



SOLUTIONS FOR BIOCLIMATIC FAÇADES

# Somfy solutions

for the development of Bioclimatic Façades

**somfy**<sup>®</sup>



# The challenges of bioclimatic façades

In our modern day, designing and renovating a building has become more and more complex. Climate change and the necessity to reduce CO<sub>2</sub> emissions have created new challenges which have strongly impacted the conventional rules in the building industry. To achieve those challenges, building professionals have to work closer together in an integrated approach focusing on two major concerns: how to improve the energy performance of buildings and provide occupants with maximum comfort.

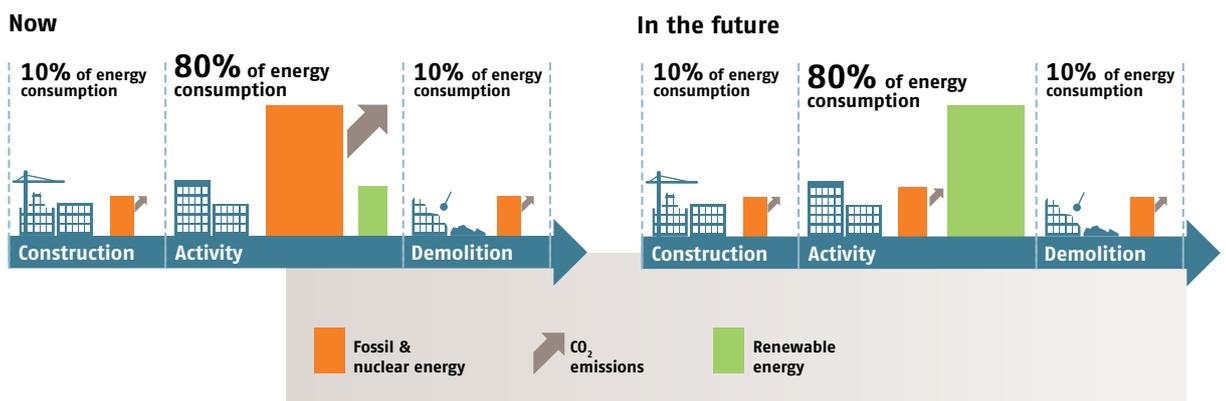
Applying the principles of bioclimatic design in a building is a proven and efficient way to reach these two objectives. The façade, being the interface where most of the thermal exchanges take place is key in this process. That is why the role of bioclimatic façades in the development of sustainable buildings is essential today.

## Meeting the requirements of new legislations

New thermal regulations are designed to improve the energy performance of buildings by limiting the need for air conditioning and controlling electricity demand. These recent regulations have also created new opportunities for the building sector by optimising conventional design processes and implementing cutting-edge innovations and technologies.

### Environmental footprint

When a building is in active use, more fossil and nuclear energy is consumed than renewable energy. In the future, this situation will need to change.



## Meeting current environmental requirements

Buildings alone are responsible for **43 % of energy consumption** in Europe! It is now essential to reduce this figure by promoting the use of natural energy sources such as **sunshine, daylight** and **outside air**. Automated solar shading and window opening devices integrated within the façade help to optimise the use of natural sources and therefore contribute to increasing the energy efficiency in buildings.

## Improving the quality of indoor environments

Another major goal of modern building specifications is enhancing the quality of the indoor environments. It is proven that **thermal and visual comfort have a beneficial effect on the occupants' well-being**. Working or living in a more pleasant, healthy environment undoubtedly leads to improved efficiency and productivity. Automatic shading devices contribute to meeting 2 objectives: maintaining comfortable indoor temperatures for a longer period of time and enabling continuous glare control.

## Adding value and longevity to the investment

Designing the façade based on bioclimatic principals reduces energy-related costs. **The initial investment for integrated automatic shading is returned after just a few years** due to smaller HVAC installations and lower energy bills. In renovation projects, the **peak load** can be efficiently reduced. The introduction of thermal efficiency assessments in the service sector also entails that a building's resale value will be significantly affected by its energy consumption rate.

The automatic control of solar shading represents another major advantage for building owners: centralised controls reduce operational costs as outdoor weather sensors protect external shading products, **extend the life** of shading and **lower maintenance costs**.

## Allowing complete architectural freedom

Bioclimatic façades represent a genuine opportunity, allowing architects to design large openings without compromising the visual comfort for building occupants. They give professionals greater freedom at every stage of the architectural design process.

**Automatic shadings:  
return on investment**

**For just 1% to 2%  
of the total building cost,  
20% to 40% energy savings.**



## The effectiveness of bioclimatic façades

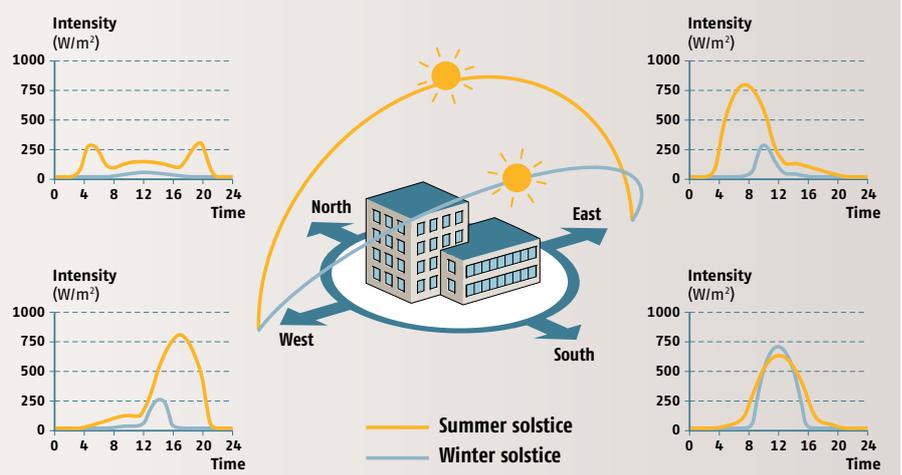
A façade designed following bioclimatic principles is more efficient than a standard façade as it works as a dynamic filter between the indoors and the outdoors. Windows fitted with automated sun protection devices can filter unwanted sunlight and regulate heat exchanges, in tune with the needs of the building occupants. To achieve a high level of performance from the façade, designers must pay close attention to the building's environment and the day-to-day activities of occupants. Consideration of these factors will influence the type of shading and the control strategy to be used in the building.

### The importance of context

#### Climate and microclimate

Sunlight, temperature and precipitation vary according to the season, month, time-of-day and orientation of the building. All of these factors will have an impact a building's energy needs. For example is the façade shaded by vegetation in the summer? Are there light restrictions or problems associated with glare from surrounding buildings?

Sunlight intensity in the northern hemisphere. Measurements on 4 façades: North, East, West and South.





## The occupants' activity and how the building is used

Occupation density and rate as well as the amount of natural light required for the activities carried out inside the building are just some of the many criteria that influence how interior space is organised and the choice of systems used.

### Changes in indoor requirements according to the building use

Occupants	2W/m <sup>2</sup>	Total : 14W/m <sup>2</sup>	Occupants	5W/m <sup>2</sup>	Total : 30W/m <sup>2</sup>	Occupants	22W/m <sup>2</sup>	Total : 67W/m <sup>2</sup>
Equipment	5W/m <sup>2</sup>		Equipment	15W/m <sup>2</sup>		Equipment	15W/m <sup>2</sup>	
Lighting	7W/m <sup>2</sup>		Lighting	10W/m <sup>2</sup>		Lighting	30W/m <sup>2</sup>	

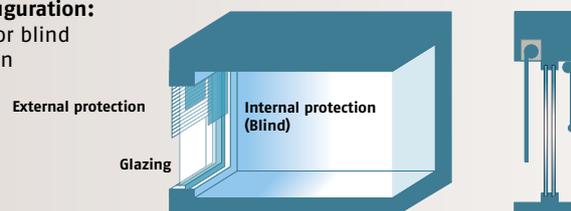


Source: Keepcool, Austrian energy agency

## Choosing the components in the façade

The type of façade (curtain wall, double skin, partly or fully glazed?...), the type of glazing (single, double, triple, etc.), the use of indoor or outdoor sun protection devices and the type of fabrics have all a significant impact on the performance of the building. When designing bioclimatic façades, it is essential to define comfort and energy performance levels before choosing the elements in the façade.

**Example of a possible configuration:**  
façade combining an interior blind and external solar protection



# How Somfy contributes to bioclimatic façades

For 40 years, Somfy has been developing intelligent solutions for building openings and closings, using high-tech motorisation and automation systems.

Dynamic Insulation™, daylight management and natural ventilation: are Somfy's three unique areas of expertise dedicated to the development of bioclimatic façades.

## Dynamic Insulation™

Improved balance in thermal exchange to reduce HVAC systems energy consumption.

## Natural light management

Better control of natural light and improved visual comfort.

## Natural ventilation

For a more pleasant, productive and healthier work environment.

## Dynamic insulation™

Windows are the main interface between the interior and exterior of a building. A façade fitted with sun protection devices can provide precise control over these exchanges, influencing the way in which heat enters and leaves the building. Solar shading devices which are raised and lowered automatically will keep the inside of a building cool or optimise the use of solar gain.

For more details, see pages 4-5

## Natural light management

Effective natural light management can improve the visual comfort, well-being and productivity of a building's occupants, while reducing the need for artificial lighting. The type of fabric and colour used on sun protection devices can have a significant effect on the light and atmosphere inside the building and form part of its interior décor.

For more details, see pages 6-7

## Natural ventilation

Natural ventilation is a cost-effective way of improving air quality within a building and cooling during the night, especially during summer time. Automating windows during the hours when a building is unoccupied means that a controlled flow of cool air can pass through the façade, significantly reducing the accumulated temperature of the building mass and improving the quality of the indoor environment the following day.

Contact us to discuss your project

[info@somfyarchitecture.co.uk](mailto:info@somfyarchitecture.co.uk)



Central St Giles – London – UK  
Architects: Renzo Piano & Fletcher Priest



Centre INRIA, Rennes, France  
Architect: FORMA6, Nantes



La Maladière school, Berne, Switzerland



Samsung Tower, Seocho, Seoul, South Korea  
Architects: KPF(USA) and SamWoo (South Korea)

# Heat management by Somfy

## Dynamic Insulation™

Dynamic Insulation™ provides improved balance in thermal exchange to reduce air conditioning and heating energy needs.

### THE PRINCIPLE

Automated sun protection devices are raised or lowered according to changes in outdoor weather conditions and indoor comfort needs. They react to commands from weather sensors (temperature and sunlight) or control algorithms, according to the occupancy and vacancy periods in the building.

#### Summer strategy

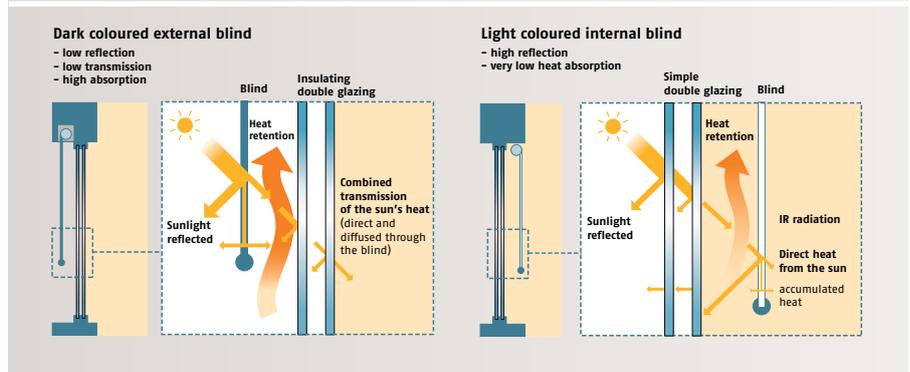


The indoor environment is protected by outdoor or indoor sun protection devices. Excess heat is reflected to keep the inside of the building cool. The combined solar factor (g) of the glazing and sun protection device must be optimised to meet energy reduction and natural light management requirements.

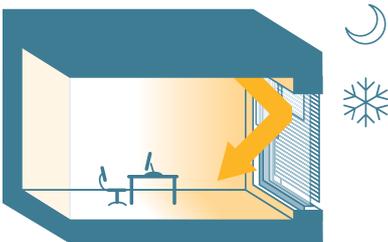
#### Impact the position and colour of the blind have on heat gains.

The diagrams below illustrate two different Dynamic Insulation™ strategies used in summer to allow an equivalent level of heat into the building:

A sun protection device fitted externally on a building is an effective solution for limiting heat gain by reflecting the sun's rays before they even reach the window. However, high performance internal blinds now exist, which limit heat absorption and reflect the sun's rays outwards.



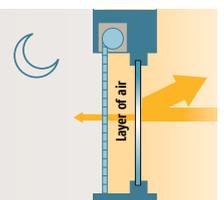
#### Winter strategy



During the day, heat is captured inside the building through the windows: the sun protection devices are raised when there is no glare and/or when the room is not occupied. In the evening, as the heat from the sun reduces and the outside temperature falls, heat is kept inside: the sun protection devices are lowered.

The combined heat transfer coefficient (U) of the glazing and sun protection device must be as low as possible.

A combination of double glazing and a roller shutter is an effective solution. However, adjustable sun shades can also help to insulate the window.





## RESULTS

### Thermal comfort and an improved indoor environment

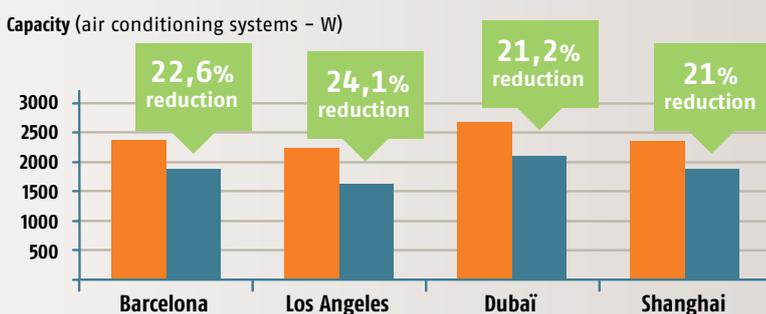
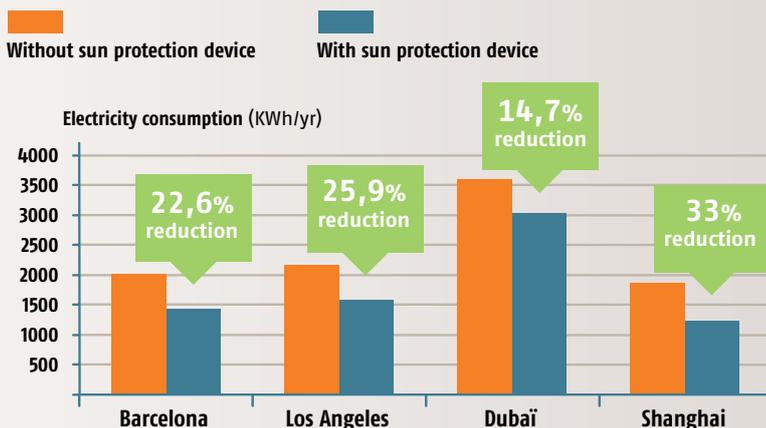
With Dynamic Insulation™, the building's occupants are no longer subjected to sudden variations in temperature. Constant thermal comfort helps to improve day-to-day well-being.

### Improved energy performance

With automated sun protection devices, it is possible to anticipate a particular building's energy consumption level. All cooling, heating, lighting and blind management systems are fully integrated and communicate with each other to maximize energy efficiency.

#### Impact of automated sun protection devices on energy consumption (operational costs) and air conditioning system capacity (investment) in a hotel room.

Simulation carried out using the Somfy DISC tool, under the following conditions: Room measuring 39.5m<sup>2</sup>, with a double-glazed window measuring 6.2m<sup>2</sup> (U = 2.88 W/m<sup>2</sup>K, g = 0.77). White PVC blind. The blind is lowered when the light level measured outside is above 15 Klux.



### Quantifying energy savings with Somfy

Somfy DISC was developed in partnership with the University of Lund in Sweden.



LUND UNIVERSITY

The software uses the derob-engine from the ParaSol tool and allows building professionals to calculate the impact of using any type of solar shading device in any type of building.

# Natural light management by Somfy

## visual comfort

Providing visual comfort indoors while enabling occupants to see the outside world has a positive effect on their well-being. Using natural light first and controlling the use of artificial lighting also has a beneficial impact on energy consumption.

### THE PRINCIPLE

Indoor visibility is a key factor in the occupants' sense of comfort. In order to maintain an optimal visual environment, automated solar shadings must ensure specific functions. Control algorithms do take many parameters into account in order to provide occupants with:

- a **maximum amount of natural light** in the building and a **view onto the outside**. For that, solar shadings should be in the fully open position as often as possible.
- **the right level of luminosity** in accordance with the activity for which the building is used, a **good contrast level (1)** and of course, **eliminate glare**. To ensure this solar shading should react to sun sensors or local controls. Favorite and intermediate positions can be pre-set in the system.

#### (1) Right contrast: the 1-3-10 rule

The difference in brightness between what the eye sees (30° angle) and a visual task (e.g. sheet of paper) must be no more than a ratio of 1 to 3. The ratio is 1 to 10 for the difference between total perceived light (90° angle) and surfaces located within the field of vision (e.g. a window).



With sun protection device



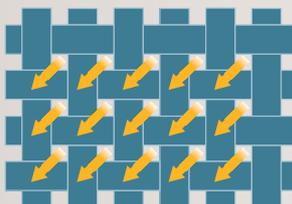
Without sun protection device

#### There is a suitable sun protection device for every project!

**With internal or external Venetian blinds**, the position of the slats can be adjusted precisely, allowing only the desired level of light to pass through.



**With fabric blinds** or screen blinds), view to the outside world is determined by the position of the blind or by the openness factor and the color of the fabric.



Openness factor



View to the outside





## RESULTS

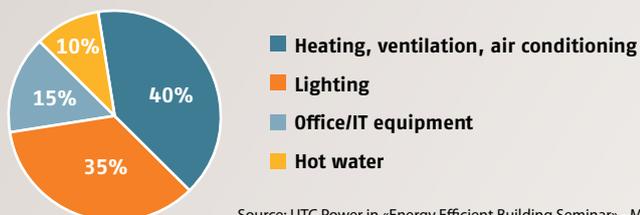
### A more comfortable workspace

With automated sun protection devices building occupants benefit from more natural light without the associated disadvantages. The ideal levels of contrast and brightness are maintained at all times. Excessive glare is eliminated.

### Energy savings on artificial lighting

Lighting accounts for a significant portion of a building's total electricity consumption and energy costs (35% on average). With automated sun protection devices, this cost can be reduced significantly, yet users are able to retain their individual preferences.

#### Energy consumption



Source: UTC Power in «Energy Efficient Building Seminar» - May 2007 in Beijing, China

Artificial lighting management systems and blinds that communicate with each other generate significant energy savings and maintain optimal visual comfort for occupants...

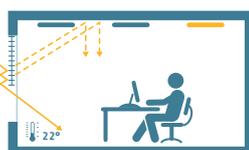
This is why Somfy and Philips Lighting share a common goal: to improve the indoor working environment through effective lighting management.



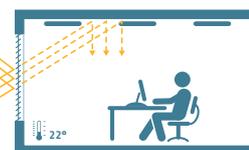
#### The combination of natural light and artificial lighting is optimal



**No sun, overcast**  
 Natural light: minimal  
 Artificial lighting: maximum



**Some sun, a few clouds**  
 Natural light: average  
 Artificial lighting: average



**Clear skies**  
 Natural light: maximum  
 Artificial lighting: minimal

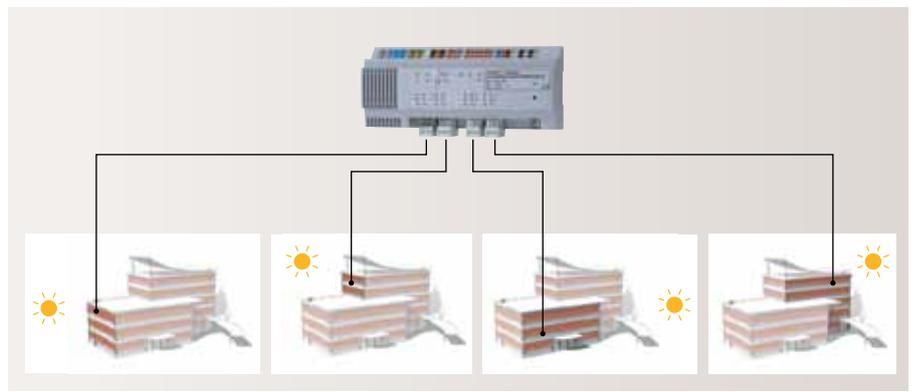


## Somfy solutions

Somfy offers a range of centralised sun protection management systems for bioclimatic façades: animeo Solo and animeo IB+ Premium. Somfy solutions are also compatible with the **KNX** and **LON** protocols.

There are several key criteria for choosing the best solution for your project: The number of sun protection devices that need to be operated, the number of zones that need to be managed, the choice of management or maintenance systems, the desired functionalities and price.

To see the full range of solutions, visit: [somfyarchitecture.co.uk](http://somfyarchitecture.co.uk)



Somfy solutions are suitable for all types of sun protection systems in all sizes and types of buildings:



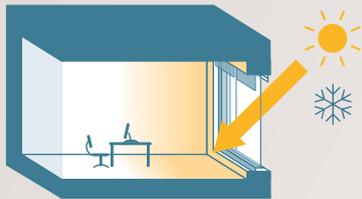
## The benefits of Somfy solutions

### Regulate heat exchange

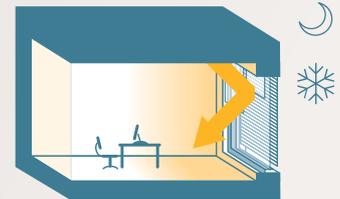
The “sun heating” and “heat preservation” functions heat or cool the building intelligently. A combination of presence detectors and temperature sensors is used to raise or lower blinds in accordance with the desired objective (to capture, block or preserve heat).

+ energy performance

animeo Premium’s “sun heating” function raises sun protection devices during the day to heat the building.



The “heat preservation” function lowers roller shutters at night to keep heat indoors.

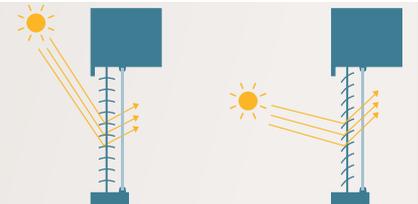


### Improve natural light management

Sun protection devices are positioned to avoid excessive glare and reflections on screens. The blind management software can be used to program a number of different intermediate positions. The Sun tracking function automatically adjusts Venetian blind slats in realtime.

+ visual comfort  
- need for artificial lighting

animeo Premium’s sun tracking function changes position of adjustable slats of adjustable sun shade slats according to the position of the sun. This means that the majority of the sun’s energy is blocked, while allowing sufficient natural light into the building.



### Maintain the appearance of the façade

In addition to their functionality, sun protection devices play a major aesthetic role in architectural design.

Greater longevity

Control algorithms can be used to program the alignment of all sun protection devices at different times of the day.



### Protect external sun protection devices

Wind sensors can be used to retract external solar shading devices in poor weather conditions (strong wind, rain, etc.).

+ durability  
- maintenance

### Manage sun protection devices with greater ease, on a daily basis

Pre-programmed timers and centralised controls make it easy to manage external sun protection devices. The systems also include a security ‘block’ function, which blocks all blinds.

- surveillance  
+ security

### Maintain flexibility for the user

Users remain in control of the system at all times (except when the ‘block function’ is activated) and are able to operate the blinds in each office using a control unit.

+ comfort

# SOMFY, The partner for your projects

Somfy operates in 51 countries, with 52 subsidiaries, 19 offices and 23 branches spread across 5 continents. With 8 production centers, Somfy has effective, responsive manufacturing facilities. Thanks to its strict quality standards, Somfy is able to satisfy the needs of 220 million users and 30,000 business clients worldwide.

## Before...

- Local teams dedicated to using their professional skills to help you at each stage of your project
- Personalised surveys
- Selection of appropriate products
- Quantities and specifications
- Creation of guideline drawings
- Technical and feasibility studies

## During...

- Somfy supervision, equipment and system installation support
- Partnerships with an international network of manufacturers, guarantee high quality and fully compatible products
- Approved Somfy installers

## After...

- Upgradable solutions that adapt to your changing needs over time



Somfy products come with a five year international guarantee and have been tested under extreme weather conditions. They are all fully factory-tested and comply with major international quality standards.



One Hyde Park – London – UK  
Architects: Rogers Stirk Harbour&Partners



Abu Dhabi Investment Authority Headquarters  
Architects: KPF



AJW Head Offices – West Sussex  
UK



Media Tower, Düsseldorf, Germany  
Architects: Findeisen & Wächter GmbH (Köln)



Paray le Monial Hospital, France  
Architects: GROUPE 6, Grenoble



ESGE Genolier school,  
Switzerland



Kost office, Tübingen  
Architect: Martin Gemmeke



Q19 Gallery, Innsbruck  
Architects: Peter Lorenz Architekt & Partner



Mérignac Media Library, France  
HPL Architects: P. Loirat



**somfy®**

FOR BIOCLIMATIC FAÇADES

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