Elithis Tower
Low energy project

Elithis Tower
France

Speaker : Mickaël Freindorf

Elithis
groupe

Elithis
groupe

"MORE GREY MATTER FOR SMALLER CARBON FOOTPRINT"

A new Engineering for a paramount global issue

The exploratory areas in the field of High Energy Efficiency are gigantic.

Our goal :

Be one of the leaders in energy performance in buildings in Europe by 2015

Our five occupations

Elithis INGENIERIE
Fluid Technology Engineering

BENEFFICIENCE
Sustainable engineering
Management in energy saving and Environnement

QUINTESSIA
Know how engineering
Behavioral Management
Training / Sandwich courses

ODAXIA
Cost effective engineering
Quantity surveying

EGIDIA
Green Building Contracting

The Elithis Tower is the Headquarters of Elithis

This building is among the most sober office buildings throughout the world, international emblem of sustainable development and giving solid form to our pioneering adventure.

Main locations : Headquarters

1 C Bld de Champagne
BP 41 249
21012 DIJON Cedex

Agency: Paris
8 rue Sentier
75002 PARIS

Main Locations

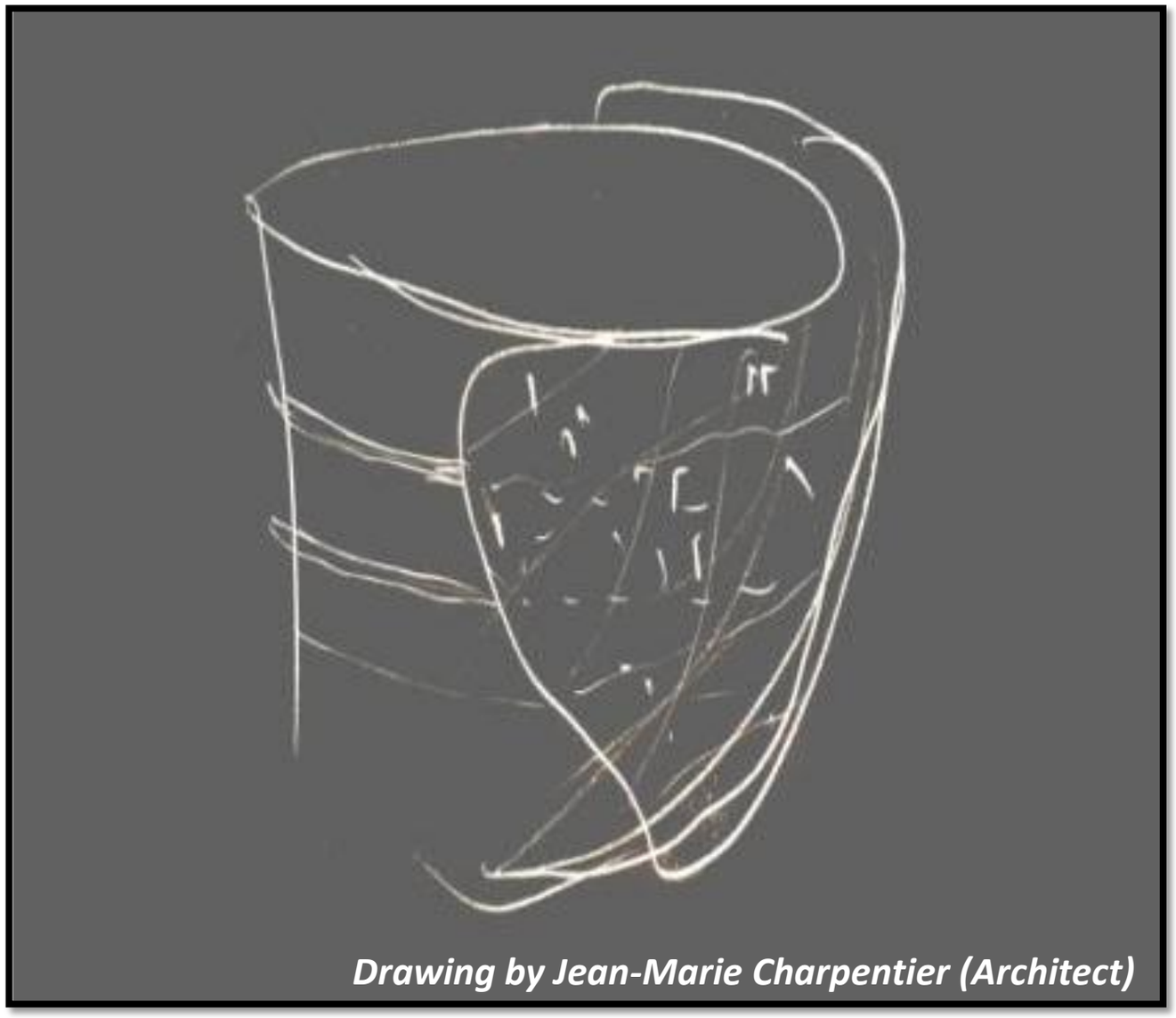
www.elithis.fr

Elithis Tower
Low energy project

Sponsor	Elithis / Thierry BIEVRE President
Architect	Jean-Marie CHARPENTIER – ARTE Charpentier – Paris
Location	Dijon / Burgundy / France
Surface	5000 m² floors
Height	Ten floor building, 33,5m high
Stage of project	Research and development began in july 2006, the conception began in december 2006, the works began in december 2007, the delivery took place at the end of march 2009
Financial data	• the cost of construction : 7 M€ (like standard price) • the sales cost is about 14M€ (40% above real estate market price)

The genesis of the project

The Elithis Tower



Drawing by Jean-Marie Charpentier (Architect)

Lateral management

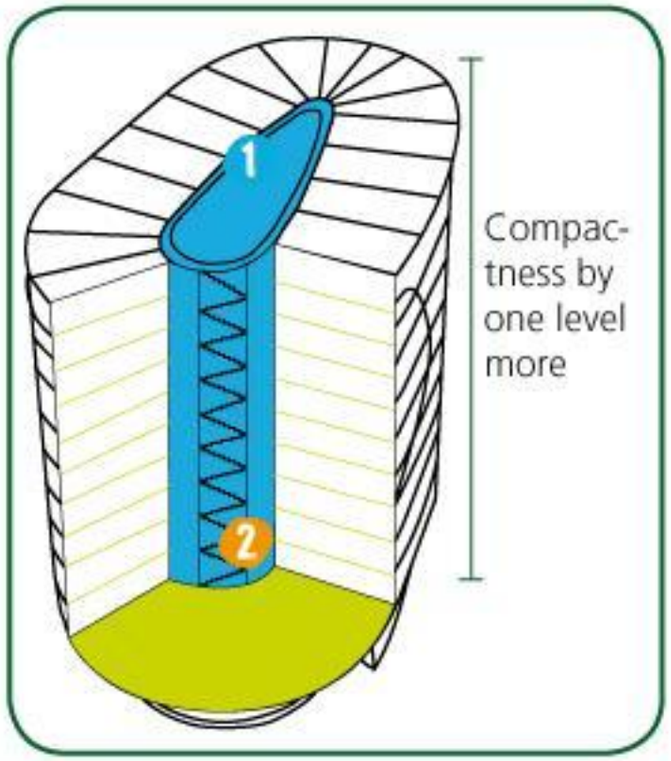
The lateral manager conveys the pair :
« positive energy efficiency / standard price »
to each of the actors

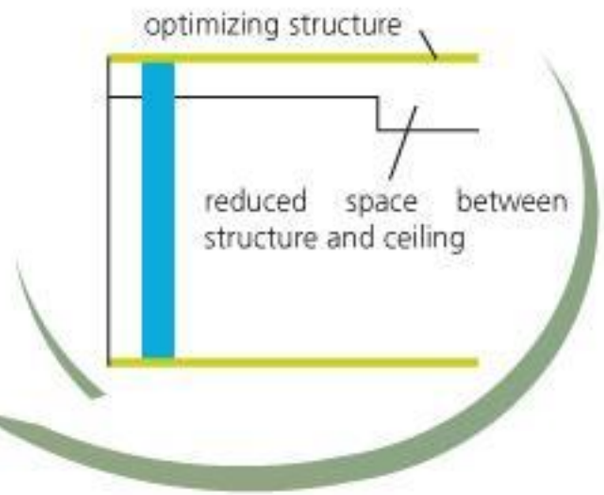
- **birth of program** (sponsors / investors)
- **research and development** (engineers)
- **conception** (engineers / architects)
- **Architectural Design** (architects)
- **Technical and technological recommendations** (Engineers / Industrialists)
- **Economical competition** (companies)
- **Building construction** (companies / industrialists / workers)
- **Delivery operation** (specialized companies)
- **Facilities management** (specialized companies)
- **Using** (users / tenants)

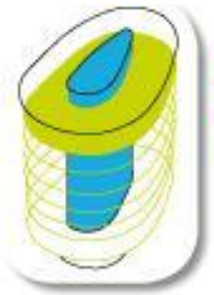
Our Motto

"More grey matter
for smaller carbon footprint"

Compactness values

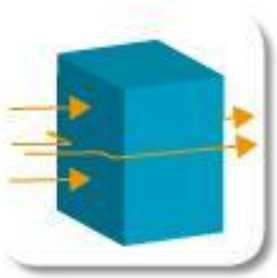






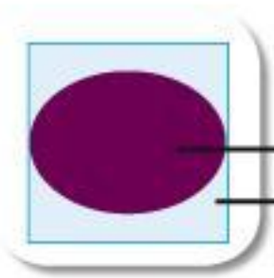
1 growth inertia by a circular concrete core

2 more usable space by double helix stairs « chambord stairs »



Traditional Tower
- High exposure to wind
- Significant façade surface

Elithis Tower
- Low exposure to wind
- Reduced façade surface



Elithis Tower=20% less façade surface

Elithis Tower

Traditional Tower

Integration on the site

Offering a building in harmony with site requirements.
Clean lines and a sleek look.

Established in a mixed-use urban zone
(residential/office) facilitating transport systems (combined parking, public bicycle system, Tram, TGV station)

Taking into account
climatology, weather forecasts, use of space, current and future constructions,
energy on site, etc.

Site view before building

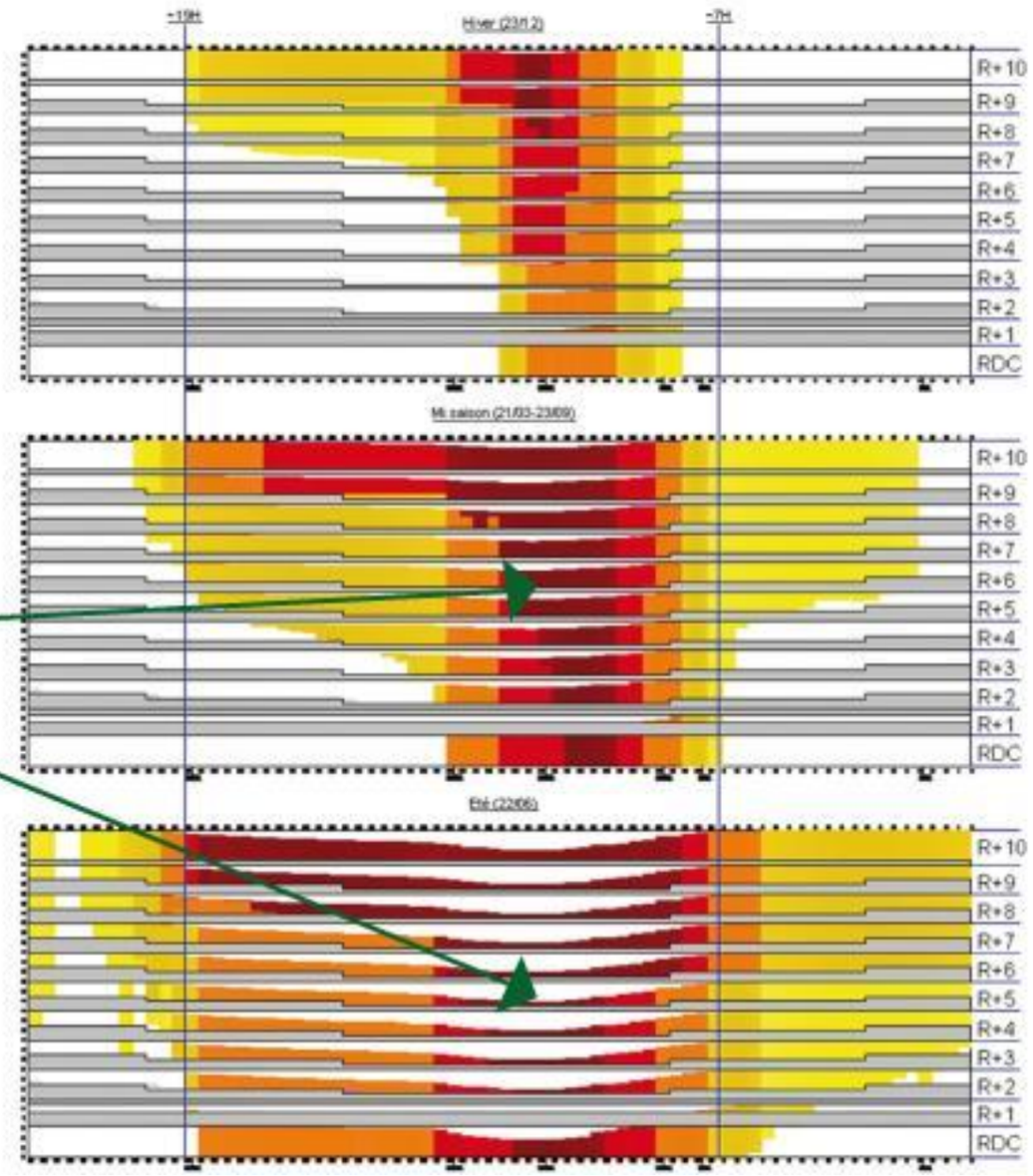
Insulating modelisation

Winter

Mid-seasons

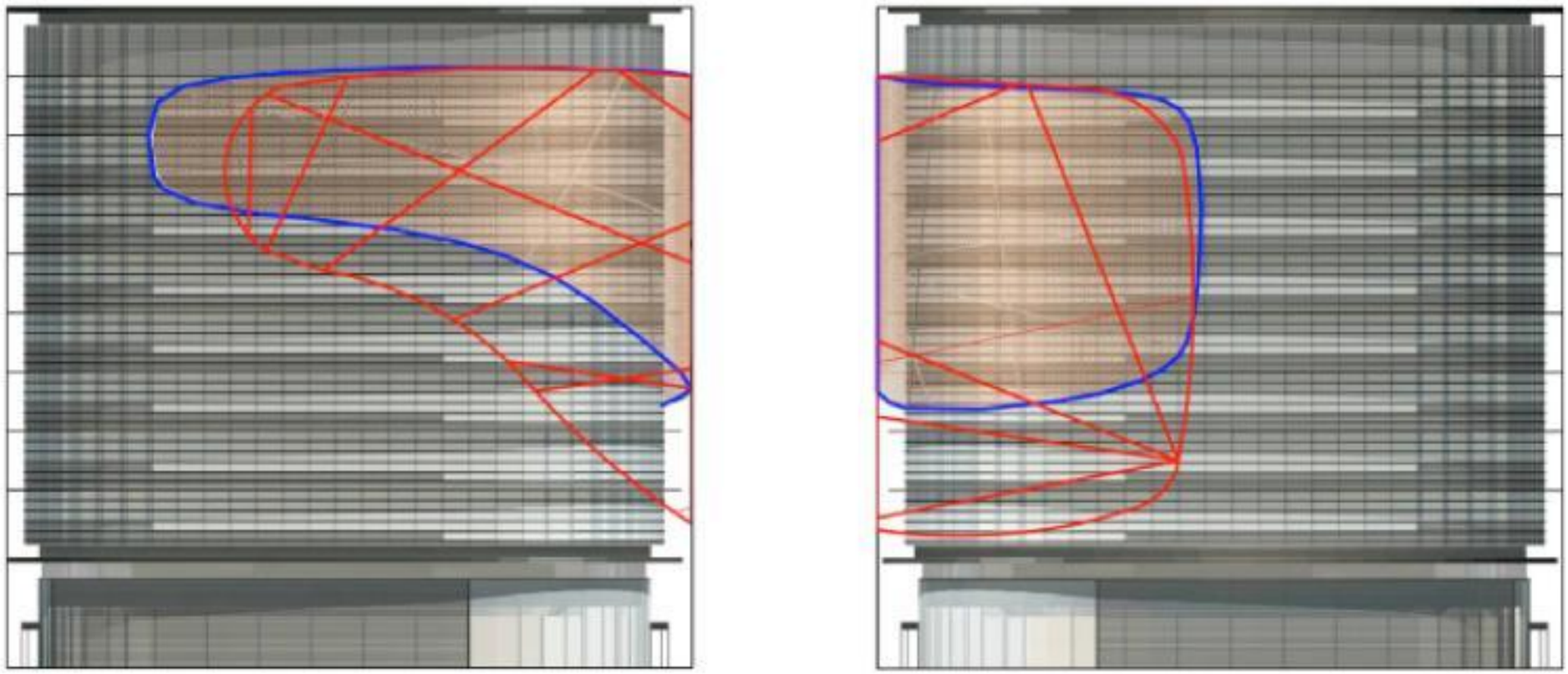
sun visor impact

Summer



Solar shield

Different drawings to meet insulating modelisation stipulations



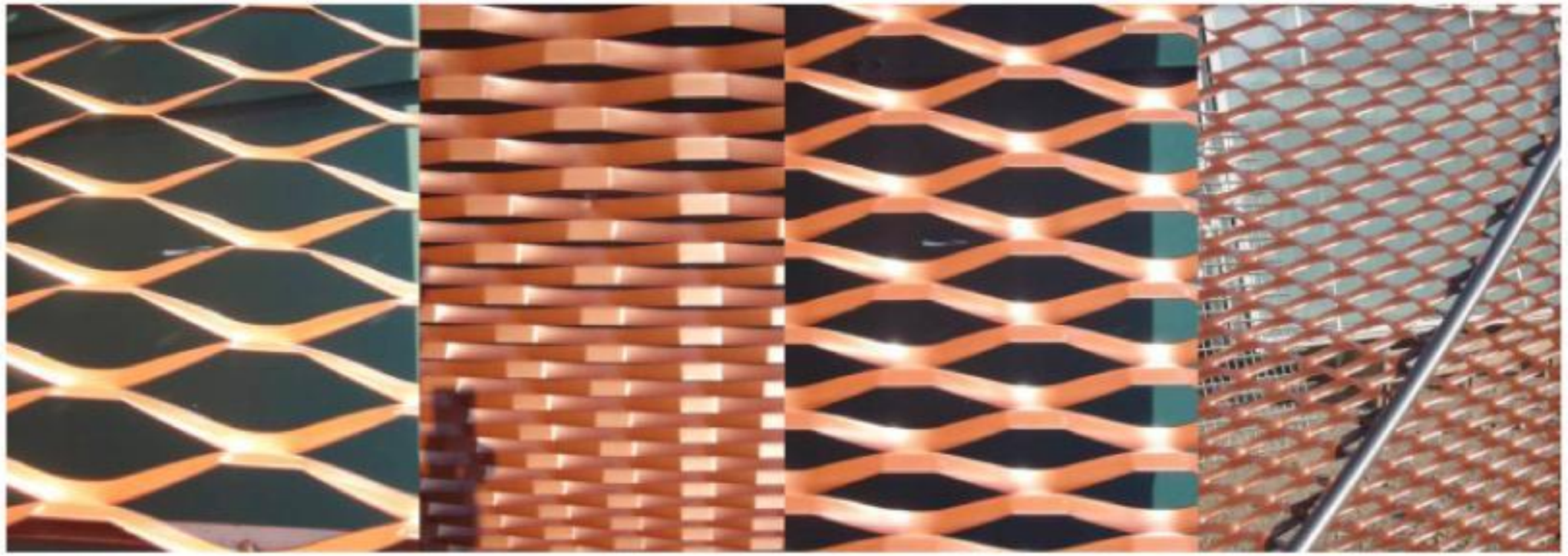
Blue → shield's architect

Red → shield's Elithis

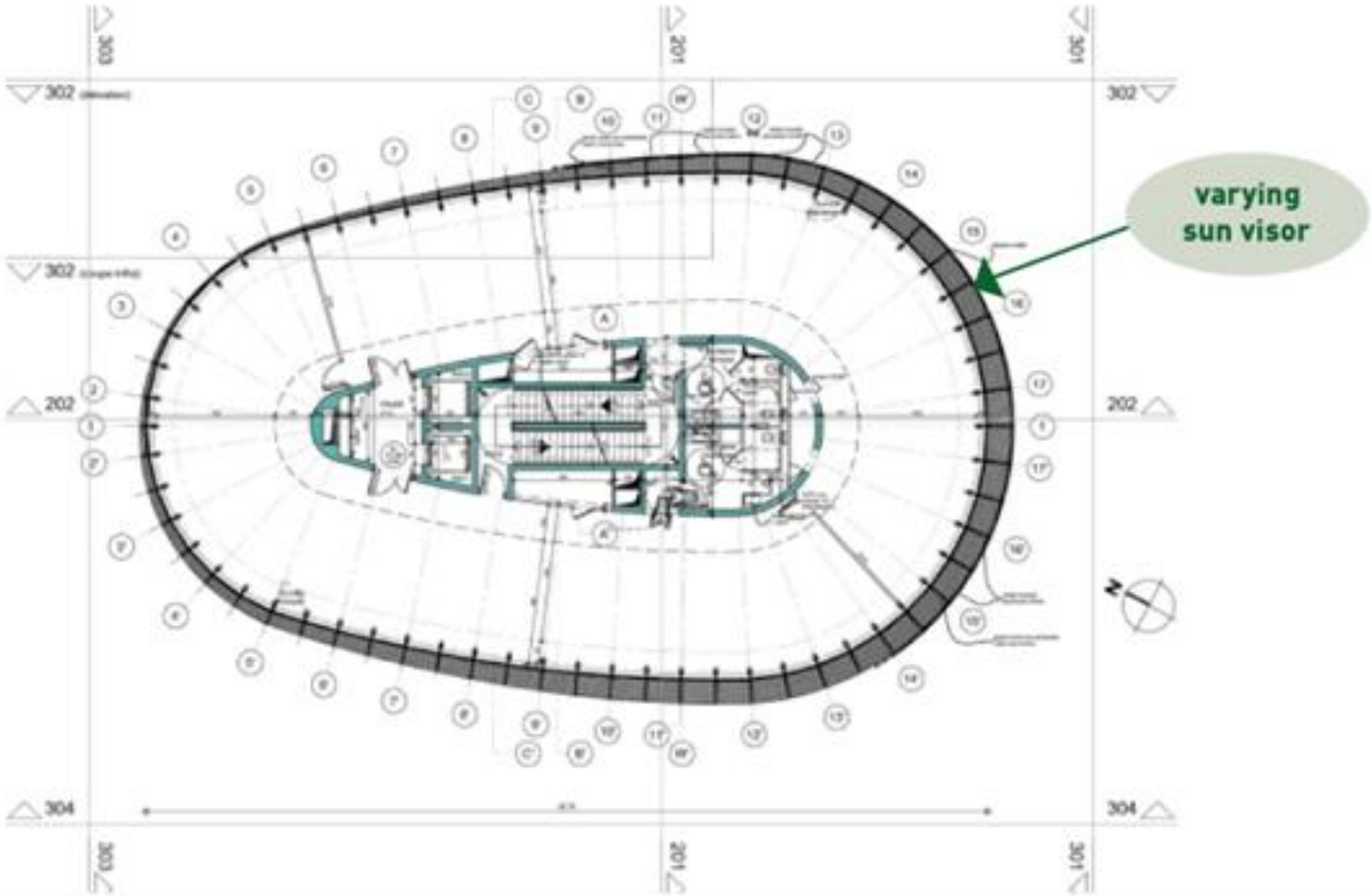
Solar shield

Various solar vibrations

The shield lets natural light enter without dazzle

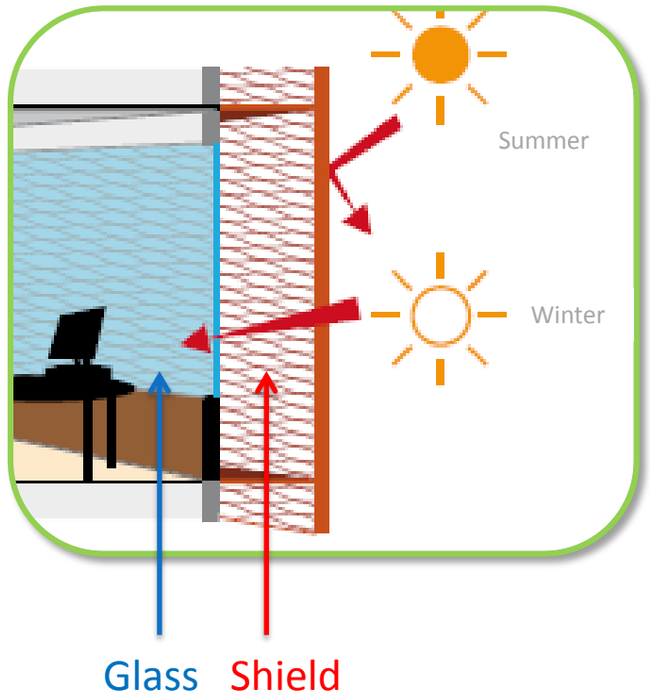


Insulating modelisation



Thanks to the solar shield :

Winter → Solar heat can enter
Summer → Solar rays are deflected



Solar shield

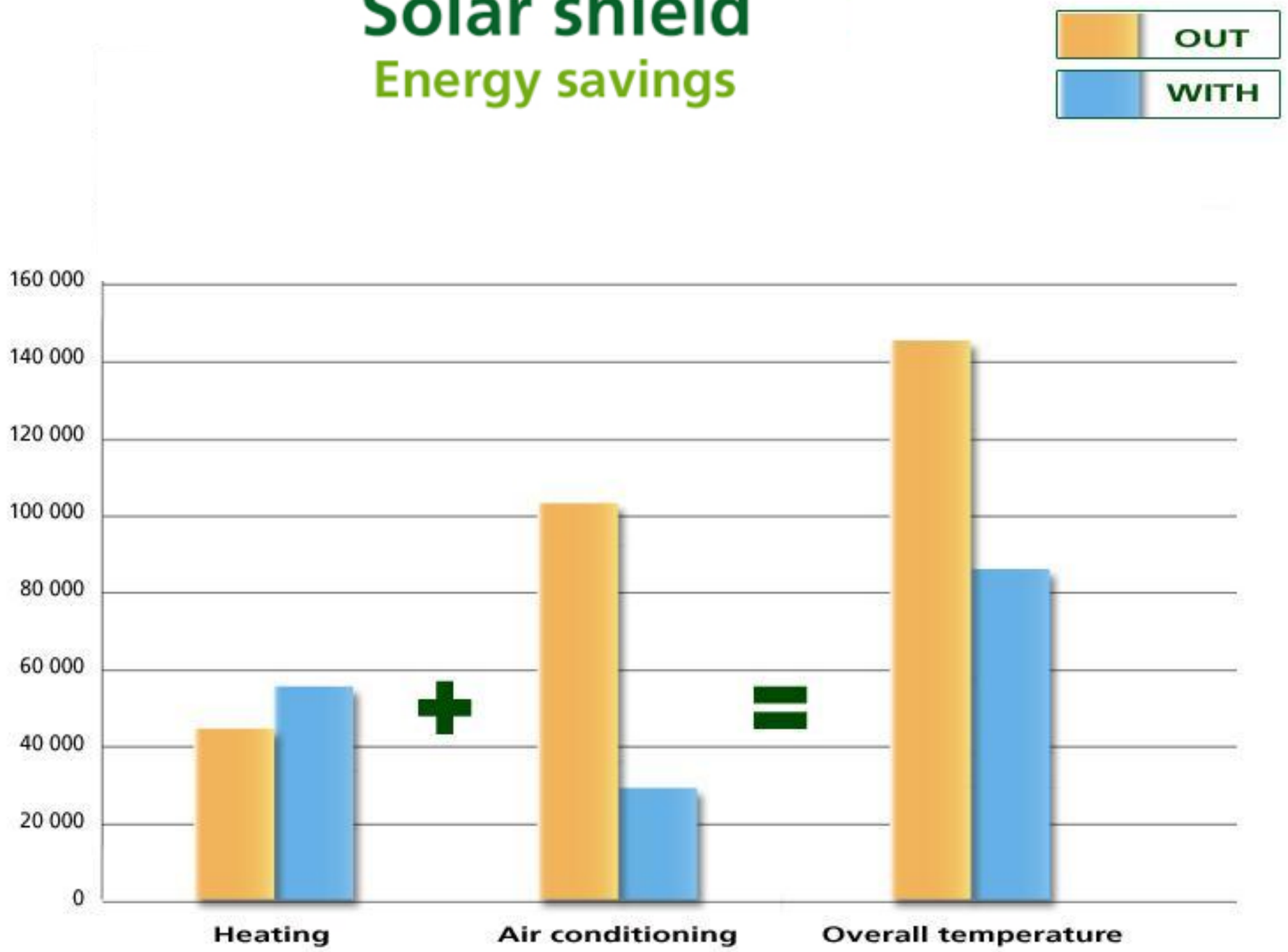
During construction

Solar shield

During construction

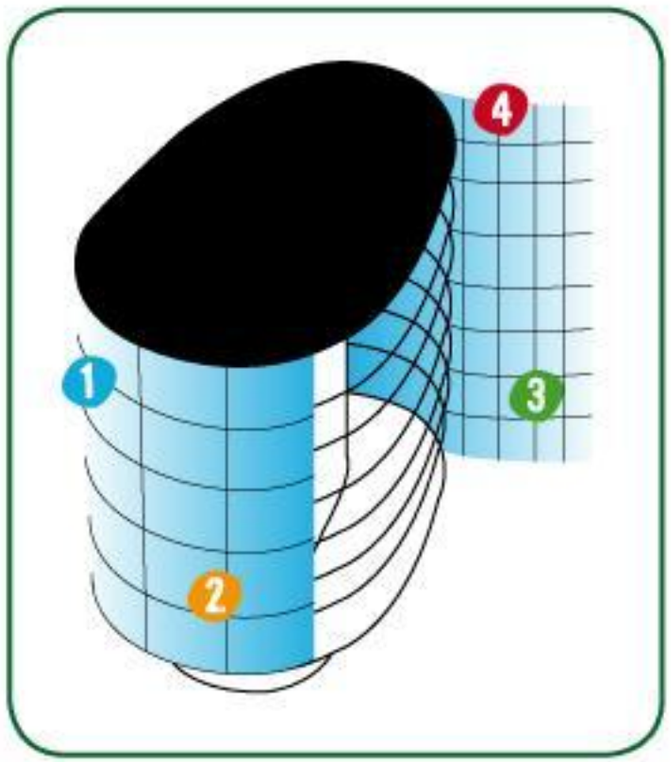
Solar shield

Energy savings



A natural façade covers the building

Main stipulations



1 **Wooden supporting structure** (glued laminated pine, PEFC EU approved) covered with aluminium facing

2 **Large high-performance glass surface** (8/20/6 Argon 90% Ug=1.1 W/m2.K FS=40%)

3 **Wooden sill + high performance insulation** of cellulose lining 120mm (recycled paper), aluminium cladding to preserve wood and facilitate maintenance

4 **Façade=Waterproof covering**

Tests conducted on a prototype and on site to ensure building is waterproof

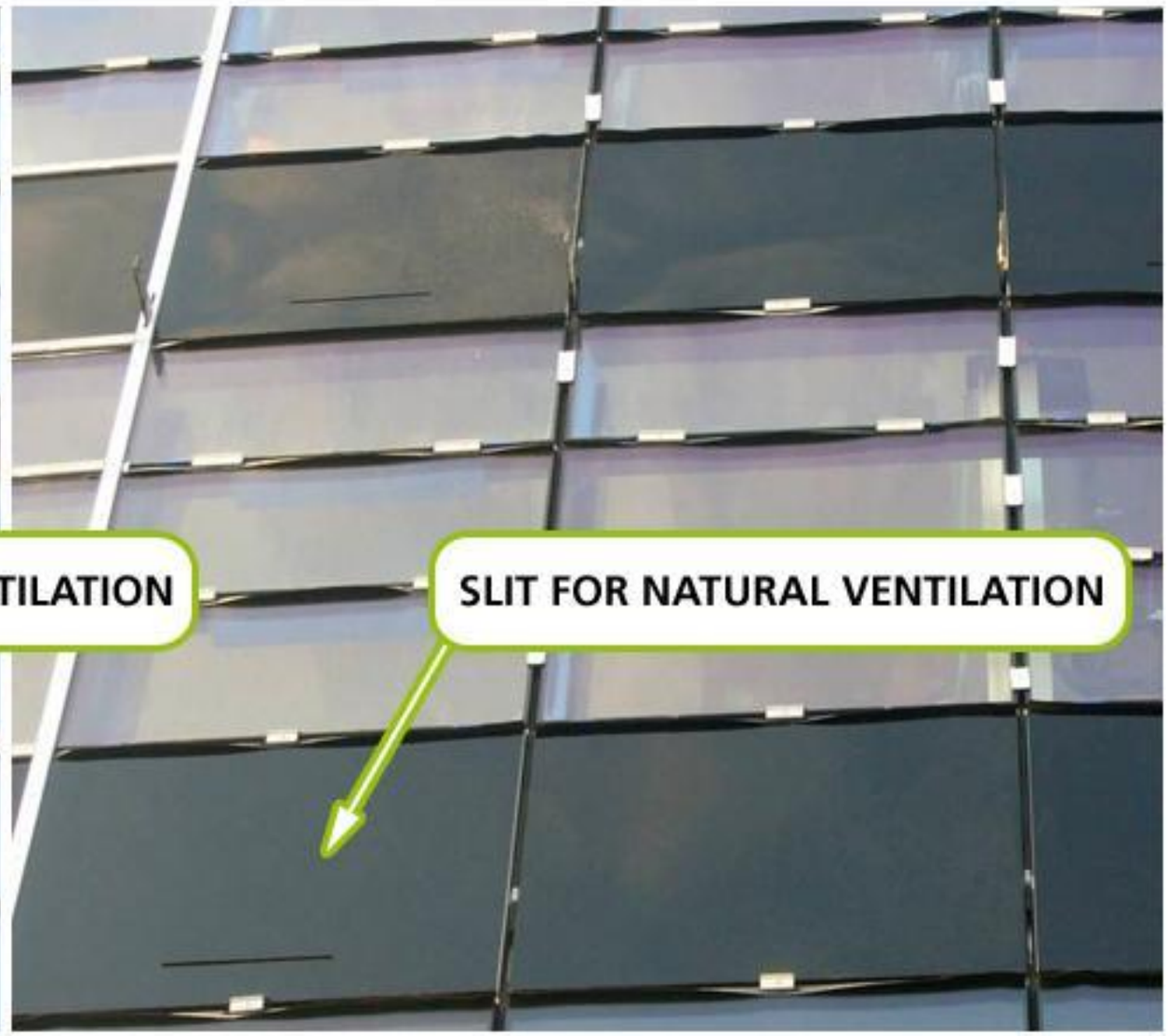
The façade is a truly dynamic comfort regulator

A natural façade covers the building

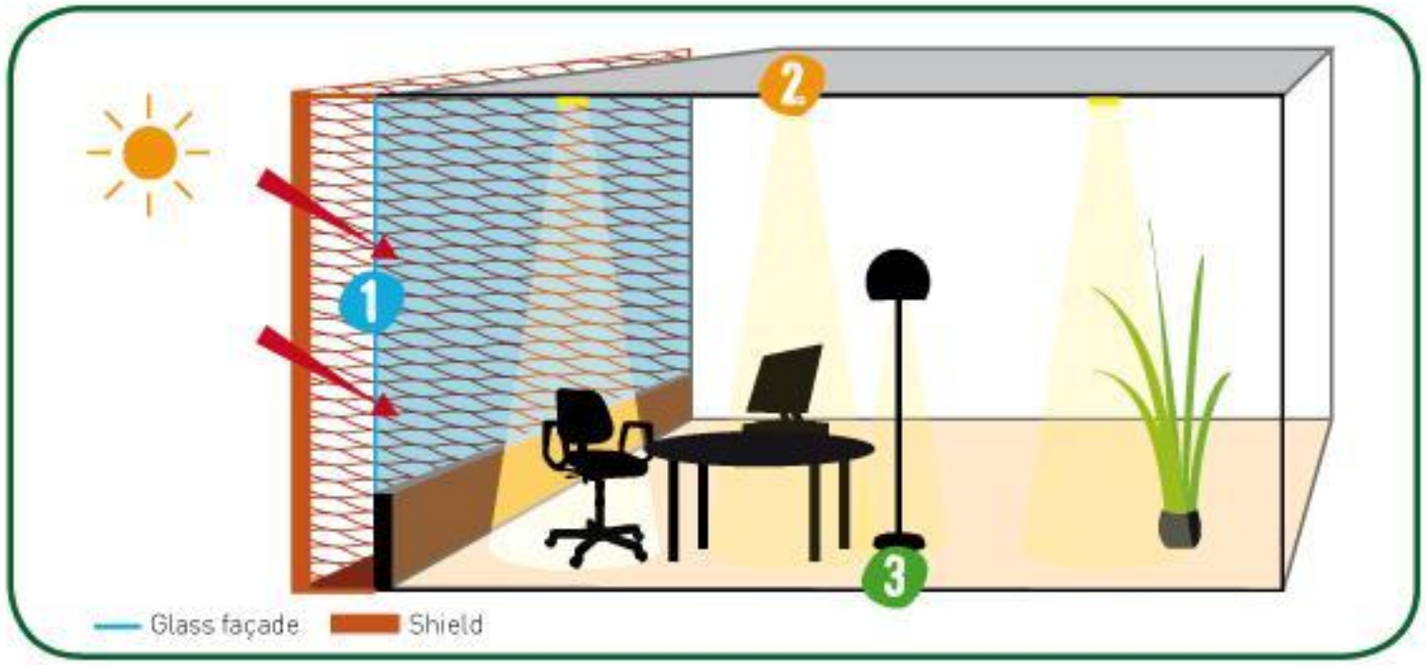
During construction

A natural façade covers the building

During construction



Lighting
work station

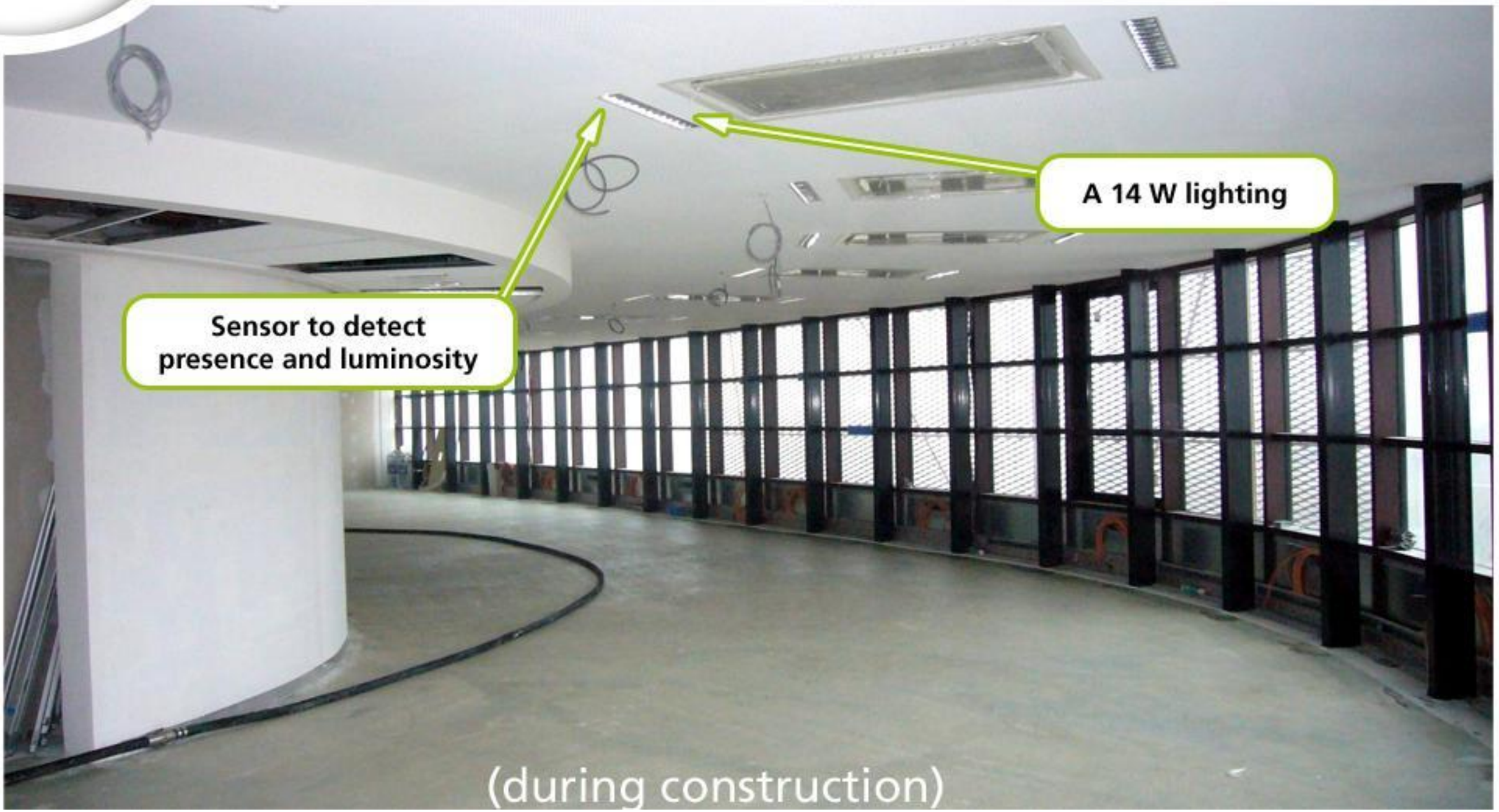


The many windows, the transparency of the solar shield, and the layout of offices into direct daylight ensure natural light.

Light fittings in the ceiling fitted into the beams bring 200/300 average Lux over the entire office space with presence detection control and luminous gradation (from 30% to 100% depending on ambient intensity).

Lighting: less is more

Lighting

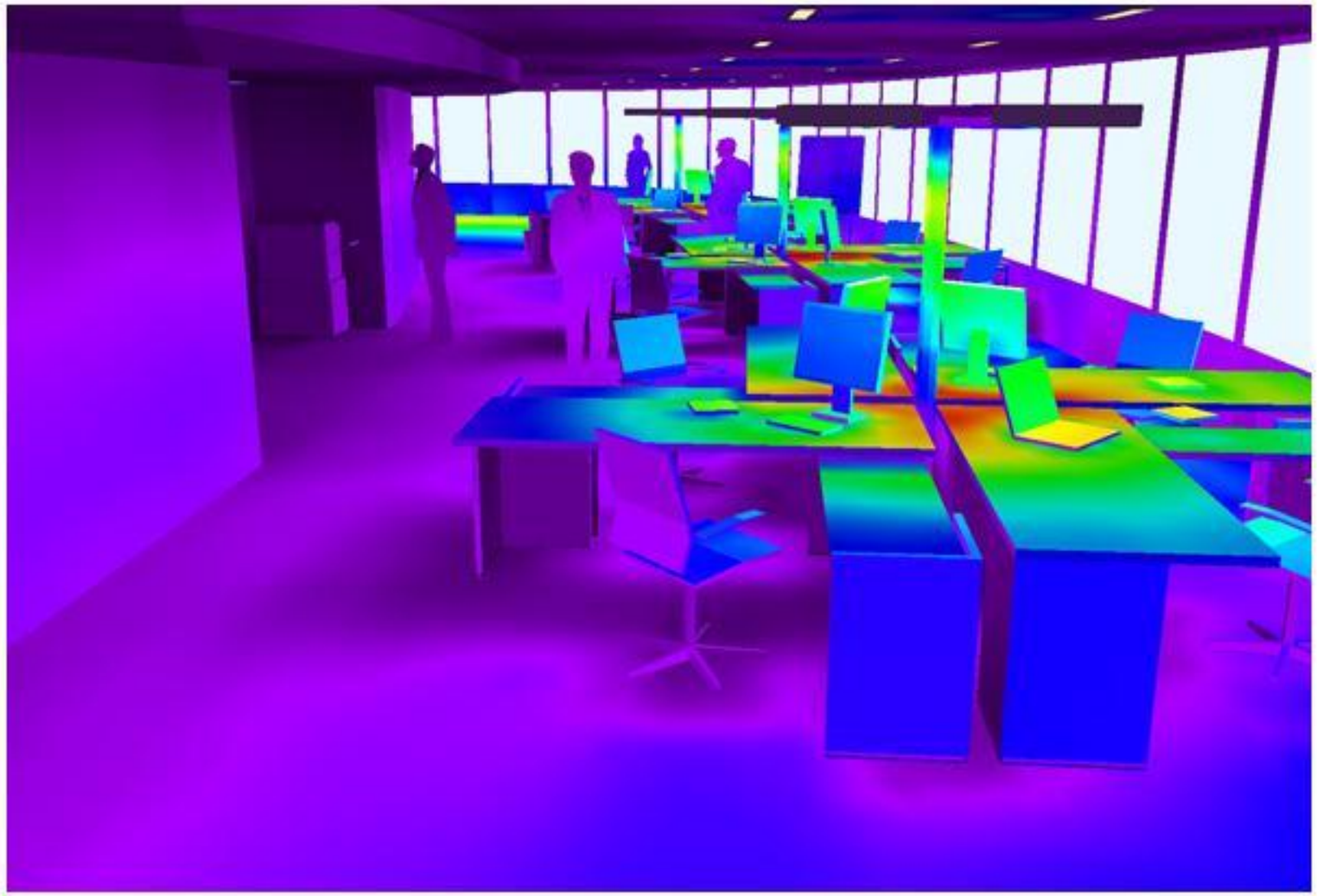

A 14 W lighting
Sensor to detect presence and luminosity
(during construction)

Nomad Lighting

COMPUTERS PROCESS

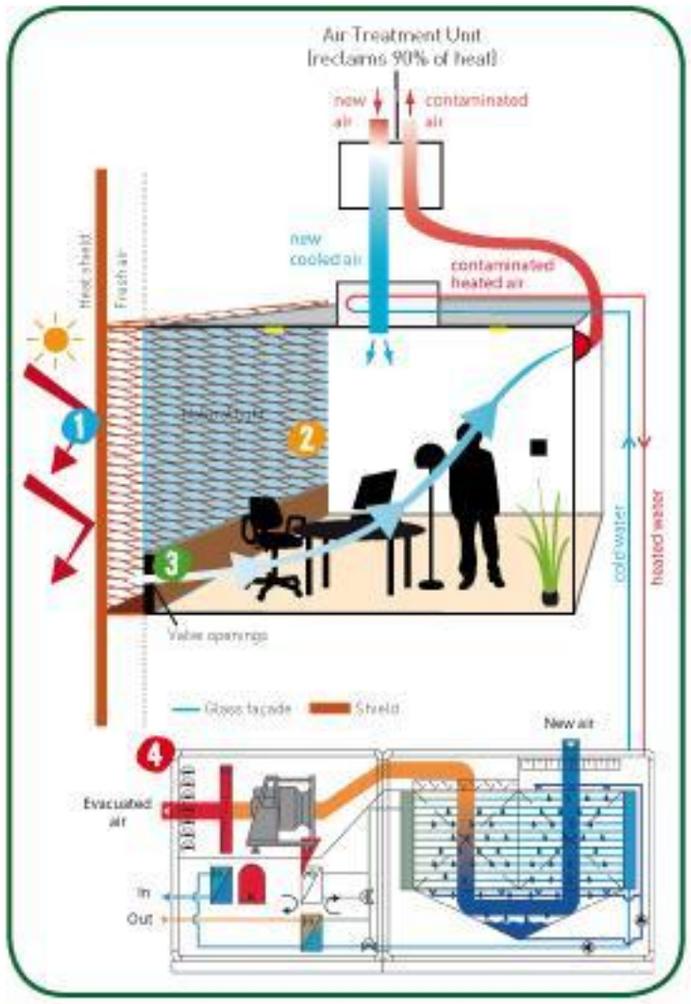
NOMAD LIGHTING

Low-consumption nomadic lighting (presence detection control and luminous gradation) ensures complementary light at work stations thanks to a network of dedicated outlets.



Technological step : Ventilation

cooling



Reducing Consumption

1. **The thermal shield** protects the building from summer/mid-season solar radiation

2. **Reduction of internal contributions** (lights and computers)

3. **Natural triple-flux controlled ventilation:** An Elithis innovation whereby adjusting the façade aeration valves provides natural cooling. At night, heat is drawn out by low energy-consuming air-turning vanes.

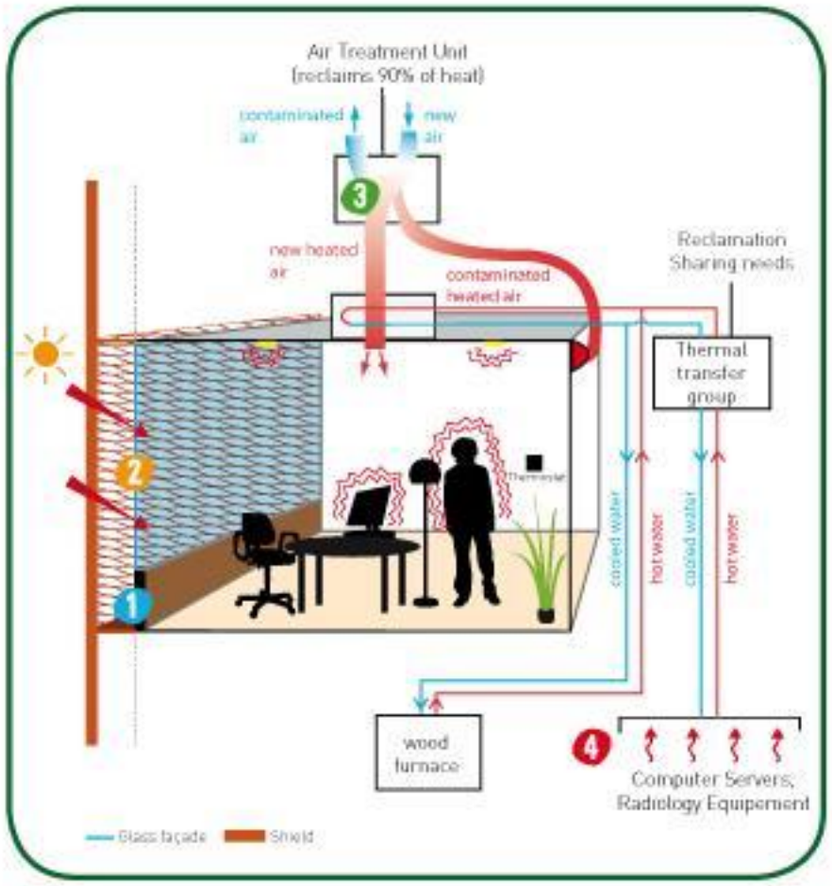
Renewable Energy

4. **The very high-output adiabatic unit** (heat pump COP to 11) associated with cold beam diffusers ensures air conditioning if the temperature → 26°.
   Two stages of cooling: Adiabatic: heat evacuated evaporation on water/air plate interchange.
   Thermodynamic : heat evacuated by water and air condensers

Triple flow System: a free cooling resource

Technological step : Heating

Hybrid and Renewable Technologies



Reducing Consumption

1. **Façade=Waterproof covering**

2. **Many high-performance windows** to facilitate solar contribution in winter ($Ug=1,1W/m^2$)

3. **Taking into account internal contributions:** humans, computers, lights, etc. Double-flux adiabatic unit that allows renewal of air by blowing new air pre-heated by internal contributions on the cold beam diffusers.

4. **Heat reclamation** by the restaurant's cold units and the computer servers.

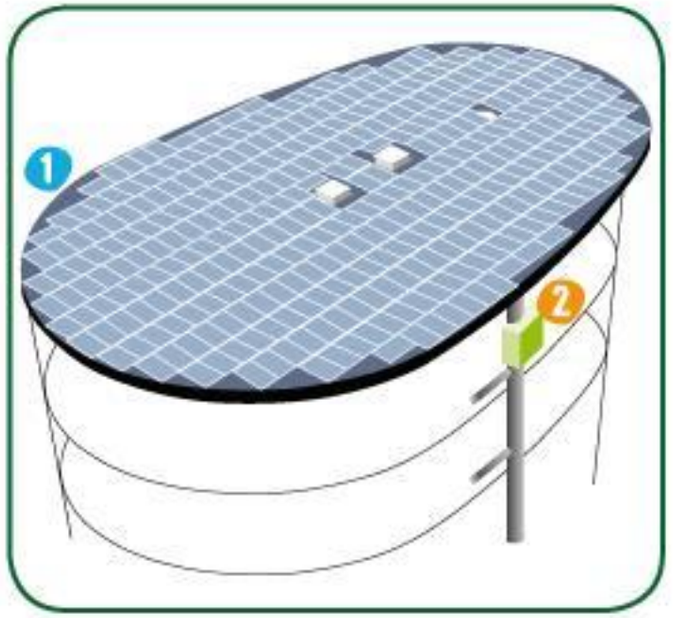
Renewable Energy

5. **A very low-power wood furnace (100kW)** ensures heating needs if necessary and the maintenance of the recommended temperature at 20°C. A second furnace is installed in case of failure of the first furnace.

Heating resources in the hustle and bustle of work activity and free contributions

Technological step : Resources

Hybrid and Renewable Technologies



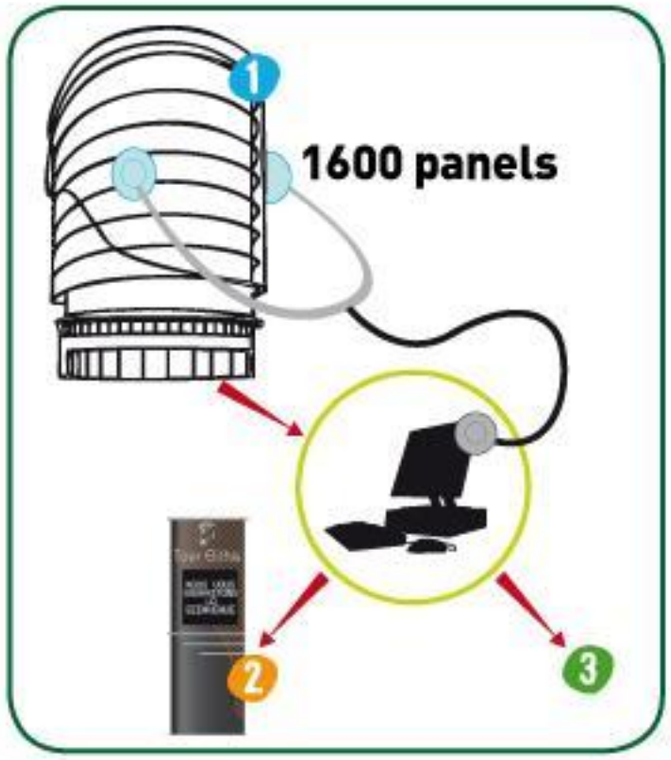
1 **The roofing is covered with 560 m² of solar panels** that ensure an annual production of 82000 kWh

2 **Rainwater is collected on the roof,** saved in a 8m3 reservoir, and reused for the toilets

Energy that leaves no footprint on the environment

Technological step : Use

Scientific laboratory

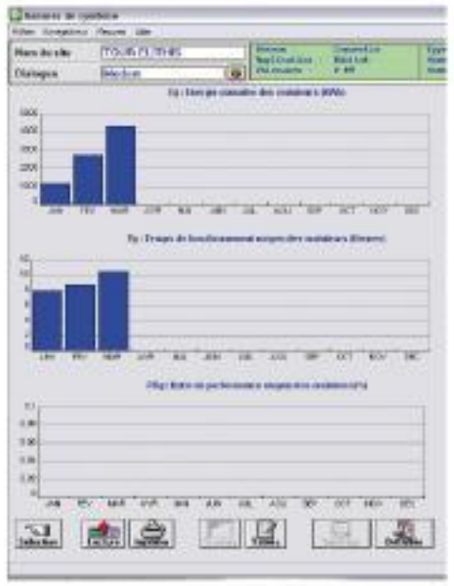


1 Real-time information collection delivered by 1600 data points feeding a centralised database and a technical building management programme.

2 

Advertising tower by public road showing the decrease of greenhouse gas emissions and energy consumption.

3 Publish consumption differences between theoretical models and reality.



A wide network of measuring systems for continuous improvement

Energy consumption balance

First year

	Forecast consumption (kWh_{PE}/m^2_{SHON}/year)	Measured consumption (kWh_{PE}/m^2_{SHON}/year)
Regulatory Frame		
Heating (wood)	2	6,32
Cooling	10,6	6,23
Ventilation	13,1	14,08
Pumps and auxiliaries	1,1	2,6
Lighting	10,5	9,5
Photovoltaic	- 41,28	- 40,24
TOTAL	- 3,98	- 1,51
Elevators	3,6	3,58
Occupation		
Office automation - Computer - Fittings (fridge, coffee machine…) - Cleaning - Instrumentation tower		
	24,2	54,6

Coefficient of conversion into primary energy :

For wood → 0,6

For electricity → 2.58

EARNINGS FOR THE USERS

4,29 €/m²$_{SHON}$/year

The operator of one floor in the Elithis Tower (500m²) receives ≈ 2 146 € per year

Experimental Laboratory of Behavior

"Users are the real winners in the fight against global warming"

Device to cut off computer power

Artistic paintings to incite users to take the stairs more often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