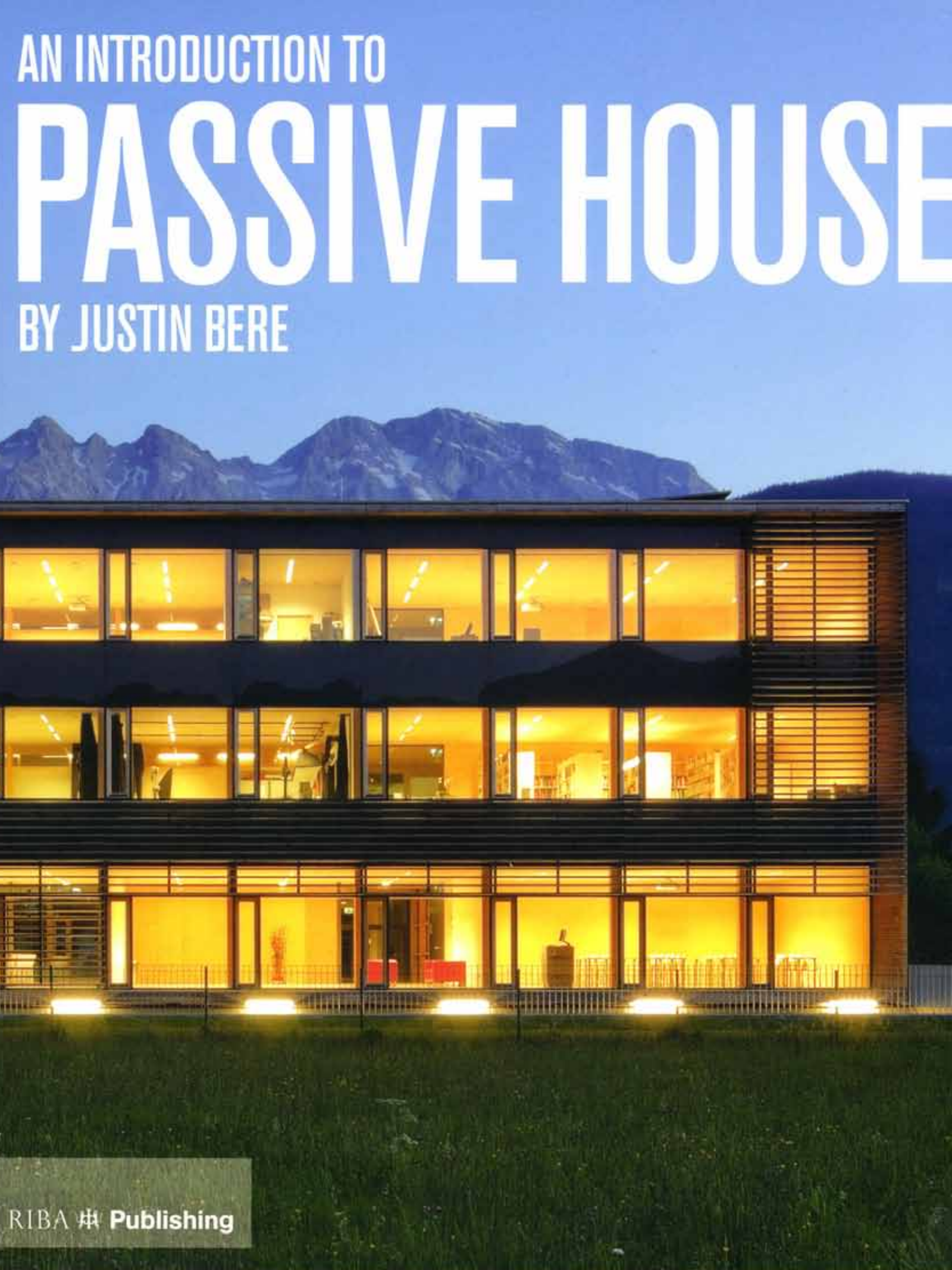
AN INTRODUCTION TO PASSIVE HOUSE

BY JUSTIN BERE



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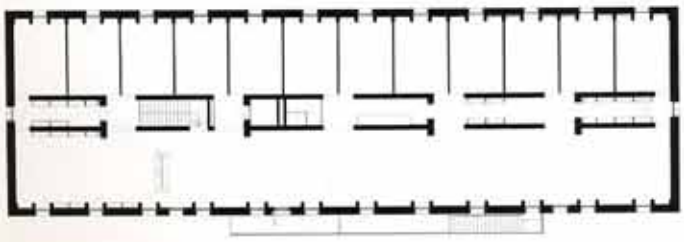
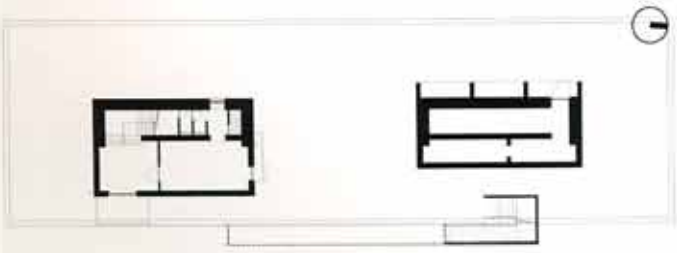
Gasser Bau Offices

Site plan



First-floor plan



Ground-floor plan

Background

The construction company L Gasser & Co. AG decided to move its headquarters to its own production yard outside Zurich, to improve internal communications and to reduce travel distances for employees.

The robust appearance of the building rearticulates the company's image, and its bold siting resolves the spatial geometry of the site. Being elevated and bridging between two massive piers, the new offices create a space beneath with protection from the elements, allowing vehicles to be moved around and providing storage space for materials.

Brief

The architects were asked to embody the company's history, work ethic and its values in a long-lasting modern office building. The new structure – with offices for management, administration and construction supervisors – was to fulfil the Minergie-P standard.

The Gasser group's own Passive House planner was involved in the process from the beginning, and the energy design was executed without compromising the organisation, appearance and structure of the building.

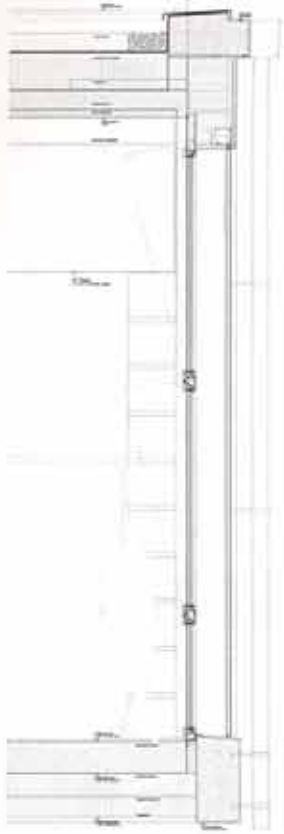
The design

The shape of the building was optimised in collaboration with both the structural and civil engineers. All loads are concentrated within only two pylons, to reduce penetrations in the thermal mantle to a minimum. The main structure is completely wrapped by an insulated perimeter "jacket".

The building volume is divided into three main areas: administration and conference spaces to the east, workstations to the west and a core zone in between.

The concrete surfaces are exposed internally, which is aesthetically pleasing and at the same time provides thermal mass to moderate the internal climate. So the concrete has a major influence on the indoor character and atmosphere of the building. It is used in different ways and with varying textures – some of it was poured on site and some was industrially prefabricated to create contrasting, smooth ceiling elements. Perfectly finished surfaces deliberately contrast with and accentuate the imprecise imprints of formwork panels, which in turn become a metaphor representing the beauty of the carpenter's craft; a durable casting of the "handwriting" of his work.

As buffer storage, the huge building mass ensures perfectly even temperatures in both summer and winter. Air circulates freely within the almost five-metre-high spaces, and this is assisted by the fact that none of the separating walls – loadbearing or partition – reach the ceiling.



Facade detail (section)

Section

The internal space creates the same sense of calm that one feels when entering an agricultural storage shed. The ventilation outlets are located – like house martins' nests in a barn – high up on the walls. The services strategy is rational and expressed with visual clarity. For ease of maintenance, all technical equipment is easily accessible. Ducts are routed from the central plant room, which is located in the ground floor of one of the podiums. Since all services run via the core, the external walls of the building are free from any technical installation – and the resulting simplicity reduces the risk of breaching the line of airtightness.

A two-layer shading system regulates the heat gains from the outside. "Intelligent" outdoor blinds prevent the interior from overheating in summer. If solar gain is desired, internal curtains allow individual shading to be adjusted for each workstation.

Evaluation

A construction firm's new office building on its own production yard creates a new space with an expressive concrete architecture.

Prefabricated, fair-faced concrete elements were fitted with precision. Joint sizes were minimised to ensure that the building is airtight. The concrete forms the line of airtightness, and joint gaps were sealed carefully to achieve the required level of airtightness.

The facade is an elegant, everlasting rain skin of slightly corrugated ceramic tiles with rear ventilation. The tiles protect the external insulation, which is up to 320mm thick. Precise planning prevented the need to cut any of the tiles.

At roof level, local vegetation grows directly in the topsoil that was taken from the area covered by the building. Rainwater is mainly stored here, and no additional watering is necessary. If heavy rain occurs, excess water is discharged by traditional-style gargoyles to seep into the ground beneath. The planted roof design was developed as a research project with the Zurich University of Applied Sciences.

Location	Rütisbergstrasse, Oberhasli, Zurich, Switzerland
Date	2011
Client	Gasser Bau AG
Team	Architect: Käferstein & Meister Architekten Services engineer: Grünberg Partner Structural engineer: Lüchinger+Meyer Bauingenieure Passive House consultant: Gasser Passivhaustechnik Contractor: L Gasser & Co. Ventilation, heating: D&W Aerosmart X2 with GSHP
Energy	17.5 kWh/m²/yr specific space-heating demand
Air test	0.4h^{-1} (50Pa pressure difference)