Solar lighting system
「HIMAWARI」

Solar lighting system Himawari LA FORET ENGINEERING CO.,LTD.

La Forêt Engineering Co.,Ltd.

KANKYO SOLUTIONS

Distributor: Kankyo Solutions Co., Ltd.

The HIMAWARI solar lighting system comfortably brightens your daily life.

As well as water and air, light will always be something to be particular about.

The HIMAWARI solar lighting system transmits high quality light while screening out ultraviolet rays. Since the light is provided by the sun, it is gentle on the eyes and skin and creates a relaxed atmosphere which could never be provided by any artificial lighting system.

The HIMAWARI system enables the light provided by the sun to shine everywhere, from houses to offices and public spaces.

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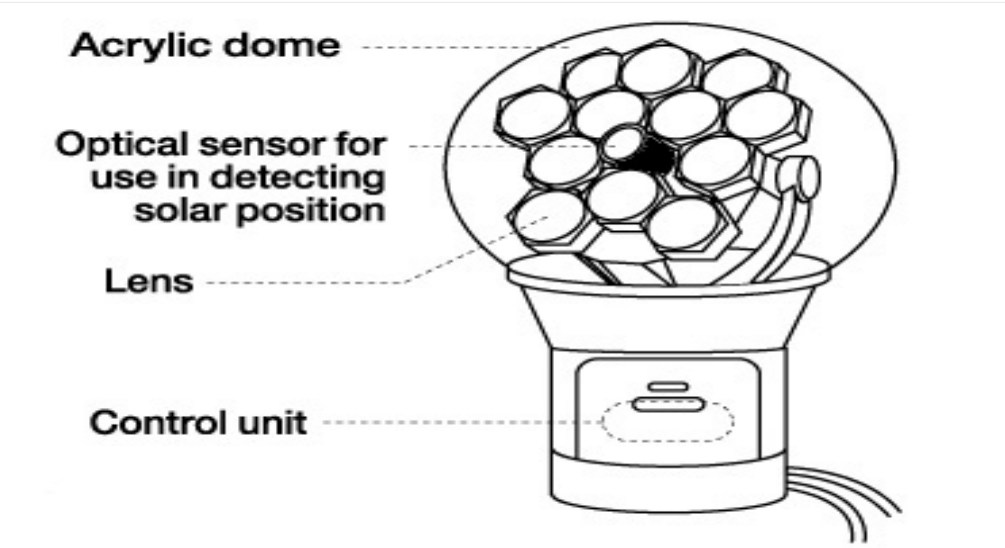
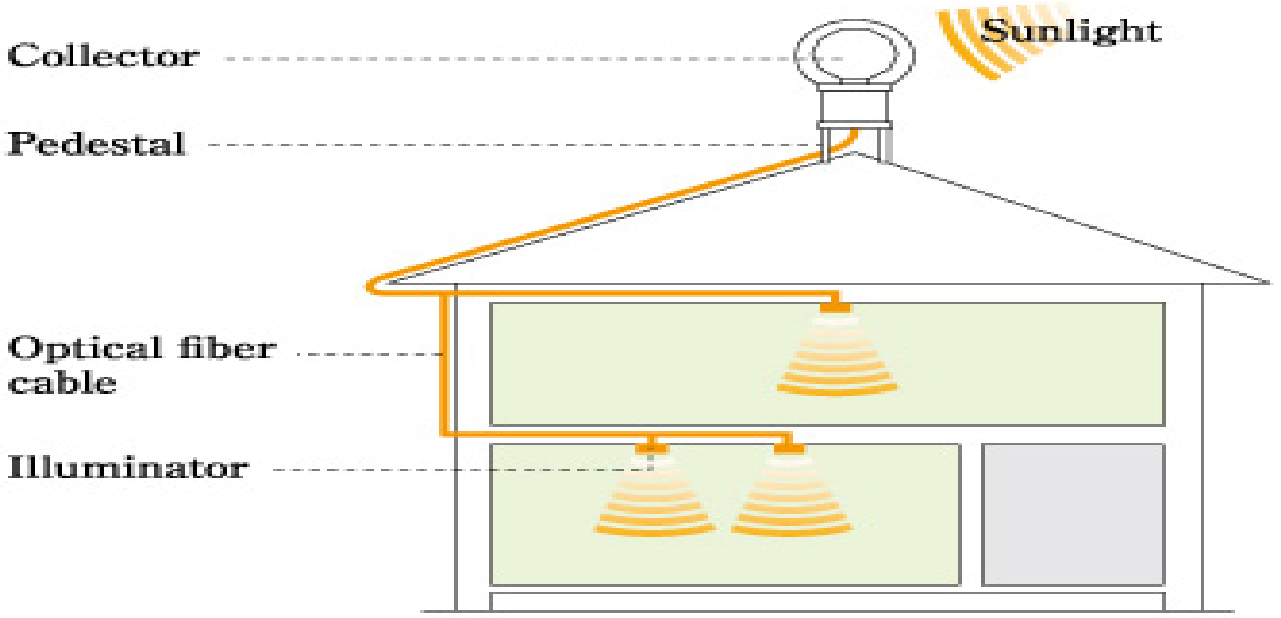
Sunlight collection at maximum efficiency with a system-lens focusing + optical fiber transmission

The HIMAWARI system consists of a lens focusing unit and optical fiber devices. Its outdoor collector can collect sunlight always at maximum efficiency and transmit it through optical fibers to anywhere you want. Unlike conventional solar lighting systems which use skylights and mirrors, stable daylight is possible all day long without suffering constraints imposed by room location, window orientation, and solar altitude.



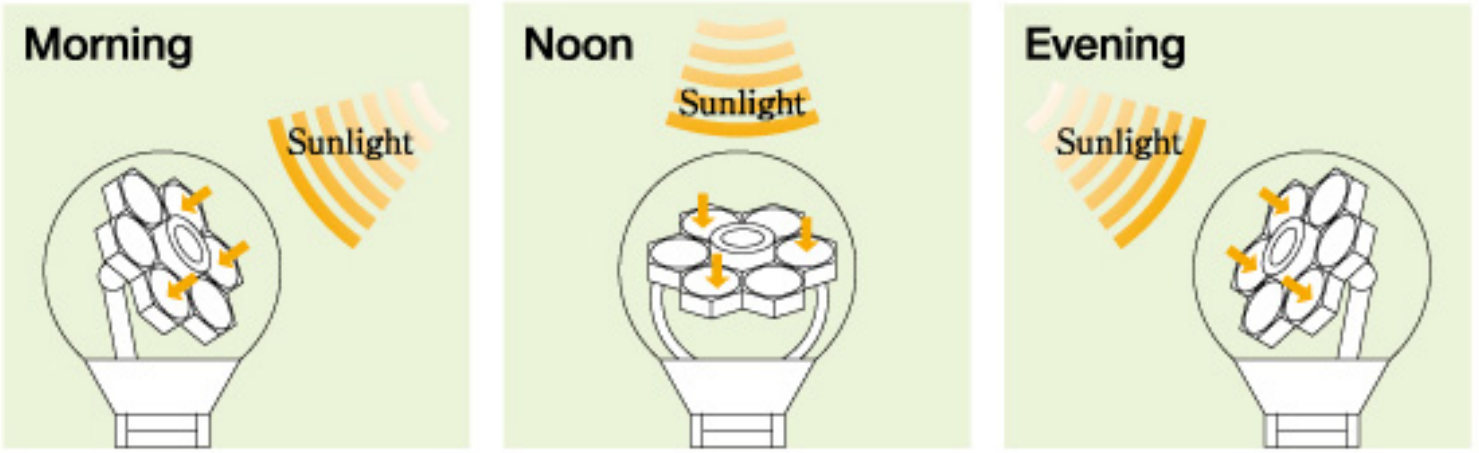
High-purity optical fiber, enabling free transmission of sunlight

Collected sunlight passes through quartz-glass optical fibers which transmit visual ray-dominated sunlight. Optical fibers are so thin and flexible that they can freely transmit light to rooms in any building, whether old or new.



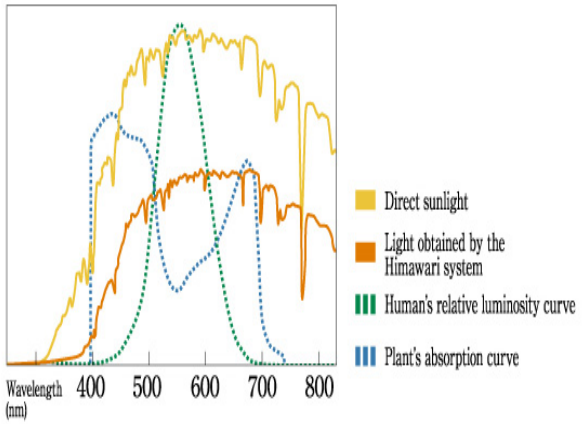
Automatic tracking system to accurately detect sunbeams

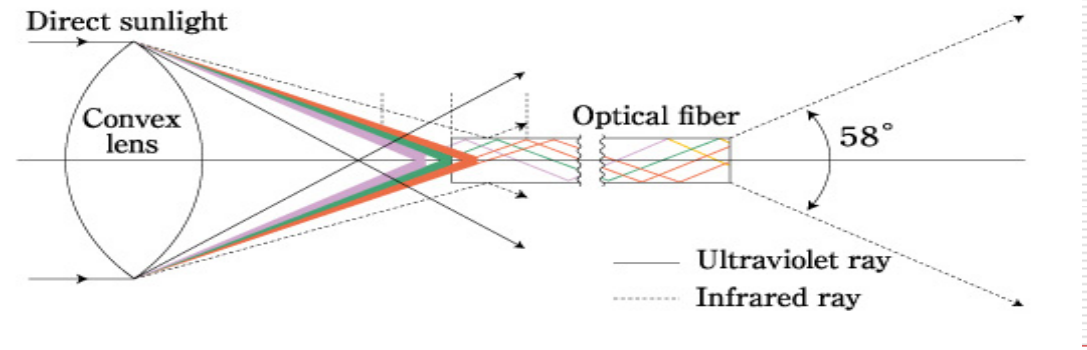
In order to accurately track the sun as it continuously changes its position from sunrise to sunset, HIMAWARI is equipped with an automatic tracking system. A solar sensor and clock mechanism control the movement of the light-focusing lens so that it is always accurately aimed at the sun. Even when clouds block out the sun, the system can track the movement of the sun by calculating the trajectory and respond speedily to changes in the weather.



It’s ultraviolet-free light, so it’s gentle on the eyes and the skin

- **High-quality sunlight is what the HIMAWARI system provides. The tone of the light is natural and gentle on the eyes, qualities that cannot be reproduced by any artificial illumination.**
- **By using the acrylic dome covering the lenses and chromatic aberration through single lens focusing, the sun’s UV can be eliminated. Therefore, the light consists predominantly of visible rays, a kind of light that is best suited for promoting photosynthesis in plants.**
- **Since the HIMAWARI system screens out ultraviolet rays, it protects furniture and carpets from color fading.**





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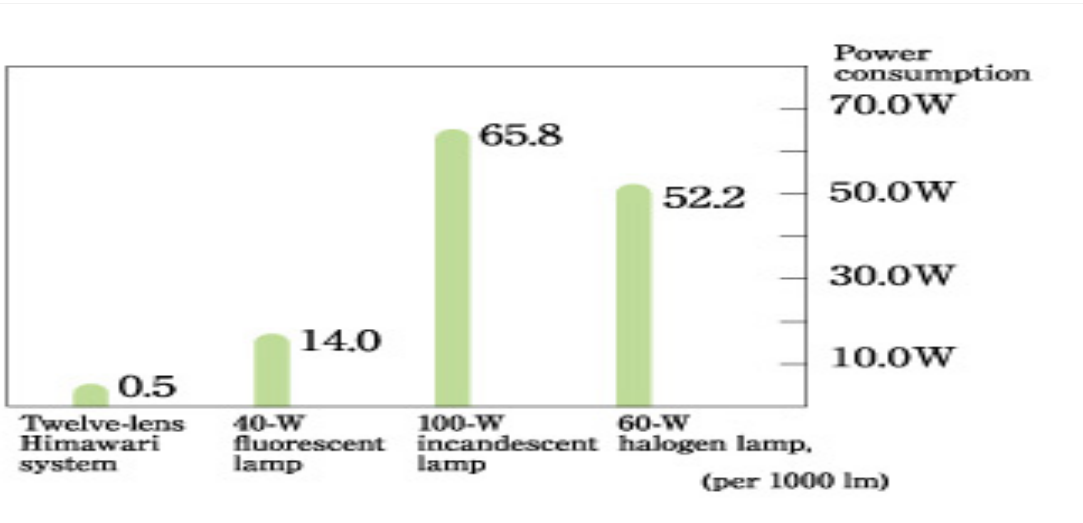
Energy saving, and what's more, maintenance-free

- **The running cost of the HIMAWARI system is approximately 1 yen a day when equipped with a twelve-lens collector. By using an energy-saving type system that is powered by solar cells, you can reduce the electricity cost to zero yen.**
- **· Once the HIMAWARI system is installed, it operates automatically without any need for manual operation. Since the precision collector is covered with an acrylic dome, the daylighting is stable over a long duration, and free from the effects of rain and dust.**



HIMAWARI system product line-up; enough to meet every need

198-lens sunlight collector XF-160S/198AS

[Large model]

◎Capable of transmitting light to up to 33 terminals

◎Suitable for use in large-scale establishments which require a large quantity of light

◎Rated at AC 85~264V

90-lens sunlight collector XF-110S/90AS

[Large model]

◎Capable of transmitting light to up to 15 terminals

◎Suitable for use in mid to large-scale establishments

◎Rated at AC 85~264V

36-lens sunlight collector XD-100S/36AS

[Mid-size model]

◎Capable of transmitting light to up to 6 terminals

◎Suitable for use in mid-scale establishments

◎Rated at AC 85~264V

SB-type 36-lens sunlight collector XD-100S/36AS·SB

[Solar cell-powered model]

◎Energy-saving model without the need of AC85~264V power supply

◎Sun tracking with generator panels and a power-storage battery

[Mid-size model]

◎Capable of transmitting light to up to 6 terminals

◎Suitable for use in mid-scale establishments

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HIMAWARI system product line-up; enough to meet every need

12-lens sunlight collector XD-50S/12AS

[Small model]

◎Equipped with two optical fiber cables
◎Perfectly suited to use in general housing, and by using multiple 12-lens collectors, can even be adapted to a wide range of establishments not less than mid-scale
◎Rated at AC 85~264V

SB-type 12-lens sunlight collector XD-50S/12AS·SB

[Solar cell-powered model]

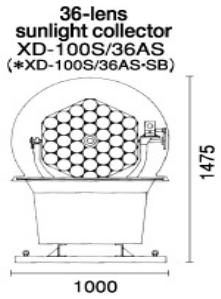
◎Energy-saving model without the need of AC85~264V power supply
◎Sun tracking with generator panels and a power-storage battery

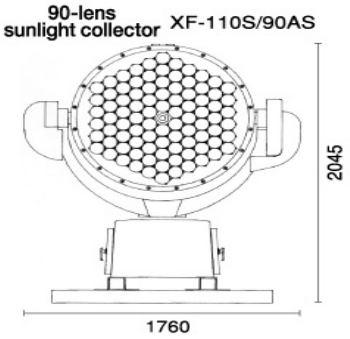
[Small model]

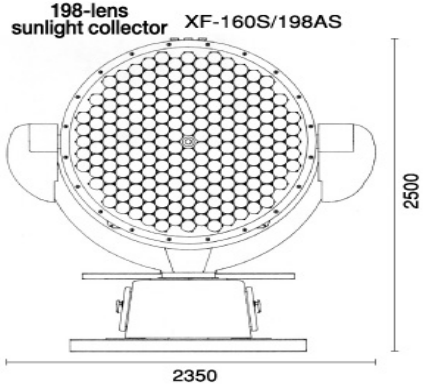
◎Equipped with two optical fiber cables
◎Suitable for use in a wide range of establishments starting from general housing and up

■ Sunlight collector dimension list

＊The outside dimensions of, 12-lens, and 36-lens AS-series collectors are the same as that of SB-series collector.







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Specification

■ Sunlight collector specification list

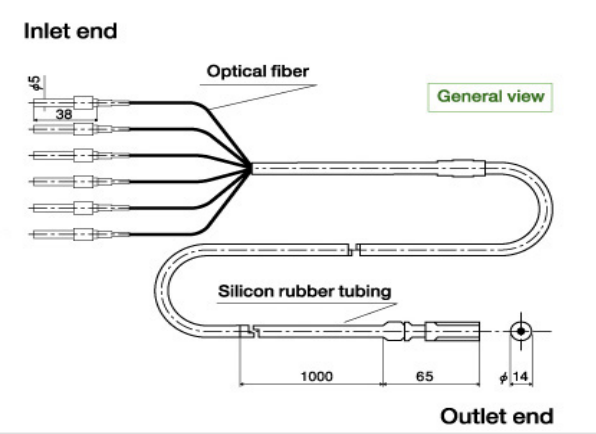
＊Direct illuminance from the sun of 98,000 lux at time of measurement

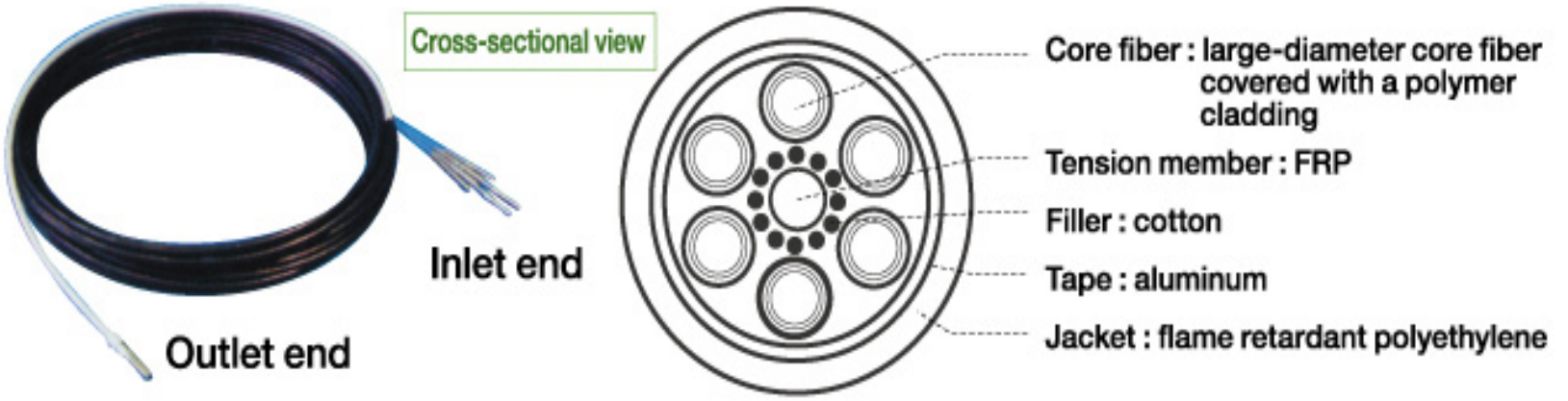
	Type	Number of lenses	Lens size (㎜)	Light receiving area (㎠)	Dome diameter (㎜)	Height (㎜)	Weight (㎏)	Number of cables	Total luminous flux (㏐)	Electric power supply	Power consumption
AS series	XF-160S/198AS*	198	95	14,035	1,630	2,500	628	33	63,360	AC85~264V	15W
	XF-110S/90AS*	90		6,379	1,170	2,045	346	15	28,800		12W
	XD-100S/36AS	36		2,552	1,000	1,475	88	6	11,520		5W
	XD-50S/12AS	12		851	520	810	14	2	3,840		2W
SB series	XD-100S/36AS･SB	36	95	2,552	1,000	1,475	90	6	11,520	–	–
	XD-50S/12AS･SB	12		851	520	810	17	2	3,840		

＊This product is supplied to order basis. Please consult us.

Optical fiber cable

- **Single cable consists of a bundle of six optical fibers with a core size of 1 mmϕ**
- **The single bundle cable can transmit sunlight collected by six lenses.**





Light fittings

- **(Various light fittings are available to safely fit the end of the optical fiber cable into ceiling)**
- **Please consult us for custom designed light fittings.**

Spotlight

◎Color: white
◎Dimensions: W 94 mmΦ× H 167 mm
◎Adjust the direction of illumination by hand
◎Diffusion type light fittings are available

Down light C model
(can be embedded in a ceiling)

◎Color: chrome
◎Dimensions: W 130 mmΦ × H 10 mm
◎Minimum ceiling clearance: 200 mm
◎Available as a point-source light

Down light NA model

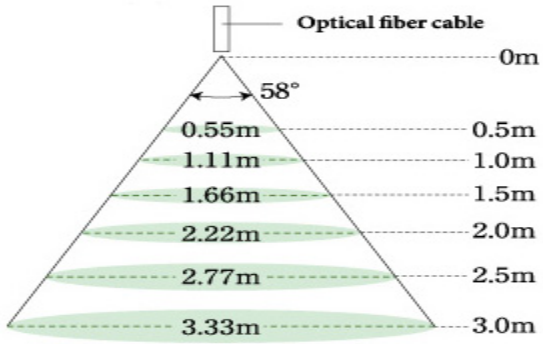
◎Color: white
◎Dimensions: W 130 mmΦ × H 90 mm
◎Minimum ceiling clearance: 300 mm
◎Illuminant diameter can be decreased by fitting a lens
◎Diffusion type light fittings are available

Down light ND model

◎Color: white (frame) + chrome (reflector)
◎Dimensions: W 85 mmΦ × H 73 mm
◎Minimum ceiling clearance: 250 mm
◎Diffusion type light fittings are available

Light distribution and luminance

- ・Light is emitted at a spread angle of 58° from the edge of the optical cable.
- ・At two meters from the end of the optical cable, an approximately 2.2-m diameter circle region (an area of 3.8 m2) is illuminated at approximately 500 lux on average.
- ・Two optical fibers (= the quantity of light supplied by a single 12-lense collector) are required for illuminating an area of approximately 10m2(3.2mx3.2m).
- * We have an automatic dimmer system available which allows you to switch between the HIMAWARI and artificial illumination systems. Please consult us about it.



〈For reference〉 Standard illuminance required in a room
- 1000 lux for detailed works such as handicrafts and sewing
- 500 lux for reading, study, and dining
- 200 lux for togetherness and recreation

(Quoted from the Illumination Engineering Institute of Japan's "Illumination Handbook")

*In the case of direct illuminance from the sun of 98,000 lux

Illumination distance [m]	Average illuminance [lux]	Illuminance (center) [lux]	Illuminant diameter [m]	Illuminant area [㎡]
0.5	7,967	11,154	0.554	0.241
1.0	1,990	2,786	1.109	0.966
1.5	884	1,238	1.663	2.172
2.0	497	696	2.217	3.860
2.5	318	445	2.772	6.035
3.0	221	309	3.326	8.688

Core size	1.0mmφ
Number of cores	6 cores
Fiber length	15m
Luminous flux per cable	1,920 lumen * (lm)
Illumination angle	58°

*The unit of measurement for quantity of light= Lumen: One lumen is defined as the quantity of light that illuminates an area of 1 ㎡ at a illuminance of 1 lux.

Applications

From houses to condominiums, offices, and public spaces, the HIMAWARI system is used in a wide variety of places.

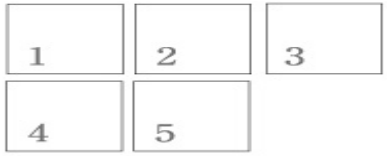
(HOME)

(FACTORY)

(PUBLIC)

HOME

- From now on, all your rooms have a southern exposure.
- Living rooms become sunny.
- Sunlight issues raised in the center of a city will be immediately resolved with the HIMAWARI system.
- You can lead a sunlit life by lighting up living rooms, north-facing rooms, and basements, which sunlight cannot reach, as well as the kitchen and the lavatory which often tend to be in dark areas.

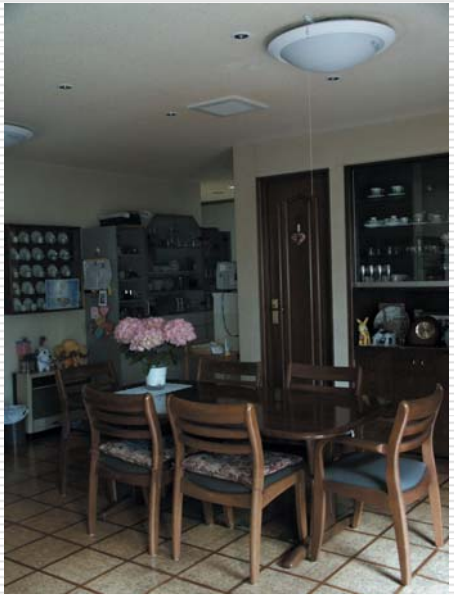


1. Living room
2. Kitchen
3. Bedroom
4. Basement
5. Lavatory

From offices to houses, the HIMAWARI systems are used in a range of spaces

Bring natural light into the rooms of your new house or remodel your existing one with HIMAWARI

(Before)



(After)

OFFICE

- Sunlight brings comfort.
- Gentle light improves office environment.
- How would you like to improve your working environment by exposing your office to sunlight?
- This is a system best suited not only for offices, but also for elevator halls, lobbies, aquaria, and planted areas.
- Optical fibers make the HIMAWARI system effective in any type of buildings.
-

1. Office room (underground)
2. Elevator hall
3. Aquarium in a lobby
4. Wall surface of a passage
5. Patio (court)

Office (Holland Hills, Mori Building)

Illuminating the coral in the entrance aquarium(Lengh of Fiber cable:150m)

PUBLIC

- Friendly to the global environment, sunlight is best for lighting public spaces.
- The HIMAWARI system is used for public space such as underground passages, sculptures built in underground open spaces, and parking areas.
- This is a maintenance-free system that enables you to feel safe in the knowledge that you are saving both energy and costs.

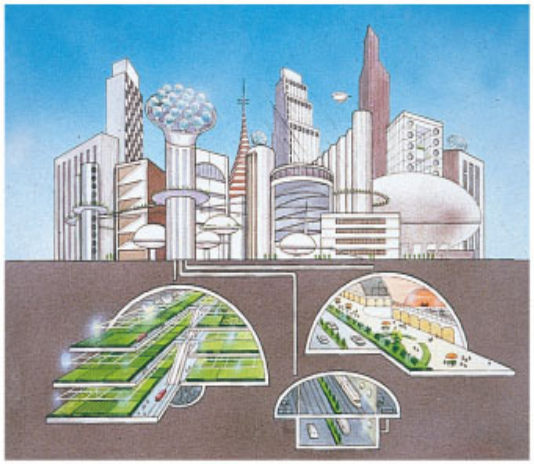
1 2 3
4 5

1. Arch of rainbow
2. Underwater illumination
3. Sculpture
4. Underground public space
5. Planted object

Future

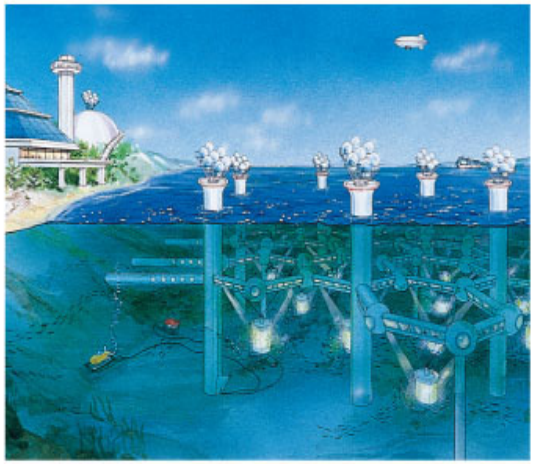
Carbon dioxide reduction/ Biotechnologies

Vegetables grown with efficient photosynthesis reduces carbon dioxide, and thus reducing global warming. Ultraviolet-free Himawari's light provides innovative potential culture techniques, since ultraviolet rays could be factors responsible for mutations and growth failure when cells are grown for breeding.



Improvement of the undergrand enviroment

The Himawari system is expected to be used to light spaces deep underground. Even in subterranean spaces at a depth of more than 50 m, solar lighting provided by the Himawari can liberate people from the stresses of being below ground, making them feel like they are on the surface. The potential provided by using underground spaces should be planned for in a constructive way.



Improvement of the submarine enviroment

The Himawari system aims to clean up seawater and promote the food chain in the sea by transmitting sunlight to parts of the sea where sunlight cannot reach directly. Growth of phytoplankton through photosynthesis decomposes eutrophic components to decontaminate the water. Consequently, zooplankton proliferates and subsequent food chains develop cyclically, thereby enriching the sea.

Corporate Information

- Trade name: La Forêt Engineering Co., Ltd.
- Address: Roppongi Annex7F 6-7-6 Roppongi, Minato-ku, Tokyo, Japan
- Established: December 6, 1991
- Founded: May 1978
- Capital stock: 100,000,000 Yen
- Shareholders: Moriiso Co., Ltd. (Mori Building Group), Asahi Glass Co., Ltd, and Arisawa Mfg. Co., Ltd.
- Main business:
  1. Research and development, manufacture, and distribution of solar lighting systems
  2. Research and development, manufacture, and distribution of optical fiber lighting systems
  3. Engineering of various kinds of solar-energy utilization systems

Application

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