



## SUPSI

Swiss BiPV Competence Centre



Source: © RPBW - Ph. Tim Griffith

# California Academy of Sciences

San Francisco, U.S.A.

## Building Details

### CONTACTS

	Name	Website (or e-mail)
<b>Owner</b>	California Academy of Sciences	<a href="http://www.calacademy.org">www.calacademy.org</a>
<b>Architect</b>	Renzo Piano Building Workshop in collaboration with Stantec Architecture	<a href="http://www.rpbw.com">www.rpbw.com</a> <a href="http://www.stantec.com">www.stantec.com</a>
<b>Energy Consultant</b>	Arup, San Francisco, CA	<a href="http://www.arup.com">www.arup.com</a>

### PV Installer

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### BUILDING

<b>Completion year</b>	2008	Building	2008	Plant
<b>Category</b>	New	Renovation	Enlargement	Other
<b>Typology</b>	Residential	Administration	Industrial	Sport
	Agricultural	Urban	Historical	Other
<b>Building Energy Performance</b>	kWh/m <sup>2</sup> y		-	

## Description

The California Academy of Science, located on the Golden Gate Park, combines research, exhibition, educational and office spaces. The architectural design, inspired by the concept of "metaphorically lift up a piece of the park sliding the museum underneath", creates a "living roof" covered with 1,700,000 selected autochthonous plants. The sustainability is the key-factor of the intervention. Eco-friendly materials are chosen to minimize the environmental impact: recycled materials from the demolition of the old museum are used; a type of thick cotton batting, made from recycled blue jeans is used as thermal insulation; 90% of recycled metal has been used for the steel structure; the rainwater is recycled for irrigation; the air conditioning is replaced by a natural ventilation system; natural lighting in 90% of occupied spaces is used: 60,000 PV cells for electricity are integrated in the borders of the green roof made. The semi-transparent solar canopy supplies almost 213,000 kWh yearly (around 15% of the need). The cell pattern and the printed glasses create a unique shadowing effect characterizing the system.

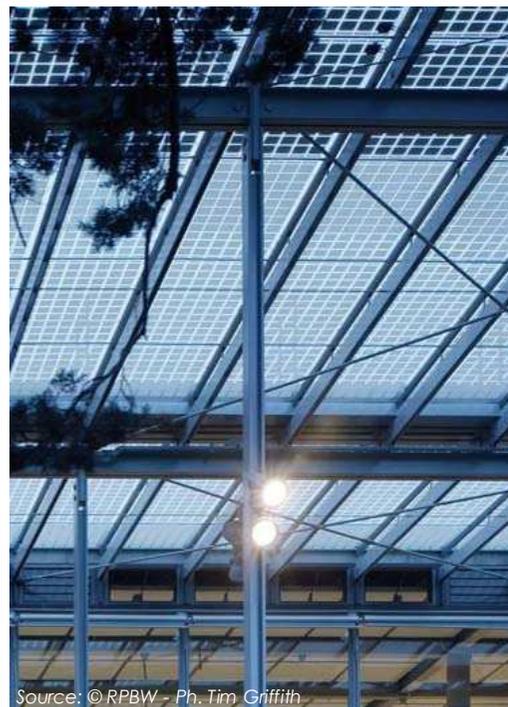
**Acknowledgments** The largest LEED Platinum building in the world



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## BiPV Details

### LOCATION OF PLANT

<b>Roof</b>	Flat roof	Sloped	Curved	Greenhouse
<b>Façade</b>	Cladding	Balcony	Greenhouse	Curved
<b>Glass</b>	Façade	Roof	Solar shading	Canopy
<b>Orientation</b>	South	West	East	North
<b>BiPV System</b>	Canopy			

### ARCHITECTURAL EVALUATION

<b>Color</b>	Black
<b>Transparency</b>	Semi-transparent
<b>Frame</b>	Frameless

### COSTUMIZATION LANGUAGE AT COMPONENT SCALE

PV CELL	MODULE LAYERING	MODULE FEATURES	DUMMIES
DESCRIPTION			

### SPECIFICATION

Photovoltaic	Monocrystalline	Multicrystalline	Thin Film
<b>PV Module</b>	<b>Cells</b>	55000 Microcrystal PV cells	
	<b>Module</b>	-	
<b>Power</b>	<b>kWp</b>	-	
<b>Size</b>	<b>m<sup>2</sup></b>	100 (PV panels); 90 (PV glass)	
<b>Energy production</b>	<b>kWh/year</b>	213000	
<b>Cost</b>	<b>€/m<sup>2</sup></b>	-	

# BiPV Details

## BUILDING SYSTEM INFORMATION

Transparency	OPAQUE	TRASPARENT	G Value
Constructive system	MASSIVE BUILDING		LIGHTWEIGHT
Ventilation system	NOT VENTILATED	MICROVENTILATED	NATURAL VENTILATED
U value (W/m <sup>2</sup> K)			

### Exhibit façade detail

#### MATERIALS LEGEND

##### GLASS TYPE

- ① SINGLE LOW IRON GLAZING.
- ② LAMINATED CLEAR GLAZING, LOW-E COATING.
- ③ LAMINATED, LOW IRON GLAZING.
- ④ COMPOUND CURVED, LAMINATED, LOW IRON GLAZING.
- ⑤ DOUBLE GLAZED INSULATED UNIT, CLEAR GLAZING WITH LOW-E COATING.
- ⑥ INSULATED GLAZING UNIT W/ LAMINATED INNER LITE, LOW IRON GLAZING.
- ⑦ INSULATED GLAZING UNIT WITH LAMINATED OUTER LITE, LOW IRON GLAZING.
- ⑧ LAMINATED LOW IRON GLAZING WITH PHOTOVOLTAIC CELLS AND CERAMIC FRIT.
- ⑨ LAMINATED LOW IRON GLAZING WITH CERAMIC FRIT.

##### KEY NOTES

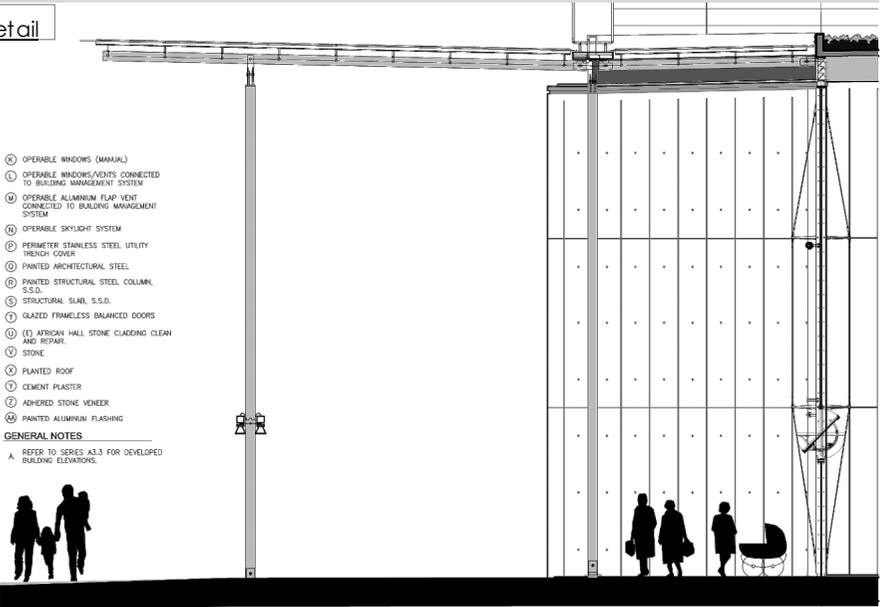
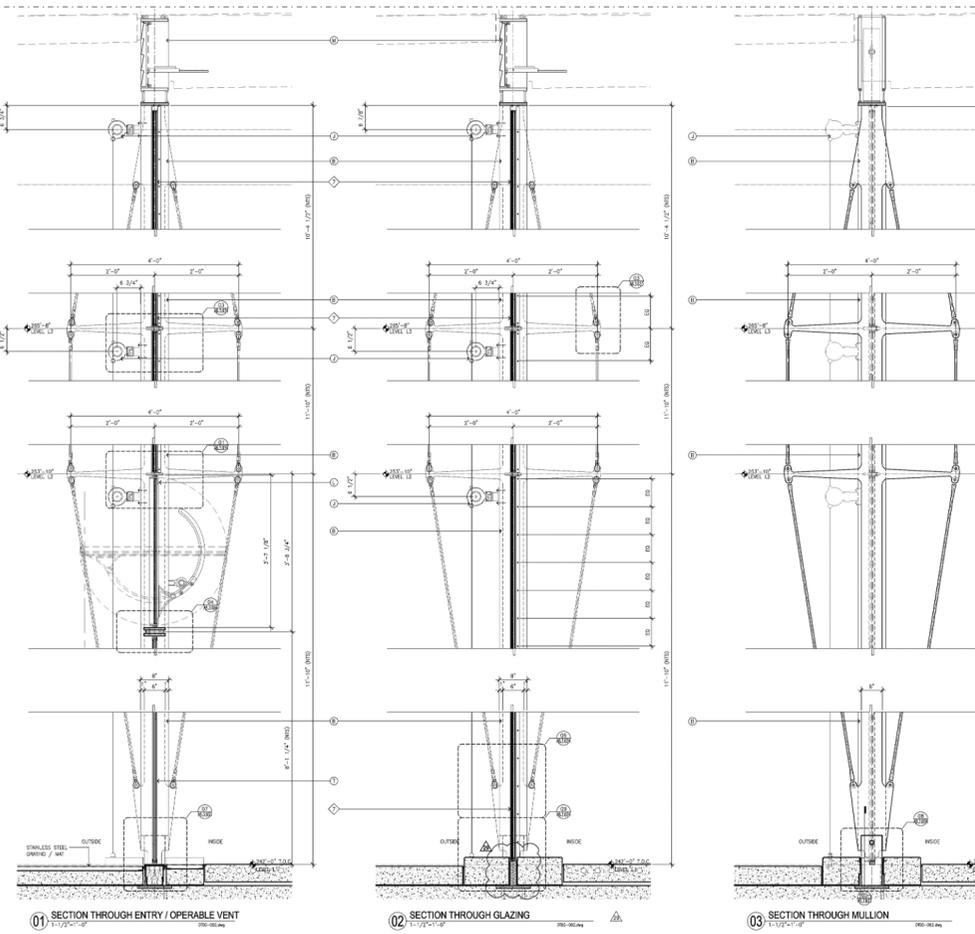
- ① PREFINISHED EXTRUDED ALUMINUM CURTAIN WALL SYSTEM
- ② STEEL FRAMED WINDOW WALL SYSTEM
- ③ GLAZED PERIMETER CANOPY
- ④ FIXED SKYLIGHT SYSTEM
- ⑤ PIAZZA SKYLIGHT SYSTEM
- ⑥ CAST IN PLACE ARCHITECTURAL CONCRETE
- ⑦ EXTERIOR SUN CONTROL DEVICES
- ⑧ RETRACTABLE RAIN SCREEN
- ⑨ RETRACTABLE SUN SHADE

- ⑩ OPERABLE WINDOWS (MANUAL)
- ⑪ OPERABLE WINDOWS/VENTS CONNECTED TO BUILDING MANAGEMENT SYSTEM
- ⑫ OPERABLE ALUMINUM FLAP VENT CONNECTED TO BUILDING MANAGEMENT SYSTEM
- ⑬ OPERABLE SKYLIGHT SYSTEM
- ⑭ PERIMETER STAINLESS STEEL UTILITY FLEXIBLE COVER
- ⑮ PAINTED STRUCTURAL STEEL
- ⑯ PAINTED STRUCTURAL STEEL COLUMN, S.S.D.
- ⑰ STRUCTURAL SLAB, S.S.D.
- ⑱ GLAZED FRAMELESS BALANCED DOORS
- ⑲ (T) AFRICAN HALL STONE CLADDING CLEAN AND REPAIR.
- ⑳ STONE
- ㉑ PLANTED ROOF
- ㉒ CEMENT PLASTER
- ㉓ ADHERED STONE VENEER
- ㉔ PAINTED ALUMINUM FLASHING

##### GENERAL NOTES

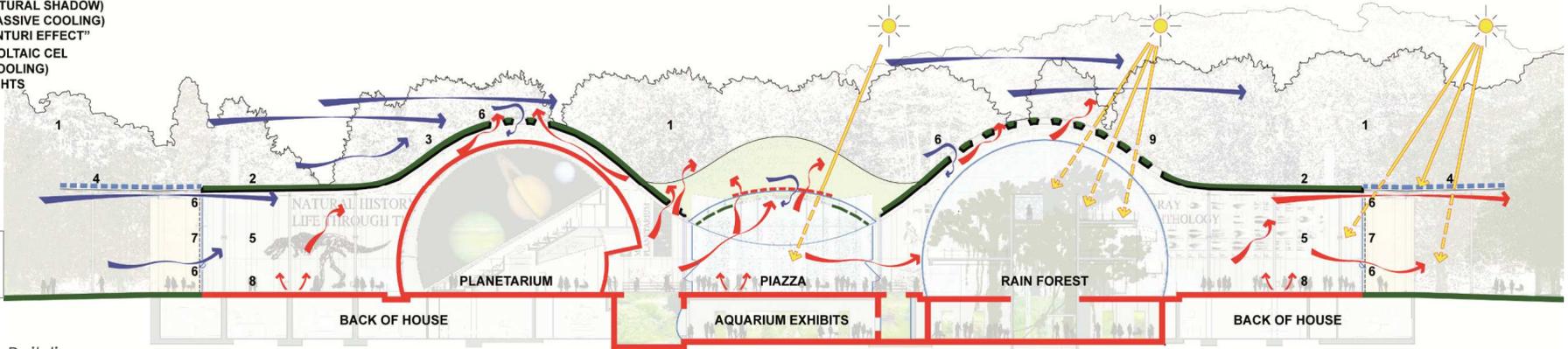
- A REFER TO SERIES A3.3 FOR DEVELOPED BUILDING ELEVATIONS.

### Detail of solar canopy



- 1 RESTORE ADJACENT PARK (NATURAL SHADOW)
- 2 GREEN ROOF (INSULATION & PASSIVE COOLING)
- 3 ROOF GEOMETRY FAVORS "VENTURI EFFECT"
- 4 GLASS CANOPY WITH PHOTOVOLTAIC CEL
- 5 CONCRETE WALLS (PASSIVE COOLING)
- 6 OPERABLE VENTS AND SKYLIGHTS
- 7 SUNSHADES
- 8 RADIANT FLOOR
- 9 NATURAL LIGHT FOR PLANTS

Diagram sustainable strategies



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