PERSPECTIVE

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A GROUP OF ARCHITECTURAL PRACTICES
WORKING TOGETHER IN EUROPE & ABROAD

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SPRING

FOCUS TOPIC: NET-ZERO CARBON PROJECTS

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FOCUS TOPIC: „NET-ZERO CARBON" GOAL FOR DESIGNING

The World Green Building Council's ***'Advancing Net Zero'*** project has set targets for all new buildings to be operating at net zero carbon by 2030 and for all buildings to operate at this same level by no later than 2050.

The WGBC defines a Net Carbon Zero Building as a highly efficient building with all residual energy needs supplied from either on-site generation and/or off-site renewable sources. Key principles involve:

1. **Measurement and Disclosure of Carbon Emissions** – Carbon is now the ultimate metric to be tracked – buildings must achieve an annual net zero carbon emissions balance, based on metred data
2. **Reduce Energy Demand** – Prioritise energy efficiency to ensure that buildings are performing as efficiently as possible and not wasting energy
3. **Generate Balance of Energy through Renewables** – Supply the remaining demand from renewable energy sources, preferably on-site, followed by off-site – or from off-sets after this
4. **Improve verification and rigour** – Progress to include consideration of embodied carbon in building materials and other impact areas such as zero water / zero waste and carbon sequestration.

Simply put, Net Zero Carbon means that a project's life-cycle greenhouse gas emissions from all sources should total zero - or less. These sources include:

- Life-cycle impacts of operational energy and water
- Life-cycle impacts of construction, including materials extraction, manufacturing, transport to the site, installation and wastage, repair, replacement, refurbishment and end of life processing
- Benefits (avoided impacts from) energy exported from the project to other users
- Benefits (avoided impacts from) reuse of materials after the project is decommissioned
- Benefit from permanently sequestered carbon (if any)

Net Zero Carbon matters because construction is responsible for 39% of all global carbon emissions. Commercially speaking, net zero carbon also matters because leading construction clients and cities are now asking for it and even if climate change is not at the top of a company's priority list, they will need to respond to such market demands in order to stay in business. The World Green Building Council's **Advancing Net Zero Commitment** has been signed by national governments, cities and leading long-term property investors and there many other investors who have yet to sign, but who are interested in applying some of the best practices to maintain their credentials as environmentally responsible organisations.

In addition to energy generation through renewable sources there needs to be a strong focus on the materiality of buildings. Annual global resource consumption exceeded 100 billion tonnes in 2017, almost doubling the per capita consumption rate of 50 years ago, and jumping 8% in just 2 years. Of this figure, the construction industry is responsible for up to 40% and a similarly high proportion of waste, as very few construction components and materials are reused or recycled. Some construction materials are never actually used before they are scrapped. Research suggests that as much as 20-30% of the materials delivered to construction sites in Brazil are discarded without being used. In the UK, this figure is around 13% and in the Netherlands between 1-10%. A **Circular economy** aims to move away from this resource-hungry model, where virgin materials are extracted, used, and discarded at the end of their life, to one which focuses on raw material reduction, retention and reuse.

Material efficiency is at the heart of circular approaches in construction, as well as designing for adaptation, and disassembly and to preserve the value of materials beyond their initial use. A key conceptual shift is to think of buildings not just for their primary purpose, but also as a method of storing thousands of tons of valuable products and materials, which can be traded and reused at the end of the building's life, rather than just discarded. This approach is being advocated by the Buildings as **Material Banks project (BAMB)**, which promotes tools such as electronic materials passports and reimagines a building as a dynamic data-tracked repository of tradable value.

In March 2020, the EU Commission published a revised **Circular Economy Action Plan**, which aims to accelerate the changes needed to realise the European Green Deal. It includes plans for a sustainable built environment strategy, which includes measures on recycled content requirements, design for durability and adaptability, integrating Life Cycle Assessment into public procurement and potentially revised material recovery targets. The Action Plan highlights the need for urgent consideration of the following:

1. **Materials efficiency: using less to do more** - Designs should aim to reduce the overall number of materials used over the lifetime of your building, taking into consideration if a material choice will result in more replacements of refurbishments, as well as favouring non-virgin and renewable materials over primary and non-renewable resources. Renewable materials are those usually sourced from resources that can be replenished, or regenerated, such as timber from sustainably managed forests,
2. **Ensuring that materials have a life beyond their initial purpose** - Design for Disassembly, Design for Adaptation and Value Conservation practices ensure that materials have a life beyond their initial purpose. These approaches require an understanding of the building and its components life-cycle and potential for reuse to ensure that the maximum possible amount of component and materials can be dismantled, recovered and reused once their initial use is over,
3. **Material choice** - Some material groups, such as metals will lend themselves more easily to being reused and therefore to higher circularity scores. Designers now need to explore mitigation measures around different material options, for example for materials like concrete that have a low circularity score, recycled concrete, the use of could be explored.

EU Taxonomy - The EU has set itself ambitious goals when it comes to its climate policy, including a 55% reduction in greenhouse gas emissions by 2030 and to become an entirely climate-neutral continent by 2050. To help achieve this, the European Commission released a sustainable finance plan in 2018, with the aim of bringing together economic and environmental policies and encouraging green investment. But for this to be a success, they first needed to establish clearer definitions of what 'green' consisted of – as a result, the EU taxonomy, first published in June 2020, was established.

In biology, taxonomy is the science of naming, describing, and classifying all living things - the Commission has taken this same approach and applied it to sustainable businesses. The EU taxonomy is a classification system of environmentally sustainable economic activities. Put simply, it's a dictionary-style tool detailing specific business activities that are considered sustainable by the EU. The taxonomy fills two important needs: it provides us with a common language for talking about sustainability and uses objective, quantifiable criteria for assessing businesses. It has identified six environmental objectives:

1. Climate change mitigation
2. Climate change adaptation
3. Protection of water and marine resources
4. Transition to a circular economy
5. Pollution control
6. The protection of ecosystems

While previous guidelines left room for interpretation, the EU taxonomy takes a more rigorous approach, looking at individual business activities in granular detail while using a science-backed approach. The taxonomy is designed primarily to be used as a tool for sustainable investment. By putting everyone on a level playing field, it will help investors understand more clearly where companies stand in relation to one another. It will also play a vital role in guiding business decision-making. Due to its objective framework, the taxonomy will make it harder for companies to hide behind their marketing.

Perspective Architectural Group acknowledges the urgent need to reduce emissions in all our projects, as far as practicable, by reducing demand for virgin materials and reducing fossil energy demand. We aim to incorporate circular economy principles by, where possible, repurposing existing buildings and materials, reducing the need for material replacements during building life-cycle by choosing longer-lasting products and by designing for adaptability, deconstruction and reuse. We will restore climate balance to achieve net zero carbon by replacing fossil energy elsewhere & seeking to sequester (biogenic) carbon.

In future, we will be working closely with Life Cycle Assessors and other specialists, who will guide this complex process and steer the design team through the different gates. To achieve these goals as architects, from the outset and inception stage of all projects, it will be vital to set out a clear zero-carbon agenda for clients, to agree manageable targets and lay out the roadmap for a successful outcome. This will need the buy-in from clients and fellow consultants and this is a challenge the we in Perspective are committed to.

Mark McCann *(Perspective Ireland) &* ***Britt Almqvist*** *(Perspective Sweden)*

FOCUS TOPIC:
FYREN (THE LIGHTHOUSE)
Mjölkudden, Luleå, Sweden

Fyren aims to create an area characterized by creativity, innovation, social- and environmental awareness. Proposed is a collection of sustainable buildings that create spaces for living, working, and meeting. The goal is to create an attractive environment that benefits from its accessibility with easy access to public transport as well as safe bicycle lanes.

The site

Mjölkudden is located in Luleå, a coastal town in the north of Sweden, 10 minutes from the city center and Luleå university of technology. The site today is mostly unused and consists of a parking lot and a recycling station. However, the site holds traces of both environmental and cultural values. These values have been used as guidelines whilst designing the project as to not harm or eliminate but rather enhance the existing values.

The site allows for a new node in Luleås urban pattern with excellent connections to and from the University, the City Centre as well as nature and its recreational qualities. It offers possibilities for housing, offices and meeting points in combination with public services. The project will act as a complement to the supply presently offered by Mjölkuddens existing center.

Climate neutrality – the only way forward

The goal with this development has been to create the first net 0 Co2 emission building designed with sustainable and locally produced materials. A vital part in obtaining climate neutrality in buildings is to use materials that have a low carbon impact, by using materials located close to the site emissions from transportation can be lowered.

Northern Sweden contains vast amounts of forest and has a long history of sustainable forestry and thus provides an obvious choice for the building materials. In relation to this, this part of the country contains massive green energy plants in the form of hydroelectric plants. This will ensure that the energy used in the building's lifespan will consist of green locally produced electricity. To ensure a net zero emission the buildings will also be equipped with solar panels as well as low energy climate control systems.

By using massive wood as the primary construction material emissions are reduced both during the extraction of the material and the construction compared with conventional materials. By implementing the wooden structure to a floorplan that allows for flexibility the building contributes to long term sustainability. Flexibility allows the building to easily change for future needs. The buildings will also be designed in a way that allows its structural elements to be re-used should it be taken down.

Our vision - a green spot with a warm identity

When you enter Luleå by buss or car you will be met by a tall 14 levels high building with tapered gable walls with a wooden façade, partly painted in the traditional Falu red paint. FYREN aims to create be new landmark accentuated by nearby lower buildings. Linked to the tall building stands a lower building with its gable facing the avenue and its orientation adapted to the rectangular structure of the Mjölkudden area. Together the two buildings create a protected square opening towards south-west, creating a perfect place for sunny afternoons and evenings. The variation in height within the project visually connects to the existing one family houses and Mjölkudden center.

At ground level the taller building offers a spacious entrance lobby and a flexible area able to hold multiple social functions such as a café, a gym, an aula etc. On the upper floors the building is designed in a grid pattern creating the possibility for multiple uses depending on the tenets need. It could become offices, meeting rooms of and long-stay living. The top floors are crowned with an open terraced area with large windows, creating a beacon in the dark winter nights. The space can be used for an array of functions such as a restaurants, co-working areas, or exhibitions spaces.

The housing block along the sideroad contains apartments with patios at ground level and balconies and terraces.

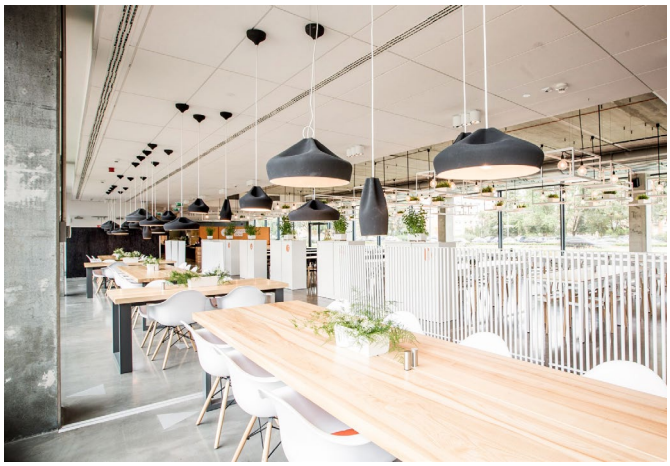
All electricity will be produced on site via photovoltaics on the roofs and heating via heat pumps in the earth. The project will follow the Sweden green building council 0 Co2 and the idea is to certify the building. The experience of a green entrance to Luleå will strengthen and develop our urban vision – a green and sustainable urban development.

BUSINESS GARDEN

Poznan, Poland

Designed by: PSP Sweden
Client: Vastint
Area: 90 000 m2 of office space
Status: Completed in 2019

Poznan, 270 km west of Warsaw, is with 600 000 inhabitants the 5th largest city in Poland. Ahlqvist&Almqvist were here commissioned to design the Poznan Business Garden, a unique office park with a high profile in all issues of sustainability.
The project is certified LEED Platinum. 2021 it was awarded ”Best completed ecological certified building” in the PLGBC Green Building Award 2020 competition. The competition is organized by PLGBC Polish Green Building Council.



The commission included analysis and development of an existing Master Plan and design of buildings, with studies of a number of alternative layouts with matching types of office typologies. The master plan is comprised of 90 000 m2 office space. 300 restaurant seats, a large underground garage and all landscaping were also included in the commission.
A&A completed construction drawing for the first phase of 45 000 m2, which was finished in 2015. The second phase was completed in 2019.

HORIZON 2020 DRIVE 0 PROJECT

PERSPECTIVE Ireland Representative, COADY Architects, is taking part in the EU funded DRIVE 0 project. The overall aim of DRIVE 0 is the decarbonization of the EU building stock via an acceleration of deep renovation within a consumer centered circular renovation process in order to make deep renovation more attractive for consumers and investors, environmentally friendly, and cost-effective.

The built environment is responsible for 40% of final energy consumption in the EU. The embodied energy in buildings counts for up to 60% of the building's life cycle energy, with collateral embodied CO2. 25%-30% of waste streams generated in the EU derives from construction and demolition. This needs to change. The Drive 0 project has 7 study and demonstration cases located in Estonia, Greece, Ireland, Italy, Netherlands, Slovenia and Spain. These demonstration cases are:

- providing insight in the potential and the exploitation of typical local drivers to initiate and accelerate deep renovation;
- giving input for the assessment of the potential of local available reusable materials and how a total local value chain can be created;
- giving feedback on the practical working and usefulness of the proposed consumer-centred circular renovation concepts (performance in practice, actual renovation time, the extent to which materials are actually re-used, the extent of appreciation by end-users etc.);
- providing evidence to the involved end-users and to the most important stakeholders on EU level (such as European 'umbrella organisations' and interest groups);
- providing input for a comparison of the potentials and effectiveness of using and exploiting local drivers;
- giving input for the calculation of the impact, on three levels

COADY work closely with our partners in the Technological University Dublin (TUD) and Vision Built with SISK, to deliver the Irish proposal of a deep circular renovation and front porch extension to 2 semi-detached houses owned by Westmeath County Council (Municipal Authority). The Irish Case Study demonstrates the application of modular, circular construction in retrofit situations. There have been 3 mock-ups of the proposed wall upgrade system developed in a factory setting, in advance of the execution of the full-scale implementation on the Irish demonstration case houses. The Irish demonstration case is now substantially complete, and and the 2 existing dwellings have now been fully retrofitted with the following:

- 2d insulated façade panels with integrated triple glazed aluclad windows and fibre cement finish to the front of the existing houses.
- 3d insulated porch addition to the front of both houses with metal seam roof, fibre cement finish, ground screw foundations and triple glazed aluclad windows.
- New triple glazed windows and doors to the sides and rear of both properties.
- EWI with silicone-based render finish to the sides and rear of both houses.
- Wet trades avoided where possible, including where window reveals made good internally.
- PV installation to the roof of both houses.
- MVHR installation to one house.
- CMEV installation to one house.
- New pellette burner to one house to replace the previous range cooker and fireplace.
- Airtightness upgrades to both houses.

The Irish demonstration case is in its final stage data extraction phase. The data being documented includes:

- In-situ wall U-value
- Real time energy bills
- Water consumption
- Electrical use
- Air quality

The research group held the final conference and workshop on 9 and 10 May 2023, in Ireland, to share knowledge and learnings from the Irish demonstration case with the test of the consortium. The Drive 0 partners Technological University Dublin, COADY Architects and Vision Built, in association with Housing Europe, also hosted a conference on 'Accelerating Deep Energy Retrofit in Housing through Modular and Circular Solutions' on the 11 May 2023 in Athlone (Ireland). This conference provided an opportunity to examine modular circular renovation and construction solutions in the Irish housing sector and share experiences and lessons learnt from completed Irish and EU projects.

See www.drive0.eu

PRIMARY SCHOOL

Fino Mornasco (Como), Italy

Designed by: PSP Italy
Client: Salsa Inmobiliaria
Area: 3 700 m² of new built area for 450 students
Status: In design

A „near 0 energy building”

PSP Italy has won, grouping with ATI Engineering, the competition for this new primary school in Fino Mornasco within the PNRR European financed projects. At the root of the design strategies is the application of the concept of sustainable development in accordance with the principle of "Do Not cause Significant Harm” damaging to the environmental objectives" (DNSH). It is a building complex which presents a convenient environmental and economic balance correlated to the energy required for its construction, the fulfillment of its functional tasks, its eventual decommissioning and which at the same time allows the use in situations of safety and comfort and also of joy and pleasure for the boys who will spend the most significant years of their formation as 'men of tomorrow' in it.

The building was designed to be flexible, modular with spaces adaptable to the plurality of teaching needs, easily maintainable and potentially open to functional and plant integrations. The project creates a compact form which, while working on the articulation of the functional blocks, reduces heat loss to a minimum; the modular facades are the result of a common language for the whole building, determined starting from the function and orientation; the volumes retain excellent permeability thanks to the presence of windows designed to capture the maximum amount of light and to link with the external green areas; radiation control is obtained with a sunscreen system in front of the windows: a technical component softened by a warm material such as wood.

The aesthetics of the building is contemporary, the materials (stone and wood) integrate well into the context of the surrounding greenery and landscape. The urban value of the project is not given by the monumentality of the architecture, but by the insertion in the context and by the square in front, which opens the school complex to the city and also takes into account the possible future insertion of an auditorium. The interior spaces are simple and easy to read, distributed starting from the entrance, marked by a canopy, from which the two volumes that make up the school complex develop: on the north-south axis the common areas, the library and the great hall also accessible from the outside; on the east-west axis the classrooms oriented towards the south so as to guarantee all the same exposure to natural light. The corridor concept is overcome by becoming an additional common space available in which students can create spaces for laboratories and socialize.

Designed by: PSP Spain
Client: Salsa Inmobiliaria
Area: 8 400 m²
Function: 240 apartments, swimming pool
Status: Under construction

LA ALMUNIA
Algarrobo Costa, Málaga, Spain

PERSPECTIVE Spain is finishing the works of the new building located in Algarrobo Costa, in Málaga.

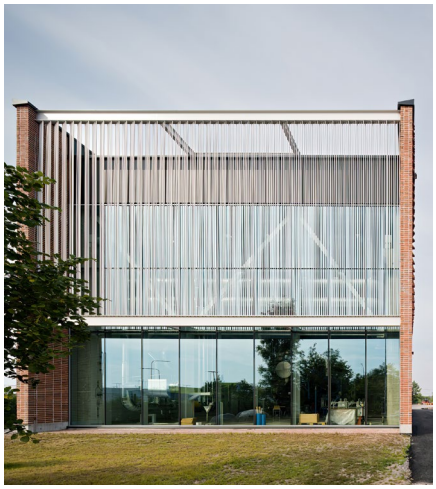
The project, developed by Salsa Inmobiliaria, includes 84 2 and 3-bedroom units, 84 private vegetable patches, common areas and a communal swimming-pool.

All the apartments have private outside space: private gardens in the ground-floor, large terraces in the main floors, and solarium for the attics. Besides that, each apartment comes with its own private vegetable patch in the plot, which can be freely cultivated in an “eco-friendly” way.

Ecological awareness also extends to the communal areas. The pool is salt watered and the gardens are planted with native species to promote the conservation of nature. The use of solar panels supports heating water, and sustainable taps offer 40% savings on water use.

Vuosaari Heat Pump Building
Vuosaari, Helsinki, Finland

Designed by: PSP Finland
Client: Helen
Area: 637 m²
13 MW district heat output / 9,5 MW district cooling output
Awarded with: Architecture Masterprize 2022 for Industrial Building



The project is located in east Helsinki, close to the Vuosaari harbour and the Baltic Sea, on an existing major power plant site. The new heat pump building sits next to two dominating architectural landmarks: Vuosaari power plant A from 1987 and Vuosaari power plant B, built in 1998, both of which were designed by our studio.

The new building is a simple box that fits into the existing industrial landscape. Within, a heat pump uses the excess heat of the internal cooling water circulation of the existing power plant in the winter and the seawater heat for about half of the year on average. Our client Helen Oy sees facilities of this kind as a vital factor in their drive for carbon-neutral energy production by 2030.

The process layout and logistics on the site defined the building's placement. Its form and materials are based on the context. The wing-shaped red bricks on the long sides of the building were custom-made for the project. The building elevates the quality of its industrial setting through architectural means.

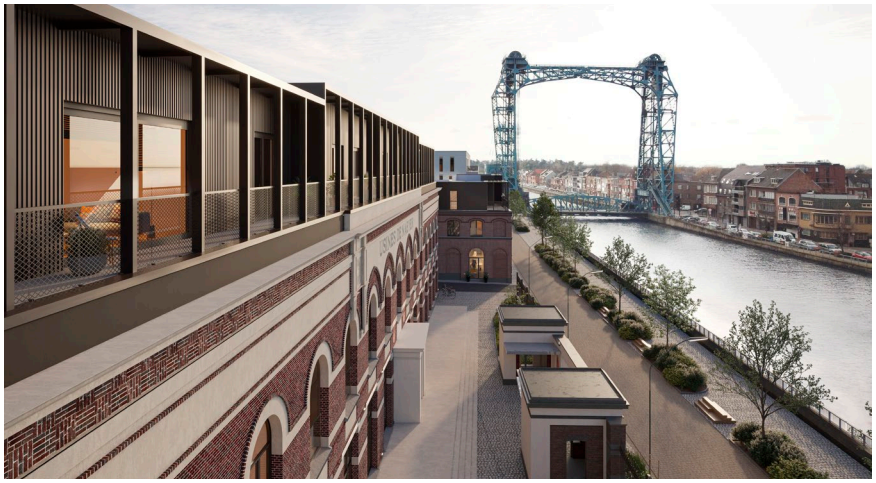
DE NAEYER
Willebroek, Belgium

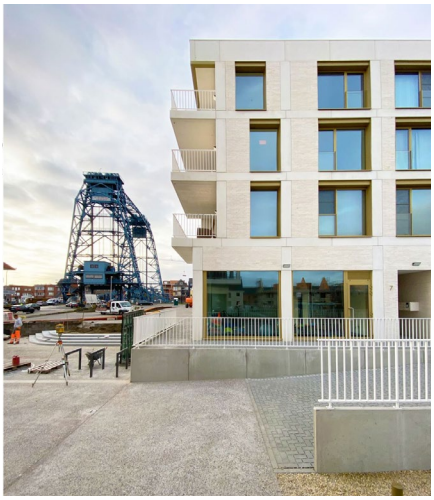
Designed by: PSP Belgium
Client: THV Denaeyer
Area: 15 500 m²
Function: 240 apartments, swimming pool
In collaboration with: Inarco & Studio Farris
Status: Under construction

This project transforms the old industrial site De Naeyer in Willebroek into a residential and mixed development. The site's location is unique: located along the canal at the former paper factory. Some authentic industrial buildings and the monumental crane are characteristic references to the past. The reconversion is realized in 3 phases of which 2 phases are completed.

The last phase includes the redevelopment of the former directors office and the drawing ateliers of the former paper factory "De Naeyer". By redeveloping these iconic buildings, the site is resurrecting an era that is of value to Willebroek. This heritage gets a new life thanks to the redevelopment. The former executive office and drawing ateliers of the paper mill will finally be saved from further decay and undergo an exceptional redevelopment.

PERSPECTIVE Belgium is in collaboration with Inarco and studio farris as the architect for all phases.





BELGIUM
ELD NV
Ilka Broeckaert
antwerp@perspective-architecturalgroup.com
T (32) 3 242 94 00

FINLAND
VIRKKUNEN & CO ARCHITECTS
Tuomas Kivinen
helsinki@perspective-architecturalgroup.com
T (358) 9 5860 770

FRANCE
LPA ARCHITECTES
Charles Bourguignon
paris@perspective-architecturalgroup.com
T (33) 1 45 00 63 81

IRELAND
COADY ARCHITECTS
Mark McCann
dublin@perspective-architecturalgroup.com
T (353) 1 497 6766

ITALY
D2U DESIGN TO USERS
Corrado Caruso
milano@perspective-architecturalgroup.com
T (39) 02 4398 1021

POLAND
ELD POLAND
Waldemar Wiśniewski
poznan@perspective-architecturalgroup.com
T (48) 61 852 46 33

PORTUGAL
NLA NUNO LEÓNIDAS ARQUITECTOS LDA
Nuno Leónidas
lisbon@perspective-architecturalgroup.com
T (351) 21 454 44 30

SPAIN
B/SV BERNAR SAINZ DE VICUNA ARQUITECTOS S.L.
Ignacio Sainz de Vicuña
madrid@perspective-architecturalgroup.com
T (34) 91 435 34 33

SWEDEN
AHLQVIST & ALMQVIST ARKITEKTER AB
Britt Almqvist
stockholm@perspective-architecturalgroup.com
T (46) 8 55 696 880

STRATEGIC ALLIANCES

CAPE VERDE
CROATIA
CZECH REPUBLIC
EAST TIMOR
HONGKONG
MEXICO
OMAN
PHILIPPINES
SAN FRANCISCO
SINGAPORE
SWITZERLAND
UNITED KINGDOM

PERSPECTIVE

ADMINISTRATOR@PERSPECTIVE-ARCHITECTURALGROUP.COM