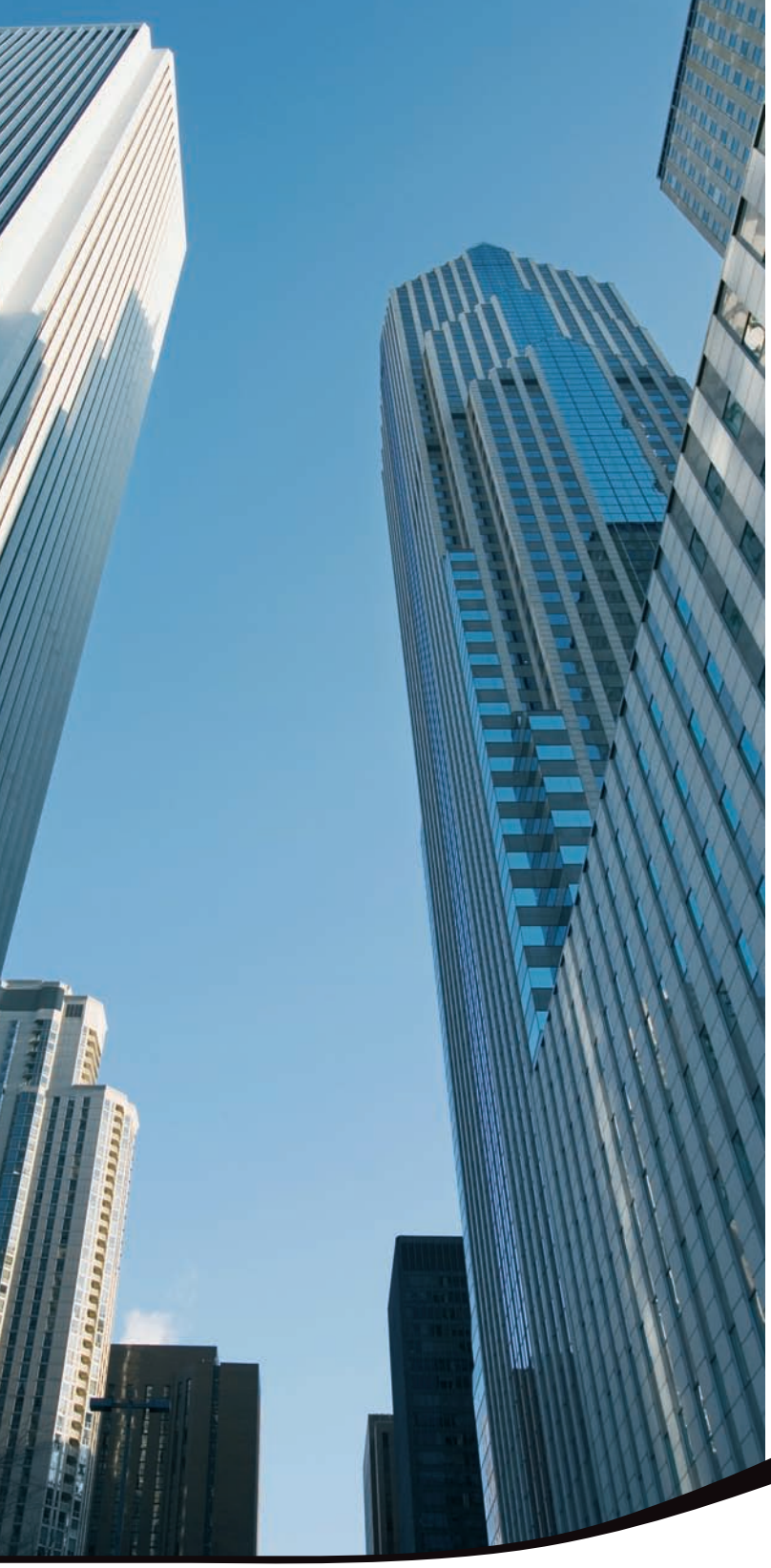


SOLUTIONS FOR BIOCLIMATIC FAÇADES

Making the working environment in **offices** more comfortable

somfy®

Offices are now places where most employees spend the majority of their working hours. So it is essential that they are designed and built to provide maximum comfort for their occupants: visual comfort, thermal comfort and quality indoor air.

New **requirements** for office buildings

From small office blocks to major business centers, all office buildings must meet a whole range of requirements.

> **Visual comfort** at all times, as everyone wants to benefit from as much natural light as possible, while at the same time avoiding glare and reflections.

> Constant **thermal comfort** by keeping the temperature at a comfortable level at all times.

> **Air quality** that is conducive to good health.

> Optimized **energy performance** that meets new environmental regulations, and allows substantial savings while preserving natural resources.

> **A rapid return on investment** as a result of energy savings and reduced operational costs.

1

2

Somfy solutions for your projects

Somfy has developed intelligent solutions for the operation of building openings and sun protection devices. These systems improve comfort for occupants while also reducing energy costs.

In this way, S**omfy contributes to the development of bioclimatic façades** for all types of buildings, regardless of function or architecture.

Bioclimatic façades

- The façade is the building's envelope, and acts as the interface between interior and exterior, and between the natural and built environments.
- Outside, climate conditions vary according to the seasons, the weather and changes in daylight hours.
- Inside, conditions must remain as stable and as comfortable as possible for all occupants, based on their activities, needs and preferences.
- The bioclimatic façade is a living membrane that continuously adapts to changes in the weather, and to occupants' changing needs.

1 / **ABU DHABI FINANCIAL CENTRE**
ABU DHABI, UNITED ARAB EMIRATES
Client: Mubadala
Architect / interior designer: Goettsch Partners
Date: 2010

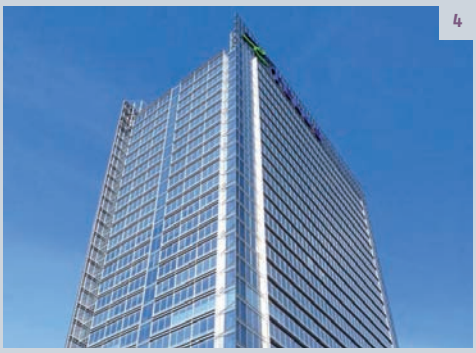
2 / **PETROBRAS VITÓRIA**
VITÓRIA, BRAZIL
Client: Petrobras
Architect / interior designer: Sidonio Porto
Date: 2010

3 / **SANTOS PLACE**
BRISBANE, AUSTRALIA
Client: Neilsen properties
Architect / interior designer: Donovan Hill
Date: 2009

4 / **TELUS TOWER**
TORONTO, CANADA
Client: Menkes Union Tower Ltd
Architect / interior designer: Adamson Architects
Sweeny Sterling Finlayson & Company
Date: 2009

5 / **FERRUM TOWER**
SEOUL, SOUTH KOREA
Client: Dongkuk Steel
Architect / interior designer: Gansam Partners
Date: 2010


3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Optimizing **comfort in the workplace** at all times

"Companies that have invested in natural lighting retrofit to existing facilities have seen worker productivity jump between 13% and 16%"
("Greening the Building and the Bottom Line", Rocky Mountain Institute, 2009.)

Improve thermal comfort

- Sudden variations in temperature are disruptive and tiring. Benefiting from constant thermal comfort, improves personal well-being and productivity.
- By combining presence detectors and temperature sensors, Somfy's intelligent systems raise or lower blinds automatically, so that occupants benefit from a pleasant indoor temperature all year round without having to intervene in any way:
  - > In summer, the goal is to reduce solar gains.
  - > In winter, the aim is to capture free energy.

Improve visual comfort

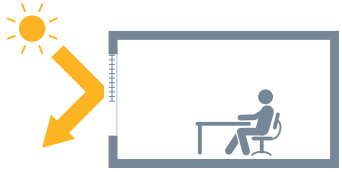
- Meeting rooms, open-plan offices, individual offices... Each type of space requires its own type of lighting. This ensures visual comfort, which in turn optimizes occupant visual comfort, reduces fatigue levels and employee absenteeism.
- By combining weather sensors, timers, centralized controls and individual controls, Somfy solutions can be used to:
  - > Let natural light in and make savings by using less artificial lighting.
  - > Filter brightness levels when using PCs, laptop computers, tablet computers, videoconference screens, etc.

Improve ventilation

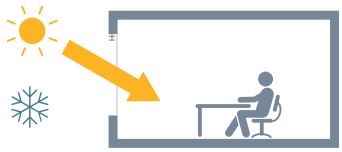
- Air quality, like temperature and light levels, is an essential component for comfort. It must be monitored in order to help provide the best possible working conditions for occupants while also ensuring their good health.
- With Somfy's automatic systems, adapting the ventilation of a meeting room on a conference hall couldn't be simpler.

Preservation of the temperature

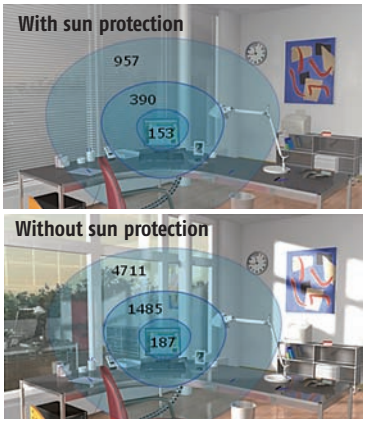
When it is hot...



When it is cold...



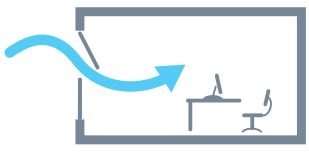
The 1/3/10 rule



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

Air renewal

Ventilate...



for better air quality.

Optimizing **building's performance**

"Gurtekin, Hartkopf and Loftness of Carnegie Mellon University reported average energy savings of 52% thanks to the use of high-performance daylighting systems." *(Carnegy Mellon University - 2004)*

Save energy

- Somfy offers Dynamic Insulation™ solutions, so that you no longer have to choose between comfort and energy savings.
- The sensors and automatic devices used in Somfy solutions reduce energy consumption:
  - > By prioritizing the use of natural light.
  - > By reducing the solar gains in summer.
  - > By adapting building openings to actual occupancy periods (taking account of variable working hours, weekends, etc.).

Make the most of your investments

- Ensure profitability is an essential requirement for office buildings. These facilities must therefore be designed and built in such a way as to extend their lifetime.
- Somfy's centralized automation solutions are easy to integrate and operate, and help reduce running costs:
  - > By reducing energy consumption (with savings of up to 10% on heating in winter, and indoor cooling gains of up to 9°C in summer).
  - > By protecting external blinds from bad weather.
  - > By ensuring all sun protection devices operate with gentle movements that extend their lifespans.
  - > By reducing the number of manual operations required, and therefore also the building's running costs.
- The high-quality design and manufacture of Somfy solutions mean that buildings fitted with these solutions are assured optimum sustainability:
  - > The bioclimatic façades enable architectural creativity that gives the building all its value.
  - > The automatic systems can be used to align all sun protection devices, ensuring design of the façade.
  - > The centralization systems are upgradeable, so they can be easily adapted to a change of activity within the building, or complying with changes in energy regulations.

*Thanks to Dynamic Insulation™ by Somfy, sun protection devices react automatically to outdoor climate conditions in order to reduce energy consumption and enable occupants to gain maximum benefit from the sun's natural light and heat.

Energy savings with automated sun protection devices

According to simulation tool created by Lund University in Sweden, an investment of 1% to 2% of the total cost of the building results in energy savings of 20% to 40% (see table below).

LUND UNIVERSITY

	Electricity consumption (annual)	**Cooling load** (Reduction in Watt)	**Total savings on consumption** (annual)
GENEVA (Switzerland)	Reduced by 32,81% (1,319 kWh compare to 1,963 kWh)	Reduced by 40,28% (1,644 W compare to 2,753 W)	At price of CHF 0,19 kWh: CHF 122,36
NEW YORK (USA)	Reduced by 32,12% (1,712 kWh compare to 2,522 kWh)	Reduced by 39,84% (1,720 W compare to 3,859 W)	At price of US$ 0,129 kWh: US$ 104,49
NEW DELHI (India)	Reduced by 42,93% (3,111 kWh compare to 5,451 kWh)	Reduced by 49,64% (1,698 W compare to 3,372 W)	At price of INR 0,19 kWh: INR 444,6
SHANGHAI (China)	Reduced by 33,86% (1,711 kWh compare to 2,587 kWh)	Reduced by 40,29% (1,602 W compare to 2,683 W)	At price of RMB 0,48 kWh: RMB 420,48

Simulation definition: A 18 m^2 office room, with 4 m^2 window glass (double glazing Low-E except for New Delhi and Shanghai Double glazing, Façade wall U-Value: 0,33 W/m^2K), representing 70% of the room façade section, south oriented. Sun protection device is an internal grey PVC. The comparison is made between sun protection device and no sun protection device, depending on light level considering 2 persons occupying the room, equipped with 180 W artificial lighting (detailed analysis available on demand).

LEED CERTIFICATION

Somfy solutions can contribute up to 20% obtaining LEED certification (approximately 20 out of 110 points and 10 criteria). They are also conducive to achieving the higher classification levels (Silver, Gold or Platinum). Somfy's responsible, economical and environmentally friendly solutions are often sought for use in LEED buildings.

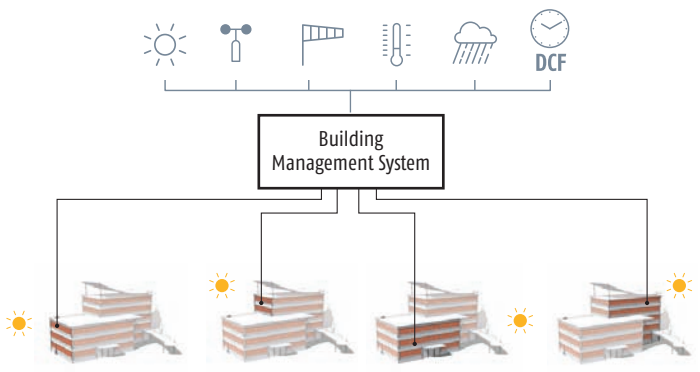
A solution **adapted to each project**

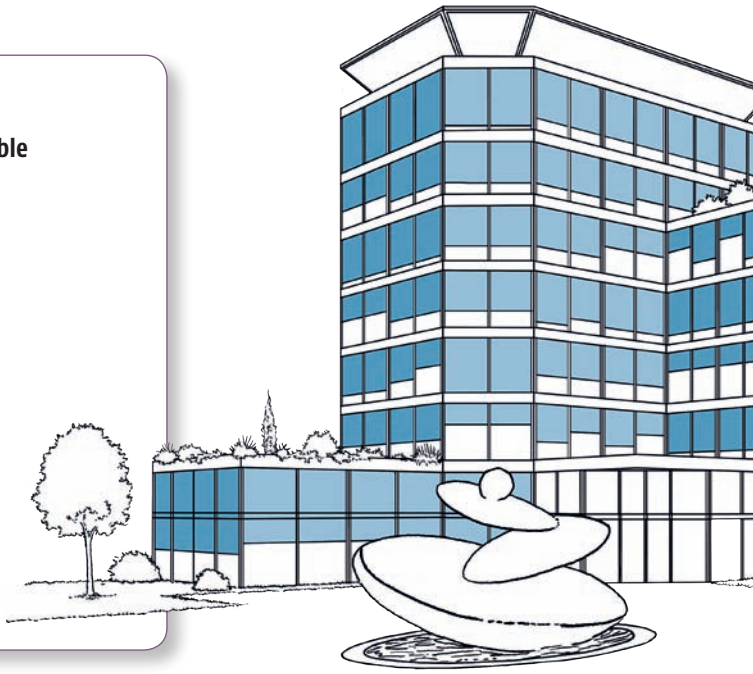
Flexible to install, easy to use and compatible with most protocols and control units on the market... All Somfy solutions are a perfect match for the needs and restrictions of the office sector.

You can anticipate requirements using timer programs, delegate to automatic sensors or let occupants make the decisions using wall-mounted control units or remote controls. Whether you want to equip a whole floor of offices, shared spaces (corridors, cafeteria, etc.), an entrance hall or a façade, your choice will depend on a number of criteria: the number of sun protection devices to be controlled (or the number of zones to be managed), the type of management or maintenance system, the desired functions and the price.

Building management system

Sun-protection management systems with the animeo range (available in LON, KNX, Premium)
Sensor parameters, zone-based control, supervision, etc.





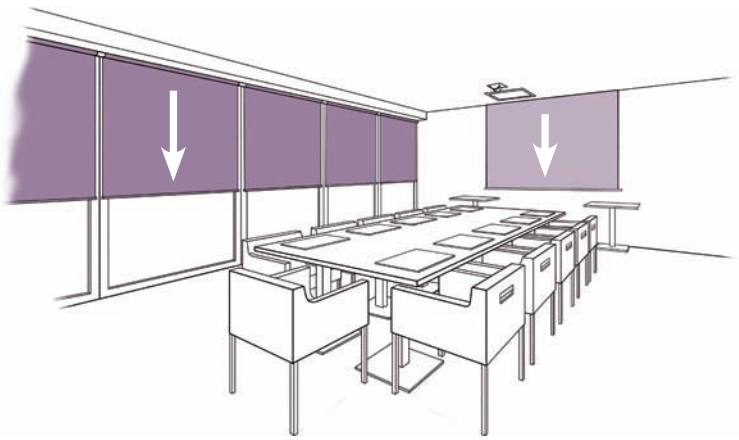
Meeting room

Outdoor sun protection:
Screen
- Motor: Altea
- Local control: Smoove

Indoor sun protection:
Curtain
- Motor: Glydea
- Local control: Smoove

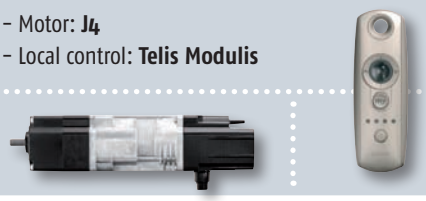
+ RS485 transmitter control (touch panel: to control lighting, projection screen, blinds, air conditioning, etc.)

+ Projection screen (Sonesse motor).



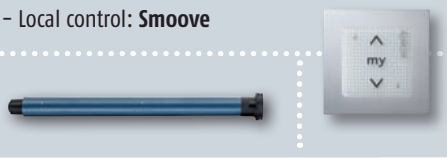
Outdoor sun protection: External Venetian blind

- Motor: **J4**
- Local control: **Telis Modulis**



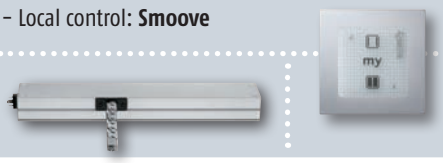
Outdoor sun protection: Screen

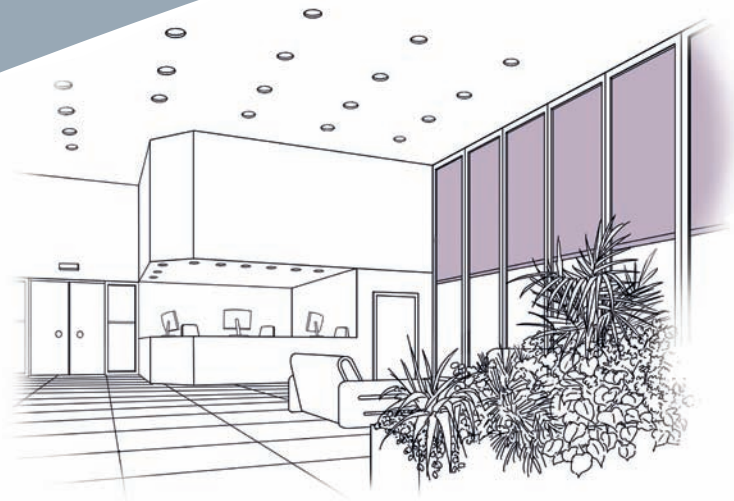
- Motor: **Altea**
- Local control: **Smoove**



Window: Opening

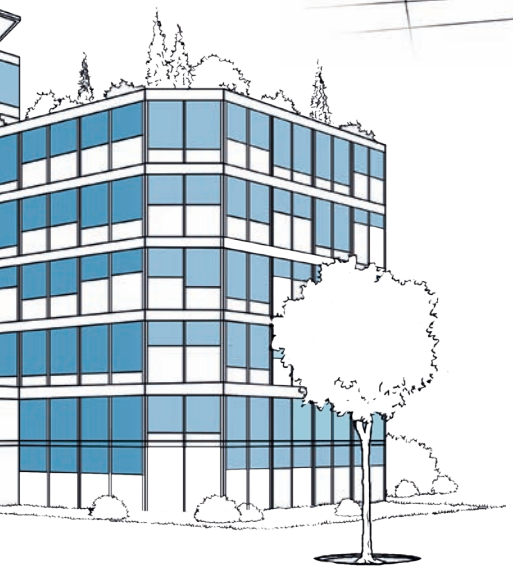
- Motor: **Linkeo**
- Local control: **Smoove**





Entrance hall / Building foyer

Indoor sun protection:
Large screen
- Motor: FTS
- Local control: Smoove



Individual office

Outdoor sun protection:
External Venetian blind
- Motor: J4
- Local control: Telis Modulis

Indoor sun protection:
Pleated
- Motor: Sonesse
- Local control: Smoove

Open-plan office

Outdoor sun protection:
Exterior screen
- Motor: Altea
- Local control: Smoove

Window:
Opening
- Motor: Linkeo
- Local control: Smoove

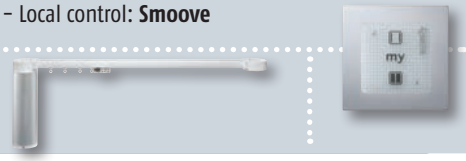
Indoor sun protection:
Roller blind
- Motor: Sonesse
- Local control: Smoove

Indoor sun protection: Roller blind

- Motor: **Sonesse**
- Local control: **Smoove**

Indoor sun protection: Curtain

- Motor: **Glydea**
- Local control: **Smoove**



Indoor sun protection: Large screen

- Motor: **FTS**
- Local control: **Smoove**

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SOLUTIONS FOR BIOCLIMATIC FAÇADES

Somfy operates in 54 countries,
with 68 subsidiaries,
51 offices and branches
spread across 5 continents.

With 7 production centers,
Somfy has effective,
responsive manufacturing facilities.

Thanks to its strict quality standards,
Somfy is able to satisfy the needs of
270 million users and
32,000 business clients worldwide.

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