



Dynamic Building Envelope Components and Systems

May 15, 2011

9:00 - 12:00 AM

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Dynamic Building Envelope
Components and Systems

Case Studies



Dynamic Building Envelope
Components and Systems

Dynamic Façades:

Performance criteria

Visual comfort

Thermal comfort

Energy Savings

- **Daylighting Design**
- **Shading**
- **View**
- **Dynamic Façade**
- **Materials**
- **Electric Lighting & Controls**
- **Related Systems & Controls**

Soka-Bau Administration Building



Dynamic Building Envelope
Components and Systems

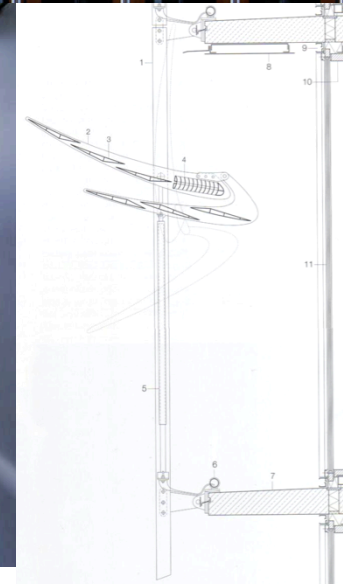
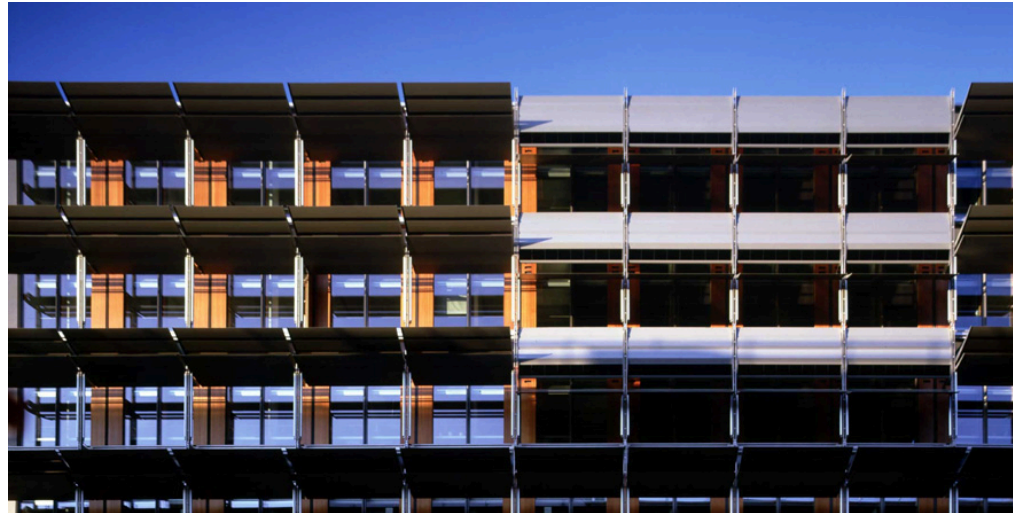
building: **Soka-Bau
Administration Building**
architect: **Thomas Herzog**
location: **Wiesbaden**



Multi-use building:
offices, conference,
computer center

• **Daylighting Strategy**

- *“Intelligent façade”*
- *two-layer south façade to manipulate daylighting*
- *Room-high glazed*
- *Concave louvers for light redirection into the space*
- *Light deflecting panels were fixed to the balconies to direct light into the back.*



Dynamic Building Envelope
Components and Systems

Source: Thomas Herzog

building: **Soka-Bau**
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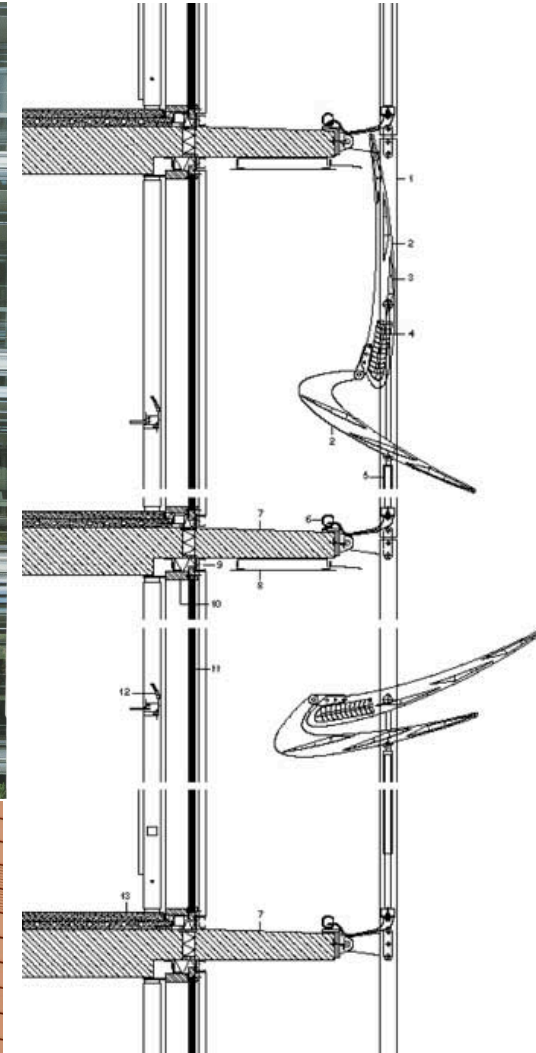
- **Daylighting Strategy**
 - *North façade: Static light reflectors*



Source: Mark Perepelitza

building: **Soka-Bau
Administration Building**
architect: **Thomas Herzog**
location: **Wiesbaden**

- **Shading**
 - *Lower wing of light shelf moves down to shade the facade*
- **View**
 - *Shape and position of the light shelf's lower wing for unobstructed view out*
- **Dynamic Facade**
 - *Automatic movement of the outer screen*
 - *Varying positions depending on weather conditions*



Source: Thomas Herzog

building: **Soka-Bau
Administration Building**
architect: **Thomas Herzog**
location: **Wiesbaden**

- **Materials**

- *Light reflecting surface*

- **Electric Lighting &
Controls**

- *Automatic movement
of the light shelves*

- **Related Systems &
Controls**

- *Integration of parts into
the outer wall*

- *Ventilation flaps
integrated in the façade*

- *A convector heats up
the outside air which
enters via four vents*



Dynamic Building Envelope
Components and Systems

Source: Thomas Herzog

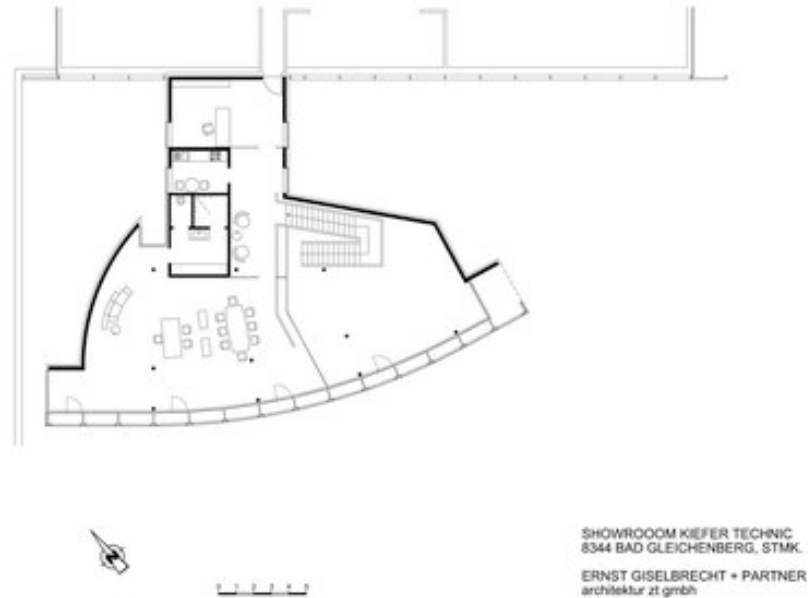
Kiefer Technic Showroom



Dynamic Building Envelope
Components and Systems

building: **Kiefer Technic Showroom**
 architect: **Ernst Giselbrecht + Partner**
 location: **Steiermark**

- **Dynamic Facade**
 - *Folding panels made of perforated aluminum move according to a set of variables*
 - *Electrically driven*
- **Shading**
 - *Perforated panels act as shading systems*
- **View**
 - *Glass façade*



Source: Ernst Giselbrecht + Partner



building: **Kiefer Technic Showroom**
architect: **Ernst Giselbrecht + Partner**
location: **Steiermark**



- **Dynamic Facade**
 - *Automated control of folding panels*
 - *Manual override by occupants*



Source: Ernst Giselbrecht + Partner

building: **Kiefer Technic Showroom**
architect: **Ernst Giselbrecht + Partner**
location: **Steiermark**

- **Materials**

- *Light colored metal panels*

- *High reflectance*

- **Electric Lighting & Controls**

- *Automatic movement of the light shelves*

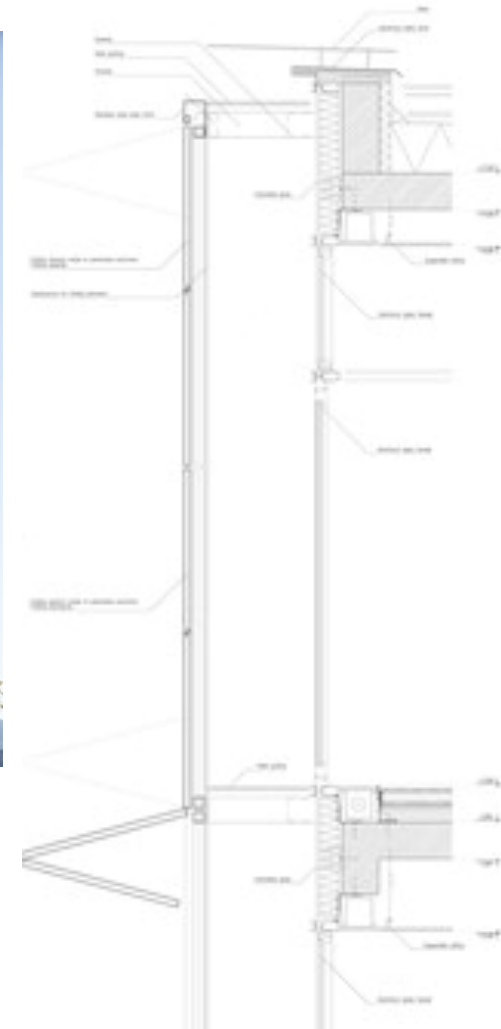
- *Reduce the use of electric lighting*

- **Related Systems & Controls**

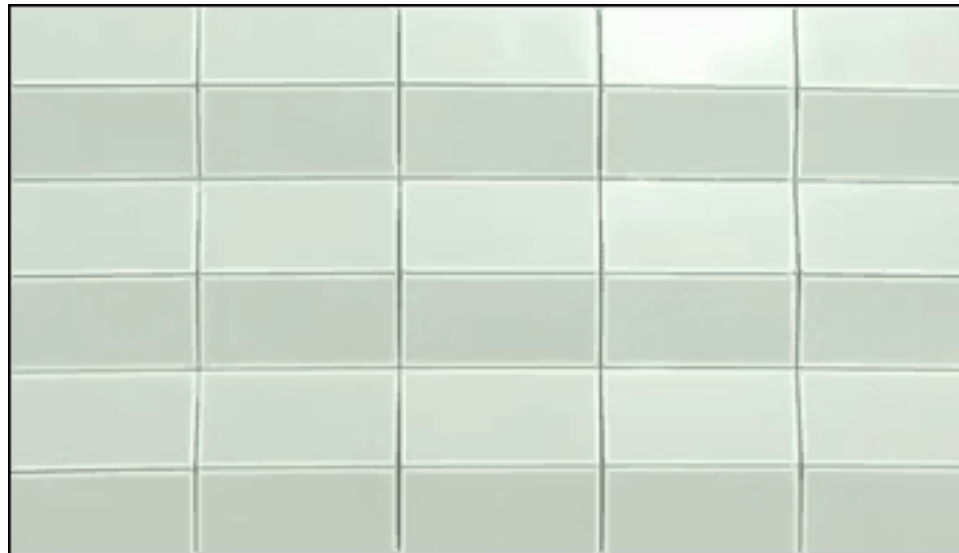
- *Ventilation flaps integrated in the facade*



Source: Ernst Giselbrecht + Partner



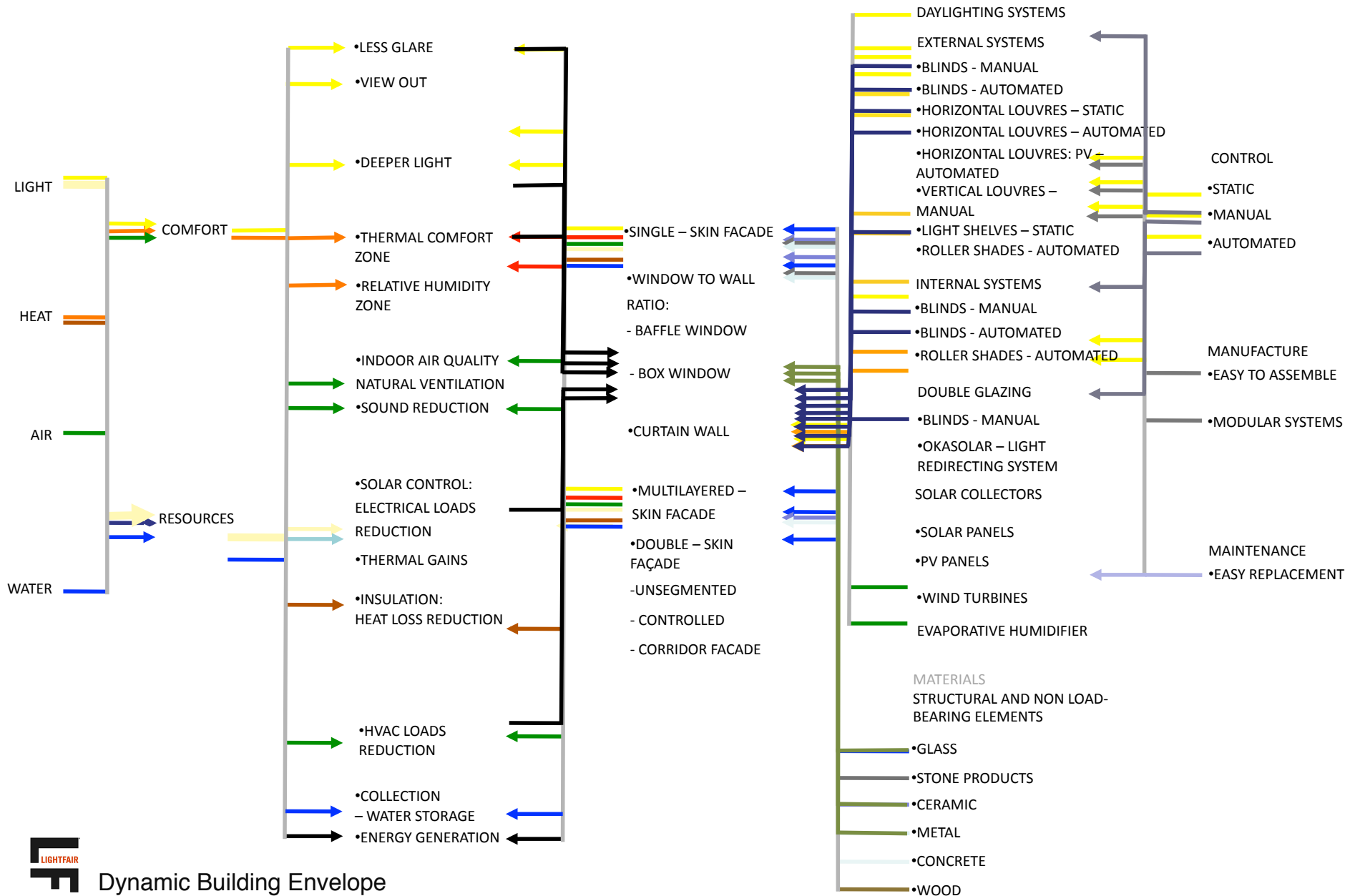
building: **Kiefer Technic Showroom**
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Source: Ernst Giselbrecht + Partner

Future Dynamic Façade Principles:

- **Integration**
 - *Of systems and components*
 - *Lighting, heating, cooling*
- **Modularity**
 - *Façade systems and components*
- **Automation**
 - *Automated control*
- **Climate design implementation**

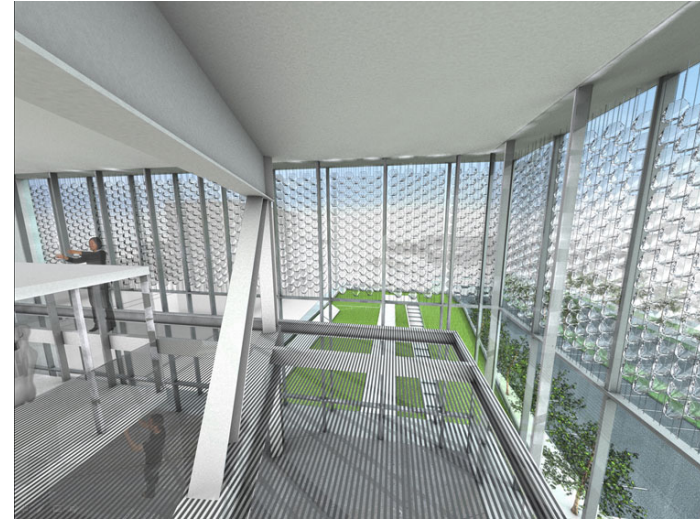


The Integrated Concentrating Solar Façade System

licensed by: HeliOptix

developed by:
CASE / Rensselaer
Polytechnic Institute

- **Integration**
 - *Integrated photovoltaic*
 - *Provide: electric power, thermal energy, enhanced daylighting, reduce solar gain*
- **Modularity**
 - *Modular design can attach to existing structures or implement to new buildings*



Source: HeliOptix LLC

- **Automation**
 - *The tracking IC Solar Module System:*
 - *Production of electricity*
 - *Shading*
 - *Diffusion of irradiation for daylighting*
 - *Lower cooling loads*
- **Climate Design Implementation**
 - *Movement based on the weather data and the location of the sun*



Source: HeliOptix LLC

HelioTrace Façade System

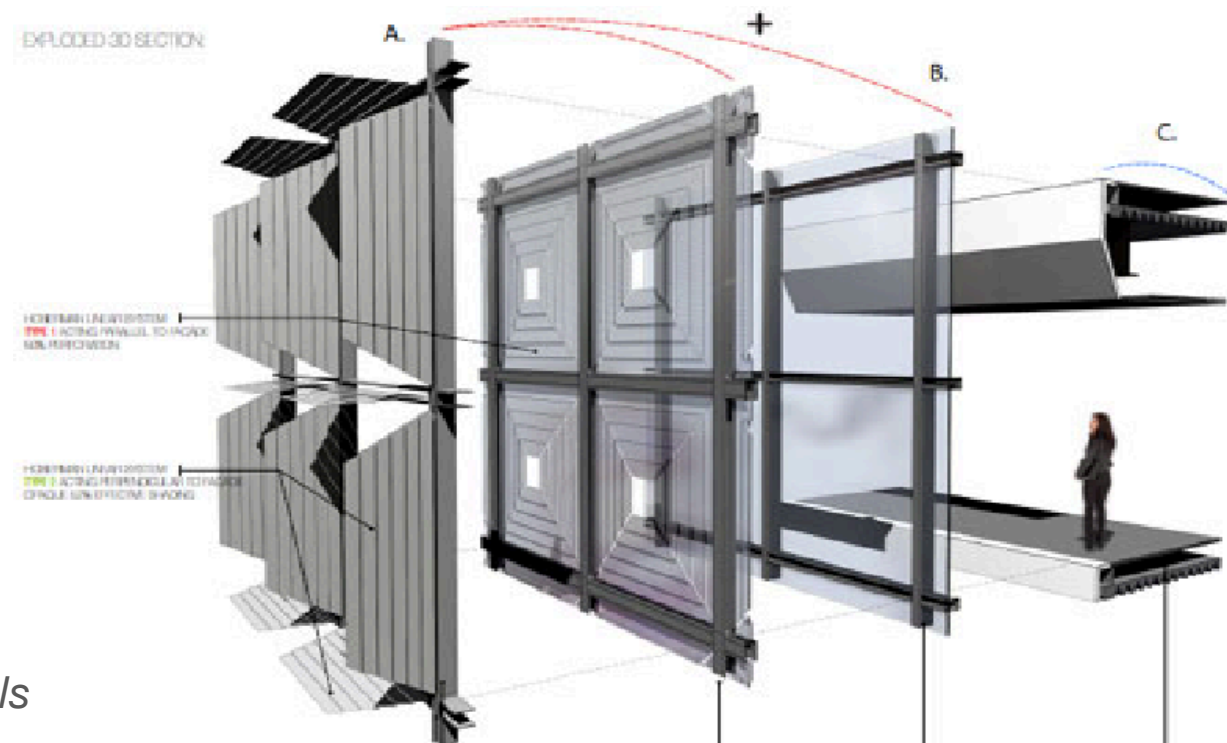
SOM, Permasteelisa, and Adaptive Building Initiative, a co-venture between Buro Happold and Hoberman and Associates.

- **Integration**

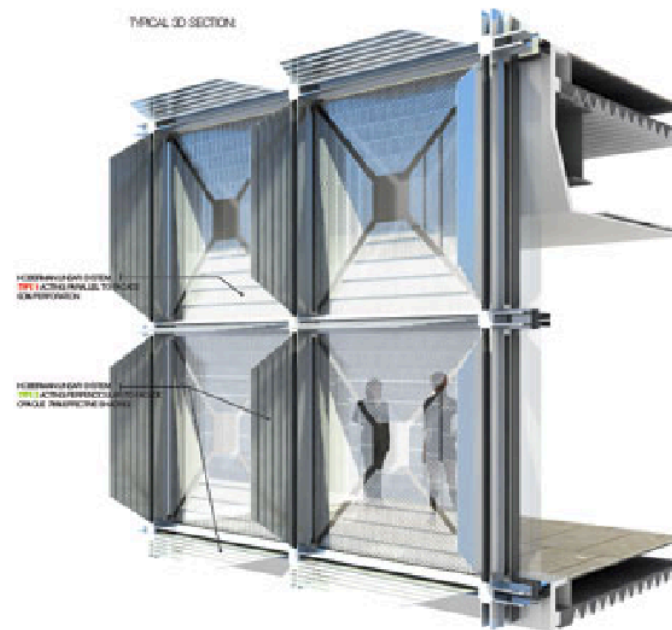
- *Kinetic shades*
- *Building enclosure*
- *Internal mechanicals*

Shading

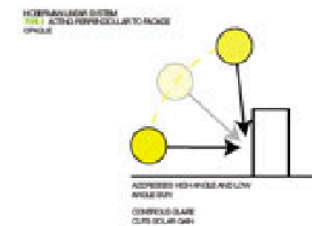
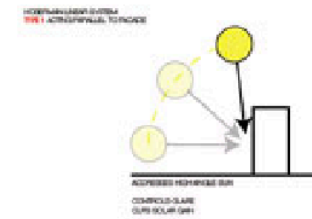
- *Opaque panels from the mullions*
- *50% perforated panels parallel to the envelope*
- *Effective shading: 78%*
- *Annual solar gain reduction: 81%*



- **Modularity**
 - *Modular elements can be integrated into various façade designs*

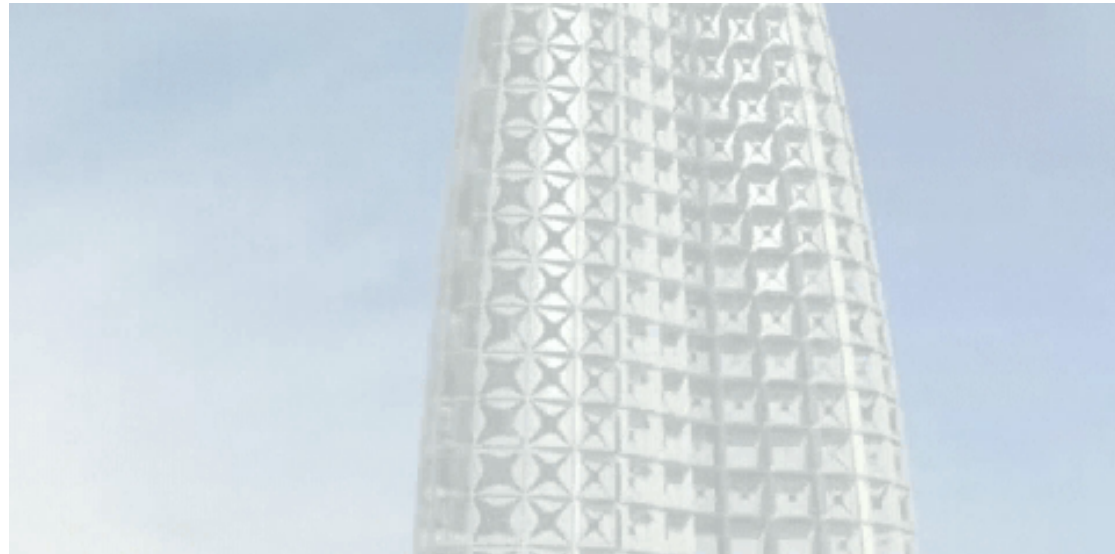


CONDITIONS ADDRESSED:



- **Automation**
 - *Automated control based on solar movement and interior occupancy*

- **Climate Design Implementation**
 - *Movement based on the weather data and sun angle*



Source: SOM