a single lively metropolis which continued to grow rapidly.

Under successive dynasties – the Idrisids, Merinids and Alawids – Fez was the kingdom’s capital, ranking alongside Rabat, Marrakech and Meknes as one of four imperial cities. It was not until the French arrived in 1912 that the capital was moved to Rabat, a move that remained after independence was achieved in 1956.

Although undertaken for practical reasons, the effect on Fez was significant – the city lost much of its economic and political status. With many of its educated also

A comprehensive approach is crucial for the river Fez to run free and clean again – bringing soul back to the medina: the new Andalusian playground will transform a particularly depressing image of the medina.

Once the life blood of the medina, today the Fez is called the “River of Trash”. Through the medina the river is mostly hidden below ground.
drawn away to other centers, its intellectual renown, as the site of the world’s oldest continuing university – al-Qarawiyyin, established in 859 – also suffered.

The medina – a living entity
It is only four meters wide, the river Fez. But it is the most potent symbol of the decline of this city that today hosts some one million people. What was once a life-giver is now little more than a sewer. Nick-named the “River of Trash”, the situation is especially critical in Fez’s ancient heart, the medina. The medina covers some 300 hectares – it is home to madrasas, fondouks, residences, palaces, gardens and fountains. Most lie hidden behind high plain walls, but these inner worlds represent the quintessential Arabo-Andalusian architecture. In 1981, the area was declared a UNESCO World Heritage Site, acknowledging its spiritual and cultural values. But this is no museum.

“When a project isn’t focused on the needs of the people, then what?” Aziza Chaouni

According to Aziza Chaouni, the medina is its own living entity. These close-knit streets buzz with energy. Handicraft enterprises maintain an active trade, principally the Chouarra leather tanneries which line the river bank. The original vats for washing, treating, smoothing and coloring the skins are still in use, and are a popular tourist attraction.

Because there were no digital maps of Fez to be found, Aziza Chaouni needed to create her own.
attraction. However, traditional means of working the hides are long gone. Now it is the job of chemicals – heavy metals such as chromium inevitably find their way into the river. Yet even before the river reaches the medina it is heavily polluted. Adding the city heart’s quantum of wastewater to the flow is the proverbial straw on this long-suffering camel’s back.

Not only is it a toxic cocktail that flows through the medina, the stench is just as nauseating. Residents, fed up with years of inaction, finally took matters into their own hands, covering the river over with concrete five years ago. It is only an occasional glimpse now that one has of opaque water and polluted river banks. “The Fez is a sewer full of rats,” Aziza Chaouni says. “Its condition is unworthy of this jewel of Moroccan history!”

World Heritage status under threat
The decline of the river Fez is symbolic of the decay of the medina as a whole. Seemingly imprisoned in a downward spiral, many buildings are in urgent need of restoration, and what is newly built is often of poor quality. Public space is rare – for 200,000 inhabitants, there are only two small parks. UNESCO is aware of the situation and has made its opinion known – the loss of Fez’s World Heritage status is under threat.

The government took UNESCO at its word and responded to the call. Two water treatment plants are planned for the city’s sewage, the river will be reopened and its historic course through the medina reconstructed. Once again it will flow – the dynamic soul to Fez’s ancient heart. It is around Aziza Chaouni that a team has been established to put this comprehensive rehabilitation plan into action. Having studied in the United States, the architect returned to the city of her birth – “I wanted to work on this project because I love my hometown.”

Focus on the people
The revitalization plan for the river, as well as a linked strategy of urban renewal, was developed in conjunction with town planner and landscape architect Takako Tajima and a variety of specialists and academics. Improving life quality for people in the medina was the focus. The strategy aims to comprehensively address the economic and social life of the city together with the ecology of the river. Various measures are planned in order to improve water quality and thereby enhance wildlife habitats. The
introduction of constructed wetlands will manage excess floodwater, clean storm water, promote groundwater recharge and encourage habitat creation. Yet all this is envisaged within a modest budget.

“Today the waters of the river run through the most fertile areas of the country only to arrive as a stinking soup entering the Atlantic at Rabat. Resuscitating the river Fez not only profits our city and its medina, but the whole of Morocco,” explains Aziza Chaouni.

Living room, not car park!
Whilst the city-scale master plan focuses on improving regional water quality, three critical site-scale interventions have been conceived. They aim, concurrently, to enhance water quality, remediate contaminated sites, create public spaces in the poorest areas, and revitalize economic Colourful, but not environmentally sound – the popular tourist attraction of the tanneries.


In 1952 the river ran freely through the medina. Today one barely noticed where it is crossed.
development. Above all, the intention is to reintegrate the river into the medina – as the central lifeline of the city's urban infrastructure.

To achieve this, the first project targets the car park in the heart of the old town. “For the river to reappear, this must disappear,” Aziza Chaouni says. The car park will be turned into a huge living room, shaded from the sun’s relentless heat by a canopy of recycled leather. Recycled wood is intended for park benches. A storm water basin at the plaza’s center will be both functional and aesthetic – riparian plants will literally resuscitate the river by oxygenating run-off water.

Playground and botanical garden
The second major project focuses on bringing a playground to the medina. Where the river bank now hosts an informal waste dump, a garden of children’s voices will soon be heard. Terraced wetlands will enhance water and air quality. Recycled leather and carpenters’ off-cuts are similarly foreseen as shade protection and park benches respectively. Recycled tires complete the picture – they will be used in the creation of the park equipment itself.

Meanwhile, the last of the three projects focuses on revitalizing one of the main perpetrators of river pollution as a public botanic garden. With the city’s tanneries

“The Chouarra tanneries of today will be the medina’s botanic gardens of tomorrow.” Aziza Chaouni
Always the people of the medina are our focus. What we do must be in their interests.

Much of the team’s work is concentrated on communicating the master plan’s vision to residents. Unfortunately many cannot yet see the potential in the project. Some are convinced things should return to the way they were, earlier, rather than the strategy’s goal which is to create something new yet still relevant – a living medina for the 21st century, not a museum relegated to antiquity. Others ask themselves why the medina should be earmarked for revitalization when people would rather move to another city quarter and live in modern rather than traditional housing.

Aziza Chaouni herself looks forward to the day when the al-Qarawiyyin University could return to the medina. “Our aim is local value creation, thus enhancing local employment opportunities.” All building projects in the context of the strategy are implemented by artisans using traditional building materials and techniques – clay bricks, fired on-site, as well as white plaster. Energy efficiency and a seamless aesthetic with existing structures is the overall intent.

Pushing boundaries
Aziza Chaouni sees this project as a life’s work – “there is so much to do! We must prioritize.” To advance the projects and engender more community involvement, she has formed an NGO “Sauvons Oued Fez” (Save the Fez River), a network of graduates, specialists and local business-people.

“It is a busy time – we work with the city authorities, we conduct investigations, interview residents, clarify their needs. Always the people of the medina are our focus. What we do must be in their interests.”

Moved to a new industrial quarter, the opportunity exists to transform the old tanneries site and its contaminated surrounds. Even the tanning vats will be integrated into the concept, while the workshop buildings themselves will be renovated as a Center for Leather Design.

Developed together with economic specialists, this project aims to capture new opportunities for the city’s leather industry, and align with international standards. Where previously the focus was only on industrial processing, in future design cooperatives offering value-added high-quality goods will be developed on site.

The car parking lot in the heart of the medina will soon be the stuff of memory. The new public space will be shaded by recycled leather canopies, visitors can enjoy the vista from park benches made of carpenters’ off-cuts. Riparian plants at the space’s center are integral to resuscitating, literally, the river Fez.
“We want the medina to still be a living urban environment in the 21st century, not a museum artifact. We ask ourselves questions like: How can we keep people in the medina? Encourage them not to sell up and move out?”

Aziza Chaouni (pictured above)

from its American-style campus on the outskirts of the city. “That would be great,” she grins.

Walking a tightrope

The architect is convinced this project demonstrates that the medina can be adapted to retain both its cultural integrity and economic value within a framework of integrated urban development. By meshing 21st century social needs with UNESCO’s dedication to preserving world inheritance, the project has significant potential to be replicated elsewhere. Many Arab countries are experiencing similar problems. Their medinas are also in crisis – too little public space, decaying infrastructure, residents leaving in search of more modern amenities. However, Aziza Chaouni is conscious that the development of each and every urban renewal strategy entails walking a tightrope. She cites Marrakech as an example where old traditions have been lost in the desire for foreign investment. “Authorities cannot help but be positive in the first instance when they see money flowing in,” she explains. However, when the only architecture school in Morocco accepts no more than 50 students a year – this in a country of some 32 million people – her options were limited if she did not set her sights further afield.

Encouraged by an uncle who had emigrated to the United States 30 years earlier, this became her destination of choice – first to university in New York, then Harvard. Aziza Chaouni’s training was complete following eight months spent in the Paris studio of Renzo Piano. He was an impressive mentor: “wonderfully generous. Despite all his successes, he still manages to keep both feet on the ground.” At 31, Aziza Chaouni is also geared for a successful career. A research scholarship from Harvard has seen her undertake projects focused on integrating sustainability, building and tourism in the Sahara. The intriguing intersection between tourism and the desert is knowledge she lectures on at Harvard – and also at the University of Toronto where she is currently an Assistant professor.

The lessons of Marrakech have been studied by Fez in the development of its master plan. “We want the medina to still be a living urban environment in the 21st century, not a museum artifact. We ask ourselves questions like: How can we keep people in the medina? Encourage them not to sell up and move out?” From its American-style campus on the outskirts of the city, “That would be great,” she grins.

A homecoming for river and architect

Just as the river Fez disappeared from the city’s medina, so too did Aziza Chaouni (pictured left) quietly slip from her hometown – there is a sense of coming home, therefore, for both her and the river. Her early interest in architecture was sponsored not only by the surrounding beauty of her country, but by an aunt engaged in the profession. “I was entranced by books about architecture, and began teaching myself,” she explains. However, when the only architecture school in Morocco accepts no more than 50 students a year – this in a country of some 32 million people – her options were limited if she did not set her sights further afield.

Encouraged by an uncle who had emigrated to the United States 30 years earlier, this became her destination of choice – first to university in New York, then Harvard. Aziza Chaouni’s training was complete following eight months spent in the Paris studio of Renzo Piano. He was an impressive mentor: “wonderfully generous. Despite all his successes, he still manages to keep both feet on the ground.” At 31, Aziza Chaouni is also geared for a successful career. A research scholarship from Harvard has seen her undertake projects focused on integrating sustainability, building and tourism in the Sahara. The intriguing intersection between tourism and the desert is knowledge she lectures on at Harvard – and also at the University of Toronto where she is currently an Assistant professor.
In Vietnam’s Mekong Delta, a new campus for the students of Ho Chi Minh City’s University of Architecture is being built. The project acknowledges the needs of both people and the environment. The unique complex, based on the design of flows, is seamless with its natural location. Slipped into this space, students will have the opportunity to directly experience sustainability.
“The 20th century is past – we can move forward without guilt,” Kazuhiro Kojima says. “It’s time to focus on 21st century needs.” Whoever wishes to match the Japanese architect’s words with actions need look no further than his design for the new campus of Ho Chi Minh City’s University of Architecture (HUA).

The starting point for Kazuhiro Kojima and his team was the question: how can space and education coexist? Computational fluid dynamics (CFD), an analysis of wind and activity flow, informed the design; rather than an imposing structure, the architecture merges with the landscape.

In this way, the design considers the environmental sensitivity of its location as much as the requirements of a growing student population.

**Living and learning in a river delta**

HUA is the most important of Vietnam’s three architecture universities. There are 6,000 students across the faculties of architecture, urban planning, civil engineering, construction, and applied arts (interior design and fashion). Its home, in the center of Ho Chi Minh City, is too small. A new campus on the outskirts of this six million strong city is planned.

The 40 hectare parcel, on an island in the Mekong Delta, will contain some 120,000 square meters of living and learning space. As well as the typical university infrastructure needed for an expected growth to 8,000 students in the future – auditoriums, administration offices, libraries and sports fields – apartments for 2,000 students are included. The river delta location is part of the city’s master plan for various new developments over coming years.

The design began from the fluid direction of the site, following the idea of slipping into nature.

**Nine dragons river**

The Mekong is one of the world’s major rivers, and South-East Asia’s lifeblood. Its source is in the Tibetan Plateau – from there, it travels around 4,500 kilometers through China, Myanmar, Laos, Thailand and Cambodia, before arriving in Vietnam, and emptying, via its delta, into the South China Sea. At least 1,300 different types of fish as well as numerous bird and reptile species call the Mekong home, making it one of the most biodiversity-rich systems on Earth. The
river’s Vietnamese name – Sông Cuu Long or Nine Dragons – describes the nine main arteries which form once the river splits around Ho Chi Minh City. The delta region can cover up to 39,000 square kilometers depending on the season – a land area equivalent to the Netherlands. Its fertile land, rich in sediment deposits, is ideal for agriculture – as the rice bowl of Vietnam, the area produces around 16 million tonnes per year as well as tropical fruit, sugar cane and coconut.

The Mekong Delta is the place where nature meets dense human settlement. A sensitive balance must be maintained – 14.5 million people live in its catchment. Many villages are reachable only by boat; there are water level variances up to ten meters. In 2001, a kilometer-long suspension bridge over the river opened the main towns of Cần Tho, My Tho, Long Xuyen and Rach Gia also to heavy traffic. The island chosen for the new HUA campus is, at present, reachable only by boat, but a highway is planned. While the water level variance is not as significant here as in some delta regions, its 1.5 meter seasonal change impacts significantly on construction planning and design.

**Space and education in co-existence**

An international competition, hosted in 2006 for the design of the new campus, was won by Kazuhiro Kojima and his team from CAT, Tokyo. The architectural studio has accomplished much in its young history – impressive large-scale projects are its hallmark. CAT has designed the campus for the newly-founded University of Central

“So much freedom can be limiting.” Kazuhiro Kojima
The design of flows

The design, therefore, calls for a ring road, about two meters higher than the surrounding area, to take account of seasonal fluctuations in the water level. Within the ring, university buildings are low-rise, with a large footprint, for minimal impact on the unstable surface. The way the buildings are arranged, fluid forms in themselves, echoes the natural landscape on their doorstep.

“Our design motif is a cross-section of celery,” Kazuhiro Kojima says. “It is a shape derived from fluid direction – the design of flows.” The architecture blends into the site, slips into its surroundings. Students have the opportunity to directly experience sustainability.

Comprehensive analyses of wind and activity flows for the site, using CFD, were...
conducted to simulate various conditions – for example, orienting buildings to take full advantage of the strong winds that blow year-round. "We use the wind as a fan," Kazuhiro Kojima says. "The Mekong Delta has a special climate – the temperature may be hot, but in the shade, with the wind, it is comfortable." CAT’s passive design of natural ventilation and solar shading means most locations on campus will need no air-conditioning.

Using the delta’s strengths
“it is so important to promote the use of natural means of air-cooling in construction projects in Asia,” Kazuhiro Kojima believes. Buildings are generally planned with an energy-hungry system in mind – Asia’s rapidly developing communities see this as a mark of Western lifestyle. Yet the effect on rising consumption and CO₂ emissions is clear. CAT’s design breaks the mold for large-scale projects – even where air-conditioning is foreseen on campus, in the auditorium or laboratories, solar collectors will provide the required energy; elsewhere natural ventilation sets the standard.

Measuring human activity – student movements are in red, white ranges represent infrastructure.

Comprehensive analyses of wind flows were conducted to simulate various conditions – HUA campus buildings are oriented to take full advantage of their site dynamics.

Although each faculty has its own space, they each form part of a sequential loop – in a system the architect believes enhances communication.
Water is also a natural resource harvested by the design. Tropical downpours cool the buildings, while rainwater is collected for potable and gray water requirements. The area’s fast-growing vegetation also contributes to energy-efficiency on campus. Within a few years, the four-storey high buildings will be dwarfed by trees up to 40 meters tall. Aesthetically, the complex will then be fully integrated into its environment. Meanwhile, the concept of porosity maximizes daylight and ventilation while ensuring solar-shading – the building façades have a double skin, the outer elements are louvers, the inner are jalousie windows. Computer modeling ensures that maximum advantage is taken from each of these design choices.

**Student participation**
After the competition win, Kazuhiro Kojima’s design was presented to lecturers and

“The setting inspired our design. As a design technique, it reaches a new height of precision. It is a shape derived from fluid direction – the design of flows.” Kazuhiro Kojima
Fortunately, however, the team’s ideas did not seek refuge in the 20th century past, but harnessed pioneering concepts which will resonate long into this new century.

Committed to design of flows

There is a certain irony in using the latest technology to better understand the oldest of natural forces. Yet Kazuhiro Kojima’s commitment to the concept of the design of flows, using the CFD analysis tool has paid

For the campus to merge seamlessly with its environment, CAT is also seeking the assistance of fast-growing nature. Within a few years, the four-storey high buildings will be dwarfed by trees up to 40 meters tall.

students from HUA’s architecture faculty. These discussions led to new ideas and solutions to issues. The project is also an ideal teaching tool – the opportunity for a new generation of specialists to be profoundly influenced in their future profession, by living and working surrounded by the architect’s vision, is high. Those opportunities go further, according to architect Daisuke Sanuki from the CAT team. “We would like to host exhibitions in the middle of the city, to bring our design concepts to the general population – it will draw attention to the importance to how the Mekong Delta is further developed,” he says. Yet the unique nature of the greenfield site was daunting in one respect – “so much freedom can be limiting. It is very easy to return to old ideas.”

Fortunately, however, the team’s ideas did not seek refuge in the 20th century past, but harnessed pioneering concepts which will resonate long into this new century.
Numerical fluid mechanics

The science of flow is that branch of mechanics which is concerned with the physical behavior of fluids – gases and liquids. Its aim is to forecast their behavior, the flow they follow, under certain conditions. Computations are made based on the fluid’s atomic structure and characteristics in order to describe its flow. The Navier-Stokes equations, named after two 19th century scientists, are used as the basis of the methodology. Their equations arose from applying Newton’s second law to fluid motion, together with different assumptions.

In fluid mechanics, huge sets of data are implicated. In the 1970s computational fluid dynamics (CFD) was developed – it uses numerical methods and algorithms to solve and analyze these complex problems. Computers are used to perform the millions of calculations required to simulate the interaction of fluids and gases with the surfaces used in engineering. Ongoing research over the years has seen different software programs developed for the computation and visualization of currents. As well as in architectural design, CFD is used in many sectors of industry, including aviation, automotive, turbine and cooling system manufacturing.

off. “As a design technique, it reaches a new height of precision,” he explains. For example, ventilation is not the “given” it once was – with CFD there are numerous possibilities that can be fed into the analysis, and the design adjusted to maximize a desired effect. Or, if there is an acoustic issue in a given space, Kazuhiro Kojima does not simply draw a wall to solve the problem, but uses CFD to consider shaping dynamics. “Designing in this way leads to architecture which is more natural, more organic, more alive,” he says.

The notion of flows also applies to activity zones on campus. The design aims to work the paradox of connectivity and separation between the different university faculties in the complex. Although each faculty has its own space, they each form part of a sequential loop – in a system the architect believes enhances communication.

Kazuhiro Kojima (left) with Vietnamese architect and co-author Trong Nghia Vo.

Natural architecture

“I often use the concept of black and white zones in my designs,” Kazuhiro Kojima explains. “Black zones are areas where functions cannot be changed – for example bathrooms, kitchens. White zones are multi-use spaces, or changeable.” Using this as a design parameter contributes to a building’s sustainable construction and long-term use without major renovation. On the HUA campus this means situating white zones such as teaching spaces and open learning areas around a building’s periphery. Labs and other specialized functions are the black zones within the building’s core.

The campus buildings will be constructed by local tradespeople using a time-honored local method – a brick-filled concrete frame finished with a façade of porous natural materials such as bamboo or mangrove timber to enhance ventilation. The economic performance of the project is also enhanced by these choices. Traditional knowledge and proven building materials are thus combined with the most modern simulation technology. And the result is a university campus at one with its new home.

“Designing in this way leads to architecture which is more natural, more organic, more alive.” Kazuhiro Kojima
Global Holcim Awards Bronze 2009

The contrast between city and country is perhaps no more starkly presented than in China. Subsistence living conditions drive millions into the cities and farming land is converted to new uses. China, however, has realized the dangers of such continuing trends – which threaten societal make-up as well as future food security. A pilot urban planning strategy on Beijing’s urban fringe demonstrates how much needs to be done to keep people in rural settings – and how much can be done.

Revitalizing old villages
Sustainable planning for a rural community, Beijing, China

Regional competition
This project was previously conferred the Holcim Awards Gold 2008 Asia Pacific; page 110

The contrast between city and country is perhaps no more starkly presented than in China. Subsistence living conditions drive millions into the cities and farming land is converted to new uses. China, however, has realized the dangers of such continuing trends – which threaten societal make-up as well as future food security. A pilot urban planning strategy on Beijing’s urban fringe demonstrates how much needs to be done to keep people in rural settings – and how much can be done.
In any context, when considering China, we are swamped by numbers – impressive, but increasingly matter-of-factual. Over the past 30 years the Chinese economy has grown, on average, by around ten percent per annum. In the same breath, one can call China both a developing country and an economic superpower.

A rural planning design for a suburban village on the outskirts of Beijing shows the power of combining heritage preservation, traditional knowledge, local materials, modern technology, and professional project management – and becomes all the more powerful when one considers the vast scale of China’s rural sector.

**One in ten global citizens is a Chinese farmer**

Economic development is most pronounced in coastal regions, accounting for some 400 million of the country’s population. However, rapidly improving life quality in such areas has generally passed China’s other 900 million inhabitants by – those who live on, and off the land. This varies more markedly between regions, but particularly between city and country. A Chinese Academy of Social Sciences study confirms that China experiences the world’s largest income divide between rural and city dwellers. The contrast is especially stark when we stop to consider that one in ten global citizens is a Chinese farmer.

There are twice as many farmers in China as there are citizens of the European Union.

**Mass migration – en masse!**

Subsistence agriculture is still the norm in China – farming families provide for themselves and, at best, sell only a quarter of their yield. This equates to little disposable income, and few opportunities to invest in mechanization or other farm improvements. Somewhat different is the situation in the catchment areas of dense development centers – agriculture here was supported by the state. Yet, over the past 20 or so years, there has been a dramatic drop in rural real income with the result that people increasingly decided to leave the land for the cities on the coast.

There was work to be had – the building and services sectors especially – which in turn encouraged others to join the mass migra-
tion. Estimates suggest that between 1982 and 1990 around 200 million people from China’s rural heartlands migrated to the cities. The government expects that by 2010, another 180 million will have followed them.

**Stemming the human tide**
Those joining the rural exodus are aware they will have few rights in their new “homes”, yet they feel compelled to still relocate to the cities. The Chinese Hukou system, as ancient as the land itself, deems residency is only valid in the place of one’s family registration. Hence, migrants have limited rights to education or government services.

For years Chinese authorities have worked to improve the system but migration is unlikely to abate until the living conditions in rural areas improve. A program to develop long-neglected regions is progressing with this goal in mind – the government is committed to doubling the average income of a rural dweller by 2020; at present, this sits at around USD 600 per annum.

**Dramatic loss of farming land**
High priority is also accorded to land reform in China. Farming land is deemed the collective property of local municipalities – families lease acreage from their village committee for 30 years. However, the drift of peasants to the cities has resulted in many leases being relinquished – free plots become aggregated and sold for other uses. Moreover, they result in the dramatic loss of farming land – on which China’s future food security depends.

Modeling undertaken by the Chinese Ministry of Agriculture states that the country needs around 120 million hectares of agriculturally-productive land in order to feed itself. Currently, 122 million hectares are still being worked but statistics indicating that a further loss of 200,000 hectares each year are alarming. Not least for the million or so farmers who eke out their existence on this limited space. An integrated solution is needed which addresses the range of incumbent causes and impacts.

**Reforming land rights**
A new initiative, introduced in 2006 as part of the current Chinese Five-Year-Plan, aims to achieve these twin objectives. Rural development is encouraged by improving infrastructure, education and training schemes, and other social services. A further measure, specifically targeting loss of arable land, is the partial liberalization of legislation regarding farm leases. In future, farmers who leave their land for the city
will have the right to on-lease directly to other farmers, or for alternate agricultural purposes. This aims to prevent the sale of common land for different uses – municipalities, still in theory the landholders, are committed to retaining land for cultivation at the disposal of any farmer who wishes to till the soil.

**A busload of researchers**

In China, each region and locality adapts state initiatives to their own conditions. In the area of Beijing itself, Government Officer Feng Ni is responsible. In 2006, he invited architect and town planner, Yue Zhang, to participate in studying the rural areas in the vicinity of the capital with a vision to how implementation of the initiative should occur. “I knew Feng Ni from Tsinghua University in Beijing,” Yue Zhang explains, himself a lecturer at the leading university. Yue Zhang was immediately attracted to the project – not least because of direct involvement with villagers, including door-to-door surveys. “I love research work,” the energetic 35-year-old says. With his team, Yue Zhang compiled an extensive questionnaire. “We took a bus to the villages and asked everyone about their needs.”

“I love research work. We took a bus to the villages and asked everyone about their needs.” Yue Zhang
authorities and develop a concrete renewal strategy for a pilot village in the Shunyi district. This small community of some 1000 inhabitants across 300 families lies 45 kilometers northeast of Beijing’s city centre. The schedule of village interviews was supplemented by research into infrastructure needs, building standards, greening of public spaces, energy use per house, existing road systems and detailed demographic data. From this mass of information, a comprehensive database was created from which improvements could be planned on all conceivable levels.

“We put a question to ourselves: How can we improve life quality here while addressing environmental pollution, all on a limited budget?” Yue Zhang enthuses. A treasure trove of measures was the result.

The new master plan classifies land use, sets clear limits to building development, protects natural resources, and includes...
zones for public use. The entire transport network is implicated – the strategy calls for a network of roads to ensure that in future any public building is accessible, whether it be an outpatient clinic or the fire-brigade depot. Infrastructure improvements include the development of parks and gardens, drainage systems to protect against flooding, and decentralized sewage and garbage collection for each household. A particularly important aspect is the revised building code – more houses are planned on less land. Instead of 300 square meter allotments, the law aims for 200.

Better homes – more opportunities
To make better use of less land, two-storey houses are planned. These are at the heart of the renewal strategy. “We developed a prototype to demonstrate that building on smaller allotments could also be attractive”, the architect says. An important consideration was also affordability. “Our research showed that USD 12,500 is the limit people would like to pay; government subsidies will be needed.” In China a sustainable house can be constructed to a reasonable standard for USD 25,000.

Yue Zhang’s team designed a home which still ensures families have opportunities for personal choice. It takes account of traditional knowledge and design patterns, combines local materials and modern technologies. Heritage preservation is taken into account. “The sustainability principles in the design include active and passive use of solar energy, decentralized sanitation pits, exterior insulation, rainwater collection, and so on. It is integrated, yet has an optional

Compact and efficient land use planning.
menu for families to also choose what suits them best.” At the end, as ever, the crucial challenge is one of cost; the team was committed to making the house as affordable as possible.

What next – a city to country exodus?

Yet Yue Zhang’s prototype is not just about cost. There are also opportunities to be had with this new building design. China’s urbanization has grown so remarkably in recent decades that there is now a yearning for country air, a demand, therefore, for brief holidays to less densely-packed regions.

“WeWith rural tourism a possibility, we designed the house in such a way that the upper floor could be furnished as guest rooms,” he says. Alternatively, a small hand-craft studio could be set up as a source of income.

Another perspective is that offered by the new building code. In Beijing, building a sizeable home is virtually impossible. Yue Zhang believes that relocating to a village could be an appealing option for urban residents who want larger homes. “But this will only happen if we can offer good infrastructure.” The architect has already met with investors who see the commercial potential in his concept. What was once the prototype of 2008 now houses a family, built by local artisans which, in itself, provides for security of employment in the area.

“Handle with care”

The measures involved in the project are so numerous that one could ask: Wouldn’t it be simpler to demolish the old and start over afresh? “Impossible – that is no solution!” Yue Zhang is emphatic. “We have no desire to destroy the character of this village.” As a result, implementation is gradual, step-by-step. The renewal project is first concentrated on abandoned locations; one household is replaced by another. Gradually a village quarter is revitalized, but in a more compact way. The emphasis is on keeping social cohesion intact.

“Whoever wishes to remain in their old house, may,” is the promise. Nobody is forced to accept innovation. “But I am convinced – our concept offers so many advantages that most people do not resist change.” To develop the new road system, some houses would need to be demolished – nevertheless in these cases Yue Zhang is also open to compromise: “If people do not wish to move, we will simply plan the road differently!” At the end of the day, the pur-
pose is to keep villagers in their community, and with improved life quality – for this reason alone, it is important for individual householders to decide their own future.

Concept with high potential to be role model
Because the village’s social development is integral to the planned structural works, and vice-versa, the community is included in all decision-making regarding the renewal strategy. Transparency is a given, feedback taken into account. Villagers are regularly informed about plans and encouraged to offer their opinions in group discussions. “We are always presented with issues to solve – for example, many older people have difficulty reading or understanding the plans,” Yue Zhang says. “We must find new ways of communication.” A new prototype is planned in order to refine the housing concept.

“We cannot turn back the hands of time, but we can better conceive the future.” Yue Zhang (pictured above)

Achievements in east and west
Yue Zhang (pictured left) was born in southern China. As a child who constantly sketched, architecture seemed a good course of study to pursue. He followed his first degree with both Masters and PhD studies in urban planning. “Above all the connection of technical and artistic aspects excites me,” he says, justifying a constant enthusiasm in his work. As an architect, Yue Zhang designed and built several houses; today he is mainly engaged with lecturing at Tsinghua University in Beijing. As part of an exchange program to Harvard University in 2008, he is conscious that “the differences between East and West can also be seen in methods of study. In China it is calmer, the strength lies in the analysis, but is communicated less.” Both cultures have their impressive qualities.

It is important to Yue Zhang that China is capable of more rapid action – after years of long-term neglect, greater responsiveness plays a significant role, for example, in environmental issues management. “Having recognized these problems, China is eager to undertake ambitious environmental improvement programs,” he says. “Economic development proceeded apace, often at the expense of the environment. That could prove in the future to be our crucial problem – it is important to get started now.”

However with provisional government support assured only until 2010, the project’s future is uncertain. Yue Zhang is confident, though, that things will proceed beyond this date – China is committed to the development of its rural areas. And the concept has high potential to be a role model for sustainable development in rural communities and urban districts experiencing rapid change in emerging economies across the world. “We need to preserve what we still have,” Yue Zhang believes.
In many US cities day laborers use street corners as informal hiring sites. For hours on end they wait by the roadside and in parking lots, often in the hot sun and without any amenities. They wait for an employer to stop by and offer a day’s work for a day’s pay. The self-contained day labor station designed by a team of committed architects aims to improve the life quality of those who find themselves on the edge of the American Dream.
Yet the eldest, Isidoro, is a little more forthcoming than his friends. He has been in San Francisco for the past six years – “At first I worked in a restaurant, but it was sold and we all lost our jobs.” Since then he has searched for permanent work but to no avail. Day labor is his only option.

“Sometimes I have work for three days in a row, then maybe it’s ten days of nothing,” he says. “You never know what tomorrow brings, but you learn to accept it.” But how does he spend his time when there is no work? “I just sit here, perhaps till the afternoon. What else can I do?”

**No chance on the job market**

Even though competition to get hired is tough, there is little sense of resentment between the laborers. At the end of the day, they spend more time together on a street corner than working. Engaging the five Mexicans in conversation, however, is difficult.

Over a hundred thousand more are stretched across the USA. For a few dollars an hour, they are hired to paint walls, maintain gardens, move furniture, or work on building sites. Potential employers cruise by in their cars, check out the faces, and choose someone they think they can trust. Perhaps qualifications or experience are asked for.

It is an informal system presenting a myriad of health, safety, and community concerns.

The concept is flexible – the day labor station can be altered to fit the realities of a given location.

Yet the eldest, Isidoro, is a little more forthcoming than his friends. He has been in San Francisco for the past six years – “At first I worked in a restaurant, but it was sold and we all lost our jobs.” Since then he has searched for permanent work but to no avail. Day labor is his only option.

**Better life in “sanctuary cities”**

US-Immigration officials estimate that illegal immigration has continued to outpace the level of legal immigration since
The studio of Public Architecture based in the center of San Francisco was established by John Peterson in 2002. “I found myself wanting more balance in my architectural work – up until then it was mainly high-end residential projects,” he explains. “I wanted to make a bigger impact on the community.” Together with his team, ideas for a public space project in San Francisco were sketched – it led to conversations with different agencies. Public Architecture was founded. It also led John Peterson to do some more thinking.

“I realized that few architects engage in non-profit work, but there is an enormous potential for us to contribute something worthwhile to the community.” Together with his team, ideas for a public space project in San Francisco were sketched – it led to conversations with different agencies. Public Architecture was founded. It also led John Peterson to do some more thinking.

Engaging non-profit work

Thanks to an initiative by architectural studio Public Architecture, a solution to improve the situation of day laborers who want to stay on the streets has been developed. Their self-contained day labor station offers flexible structures, shelter, benches, washrooms, a kitchen and an education/training space. Green and recycled materials are used to minimize the environmental footprint and economic cost of each facility.

The day laborers who call San Francisco home do so because of its reputation as a “sanctuary city”. Around 20 locations in the USA are similarly known – their town hall authorities and police force ask no questions about a person’s residency status. Life is better but it certainly isn’t easy. If employed by disreputable contractors, perhaps they are not paid for their labor. Robbery is common – paid in cash, they make an easy target.

The Day Labor Program, a non-profit organization, tries to address these issues via their 100 official centers established across the country. The centers aim to connect workers with jobs, at a fixed hourly rate, and with their rights respected. They also offer education programs – language or computer skills, for example. Yet most day laborers avoid the centers – mainly because they believe they have a better chance on the street, but also because it raises fears about their status.

The studio of Public Architecture based in the center of San Francisco was established by John Peterson in 2002. “I found myself wanting more balance in my architectural work – up until then it was mainly high-end residential projects,” he explains. “I wanted to make a bigger impact on the community.” Together with his team, ideas for a public space project in San Francisco were sketched – it led to conversations with different agencies. Public Architecture was founded. It also led John Peterson to do some more thinking.

“I realized that few architects engage in non-profit work, but there is an enormous potential for us to contribute something worthwhile to the community.” Together with his team, ideas for a public space project in San Francisco were sketched – it led to conversations with different agencies. Public Architecture was founded. It also led John Peterson to do some more thinking.

“The 1% Program sprang to life. “The 1% Program challenges architecture and design firms to pledge a minimum of 1% of their time to pro bono service,” he says. “We act as a
facilitator to connect firms with the nonprofit organizations who need design assistance.” The program is having its desired impact – in 2005, its first year, 20,000 work hours with a market value of USD 2 million were offered.

**Identifying problems**

John Peterson describes Public Architecture as “a new model for an architectural practice.” Supported by foundations, corporate and individual donations and grants, the studio can work outside the economic constraints which apply to conventional practices. Public Architecture therefore can work for the public good.

“We’re a venue where architects can identify problems and think about how to solve them – not just respond to a client who says: ‘Make that!’,” he says. As an example, the team looks at how innovative design can encourage people’s interactions in public areas. “A bus stop is not just a bus stop,” he says. “It’s a meeting point, especially in the suburbs where people exist in detached isolation. It’s a place to engage with others.”

Several years ago John Peterson discussed this idea with a colleague who was involved with the migrant community. “Instead of a bus station for commuters, we began to develop ideas for a day labor station – a sheltered space for them to wait for work, as well as a restroom.”

Liz Ogbu quickly developed a strong relationship with her day laborer clients – a big advantage in the project.

**Innovative and adaptable**

John Peterson designed the day labor station together with Liz Oggu. Born in San Francisco, and trained at Harvard, Liz Oggu has always seen architecture as more than the design of an object. With her father, an anthropologist, discussions around the family dinner table informed her opinions about social issues early. All her projects to date have fulfilled a strong societal need. Further, they are developed as prototypes which can be adapted to the needs of non-profit organizations who need design assistance. The program is having its desired impact – in 2005, its first year, 20,000 work hours with a market value of USD 2 million were offered.

“We’re a venue where architects can identify problems and think about how to solve them – not just respond to a client who says: ‘Make that!’.” John Petersen
For the day labor station, Liz Ogbu followed the same developmental process. “First we went and talked with day laborers about their needs,” she says. “Their business model is very simple, but successful – a potential employer arrives, describes the job, agrees a price with the laborer and takes him to the site. Our design needed to take account of this process.”

Restroom: Toilet facilities are a basic yet critical need often lacking at most informal sites. In situations where there is a larger day laborer population, the flexibility of the Station’s design concept allows for more than one restroom cube.

Kitchen: The kitchen can function as a food business, serving as an income generator for the Station as well as a food service training opportunity for workers. With employers as well as patrons from nearby businesses as customers, it also provides a focal point for social interaction.

Office: The Station not only has the potential to host meetings, but in situations where the day laborers desire a coordinator, a cube can be designed as an office.
Yet, the day laborers were amazed when Public Architecture took their ideas seriously. “They were our clients, but had no experience at being treated as such,” she says.

The main problems they described were no access to water or amenities during their sometimes long wait for a job. Using amenities in nearby restaurants was their only choice, which generated ill will. Standing in the sun for hours was debilitating. A further point was the need to ensure they had good eye contact with the potential employer. “That is how jobs are allocated,” Liz Ogbu says. “Visual contact is key to a worker’s perception of a fair hiring process.”

Flexible and self-sufficient

The station the architects designed was very similar to the bus station of their original discussion. The day laborers sit on raised wooden benches under a canopy roof. At each end boxes can be attached for use as toilet or kitchen – the latter, similar to a mobile food vendor, could generate funds to support maintenance. The station is self-sufficient. Electricity comes from photovoltaic modules integrated into the canopy. Designed to make a minimal
could be converted into a classroom. As most jobs are assigned by nine in the morning, for the remainder there is the opportunity to use their free time for learning programs that support organizations offer.

Social and aesthetic
The station amply meets the social requirements of the brief. But it is designed with aesthetics in mind as well. “For the team at Public Architecture, these things go hand-in-hand,” Liz Ogbu says. “Workers view their hiring sites as sacred – our structure should reflect that.” John Peterson adds: “We aim to answer the question: how can we design something of beauty that solves a genuine social need. The strength in design shouldn’t be underestimated – it demonstrates we value our clients highly, no matter what strata of society they occupy.”

Flexible Solutions: Because community needs vary, the station is designed as a kit of parts to be altered to fit the realities of a given location. The specificity in each context is determined through discussions and coordination with the diverse stakeholders at each project location.

footprint, it utilizes green materials such as recycled PVC tiles, billboard vinyl, fiber cement panels and locally sourced, salvaged or recycled timber. The kitchen can be fitted out with recycled restaurant appliances.

The prototype demonstrates its flexibility to be adapted to any situation. “For the toilet, we have various possibilities,” Liz Ogbu says. “In some places it could even be a camper-toilet.” With few modifications, the station footprint, it utilizes green materials such as recycled PVC tiles, billboard vinyl, fiber cement panels and locally sourced, salvaged or recycled timber. The kitchen can be fitted out with recycled restaurant appliances.
Indeed day laborers live on society’s periphery. The station concept creates a sensitive living environment which meets their daily needs. In addition the structure provides a physical location for outreach programs and enhances social cohesion amongst the laborers themselves. It provides them with a more dignified presence in the public realm, in the face of, at times, community hostility. In the end, the day labor station is not just a station. Just as a bus stop is not just a bus stop. It is an opportunity for advocacy about the role of day laborers in the fabric of society.

Demonstrating their commitment to the project, the hope is that day laborers will self-build their stations. This is also to keep costs to a minimum, which would need to be covered by the state, donations or non-profit organizations – “it is difficult to find a good solution that isn’t too expensive,” Liz Ogbu says. Without foundations or solar collectors, the cost per unit is around USD 100,000.

Willing to work for a better life
Although built as a prototype, discussions are ongoing with several cities which are eager to trial the concept. From a city’s perspective, its potential for improving health and security for day laborers as well as the broader community is high. “The informal sites are controversial,” Liz Ogbu explains. “Over three quarters of the sites occupy spaces meant for other uses such as home improvement store parking lots.”

The irony she sees is that day laborers echo core American values, despite their mostly illegal status in the country. “They are here to get a better life for themselves and their children – and they’re willing to work for it!”

In the long run, politics will play a significant role in whether day labor stations are deployed as informal hiring sites across the country or not”, Liz Ogbu says. “As architects, we have an opportunity and a responsibility to advance conversations on issues such as this,” she adds. “Without a holistic vision, how can we create a better world?”

“Without a holistic vision, how can we create a better world?” Liz Ogbu

Day labor: life in the margins
Each day around 120,000 day laborers wait at informal hiring sites in the USA for work, principally in the construction industry. Mainly located in the dense urban centers of the east and west coast, only one in five day laborers use the infrastructure of non-profit support organizations. Others make it on their own, on the streets. Two-thirds are Mexican, a quarter arrive from other Central American countries. Most are between 18 and 37 years old and earn hardly enough to live on.

The demand for day labor has grown strongly in recent years – the border between fixed and casual employment is more fluid in many regions and industries. Particularly in the construction and agricultural sectors, temporary or seasonal workforces are the norm. A study shows that, each year, one in five day laborers in the USA are involved in a serious work-related accident.

Liz Ogbu and John Peterson from Public Architecture: Good quality design can solve real problems.

Without a holistic vision, how can we create a better world?” Liz Ogbu

Day labor:
life in the margins
Each day around 120,000 day laborers wait at informal hiring sites in the USA for work, principally in the construction industry. Mainly located in the dense urban centers of the east and west coast, only one in five day laborers use the infrastructure of non-profit support organizations. Others make it on their own, on the streets. Two-thirds are Mexican, a quarter arrive from other Central American countries. Most are between 18 and 37 years old and earn hardly enough to live on.

The demand for day labor has grown strongly in recent years – the border between fixed and casual employment is more fluid in many regions and industries. Particularly in the construction and agricultural sectors, temporary or seasonal workforces are the norm. A study shows that, each year, one in five day laborers in the USA are involved in a serious work-related accident.

Indeed day laborers live on society’s periphery. The station concept creates a sensitive living environment which meets their daily needs. In addition the structure provides a physical location for outreach programs and enhances social cohesion amongst the laborers themselves. It provides them with a more dignified presence in the public realm, in the face of, at times, community hostility. In the end, the day labor station is not just a station. Just as a bus stop is not just a bus stop. It is an opportunity for advocacy about the role of day laborers in the fabric of society.

Demonstrating their commitment to the project, the hope is that day laborers will self-build their stations. This is also to keep costs to a minimum, which would need to be covered by the state, donations or non-profit organizations – “it is difficult to find a good solution that isn’t too expensive,” Liz Ogbu says. Without foundations or solar collectors, the cost per unit is around USD 100,000.

Willing to work for a better life
Although built as a prototype, discussions are ongoing with several cities which are eager to trial the concept. From a city’s perspective, its potential for improving health and security for day laborers as well as the broader community is high. “The informal sites are controversial,” Liz Ogbu explains. “Over three quarters of the sites occupy spaces meant for other uses such as home improvement store parking lots.”

The irony she sees is that day laborers echo core American values, despite their mostly illegal status in the country. “They are here to get a better life for themselves and their children – and they’re willing to work for it!”

In the long run, politics will play a significant role in whether day labor stations are deployed as informal hiring sites across the country or not”, Liz Ogbu says. “As architects, we have an opportunity and a responsibility to advance conversations on issues such as this,” she adds. “Without a holistic vision, how can we create a better world?”

“Without a holistic vision, how can we create a better world?” Liz Ogbu
Belgrade, Serbia
In an informal settlement, some 220 Romani families live in chronically-poor conditions. The city’s social housing program plans a new neighborhood in an area serviced by schools, hospitals and shops. By involving the residents in the design of their new living spaces, the Culturally-responsive urban village ensures the housing units are in harmony with the residents’ culture.
Pages 52 and 138

Budapest, Hungary
A new government quarter housing all Hungarian ministries is planned in the nation’s capital. The Contextual government quarter development extended the brief to include economic, environmental and social objectives in an integrated concept that would give a neglected city area new horizons. The result is a comprehensive approach to urban renewal.
Pages 50 and 122

Maribor, Slovenia
With more waste than ever heading toward the incinerator, opportunities arise for former landfills to be put to new use. The Temporary urban extension in a former landfill harnessed the unlimited potential of its disused site. Its aim is to show how an area once recognized by its mounds of garbage can be re-naturalized into a living city quarter.
Pages 51 and 130

Zermatt, Switzerland
Beside the Monte Rosa glacier in the Swiss Alps, the Autonomous alpine shelter, Monte Rosa hut has been built by a partnership led by ETH Zurich. In splendid isolation, the building operates under extreme climatic conditions, is fully self-sufficient, and demonstrates that sustainable construction is possible anywhere.
Pages 52 and 138
Milan, Italy

Four kilometers from the city center a new business district is planned, set in landscaped gardens. Office building with green hyper-core presents a concept for a sustainable complex with a large central court-yard. The open groundfloor is integrated into the adjacent landscape, and passive design elements allow for continuous natural ventilation throughout the building.

Page 55

Southern Italy

Short-sighted economic goals have harmed some of the Mediterranean’s most spectacular coastline. Waterfront reclamation and remediation is part of a government program that will see the rehabili-tation of 170,000 hectares of foreshores. Threats to environmental and hu-man health will be elimi-nated, and employment created through cultural and tourism infrastructure.

Page 56

New Haven, UK

For a ferry terminal in the south of England, a brief for a restaurant has been transformed into a tea-house – but one which is designed with an entire system in mind. The Pro-production and ecological cluster envisages the grow-ing and harvesting of flowers, their drying into herbal teas, and their col-lection by customers to make their own infusions. All at a ferry terminal.

Page 57

Madrid, Spain

Balconies, terraces and sidewalks are the traditional homes of pot plants. The project, Urban greening and economic catalyst, cre-ates a green island – including a plant production area, park, fitness center, hotel and restaurant. Air and water quality im-proves, social interaction is stimulated. And, as a commercial venture, the greening of the landscape is financed.

Page 58

Paimio, Finland

Migration from rural areas to the city is a problem. The Self-sufficient rural community project aims to foster a sustainable way of living outside the urban fabric with housing units built from local skills and materials. The concept links the long-term econo-mic viability for a commu-nity of 15 households to the promotion of biogas production from house-hold and farming waste.

Page 59
Regional Holcim Awards jury and ceremony Europe

Jury meeting

Zurich, Switzerland  June 26/27, 2008, at Swiss Federal Institute of Technology (ETH Zurich)

Members of the Jury from left to right:
Jean-Philippe Vassal, Director, Lacaton & Vassal Architectes, Paris, France; Professor, Technische Universität Berlin, Germany
Saverio A. Banchini, CEO, Holcim Spain, Madrid, Spain
Lucy Musgrave, Co-director, General Public Agency, London, United Kingdom
Nathalie de Vries, Principal architect and founder, MVRDV, Rotterdam, The Netherlands
Harry Gugger (Head), Partner, Herzog & de Meuron, Basel; Full Professor, School of Architecture, Civil and Environmental Engineering, École Polytechnique Fédérale de Lausanne, Switzerland
Luis Fernández-Galiano, Professor, School of Architecture, Universidad Politécnica de Madrid; Editor, Architectura Viva, Madrid, Spain
Klaus Sedlbauer, Director, Fraunhofer Institute for Building Physics; Chair of Building Physics, Head of the Department Life Cycle Engineering, Universität Stuttgart, Germany
Hans-Rudolf Schälcher, Chair of Planning and Management in Construction, Swiss Federal Institute of Technology; Member of the Management Board and Head of the Technical Competence Center, Holcim Foundation for Sustainable Construction, Zurich, Switzerland

Excused:
Klaus Töpfer, former Executive Director, United Nations Environment Programme; Member of the Advisory Board, Holcim Foundation for Sustainable Construction, Germany
The first of the five regional Awards ceremonies took place in Spain and proved to be an ideal curtain raiser. Markus Akermann, CEO of Holcim and Chairman of the Management Board of the Holcim Foundation, led the ceremony as chair of the day. Over 300 guests from more than 20 countries gained illuminating insight into the future of sustainable construction – as well as the architecture and culture of Madrid.
The outstanding highlight of this project is its comprehensive approach to urban renewal. The initial driver of the project was the need for additional space to accommodate government administrative departments in the heart of Budapest. Instead of just fulfilling this prime purpose by another large office complex, the project incorporates the revitalization of the adjacent historic Teréz quarter consisting mainly of housing and small businesses as well as the creation of additional public functions and parks including the upgrading of a beautiful old railway station that had been neglected for many years. In addition, a sustainable energy concept will be applied to the new administration buildings. Due to this integral development of a previously rather disregarded urban area, a win-win situation will be created: on the one hand the new office spaces will be built according to the specific expectations of the government and the users, and on the other hand most of the inhabitants of this quarter will stay in their former but upgraded living environment and will benefit from access to additional recreation facilities. Overall, the project demonstrates in a convincing manner how urban renewal should be tackled in order to realize substantial contributions to the sustainable development of degraded urban areas.

More from page 122
The project’s notoriety lies in its ecological and social qualities as well as its transferability and economic efficiency. The basic idea of revitalizing an existing municipal waste dumping area is unique. The project creates an elevated landscape shaped in large circles that will host manifold sports, recreation and cultural facilities for public use. The planned housing units surrounding the multi-use spaces are designed as earth shelters and therefore will be completely integrated into the landscape with a minimum consumption of energy and materials.

The striking concept includes, in addition to traditional architectural and landscape elements, the dimension of time as a further design parameter. All buildings and the newly landscaped areas are temporary and designed for relocation and reuse. Such a design approach is visionary and innovative. It fits many other similar situations especially in emerging countries where waste is often disposed in a rather unprofessional way. Overall it is a very smart and economically-efficient solution for the reuse of an otherwise lost and abandoned territory.

More from page 130
The new Monte Rosa hut at an altitude of 2,883m above sea level and surrounded by the highest peaks of the Swiss Alps is extremely inspiring not only due to its glittering crystal shape but even more with regard to its convincing demonstration of state of the art technology. It is noteworthy that all the façade and load-bearing elements as well as the interior partition walls are the results of computer-aided design and computer-integrated manufacturing in a way that material consumption and transport weight are reduced to an absolute minimum. In addition, this innovative production technology facilitates the construction of the various elements and therefore cuts substantially on-site building time. The technical autonomy of this building is another outstanding highlight. Far away from any public utility network, the Monte Rosa hut relies completely on its own energy production, water collection, and systems for treating solid waste and waste water. As a result the CO₂ emission will be less than one third compared to the existing alpine hut, which will be dismantled. Although this project incurs high construction costs, requires the transport of all construction elements by helicopter, and has limited transferability as an entire project, its convincing achievements in terms of autonomy and use of technology received the commendation of the jury.

More from page 138
Thenewmahala (neighborhood) for Romani people in Belgradeisanoutstanding demonstrationof how privateinitiatives can lead to a substantial improvementin the living conditionsfor chronically-poorinhabitants of urban informalsettlements. Contrary to otherslum upgradingprojects, the new mahala for Romani people will not be placed in the existingslums, but at anew location on land owned by the city of Belgrade which is already well-equipped with public utilities and in theneighborhoodof schoolshospitals and shops. The close integration of various goals such as education, employment, health care, housing, anti-discrimination, poverty reduction and gender issuesisa unique and very promising approach. All stakeholders, particularly the permanent and the temporary inhabitants of the informal settlement as well as government authorities, were involved in the goal setting, planning and realization process. The new housing units are designed and built in harmony with the Romani culture. The schemesaresimple but appropriate with a high degree of standardization reflecting the traditions and habits of Romani families. Due to the intensive involvement of the future users, the later relocation of the people is addressed proactively. Overall, it isa convincing example of a fruitful collaboration between individuals, families and government authorities.
The revival of abandoned industrial sites is not only an important issue in the old docks of Ghent but in many other cities that are stricken by a sharply diminishing secondary economic sector. Usually such empty spaces are taken over by artists, small businesses and informal occupants for temporary use. The uniqueness of this project consists in the transformation of these huge multi-floor warehouses into modern, very flexible but at the same time highly-affordable housing units. The creative design team developed a box-in-a-box solution by inserting a mostly prefabricated box-like unit with a floor area of 3.5 to 18 m². The structure is very light and all the services are concentrated in a central functional block containing kitchen, shower and lavatory. During summer the fully glazed west façade of the boxes will be opened to have the old barn becoming part of the living space and during the winter the very compact and well-insulated boxes need only little energy for heating. The outstanding result provides very attractive living spaces that perfectly match the lifestyle of young urban people at an astonishingly low price.
The strength of the office building design lies in its smart concept combining the manifold requirements of a modern office complex with passive design elements that allow considerable energy savings and relatively high use of natural ventilation. In addition, the open ground floor with public access is fully integrated into the adjacent landscaped area and therefore creates a specific work ambiance in the generously designed inner court of the building. The basic concept of arranging all vertical service and transportation zones at the outside of the façade leads to a substantial increase in economic performance.

All in all, a successful and widely-transferable example of the well known principle stipulating that the various aspects of sustainable construction should be already considered at the very early, conceptual design stage.

Holcim Awards Acknowledgement prize Europe

Office building with green hypercore

Milan, Italy

Project authors

Hiromi Hosoya, Markus Schaefer, Roland Schreiber and Christian Bandi, Hosoya Schaefer Architects AG, Zurich, Switzerland; Mitsuhiro Kanada and David Richards, Arup London, London, UK

The strength of the office building design lies in its smart concept combining the manifold requirements of a modern office complex with passive design elements that allow considerable energy savings and relatively high use of natural ventilation. In addition, the open ground floor with public access is fully integrated into the adjacent landscaped area and therefore creates a specific work ambiance in the generously designed inner court of the building. The basic concept of arranging all vertical service and transportation zones at the outside of the façade leads to a substantial increase in economic performance.

All in all, a successful and widely-transferable example of the well known principle stipulating that the various aspects of sustainable construction should be already considered at the very early, conceptual design stage.
This project focuses on land use, human health and nature. The basic philosophy consists of recovering and revitalizing large areas on the Italian coast already deteriorated and contaminated through human activities instead of claiming new territories to satisfy future needs. The project encompasses three dimensions: firstly, the elimination of threats to human life and nature caused by chemical agents, dust and metals in the ground, air and water including the re-conversion of illegal companies into legal and clean firms; secondly, generating increased levels of employment by implementing programs for land reclamation and the settlement of new research labs and industries in the fields of biotechnology, phytodepuration and renewable energy production; and finally, through establishing a sustainable cultural and tourism infrastructure. It is a unique example of how to re-establish sustainable development on a large scale by healing the wounds to humanity and nature. It is a quantum change, socially driven, privately initiated, and highly transferable.
Starting from a rather standard brief to design a restaurant at a ferry terminal, the project has been evolved by the author towards a comprehensive socio-ecological development program for a small but important area. The jury was delighted by the sensitivity with which the author has broadened the scope and sought to benefit from locally-grown flowers as a raw material for an ingenious tea manufacturing process handled by the local population. The end product will finally be sold in the restaurant which has become a tea house. The water for the tea house is collected in the nearby heavily degraded river, purified using reed beds and then finally brought to drinking water quality in the pre-existing desalination plant close to the ferry terminal. Solar energy is used for power and hot water production. The project has been commended due to its careful and sensitive combination of elements of sustainable construction at a small scale and due to the poetic design.

Holcim Awards "Next Generation" first prize Europe
Production and ecological cluster
New Haven, UK

Project author  Semini Pabodha Samarasinghe, Kandy, Sri Lanka
The strong and convincing vision of this project consists of creating a large green island on an empty piece of land at the interface of three principally residential districts in Madrid in order to achieve a considerable improvement of the climatic conditions. Usually such projects are not feasible due to the extremely high cost of land in urban centers. The striking idea of the project is to combine the positive effects of huge plantations on health, air and water quality with the economic potential of the industrialized production of trees and pot plants for private and public use. The open plantations and the greenhouses will be designed as a public park and enriched with a multitude of cultural, sports, health and educational facilities. By this unique combination of industrial production plant, recreational functions, serving the city with additional plants to be placed in streets and squares as well as on façades and balconies triggering off various positive impacts on the local climate, this project contains a lot of creativity and innovation coupled with a good sense of economic feasibility.
The project’s strength lies in the promotion of biogas production from household and farming waste in order to provide a long-term viability for small agricultural households in rural areas. Sparse employment prospects in rural areas necessitates that young people abandon their home town environment or commute over long distances to work each day. The basic concept of this project fosters a sustainable way of living outside of the urban fabric by constructing new housing units that are built with local skills and materials and that operate autonomously. An attractive design and ample floor space will offer additional potential for soft agro tourism and other small businesses. A considered and well-designed solution to address the globally increasing migration from rural to urban areas that maintains the otherwise abandoned and neglected landscape.

**Holcim Awards “Next Generation” third prize Europe**

**Self-sufficient rural community**

**Paimio, Finland**

**Project authors**

Heikki Johannes Riitahuhta, Heikki Juho Jalmari Muntola and Mikko Jari Tapani Jakonen, Oulu University, Oulu, Finland
Regional Holcim Awards 2008 North America

New York, USA

Showing that sustainable energy use is possible in lower Manhattan is the objective of the Solar 2 Green Energy, Arts & Education Center. The center's plethora of outreach programs for all ages demonstrates the potential that comes from harnessing the sun’s energy. As the first carbon-neutral building in the city, it is an important symbol for going green in an urban setting.

Pages 64 and 146

San Francisco, USA

In many US cities day laborers use street corners as informal hiring sites. For hours on end they wait by the roadside and in parking lots, often in the hot sun and without any amenities, in the hope of securing a day’s work for a day’s pay. The Self-contained day labor station aims to improve the life quality of those who find themselves on the edge of the American Dream.

Pages 38 and 65

Sudbury, Canada

It has taken many different measures over a number of years to rehabilitate the severely degraded environment of an acid-rain-drenched mining city into a healthy landscape again. Symbolic of the metamorphosis is the Living with Lakes Center for freshwater restoration and research. Its interdisciplinary team is guided by the mantra of “restore, reduce and renew”.

Pages 38 and 65

Toronto, Canada

With the project, Evergreen Brick Works: heritage site revitalization, an abandoned factory site is reborn – incorporating an education center, exhibition spaces and diverse social services focused on promoting sustainable cities. Heritage conservation is coupled with energy and resource efficiency in a project made possible by active citizenship.

Page 67

Vancouver, Canada

Damaged by frequent, serious flooding, an environmental learning center that has fallen into disrepair over the years will be rebuilt. The Minimal-impact North Vancouver Outdoor School is completely self-reliant and CO₂-neutral. Elevated on a structural platform offering spectacular views and access to nature, the building’s placement also offers protection against future flood concerns.

Page 68

Detroit, USA

Over recent years, bee colonies have been in sharp decline, with grave implications for fruit and vegetable production. The Strategy for environmentally-friendly integration of beehives aims to support the resettlement of honeybees by converting abandoned former industrial sites and vacant land into ecologically valuable habitats – “nectar corridors” filled with flowers.

Page 69
Microstructure research for building skins seeks to develop a sustainable skin which offers construction without joints, as well as load-bearing, ventilation, thermal and noise insulation, and changing light penetration capacities. Both high-tech and traditional building materials are involved in this interdisciplinary project combining design, materials science and engineering.

Page 70

Increasing residential density can limit sprawl and foster sustainable urban transformation. One instrument of change is building in between existing structures on "left-over" space. For each type of site, Residential density for urban spaces develops a new type of house. At times eccentric, these designs perfectly utilize small gaps in the urban fabric, and create a new overall aesthetic.

Page 71

The new YMCA is located on a bisecting garden and path that meanders through the city’s heart. The Responsive urban downtown activity center continues this existing green space with a program of fitness, cultural and housing elements. Energy from all activities (e.g. a jogger) can be collected to then power the infrastructure on-site (e.g. path lighting).

Page 72
Regional Holcim Awards jury and ceremony North America

Jury meeting

Cambridge, USA

Jury meeting, Cambridge, USA, July 1/2, 2008, at Massachusetts Institute of Technology (MIT)

Members of the Jury from left to right:
Ray Cole, Professor, Head of the Environmental Research Group, School of Architecture and Landscape Architecture, University of British Columbia, Vancouver, Canada
Mohsen Mostafavi, Dean, Graduate School of Design, Harvard University, Cambridge, USA
Sarah Graham, Principal partner, agps architecture zurich-los angeles, Los Angeles, USA
Hans-Rudolf Schalcher, Chair of Planning and Management in Construction, Swiss Federal Institute of Technology, Member of the Management Board and Head of the Technical Competence Center, Holcim Foundation for Sustainable Construction, Zurich, Switzerland
Reed Kroloff, Director, Cranbrook Academy of Art; Principal, Jones-Kroloff Design Services, Bloomfield Hills, USA
Adèle Naudé Santos (Head), Dean, School of Architecture and Planning, Massachusetts Institute of Technology, Cambridge, Principal, Santos Prescott and Associates, San Francisco, USA
Marion Weiss, Graham Chair Professor of Architecture, University of Pennsylvania School of Design; Partner, Weiss/Manfredi Architecture/Landscape/Urbanism, New York, USA
Philippe Arto, CEO, Holcim Canada, Concord, Canada
Mark West, Founding Director, Centre for Architectural Structures and Technology, Professor, Department of Architecture, University of Manitoba, Winnipeg, Canada
The ceremony for North America was held in Montreal, one of three UNESCO Cities of Design. More than 300 guests from six countries enjoyed thought-provoking presentations, a broad array of projects that spanned the region, and a collage of shows, culture and entertainment. The jam-packed program and relaxed atmosphere led to lengthy exchanges of ideas between participants.
The unique strength of the “Solar 2 Green Energy, Arts & Education Center” project will be its tremendous impact on public awareness concerning sustainable development in general, and sustainable construction in particular. The zero net-energy facility to be realized on a “brownfield” waterfront site in downtown Manhattan will be the first carbon-neutral building in the City of New York, producing all the energy it uses. Therefore, it will become a landmark and a symbol of the city’s commitment to energy independence and environmental sustainability.

The elegant building enclosed in a green envelope will convincingly demonstrate, at the very limits of what is possible, the actual state-of-the-art with regard to the use of sustainable materials, photovoltaic technology, geothermal exchange wells, natural lighting and ventilation. All the technical features will be shown and explained in a public exhibition. Through a highly-sophisticated monitoring system the effects of the different technologies as well as of the impacts of the surrounding conditions will be made visible. In addition, the interplay between our everyday choices and behavior and the consumption of energy and resource will be exhibited. Public stakeholders will be enticed to visit the “Solar 2” center by various cultural activities such as free art, dance and music performances. All in all, an extremely effective and easily transferable way to communicate to people how one might personally contribute to the solution of future energy and climatic challenges.

More from page 146
Day labor is a challenging social issue in many cities around the globe. Although industry and commerce utilize this informal or casual source of human capital, day labor is itself not organized at all. The project’s uniqueness lies in its simple and convincing approach to this problem. The idea of establishing formal stations where day laborers are allowed to stay and offer their services is unique. The stations – with a shelter, benches, toilets and facilities to buy or even prepare meals – create a sensitive living environment for people who normally live on the periphery of society. In addition the structure provides a physical location for outreach programs and also supports social cohesion amongst day laborers.

From the city’s perspective, day labor stations are a considerable improvement to the provision of sanitation and security for this marginalized community. From the demand side, labor stations facilitate hiring the required workforce and meeting legal requirements and wage standards. Since day labor is common practice in the construction industry, the project contributes substantially to providing an effective response to the “target issues” ethical standards, social equity and economic performance.

More from page 38
The Living with Lakes Center for applied research in environmental restoration and sustainability will be situated at Lake Ramsey, the natural drinking water reservoir of Sudbury, a city of 150,000 people in northern Ontario. The outstanding strengths of this project are twofold. Firstly, the new research and exhibition center will be built according to the most stringent criteria of sustainable construction minimizing the ecological footprint and assuring self-reliance with regard to energy and heat supply. Secondly, the research to be conducted in this center will contribute to the restoration of Sudbury’s ecosystem with an emphasis on guaranteeing the drinking water quality and quantity for future generations. The center and the water reservoir will be fitted with instrumentation to monitor the effectiveness of the array of technical features and the consequent impact on lake water quality. The results will be communicated to the public through web-based media and exhibitions at the nearby science center of Sudbury. The jury has commended this project due to its high potential as a practical demonstration of sustainable construction in action, and the broad dissemination of the gained knowledge.

More from page 154
Revitalization of the Don Valley Brick Works is an initiative of a Canadian charity, Evergreen, that aims to engage citizens in restoring degraded and abandoned urban places through active participation. This specific project consists of the revitalization of an industrial heritage site as an education center focused on sustainable cities. The key issues to be developed and communicated to the broad public encompass environmental and community health, “brownfield” redevelopment, heritage conservation, sustainable design and the need for innovative public-private partnerships.

The altered and upgraded buildings hosting classrooms, exhibitions and various social services will comply with today’s requirements regarding resource and energy consumption. This very broad approach to the complex task of urban transformation, combined with an efficient management of the urban metabolism driven by a strong partnership between citizens and authorities, are the outstanding merits of this project.

Holcim Awards Acknowledgement prize North America

**Evergreen Brick Works heritage site revitalization, Toronto, Canada**

Projects authors

- David Stonehouse, Evergreen, Toronto, Canada
- Joe Lobko, du Toit Allsopp Hillier and du Toit Architects Limited, Toronto, Canada
This project was commended due to its comprehensive planning approach for rebuilding an environmental learning center which has been degraded over the years and damaged by frequent, serious flooding. The responsible entities took advantage of this need for complete reconstruction and developed an overall master plan that assures a maximum preservation of the surrounding natural ecological reserve land and also demonstrates state-of-the-art in sustainable construction. As a result, the new school and exhibition buildings will be completely self-reliant and fulfill net zero energy and net zero CO₂ requirements. The elevated buildings offer free view and access to the beautiful nature in the neighborhood and avoid potential future damage from flooding. In addition, the building components and systems will become part of the learning experience and therefore fundamentally change the educational concept.

Holcim Awards Acknowledgement prize North America

Minimal-impact North Vancouver Outdoor School, Canada

Project authors
Ron Kato, Larry McFarland and Craig Duffield, Larry McFarland Architects Ltd., Vancouver, Canada
This innovative and unique project strives for the resettlement of honeybees in Detroit in order to address the sharp decline of bee colonies over recent years. Bees are vitally important agricultural insects throughout Michigan where fruit and vegetable production is a significant sector of the economy. The convincing advantages of this project are manifold. One of the crucial problems in Detroit is the many abandoned former industrial sites and vacant land plots coupled with a lack of investment. The project aims to transform these open spaces into green parks planted with flower varieties to feed the bees and to function as buffer zones between the remaining active industrial areas and residential precincts. The new honeybee colonies shall not only be deployed in underprivileged areas, but shall become an integral part of the city’s life. Therefore the bees will be colonized in public areas such as streets and squares. In order to avoid the bees from becoming a nuisance to pedestrians, the beehives will be elevated. By this re-settlement of bee colonies the city will create new workplaces for unskilled people and offer pollination services to the large fruit and vegetable farms in Michigan. Although this project is quite far away from sustainable construction in the narrow sense, the jury has commended the project due to its positive impact on living conditions and on biodiversity in urban areas.

Holcim Awards Acknowledgement prize North America

Strategy for environmentally-friendly integration of beehives, Detroit, USA

Projects authors  Stéphane Orsolini and Erika Mayr, Berlin, Germany
This project deals with new construction materials. The visionary and novel idea consists of developing a building skin that offers construction without joints and assembly and is also able to accommodate different functionalities such as load bearing capacity, natural ventilation through osmosis, thermal and noise insulation and changing light penetration wherever and whenever requested. What might sound like a miracle shall be achieved by a hierarchical combination of carbon nanotubes, polymers and traditional building materials such as steel, wood and glass. Although the invention is still at the level of computer simulations, lab tests and prototyping at small scales, the jury is convinced that this fantastic vision possesses a realistic potential to design, fabricate, construct and maintain a material architecture which is specifically assigned to accommodate particular structural, functional and environmental conditions.
Increasing the residential density of our cities, “densifying”, is considered as an effective way to fight against urban sprawl and to foster a sustainable urban transformation that increases the individual’s quality of life and solves their transportation problems. But without dismantling existing buildings the only way to substantially increase density is to make use of the “left over” spaces. Such pieces of land are usually small or have puzzling dimensions.

By using Toronto as a case study, the authors have identified a multitude of such “left-overs” on which they have developed a new housing typology matching the unusual framework conditions, e.g. the unfavourable geometry of the real estate, the adjacent buildings and the possibilities for access. The result of their efforts is a series of creative but unusual housing designs that perfectly utilize these small gaps in the urban fabric. Interesting is the thought that these partially “eccentric” housing units will respond to a tremendous demand due to the increasing social differentiation of urban society.
Locating itself on a bisecting garden and artificial path weaving through downtown Boston, the concept for a new YMCA proposes a continuation of this existing green space and to articulate the notion of a program as path which is made up of fitness, cultural and housing program elements. The unique idea is to gather and use the energy created with the activities intrinsic within each program category, such as running on a treadmill, for instance. The collected energy will then be stored in batteries and used for public purposes such as lighting the pathways or completely running the YMCA building. The striking vision of this project is the conviction that absolutely no energy source is too small to be exploited.

Project author  Andrew Edward Lantz, Harvard University, Graduate School of Design, Cambridge, MA, USA
Before computers or photocopiers existed, the pantograph was an indispensable instrument used to reproduce drawings at an equal, larger, or smaller scale. Adjustable somewhat like a pair of compasses, the pantograph works on the principle of the intercept theorem.

The pantograph works on the principle of the intercept theorem. If two arms running through a point are cut by two parallel arms that do not run through the vertex, then the two sections on the one arm behave like the corresponding sections on the other: za and ab behave like zx and zy.

The instrument was invented in 1603 by German astronomer Christoph Scheiner. Pantograph comes from Greek roots meaning “all, every” and “to write.” The pantograph is a mechanical linkage of four arms connected with hinged joints to form a parallelogram. The arms move in fixed relation to each other.

Pantographs were formerly used especially in cartography and geodesy to make scale copies of maps and plans. The pantograph was also used to draw patterns, stencils, etc. A unique variety of pantograph plays an important role in connection with the Holcim Awards. These specially designed instruments — golden mean gauges — measure the golden ratio and transfer golden proportions to other scales and are presented to the winners of Holcim Awards Acknowledgement prizes in recognition of their projects.
Just a few years ago the city of Medellín was considered a center of violence and criminal activity. Now a fairytale transformation stands in its place. One of the catalysts for change is the project, Urban integration of an informal area. Numerous measures and many stakeholders are involved in ensuring that the poorest receive only the best in infrastructure.

Pages 78 and 162

The Pontifical Catholic University of Rio (PUC-Rio) plans a Low-energy university mediathque. It will establish an architectural landmark for Rio de Janeiro as well as outreach to the informal community that lies on the institution’s doorstep. With its design using state-of-the-art technology, the building celebrates a centuries-old form of knowledge management: the book.

Pages 79 and 170

There are simply too few houses for low-income families in Brazil. State housing programs work to decrease the deficit by providing basic standard homes. Specialists used these initiatives to bring technology and innovation into the equation – a Solar water heating and rainwater tower provides a sustainable solution to domestic water storage and heating needs.

Pages 80 and 178

From a flood-prone parcel of communal land, the Ecological river remediation park creates a public park, and more – an ecosystem, cultural center and commercial market garden – in a partnership involving local farmers, public authorities and NGOs. A series of lakes biologically treats waste-water, provides fishing opportunities and gives water birds a home.

Page 81

In the planning of this Energy-efficient medical and social center, computer simulations played an important role – aerodynamics, thermal behavior and natural lighting were traced to minimize building costs and improve eco-efficiency. One sustainable measures is harnessing ground-water to cool intake air before standard air-conditioning systems are needed – known as geo-thermal pre-cooling.

Page 82

The city is surrounded by an impressive mountain range. The project, Mountain trail for land preservation and urban demarcation, connects eight million inhabitants to their natural environment. The 52 kilometer long path links neighborhoods to each other, improving social mix and cohesion, while marking the border between built space and forest reserve.

Page 83
For the FIFA World Cup 2014, 5,000 car-parking spaces will be needed at the soccer stadium. The Multimodal transport hub upgrade, however, takes the idea for a car park above the train lines much further – a main station will link all public transport, serve as a connection platform for pedestrians and cyclists, and include a public park in its design.

Rio de Janeiro, Brazil

For the FIFA World Cup 2014, 5,000 car-parking spaces will be needed at the soccer stadium. The Multimodal transport hub upgrade, however, takes the idea for a car park above the train lines much further – a main station will link all public transport, serve as a connection platform for pedestrians and cyclists, and include a public park in its design.

San Lorenzo of Tarapacá, Chile

The villagers of San Lorenzo fell victim to an earthquake – the Post-earthquake reconstruction project aims to rebuild their lives. The homes need to protect against the harsh climate, be resistant to future shocks, and quick and simple to build using local materials. Families are involved in designing their own houses to meet their own social needs.

Tuxtla Gutiérrez, Mexico

The project, Sanitation and river remediation, aims to rehabilitate the Sabinal River which is misused as the city’s sewage system. The water quality will be improved through a cascade of primary filter systems before entering urban wetlands. A green pedestrian corridor along the riverbank will reconnect city residents with the waterway, raising ecological awareness.

Huasco, Chile

Huasco is an arid agricultural region dependent on irrigation. With its river depleted, the Coastal fog-harvesting tower proposes an ingenious solution using only wind energy and gravity. The 200 meter tall tower is constructed as a spiral – it collects water particles from coastal fog, filters out salt by reverse osmosis and distributes freshwater to an otherwise declining agricultural area.

Mexico City, Mexico

Mexico’s poor need more public areas. The Eutropia low-cost and space-efficient social housing project re-distributes space to create a neighborhood. Medium density housing with a minimal footprint frees up areas for other uses. As well as a public square, the design includes a community building with flexible space for a market, healthcare and educational facilities.

Campinas, Brazil

The concept behind Agriculture facility for inner-city voids turns abandoned urban areas over to agricultural use. Production can even be taken into the interior of buildings using different techniques (e.g. hydroponics). The city-based program offers research opportunities into new plantation methods, leisure areas and street markets – a novel approach to lifecycle thinking.
Regional Holcim Awards jury and ceremony Latin America

Jury meeting

Mexico City, Mexico July 10 to 12, 2008, at Universidad Iberoamericana (UIA)

Members of the Jury from left to right:
Fernando Diez, Director, Department of Urbanism, Faculty of Architecture and Urbanism, Universidad de Palermo; Executive Editor, Summa+, Buenos Aires, Argentina
Yolanda Kakabadse, General Counsel and former Executive President, Fundación Futuro Latinoamericano; Member of the Advisory Board, Holcim Foundation for Sustainable Construction, Quito, Ecuador
Marc M. Angéli, Chair of Architecture and Design, Swiss Federal Institute of Technology; Member of the Management Board and the Technical Competence Center, Holcim Foundation for Sustainable Construction, Zurich, Switzerland
Hans-Rudolf Schalcher, Chair of Planning and Management in Construction, Swiss Federal Institute of Technology; Member of the Management Board and Head of the Technical Competence Center, Holcim Foundation for Sustainable Construction, Zurich, Switzerland
José Luis Cortés (Head), Dean of Architecture, Universidad Iberoamericana, Mexico City, Mexico
Sara Topelson, Under Secretary of Urban Development, Mexican Secretary of Social Development for the Mexican Republic; Principal and co-founder, Grinberg & Topelson Arquitectos, Mexico City, Mexico
Bruno Stagno, Principal, Bruno Stagno Arquitecto y Asociados, San José, Costa Rica
Daniel Bermúdez Samper, Professor, Department of Architecture, Universidad de los Andes, Bogotá, Colombia
Vanderley M. John, Associate Professor, Department of Construction Engineering, Polytechnic School, Universidade de São Paulo, Brazil
The Awards ceremony in Mexico City was conducted in a venue with particular style: a former seminary from the 16th century. The ceremony itself was just as elegant: more than 360 guests from 14 nations experienced prominent speakers, first-class project presentations, entertainment loaded with vitality, and an exciting supporting program.

Top left: Regional Holcim Awards Gold winners from Colombia, accompanied by Ricardo Legorreta, internationally renowned Mexican architect who delivered a keynote address at the ceremony.

Top right: Regional Holcim Awards Silver and Bronze winners from Brazil, accompanied by Carlos Bühler, CEO of Holcim Brazil.

Bottom left: Gerardo Ruiz Mateos, Secretary of the Economy of the Republic of Mexico, delivered a speech that emphasized the broad potential for sustainable construction to generate tangible change, both social and environmental.

Bottom right: Open-air exhibition of the prize-winning projects in the courtyard of the 16th-century building.
The unique strength of this project lies in its comprehensive and ground-breaking approach to the reduction of the worldwide problem of slum formation in the urban context through eradicating poverty, providing education and improving environmental sustainability. The already existing MetroCable connecting this huge squatter settlement with the formal city of Medellín was the catalyst of this project. The overall scope of the project includes the refurbishment and extension of the road network and the public utilities, the construction of numerous health, education, and sports facilities and also the implementation of social development programs. The main development strategy aims to strengthen self-responsibility, community participation and inter-institutional coordination. The project benefits from generous financial and technical support by governmental authorities and various NGOs. Multidisciplinary in all its phases with involvement at all scales, this is a very strong and comprehensive project inducing urban transformation and bringing dignity to the residents.

More from page 162

Holcim Awards Gold Latin America

Urban integration of an informal area
Medellín, Colombia

Project authors
Gustavo Adolfo Restrepo Lalinde, Carlos Mario Rodríguez Osorio, Alejandro Echeverri Restrepo, César Hernández Correa, Miguel Ángel Guerrero Mayorga, Marcia Caro Hernández, Ángela M. Luna Guerra, Felipe Díaz, Sergio Fajardo, Deyanile Varela, Carmen Hurtado, Carlos Mario Jiménez, Pablo Andres Baez, Ana Vergara and Juan Narvaez, Empresa de Desarrollo Urbano, Medellín, Colombia
The PUC-Rio Mediatheque serves different purposes: it is both the knowledge base of the university campus but also is open to the public and offers educational programs to the residents in the nearby informal settlement of Favela da Rocinha. The building itself is an attractive landmark demonstrating the high standard of Brazilian architecture and exploring ultimate construction technology. Its concept is driven by passive design elements such as appropriate orientation, heat insulation, shaded windows, natural ventilation and natural lighting which will contribute to a substantial reduction of the energy consumption despite the unusually high requirements regarding the interior climate for book and media preservation. A further strength lies in the careful integration of the rather voluminous building into the sensitively landscaped surroundings. The project was commended as an excellent example of modern Brazilian architecture responding to the very different needs of academia and the public, and was created by a multidisciplinary team effort based on a sound strategy for passive thermal control.

More from page 170
This project proposes an innovative and economical solution to a very common problem related to low income family housing. Due to the lack of public infrastructure, residents do not have ready access to drinking water, sewage systems and energy supply. The most serious shortcoming is potable and hot water, basic needs that are covered by the sustainable tower which provides a rainwater harvesting system, potable water storage tank and solar water heating device in an integrated structure. The tower itself is composed of prefabricated rings made of ferrocement. The modular system, adaptable to different needs and local situations can be incorporated in new houses as well as in existing ones and allows for energy efficiency and rational use of water. The smart combination of existing and proven technologies has a great potential for industrial production and realizing the associated economies of scale to reduce costs of production per unit. Overall this is an innovative concept with a substantial impact on the daily living conditions of poor families and with a great potential for transferability.

More from page 178
This project focuses on four social, environmental and urban objectives: to create a metropolitan park for Morelia in the province of Michoacan, Mexico; to provide new job opportunities for the community farmers; to install an effective flood control system; and to revitalize a heavily contaminated drainage channel. The result is a unique lacustrian (lake-based) park with multiple water bodies each of them functioning in sequence for the biological treatment of wastewater. The green areas in between are used for the commercial production of trees, plants and vegetables to be sold at local markets. The public park is fully integrated and offers attractive leisure facilities. The whole planning and implementation process was a joint undertaking of the local farmers, public authorities and NGOs. The project has been commended because of its substantial contributions to social welfare, its environmental achievements and the successful public-private partnership.
The Enkyo medical and social center located in the Asian Quarter of Liberdade close to downtown São Paulo will be thoroughly computer-simulated with regard to its surrounding urban context for observations of aerodynamics, thermal behavior and natural lighting. This is a pilot project for computer-simulation in Brazil. Based on sound analyses, all traced strategies were meant to be economical and simple rather than high-tech in order to keep life cycle costs low.

As a result many passive measures were integrated into the design such as an optimal building orientation and shading elements on the façades without affecting high daylight penetration. Geothermal precooling as an entirely new strategy for the subtropical region of Brazil was developed, bringing naturally available groundwater as cooling fluid to standard fan-coil units of conventional air conditioning systems. In addition 100% of the rainwater will be collected for non-potable use, also improving storm water management. The jury has commended this project because it has the potential to become a benchmark with regard to energy efficiency, geothermal precooling and rainwater harvesting in the urban context of Brazil.
high-class condominiums, middle-class homes, working-class neighborhoods and squatter settlements, and will thus contribute to an improved social mix and cohesion. The jury has commended this project because the Bogotá mountain trail is not simply an infrastructure project, but it is a clear sign of respect between humanity and nature. In this sense it will become a strong instrument to channel the further development of Bogotá and to improve its ecological quality. It is a simple and efficient solution to a common problem in rapidly-growing cities.

Holcim Awards Acknowledgement prize Latin America

Mountain trail for land preservation and urban demarcation, Bogotá, Colombia

Project authors
Diana Wiesner, Arquitectura y Paisaje, Bogotá, Colombia; Otto Francisco Quintero, Grupo de Estudios Urbanos, Bogotá, Colombia

The mountain trail will define the future border line between the city and the mountainous forest reserve surrounding Bogotá over a distance of 52 km. The core strategy is to clearly mark and preserve the border line between the built space and the natural areas serving as an important recreational resort. Furthermore the new path for pedestrians, joggers and bicycles will connect
In preparation for the FIFA World Cup 2014 which will take place in Brazil, the existing soccer stadium Maracanã in Rio de Janeiro will have to provide a new parking structure for at least 5,000 cars. Today the surrounding public space lacks quality; it is used for informal purposes and is frequently flooded by storm water. Furthermore, the existing railway lines divide the area between the stadium, the degraded informal settlement of Mangueira and a large adjacent public park. The convincing vision of this project consists in temporarily placing the requested 5,000 parking spaces above the railway lines, creating a central multi-modal transport node linking all public transport (rail, metro and bus) while providing an attractive main station that also serves as a connection platform for pedestrians and cyclists. The surroundings of the main station including the area in front of the stadium will be transformed into a public park linked to the existing park. The wide spans and elegant roof of the main station and parking station incorporate photovoltaic panels that produce energy for the public network and collect rainwater for irrigation. Following the World Cup, part of the parking will not be used anymore and shall be transformed into housing, office space, and schools.
This project is about the reconstruction of an earthquake-devastated community in the Tarapacá area of Chile. The traditional adobe homes had to be replaced by inexpensive houses, meeting the requirements of the harsh climate and satisfying the social needs of the inhabitants whose homes had been destroyed. In addition they had to be easy and fast to build by the local population with local materials. The result is a simple metal frame construction with cement block walls, giving support to the quincha façades made of wood and clay (debris). The roofs are also made of clay. Each family had the opportunity to define the overall dimensions and the number and size of the rooms according to their specific needs. The carefully-chosen design answers to different situations, fills the gap between old and new and recovers the image of the traditional home of this area by using the traditional typology.
Today, the Sabinal River in Tuxtla Gutiérrez in the province of Chiapas is misused as the city’s sewage system and therefore extremely contaminated. This project intends to regain the river’s health through a cascade of primary filter systems retaining garbage and residual solids before having the water pass through a process of purification operating at two different levels: the technical level consists of the urban wetlands and an ozone injection system that will filter and regenerate the water. The second element focuses upon social behavior by creating a green pedestrian corridor along the river bank that will enhance ecological consciousness among residents and therefore contribute indirectly to better water quality. This project has been commended due to its simple purification technology and its rarely-applied attempt to incorporate the population and modify awareness of the main originators of waste and effluent.
The Huasca region in northern Chile is an agricultural region that depends on water for irrigation from the Huasca River. Water availability has decreased over the last decade, and new solutions have to be found to obtain water on the coast of this desert region. This project intends to use of the “Camanchaca”, a coastal fog originating from the anticyclone of the Pacific and condensing behind the coastline. The striking idea consists of towers with a height of 200 m catching the water particles and conducting them to the base of the tower, where the liquid will be filtered through a reverse osmosis process to eliminate salt. The tower is constructed as a spiral structure with a wooden base, copper mesh providing conduits and a plastic skin. The water catching system only uses wind energy and gravity in its principal working process. The jury was delighted by this innovative, simple and elegant solution that will provide water to an otherwise declining agricultural area.

Holcim Awards "Next Generation" first prize Latin America

Coastal fog-harvesting tower
Huasco, Chile

Project authors
Alberto Fernández González and Susana Valeria Ortega Gómez,
Santiago, Chile
Aiming at an integrated approach to low cost housing in urban areas, the project proposes a re-distribution of space to reflect a "neighborhood" typology, favoring urban and community relationships. The strategy is to compress the buildings to a minimum footprint and align them in order to free up some land area. Four blocks of medium density buildings are linked to each other by collective stairs. The line of buildings divides the lot into public and private portions, bordered by the street with a sidewalk leading to a small public square. A community building on the square has a flexible ground floor for different uses such as a small market, health care and educational facilities. On the upper level there is ample space for horticultural activities and rain water collection. The outstanding strength of this project is its focus on community building and social equity, integrating the street and squares as dynamic elements of daily life.

Holcim Awards “Next Generation” second prize Latin America

Eutropia low-cost and space-efficient social housing, Mexico City, Mexico

Project authors

Ricardo Julián Vásquez Ochoa and Emilio José García Bidegorry, Mexico City, Mexico
This project is located in the city of Campinas, Brazil, but it’s transferable to any other place. Its core strategy consists of the occupation of urban voids and inactive real estate properties by agriculture. It dialogues with the city at several layers and scales. By the use of a technique of agricultural production with no land (hydroponics) and use of different substrates (mainly building materials), agricultural production can be taken to the interior of buildings located in strategic places that are close to the consumers, such as city centers, harbors or shopping areas. The program also offers research and learning facilities for the development of new plantation techniques, leisure areas and street markets. The buildings will be equipped with photovoltaic panels generating electrical energy. Rainwater will be collected for irrigation and the organic waste is treated and reused as fertilizer. The jury has commended this project due to its innovative and novel approach to life cycle thinking and the revitalization of abandoned urban areas.
Regional Holcim Awards 2008 Africa Middle East

The medina of the Moroccan royal city of Fez is a UNESCO World Heritage Site. However its continuing decline threatens this prestigious title. The project, River remediation and urban development scheme, aims to revitalize the heavily polluted and neglected river Fez. By returning to this ancient heart its dynamic soul, urban renewal and life quality will follow. Pages 14 and 94

HIV/AIDS has made orphans of millions of children. With a tree at its symbolic center, the Low-cost school and home for HIV orphans enables children to create their own home, and even help in its construction. As the children grow to adulthood, the village can be extended for their own families to grow up in this caring community. Pages 95 and 186

The words “Dubai” and “sustainable construction” do not often appear in the same sentence. That is set to change, thanks to strong environmental regulations and visionary projects such as the Lighthouse tower with low-carbon footprint. The elegant skyscraper, in which three massive wind turbines have been integrated, will consume around 65% less energy than its peers. Pages 96 and 194

In the harsh climate of the Cape coast, this Low-impact environmentally-responsive house works with, not against, the elements. Its light, open frame-like structure blurs the boundaries between inner and outer space. An emphasis on resource conservation and recycling ensures independence from public utility networks – a direct response to climate and context. Page 97

Education is an important building block of sustainable development. The project, School infrastructure from local resources, transforms schools into community centers of lifelong learning. Here, sustainable livelihoods training can take place – energy efficiency, renewable energy use, rainwater harvesting and local food production are all part of the program. Page 98

The Stabilized earth visitors’ center, Mapungubwe National Park, builds relationships amongst people as well as between people and the environment. The building’s form uses materials and techniques which reflect the landscape and cultural traditions of place. The innovative construction uses stabilized earth tiles in a system of lightweight vaulted spaces. Page 99
The concept behind the Tuna-HAKI integrated theater and orphanage is both ordinary and spectacular. It connects an orphanage to a public theater – a private compound with a festive gathering place. As a communal focal point, orphans can better integrate into the life of the village; the concept also facilitates the sharing of construction and operational costs.

Amphibious dwellings in informal settlements is a striking concept to move squatters into floating homes on unused coastal areas closer to their source of income. Houses out of “found” materials, at low or no-cost, are constructed on buoyant platforms. Dwellings are equipped with rainwater collectors, purification units and dry-composting toilets to assure minimum sanitation.

Dune antidesertification architecture is a project proposed in response to the Green-Wall Sahara initiative. At the cutting edge of biotechnology, the plan is to use microorganisms to bind loose sand into sandstone to create structurally stable dune-like formations. These dunes protect new oases in which people displaced by desertification can live.

The Mama Ngina waterfront park is polluted and degraded. The plan proposes a holistic intervention to develop the site and protect the environment. The Waterfront sustainable development concept proposes sustainably constructed buildings in landscaped parkland – sociocultural facilities embedded within nature. Free public access is assured.
Members of the Jury from left to right:
Joe Addo (Head), Principal and founder, Constructs LLC, Accra, Ghana
Amer Moustafa, Associate Dean, School of Architecture and Design, American University of Sharjah, United Arab Emirates
Holger Wallbaum, Chair of Sustainable Construction, Swiss Federal Institute of Technology, Member of the Technical Competence Center, Holcim Foundation for Sustainable Construction, Zurich, Switzerland
Hans-Rudolf Schalcher, Chair of Planning and Management in Construction, Swiss Federal Institute of Technology, Member of the Management Board and Head of the Technical Competence Center, Holcim Foundation for Sustainable Construction, Zurich, Switzerland
Nina Maritz, Principal and founder, Nina Maritz Architect, Klein Windhoek, Namibia
Dominique Drouet, CEO, Holcim Morocco, Rabat, Morocco
Rachid Benmokhtar Benabdellah, President, Al Akhawayn University, Ifrane, Morocco
Daniel K Irurah, Senior Lecturer, School of Architecture and Planning, University of the Witwatersrand, Johannesburg, South Africa
Eyal Weizman, Director, Centre of Architectural Research, Department of Visual Cultures, Goldsmiths, University of London, United Kingdom
Over 320 guests from 24 countries made their way to the beautiful city of Marrakech. They experienced a colorful event, with Rolf Soiron, Chairman of the Board of Directors of Holcim and Chairman of the Advisory Board of the Holcim Foundation, as chair of the day. The prize winners represented a broad array of cultural groups from Africa and beyond, and the entertainment program offered an exciting mix of traditional and modern elements.
The preeminent feature of this project consists of the comprehensive approach to environmental revitalization and urban renewal. The Fez River, a historic lifeline traversing the medina of Fez, is now faced with a diminished role due to serious pollution and risks drying up. The future water-diversion to a new sewage treatment plant allows the mostly covered river to be laid open again and thus regain its potential as a public amenity.

The project proposes interventions at city-scale master plan and site-scale projects for cleaning the degraded water as well as the remediation of heavily polluted sites. The jury commended this project because of the coupling of a comprehensive sociocultural and economic program to an environmental remediation initiative. The proposal has the potential to restore the vitality of the city of Fez for its residents and visitors by mitigating the two major threats now facing the river. Equally, the proposed transformation of existing nuisances through community supported programs such as a leather-craft centre, recreation facilities for children, water-cleaning wetlands and botanical gardens is highly commended. The project promises to be a strategic environmental intervention creating a myriad of social benefits.
The project’s notoriety lies in its long-term social and contextual impact. The conceptual philosophy consists of creating new homes for orphans caused by HIV/AIDS that reflect the local social traditions and habits, provide shelter and offer health care, educational and leisure amenities. The whole project strives for appropriate domestic technology and self-reliance: for example, the homes will be built by the orphans with local materials, utilize solar energy, and the community will produce their own food-stuffs. The very simple modular block geometry of the buildings with a wide cantilever roof will generate poetic and diverse internal as well as external spaces. The project envisages the gradual evolution of the Mukwano Home into Mukwano Village through continuous additions of similar modular units as more children become integrated into the center. The older ones becoming adults will have the possibility to stay at the village with their families and thus contributing to the long-term development towards an organically grown and solid community.

More from page 186
The jury commended this project because it demonstrates in a convincing manner that high-rise buildings also have significant potential to be designed and constructed in compliance with the globally-accepted standards for sustainable construction. This high-tech structure is a 400m-tall, 53-storey twin tower mainly for “class A” office use. Optimization of passive cooling and daylight through a context-responsive façade is expected to achieve energy savings of over 50% compared to Dubai standard practices. In addition, the three horizontal-axis wind turbines at a diameter of 29 m each and 6,000 photovoltaic panels integrated into the façade will generate most of the energy needs of the building.

Many other design provisions will contribute to substantial savings with regard to water and materials consumption. In the context of the United Arab Emirates, where emerging wealth – mainly propelled by oil revenues – is rapidly changing the built environment, high-rise buildings will continue to dominate the skylines of the cities. Accepting this fact, the Lighthouse Tower will become a benchmark in this region with regard to energy efficiency and renewable energy sources.

More from page 194
The project’s strength lies in the thorough research and planning and careful execution of this resource conserving and spatially-inspiring dwelling on a site within a harsh Cape-coast climatic zone in South Africa. The result is a very attractive living space which is in harmony with its environment. The light, open frame-like structure, sliding screens and glazing as well as the continuity of finishes blur the boundaries between inside and outside. The house seeks to make use of and recycle any available natural resources so as to put minimal strain on the environment. In addition, solar energy, solar heating, rainwater harvesting and biological waste processing will ensure independence from any public utility network. The jury has commended this project both for its formal and light-structure approach to the sensitive site and the smart implementation of sustainable materials and construction techniques.
Education is a key prerequisite of sustainable development. The goal of the project is to develop schools as community hubs and centers for lifelong learning. The Creating Learning Spaces Programme conceptualizes the school becoming a community resource center which facilitates the revitalization and development of communities through training as well as demonstrations of sustainable livelihoods through energy efficiency, renewable-energy use, rainwater harvesting and local food production. In addition to the theoretical programmatic background, the project also proposes standardized layouts, schemes, materials and construction technology for the design and realization of such learning spaces. The project has been commended because of its comprehensive approach to lifelong learning in rural areas and due to the stringent involvement and commitment of the population.

Holcim Awards Acknowledgement prize Africa Middle East

School infrastructure from local resources

Vele and Vryheid, South Africa

Project authors
Steve Kinsler and Derek van Heerden, East Coast Architects, Durban, South Africa; Gregg Sherkin, Oprah’s Angel Network, Chicago, IL, USA
This project deals with two kinds of relationships: the one between people and the environment and the one amongst people. The project to house the Mapungubwe National Park Interpretive Center reflects the natural landscape in its materials and the cultural landscape in its form. The project is conceptualized as a place for commemorating the historical relevance of the site in relation to a past civilization. The overall design relies on a spatial concept aligned to a narrative and coupled to building shapes which respond to the natural landscape. The buildings are inspired by an innovative construction technique of a light-weight vaulted-system for roofs and walls fabricated using stabilized earth-tiles. The adaptation of the vault-system with the objective of using local materials combined with a smart construction technology and thus enhancing skills development and employment opportunities are the key merits of this project.

Holcim Awards Acknowledgement prize Africa Middle East

Stabilized earth visitors’ center
Mapungubwe National Park, South Africa

Project authors

Peter Rich, Lerotholi Rich Associated Architects, Johannesburg, South Africa; Michael Hector Ramage, University of Cambridge, Cambridge, UK; John A. Ochsendorf and Matthew M. Hodge, Massachusetts Institute of Technology, Cambridge, MA, USA; Anne Fitchett, University of the Witwatersrand, Johannesburg, South Africa
The program for the TunaHAKI Centre located in Moshi, Tanzania, is at the same time both ordinary and spectacular, an orphanage and a public theatre. As opposed to the conventional approach of accommodating orphaned children in facilities isolated from the rest of the community, the orphanage is conceptualized as a communal focal point anchoring other community activities. This creates the opportunity for orphans to become integrated into their social environment in a manner approaching that which a typical community may offer. It also facilitates the sharing of both construction and operational costs between the community and the private operators of the orphanage. In addition to these predominately social achievements, the project demonstrates the appropriate application of locally available measures making construction sustainable including the integration of local crafts and recycled materials and artifacts. The project is commended due to its sensitive strategies for addressing the widely spread problem of HIV/AIDS orphans in Africa and its convincing commitment to sustainable construction.

TunaHAKI integrated theater and orphanage
Moshi, Tanzania

Holcim Awards Acknowledgement prize Africa Middle East

Project authors
Saija Hannele Hollmén, Jenni Maria Reuter and Helena Elisabeth Sandman, Hollmén Reuter Sandman Architects, Helsinki, Finland; Claude E. Armstrong and Donna L. Cohen, Armstrong + Cohen Architecture, Gainesville, Fl, USA
Xeritown is a mixed-use property development at an urban scale located on the outskirts of Dubai. The proposal respects its hot and arid desert site context, while at the same time demonstrating lessons and principles out of the rich tradition of city patterns and dwellings in the Middle East. Most projects in the area consider the site as 

*tabula rasa* on which to impose an artificial urban context. In a radical departure from the conventional approach, Xeritown integrates the desert and local climate by working with the natural environment instead of against it. The master plan relies on the clustering of building volumes within the less productive areas of the site, thus sparing the more productive zones to support the complementary landscaping. The traditional settlement principles of narrow internal streets providing shading from the hot sun, intimate courtyards and perforated walls have been systematically adapted and optimized. The project is recommended for its novel, alternative approach to property development within the booming economy of Dubai while remaining sensitive to context issues such as topography, sun, wind and socio-cultural priorities of the residents.

**Holcim Awards Acknowledgement prize Africa Middle East**

**Xeritown responsive urban planning strategy**

**Dubai, UAE**

**Project authors**

Andreas Quednau and Sabine Müller, SMAQ – architecture urbanism research, Berlin, Germany; Ahmed Al Ali and Farid Esmaeil, X-Architects, Dubai, UAE; Johannes Grothaus, Johannes Grothaus & Partners, Potsdam, Germany; Thomas Mika, Reflexion AG, Zurich, Switzerland
The innovative and striking idea of this project envisages moving the inhabitants of the traditional, neglected squatter settlements at the borders of the cities to floating homes on unused coastal areas. Such amphibious dwellings shall be erected on floating platforms and built with low- or no-cost available materials usually considered as trash, such as recycled wood from construction sites, plastic foils, used sheet metal, reeds and thatch. In order to assure minimum sanitation, the dwellings will be equipped with rainwater catchment, purification units, and dry compost toilets. These dwellings will be legal, cheap and easy to maintain. Since the dwellings are not too far away from the city center, they provide multiple opportunities for day labor and small businesses. This project has been commended due to its fresh and simple approach to a globally-present problem in urban areas.

Holcim Awards "Next Generation" first prize Africa Middle East

Amphibious dwellings in informal settlements
Lagos, Nigeria

Project author
Akinlabi A. Afolayan, Niles Bolton Associates, Atlanta, GA, USA
This outstanding and absolutely novel project proposes an architectural complement to the “Anti-desertification Green-wall Sahara” initiative of the Sahel states. It envisages facilitating the creation of oases for human habitation through the application of cutting-edge biotechnology: micro-organisms whose metabolic processes bind loose sand into sandstone to create structurally stable dune-like formations which not only stabilize the sand dunes but also provide shelter for people. The possibility of seminatural dwellings in complement to the ongoing tree-belt initiative would significantly enhance the adaptive capabilities of those now faced with migration to escape the escalating environmental crises of the encroaching desert. Although the project is highly speculative, the jury commended it due to its visionary concept and sound scientific background.
The project proposes a holistic intervention towards an intensive commercial development of a highly-attractive prime beach area located within a hot-humid tropical climate in Mombasa, Kenya. At the same time the prevailing threats of pollution by sewage water and solid waste as well as the naturally driven erosion of the coast line shall be stopped. All the future buildings will be built in compliance with actual state-of-the-art technology of sustainable construction. The whole complex will incorporate a series of sociocultural facilities and will be embedded in a large, intensively landscaped garden to which the public will have free access. The project is commended due to its attempt to combine the usually prevailing financial goals of professional investors with a multitude of quantitative as well as qualitative environmental and social targets.
Throughout his life, Swiss architect Le Corbusier (1887 to 1965) sought rules and laws in art, in nature, and in architecture. He found no system of proportions that satisfied his needs, so he developed one himself – the Modulor. The Modulor is the most important modern attempt to give architecture mathematical order that reflects both the golden ratio and the proportions of the human figure – because for Le Corbusier the human being was the measure of all things.

The Modulor combines imperial units of measure with the metric system. The Modulor is based on a human figure 183 centimeters or six feet tall. From this Le Corbusier calculated a geometric sequence of intervals that relate to each other in the golden ratio – body height and navel level for example display the ratio 183 to 113.

With the Modulor, Le Corbusier sought to give architecture human measure and rational order. Uncounted buildings and pieces of furniture have been designed using the proportions of the Modulor.

The Modulor: a human figure with a raised arm supplies the main points of spatial division – foot, solar plexus, head, finger-tips of the raised arm – three intervals that display a series of golden ratios.

A model of the Modulor is presented to the winners of Holcim Awards “Next Generation” prizes in recognition of their projects.
Subsistence living conditions drive millions of China’s rural poor into the cities. Concurrently farming land is converted to new uses. Sustainable planning for a rural community is a pilot project in Beijing’s urban sprawl. It demonstrates how much needs to be done to keep people in rural settings – and how much can be done.

Pages 30 and 110

In Vietnam’s Mekong Delta, a new Low-impact greenfield university campus is being built. The project acknowledges the needs of both people and the environment. The design of this unique complex was informed by computer analyses of wind and activity flows. Rather than an imposing structure, the architecture merges seamlessly with the landscape.

Pages 22 and 111

India’s energy and infrastructure development cannot keep up with the needs of its booming IT sector. An Energy-efficient office complex has a sustainable answer to reduce reliance on the public electricity grid. It harnesses a resource the country is rich in, but which many architectural solutions have sought to escape in the past – the sun.

Pages 112 and 202

After the devastating earthquake of 2005, training centers for the reconstruction of private housing were created. The concept, Advocacy of traditional earthquake-resistant construction, couples advanced engineering knowledge with the reliability of traditional materials and skills. Pilot projects strengthen self-reliance in the local population to undertake re-building.

Page 113
Dongtan will be one of the first eco-cities developed in China. In the first phase of the Dongtan Eco-City urban concept, housing for a population of 80,000 and 52,000 jobs are planned. The three overlapping urban villages foster internal transportation by walking, cycling or public means. Renewable energy powers buildings, infrastructure and transport.

Page 114

The project Low-cost, low-maintenance school extension uses local and robust materials and technologies to create a functional, environmentally-compatible and aesthetic construction. Thanks to natural stone foundations, rammed earth walls and a systematic integration of closed water and waste cycles, the school establishes a new standard in local sustainable design.

Page 115

Fengdu lies on the western side of the Three Gorges Dam on the Yangtze River. Because of its periodic flooding, settlement was moved to a new location on a plateau north of the dam. Revitalization and relocation plan for Ghost City involves the community in a comprehensive development concept integrating urban space planning and traditional cultural elements.

Page 116

The project, Heart of Suzhou Creek ecosystem revitalization, analyzed the impacts of flooding and pollution on this important waterway. Inspired by the workings of the heart, the visionary idea involves diverting water into a landscaped texture which controls the varying water level and purifies its content by a process of phyto-remediation.

Page 117

With 600,000 inhabitants across 220 hectares, Mumbai’s Dharavi is the largest informal settlement in Asia. Realizing solutions for the redevelopment of Dharavi aims at an inverse approach to transforming the slum into a modern business and housing district – Dharavi’s existing communities should be the owner-builders of their own future environment.

Page 118

Over the past 15 years, most residential construction has targeted the high-end high-rise luxury market. The project, Low and dense urban elements, argues against this trend. Instead, it favors a more reciprocal infill strategy of preserving urban heritage and re-introducing low-rise high-density areas – this respects cultural heritage and keeps the social fabric alive.

Page 119
Regional Holcim Awards jury and ceremony Asia Pacific

Jury meeting

Members of the Jury from left to right:
Kazuo Iwamura, Principal and founder, Iwamura Atelier, Tokyo; Professor, Faculty of Environmental & Information Studies, Musashi Institute of Technology, Yokohama, Japan
Mark Lee, Founder and principal, Johnston Marklee & Associates, Los Angeles, USA
Wowo Ding, Dean, School of Architecture, Nanjing University, China
Hans-Rudolf Schalcher, Chair of Planning and Management in Construction, Swiss Federal Institute of Technology; Member of the Management Board and Head of the Technical Competence Center, Holcim Foundation for Sustainable Construction, Zurich, Switzerland
Gunawan Tjahjono, Professor of Architecture, Faculty of Engineering, University of Indonesia, Jakarta, Indonesia
Zeenat Niazi, Programme Director for Habitat, Development Alternatives, New Delhi, India
Olivia la O’Castillo, Member, United Nations Secretary-General’s Advisory Board on Water and Sanitation; Chair/President of Sustainable Development Solutions for Asia and the Pacific Inc., Manila, Philippines
Hansjürg Leibundgut, Professor of Building Services, Swiss Federal Institute of Technology; Member of the Technical Competence Center, Holcim Foundation for Sustainable Construction, Zurich, Switzerland
Ashok B. Lall (Head), Principal, Ashok B. Lall Architects; Visiting Professor of Architecture, Guru Gobind Singh Indraprastha University, New Delhi, India

Shanghai, China June 5 to 7, 2008, at Tongji University (TJU)
The prize hand-over event in New Delhi and the supporting program offered the 320 guests from 23 countries an unforgettable experience while creating a worthy conclusion to the series of regional Awards ceremonies. The terrorist attacks in Mumbai the night before the ceremony to celebrate the prize winners from Asia Pacific required the entire program to be adapted to the new situation.

Top: Winners of the regional Holcim Awards accompanied by jury head Ashok B. Lall (left) and Yeqing Li, CEO of Huaxin Group (right).

Left: In his opening speech, Chair of the day and CEO of Holcim Markus Akermann presented a model project to which the Holcim Foundation has dedicated funds and a publication: the world headquarters of Development Alternatives in New Delhi.

Center: Ashok Khosla, Founding Chairman of Development Alternatives, President of IUCN and Co-President of the Club of Rome, welcomed the guests.

Right: Economist Bimal Jalan, Member of the Indian Parliament and former Governor of the Reserve Bank of India, illustrated in his speech the vast opportunities for sustainable construction to make a tangible difference in both developing and developed countries.
The dominating highlight of this project is the innovative and unique approach to the overall land use planning for the development of the rural community that is based on a sound field survey and the establishment and scientific analysis of a comprehensive database. The anticipated transformation of this community consists of the overall improvement of the circulation network, public utilities and public services as well as the stringent consideration of ecological and energy saving technologies for the renewal of existing buildings and for newly built facilities. The whole renewal process is driven by public participation and steered by the local authorities. The project is a joint effort of a multidisciplinary team. This work is an enjoyable idea and represents a very comprehensive approach at the urban level. The project has been commended because it demonstrates in an ideal way the smart combination of heritage preservation, traditional knowledge and habits, local materials and modern technologies and last but not least professional project management. It has a high potential to become a role model for the sustainable development of rural communities and urban districts in emerging economies experiencing rapid change.

More from page 30
The crucial starting point of this new campus situated on an island in the Mekong Delta was the question of how space and education could coexist and how connectivity and separation between the different university departments could be realized. The proposed solution strives for a maximum integration of the new campus into the natural environment, an extensive application of passive design in order to reduce air-conditioning use and to create as much outside shaded space as possible. The general layout of the site is driven by the idea of using the strong winds for natural ventilation of buildings and open circulation areas. The heavy rainfalls will be collected and stored in order to meet potable and grey water requirements. Energy consumption will be reduced by passive design and a maximum use of daylight. The jury commended this project because the new campus design is an entire response to the environment based on a surprisingly simple idea which produces unexpected aesthetic and spatial experiences. Its striking design strategy makes it a robust system amenable to adaptation and change responding to the evolving needs of the user community.

More from page 22
The dominant design target of this new office building at the outskirts of Hyderabad was the optimization of maximum shading and maximum use of daylight in order to reduce energy consumption. The proposed solution follows a twin strategy to achieve these conflicting goals. Firstly, the general layout of the courtyard building optimizes orientation and provides maximum fenestration for work spaces in the north and south wings, whereas the east and west wings in which radiation levels are high are occupied by cores. Furthermore the building shape steps out upwardly on its south façades to create self-shading effects. Secondly, the façade design is carefully analyzed to minimize solar heat gain while maintaining views and high daylight levels. Vertical shading fins on the façade run the full length of the building. The varying but fixed angle of the fins for each orientation is optimized through extensive shading coefficient analyses. To enhance the contributions to a sustainable performance of the building, rainwater is harvested to be used for irrigation and replenishing the aquifer and an onsite sewage treatment plant processes grey water for non-potable use. This project has been commended because it is an outstanding example of a perfectly designed and engineered building that provides a multitude of sound contributions to sustainable construction without using any gimmicks.

More from page 202
The highlight of this initiative to create eleven training centers for the reconstruction of private houses, is the consequent renunciation of typically-applied modern construction materials and techniques such as steel and reinforced concrete. In the isolated mountain areas of Pakistan such methods are not feasible. Hence, the approach consisted of identifying the retained as well as already-lost know-how, developing the missing parts and creating a simple manual for the construction of earthquake-resistant dwellings with local materials and skills. Even more important was to establish the self-confidence and the motivation among the local population through pilot projects and training. The jury has commended this project because it’s an encouraging example of self-reliance in exceptional situations and the potential of using advanced engineering knowledge to dramatically improve the efficiency and reliability of traditional techniques.

Holcim Awards Acknowledgement prize Asia Pacific
Advocacy of traditional earthquake-resistant construction, North-West Frontier Province, Pakistan

Project authors: Tom Schacher, Swiss Agency for Development and Cooperation SDC, Agarone, Switzerland; Thomas Fisler, Swiss Agency for Development and Cooperation SDC, Mansehra, Pakistan
Dongtan on Chongming Island in Shanghai will be one of the first eco-cities to be developed in China. Plans include a final population of up to 500,000, whereas this award submission concerns the planning of the start-up area at the southern end of the 84 km² site. The first phase providing housing for a population of 80,000 and 52,000 jobs in three overlapping urban villages fosters internal transportation by walking, cycling or public means. All the energy for buildings, infrastructure and transport will be from renewable sources. Waste will be recycled and organics used as an energy source. Lakes and canals form the surface water management system. The adjacent wetland will be protected by a 3.5 km buffer zone between the development and the sea. The huge project claims to achieve a footprint less than 2.6 gha, close to the average global footprint of 2 gha. This project has been commended due to its promising integral attempt to the sustainable development of the rapidly growing urban areas all over the world.

Holcim Awards Acknowledgement prize Asia Pacific

Dongtan Eco-City urban concept
Shanghai, China

Project authors

Peter Head, Nicola White, Elaine Trimble, Rainer Zimmann, Volker Buscher, Darren Briggs, Stuart Jenkins, Alejandro Gutiérrez, Chris Twinn, Roger Wood and Neil Harwood, Arup, London, UK; Braulio Eduardo Morera, Ove Arup & Partners, London, UK; Roger Henry Alley and Raymond Yau, Ove Arup & Partners Hong Kong Ltd, Hong Kong, SAR China; Andy Mace, Arup, Newcastle Upon Tyne, UK
This small school extension project in Tanisandra, Bangalore, India, shows in a convincing manner how local and robust materials and technologies can lead to an outstanding result, i.e.: a cost effective, durable, functionally sound and aesthetically rewarding as well as environmentally-compatible school building. The project was initiated by the local population and then managed by the community officials. Such initiatives are of vital importance because public buildings in emerging countries are particularly prone to suffer from a lack of care and poor maintenance, and are therefore amongst the most neglected buildings. Fast deterioration of such structures does not only cause economic threats but leads also to severe institutional and social damages. The easily transferable and innovative strengths of this project are the convincing demonstration of low embodied (grey) energy, carefully engineered natural stone foundations and rammed earth walls for the building, a systematic integration of a closed water and waste cycles and in addition generating a new visual identity to the previously rather dull school compound.
The "Ghost City" of Fengdu is located on the western side of the Three Gorges Dam on the Yangtze River. Due to the construction of the dam, the original and abandoned city is periodically flooded depending on water captured in the dam. A new settlement had to be built on the top of a wide protective embankment to the north. For thousands of years, Fengdu has been regarded by native beliefs and in Taoism as the location of the inferno and the final trail, which maintained in Fengdu a duality between the real and the opposite shore. By taking advantage of rebuilding the city, comprehensive development planning has started that involves authorities and the whole population. The consistent rebuilding process covers a multi-faceted content of urban space and cultural elements, including shape, scale, type, construction, craftsmanship and aboriginal life. The jury has commended this project due to its strong vision to conserve the historical heritage and cultural traditions through a careful rebuilding of the ancient town.

Holcim Awards Acknowledgement prize Asia Pacific

Revitalization and relocation plan for Ghost City Fengdu, China

Project authors

Kai Sheng Li, Yu Hua Jin and Ji Feng Zhou, China Academy of Art, School of Architecture, Department of Urban Design, Hangzhou, China; Nu Peng and Nan Kai Xia, Tongji University, College of Architecture and Urban Planning, Shanghai, China

The "Ghost City" of Fengdu is located on the western side of the Three Gorges Dam on the Yangtze River. Due to the construction of
This project addresses two very common and serious problems in rapidly-growing cities: flooding and water pollution. Suzhou Creek in Shanghai belongs to one of the most polluted stretches of water in the world. Its flow direction isn’t constant due to the periodical variations of the sea level which leads to intermittent flooding in wide parts of Shanghai. The visionary idea regarding the control of the water flow and its pollution is not to rely on traditional protective structures and water purification processes, but to divert the polluted water into a landscaped texture which allows control of the varying water level and reduces pollution by a phytoremediation process. The cleaned water will seep away and nourish the ground water reservoir of Shanghai and therefore reduce the frequency of ground resettlement due to variance in the water table under the city. The river flow as well as the contaminants of the water will be controlled by computational fluid dynamics simulation. The jury commended this proposal because its smart concept is unique and uses the most natural way to reform the hydrological system of Shanghai.
This project deals with informal settlements in Dharavi north of Mumbai, the biggest slum in Asia covering an area of approximately 220 ha and housing some 600,000 inhabitants. Due to the exponential growth of Mumbai, the informal settlements at Dharavi shall be cleared and transformed into modern business and housing districts. Therefore it was intended to sell the land in its current state, leaving the new owners to invest in infrastructure and buildings, and implying the relocation of the current inhabitants and their businesses. This project aims at an inverse approach by paying respect to the existing social fabric. First, the public shall invest in the infrastructure such as sanitation, electricity, roads and public transport and then each neighborhood will be rehabilitated within its ancestral location and at the expense of the present dwellers, protect the current residents from the need to relocate. This project has been commended due to its unique and robust strategy which is based on a sound and astonishingly mature in situ analysis.
This project argues against the increasingly generic high-rise trend in Shanghai and other large cities in China. It favors a more reciprocal infill strategy of preserving urban heritage and re-introducing low-rise high-density fragments. In order to realize the anticipated additional housing space the existing buildings shall be extended and renovated, courtyards shall be built and the public areas revitalized. Such a transformation will strengthen social cohesion and shared responsibility. This community building process at a small scale also facilitates joint investments in alternative energy production, rainwater harvesting and in other sustainable endeavors. The project is commended due to its valuable contribution to the evolution of urban typologies that manage change with social and cultural continuities.
Perception after a long journey through all regions of the world: sustainable construction has become globally prevalent common sense; Marius Leutenegger (text) and Nikkol Rot (photos) visited the 15 finalists of the global Holcim Awards competition in order to present them in this book.

If we had to describe the trips to the 15 winners of regional Holcim Awards 2008 in a single word, we would not have to search long for the answer. These trips were above all one thing: diverse.

Anyone who within a very short time has visited a remote village in Uganda, gigantic construction sites in Dubai, and an informal settlement in Colombia to collect documentation for illustrated reports can imagine what we mean. In many ways, a fitting adjective for the long journey we made would also be “strenuous”, but let’s stay with “diverse”!

Diverse were the locations we saw. Diverse were the problems tackled by the project authors – the winners of the five regional Holcim Awards Gold, Silver, and Bronze. And the project authors themselves are as diverse as their proposals. The ideals of
The focus on compelling projects that won a Holcim Award cannot erase the picture created by the bulk of shameful buildings, missed opportunities, and concepts without a soul. These are still encountered everywhere, often adjacent to projects that won a Holcim Award. One must only think of some of the airports, hotels, office buildings, and university buildings we experienced on our trip.

Lighthouses of sustainable construction, such as those presented in this book, are not enough. Sustainable construction must become the norm. Signposts on the road to sustainable construction are sufficiently present everywhere in the world. Some of them are introduced in this book. Our reports on the winners of the four global Holcim Awards 2009 begin on page 14 and the other 11 projects nominated for this competition on page 122. Enjoy the trip and its diverse destinations!

Sustainable construction are no longer upheld only by a dedicated circle of visionary insiders, but have become globally prevalent common sense.

What else could explain that the interviews led us to highly degraded areas that hardly deserve the name environments, and also to spacious offices on Wall Street in New York? We met architects in stylish dress and urban designers in tattered tennis shoes. We spoke with dynamic young professionals full of vision — and with relaxed older gentlemen full of experience.

The winners of the Holcim Awards are miles apart in their political convictions, lifestyles, and design possibilities. That’s good for a photographer and a journalist, because variety makes it easier to put together attractive reports. But it’s mainly good for sustainable construction and — although it might sound an empty platitude — for the global community. The idea of sustainable construction has crossed all geographic and social borders.

The encounters with the competition winners showed us clearly that for many architects, engineers, and city planners — sustainability is not a detour on the way to the goal, but truly a central concern. Sustainable construction has outgrown the nursery. Where it was cuddled, but also not yet taken so seriously. It has come out into the big world.

There is still another broad impression we brought home from our trip that can also be easily summarized: “project hardship”. We feel that, in spite of the common sense among design professionals, the road to a sustainably-built world is still long and in places quite rocky.
The brief: a building complex to house 11 ministries of the Hungarian government in Budapest. The response: a comprehensive approach to urban renewal. Architect Péter Janesch and his team developed a project which not only meets client needs, but includes the revitalization of neighboring urban areas. The result, therefore, is the design of an integrated and operable urban system.
“I think in systems,” Péter Janesch says during a walk through his hometown of Budapest. “A system that functions well is more important to me than obeying the urge to create something unique or aesthetically appealing.” As example, he points to a structure beside the city’s main railway station. The famous station building, designed by the studio of Gustave Eiffel in 1877, has a new neighbor – a multi-storey car park. On its roof is an outdoor complex including café, playground and viewing platform. But the space is not well utilized. “If the system doesn’t function, the architecture has not been well-designed,” he explains.

New location for a long-term project
Systems-thinking won Péter Janesch his biggest project to date – the building of the new Hungarian government complex. For years, the government expressed the desire to find a solution to the dilemma of having its various ministries scattered throughout the city.

Efficiencies of operation were close to nil. Maintenance, renovation and costs of re-organization were becoming greater. Over time, various site proposals had been flagged, looking at one city area or another. Then, in 2007, agreement was reached – the 30 hectares of largely vacant land beside Gustave Eiffel’s railway station.

All woven together
An international competition was announced for the design of the new government quarter. The jury received 17 proposals; the winner – Team0708, a Hungarian-Japanese co-production. Péter Janesch was team-leader of more than ten young Hungarian

“A system that functions well is more important to me than obeying the urge to create something unique or aesthetically appealing.” Péter Janesch
architects and 25-30 specialists; Kengo Kuma, well-known for his work in natural materials, led another team of architects and specialists. “Kengo held a lecture in 2007 at a conference here in Budapest. When he heard of the competition, he requested local support – even though the competition was international, the host language was Hungarian.” The teams divided the work amongst themselves – the Japanese looked at the West End City Center 2 and related urban design issues while the government building was designed by the Hungarians. Péter Janesch and his team worked on a complex of glass and concrete with a horticultural façade – 400 meters long, several storeys high, housing some 150,000 square meters of space for all government ministries. The building, however, is not a square block, but a woven tapestry of spaces connected by inner courtyards which provide for the circulation of light, air and heat. According to the Budapest competition jury led by architect Adam Sylvester, chairman of the Hungarian Chamber of Architects: “The building is open, spatially variable with the possibility of reorganization as required. It does not represent a symbol to power.”

**An integrated concept**

This last point of the jury’s was very important for Péter Janesch. “It was clear from the outset that we would not design a government complex with “power” as its leitmotif. Instead our goal is to be a model of common sense, responsibility and sustainability.” Architecture cannot help but be political – the questions confronting the profession today have changed, just as the political context alongside it has also changed.

Through the project’s integrated concept of energy, architecture and urban renewal, it aims to raise awareness within the community and demonstrate the long-term bene-
fits of such an approach for the nation’s future development. The designed complex is indeed a role model of eco-consciousness. Its sustainable energy concept fulfills zero-emission requirements. Heat pumps meet 100% of heating and 50% of cooling energy needs. The remaining cooling needs are met by ground air collectors applied to the base plate of the railway lines (or, alternatively, via water piped from the river Danube).

Wall heating and cooling is combined with extreme thermal insulation using innovative materials. Direct heat impact is eliminated by plants on the façade. The use of natural light significantly reduces electricity consumption. Green electricity and hot-water needs are met by solar vacuum tubes and photovoltaic panels. Rainwater is collected, there is split wastewater management. Selective waste management is carried out on site.

“I learned a lot with this design – especially about the integration of new technologies.” Péter Janesch

All these measures will lead, in the next 25 years, to energy savings of some USD 700 million. The financing concept for the complex is also sustainable. The plan is for private investors to buy-in and then lease the buildings back to the state. “Private owners are interested in good building quality,” Péter Janesch says. “They do not want the expense of constant renovation.”

“Four quarters make a whole” Behind Péter Janesch’s quiet demeanor lies the excitement of a man at work on a project he believes in. “I learned a lot with this design – especially about the integration of new technologies. Bringing together technologies for sustainable building services, eleven different functional units, security requirements, the system of green façades, creating the balance and logistics for all this – it was an enormous challenge.” But he is
proud of the result. “It is beautiful to see it all come together – as a system. There is poetry in its complex simplicity.” Yet the government building is only one part of the architect’s vision of a fully-functioning system. “Placing this structure in the middle of the city raises many questions. It needs to have a relationship with the spaces around it. We need to find an equilibrium between its quality and its surrounding environment.”

The team’s ambitious plan is to entirely transform the poorly functioning urban area neighboring the project location. The government building is set into a framework of three equally radical interventions.

“The new complex is only one quarter,” Péter Janesch explains. “It only becomes whole after reworking the other three precincts.” In this way, the resulting system will be more than the sum of its parts. The first intervention concerns the railway lines themselves. Team 0708 suggested taking the rails and station functions underground in order to create a huge public park. “The railway splits the city,” he says. “We needed to create a connection.” That connection is continued through the new urban precinct – with public functions on its lower floors, the aim is to ensure the quarter is highly accessible and open to walk-through.

**Urban renewal**
The second intervention concerns redevelopment of the town square in front of the station building. The Eiffel Hall itself will be renovated as an attractive public space, a worthy gateway to the new quarter. The final intervention is a full renovation of the 22-block urban area across the street from the new government building. The historic Terez quarter has fallen into a state of decay. Its fin de siècle architecture is run-
Opportunities to transform
Péter Janesch knows it isn’t simple to ease traffic and take parked cars off the roads. “Everyone hates traffic in the city, even those who drive – it is always preferable to walk through a dedicated pedestrian precinct than slipping in and out between parked cars.” It is a common problem in most cities – the paradox of a car being faster between A and B against the reality of traffic jams. Thinking this through led down and neglected. The ground floors of its buildings are heavily underused – only a few low-profile discounters and other retailers serving occasional customers. Traffic and parking is a problem. “A comprehensive approach to urban renewal is needed here,” Péter Janesch believes. “If we create mixed-use zones with an emphasis on pedestrian traffic, liberating them from parked cars, life will return to the quarter. It will be valued differently.” The flow-on effects are clear – more investment, the renovation of buildings and so on.

“Everyone hates traffic in the city, even those who drive – it is always preferable to walk through a dedicated pedestrian precinct than slipping in and out between parked cars.” It is a common problem in most cities – the paradox of a car being faster between A and B against the reality of traffic jams. Thinking this through led down and neglected. The ground floors of its buildings are heavily underused – only a few low-profile discounters and other retailers serving occasional customers. Traffic and parking is a problem. “A comprehensive approach to urban renewal is needed here,” Péter Janesch believes. “If we create mixed-use zones with an emphasis on pedestrian traffic, liberating them from parked cars, life will return to the quarter. It will be valued differently.”

The flow-on effects are clear – more investment, the renovation of buildings and so on.
The expression of interest has been received. For example, the expectation of additional traffic, a consequence of the density of government administration centered on a single location, cannot be handled by existing road infrastructure, only in a much wider context. "This lies outside the sphere of influence of investors, who don't have the political means for controlling larger-scale urban processes," he explains. "Taking on such risks is not for the serious player."

Intervention as investment

Whether the project will be eventually realized, Péter Janesch can only answer with a shrug. "The situation was rather strange," he remembers. "We had won this international competition, but we weren't only celebrating our selection, but also being mindful of the long road ahead. This was no football tournament – "there you win, you go home, you celebrate. Here you have over 25 years – the other two-thirds come from maintenance and leasing, respectively. The government plans to sell previously used buildings to private investors to help cover a fair proportion.

Politics, politics …

Yet, despite it looking good on paper, there are still discussions within the Hungarian parliament about the project’s viability. "A lot is politically-driven," Péter Janesch admits. Although each administration since 1989 has planned the establishment of a government quarter, there is opposition critical of the investment required for its realization, describing the project as building a "new aristocracy". As a result, the new ministries precinct, and by default all other proposals, are currently on hold – due to unclear definition of roles and cost-sharing, interest from private investors has diminished, and indeed, in the end, only one expression of interest has been received. For example, the expectation of additional traffic, a consequence of the density of government administration centered on a single location, cannot be handled by existing road infrastructure, only in a much wider context. "This lies outside the sphere of influence of investors, who don't have the political means for controlling larger-scale urban processes," he explains. "Taking on such risks is not for the serious player."
to win again and again. First, the project has to be carried out, and second, it has to be realized well.” In Team0708’s case, there was the pressure to continue working, but then in the blink of an eye, the project’s suspension. Now, however, batteries recharged, he is hopeful the project will be resurrected. The government has signaled that the project is by no means off the table: “During the process of preparations several issues have been raised … which proved to be time consuming, … postponing but not cancelling the construction of the new government quarter,” a report announced. The team, therefore, has a green light to work on the concept in detail.

“We need to find an equilibrium between the building’s quality and its surrounding environment.” Péter Janesch (pictured above)

“The desire to build a new seat of government is a radical idea which takes much time and planning to be realized. In the case of Brazil, a decision was taken as early as 1891. However it was not until 1956 that construction began on the new capital, in the geographic center of the country; in 1960 Brasilia was inaugurated. Urban planner Lucio Costa envisioned the new city as “progress” – for him, the form of an aeroplane represented this idea best. Oscar Niemeyer was the architect responsible for building the city. His cathedral and parliamentary buildings are iconic structures in 20th century architecture.

Many countries search for an appropriate symbol to represent the values and cultural integrity they stand for – for example, Germany, against its historic backdrop. In 1963, architect Sep Ruf designed the new seat of government in Bonn – the idea “transparency”, the building an objective representation of same. After unification in 1990, the question stood before the nation again. This time Axel Schultes and Charlotte Frank were the designers. Their “Band des Bundes” stands in Berlin as a symbolic bridge between East and West along the length of the city’s river – reconnecting what was lost, representing hope for a common future. Meanwhile, in the Bulgarian capital of Sofia, renowned architects Norman Foster and Zaha Hadid are busy working on that city’s new government precinct. As in Budapest, the plan is to have all ministries, currently strewn across the city in outdated buildings, brought together in the one location by 2012.

In conclusion, investors, community.” Nevertheless, for this architect who thinks in systems, it is worth the effort. “The construction costs are high, yes, but more than compensated by the lower operating costs and revitalized economic growth it will bring to adjacent quarters,” Péter Janesch says. “The intervention is long-term. And that makes it a good investment.”

Seats of government – objects and symbols

With the railway lines underground, the station building will be free for other uses.

The quarter proposed for the new government complex is potentially one of the most valuable areas of Budapest.
With more waste than ever heading toward the incinerator, opportunities arise for former landfills to be put to new use. A team of Spanish architects and urban planners designed an innovative project in Maribor, Slovenia, to renaturalize an area once recognized only by its mounds of garbage.
Since the beginning of industrialization and the time of mass production, we have lived in the Age of Waste. Each day, every day 130 million tonnes of trash is thrown away. In a lifetime, the average American builds a mountain of garbage the size of an Egyptian pyramid. Despite various measures over recent years, the waste problem worldwide is not becoming any smaller. On the contrary, consumerism seems to be providing us with more opportunities to accumulate waste than ever before.

Natural paradise instead of garbage mountain

Nevertheless, the waste itself seems to disappear from our sight. Where there were once landfills, in many developed countries different disposal options are now becoming more accepted. Unfortunately recycling is still in its infancy – only around 6% of waste generated worldwide is reused. A lot is incinerated. This opens up opportunities for former dumps to be reused. Often the plan is simply for rehabilitation of the contaminated areas and renaturalization with appropriate flora species. Yet, as settlements encroach on these once far-removed locations, innovative projects are being developed to reintegrate these spaces back into the cities they served.

One such example is Cairo. On the site of the 500 year-old, 40 meter high garbage mountain Dharassa now stands Al-Azhar Park, a 30 hectare green lung for the overpopulated and polluted Egyptian capital. Six hundred thousand plants transformed the former landfill site into a natural paradise. A similar project is being undertaken on New York’s Staten Island where, for over 50 years, garbage was piled up into mounds simply named North, South, East and West. With mound “peaks” topping the Statue of Liberty by 25 meters, over the next 30 years, the Fresh Kills landfill – at 2200 hectares arguably the largest landfill in human history – will be transformed into its own green lung of reclaimed wetlands and landscaped parklands.

Spanish ideas for a Slovenian dump

On a significantly more modest scale, but extremely impressive in its conception, is the project planned for the former landfill...
site at Pobrežje, just a few minutes drive from the Slovenian city of Maribor. Disused for years, city planners were searching for innovative ideas to transform the site. They used the opportunity of the Europan young architecture and urban design competition to call for expressions of interest.

The Maribor project proved intriguing for a studio in Spain – ecosistema urbano in Madrid. The eight-person team led by Belinda Tato and José Luis Vallejo, specialize, as their name suggests, in sustainable urban design. Twice previously they had taken part in Europan sessions and won awards for their work.

“For us, sustainability also means leaving doors open for new opportunities.” Belinda Tato

Temporary is sustainable
Important for the project is the dimension of time. For Belinda Tato, it is a design parameter the equal of any other architectural or landscape element. “We understand architecture as a reversible
process that, due to its slow passage through time, requires a capacity to anticipate and think strategically,” she explains. “For us, sustainability also means leaving doors open for new opportunities. We were intrigued by the 25-year “life” specified for the site’s use. We could be creative, and flexible.”

The 25-year time horizon is to take account of the current phase of ecological rehabilitation. Longer-term, the plan is to accommodate student housing for the University of Maribor on the site.

“These parameters suggested to us a low-density option for the site. Our aim is to create a new topography – a temporary landscape on which it is possible to build temporary structures. Our philosophy is to manage a built object’s life – not only its construction, but its use and eventual dismantling, relocation or reuse in another context.”

**Life in every suburb**

In developing their concept, these young designers from Madrid wanted to ensure that the site did not become a lifeless suburb on the city outskirts, even if only temporarily. That they specifically considered this aspect says much about their experiences to date. “We see building sins committed each day in Madrid,” Belinda Tato says. “Urban design needs to be well-planned. There is no point constructing residential blocks which have no soul. If there is nothing attractive about a suburb, then people will not be motivated to developing a community spirit there.”

A local project on which the team from ecosistema urbano worked, in order to engage people in such residential developments, involved the siting of “air trees” along a central boulevard. The enormous hollow cylinders function as public spaces and can be used for various community activities. Self-sufficient, the clean energy generated is sold back into
the grid. The innovative design was commended in the first Holcim Awards competition with an Acknowledgement Prize in 2005.

**Starting from zero**

Integrating the Maribor development into the life of the city is therefore important for the designers. “It needs to offer something more, so that people will be attracted to visit,” Belinda Tato explains. “It should remain open around the clock, and address various needs. We are starting from zero – there is nothing interesting here, no lake, no vegetation, no old houses. Just a disused landfill!” With such unlimited potential, the result is unique – innovative and visionary. The new topography has been conceived as differentiated enclosures, the elevated landscape shaped into large circles which can host various sport, recreation or cultural facilities. Planned housing units are built into the perimeters, as earth shelters. “The rings are open air green spaces, communal for residential areas, or multi-purpose for public areas – a football field, for example, or a concert arena.” Important, however, is that nothing is “set in concrete”. The philosophy of the studio is that aspects of the design are left open for locals to decide. “We are serious about people using this space, and making it their own.”

**Motorway as communication channel**

An important target group for the Maribor project are motorway users. The former landfill is close to a major arterial – the planned Pan-European motorway from Barcelona to Kiev. “This is a big advantage,” Belinda Tato says. “Our aim is for Maribor to be an attractive location for a pit-stop – travelers will find anything from children can play safely in the car-free areas of the quarter – that strengthens neighborhood spirit.”
accommodation to open-air concerts here.” The road infrastructure will be a prime communication channel, with signage pitching the site as a Five-Star service area.

**Stimulating change**

The most important group, of course, who must feel at home in the revitalized setting of an old dump are the residents. “Our plan is for the new city quarter to offer something new and genuinely different.” The entire space is planned to be car-free. Pedestrians have priority at all times. A single bus line is foreseen. “Children will be able to play directly in front on their homes, without danger,” Belinda Tato explains. “That strengthens neighborhood spirit.”

The earth shelters have been designed as multiuse spaces – flexible, affordable and energy-efficient. They follow the concept of a greenhouse, and are enclosed by

“Our plan is for the new city quarter to offer something new and genuinely different.” Belinda Tato
specified. “Today the market still thinks in square meters; it is too conservative. But if we think in cubic meters, we can make better use of all available space – people are often more flexible than the market thinks.”

Sand in the gears
Whether the project is given the green light is still unclear. Government authorities were thrilled with the designers’ concept; they won the Europan competition. But with an election in the interim and new members of government appointed, the fate of the project remains in the balance. “We have sand in the gears,” Belinda Tato explains. The hope is that the Holcim Awards win will bring new impetus to the government to proceed with the project. The ring-concept is a distinct advantage in this context. It allows for gradual development with a lower investment risk. Step by step. Or, in this case, ring by ring.

The architect remains optimistic. “We have already transformed thinking with our designs,” she says. “And there are many former landfill sites on the outskirts of cities where our project could be realized, if not here.” She is also pleased that a “win” for sustainable construction has been registered. “Sustainability means nothing else that designing the best building for a certain location using the least resources possible. It is a criteria for success!”

The large public spaces are open to many uses – football field, concert arena, landscaped parkland.

The housing units are designed as a selection of prefabricated cubes, 3D components comprising kitchen, bathroom, living area and so on, which are owner-

“Sustainability means nothing else that designing the best building for a certain location using the least resources possible.” Belinda Tato

glazed surfaces – this enables passive solar heating, while cooling needs in summer are met by subterranean air pipes. Blending the housing units into the landscape, blurring the lines between natural and artificial, is not just an aesthetic principle. The thermal energy embodied in the earth shelters radiates out and will encourage nearby plants to regenerate more quickly.

The large public spaces are open to many uses – football field, concert arena, landscaped parkland.

...
“Things are not yet as good as they could or should be.” Belinda Tato (pictured above)

“Sustainability must be natural!”
“Sustainability must be seen in the future to be as necessary to a building as its foundations. It must be a perfectly natural part of our life, not an add-on or something special,” Belinda Tato believes. “Then we would have no need for conferences or competitions in sustainable construction. All construction would be sustainable, as a matter of course.

“It is nothing new,” she adds. “This knowledge has been around for a long time.” But she is practical – “things are often not as good as they could or should be.” Yet with energy and commitment, studios such as ecosistema urbano are well on their way to helping build this ideal world.
Near Zermatt, overlooking the Monte Rosa glacier in the Swiss Alps, a new mountain hut is being built by a partnership led by the ETH Zurich. Its message: sustainable construction is possible in any setting. If a building can be constructed in “splendid isolation”, under extreme climatic conditions and be fully self-sufficient, then the concept can be replicated anywhere.

Regional competition Holcim Awards Bronze 2008 Europe; jury appraisal page 52
A tough job, but a spectacular workplace: during a short alpine summer, a small yet skilled team sets about constructing the foundations for a new mountain hut in the moraine beside the Monte Rosa glacier. They are 2883 meters above sea level, and with a view of the world famous Matterhorn. But there is no time to enjoy the scenery – work lasts from sunrise to sunset, without any of the comforts of home. No electricity, no running water, no sewerage. Each night they find themselves in bunk beds of the century-old mountain hut which their new and sustainable construction will replace.

**University and Alpine Club**

There are more than 150 such mountain huts scattered throughout the Swiss Alps offering simple accommodation to hikers and climbers. They are under the stewardship of the Swiss Alpine Club (SAC) which has some 120,000 members – mountaineering is a popular sport. The Monte Rosa hut can be reached from Zermatt by cog railway, followed by a three hour hike. Built in 1895, over the years it had been extended, but its aging infrastructure was insufficient for the needs of today. The SAC, however, had no funds to commit to a major renovation.

Fortunately, at the right time, along came ETH Zurich’s 150th anniversary celebrations. How should the Swiss Federal Institute of Technology best celebrate its reputation as a renowned university of engineering and architecture? Something lasting, something sustainable. Meinrad Eberle was the professor responsible for the celebration, but his wife came up with the idea: why not design a sustainable mountain hut for the SAC?

The Alps stretch across a 1200 km arc from Austria and Slovenia in the east to France in the west. 128 of its peaks are over 4,000 meters in height. The most famous is the Matterhorn – close by is the new Monte Rosa mountain hut.

Beautiful, but its aging infrastructure is insufficient for the needs of today: the old Monte Rosa mountain hut.
Almost totally self-sufficient

Professor Andrea Deplazes from ETH’s Department of Architecture was appointed to develop the concept. Together with a SAC hut expert he looked at which huts needed renovation, which ones had the most interesting challenges. “Some are in amazing locations, at the foot of a high cliff, for example,” he describes. “But we wanted to ensure that it was not only extreme sportspeople who could use the facility.” They agreed, therefore, to support Monte Rosa, which could be enjoyed by more hikers.

A specific architectural studio was established, masters students were invited to contribute. In the first semester, ten students contributed their designs. The six most interesting designs were brought forward in the following semester – this time 12 new students contributed their ideas. The didactic concept of changing design teams worked. Two designs made the cut to the next stage – to be further developed by specialists.

After four semesters, there was a result. “It was a castle in the air, just as we had visualized,” Andrea Deplazes says. A spectacular castle at that – the students had designed the hut to be almost totally self-sufficient in its remote mountain location. Energy efficiency, of course, is a prime concern. The design enables some 90% of the hut’s energy needs to be met by itself – by harnessing the sun’s energy as well as the building’s thermal mass.

Members of the Studio Monte Rosa team (from left). Marcel Baumgartner, Andrea Deplazes and Kai Hellat.

Building materials were brought in by helicopter, and needed to be as light-weight as possible.
What is not immediately needed can be stored for future use via battery banks.

**Best-case scenario**
The concept concentrated on developing solutions within a self-sufficient environment. Its technical autonomy extends beyond its own energy production to water collection and systems for treating solid waste and waste water. An integrated water circulation system sees melt water collected in a cavern, and waste water recycled wherever possible (for example, with the flushing of toilets). “We looked for optimal efficiency at every turn,” Andrea Deplazes explains. “We used climate data, building data, looked at visitor records, considered use cycles. We have modeled an entire system of how the hut will be used and how the design can be most efficient in enabling user needs to be met.”

The architectural form of the hut also reflects this goal. A ball or cylinder design delivers the smallest surface size relative to volume, hence conserving energy. The Monte Rosa project took this exacting principle at its word – developing a ball-shaped but geometrically-segmented form. It looks like a quartz crystal, an impression that is only heightened by its outer metallic skin studded with photovoltaic panels. Into this crystal is packed some 3700 cubic meters of space, divided into 50 areas. The design includes a spiral-shaped glass band which follows the sun, bringing passive energy into the cascade staircase which winds its way up the building’s periphery. Full advantage is taken of the spectacular landscape, but an important practical purpose is served as well – air circulation across the hut’s five floors.

**Architectural flight-simulator**
The students took the opportunity to think about so many alternatives, so many “what ifs”, that the project developed into a type of architectural flight-simulator. “There were diverse challenges for which we needed to find solutions,” Andrea Deplazes says. “Universities mainly operate in the theoretical space. We needed to ensure that important job – the selection of the ideal building site.

Melt water is stored in a cavern.
manager Marcel Baumgartner says. “At one stage the students considered quarrying stone from the building site and making concrete, but at the end we agreed on a wooden lathe building method.”

Comparatively speaking, the structure is a veritable “lightweight” using only 200 tonnes of building materials. Pre-fabricated elements are produced down in the valley and computer modeling helped decide the most optimal way to assemble the various components before delivery to site. This integrated manufacturing technique was designed to ensure minimal material consumption and transport weight as much as efficient use of on-site building time.

The wooden structure and its thermal insulation will be packed into its thin metallic skin. The whole structure stands on a spider-like steel platform – joined to the

"We needed to ensure that the design we came up with would actually be built, not end up in a drawer.” Andrea Deplazes

The “light-weight” wooden structure is made of computer-aided prefabricated elements.

the design we came up with would actually be built, not end up in a drawer.” Extreme care was taken, therefore, and many other specialists were brought into the equation.

“It was an interdisciplinary approach – a collaboration involving other ETH departments, further universities, industry planners and SAC experts. All together they demonstrated to the students what a complex and integrated task developing a sustainable mountain hut can be!”

Treading lightly ...

With the design agreed, thoughts turned to financing. Together with funding from the ETH R&D budget, sponsors were sought for the ambitious USD 5 million project. The expense lay mostly in the transport of building materials – by helicopter. “That optimized many of our decisions,” project
ground by only ten steel stilts and concrete foundations. “This is to ensure the hut does not interact with the permafrost – we don’t want its stability compromised by the warmth generated by the building,” Marcel Baumgartner explains.

Not as high-tech as it seems
Even if the new hut seems high-tech, it isn’t. The designers concentrated on using existing methods and technologies, modified where necessary. However it is important that what is within and without

“There is no infrastructure here, there is no tradesman to call if something breaks, there is no power point in which to plug the coffee machine.” Andrea Deplazes
The students needed to think about this in depth, in order to come up with their concepts. “Besides the glacier, there is nothing else which is different to any urban location’s architectural or technical requirements,” Marcel Baumgartner continues. “Cooking is done with natural gas – if we had made the hut 100% self-sufficient, it would not model life.”

**Better without a hut?**

Even if the new hut is a model of sustainable construction, fundamental questions remain about sustainability overall. Is it appropriate that a building is constructed for 120 people’s comfortable overnight accommodation in such a sensitive location, with helicopter transport required to fly in everything needed for their sustenance? What about no hut at all, and nature returning to itself?

Andrea Deplazes is circumspect. “Everyone has an opinion. There are no simple answers. In return I could pose the question: what happens to this region if there is no more tourism? What effects would that have on the local population?” Renovating the old hut was no option. “That would have resulted in a far less sustainable solution,” he says.

The location is not conducive to mass tourism. Helicopter transport is only for supplies. Each hiker must walk in under his or her own steam. But Andrea Deplazes is
The old hut was built directly on the edge of the glacier – now it is in the midst of moraine. The glacier has retreated hundreds of meters, some has split off into the lake at its base. A case of “seeing is believing” for all visitors to the area.

Meanwhile, the new hut’s energy consumption will be published on the Web. Visitors can measure their own impacts. In warmth and comfort, they will see that they are responsible for only a third of the emissions generated by the old hut.

“Less is more” is set to become a mantra as strong as “seeing is believing”. But for Andrea Deplazes and his team, it has been worth the effort to bring this project to fruition. “It was an intensive five years,” he says. “I feel like we’ve run a marathon. But it was the right one to run.”

“The principles used in this design can be made anywhere, because the sun is everywhere.” Andrea Deplazes (pictured above)
The need for energy in New York continues to grow along with the city’s development. As the city’s first solar-powered “Green Energy, Arts and Education Center”, Solar One’s objective is to demonstrate that sustainable development is possible in the middle of Manhattan. The center’s plethora of outreach programs demonstrates the potential that comes from harnessing the sun’s energy. With the building of Solar 2, the first carbon-neutral building in the city, they aim to put all these ideas into practice.
147
closely tied to that of the park. In the 1980s, a huge development was planned on the site of, at that time, a parking lot. Residents took their outrage to the streets, criticizing the danger such construction would present to the sensitive river bank area, already heavily degraded. Finally, the building project was stopped. Discussions then turned to other proposals. A park was agreed by city planners but with two conditions. Stuyvesant Cove Park on 23rd Street downtown Manhattan hugs the bank of the East River. To the west it borders Franklin D Roosevelt Drive. Around the clock traffic thunders past, as well as on the highway above. The busiest petrol station in Manhattan is on the park’s northern edge. The silhouette of a power plant looms in the background. Its location seems hopeless. But once entered, the contrast to its surroundings is stark. Here lies one of the best-maintained parks in New York, rich in biodiversity. Birdwatchers congregate to observe rare waterbirds and migratory species, a flowering oasis lures bees and butterflies. In a sea of fuel consumption, it is a treasury of nature.

**Born from resistance**
The 5,000 square meter park attracts many visitors – to enjoy nature as well as attend outreach events at the unique Solar One center neighboring the petrol station. The history of this not-for-profit organization is closely tied to that of the park. In the 1980s, a huge development was planned on the site of, at that time, a parking lot. Residents took their outrage to the streets, criticizing the danger such construction would present to the sensitive river bank area, already heavily degraded. Finally, the building project was stopped. Discussions then turned to other proposals. A park was agreed by city planners but with two conditions.

**Solar 2** redevelops a brownfield site, bringing life to a degraded space with creative use of industrial waterfront.

**Solar One** bursts at the seams – time to expand...
education programs for New York’s children – “environmental education is not normally covered in the school curriculum, nor is the science that goes with it.”

“A-ha – wow, that’s cool!”

Thousands of school children have visited Solar One’s center in the park, many more have had Solar One come to them – in classrooms throughout the city, educators demonstrate energy and water-efficient measures, and work with the children on “eco-art” projects.

Outreach to teenagers and young adults has a different focus – “our green design lab and green innovator courses look at sustainable design and manufacturing,” Chris Collins explains. “We show the different career possibilities, whether as an engineer for a hybrid car, or a parks employee,” he says. “Put simply, green-collar jobs.” As part of the

The right place for energy efficiency

In 2002, the park was opened. Since then various volunteer groups such as Park Angels have invested thousands of hours into its maintenance. The following year, CEC opened the Solar One center. Chris Collins is its executive director.

The New York lawyer had practiced for more than 20 years before deciding to call “time-out”. “It was time to think about what to do with the rest of my life,” he says. Solar One was the answer. His enthusiasm for the career change is infectious. “We are the only organization that is totally focused on energy efficiency – although the last two years have seen a 2% decrease, still 77% of all CO2 emissions in the city come from buildings,” he says. “New York is the right place to open a center such as ours.”

Solar One began its outreach with innovative primary and secondary school

Residents fought for years for the Stuyvesant Cove Park.
“It is becoming clearer to people that going green means more quality of life.” Chris Collins

Going green
The change in public consciousness in the US to all things eco-friendly has been recent, but relatively fast – something which has contributed to Solar One’s success, but which they are keen to harness further. In fashion-speak, green is the new black. Finding an advertisement that does not tout the environmental advantages of its product is difficult. The political scene also places sustainability issues high on the agenda. “It is becoming clearer to people that going green means more quality of life,” Chris Collins believes. “Children are important multipliers of this message. When they go home after a classroom program, students build mobile solar plants which are showcased on Broadway and throughout the city. Broader community outreach includes a ‘green renter’ lecture series which aims to engage householders via weekly talks on sustainability topics and opportunities for self-action.

Meanwhile, a cultural program includes free art, dance and music performances in the park – appropriately solar-powered and introduced by Chris Collins himself. “I step up on stage and explain where the energy comes from for these events,” he says. “It’s a real ‘A-ha – wow, that’s cool!’ kind of moment.”
“Every decision has an environmental impact – whether it is made consciously or unconsciously.” Chris Collins

Collins explains. “We want to expand into a much larger facility where we can do more.” For years, the Solar One team has dreamt of building a completely zero net-energy use facility as a symbol of New York City’s commitment to energy independence and environmental sustainability. Now the finished plans for this exciting building lie on the table.

Eco-apartment ideas
Solar 2 is not a museum, nor a playground, nor a classroom. It is a successful integration of all these things, and more. “It is designed to be unique – a place where it all comes together, and at a scale where people can see how it happens,” says the executive director. “It will be a sensory experience, a true learning center.” Solar 2’s exhibitions, and indeed its very existence, will demonstrate how the sun, vegetation and water are used for heating, cooling, power and lighting. Visitors will be able to witness these complex relationships between natural forces and urban systems in action. And understand how their everyday choices impact upon the world.

The center harnesses 750 square meters of interior and 500 square meters of exterior space spread over two floors. On the ground floor is an exhibition space, café and entry...
Above are classrooms and an eco-apartment/office display. "We will simulate everything," Chris Collins explains. "It will demonstrate how much energy is used – when a window is opened, the air-conditioning switched on, or the kitchen used," he says. "Every decision has an environmental impact – whether it is made consciously or unconsciously." The eco-apartment/office integrates the newest in energy-saving innovations as well as simple measures people can take already and information for visitors who have questions and need answers' he laughs. "Anyone who visits will learn something – what we hope is that it will also inform their future choices."

**Fully loaded**
Solar 2 itself will be the best ambassador for what is possible. Although there are already two LEED platinum buildings in the City of
New York, and another one on the way – Solar 2 is the only LEED platinum building that is also net-zero. Yet all the measures included in its design do not focus on technologies out of reach to the average home-builder. “We have gone as conventional as possible,” says Colin Cathcart, partner in Brooklyn-based Kiss + Cathcart. The architecture studio responsible for Solar 2 “couldn’t design an eco-unfriendly building if it tried,” according to a recent article in The Architect’s Newspaper. Indeed, Solar 2’s design is fully loaded with sustainable materials with the highest environmental rating will be specified – CEC’s assessment will include everything from an item’s durability, embodied energy and recycled content, to its manufacturing source, toxicity and pollution generation.

**Blended space**
Solar 2 is self-sufficient when it comes to energy. An 90kWh photovoltaic roof will meet all its electrical demand, and more – all excess will be fed into the grid. “With this, we demonstrate that harnessing the
sun for electricity is possible anywhere,”
Chris Collins says. “It’s a myth that the sun
is only strong enough in Arizona to be an
efficient provider of energy in this country.”

The center is a powerhouse according to any
parameter, a worthy example of the bond
between the built environment and the
natural world. “Nature isn’t the enemy,”
Colin Cathcart adds. “It’s our best friend.”

To that end, Solar 2 is as natural a blend of
inner and outer space as a construction can
be. Cutaways and transparent walls are
featured. Encased in its green envelope, the
upper level questions the boundary
between natural and built; while the lower
level provides a visual connection to the
river – a connection brought home to
visitors in a reconstructed wetland as well
as programs focused on the water ecology
of New York’s estuaries.

Investing in the future
The project is a landmark of what is possible
in sustainable construction and urban
design. It redevelops a brownfield site,
bringing life to a degraded space with
creative use of industrial waterfront. Solar
One’s programs cover a plethora of topics on
renewable energy and conservation. The
enthusiastic and innovative way in which
the team outreaches to all New Yorkers will
ensure this new space is the meeting place
for learning anything and everything about
sustainability. And how people can personally
contribute to the solution of future energy
and environmental challenges – whether
architects, industrialists or proud New York
citizens. Solar 2 has important backers. Half
of its USD 12 million construction cost is
covered by local, state and federal govern-
ment. The project is seeking sponsors for
the remainder. Investors can take advantage
of tax credits and incentives from state and
federal schemes in renewable technologies.

Chris Collins has every confidence that
investors will come to the party. The in-
vventor Thomas Edison’s 1931 comment, to
his friend Henry Ford no less, has become
his mantra. “I’d put my money on the sun
and solar energy,” Edison is reported to have
said. “What a source of power!” As more
investors follow his advice, and sponsor the
construction of this important symbol, the
oasis Solar One pioneered in the park will
continue to grow, and take public con-
sciousness about our future with it.

“Nature is our best friend.” Colin Cathcart
Surrounded by the raw beauty of the Canadian wilderness, the city of Sudbury experienced environmental devastation. At the heart of the area’s ecological recovery is the Laurentian University Cooperative Freshwater Ecology Unit – which has outgrown the modest cottages that house it. The new Living with Lakes Center exemplifies the region’s metamorphosis and the importance of protecting the “blue gold” of the 21st century, freshwater.
The Sudbury basin was formed about two billion years ago. Sudbury lies at the centre of more than a million lakes in the Boreal Shield Ecozone.
Earth’s crust and created a pool of molten magma in which the heavy mineral nickel sank and concentrated in a layer.

Initially, Sudbury was just another sleepy loggers’ camp and this vast deposit of nickel ore went unnoticed in the early years of European settlement of the district. That changed when the Canadian Pacific Railway went through in 1883 and construction works uncovered the vast underground riches. The “Nickel City” of Sudbury became a typical mining boom town of the early 20th century.

**Poisoned lakes**

Although environmental protection was not a mainstream concept as it is today, the world’s largest nickel smelter constructed its Superstack in 1972 to address environmental performance. At 381 meters it is the tallest chimney in the western hemisphere, and the second tallest in the world. It dwarfs the Eiffel Tower and most New York skyscrapers. The intention was to take the sulfur oxide so...
high into the atmosphere that its dispersal over a far greater area would reduce concentrated toxicity – but by then much of the damage had already occurred. In a 200 kilometer-radius around Sudbury, acid rain destroyed flora and fauna, and poisoned lakes.

Sudbury lies at the centre of more than a million lakes in the Boreal Shield Ecozone. “We know that acid rain has poisoned around 7,000 lakes in the region,” John Gunn says. The biologist is a freshwater ecology expert, and holds a research chair in stressed aquatic systems at the city’s bilingual Laurentian University. “The extent of the disaster was almost inconceivable – in lakes within about 20 km of the city nearly all of the fish were gone.”

**Engagement for environmental protection**

John Gunn can make these statements in the past tense because much has changed over recent years – principally due to the untiring activism of people like himself. The building of the Superstack kick-started a whole range of public and private rehabilitation efforts – the city’s water reservoir, Lake Ramsey, was cleaned up; 9 million trees were planted over the years. At the 1992 Rio Earth Summit, Sudbury was one of 12 cities around the world to receive a special award for their community-based environmental restoration strategies.

“What can we do to strengthen the positive change we see?”

The decrease in sulfur dioxide emissions from the nickel smelter is as important for the ongoing environmental health of the region as any strategy to rehabilitate past actions. Mining technology and better filter systems have reduced emissions by 90 percent over the past 30 years. But there is much to do before this area of northern Ontario can be described as a natural paradise again.

Important efforts in this regard are being conducted by John Gunn and his team at Laurentian University. The university has a reputation for innovation in mining sciences, but also in environmental research. For the past 20 years, its Cooperative Freshwater Ecology Unit (CFEU) has been a partnership...
between industry, public authorities and researchers looking at the effects of acid rain on the region’s lakes, streams and wetlands. “We conduct studies to see if the measures implemented to date have improved water quality,” he explains. “Does fauna return when acid rain disappears? Why do some lakes recover more quickly than others? What can we do to strengthen the positive change we see?” These research questions, amongst others, inform projects undertaken by the CFEU. Their comprehensive approach has seen all 7,000 lakes studied by the scientists and their students.

Simple accommodation
This is one of the most important places worldwide in which to study the effects of acid rain. But you would not realize it on the basis of the four modest cottages which house the research unit. Previously used by bush pilots, the simplicity of the accommodation does not disturb John Gunn. “It’s a cozy atmosphere – our workspace reflects the work we do,” he explains. “Our goal is to make our ecological footprint as small as possible, so you won’t see us in an ivory tower!” Yet the needs of the unit – in terms of space and facilities – mean that these homely cottages will soon be part of CFEU’s.

“Our goal is to make our ecological footprint as small as possible.” John Gunn

Reminiscent of the glacial sheets that carved the rugged landscape: the Living with Lakes Center for freshwater restoration and research (LLC).
print is like a wish-list of all things sustainable. Wind turbines; solar-heated water; green roof to reduce storm-water run-off; storm- and grey-water treatment; natural day-lighting; energy-efficient lighting; appliances and smart building systems to supply or save energy.

Especially notable are its heating and cooling systems. In winter, the temperature can drop to below –30°C. Keeping things comfortable calls upon a clever mix of high-performance thermal envelope, ground source

15 percentage more efficient
The number of measures included in the new center to minimize its ecological footprint is like a wish-list of all things sustainable. Wind turbines; solar-heated water; green roof to reduce storm-water run-off; storm- and grey-water treatment; natural day-lighting; energy-efficient lighting; appliances and smart building systems to supply or save energy.

Especially notable are its heating and cooling systems. In winter, the temperature can drop to below –30°C. Keeping things comfortable calls upon a clever mix of high-performance thermal envelope, ground source

“it’s a strong symbol for a sustainable construction to be placed in the midst of an industrial city.”  

Jeff Laberge

history. Six years ago John Gunn began to think about his vision for the future – its name, the Living with Lakes Center for freshwater restoration and research (LLC); its atmosphere, no less cozy than the cottages of old, and its aim, to protect the 21st century’s “blue gold”, freshwater.

Of glaciers and forests
Planning for the new center began in 2006, including its location – below the university on the shores of Lake Ramsey. The architectural studio Busby Perkins + Will was engaged – the Vancouver firm is well-known for its green concepts. Together with a local architect, Jeff Laberge, they set to work designing a structure symbolic of Sudbury’s engagement in environmental rehabilitation.

First impressions stick – the building looks like a glacier curving down toward the lake. “We wanted to design something representative,” Jeff Laberge confirms. “For some the form is reminiscent of a glacial sheet that once scoured this rugged landscape. And the building’s wooden exterior tells the story of the pine forests that once dominated the region.” Coupled with its aesthetic presence, the two-storey center will be constructed to meet LEED’s platinum standard. “It’s a strong symbol for a sustainable construction to be placed in the midst of an industrial city” he says. “it’s a symbol for the future – from Nickel City to Science City.”

Whether from offices or labs, researchers and students can look out over Lake Ramsey, a constant reminder of the importance of their work.
heat pump, biomass-powered heating, hydronic radiant floor heating, and various passive measures.

The consequences of climate change are high on the agenda for the center – the building is designed to the climate in 2050. John Gunn laughs. “Even then, it will still be quite cold for us up here.” All strategies contribute to the facility being 70% more efficient than a conventional building – an impressive result which will boost eco-industry in the region and make a significant impact on construction employment and specialized technologies.

**Buildings as filters**
The design of the building is a collaboration between the architects and the university’s researchers. “We agreed to three goals,” John Gunn remembers. “Firstly, we wanted the location to profit from the center being here – the water quality should improve.” The LLC sets out to disprove the adage that the most sustainable building is the one that isn’t built at all. Its limestone foundations will neutralize metals in the acidic soil. “If you want to rehabilitate a patch of ground, you generally start by spreading crushed limestone over it,” he explains. The center will act as a filter to improve Sudbury’s drinking water supply. Driveways and parking lots are permeably paved over limestone to enhance the effect.

The researchers’ second goal was to maintain the good working atmosphere of their current home. “We want everyone to be happy working here!” John Gunn says. “The atmosphere in the cottages is great. We don’t want to lose it.” In the new center, at least 60 people will undertake creative, collaborative research. Their working area of 2,700 square meters is generous. “We build for now,” he explains. “But with an eye on the future. We want to grow as a team and contribute to more projects.”
Partnerships between university researchers and industry yield results. We have the opportunity to conduct research and share experiences that can have positive impacts elsewhere – collaboration rewards us both.

Likewise, Jeff Laberge, need only look out his car window on a drive through his hometown to see the rewards of this collaboration. “A year ago, there was nothing there,” he says, pointing to a verdant patch of ground. In Sudbury, it is just as possible to witness how fast nature can be destroyed as it is to see her strength to regenerate.

A mantra of “restore, reduce and renew” guides the CFEU team’s work – a case of living lakes and living with lakes, both symbolically and literally.

The huge windows of the open-plan office space on the second floor overlook the lake. Researchers and students are ever-reminded of the importance of their work. A second building houses the labs and all associated equipment – water probes, nets, boats, vehicles, and so on.

Contributions from industry

The third goal is financial. Ongoing maintenance is set at around USD 30,000. “CFEU is not interested in making money,” John Gunn says. “We’re interested in providing high quality research at no cost. We know that if our costs are higher than budgeted, we won’t be able to move to the new center.”

Behind this practical reasoning, however, lies a fundamental principle – spending as little as possible on energy. That way we have more to invest in research. The center will demonstrate a commitment to economic, social and environmental efficiencies – “it’s a sustainable choice, for worker productivity as much as reducing energy costs, and water consumption.” To build the center will cost USD 15 million. Most funding has been received – from industry, the university, and public funds – who together have the opportunity to support the building of a sustainable center for the future.

“Restore, reduce and renew”

“We have dedicated our lives to the struggle against environmental pollution, but industry itself is not the enemy,” says John Gunn. The mine managers here are young, environmentally-conscious – some were students here at the university.” Partnerships between university researchers and industry yield results. “We have the opportunity to conduct research and share experiences that can have positive impacts elsewhere – collaboration rewards us both.”

Likewise, Jeff Laberge, need only look out his car window on a drive through his hometown to see the rewards of this collaboration. “A year ago, there was nothing there,” he says, pointing to a verdant patch of ground. In Sudbury, it is just as possible to witness how fast nature can be destroyed as it is to see her strength to regenerate. A mantra of “restore, reduce and renew” guides the CFEU team’s work – a case of living lakes and living with lakes, both symbolically and literally.

“We’re interested in providing high quality research at no cost.” John Gunn

Helping nature help herself

Rehabilitation measures are widely used in the mining industry, especially in open-cut operations which require large surface areas. Often nature is capable of healing itself over time, but an initial kick-start to the process offers the opportunity for speedier recovery.

Depending on the objectives for the rehabilitated site – simple revegetation, conversion to another public use such as parkland or sporting facility; perhaps incorporating a lake or wetland environment – various strategies are used. They can involve anything from contaminated soil removal, contouring of slopes, backfilling of previously worked mine sections or simply adding topsoil and planting appropriate flora across the site.
For many years, the Colombian city of Medellín was subjected to much violence and criminal activity. A page has turned, and a stunning transformation stands in its place. Even in the informal settlement of Comuna 13, living conditions have substantially improved. But how did it happen? Behind the scenes are numerous stakeholders – government authorities, expert planners and designers, NGOs, businesses, and the community itself – all working together on projects which are moving the city and its people to a brighter future.
Fifteen years ago the annual murder rate in the second largest city of Colombia stood at 380 per 100,000 inhabitants. In 2007 the rate was down at 26 per 100,000 inhabitants. Today people walk the streets of Medellín in safety.

In the past, Medellín’s mild climate led to it being called “the city of perpetual spring”. Now, that title also applies to the quality of life enjoyed by its residents. The key to this impressive transformation was to look beyond the symptoms of urban degeneration – and to treat the disease. The ground was prepared for working together with all groups, including the poorest areas, and funds were made available for investment in urban redevelopment projects.

**Repairing the social fabric**

One of the creative leaders responsible for Medellín’s Integral Urban Project (IUP) is
Not unexpectedly there was mistrust. From the outset, Gustavo Restrepo and his team focused on community involvement, bringing the residents themselves into the planning loop, ensuring them that the projects were designed to meet their needs. “We conducted an intensive character study – our research stretched over a year and a half before we could analyze first results.”

Building trust in the community
As part of the urban master plan, Comuna 1 was first to be transformed. “Residents were skeptical,” Gustavo Restrepo explains, and their opinion was: ‘you promise us things but it won’t happen.’” Progress was slow, but involved bringing both formal and informal community leaders on board first. “Football players, for instance,” he says. “Often, the football field is more important than anything else when you want to talk about change!”
Leaflets and flyers invited the community to information sessions. At first only a couple of people showed up, a week later it was ten, then 100 and after that 400. The process engendered trust, community participation was assured. The long list of improvements needed in the quarter reflected its formidable level of degradation, built up over decades of neglect and improvised living.

Involving children
Community involvement initiatives include participation in the construction works as well as specific activities for children. They were encouraged, for example, to express their visions for the future on paper. “They painted parks, public spaces, and schools – even escalators!”

Many small projects have arisen from the children’s ideas. “Escalators would be revolutionary but not unattainable,” the architect believes. “We are trialing pilot projects – if expectations are met, the idea can be multiplied.”

Informal dwellings, lack of public space
Since the 1950s squatters had been arriving in Medellin, driven away from rural areas. “They arrive with nothing – no money, no home, no papers. They have lost everything, including hope,” Gustavo Restrepo explains. For three months they receive government support, and then they are responsible for their own survival.

Some find work on building sites, others in the informal economy. Many families exist on less than the minimum wage and unemployment hovers around 50%. Building an informal dwelling on a free patch of land is their only choice. The informal settlements climb the hills surrounding the main city in the valley.
In these unplanned and fast-growing settlements there is no transport system. Only footpaths and staircases lead into these hillside quarters. In a life-threatening emergency, ambulance or fire services would have no chance of reaching the uppermost households. Beyond the lack of roads, however, is the critical problem of no public space – no football fields or meeting places where community members can socialize.

New accommodation for every fourth inhabitant of the city

Medellín itself lies in a fertile basin of forests and fields, but within the informal settlements there is not a single tree. Too few schools and daycare centers are available for children. Yet where could such public facilities be sited when each dwelling is built directly against its neighbor’s wall? The government committed to radical intervention, structural urban redesign was urgently needed. Many small houses are inefficient in terms of land use – through the densification of residential precincts; the balance of land use can be adjusted to public buildings, infrastructure, and recreation. Over the coming years Medellín will be home to 15,000 new apartment buildings. Each will house 10 to 16 apartments for an average family of five.

The initiative will bring almost a quarter of the city’s 2.3 million residents into new accommodation. Families displaced by the building works are guaranteed a place in the redeveloped quarter. In the meantime they are housed in temporary accommodation at state cost.

“Our plan ensures that the social structure of the quarters is respected, and not disturbed,” Gustavo Restrepo says. “We must maintain the identity of the place under intervention as well as the collective memory of its inhabitants.”

Turning urban degradation around

After first results from the Comuna 1 intervention demonstrated the benefit of the IUP approach, the EDU team turned their sights on Comuna 13 in the city’s north-east. Around 700 hectares in size, and with some 145,000 inhabitants, this huge informal settlement had only a few years before been an urban crisis zone. “Our experiences in Comuna 1 showed us...
“We are trialing pilot projects – if expectations are met, the idea can be multiplied.” — Gustavo Restrepo

Part of the infrastructure development includes daycare centers — mothers bring their children and help in looking after the different groups.

the way,” Gustavo Restrepo says. A planning office was established in the middle of the quarter. As well as the direct involvement of residents, many stakeholder groups engaged in the process of developing the comprehensive renewal strategy, including NGOs, other government agencies, local community organizations and businesses.

Riding the new Metrocable
The project which generates the most excitement is the innovative public transport system Metrocable, which connects the settlements on the hills with the subway and the formal city in the valley below. Comuna 13’s Metrocable line was opened in January 2008. Gondolas for up to eight occupants transport around 40,000 people a day.
Access has had a major impact on revaluing housing in the quarters.

Gustavo Restrepo is delighted: “When I hear from a resident that ‘thanks to Metrocable there are no borders or walls between us anymore,’ you can’t help but feel enthused about the real change taking place here.”

It is a comfortable mode of transport; its stations are new and spotless. In only a few minutes, the gondola is high over the quarter, bringing with it an overview of some 40 building projects currently under way. “That’s a new school, and here is a hospital,” Gustavo Restrepo says, pointing out landmarks. “Over there is a daycare center for children.”

The various projects have already created such an impact that some residents are planning to extend their homes to sub-let rooms. Such is the demand for housing in Comuna 13.

Financing the revitalization

The number of projects under construction and the commitment to quality inevitably leads to the question: who pays? The answer is simple, according to Gustavo Restrepo. “Medellin has always been a rich city – it is the center of the Latin American textile industry,” he explains. “Revitalization of the city brings success and people have the means to pay taxes again. So we apply that money to our projects.”

Making up for lost time

Gustavo Restrepo is fully engaged in the high-speed and high-pressure process. “For many years, progress was at a dawdling pace but now we are making up for lost time.” The 180 projects involved in this comprehensive process of urban trans-
formation and integration employs 26 people full-time, and draws on the resources of some 400 external specialists. “We are confronted by challenges every day, but it is exciting and rewarding work.”

The positive energy generated in the community by the renewal process cannot be underestimated. Everywhere in Medellin one meets committed, engaged people who are ambassadors for change – change that demonstrates a strong contribution to the fulfillment of the Millennium Development Goals. In this context, a professional daycare center is not simply a daycare center, nor are primary or secondary schools simply houses of learning. They are windows onto a real-life happy ending for this stunning transformation in Medellin.

City lab

Behind the renewal strategy for Comuna 13 was background research covering all key elements of the quarter’s current state and future needs – this included such aspects as public space components, mobility, equipment, environment and dwellings. The analysis took months and the results were published in a 100-page thick document. Each tree was counted, all building materials, plans and inventories were recorded. Comuna 13 in its entirety was committed to paper. “There were no records,” Gustavo Restrepo (pictured left) says. “The analysis was critical to the process. The quarter itself was our laboratory.”

From their investigations, the priority focus was on the creation of community meeting points to encourage public gathering and social cohesion. A target of a 40% increase in public space was set. This included revitalizing the series of streams that flow down from the hills into the city’s river network. “We have reclaimed them as green corridors,” Gustavo Restrepo explains. Remediation efforts include adapting informal dwellings on their banks, revegetation and the integration of new public spaces.

“The positive energy generated in the community by the renewal process cannot be underestimated. Everywhere in Medellin one meets committed, engaged people who are ambassadors for change – change that demonstrates a strong contribution to the fulfillment of the Millennium Development Goals. In this context, a professional daycare center is not simply a daycare center, nor are primary or secondary schools simply houses of learning. They are windows onto a real-life happy ending for this stunning transformation in Medellin.”

Gustavo Restrepo (pictured above)
With the 1955 building bursting at the seams, the aim of the Pontifical Catholic University of Rio (PUC-Rio) is to establish an architectural landmark as well as to reach out to the informal community that lies on the university’s doorstep. PUC-Rio has a vision of a central mediatheque that provides an integrated and adequate space for its library, visitors, computer labs and staff. A small architectural studio in São Paulo has a sustainable answer to the many requirements.
“A building or room containing a collection of books or periodicals for use by the public or the members of an institution.” This definition of a library from the Oxford English dictionary leaves many things unsaid. Principally, its symbolic power – the demonstration of civilization and culture represented in what would otherwise be considered a simple collection of books.

The Italian writer Umberto Eco describes the library as “a universal brain”. The 18th century French revolutionary architect Etienne Louis Boullée believed there was no greater ideal for the National Library in Paris than to be “a worthy monument for the nation”. But no one places its value higher than Argentinean poet Jorge Luis Borges: “heaven itself is a library”. The fact that libraries are important social and political institutions is not only on the basis of quotes from eminent personalities. The symbolic meaning lies in the physical structure itself. The 79 meter tall new National Library in Paris, designed by Dominique Perrault and opened in 1996, sets the theme for the whole city quarter in which it is located.

A beacon of learning
A university campus library also fulfills this iconic role, exemplifying humanity’s quest for knowledge, within its surrounding environment. PUC-Rio is the oldest private university in Brazil and boasts a treasury of some 250,000 volumes. When the campus was originally built, more than 50 years ago, a central library to house the university’s knowledge was part of the construction. But the fast growth of the university over the years outpaced planning ideas, requiring additional library facilities to be spread across the campus in improvised facilities. Now, with some breathing space, a competition was launched for the design of a new mediatheque. The brief: to encompass all existing collections within 7,000 square meters, including room for 800 computer terminals, exhibition spaces and an auditorium. The new building would be a lighthouse not only for knowledge on campus, but beyond.
Reading as a social indicator

There are hardly any libraries in Rio’s south where PUC-Rio is located, but many potential readers. In the vicinity of the campus is Favela da Rocinha – with 100,000 residents, the largest informal squatter settlement in Brazil. The mediatheque is designed with these potential users in mind. As well as being a knowledge base for the university, it will be open to the general public. Reading is an important social indicator in Brazil, one that was promoted by the establishment of a UNESCO Chair in Reading at the university in 2006.

To be incorporated into the new mediatheque, the department is responsible for the training of specialist educators in reading and literacy programs for children, youths and adults. PUC-Rio’s plans for an expanded central library therefore are much more than for a unified repository of its books. A cultural and architectural landmark will be built to accommodate more than 3,000 visitors each day.

A small dynamic team

The winning design was developed by a small dynamic team from the architectural studio SPBR. Its name may appear cryptic, but stands simply for its location - in São Paulo, Brazil. Angelo Bucci leads a team of four. Not only is he a well-known designer, but a respected educator. He lectures at his...
hometown university as well as at Harvard and MIT in the United States. There, surprise at the small size of his studio is often expressed, as much as at the wide variety of work they are capable of handling. Together with the architect are three former students – João Paulo Meirelles, Juliana Braga and Ciro Miguel. They work on projects as diverse as homes, schools and cultural centers. Now a landmark library will be added to the portfolio.

**Two ground levels**

The concept for the mediatheque is designed around its dual program needs – the housing of the university’s book and periodical collections and administration, and separately, the public space for students, researchers and visitors. The result is two buildings – stacked one on the other but connected via a communal plaza. The sloping site gives the impression of two
The main reading room pays homage to the printed word, and leaves plenty of empty space for thinking.

ground levels which create an integrated effect. Via the lower-ground level, access is provided to the book collection and offices of the support building. Books are housed in a glass core surrounded by office space. This configuration reduces the energy demand for controlling the temperature and humidity of the collection.

The 90-meter long public mediatheque has been placed atop the support structure. Via its upper-ground level access this space is linked to the main university building. The mediatheque is anchored to the lower building at four points. The remainder of the roof of the support building is a huge reflecting pool over which it seems to float. Integrated into the design is a plaza which acts as a connection hub for the complex – from it are ramps and stairs to different areas of the two buildings. Its positioning will also guarantee its use as the main meeting place on campus. It is an open space, accessible to all. “This is a building for everyone,” Angelo Bucci says.

300,000 books and 800 computer terminals
The ramp to the top of the mediatheque leads to a nine-meter high public reading room. “We want to celebrate the book,” João Paulo Meirelles explains. He cites the example of the Stockholm Public Library.

“This is a building for everyone.”  Angelo Bucci

Juliana Braga and João Paulo Meirelles.
designed by Gunnar Asplund in 1928 — from the rotunda at its center radiate four wings, leaving the impression of a cathedral built in homage to the printed word. Its symbolic effect is something SPBR’s design also achieves.

While reflecting the optimism with which the centre for knowledge and learning is perceived, practical considerations have been factored into the building’s design. Space is provided for 300,000 books in expectation of the collection’s growth despite earlier predictions that the digital age would lead to the demise of the printed book. With a shift towards electronic journals and growing demand for internet resources, access to the online knowledge is accommodated with 800 computer terminals located within the building.

**Sustainable technologies despite difficult conditions**

The main reading room is open to both north and south, shaded by sun-sails. In order to prevent heating and direct sunlight, the 90-meter longitudinal façades have no windows. A void is integrated into the design, like a piece of outside space enclosed inside the building that works as a natural lamp. It also acts as a balcony to which a reader can withdraw and enjoy a view of the city. Meanwhile, two sections of glass floor on the level above allow natural light from the clerestory to pass through. The rationale of this design is to reduce energy consumption — as simple as that.

An important design feature to enhance passive cooling is the pool on the roof of the support building. Poured onto the slab as soon as it is cast, the water makes the surface impermeable as well as provides effective thermal insulation. It acts to cool the outside air, the breeze circulating in and under the main mediatheque building to prevent heat build-up and lower the ambient temperature. Rio’s temperature can climb to 40°C in summer and combines with high humidity to create sweltering tropical conditions. Although air-conditioning is included in the building’s design, such

“We integrated the building into the existing space to reduce its impact.”

Juliana Braga
passive measures will help keep its use to a minimum. Angelo Bucci believes that it will be unnecessary for at least the four winter months of each year.

**Single measures have little impact**

The reflecting pool has another function – as part of the campus fire control system. In Brazil each building needs to incorporate a reservoir for emergency use in case of fire. In this case, the pool is an innovative solution to serve multiple purposes. Which begs the question why such an idea is not integrated into other building designs. “The topic of sustainable construction sometimes leads to misunderstandings," Juliana Braga explains. “A single ecological measure may be included in a design, but no thought is given to the building as a whole. At the end of the day, it can have little impact.”

“Standards or following international trends can be misleading,” João Paulo Meirelles adds. “Apartement buildings out of glass, for example, may be applauded but we find them difficult to justify from the perspective of climate control and the energy consumption needed for air-conditioning.” The young architect believes in locally adapted solutions. “It’s not just about technology,” he says, “a good building should always be a green building.”
Typically Brazilian design

The design of the library follows the tradition of modern art in Brazil. “There has been no significant post-modern art movement here, modernism continues to reign supreme,” says João Paulo Meirelles.

The best proof is the ongoing popularity of the “sculptor of monuments” Oscar Niemeyer who retains preeminence in modern Brazilian architecture. “It is no coincidence,” continues the architect, “Brazilian architecture developed out of engineering, and is strongly influenced by structure”.

The design of the new mediatheque is therefore typically Brazilian: the structure of the building is not hidden, but celebrated. João Paulo Meirelles continues with enthusiasm to detail the technical features of the building – such as the outer skin of the horizontal façade created from a single 5 mm plate of steel which not only provides protection from the weather, but reduces heat gain by shading the wall behind it.

The strength in empty space

The upper building seems to float above its supporting structure. Yet the latter is no simple block. It is irregularly formed to adapt to the landscape and preserves the existing trees. Besides, this irregularity provides a lot of freedom to accommodate administrative spaces. “We integrated the building into the existing space to reduce its impact,” Juliana Braga explains.

Niemeyer’s vision of incorporating empty space into structures is also echoed by the mediatheque design. The reading room celebrates emptiness and spacious architecture as much as it does the book. The goal, to design an architectural landmark for the city of Rio, has been achieved.

Positive reactions

A fundraising program is underway and approval by the Ministry of Culture qualifies the project for a tax bonus program. The SPBR team remains confident they will see their project built. “The problems with the book collections on campus must be solved,” Angelo Bucci says. “The UNESCO Chair already exists. The opportunities to bring the public in for educational programs are waiting to be tapped.”

He believes 2010, as planned by the PUC-Rio team, will see building works commence. “Our design has received positive reactions everywhere!”

The end of the book?

Is it even reasonable to build a library in today’s modern context? The end of the book has been predicted for years, and it is true that the dissemination of knowledge and literature is no longer as it used to be. Today we can import entire libraries into a computer; and through the Internet the vast bulk of published texts are a mere click away.

The book as a medium continues to show its resilience. At the world’s largest book fair in Frankfurt, over 400,000 new titles were presented in 2008. A new book is published somewhere in the world every thirty seconds. The Italian author Umberto Eco identified a reason for the popularity of the book: “A book to read is one of the wonders of perfected technology, such as the wheel, the spoon, or the hammer,” he wrote. Humanity would not want to be without books because “books can be picked up anywhere, even where there is no electricity, and even when every battery is dead.”

The end of the book?
In Brazil there are few dwellings which are affordable for low-income families. State housing programs work to decrease the deficit by providing simple standard homes. Specialists from Florianópolis have used these initiatives as an opportunity to introduce sustainable technologies into the equation. A solar water heating and rainwater tower has been designed to accompany the building on offer.
Brazil is a country rich in natural resources, including water – around one-eighth of the world’s freshwater flows through its rivers. Yet the water situation in many regions is critical. Although the Amazon region contains most of Brazil’s water reserves, it is sparsely populated. Elsewhere, the life-giver is unevenly distributed across the enormous country. The problem is compounded by poor public infrastructure in many locations.

More than one third of water is lost on its way to end-users because of leaks in the water supply system. Further, much water is polluted by pesticides used in agriculture.

Even water-rich Brazil is looking toward an uncertain future – experts predict that by 2025 two-thirds of the global population will be faced with water shortages if measures are not taken.

“One million water tanks”

Inadequate supply is already a reality in some regions – for example, the semi-arid Sertão of Brazil’s north-east. The region’s 25 million inhabitants are subject to long periods of drought that undermine access to clean drinking water. A government program aims to alleviate the problem. Its name is its clearly-stated objective – “one million water tanks”. Since 2003, around 250,000 rainwater tanks have been provided to families in need. The cost, some USD 400 for a 16,000-liter tank, is principally covered by the state. However, the quality of water collected for potable use cannot be guaranteed. It can take several falls of

The Amazon Delta: around one-eighth of the world’s freshwater flows through Brazilian rivers.
underway to improve the situation. These programs are usually carried out at state level by departments of housing which create additional single and multifamily affordable housing. The department of housing in Santa Catarina state COHAB-SC, in which Florianópolis is the capital, has developed a standard house which is available for low-income families. One of the programs called PSH (Program of Housing Allowance for Social Interest) is run by COHAB-SC and intends to improve the dwellings provided for single families using the standard house project. The plan is to construct the additional dwellings in areas where people already live, rather than establish new residential districts.

Within the modest confines of 36 square meters of space, the COHAB-SC standard family house fits everything a simple dwelling needs – two bedrooms, a living

A home for all
Addressing the water supply in Sertão is compounded, however, by other issues. Chief amongst them is a chronic shortage of affordable housing. Across Brazil there is a housing deficit of some seven million dwellings. Government programs are

Rain before harvesting is recommended. With low regional rainfall, this waiting game is a problem. To date, chlorine added to the water supply has been the only answer.

Water towers are common in Brazil. But they can pose health and safety risks – many are unstable or do not provide safe drinking water.

“The housing deficit is being tackled, but now we have a chance to improve the sustainability of millions of dwellings.” Andrea Triana
with four other universities to develop appropriate solutions that make low income housing construction more sustainable for Brazil – technologies for building more sustainable housing. Through the national research project, COHAB-SC and LabEEE worked together to improve the standard COHAB-SC single house project. “The housing deficit is being tackled with their

Improved life quality in a better environment
LabEEE is well-recognized for its work focused on sustainable technologies addressing energy and water use which can be easily multiplied. LabEEE is also participating on a national research project

Existing and proven technologies – the design to improve the sustainability of the COHAB-SC building.

Architect Andrea Triana is responsible for the COHAB-SC project, together with civil engineer and Doctor of hydraulics and sanitation, Marcio Andrade.

room with open kitchen, a bathroom; but without specific adaptations to local climate. To pursue greater energy and water use efficiency, a partnership between the COHAB-SC and LabEEE was established. LabEEE is a laboratory for the development of sustainable technology, run by the Department of Civil Engineering at the Federal University of Santa Catarina (UFSC). Based in Florianópolis in the country’s south the team at LabEEE is led by Professor Roberto Lamberts. Architect Andrea Triana is responsible for the COHAB-SC project, together with civil engineer and Doctor of hydraulics and sanitation, Marcio Andrade.

Improved life quality in a better environment
LabEEE is well-recognized for its work focused on sustainable technologies addressing energy and water use which can be easily multiplied. LabEEE is also participating on a national research project

Existing and proven technologies – the design to improve the sustainability of the COHAB-SC building.

Architect Andrea Triana is responsible for the COHAB-SC project, together with civil engineer and Doctor of hydraulics and sanitation, Marcio Andrade.

Improved life quality in a better environment
LabEEE is well-recognized for its work focused on sustainable technologies addressing energy and water use which can be easily multiplied. LabEEE is also participating on a national research project

Existing and proven technologies – the design to improve the sustainability of the COHAB-SC building.

Architect Andrea Triana is responsible for the COHAB-SC project, together with civil engineer and Doctor of hydraulics and sanitation, Marcio Andrade.

Improved life quality in a better environment
LabEEE is well-recognized for its work focused on sustainable technologies addressing energy and water use which can be easily multiplied. LabEEE is also participating on a national research project

Existing and proven technologies – the design to improve the sustainability of the COHAB-SC building.

Architect Andrea Triana is responsible for the COHAB-SC project, together with civil engineer and Doctor of hydraulics and sanitation, Marcio Andrade.

Improved life quality in a better environment
LabEEE is well-recognized for its work focused on sustainable technologies addressing energy and water use which can be easily multiplied. LabEEE is also participating on a national research project

Existing and proven technologies – the design to improve the sustainability of the COHAB-SC building.
standard house concept, but now we have a chance to improve the sustainability of millions of dwellings.” Andrea Triana says. And improving the environmental efficiency of housing for low income families has a positive impact on the environmental perspective of the country as a whole. With more than 40% of Brazil’s energy consumed by the built environment, and half of that to meet cooling, water heating and lighting needs of residential buildings, there is enormous potential. Environmental efficiency measures that address these residential needs can substantially decrease Brazil’s ecological footprint.

**Ingenious yet simple**

LabEEE presented COHAB-SC with a range of proposals. The most important contribution was the concept for a combined solar water heating and rainwater tower to meet each family’s basic needs for potable water, non-potable water and hot water. The tower may look simple, but the design is ingenious in order to achieve its twin objectives – the reduction of household energy consumption as well as reduction of potable water consumption. The integrated structure includes rainwater collection in a lower tank, and potable water in an upper tank. The latter has a capacity of 1000 liters, double a family’s average daily needs. However this is necessary if town water supplies fail.

The tower’s height enables the water to be gravity-fed into the house. “Self-built water towers are a common sight across Brazil,” Marcio Andrade explains. “Many households are not connected to town water or the water supply infrastructure is unreliable.” The problem with the self-built tanks is three-fold – they are precariously built structures subject to collapse, the water quality is often compromised, and they are generally too small to have the desired impact.

**Flexible options**

Constructed of prefabricated rings of ferocement, the LabEEE tower has been developed to address all of these issues. In addition, there is the solar water heating...
device which sits between the two tanks, generating enough energy to heat 160 liters of water. “Solar energy is ideal for this purpose,” Andrea Triana says. “It is a renewable and accessible resource.” The solar collector can be installed at different angles toward the sun, depending on the local latitude and the orientation of the house toward the north. “If it were to be attached to the roof of the house rather than the tower, we would have fewer options to maneuver the solar panel’s position to optimize its effectiveness,” she explains. Integrated into the design of the tower, the solar panels also act as a shading device. The laundry tub built into the tower’s base is thus protected from the sun.

Collected in the lower tank, rainwater harvested from the home’s roof is diverted for non-potable uses such as washing and toilet flushing. Its capacity of 3.6 cubic
“A simple modular system adaptable to different needs.”

Marcio Andrade

meters takes into consideration an average family’s water use as well as anticipating a period of 17 days without rain. “We can increase this capacity for dry regions,” Roberto Lamberts adds. One of the tower’s best features is its flexibility — the volume of either tank can be varied according to local conditions, including rainfall volumes and distribution across the year. For example, if there is no town water supply, both tanks can be converted to rainwater collection. “In such an instance, it would be possible to add a water purification device to the upper tank to still guarantee the supply of potable water,” Marcio Andrade says. In short, it is a simple modular system adaptable to different needs.

Saving water pays

“Our system is flexible because it is not just attached to one housing concept,” Andrea Triana says. “Even though it was developed for COHAB-SC, the design could be adapted to any type of new or existing house. It could also conceivably be built from other materials.” The tower’s combination of existing and proven technologies has application across Brazil, and beyond. It has the opportunity to significantly reduce
```
It is obviously too much,” Roberto Lamberts says. “The burden is too high.”

Clearly the state would need to absorb much, if not all, of the investment – their budget would blow out. As a result, LabEEE is investigating how economies of scale could be achieved to bring down the per-unit costs – and improve affordability. The LabEEE team is convinced of the benefits of their design, and the quantum change its widespread use could make to a nation the size of Brazil. Their innovative solution has the potential to make a substantial impact on a country which is at the same time both water-rich and water-poor.

Accordingly the water tower supports social goals as much as environmental and economic – it is a comprehensive and sustainable response which can be easily transferred.

Scaling up to bring costs down

The design of the tower is one thing. Its construction is another. A prototype has excited COHAB-SC, but the outlay has not. A standard COHAB-SC house costs USD 4,500. Much of this is absorbed by the state; low-income families pay part of the cost, of some USD 30 per month. Yet the water tower would add a further USD 2,600 to the overall cost, compared to installing a self-constructed water tower and solar water heater. “It is obviously too much,” Roberto Lamberts says. “The burden is too high.” Clearly the state would need to absorb much, if not all, of the investment – their budget would blow out.

As a result, LabEEE is investigating how economies of scale could be achieved to bring down the per-unit costs – and improve affordability. The LabEEE team is convinced of the benefits of their design, and the quantum change its widespread use could make to a nation the size of Brazil. Their innovative solution has the potential to make a substantial impact on a country which is at the same time both water-rich and water-poor.

“Our system is flexible because it is not just attached to one housing concept.” Andrea Triana
```
A strong center builds a strong community
Low-cost school and home for HIV orphans, Rakai, Uganda

It takes a village to raise a child, runs the African proverb. Yet for millions of children whose parents have fallen victim to HIV/AIDS, the saying takes on new meaning. Orphans in the Ugandan district of Rakai are in the process of creating their own village – based upon an innovative concept from a Japanese architect.
In a classroom of the Samanya orphanage in Rakai, some 20 children sing and dance for their adult guests. More than 100 people sit in the hot and sticky hall, drenched by mixed emotion – should they celebrate the strength the children find in their music, or lament the tragedy of their suffering?

But the children are unaware of their surroundings, instead immersed only in their music and movement, their song about a life unwished for, but inherited all the same: “We’re the younger generation crying for the elder – Aids, Aids, Aids!” The singing swells. And hope triumphs, not least because of the future they are building for themselves.

The fight against Aids
Uganda is a country heavily impacted by HIV/Aids. It is almost 30 years since the first epidemic was recorded in the southwestern district of Rakai. Because many refuse to be tested, the number of HIV-positive inhabitants can only be estimated. Uganda is open about the problem and therefore on the way to mitigating its devastating effects. Public education campaigns are supported; there is strong government leadership; even in remote areas testing and counseling are quite easily accessible.

With President Yoweri Museveni using any opportunity to reinforce the message, these efforts are bearing results. Where, in
1992, 30% of pregnant women tested HIV-positive, now the rate is less than 5% but despite such indicators of success, almost one-quarter of Rakai’s population are HIV-positive. The fight against Aids still continues.

Uganda is often held up as a model for Africa in the fight against HIV/AIDS. But improving statistics cannot hide the tragedy of a nation already decimated. The effects are personal, social and economic.

Average life expectancy is a young 52 years, and with the adult population vastly impacted, half of the Ugandan populace is under the age of 15. UNAIDS estimates that there are 1.2 million AIDS-orphans in Uganda.

“Love for people”
They live a precarious existence. Once a mother dies, the family fragments unless there is strong support from other carers. It usually falls, therefore, to older siblings to care for their younger sisters or brothers and maintain the household, if possible. Otherwise it is the life of the streets, fringe-dwellers on the edges of villages. Or an orphanage if space is available. Everything suffers – the children’s emotional development, basic survival needs of shelter, food and health care, education. Whether infected or not, the stigma of Aids follows them everywhere. A tragedy in any language.
Yet into this mix are people who care, who support the poorest of the poor, give hope to those without hope. One such person is Ssenkima. In 2000, this man from Rakai was allocated nine hectares of land on the outskirts of town which were then used to establish the Samanya orphanage for the first 13 children. Why? His “love for people”. As simple as that. The shelter was rudimentary, a hut of corrugated iron. Food was cooked on an open fire. Committed teachers conducted lessons under a large and shady tree. It was a beginning. It was enough.

Help from Japan
The fact that the orphanage has grown, and is a warm and beautiful place in which the children feel loved and at home is thanks to NGO Mukwano. Established in Japan in 2006, the meaning of Mukwano is “close friend” in the local language of Lugandan. Although there was considerable support from the government and some NGOs in the capital of Kampala, there was no help from any international NGO in Rakai. Aids orphans built their homes themselves and the houses were in a dangerous situation.

It was simply by chance that Mukwano decided to support the Samanya orphanage in Rakai. There are similar orphanages operating throughout Uganda, all of which are in need. The first goal agreed upon was the construction of
a proper home and school, a solid base on which the children could depend. Longer-term, the plan is to invest in vocational training and employment opportunities for the children as they grow towards adulthood. Educating the children in sexual health, to ensure their protection from the fate of their parents, is also a priority. Overall, Mukwano aims to contribute to lessening the HIV infection rate in the Rakai district.

A tree called home
Mukwano raised funds in Japan to build the orphanage. They also found an architect who was passionate about the project and willing to forego payment. Koji Tsutsui is a 37-year-old globetrotter from Tokyo. He studied through work under Japanese star architect, Tadao Ando at his studio in Osaka and undertook his Masters study in London. In 2004, he opened his architectural studio in Tokyo and has designed buildings in France, Japan and the USA. Koji Tsutsui described how touched he was that the orphans would undertake construction themselves, learning as they went.

“But I also saw opportunities to learn myself – Uganda is so different to Tokyo, here was my chance to experience something completely new.” Koji Tsutsui developed his concept for the orphanage through lengthy discussions with the people from Mukwano. While it respected local traditions, it was still innovative in design. Normally, Ugandan buildings are in a row – village on one side, road on the other. Instead, the architect grouped a series of small houses in a circle like a traditional African village, and around the tree under which the children took their

Earlier, the children were taught under this tree. Now it stands proud at the center of their community.
first lessons. “This tree is an important symbol for the community,” Koji Tsutsui explains. “It stands at the centre of their world. For the children, it is the tree which makes this place home, from which strong bonds can be forged.”

The power of architecture
Koji Tsutsui’s concept has been developed with the long-term in mind. He thought not only of an orphanage, but an entire village of the future. “When the children are old enough to live alone, they can choose to build their own home in the same style,” he says. “Over time you could see many small house groups like this one, each around its own center. A village would simply have many centers.”

He is convinced that the present-day orphanage will, in time, form part of a larger village. “This is the children’s home community,” he says. “They will want to stay.” And there is space enough, even for the vocational training center Mukwano has planned. The Samanya orphanage stands alone on a plateau. According to Koji Tsutsui, architecture is a powerful medium for change. “We are building a functioning community, one that gives people the feeling that they belong to a place.” That feeling of belonging is not to a small degree caused by the orphans’ participation in building the brick and wood houses themselves, together with their teachers. The architect

“As the children grow to adulthood, they can plan their own homes and thus grow Samanya from an orphanage into a village.” Koji Tsutsui
provided drawings of plans, sections, elevations and details, but he also gave flexibility to use the drawings. “I thought it was important that they could interpret the ideas themselves, according to their own local traditions and needs.”

Water tanks and solar collectors
When Koji Tsutsui set foot in Uganda to see the finished project, he could not hide his delight: “It looked exactly as I imagined!” The spaces between the huts offer the children various opportunities for play or study. All in the shade. The children themselves are very proud to show off their achievements – they have built their community out of brick walls.
more than a shelter where basic needs are met. It is a center for healthcare, education and leisure.

Already far more than they had before, the eight new buildings around the central tree are full to capacity. There are 85 beds available; 200 orphans, however, come regularly to school.

An extension is already planned. The orphanage director and the architect begin a lively discussion. Drawings are shared, decisions are made.

Ssenkima proudly leads his visitors on a tour of the basic infirmary, teachers’ rooms and valuable new water tanks. Previously there was a long trek to a lake in order to fetch water. On the roof of the small administrative building, solar collectors are assembled. The project is a model of self-reliance that has resulted in

and wooden roofs. The learning tree stands watchful at the center of the courtyard. “It is said that a strong center makes a strong community,” the architect observes.

According to UNICEF, the Aids virus in sub-Saharan Africa has already made 12 million children orphans. Despite Uganda’s success in stemming the tide of Aids infection, they are not immune to continued tragedy. Many parents who are already ill will die in coming years without ready access to antiretroviral treatment. The impact on children is devastating and girls are especially vulnerable. Most leave school early to care for younger siblings. They are then too often beyond the reach of education campaigns and can easily be next in line to fall victim to the virus.

Yet there is hope on the horizon. A recent Ugandan study found significant reduction in child mortality of parents receiving treatment as well as a 93% decrease in the incidence of children being orphaned.

“I thought it was important that they could interpret the ideas themselves, according to their own local traditions and needs.” Koji Tsutsui (pictured above)

“Multipler effect

Multiplier effect

At present the extension is only on paper. When it can be built is difficult to answer. Material is expensive, funding unclear. For the initial project, Mukwano had budgeted USD 30,000, yet ran a third over with unexpected energy costs. The orphanage supports itself on very little, some USD 10,000 per year cover the teachers’ modest salaries and supplies. Yet visitors bring gifts – of equipment, books, materials. The orphanage grows its own food. And the atmosphere is one of joy and hope. In the end, it is the commitment of the carers and their charges who will ensure their own survival.

Samanya orphanage is an island of independence, of self-help and resourcefulness, skills the children are learning with ease even as they sing and dance out their pain at the loss of their parents.
Thanks to visionary projects such as the DIFC Lighthouse Tower and recently-implemented strong environmental regulations, the emirate of Dubai is set to be a beacon for sustainable construction. Currently under construction, the elegant skyscraper is expected to more than halve its total energy consumption and reduce water consumption by 35% compared to its peers.

Green giant
Lighthouse tower with low-carbon footprint
Dubai, UAE

Regional competition Holcim Awards Bronze 2008 Africa Middle East; jury appraisal page 96
When architect Shaun Killa left his October 2006 meeting with new client, the Dubai International Finance Center (DIFC), he knew he would spend the weekend working. The brief was simple: to design a 90,000 square meter office tower that symbolizes DIFC as the centre for finance between Europe and Asia, to create an iconic beacon in a city that already had many ambitious projects, and that they needed the concept design within the week. In those few days, Shaun Killa came up with a design for a skyscraper which would not only set new standards for Dubai, but create new benchmarks for low energy high-rise buildings within the region and beyond.

**Towers, towers, towers**

“The idea for the lighthouse came to me the moment I left the meeting,” the architect says. In the car, he drew a quick sketch on notepaper. Comparing that design with the

---

Everything clear – after the first meeting with the clients, Shaun Killa was ready to design their Lighthouse Tower.
final building plans of today is amazing – Shaun Killa had not only recorded his vision for the project, but its final realization. The 39-year-old architect is one of the leading tall building designers in the world. He is responsible for many iconic structures on the Dubai skyline – including the Al Mas, Millennium, 21st Century, and Chelsea Tower. They are all between 250 and 360 meters high, and all are new – no wonder that Shaun Killa has called only Dubai “home” for the past ten years.

**Wind turbines on a world stage**

Having studied at the University of Cape Town and worked on many large projects in his native South Africa, Shaun Killa left the country in 1998 with the UK as his destination. En route he stopped-over in Dubai to visit a friend. It turned out to be a long stopover. As design director of Atkins Dubai, he is part of one of the largest architectural firms in the world. To date, his most celebrated tall building is not located in Dubai but in the nearby Kingdom of Bahrain.

The Bahrain World Trade Center is the first building in the world with its own integrated wind power station. The twin 240-meter-tall towers are connected by three turbines – each with a diameter of 29 meters – generating some 15 to 25 percent of the complex’s energy needs. For the first time, Shaun Killa was able to link his passion for tall towers with his interest in sustainable solutions in a more than visible way. He also demonstrated that a tall building with a low-carbon footprint could generate worldwide attention and set a precedent for future sustainable towers.

On the 63rd floor will be the Visitor’s Center – the backdrop to its permanent exhibitions on sustainability will be the impressive view of rotating wind turbines.

**Lighthouse for sustainable construction**

Interpreting the client’s brief as a “lighthouse” sends a strong message about its intent. “The building needs to be visible – both physically in height, and metaphorically as a leader. Its narrow plan creates incredible day lighting – therefore lighthouse – and it is a strong symbol for what the Finance Center stands for,” the architect says. “The Lighthouse Tower presents itself as a beacon for sustainable construction in the region. As a prototype, it demonstrates we can consider energy-efficiency at the center of architecture and, without compromising comfort or aesthetics.”

According to Shaun Killa, it is usual for individual technical systems to be added after the concept design has been completed, but with the Lighthouse Tower, we reviewed and questioned each element.
“The Lighthouse Tower demonstrates we can consider energy-efficiency at the center of architecture and, without compromising comfort or aesthetics.”

Shaun Killa

“Low-carbon, high potential
An expert team was assembled to work on the concept. As well as Atkins’ own team, other specialists from around the world were consulted. The plan was for the Lighthouse Tower, among the ten tallest office towers in the world, to be the one with the smallest environmental footprint.

Hundreds of assessments were undertaken, numerous ideas considered, discounted or adopted. Hong Kong Polytechnic worked on the air-cooling system, the Welsh School of Architecture developed concepts for air-quality and the façade energy modeling. The numbers are impressive – the context-responsive design optimizes passive cooling and lighting with projected savings of 65% in total energy consumption and 35% in water consumption compared to Dubai standard practices. Another accolade is

as if it were part of an organism to create a truly holistic design where everything works together, interdependently.”

The Lighthouse Tower is tall and slim, a geometric shape sculpted by sunlight and wind. The high-tech structure is 400 meters tall comprising of 64 floors – predominantly office space, with the top floor dedicated to a viewing deck and resource centre for sustainable design for the region. The façade is inspired by the traditional mashrabiya screens of the region, the traditional carved lattice shutters which form a decorative screen between inside and outside to protect against the harsh heat and light.

In the case of the Lighthouse Tower, the mashrabiya design is based on repetitions of the DIFC logo creating an elegant pattern that take cognizance of the building’s context and the region’s past.
that the Lighthouse is to be the tallest building in the world to receive LEED Platinum status, the highest rating in the Green Building Council program. Harnessing wind energy, as he had done in Bahrain, is a major element of Shaun Killa’s low-carbon concept. Three horizontal axis turbines, each 29 meters in diameter, are being considered for the upper portion of the tower.

“In Dubai, the wind is a fairly constant,” he says. The turbines are aligned to catch the breezes that blow in from the north-westerly onshore sea breeze, producing between 700 and 900 megawatt hours of energy, some 6% of the building’s energy needs. Another 3-4% is produced by the 6,000 photovoltaic units in the façade’s spandrel panels. The project successfully demonstrates how renewable energy...
Don’t reinvent the wheel!
The commitment to energy- and water-efficiency in the Lighthouse Tower can be found in many of the project details. The intelligent design includes 16 double-decker regenerative breaking elevators where their descending motion produces 30% of the energy required for a simultaneous ascending elevator. Ventilation systems recover heat and cooling. Sensors ensure lighting is only used when required though motion and solar sensors. The less artificial light, the less heat build-up and by including chilled ceilings, the Lighthouse Tower also reduces its cooling load by more than 45%. The most energy-efficient mechanical systems are used – whether variable motors and pumps or CO2-demand-driven ventilators for car parking. Building control systems, where every device has an IP address, are all monitored in symphony to reduce the energy consumption of each element of the building.

Water consumption is minimized with the use of efficient fittings and appliances. “Often we install systems in our offices to test manufacturers’ claims before using them in our projects,” Shaun Killa explains. “We don’t need to reinvent the wheel – most of these devices are available on the market however they are simply not well known.” The building is specified to have waterless urinals, dual flush toilets, flow restrictors on taps, grey water recycling, condensate collection from chilling units – to name a few of the water-saving measures.

Rethink in the Emirates
Most of these decisions came a long time after that first presentation of the lighthouse sketches. Shaun Killa remembers explaining his sustainable ideas to the clients, their excitement and immediate acceptance of the concept – “they understood the enormous potential of this project as being a leading example of more sustainable buildings within the

“Most of the devices are available on the market however they are simply not well known.” Shaun Killa
Sustainable investment

Yet an industry as successful as the building industry in Dubai needs time to change. As always the biggest challenge is commercial. “We must prove that sustainability pays.” DIFC Lighthouse Tower rises to this challenge. The total extra cost for all sustainability initiatives, including the integrated renewables is recouped in less than eight years. The experience of Bahrain shows that tenants are prepared to pay a premium to rent space in a tower with a sustainability focus. “They are attracted by the building’s green image, and these greater returns readily surpass the additional capital expenditure for environmental measures.”

An experiment guaranteed to function

The Lighthouse Tower completes its sustainability credentials with social criteria. Outdoor spaces will be landscaped by government authorities who last year introduced tough environmental regulations for all new buildings. Two years ago, the Emirates Green Building Council was established and Richard Smith, technical director at Atkins, is its vice-president.

The fact that Dubai is eager to position itself as a regional pioneer in sustainable construction is in no small part due to its friendly rivalry with Abu Dhabi. In the capital of the UAE, the Norman Foster-designed Masdar is being built – pitched as the first CO2-neutral city in the world. Meanwhile, Dubai is building a metro – in cooperation with Atkins – to address the challenging public transport problems in the city. “The Lighthouse Tower came at just the right time,” Shaun Killa believes, “we are at the threshold of change and have hopefully helped to guide the way to a more sustainable urban environment.”
as public parkland. Shady trees will ensure the spaces are comfortable to use for far more of the year than is normal for Dubai.

Lighthouse Tower will also educate people about sustainability. The Visitor’s Center on the 64th floor will house permanent exhibitions on sustainability themes, and an observation deck on the roof—at a height equivalent to the 94th floor. The project has the potential to redefine how tall towers should be built in the future. “As an example of sustainable construction, it is a highly technical innovative solution that will be a resounding success.”

“Planet, Project, People – for me, that means architecture in the 21st century.”  

Shaun Killa (pictured above)

Setting the standard
Despite concerns about the impact of the global financial crisis on this project, Shaun Killa remains optimistic. Foundations are being dug and the piling is almost complete. Construction is set for the next two and a half years. “A lot can happen in that time,” he says. “In Bahrain, the first six floors were built before we got the go-ahead for the turbines.”

The Lighthouse Tower is a beacon for sustainable construction. “There is nothing like it, anywhere in the world. We have integrated so many different sustainability measures into a single project – it will set the standard for years to come.”

For the past 80 or so years, skyscrapers have been built in more or less the same way. Now change has come, and radically. “Planet, Project, People – for me, that means architecture in the 21st century.”

A test-run on the roof
WS Atkins PLC is a multinational engineering and design consultancy. Established by Sir William Atkins in 1938, it is the largest multidisciplinary consulting firm in Europe and one of the largest design companies in the world. Atkins not only builds sustainably, but conducts sustainable design research – for example, in Dubai. On the roof of its office are banks of solar cells. “We lack a lot of data about solar cell performance in Middle Eastern conditions,” Atkins’ design director Shaun Killa (pictured left) explains. “We can’t go to our clients and say: these solar cells cost X million, when we don’t know how much energy they will finally produce in this climate.” As a result, the firm tests the operation of various manufacturers’ products, under various conditions.

Questions are asked, data is collected. For example, does a vertical panel produce more energy than a horizontal one that is cleaned every six months? “We’ve put together this knowledge, and even managed to discount some myths in the meantime – such as, under certain conditions, solar cells on a northern façade can produce more energy than on a southern façade.” Atkins pitches itself as a firm which delivers workable solutions for a carbon critical economy – even the roof of the Dubai office is involved in their quest.
A new office complex on the outskirts of the Indian city of Hyderabad harnesses a resource the country is rich in, but which many architectural solutions have sought to escape in the past – the sun. In so doing, it manages to meet two seemingly conflicting objectives – to maximize shading as well as the use of daylight. The result is a significant reduction in energy consumption.
New York-based Skidmore, Owings & Merrill (SOM) is one of the largest architecture firms in the world. They built the Sears Tower in Chicago, New York’s Time Warner Center and the world’s tallest building at a height of over 800, the Burj Dubai. The SOM design for One World Trade Center, the first office tower to rise on the World Trade Center site is also currently under construction.

With seven offices worldwide, it is no surprise to learn the firm is active in India. SOM Director Mark Igou leads the firm’s practice in India and currently oversees the Hill Country Special Economic Zone (SEZ) Office Complex project – a sustainable office complex in Hyderabad that sets new standards on the sub-continent. Mark Igou is a passionate ambassador for his work in India. “The country just buzzes with life,” he explains.

“The focus here is on development. It’s a rewarding experience because combined with a can-do attitude are rich traditions and a unique culture.”  

Mark Igou

Global thinking, local action

Part of a global firm, Mark Igou has his feet firmly rooted in the soil where he works. “You can apply the old adage – think global, act local – to what we’re doing here,” he says. Although SOM is an international practice with global expertise, it also possesses a deep understanding of the cultural, environmental and political issues which are most relevant to India. “We can bring all this global thinking together to develop solutions which best suit local conditions. Collaborating with some of India’s foremost academics and research specialists to develop a meaningful understanding of local issues combined with the firm’s legacy of design and technical innovation delivers architecture seamlessly integrated to local conditions and needs,” Mark Igou explains.

The solution proposed by SOM for the Hill County Special Economic Zone (SEZ) on
the outskirts of Hyderabad is a case in point. SEZs are government-backed export processing zones to fast-track economic development and foreign investment. Some 100 such zones already exist; a further 250 are in development. As well as designing an iconic building for Hill County’s developer, Maytas Properties, SOM are responsible for the zone’s overall master plan.

Enhancing the quality of life

The master plan takes into account local living and work practices together with an analysis of the current state of the region’s infrastructure. “People generally come to work by bus in India,” Mark Igou explains. “But the roads here don’t have the capacity to support all of the proposed development.” The SEZ, therefore, will only be able to function optimally if workers live in its vicinity – “otherwise they would
“‘Walk to work’ is the tagline for the concept.” Mark Igou

be stuck in traffic chaos, which is neither economically nor environmentally sound.” The master plan envisions a mixed-use development programmed with public amenities such as parks, plazas and community centers. Living and recreational space for up to 30,000 people is anticipated. “Walk to work” is the tagline for the concept – and encouraged by an attractive streetscape design, higher quality of life is the goal.

Sustainable design in a contrary climate
Currently under construction, the Hill Country SEZ Office Complex will house around 3,000 workers across 110,000 square meters of space in the IT and IT-enabled sector. Its intriguing design reduces energy consumption compared to the average Indian office building by 35-40%. This effectively reduces the building’s overall carbon emission, a concern emphasized by the government of India in 2007 when the Energy Conservation Building Code was established. The new office complex is on target to achieve an LEED Gold rating, and promises to pioneer a new standard for sustainable design on the sub-continent. “This climate isn’t mild,” Mark Igou points out. “The sun can be relentless – but an understanding of the harsh local climate informs the building’s numerous sustainable innovations.”

Natural or artificial lighting?
The SOM Team had four objectives for the design concept: to reduce energy consumption, improve worker comfort, ensure low maintenance costs over the life of the building, and decrease reliance on public infrastructure. “All our objectives were in response to the situation, for example, to improve worker comfort.” Mark Igou explains that in many IT company offices,
Outages are a common occurrence, disrupting work days and schedules, and a major problem for a country that wants to continue to grow. On the contrary, it contributes to decentralization and a desire to minimize reliance on government.

Workspaces are cramped and there is little natural light. “To minimize direct sunlight turning the building into an oven, most offices have heavily tinted windows,” he says. The effect, however, is not just an issue of worker comfort – it means the energy balance is disturbed. By keeping sunlight out, office spaces must be artificially lit, and in India, this accounts for some 60% of all energy consumption. “The load this places on power infrastructure is massive, and growing,” Mark Igou explains.
by bridges. The layout is organized around a series of interior courtyards which allow sunlight to penetrate down into the building’s core – a solution which is optimized to harness the sun’s energy, and decreases dependence on electric lighting. In this way, the design successfully meets two seemingly conflicting objectives – to maximize shading as well as the use of daylight.

While this strategy is low-tech, the result for energy savings and building comfort are high-impact. The building’s workspaces are contained in the north and south wings in relatively narrow floor plates, 22 meters in width. The east and west wings, subject to high radiation levels, are occupied by cores containing infrastructure. “We are developing our own sustainable solutions.” Strategies to increase both worker comfort and building performativity include interior courtyards and light wells, and exterior shading devices based on vernacular Indian architecture.

**Connecting inside and out**
The building’s design is energy-efficiency in action. For its own sake, and beyond. “Nature is not the enemy,” Mark Igou says. “We spend much of our lives disconnected from the real world – moving from our air-conditioned houses, to air-conditioned cars, to drive to air-conditioned offices.”

As a result, the SOM team challenged this paradigm by understanding climatic challenges and developing design strategies that harness their potential. By harnessing the sun’s energy in their concept, they will reconnect those who work within with the wider world outside. Yet, the idea is not new. The concept originates from India’s ancient architectural philosophy Vastu Sastra which seeks to create harmony between the built environment and the five natural elements – earth, water, fire, air and space.

In SOM’s case this meant feeding a plethora of data concerning rainfall, wind direction, sun exposure and temperature into their computers. The modeled climatic conditions and analysis significantly informed the building’s overall design.

**High impact, low-tech**
The office complex is lean, and low-rise. It is constructed in two sections, connected by bridges. The layout is organized around a series of interior courtyards which allow sunlight to penetrate down into the building’s core – a solution which is optimized to harness the sun’s energy, and decreases dependence on electric lighting. In this way, the design successfully meets two seemingly conflicting objectives – to maximize shading as well as the use of daylight.

“Nature is not the enemy.” Mark Igou
Vertical shading fins are positioned at varying but fixed angles – they are inspired by the traditional perforated stone screen jali.

Elevator shafts, stairs, toilets and other service rooms. Self-shading effects are achieved from stepping the building up, outwards toward the south to reduce solar gains. However, it is the façade design which particularly stands out.

A system of vertical shading fins runs the full length of the building. The fins are fixed to the building but the angle of their positioning, determined through extensive shading coefficient analysis, varies. “The ideal would have been to constantly vary the angles of the fins throughout the year – but that needs too much additional

The building is stepped-up towards the south – self-shading is the result.
Passively and virtually green

The belief that cutting edge architectural design and energy efficiency cannot be combined is being shattered by some contemporary office building designs. Skidmore, Owings and Merrill (SOM) will complete China’s first zero-net energy skyscraper in terms of operating energy in 2010. The Pearl River Tower façade captures wind to power turbines that help to reduce dependence on conventional energy sources. The building will also tap into sun, cool water aquifers and other available natural energy streams. But how is a design tested before the first foundations are placed?

Passive energy design from computer generated modeling is a big part of the solution. Individual buildings are modeled with solar orientation on their exteriors to keep out the summer heat but allow warming light in winter. Interiors use parametric modeling to heighten passive solar access for maximum office productivity, and thermal imaging software to optimize energy efficient performance. Combined with geothermal heating and cooling designs, and integrated active photovoltaic solar skins.

“A good project is the product of a well-developed process.” Mark Igou (pictured above)

Better atmosphere, less turnover

Other contributions to the sustainable performance of the building focus on water use. Rainwater is harvested for irrigation and aquifer replenishment. Onsite sewage treatment enables the processing and re-use of grey-water for non-potable uses, including chilled water for air handling units. In addition, local materials and techniques are used in the construction of the complex. The design aims to ensure low maintenance costs over a long building life as well as being flexible enough to not require structural adjustments over time.

According to SOM’s calculations, the higher capital costs to realize construction will be amortized in two years by the reduced energy consumption. Mark Igou is pleased with the progress. “We have created a better atmosphere in which people can work,” he says. Higher employee satisfaction is a welcome by-product of improved working conditions. India’s IT industry experiences significant turnover rates, not least because of this reason.

Structure reflects the landscape

The complex takes full advantage of its contoured and rocky terrain, elevating as extensions of the contours themselves. A ribbon effect is created as the structure reflects the landscape into which it is grafted. “We’ve taken the opportunity to interpret traditions and harness the optimism of the country as much as the energy of the sun in our design.”

“Red thread of sustainability”

Coupled with that optimism is the red thread of sustainability that binds the whole together. Or as Mark Igou simply says: “A good project is the product of a well-developed process.”
Editor: Edward Schwarz, Holcim Foundation, Zurich, Switzerland

Winner essays: Marius Leutenegger, dertexter; Nikkol Røt, nikkolrot fotografie, Zurich, Switzerland

English editing: FMKomm, Zurich, Switzerland; Kevin Jones, Lucid Communications, Brisbane, Australia

Project appraisals: Juries of the Holcim Awards competitions in five regions of the world

Illustrations: Model and project photos, plans and sketches courtesy of the respective project author(s)

All other images are from the archive of the Holcim Foundation

All copyrights for illustrations published in this book remain with their authors

Layout: Schadegg Grafik, Zurich-Gockhausen, Switzerland

Print: Stäubli Zurich, Switzerland, on FSC paper

Holcim Awards: The regional and global competitions are run in close collaboration with the partner universities of the Holcim Foundation (see pages 48, 62, 76, 92, 108) and administered and monitored by

Technical Competence Center of the Holcim Foundation

c/o ETH Zurich, Switzerland

Marc Angélil, Hansjürg Leibundgut,
Hans-Rudolf Schalcher, Holger Wallbaum
Project Manager: Brigitte Cuperus

Office of the Holcim Foundation, Zurich, Switzerland

Dominik Baumann, Mia Knechtli,
Janine Riedi, Edward Schwarz, Philip Zumstein

Online submissions are handled by

[phase eins]., Berlin, Germany; Raecke Schreiber, Berlin, Germany
Regional and global Holcim Awards competitions for sustainable construction projects and visions 2008/2009