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Administration center in Switzerland
Pas de cinq: Energy, materiality, economy, use, and space

Introduction by Marc Angélil, Sarah Graham, Reto Pfenninger, Manuel Scholl, and Hanspeter Oester, agps.architecture, Zurich, Switzerland
From the outset, the International Union for Conservation of Nature was a special client. As the world’s oldest and largest environmental network, IUCN is a global player in the fields of conservation and sustainability. With members including more than 1,000 NGOs and governmental organizations as well as almost 11,000 volunteer scientists in some 160 countries, it is difficult to conceive of a more exciting organization with which to collaborate on the expansion of their headquarters in Gland, near Geneva, Switzerland. The Union asked for a radically progressive building to be achieved with very limited resources – requiring a type of modern alchemy or outright magic.

Developed directly from IUCN’s mission and approach, three principles formed the conceptual strategy for the building project. First, the conservation of natural resources was to be achieved through environmental sustainability, focusing on energy and materiality. Second, an economy of means was a fiscal as well as a philosophical principle in the development of the architecture. Third, a highly collaborative design process, reflecting the essential methodology of the institution, maximized the quality of the working space. Together, these principles led to the interplay of five points in a type of dance, or pas de cinq, of energy, materiality, economy, use, and space.

In research, work builds upon previous work, looking beyond its current state toward its own future evolution. Architects, among others, tend to work in series with experiments from one project forming a base of departure for a following work. For agps.architecture, the mandate to set a benchmark in sustainable design for IUCN occurred within a sequence of environmentally designed projects. As early as 1989, the office had established a definition for sustainable design in the Esslingen Town Center, that being ecologically conscious land, energy, and materials use.
Subsequently, the Midfield Terminal (Dock E) at the Zurich International Airport and the Zurich International School in Adliswil, Switzerland explored strategies for sustainable development of buildings through geothermal energy for heating and cooling, the reduction of ductwork, decentralizing mechanical systems, and use of concrete as thermal mass. These projects also explored reductive materiality through eliminating additive layers and exposing the primary construction of concrete, steel, and glass. Both were based on an economy of means, and both developed space through careful programmatic assessment. The buildings set the stage for more radical implementation in the IUCN project. Reciprocity among energy, material, economic, functional, and spatial considerations progressed still further in subsequent projects at the building and urban scales utilizing concrete building mass and geothermal systems supplemented by the sun. These proposals form an ongoing experiment with
architecture perceived as a type of laboratory in which ideas and techniques are reframed, tested, rejected, explored, and redefined, and in which the IUCN project played an important role.

In the new IUCN facility, environmental design is implemented through an economy of means, generating a straightforward albeit generous architecture. Highest Swiss environmental standards (Minergie-P and Minergie-Eco) and LEED Platinum ratings were implemented. Geothermal heating and cooling utilize the constant ground temperature of the earth 180 meters below using heat exchangers with heat pumps. Decentralized airboxes along the building’s exterior walls bring in tempered fresh air. Ceiling panels with CO₂ sensors provide consolidated building services, including heating, cooling, acoustics, lighting, fire sprinklers, and air return. The sensors activate air exchange only when the space is in use, making
operation highly efficient. A rooftop power plant is comprised of photovoltaic panels; rooftop rainwater is stored and employed for graywater use. Peripheral balconies and adjustable exterior blinds prevent overheating in summer and allow passive solar gain in winter while maximizing natural light.

The building’s materiality focuses on exposed concrete, which is used for cores and ceilings. Both recycled concrete and insulating concrete are exposed, depending upon location. A key factor of the architectural concept is that building components serve multiple purposes and anything unnecessary is eliminated. The concrete provides high thermal value, and it expresses a language of intentional roughness, reflecting the economic value placed on sustainability rather than on refined materiality. Working in collaboration with the Swiss concrete industry, various means were laboratory tested to enhance the compressive strength of insulating concrete, including recycled aggregate within the concrete mix. Also investigated were the life cycle of materials, recycling, and use of local renewable materials throughout the building.

One enters IUCN through the gap between the old and new buildings in a spatial compression created by a cluster of adjacent activities: a library open to the public, cafeteria, stair and hallways, and a rooftop volume hovering above. The original building is organized around central atria filled with tables, machines, plants, books, and the detritus of people working – a hodgepodge of things and activities – all part of the bustle of work in progress. This active and informal space was conceptually inserted into the headquarters expansion but with a reversed reading. While the original building’s exterior is largely closed, the new is open, revealing the inner workings of the organization. Two large courtyards penetrate the simple
box of the extension, each with varying area and depth. One extends down into the parking level, bringing light and air into that semi-below-grade realm. The second courtyard, Espace Rencontre Luc Hoffmann, is an outdoor event space, a center for communal activities. Offices are located along the outside walls, surrounded by exterior balconies which double as fire exits, thus eliminating the need for rated corridors. The circulation area between the offices is double-height flexible working space, similar to the atria in the original building, filled with natural light and promoting social interaction. The office walls are nonstructural, easily reconfigured as needs change over time.

Formally linked to the folding of the roof is a play of structure subtly expressed on the facade. Staggered steel columns which span only single floor levels and alternate as tension and compression members, plus structural balustrades acting as beams, carry the loads to the ground in an indirect, rhythmic path.

Floating over a north-south folded rooftop sea of photovoltaic collectors is the Holcim Think Tank, a separate and special meeting space. This is the place where ideas are developed in interdisciplinary workshops while looking toward Lake Geneva and the Swiss and French Alps beyond.

The big view can hopefully contribute to the making of big ideas. IUCN is by definition a complex organization with a clear mission, with its diverse membership looking toward solving essential global challenges. The new headquarters building implements and visualizes IUCN’s belief in sustainability, its fiscal restraint, as well as its open working methodology in a rich sequence of spaces, proving that something can be made out of nothing – that alchemy in fact works.
“Target issues” for sustainable construction

Innovation and transferability
Environmental quality and resource efficiency
Ethical standards and social equity
Economic performance and compatibility
Contextual and aesthetic impact
Sustainable development and architecture are multifaceted subjects intertwined with each other and with many other complex issues. To make sustainable construction easier to understand, assess, and practice, the Holcim Foundation for Sustainable Construction developed a five-point definition, the so-called “target issues,” which serve to measure the degree to which a building contributes to sustainable development.

Three of the five target issues align with the primary goals of the Rio Agenda: balanced environmental, social, and economic performance. A further target issue applies specifically to building – the creation of appropriate built environments. The final target issue recognizes the need for innovation to drive significant advancements that can be applied on a broad scale.

The target issues are explained in detail and illustrated at the website: www.holcimfoundation.org/target. The pages that follow summarize the five criteria and how the new IUCN Conservation Centre meets them.
Innovation and transferability
The project must demonstrate innovation at the forefront of sustainable construction. Breakthroughs and trendsetting approaches, irrespective of scale, must be transferable to a range of other applications.

The IUCN Conservation Centre is a forum for global change – collecting and disseminating knowledge and coordinating organizations, events, and projects to promote sustainability.

Because IUCN enjoys a high profile worldwide, the building serves as a model of sustainability to inspire and educate member organizations, partners, governments, NGOs, and the private sector.

The design team applied an interdisciplinary and all-encompassing approach to sustainable construction. This five-point approach is practical and can be applied in any socioeconomic or geographic setting.

The building employs an innovative climate-control system and the project served to field-test prototype decentralized air-handling units. The benefits of this technology include energy efficiency, flexibility, economy, hygiene, and ease of installation.

An innovative insulating concrete was developed and tested specifically for this building. Offering high load-bearing capacity and high insulation value, this new material can replace complicated composite assemblies.
Environmental quality and resource efficiency
The project must exhibit sensible use and management of natural resources throughout its life cycle, including operation and maintenance. Long-term environmental concerns, whether pertaining to flows of material or energy, should be an integral part of the built structure.

The IUCN Conservation Centre is the world’s first building to receive LEED* Platinum and Minergie-P Eco certification, two of the most stringent ratings for green buildings.

The facility incorporates an array of energy-saving features and systems fully integrated into the design. Energy required for operation is only 20 percent of that of standard buildings of comparable size.

The super-insulated building uses geothermal energy as the heating and cooling source and features a CO₂-controlled ventilation system for energy efficiency.

The building is powered by two carbon-neutral renewable energy sources: hydroelectric power and electricity generated by the rooftop photovoltaic system.

Efficient water management includes waterless urinals, low-flow fixtures, motion sensors for faucets, and collection of rainwater for irrigation and flushing toilets.

* LEED (Leadership in Energy and Environmental Design) is the green building rating system of the U.S. Green Building Council (USGBC).
Ethical standards and social equity
The project must adhere to the highest ethical standards and support social equity at all stages of construction, from planning and building processes to long-term impact on the community fabric. The project has to provide an advanced response in terms of ethical and social responsibility.

The IUCN Conservation Centre is designed with a transparency that promotes social integrity and interaction. This feeling of openness reinforces the transparency that IUCN values in all its relationships.

The health and wellbeing of people is central to the design of the building. The building offers a comfortable, healthful, and stimulating indoor environment.

Because IUCN is an association of member organizations, the new center promotes interaction and collaboration among thousands of organizations and individuals in support of global environmental and ethical causes.

As part of its local public services, the facility includes a visitors center, a cafeteria, and a beautiful and informative natural garden open to everyone.

The center was created as a collaborative project supported by national and local governments, foundations, and private companies acting as sponsors, technical partners, and now tenants.
Economic performance and compatibility
The project must prove to be economically feasible and innovative as far as the deployment of financial resources is concerned. Funding must promote an economy of means and be compatible with the demands and constraints encountered throughout the structure’s life span.

The IUCN Conservation Centre is efficient to operate, promotes high productivity, and will be economical to dismantle and recycle at the end of its long service life.

As an expansion to the IUCN headquarters, the building collects all staff under one roof, facilitating efficient collaboration and interaction. It also houses tenant spaces rented by partner organizations and others.

Economy of means is a basic design principle applied by the architects, reducing both construction cost and operating expenses. The construction cost was on par with the average for Swiss buildings.

The building was designed with low life-cycle cost in mind rather than low initial cost. It will remain a valuable asset to future generations.

Some prominent parts of the building were conceived as spaces offered for sponsorship (and were made possible only through sponsorship), such as the Holcim Think Tank and the *Espace Rencontre Luc Hoffmann.*
Contextual and aesthetic impact
The project must convey a high standard of architectural quality in the way it addresses cultural and physical factors. With space and form of utmost significance, the construction must have a lasting aesthetic impact on its surrounding environment.

The IUCN Conservation Centre achieves relatively dense land use while sensitively preserving and even extending the natural garden on the site.

Advancing the notion of green building, the design distinguishes between energy consumption and emissions. With zero-emission energy sources, the emphasis shifted from energy efficiency at any cost toward achieving a higher level of architectural quality.

The building is spacious and dignified without being pretentious or luxurious. It is appropriate for an important, globally active, donor-supported NGO.

The extension harmonizes and integrates with the original building to form an expanded complex that functions as a coherent whole.

The iconic building with eye-catching architecture has become a new and powerful symbol of IUCN, strengthening the organization’s pride and image.
The new IUCN Conservation Centre

By Daniel Wentz

Daniel Wentz was born in California and received a Bachelor of Architecture from Virginia Polytechnic Institute and State University. He has practiced as an architect in the USA and in Europe, and works as a freelance writer and translator living near Basel, Switzerland.
The vision of the International Union for Conservation of Nature is a just world that values and conserves nature. The organization’s mission is to influence, encourage, and assist societies throughout the world to conserve the integrity and diversity of nature and to see that the use of natural resources becomes equitable and ecologically sustainable. As a leading authority on the environment and sustainable development, IUCN helps find pragmatic solutions to meet the world’s most pressing environmental and development challenges. It supports scientific research, manages thousands of field projects around the world, and brings together governments, nongovernmental organizations, United Nations agencies, private companies, and communities to develop and implement policy, laws, and best practices. IUCN’s work is supported by over 1,000 professional staff in 60 offices as well as hundreds of partners in public, NGO, and private sectors around the world.

IUCN’s worldwide activities are directed from its head office in Gland, Switzerland. The original building was constructed in 1992, designed for 110 occupants. As the organization grew, up to 155 staff were working in the building and IUCN was renting additional office space elsewhere in Gland. It became imperative to gather all employees under one roof. In December 2003 the IUCN Council mandated the expansion of the headquarters building. The aim was to provide office space for an additional
120 employees, achieving a total capacity of 230 persons. Space was also to be created for commission members and regional employees who visit the head office.

Because IUCN coordinates the world’s environmental and nature organizations, the new building was conceived to do more than just provide office space. It is designed to accommodate a range of activities with partners, donors, consultants, trainers, and other international organizations. It can accommodate international meetings and other large assemblies. It also offers tenant space for organizations associated with IUCN, facilitating close collaboration. As a visitors center, the building also supports interaction with the public. As a hub for all these organizations and for all interested people, the extension is conceived as a multifunctional conservation center. IUCN insisted that the new building be designed and constructed to meet the highest standards of sustainability – fitting for an organization committed to the protection of nature. Accordingly, broad objectives were set for the project. The extension was to provide a high-quality working environment and be highly efficient in the use of energy and materials. To demonstrate its intentions and actions, IUCN wanted not one but two green building certifications. The IUCN Conservation Centre is the first building to attain two of the world’s most stringent labels: Minergie-P Eco and LEED Platinum.
The original IUCN building was not designed for adding further floors, so horizontal expansion was the only option. The land to the southeast of the old building, at the center of the site, was ideally suited. The new wing is conceived as a separate building volume roughly equal to that of the original building. Functionally, the two wings comprise a unified complex, but architecturally, the original building and the new wing are juxtaposed as a pair of dissimilar, separate buildings. In fact, IUCN refers to the new wing as the Lake Building and the original building as the Jura Building.

The original building is post-modern, a flat rectilinear travertine facade dotted with small windows. The new wing boasts a three-dimensional transparency – a play of balconies, columns, balustrades, and diagonals against a backdrop of large windows revealing deep interior spaces.

Although the language of the two wings differs, the ensemble forms a controlled whole. The massing and alignment of the two volumes
correspond, materials and colors are complementary, and the pair is unified by the entrance tower as central linking element.

The two building volumes are loosely aligned, separated by a space of 7.25 meters. This interstitial space forms a narrow entrance court off Rue Mauverney. Because the main doors are not on the street but set back some 20 meters, the entrance has been accentuated as a three-story tower. The top floor of this tower is a rectangular penthouse that rises above both wings, cantilevering forward to shelter the entrance doors, and extending to the original building, nearly touching it, but leaving a slit of sky visible. It seems to float, with dramatic effect. This penthouse was not included in the original program or in the construction budget; it was proposed by the architects as a unifying element and to mark the entrance. Sponsored by Holcim, it has been named the Holcim Think Tank. Literally and figuratively
the high point of the building, the large space is designed to accommodate important meetings and prestigious events hosted by IUCN or renters. The southeast wall is fully glazed, offering a stupendous vista of the Alps across Lake Geneva and a close-up survey of the impressive photovoltaic roofscape of the new wing.

This roof is a flat concrete deck covered with 34 centimeters of insulation and sealed with a polymeric membrane. Rows of shallow gables are installed upon this assembly, covering the entire roof. To gain southern orientation, this sawtooth superstructure is arranged at a 45-degree angle to the building grid. The south-facing slopes are completely covered with photovoltaic panels inclined at ten degrees. The north-facing slopes are covered with aluminum-clad panels pierced with rows of skylights. Between each pair of rows is a walkway for service access. The architects call this roof the fifth facade of the building, and rightly so. The highly ordered geometry wraps around the edges and is carried onto the vertical facades, and from the penthouse the roof is perceived as an edifice.
With large openings, windows, and rigorous order, this roof is the type Louis Barragan referred to as “a facade to the sky.”

Hansjürg Leibundgut, partner at Amstein + Walthert responsible for the mechanical concept of the project and Chair of Building Systems at the Swiss Federal Institute of Technology, explains that the design integrates architecture and engineering in an organic way:

“The sawtooth roof profile was determined by the solar orientation of the building, and this pattern induced a significant part of the formal and aesthetic expression of the project. This is the first project where I have experienced a technical characteristic both inducing and then encouraging an overall design schema.” — Hansjürg Leibundgut

Two peripheral atria penetrate the roof, a smaller one opening toward Lake Geneva, and a large one facing the natural garden. These penetrations effectively transform the building volume from a rectangular block measuring 78 by 42 meters into a winding linear envelope 16 meters wide,
a width that allows good daylighting of the perimeter spaces. The large, semi-enclosed terrace at the west corner of the building, adjacent to the cafeteria, is named *Espace Rencontre Luc Hoffmann* in honor of its sponsor. Measuring a generous 21.5 by 22.5 meters, this space can be used for many outdoor functions, such as lunch, receptions, exhibits, or performances. The terrace also provides a pleasant view from the cafeteria, offices, part of the kitchen, and the adjacent offices in the original building.

The terrace deck is FSC (Forest Stewardship Council) certified cumaru from Peru and Brazil. South American tropical wood was deliberately chosen instead of a local wood in order to make a provocative statement. Granted, the environmental impact of transporting local lumber would have been less, but the use of cumaru is intended to raise people’s consciousness about supporting livelihoods and sustainable forestry in the tropics, where socioeconomic needs are great. The deck is weathering to a neutral gray, harmonizing with the brushed aluminum facade panels, light gray concrete, and galvanized steel trellis.
The small and tall atrium offers a surprise when entering the semi-subterranean garage. Arriving cars descend the ramp and are suddenly back outside, in this tall courtyard, with open sky above. A single tree reaches upward, accentuating the verticality of this space. Driving further, the cars are once again beneath the building. Because the basement is partially open, it is very well ventilated and enjoys natural light. This atrium is also the delivery and service court, providing access to mechanical equipment rooms and storage rooms in the basement.

From the windows and balconies of the floors above, one sees cars arriving and leaving, deliveries being made, and other service activities. Noise of these activities is not a disturbance because the windows are well insulated. There is no need to hide the rhythm of everyday life somewhere behind the building.
Design strategy
Employing an integrated design process, the design team worked closely together from the start to develop a comprehensive concept incorporating progressive ideas about energy use of buildings. Hanspeter Oester, partner at agps.architecture and project manager for the expansion, explains:

“With its architectural, energy-management, and technical response, the IUCN Conservation Centre espouses the initiative Towards Zero Emissions Architecture of the Architecture Department of the Swiss Federal Institute of Technology, Zurich. Its goal is to separate energy consumption from building emissions. The prime concern is no longer (expensive) energy savings at any price, but rather the avoidance of emissions from buildings.”

Hanspeter Oester

Zero-carbon 100%-renewable energy sources were established for the building, which freed the design team to adopt an unusual approach. Instead of following the trend of compact, superinsulated building envelopes with maximum solar gain, the team placed greater value on daylighting and the quality of all interior spaces. The overall building footprint is rectangular, but the actual building envelope is anything but compact. Offices are typically five meters deep, with large windows permitting views and natural light, contributing to a pleasant indoor atmosphere while reducing the need for artificial lighting.

An overriding design principle applied throughout the building is economy of means, achieved through lean design, skin-and-bones architecture, multifunctional building elements, and functional synergy instead of physical integration. The benefits of this concept are both economic and ecological. A simple example is the precast concrete columns in the building, produced with an attractive finish surface and left without cladding or plastering. Leaving the columns naked not only saves costs, it avoids
Ground floor
A  Main entrance
B  Large atrium
C  Small atrium
unnecessary material and energy consumption and the associated CO₂ emissions of producing, transporting, installing, and ultimately removing the cladding or plaster and dumping it as waste — or, in the best case, sorting and recycling it. In the same vein, many walls of the building are raw concrete, finish floors are screed and finish in one, and much of the underside of the concrete floor slabs is left exposed as finished ceiling.

Economy through multifunctional building elements is best illustrated by the balconies that wrap the building, serving as fire exits, shading elements, outdoor space for the offices, and an outdoor promenade. The perimeter balconies eliminate the need for fire separation walls and fire doors within the building, simplifying the construction and enhancing space flow and interior transparency, and freeing the corridors to be used as open workspace. The balconies also protect the exterior blinds from snow, allowing the use of blinds which close from the bottom upward, providing optimum daylighting and shading during the summer. A further example of functional synergy is the placement of distribution piping for the ceiling convectors. Although the climate control concept relies on activation of the thermal mass of the concrete framing, the piping is not placed inside the slabs (direct coupling) but is surface mounted. With the structure largely exposed to the indoor air, the thermal lag is acceptable even with indirect coupling. The mechanical, electrical and lighting fixtures and conduits are largely surface mounted, and can easily be removed, relocated, or replaced at a later time. This accessibility ensures the longevity of the building by allowing for maintenance and repairs, changes in use or layout, and upgrading to incorporate future technologies. Separation instead of integration also facilitates sorting and recycling of materials when the building has served its useful life.
First floor
A  Connecting terrace
B  Visitors center
C  Red List Center
Thus the construction is simple. Materials and systems, reduced to the essential, are added to the skeleton. This additive principle however has not produced a building that lacks integrated design and interaction of systems. The systems form a functional synergy of the highest order, and this is exactly what makes the building easy to underestimate. One is misled by the simple appearance, but the longer one studies the building, the more one realizes how a complex range of concerns has been answered with penetrating vision and astounding clarity. In the words of Daniel Meyer, Structural Engineer ETH SIA SWB, Dr. Lüchinger + Meyer Bauingenieure AG, SIA board member, Zurich, and jury member for the SIA awards program Umsicht Regards Sguardi 2011,

“\textit{This project is one of those that require very close examination. At first, it triggered little discussion among the jury. I think we had not looked close enough; sometimes, one needs time to uncover the secrets and see what one is looking at. But as we discovered the quality that pervades even the details, the discussion became more and more that this building must absolutely be awarded.}”

Daniel Meyer

The skin-and-bones concept at the IUCN Conservation Centre has been applied with great design sensitivity, producing special aesthetic appeal quite in the sense of Mies van der Rohe’s minimalist aphorism “less is more.” Materials were chosen thoughtfully, combined skillfully, worked with great care, and shown for what they are, producing a beautiful simplicity that gives the building an honest integrity. One sees the care that has been taken with every building element, and knows that the material resources that went into the structure have been used with respect. One perceives a sense of genuine quality – not luxury – within the building. Thus, not only the function but also the feeling of this place is in perfect tune with the intentions and values of IUCN.
The structural system

The structure of this building is a veritable showcase of modern and emerging concrete technology, featuring CO$_2$-reduced concrete, recycled concrete, prestressed concrete, insulating concrete, precast concrete, and in situ concrete. Concrete is used as load-bearing structure, thermal mass, lateral stiffener, finished surface, insulation, and architectural accent. Concrete was chosen over wood for the structural system because it is long-lasting, economical, offers high thermal mass, and offers better acoustic insulation. The structure is an earthquake-resistant flat-slab reinforced-concrete frame. Structural bays measure 7.8 meters in both directions, and column spacing is 3.9 meters at slab edges. This grid suits the flexible partitioning scheme of the offices and the parking layout in the basement. Columns are precast, which allowed rapid and precise placement. The slab above the basement is thicker around the columns and thinner in the fields, to save material. Slabs above interior spaces are flat. The structure is laterally stiffened by concrete cores and diaphragm walls that extend from the foundation slab to the roof slab. The building rests on a concrete surface foundation, thickened at concentrated loads. This foundation costs the same as a footing foundation would, but is better suited to the soil conditions and is less susceptible to differential settlement.

CO$_2$-reduced concrete was used throughout the building. For this concrete, part of the clinker (manufactured in an energy-intensive and CO$_2$-producing kiln process) in the cement has been replaced with high-quality limestone. All aggregates and cement used in the concrete for the building were sourced and processed within a radius of 25 kilometers from the site.

Recycled concrete was used for all slabs except the foundation slab. This represents 40 percent of the concrete used in the building. Recycled
concrete is made with crushed demolition concrete as aggregate. The demolition material for the recycled concrete used in the IUCN Conservation Centre came from a building demolished a few kilometers from Gland. The recycling of rubble from demolished buildings not only helps ease the landfill problem, it conserves gravel as a natural resource. This is particularly important in this region of Switzerland, where gravel supplies are limited.

Demolishing old buildings and reusing the material to create new ones can be repeated indefinitely, which is the very essence of sustainability, but recycled concrete does have its limitations. It is not suitable for exposed applications where acids and freeze-thaw cycles can attack it. As usage increases, there will be shortages of demolition rubble. Recycled concrete requires about five percent more cement as binder than normal concrete does, and the structural members may have to be somewhat thicker, depending on the structural system. The technology for recycled concrete is still developing.

The entrance tower has its own separate structural system, employing bearing walls that pass through the interior and are also exposed to the outdoors. For these walls, the engineers sought a single material to serve simultaneously as structure and insulation. Insulating concrete was found to be the most cost-effective solution for the rectangular stair core and the monumental pylon at the entrance, which is 55 centimeters thick, seven meters long, and twelve meters high. These two structural elements support the tower and provide earthquake stability. Insulating concrete contains expanded clay and expanded glass as aggregates, both of which are full of tiny air pockets. The concrete weighs only 950 kg per cubic meter, over two-and-a-half times lighter than normal concrete. Lighter than water, it floats. Insulating concrete cannot be vibrated like normal
concrete, otherwise the lightweight aggregates would rise in the matrix like bubbles – therefore this concrete displays a pattern of surface voids. Many tests and studies were conducted to verify the strength and the casting behavior of the concrete. Core samples were taken to verify the density and compressive strength. Long-time creep, shrinkage, and behavior under permanent loading are properties still being learned about.

Claudio Pirazzi, structural engineer at INGENI SA Geneve¹, responsible for the structural design of the building, has a good deal of experience designing Minergie-certified buildings, but says that this was the first time INGENI used recycled concrete and insulating concrete:

“To apply these innovative materials and systems we had to enter unknown territory. Because the material properties and material behavior were not fully known, we had to conduct a good bit of research and work with sound hypotheses. Contributing to the realization of this innovative and pioneering building has given us not only experience and knowledge, but also pride.”

Claudio Pirazzi

¹ At the time of construction of the IUCN Conservation Centre, INGENI SA Geneve was called Guscetti & Tournier SA.
Building systems
The engineering firm Amstein + Walthert handled the mechanical, electrical, and plumbing design for the building. The engineers were charged with designing the systems to meet Minergie-P Eco standards and supporting the architects to achieve a building design that meets LEED Platinum standards. They implemented a holistic and highly innovative mechanical concept. Hansjürg Leibundgut, mastermind of the concept, says that:

“This is the first full-scale project in which we at Amstein + Walthert were able to implement the concept of distributed intelligence across the entire project.”

Hansjürg Leibundgut

**Heating, ventilation, and air conditioning**

The engineering team used a lean-tech approach. Gisela Branco, consultant for energy and environment at Amstein + Walthert and responsible for Minergie certification for the IUCN Conservation Centre, explains that this method is to first design the building shell to minimize thermal loads (passive design) and then to design the mechanical equipment (active systems) to meet the reduced requirements. Super-insulated, airtight buildings reduce thermal loss to a minimum, thereby opening a wider field of options for heating and cooling systems. A geothermal heat pump is used to heat and cool the building. Fifteen pipe loops extending 180 meters into the ground circulate a water-glycol mixture, extracting heat from the earth in winter and creating a heat sink for cooling in summer. The loops are connected to a heat pump, which may be bypassed when temperature conditions allow, achieving even greater efficiency. The heat-transfer fluid is carried to three types of HVAC (heating, ventilation, and air conditioning) units in the building: ceiling-mounted convectors, sub-floor airboxes, and large air-handling units in the basement.
Convectors are part of the primary system for heating and cooling most of the building. The heat-transfer fluid (warm in winter and cold in summer) is conducted through a three-pipe ceiling-mounted feeder following the corridors of each floor. Branch piping extends to ceiling-mounted convectors. These units warm the air (or cool it in summer), while the thermal mass of the concrete structure is heated (or cooled) by the system. Heating or cooling the thermal mass eliminates peak loads, in line with the lean concept. Response time is slow due to thermal lag, but tolerable because the indoor temperature fluctuation is very low.
Airtight buildings require the controlled change of indoor air. In the IUCN Conservation Centre, this is provided by 107 floor-mounted airboxes located along the perimeter walls. Each airbox includes a filter, fan, and heat exchanger. The airboxes draw in outside air through vents located beneath the balconies, filter it, temper it using heat recovery, and feed the air through a short duct to three floor vents. The airboxes must be serviced once a year; a removable panel in the floor provides easy access to each box. The boxes are located in front of each door to the outside, where they will never be covered by furniture. The short straight duct runs can easily be cleaned to eliminate dust build-up, so the ducts will have a long service life. Prototype airboxes were developed especially for this building. As planned, these were replaced when the standard units became available on the market, and the change entailed additional adjusting and optimizing. Thus, the building serves the purpose of research and development. IUCN accepted this role in order to advance the technology and benefit from some leading-edge equipment that was not yet available on the market.

Exhaust air is drawn into ceiling vents. The rate of air exchange is controlled by sensors that measure CO₂ in the indoor air. As an energy-saving mechanism, when the CO₂ level in a room drops below a defined value, dampers are automatically activated in the fresh air and exhaust air systems reduce or stop the air flow. Thus the air exchange rate is higher when needed, and lower when spaces are unoccupied. “The building breathes in unison with its users,” says Matthias Achermann, partner at Amstein + Walthert.

The CO₂ sensors and exhaust air vents are integrated into innovative ceiling panels that also incorporate convectors, lights, sprinkler heads, and perforated acoustic baffles. The devices in these multifunctional panels
are connected to the ceiling-mounted building systems spine that circulates through the corridor. The panels not only assemble the several mechanical and electrical devices into an organized and attractive unit, they also blend perfectly with the raw concrete ceilings on which they are mounted. The panels are located to allow flexible floor plans and partitioning.

The mechanical system is simple and versatile, serving adequately even when space use changes. The carefully controlled HVAC system efficiently maintains a comfortable temperature and good indoor air quality. Experience shows that ventilation controlled by building users interferes with proper performance of similar sensitive systems, therefore the windows are fixed and the exterior doors have closers and are not intended for ventilation. Hansjürg Leibundgut expects this decentralized HVAC concept to become mainstream practice:

“We are moving in a new direction in building design – away from creating prototypes and towards creating high-efficiency systems ready for industrialization. This high-efficiency system has been developed and proven through a series of buildings, and it is fully integrated with the architecture.”

Hansjürg Leibundgut

Small decentralized mechanical units are strategically located throughout the building. Besides using energy at its most efficient level, this concept can speed construction, reduce costs, and add flexibility, because any set of units can be adjusted as needed without affecting the others. Decentralized space-conditioning technology is without precedent in this part of Switzerland, so communicating the radical concept was problematic, until it was compared with a tree.
Separate air-handling units in the basement serve the special, high-load spaces: restaurant, kitchen, conference hall, and penthouse. These systems also incorporate heat recovery from exhaust air. A metering system records and analyzes the consumption of thermal energy for the entire building.

Electrical systems
The IUCN Conservation Centre runs entirely on green energy, a mix of hydroelectric and photovoltaic power. The photovoltaic plant on the roof, installed by Romande Energie, generates roughly 150 kilowatts – enough power to cover about half of the building’s requirements. At the beginning of the project, the system was calculated to produce 120 kilowatts, however, by the time the panels were installed, the technology had improved, and efficiency had increased by 25 percent.

Lighting is a significant power consumer in office buildings. Natural lighting is maximized by using skylights in the corridors and large windows throughout the building. Glare and overheating in summer are controlled by balconies and exterior blinds, motorized and centrally controlled. Nevertheless, occupants can control the blinds in their offices as they choose. The central control system has the flexibility to adapt to changes in layout and room use. The building incorporates two main types of artificial lighting fixtures. Thin-tube fluorescent fixtures provide general illumination and incorporate motion and daylight sensors. Lights operate only when needed, and turn off automatically. Adjustable LED spotlights provide light with a warm color temperature. The fluorescent and LED systems can be operated independently. Philips worked closely with the

“Can you imagine a tree that has only one leaf? If the single leaf falls from the tree, the tree will die. This was the clear analogy that convinced the client,” Hansjürg Leibundgut
architects and engineers to develop an optimal lighting solution for this building and donated the fixtures, which are very efficient, rated Class A according to EU energy standards.

High- and low-voltage power cabling and data-transmission cabling is easily accessible, installed in under-floor raceways. All outlets are floor mounted. Placing outlets in the exterior walls would have compromised the thermal performance and added costly detail work. Outlets are not placed in the partition walls because the walls are movable. The design team used a variety of furniture layouts to determine the best locations for the outlets. Digital wiring, providing both power and data, is used throughout the IUCN Conservation Centre. The digital wiring for the ventilation system in particular makes for an organized installation and ideal control. An uninterrupted power supply is provided for sensitive installations such as the data center and telecom systems. Tenant spaces have individual metering.

**Plumbing**
The IUCN Conservation Centre is designed for efficient water management. Faucets are equipped with motion sensors and timers to automatically close valves. Low-flow fittings conserve water. Urinals are waterless. Rainwater is harvested on the roof and collected in a large tank and used to flush toilets and irrigate the garden. Four drinking fountains are installed in the main corridors. The fountains use tap water, which is preferable to bottled water because it eliminates the need for deliveries, handling, and packaging. Hot water for the lavatories and the kitchen is heated by thermal energy reclaimed from the refrigeration rooms of the kitchen.
The facade
The distinguishing characteristic of the exterior is the play of diagonal lines of the balustrades and the roof edge. Each balustrade panel is composed of two precast concrete panels that meet along a sloping line. One side of each trapezoidal panel has a smooth finish, and the other is sandblasted to expose the course aggregate. A smooth side is always paired with a sandblasted side to accentuate the diagonal lines. A difference in panel thickness adds further emphasis. This detail is a cost-effective and simple way to achieve the visual effect without expanding the material palette.

The slope of the diagonals of the balustrades matches the oblique angles at which the saw-tooth superstructure of the roof intersects the plane of the facade. Thus, the lines of the facade derive directly from the orientation and incline of the solar panels. This geometric correspondence between roof and facade solves the formal problem of a rectilinear building capped with a sawtooth roofline. The jagged roof lines are not simply repeated down the facade; the balustrade diagonals are offset or reversed at each floor. The overall design is cohesive, it is organically motivated and rigorous, yet lively.

Dark steel balcony columns build on this theme. They are discontinuous, and the segments are offset rather than extending from roof to ground. The mind’s eye connects the segments, creating another pattern of diagonals. The transposition of seen and imagined diagonals over the orthogonal backdrop of doors and windows creates a three-dimensional meshwork that is especially attractive when the viewer is walking, and the two planes of the facade seem to shift against each other.
The balustrades, as the first layer of the facade, define the outermost rectangular perimeter of the building. The exterior walls, as the second layer, follow the building envelope as it winds around the atria. These walls are constructed of wood framing to which three types of modular elements are attached in a rhythmic pattern: large windows, opaque doors, and aluminum-clad panels. Windows are triple-glazed fixed panels. Each is fitted with exterior blinds that extend from the bottom up. This allows shading in summer at the bottom only, where the sun strikes the glass, while fully preserving views and allowing the greatest amount of daylight. Doors are insulated wood. Opaque bays of the facade are clad with ventilated aluminum composite panels. Most of these panels are on the northwest facade and at corners; the other facades feature more glazing units to permit solar gain.

The two layers of the facade part ways at the atria, as the building envelope cuts in and the balcony becomes a two-tiered pedestrian bridge that follows the outer perimeter of the building. From the large atrium, this scaffolding frames views of the natural garden and the scenery beyond.

With unusual zigzag lines, continuous balconies, a sawtooth silhouette, and columns staggered like notes on a sheet of music, this facade presents an iconoclastic image, and one that represents IUCN well. It states that buildings can be different, and should be. It says that open-mindedness and new ways of doing things are called for in these times. It communicates that IUCN is a future-oriented organization that supports and initiates change.
The interior
The IUCN Conservation Centre consists of four levels: basement, two full floor levels, and the penthouse. The basement and the two main floors align with and connect to the corresponding levels of the original building, so the expanded facility functions as one.

From the outside, the extension appears flattened and horizontal, but inside it is surprisingly vertical. Ceiling heights vary subtly, to define space. Stairwells rise into two-story atria covered with skylights, pulling the eye upward. Views into the outdoor atria extend upward to the roof edge and the clouds.

Along the central axis flows an uninterrupted corridor, designed for circulation and for interaction. Semiprivate meetings, group collaboration, informal exchange, and unplanned discussion constantly happen here. The corridors are accented with open stairwells, creating a two-story space. Rows of skylights on axis with the corridors provide natural light. This openness with natural lighting creates a very pleasant indoor environment, which, combined with the clarity of the interior lines and surfaces, creates an inspiring interior atmosphere of simple elegance.

Large windows and doors wrap the facade continuously except at corners. The interior can be laid out with great flexibility because the post-and-slab structure is largely free of bearing walls. Private offices, group offices, open offices, or meeting rooms can be created anywhere along the building perimeter. This flexibility of the floor plan is not theoretical, but thought out to the last detail. It is supported by the spacing and location of exit doors, windows, columns, light fixtures, electrical outlets, and air vents. Each space, no matter what size or shape, enjoys optimal lighting and climate control, and has at least one door to the outside.
This “modular infrastructure” allows offices to be partitioned at will into the standard sizes prescribed by IUCN. The floor plan is currently laid out to provide a good balance of private offices, team offices, and open office space. Open office areas are typically located at corners or corridor ends, with windows on two or three sides. Single offices have windows on one side only.

Windows are inoperable, but there is no need to open them. The ventilation system delivers plenty of fresh air, and the windows are so large that occupants have no feeling of being pent in.

The floor plan can be easily adapted to the changing needs of IUCN and the building tenants because nearly all partition walls are movable. The partition panels extend to the slab above; there is no suspended ceiling to interfere. Opaque panels can be replaced easily with glass panels. The finish, acoustical qualities, and stability of the partition system are as good as permanent walls, yet the panels can be disassembled and relocated within a few hours. This can be done without the disruption and debris that would be caused by the demolition of frame, gypsum, or masonry partitions, and without waste or the need for replacing materials. The system embodies considerable gray energy but this is compensated by the long service life it promises.

**Main entrance**
The new entrance lobby is located where the entrance stairs formerly stood in front of the original building. Because the entrance has not moved, the new entrance lobby connects directly to the entrance hall of the original building, making for perfect functional integration. This large unified space is designed for flexible use. Besides providing circulation, it can serve as an
exhibition space, a place for receptions, a hall to display merchandise, or a venue for other public, social, or business gatherings. With reception desk and views into both wings, the entrance lobby serves as the main point of orientation. Stairs and elevator connect it directly to the parking level below, to the conference rooms and cafeteria on the ground floor, to the visitors center and the Red List Center above, and to the Holcim Think Tank. Corridors on the ground floor and upper floor lead to offices and meeting rooms in both wings.

**Materials and finishes**

All materials in the building were selected for low environmental impact. Preference was given to certified and sustainably produced materials, recycled materials and materials that can be easily recycled, materials with low gray energy, locally sourced and produced materials, materials by certified suppliers, and green products, even if non-local. 95 percent of the materials were locally sourced. 75 percent of the wood is FSC certified (the remaining 25 percent comprises wood products for which no certification exists). All interior finishes in the building are nontoxic and solvent free.

The interior has an unpretentious and simple elegance. This is achieved by the clear layout and design, expansive windows and surfaces, and the harmonious composition of honestly expressed materials and finishes. The architects used a limited palette of interior materials to produce a comfortable, warm, and attractive indoor environment. The main materials are tan anhydrite flooring with oak accent panels, spruce window trim stained off-white, partitions in glass and warm light-gray laminate, perforated MDF (medium density fiberboard) panels stained dark brown, perforated aluminum ceiling panels, and raw concrete columns, ceilings, and accent walls. Many types of concrete elements are seen simultaneously: columns,
walls, ceiling, and balustrades. The colors and textures vary but harmonize. The columns are prefabricated concrete elements, made on a 100-year-old machine located a few kilometers from the site, thus the gray energy of these columns is very low. The smooth-finish columns are left unpainted and display a beautiful variegated texture. Each is unique. Displaying the natural color and texture of the construction materials, even manufactured ones, is a design ethic carried throughout the interior.

Window sills are 40 centimeters deep, corresponding with the thickness of the wall insulation. Sills and window surrounds are spruce. The matt finish is a semi-opaque oil stain with white pigment; knots and grain pattern remain visible. The height and depth of the window sills make them ideal for sitting on, and the wood is pleasant to the touch. Natural wood finishes in the building include the access panels in the floors, handrails at the stairs, and the pulls for entrance doors – all FSC-certified oak. Wood was chosen for pulls and handrails for its tactile and visual qualities. Perforated MDF stained chocolate brown is used for balusters at the open stairs in the corridors. These are the only dark elements in the otherwise light interior. They accentuate the stairs and add weight to the central vertical spaces.

**Green furniture**
The furniture in the IUCN Conservation Centre adds bright splashes of color. It was donated by Kinnarps, a Swedish manufacturer of furniture for offices, schools, and hospitals. Kinnarps is one of the few global furniture makers to assume responsibility for the entire supply chain from raw materials to furnished space. All the wood used in production at Kinnarps is from monitored or certified forests. The company uses a minimum of packaging, and delivers its furniture wrapped in blankets that are reused.
The natural site
The largest open space on the site is to the southwest. Here, adjacent to the original building, is a natural garden measuring some 3,400 square meters. This manmade meadow expresses and symbolizes IUCN’s commitment to conserving the integrity and diversity of nature. It was begun in 1992 and provides a habitat for a broad and changing diversity of species, some of which have appeared on the site or disappeared over the years.

Although the garden is situated in a suburban setting, it is home to many rare species found nowhere else nearby, including twelve species of plants and animals on IUCN Red List of Threatened Species™. Unlike most ornamental gardens, this natural garden is full of life all year round, even in the dead of winter. Maintenance of the natural garden consists of the occasional cutting of trees, removal of neophytes, and mowing the grass. The grass is cut in a piecemeal fashion, circumnavigating nests and spider webs.

Biologist and ecology consultant Florian Meier has been in charge of the natural garden since he created it, and he extended it to the southeast as part of the expansion project. The expanded section reproduces the hydro-geological conditions of once-prevalent Swiss marshland, 90 percent of which has been lost over the past decades, and the remainder of which is now protected. The garden now contains a wider range of habitats with varying soil hydrology and mineralogy. From pond to marsh to dry meadow to gravelly soil to rock, a range of ecological conditions has been created to support a great diversity of indigenous species. Rather than drawing detailed plans, Florian Meier worked in dialog with nature as the work progressed and the site took form. He sought not to shape nature to fit an ideal, but rather to create conditions on the site for nature to thrive:

“You cannot plan nature; you can accommodate it and hope it cooperates.” Florian Meier
Site plan

A Original building
B Extension
C Holcim Think Tank

1 Main entrance
2 Large atrium
3 Small atrium
4 Previous natural garden
5 Extension: natural garden/ecological farmland
In the newly created marsh, an area of some 1,000 square meters was excavated to within 30 to 60 centimeters of the water table. A thin layer of clayey and sandy topsoil was placed over the exposed glacial till subsoil. An assortment of suitable indigenous grasses, shrubs, bushes, and trees of various heights is planted here – including some rare species with spectacular blossoms, such as sword flag, also called marsh gladiolus (gladiolus palustris). Nature will consummate the transformation of this area over the forthcoming decade.

**Ecological farmland**

On the long strip of land at the southeast of the site, roughly a third of a hectare, IUCN plans to illustrate the type of environmentally compatible farmland that was once indigenous to the region. Here, old varieties of crops will be planted, harvested, and rotated. Of course, no pesticides, herbicides, or artificial fertilizers are or will be used here or anywhere else on the site. The absence of herbicides will enable threatened adventitious flora to flourish on the ploughed soil. Stones removed from the field are piled in rows, in the traditional manner. Adapted vegetation thrives in this rockscape, as do many reptiles, amphibians, and rodents. A living hedgerow woven of thorny bushes is to illustrate the old way of naturally fencing in farm animals. This part of the site will show that, before monoculture, farmland and farming methods supported biodiversity – and could do so once again.

The entire site is open to the public. Paths lead through all parts of the garden. This is an attractive and multifaceted place for observing nature, for walks, guided tours, and for learning about local flora and fauna and the habitats these species require. In the spirit of IUCN, the site is a microcosm of Conservation of Nature.
As part of LEED certification, energy consumption of the finished building is monitored to ascertain the actual energy efficiency. This includes continuous recording of energy consumption for lighting, heating, cooling, and ventilation throughout an entire year. The recorded energy consumption is then compared with the values from the building simulation conducted during the design phase. To ensure that this comparison is representative, the building model and the associated weather data must be calibrated with the comparison phase. To conduct such a comparative study, the building must have been in operation for some time and the optimization of the systems successfully completed. Measurement of data for the comparative study of the IUCN building began in fall 2011. The evaluation of the first six months was conducted in summer 2012. At the time of this writing, the system adjustment and optimization were complete. With specific measurements taken over periods of several days and weeks, functional tests and plausibility checks had been conducted. Using these point measurements, the initial operational values were compared with the planned values.

<table>
<thead>
<tr>
<th>Comparison period</th>
<th>Calculated</th>
<th>Measured</th>
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</thead>
<tbody>
<tr>
<td><strong>November to December 2011</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COP heat pumps</td>
<td>5.5</td>
<td>5.7</td>
</tr>
<tr>
<td>Power consumption of heat pumps</td>
<td>3,446 kWh/m</td>
<td>4,100* kWh/m</td>
</tr>
<tr>
<td>Ventilation (monoblocks)</td>
<td>1982 kWh/m</td>
<td>1970 kWh/m</td>
</tr>
<tr>
<td>Kitchen equipment</td>
<td>212 W/m²</td>
<td>163 W/m²</td>
</tr>
<tr>
<td>Total power consumption: lighting, equipment, pumps and warm water</td>
<td>18,035 kWh/m</td>
<td>21,500 kWh/m</td>
</tr>
<tr>
<td>Solar power generation in first year of operation</td>
<td>145 MWh/a</td>
<td>166 MWh/a</td>
</tr>
</tbody>
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* Room temperature settings were 2°C higher than planned
A review of the monthly total power consumption since the building was commissioned shows a continual reduction, which is due to the optimization of the systems.

**Comparative overall electrical energy consumption**

<table>
<thead>
<tr>
<th>kWh/m²</th>
<th>January 2011 to June 2012</th>
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<tbody>
<tr>
<td>8.0</td>
<td></td>
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<tr>
<td>7.0</td>
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<tr>
<td>6.0</td>
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<td>1.0</td>
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<td>0.0</td>
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Calculated energy kWh/m²
Measured energy kWh/m²
Linear (Measured energy kWh/m²)

An initial survey of the energy efficiency of the building shows that the target values of the Minergie-P building are well achievable. Decisive factors in this are the adjustment of the systems and the subsequent optimization phase, which serves to adapt the building to its users. Because total energy consumption is so low, any adverse influences carry greater weight, thus, deviations within a month can be as high as 20%. However, measured in absolute terms, such a deviation is small. In summary, it is evident already now that the building is very energy efficient and has earned the Minergie-P label.
Photovoltaic power generation

(kWh) December 2010 to November 2011

Calculated total energy
Total energy generated

Inverter 1
Inverter 2
Inverter 3
Inverter 4
**Signature energy consumption**

Thermal energy week (kWh) / Mean outdoor temperature week (°C)

**Measured COP geothermal heat pumps**

Mean daily (kWh) and COP (–)
Certifications and awards
**Minergie-P Eco**

Minergie is a Swiss certification for green buildings, introduced in 1994 and endorsed by the Swiss government. Minergie-certified buildings are energy efficient, use renewable energy sources, have low environmental impact, and provide a comfortable indoor environment.

Minergie-P is a more stringent level of Minergie certification. The P stands for passive design. Minergie-P buildings are not just super-insulated structures; they are an integrated system of all building elements designed for high efficiency, comfort, and cost-effectiveness. The main Minergie requirements are:

<table>
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<tr>
<th>Requirement</th>
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<tbody>
<tr>
<td>Low specific thermal energy consumption</td>
</tr>
<tr>
<td>Controlled indoor air exchange</td>
</tr>
<tr>
<td>Prevention of overheating in summer</td>
</tr>
<tr>
<td>Insulation and air tightness of the building shell</td>
</tr>
<tr>
<td>Energy-efficient appliances</td>
</tr>
<tr>
<td>Additional cost of green building maximum 15 percent</td>
</tr>
<tr>
<td>Simple operation of the building and systems</td>
</tr>
</tbody>
</table>

Minergie-Eco is a further level of Minergie certification for buildings that are healthful for occupants and have limited environmental impact regarding raw material consumption and recycling as well as manufacturing and processing of building materials. The requirements for healthful indoor environments include adequate daylight, low noise emissions, and low emissions of indoor pollutants and radiation. The requirements for low environmental impact include the use of plentiful raw materials, local materials, certified green materials, and recycled materials, building materials with low gray energy and low emissions during processing, and
the use of building methods that allow materials to be easily reclaimed (sorted) or disposed of in an environmentally responsible way.

Besides stipulating requirements for green buildings, Minergie also forbids the use of less-preferable or harmful practices and materials. In the interest of healthful interiors, the use of biocides and wood preservatives is prohibited in interiors, as well as certain solvent-based products and wood products that emit formaldehyde. In the interest of controlling environmental impact, the use of materials containing heavy metals is controlled, the use of recycled concrete is required if it is available within a radius of 25 kilometers, the use of non-local wood is prohibited unless it is environmentally certified, and the use of adhesive and sealing foams is prohibited.

**LEED Platinum**

Leadership in Energy Efficiency and Design (LEED) by the USGBC (U.S. Green Building Council) has become the world’s preeminent system for rating the design, construction, operation, and renovation of green buildings. The USGBC has designed at least eight LEED rating systems to cover virtually all building types and every life-cycle phase. The program is intended for the USA, but has found global use. Under the program, the independent Green Building Certification Institute (GBCI) verifies that LEED buildings are constructed as intended. GBCI includes a network of ISO-compliant international certifying bodies, ensuring the consistency, capacity, and integrity of LEED certification.

The various LEED systems exist in several versions. The IUCN Conservation Centre is certified under LEED for New Construction Version 2.2. Under this system, up to 69 possible points are awarded for fulfilling specific criteria in six categories: sustainable sites, water efficiency, energy and atmosphere,
materials and resources, indoor environmental quality, and innovation & design process. Depending on the total number of points, the building can receive one of four levels of certification. With 54 points, the IUCN Conservation Centre earned Platinum, the highest level of certification.

**Umsicht – Regards – Sguardi 2011**

This award for sustainable and forward-looking design of the built environment is given by the Swiss Society of Engineers and Architects (SIA). Judging criteria for the award are six-fold: pilot character for future development, interdisciplinary response to complex issues, social relevance and responsibility, environmental responsibility, economic soundness, and cultural and aesthetic value. The prize was first awarded in 2007 and for the second time in 2011. In 2011 the IUCN Conservation Centre received the award along with five other projects. Jury member Jean-Louis Scartezzini, Professor and Director, Solar Energy and Building Physics Laboratory, Swiss Federal Institute of Technology, EPFL Lausanne, explains why the IUCN Conservation Centre was premiated:

“The convincing argument was the integration of practically all concerns and aspects of sustainable development: social and economic as well as technical aspects. What’s more, the building in itself is a testing ground, which means that completely new avant-garde solutions were used. It also means that it will be able to maintain this important status and continue to serve as a testing ground.”

Jean-Louis Scartezzini

**Swiss Solar Prize 2010**

The Swiss Solar Prize is awarded by SWISSOLAR, Swiss Professional Association for Solar Energy, for outstanding applications of solar energy systems. Its goal is the promotion renewable energy, in particular, solar energy. The Swiss Solar Prize has been awarded every year since 1991.
The prize is awarded in three categories: Buildings, Power Plants, and Persons (including companies and governments). In 2010 the IUCN Conservation Centre received the award along with six other projects in the category Buildings and was appraised by the jury as follows:

“The expansion of the IUCN complex of 4,530 m² is a genuinely successful realization of the architectural plans, serving the organization as a social base and as an exemplary model. This large building is Minergie-P Eco certified. The photovoltaic system integrated on the flat roof, with an output of 146 kWc, has the capacity to meet half the power needs of the building of 261,000 kWh/a. This significant photovoltaic system generates some 139,700 kWh/a and supplies the heat pumps with an extra 35,300 kWh/a of solar power. CO₂ emissions of the building are correspondingly reduced, in comparison with similar buildings, on the order of 103.5 tons per year.”

Swiss Solar Prize jury
People and transparency

Epilog by Julia Marton-Lefèvre, Director General, International Union for Conservation of Nature (IUCN), Gland, Switzerland
Since 1948, the International Union for Conservation of Nature has been assisting the world to conserve the integrity and diversity of nature. The extension of our former headquarters into the new IUCN Conservation Centre is an exciting milestone in our history. It allows IUCN to continue expanding its work, developing good conservation knowledge, cultivating partnerships, and bringing different types of people and organizations together to share, debate, and decide on some of the most pressing issues of our time. Only by collaborating effectively and globally can we master the challenges that face humankind and the planet.

The extension doubled the size of our building, allowing us to gather our people under one roof, along with some partner organizations. With this concentration, we have attained a sort of critical mass, as you can see walking around here. This place is full of life, it’s a friendly place. The space encourages communication and discussion, and that’s what IUCN is all about – it’s a union. For me the U in our title is most important. The Centre is buzzing with activity, and the building is working for that, with all its different spaces and places to work and interact: formal and informal rooms, as well as public and private areas. It’s pushing us to do exactly what we are supposed to do as we work together and learn from each other’s point of view about the world – so that we can make it a better place.

One of the impressions that you get when you enter here is that this is a transparent building, in every sense of the word. And IUCN really strives to be transparent, in what we do, in our relationships, in the rapport we have with people who come here. This transparent environment is just what we need. In addition to accommodating our day-to-day activities, the building works very well when we hold events for visitors. We have the rooms to accommodate meetings of every size – from large conferences to
small workshops. And of course we have the Holcim Think Tank, the “jewel in our crown” which provides an exclusive setting for larger groups. So with this range of spaces we can always choose the ideal room for any event, and even hold several events simultaneously. Our cafeteria, operated by a nonprofit foundation, provides excellent food and friendly service, and in good weather people always enjoy sitting out on the terrace, named Espace Rencontre Luc Hoffmann.

We have had many visitors, from individuals and small groups to schools and professional and environmental associations. Each visit is an opportunity to showcase the building to people who may or may not share our commitment to biodiversity. The building has actually helped open doors with people we didn’t know before but who are intrigued about this green building and the beauty of it. So we’ve made a lot of new friends thanks to the building. Many neighbors who never came to IUCN now come for lunch regularly. The cafeteria and terrace have become a hub of interactivity and intermingling. Tenants in the building include some foundations, members, and partners we work closely with, MAVA¹, WAZA², FIBA₃, and Ramsar⁴, as

¹ MAVA, *Fondation pour la Nature*, is an NGO that works to promote the protection and sustainable management of nature, biodiversity, and natural resources by supporting scientific research, training, and integrated management practices and by finding solutions that deliver balanced cultural, economic, and ecological benefits.

² WAZA, the *World Association of Zoos and Aquariums*, is the unifying organization for the world zoo and aquarium community. The NGO aims to guide, encourage, and support the zoos, aquariums, and like-minded organizations of the world in animal care and welfare, environmental education, and global conservation.

³ FIBA, *Fondation Internationale du Banc d’Arguin*, is an NGO dedicated to the research and conservation of nature. Specific objectives include the conservation and improvement of the Banc d’Arguin and the other West African ecosystems in harmony with social development.

⁴ The Ramsar Convention on Wetlands is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.
well as a sustainability management school and a communication and interactive agency, which also appreciate the open office layout. Besides offering synergy, having these organizations co-located with us brings more life and young people into the building.

There is a special feeling of wellbeing in this place, which comes from a combination of factors: the daylight, the openness, the earth-colored floors, and natural materials left uncovered, well-designed spaces, simple but beautiful furniture, the setting within the natural garden, and the feeling of being among people who are all working together for the common good. This place inspires the senses.

Our natural garden is open to the public, and many people enjoy it, including staff, visitors, and neighbors. The garden is not only a beautiful amenity and a functioning ecosystem, it gives visitors a lot of useful information, and it shows that attractive gardens can be something different than manicured landscaping – they can actively support biodiversity. The mission of IUCN is to influence, encourage, and assist societies to respect and conserve nature as they continue to thrive and develop.

The IUCN Conservation Centre is an outstanding example of how we can and should build to ensure a sustainable future. We are very proud of this wonderful building, and as the world’s preeminent environmental network, it’s important that we have such a building for our headquarters, even if it may not be our core business. It shows that we are trying to do our best and that we see the need for rethinking, for innovation, for questioning the way we build, the way we live, and what our values are – and then act accordingly. At a time when the wellbeing of future generations and our one and only planet depends on what we do today, this is more important than ever.
## Project and technical data

<table>
<thead>
<tr>
<th><strong>Project data</strong></th>
<th>Building type: multi-purpose – offices, library, exhibition space, conference center, cafeteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total site area</td>
<td>16,765 m²</td>
</tr>
<tr>
<td>Construction period, June 2008 to March 2010</td>
<td></td>
</tr>
<tr>
<td>Construction cost (Building Cost Plan 2 with fees)</td>
<td>CHF 20.75 million</td>
</tr>
<tr>
<td>Cost per m³, as per SIA 416 including design fees</td>
<td>CHF 628/m³</td>
</tr>
<tr>
<td>Cost per m², as per SIA 416 including design fees</td>
<td>CHF 2,250/m²</td>
</tr>
</tbody>
</table>

| **Volume and areas** | Building volume as per SIA 416 | 26,675 m³ |
|-----------------------|---------------------------------|
| **Building areas**    | Building footprint | 3,400 m² |
|                       | Gross floor area 7,438 m²      |
|                       | Basement                        | 2,885 m² |
|                       | Ground floor                    | 2,193 m² |
|                       | 2nd floor                       | 1954 m²  |
|                       | 3rd floor                       | 406 m²   |
|                       | Useable floor area              | 6,190 m² |

<table>
<thead>
<tr>
<th><strong>Energy performance</strong></th>
<th>as per SIA 380 / 1 SN 520 380 / 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmentally controlled space (EBF)</td>
<td>5,150 m²</td>
</tr>
<tr>
<td>Building envelope index (A/EBF)</td>
<td>1.75</td>
</tr>
<tr>
<td>Heating energy demand (Qh)</td>
<td>97.9 MJ/m²⋅a</td>
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<tr>
<td>Mechanical thermal recovery coefficient</td>
<td>0.82%</td>
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<tr>
<td>Energy demand, hot water (Qww)</td>
<td>23 MJ/m²⋅a</td>
</tr>
<tr>
<td>Total power index as per SIA 380 / 4</td>
<td>4.70 KWh/m²⋅a</td>
</tr>
<tr>
<td>Power index (heating)</td>
<td>10.80 KWh/m²⋅a</td>
</tr>
</tbody>
</table>
# Addresses

| Building owner | IUCN, International Union for Conservation of Nature  
| World Headquarters  
| Rue Mauverney 28, 1196 Gland, Switzerland,  
| mail@iucn.org, www.iucn.org  
| Project team: Mike Davis, Christian Laufenberg, Merja Murdoch |
| --- | --- |
| Development consultant | The Building Foundation for International Organizations, FIPOI,  
| Rue de Varembé 15, 1211 Geneva 20, Switzerland |
| Owner’s technical agent (pilot) | Institut pour l’Economie de la Construction S.A., IEC  
| Place de la Gare 4, 1001 Lausanne, Switzerland  
| Michel Coubès, Daniel Dorsaz, Christian Morand (Techdata SA) |
| Total services contractor | Steiner SA  
| 87, rue de Lyon, 1203 Geneva, Switzerland  
| Thierry Diserens, Jean-Manuel Megow, Laurent Rollier |
| Architects | agps.architecture  
| Zypressenstr. 71, 8004 Zurich, Switzerland  
| Marc Angélil, Dominik Arioli, Sarah Graham, Hanspeter Oester,  
| Reto Pfenninger, Angelika Scherer, Manuel Scholl, Ines Trenner |
| Energy concept | Hansjürg Leibundgut  
<p>| Chair of Building Systems, Swiss Federal Institute of Technology (ETH Zurich), Schafmattstrasse 32, 8093 Zurich, Switzerland |</p>
<table>
<thead>
<tr>
<th>Service</th>
<th>Company</th>
<th>Address</th>
<th>Individuals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical engineering</td>
<td>Amstein + Walthert SA</td>
<td>Rue Pécolat 1, CP 1044, 1211 Geneva 1, Switzerland</td>
<td>Matthias Achermann, Adrian Altenburger, Yannick Barthet, Gisela Branco, Franco Magistris, Sanel Muratovic</td>
</tr>
<tr>
<td>Structural engineering</td>
<td>INGENI SA Genève</td>
<td>Rue du Pont-Neuf 12, 1227 Carouge, Switzerland</td>
<td>Marco Andrade, Benoît Favre, Gabriele Guscetti, Gabriel Mussini, Claudio Pirazzi, Jérôme Pochat, Marc Walgenwitz</td>
</tr>
<tr>
<td>Landscape architecture</td>
<td>Nipkow Landschaftsarchitektur BSLA SIA</td>
<td>Seefeldstrasse 307, 8008 Zurich, Switzerland</td>
<td>Nadia Bühlmann, Beat Nipkow</td>
</tr>
<tr>
<td>concept</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural garden and ecological farmland</td>
<td>Florian Meier, Consultant in Ecology</td>
<td>Bois de Chênes, 1272 Genolier, Switzerland</td>
<td></td>
</tr>
<tr>
<td>LEED consultants</td>
<td>Architectural Energy Corporation</td>
<td>2540 Frontier Avenue, Suite 100, Boulder, Colorado 80301, USA</td>
<td>Sally Blair, Michael Holtz</td>
</tr>
</tbody>
</table>
Acknowledgements

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Photos

Alain Bucher, Berne, Switzerland

Sources

IUCN (2010) Building the Future
Rabitsch, V. (2010). Ein simpler Betonbau. baublatt

A first publication on the IUCN Conservation Centre was released by the Holcim Foundation 2010 to commemorate the inauguration of the building (ISBN 978-3-7266-0088-4, English; ISBN 978-3-7266-0089-1, French).
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* see details at: www.holcimfoundation.org/univ