ENTRY NO. 6082-P

Healing Resort 「Eco Lodge Shimanto」

Green Development

「Eco Lodge Shimanto」 has just opened this year, July 2, 2002, at the natural beautiful site between Shimanto-River, one of the purest river in Japan and Pacific ocean in Shikoku Island, Western part of Japan.

Nakamura City, 35000 population Local government and Japan Railroad –Shikoku have created this green project in an environmentally friendly way from the beginning, planning stage to construction as much as they could. Now they are trying to operate in a green way with environmental education.

The owners, planners, architects & engineers, construction companies and local people are all worked together in green development team.

Now, this facility is becoming popular in Japan, and the beyond.

「Eco Lodge Shimanto」 is a complex facility to heal the people and the earth totally, consists of three parts, Eastern-Chinese Clinic, Center Facility with spa and restaurant , and 30 rooms hotel.

In the woods, Building smiles with Spirit of trees talk to
River of Shimanto tender to our eyes
Sound of Ocean please our ears

■Owners	Nakamura City,/JR Shikoku
■Planner, Architect	PES Kenchiku Kankyo Sekkei, Takatoshi Ishiguro
■General Contractors	Takenaka Construction Co. & Joint Venture Companies/ Shikoku Kaihatsu Kensetsu Co.
■Planning,Design	Mar. 2000- Mar.2001
■Construction	Sep. 2001-June 2002

Pause In Nature

There is a pause in nature
Human cannot add anything to Nature

Waiting Spring Sun, heating haze up the hill and field
In early summer, a pause while waiting breeze over the field
Long night autumn, a pause while waiting late full moon
A pause longing for warm sunlight, is a winter afternoon.

All hope and excitement is in a pause
Waiting rain, in a pause
Waiting sun, in a pause
Promise more satisfactory mind and peace

Nature, its swelling and shaking connect a pause,
And a pause revitalizes heritage and culture,
Nature is passive to any severe weather
And bear fertile fruit
Abandoned materials wake up from long sleep
By compassionate users
And direct new era proudly with blessing in the land

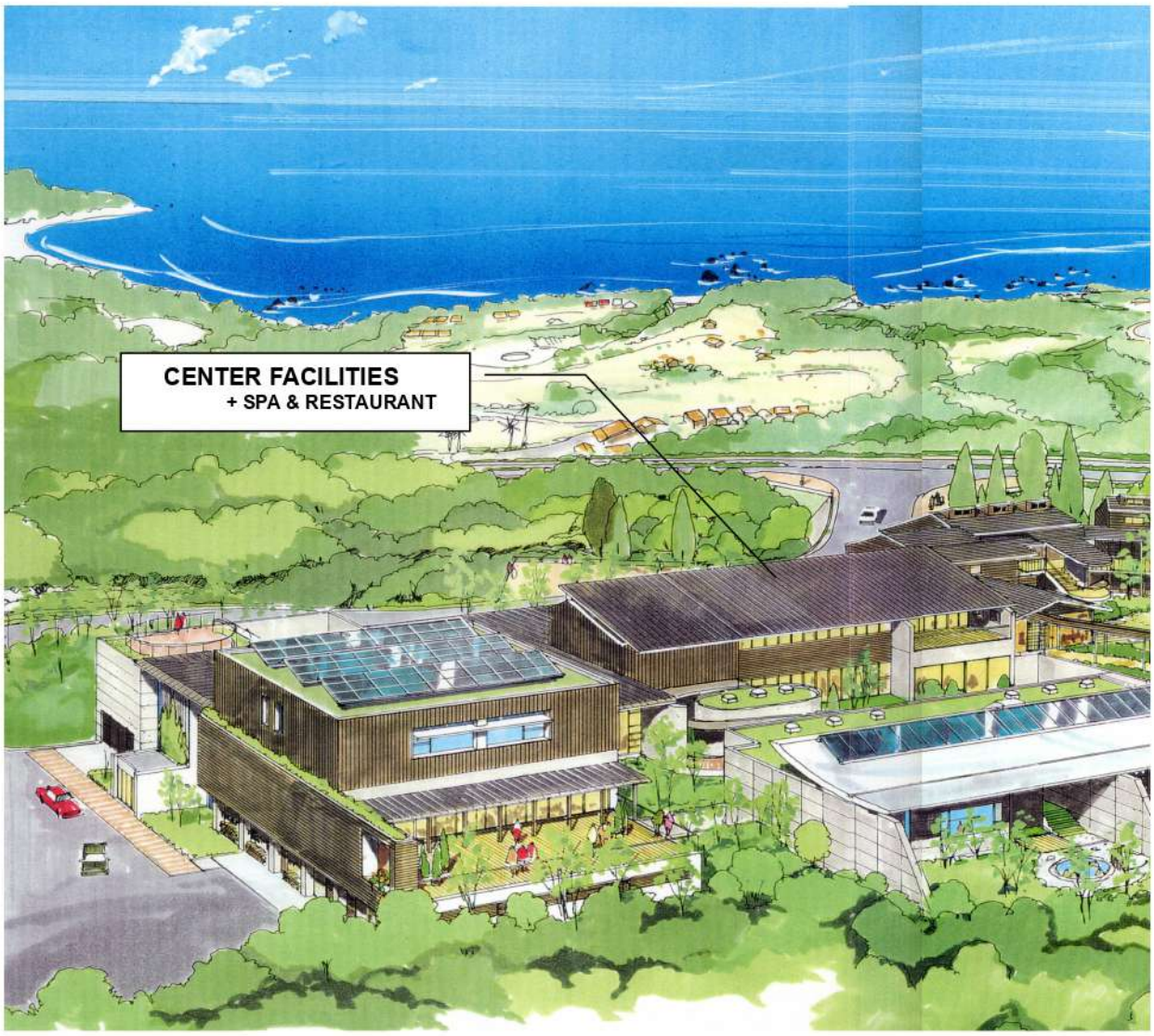
Spirit of pause is a warm heart
Sincere hospitality heals busily tired people
In Nature peace of mind is given healthily
Makes recapture lost sensibility

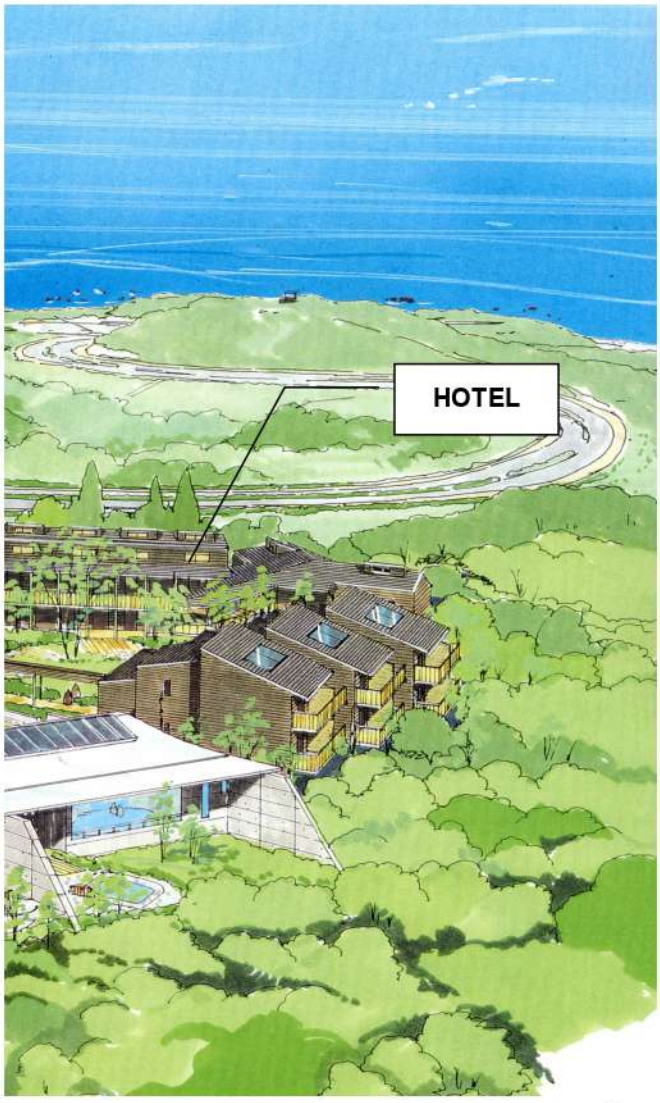
Eyes see endless view of scenery,
And soak in a natural scent
Ears are enjoyed with pleasant sound
Tongue is thrilled and surprised at rich harvest
When sense of touch run through the body,
Resonant the strings of soul

Healing Resort 「Eco Lodge Shimanto」

Concept of Green Development

In the woods, Building smiles with Spirit of trees talk to
River of Shimanto tender to our eyes
Sound of Ocean please our ears
Nature pore life in Sunlight and heat into the building
Soil ease the building by its charm
Wind delight people in their stream
Rain give moisture living thing in the morning,
And in the evening
Building echoes the nature, and see the existence each other
People roam, are led, and pause in and around light and shadow
And know the heal and relax
Smell scent of harmony of its culture in a form and color
Remembering the olden days, and feel the emerge of power for tomorrow





CENTER FACILITIES
+ SPA & RESTAURANT

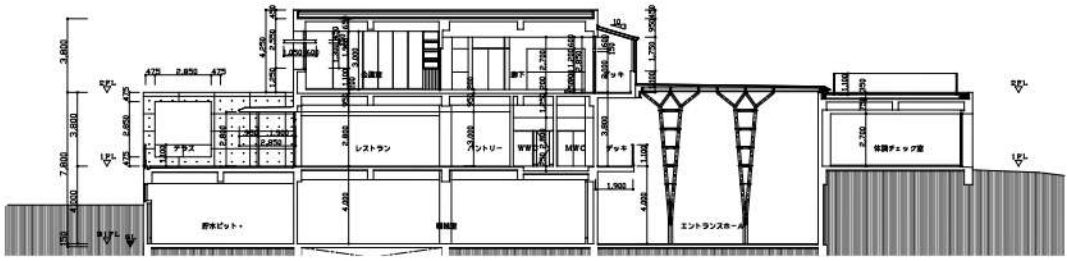
PROJECT OUTLINE

Location	Nakamura City, Kochi Prefecture, Japan
Owner	Nakamura City
Structure	reinforced concrete and steel frame; 3 Stories
Main Use	Hotel Lobby Spa , Restaurant, Conference Rooms
Site Area	6,348.65 ㎡
Building Area	1,540.19 ㎡
Total Floor Area	2,069.93 ㎡
Completion Date	July 2, 2002

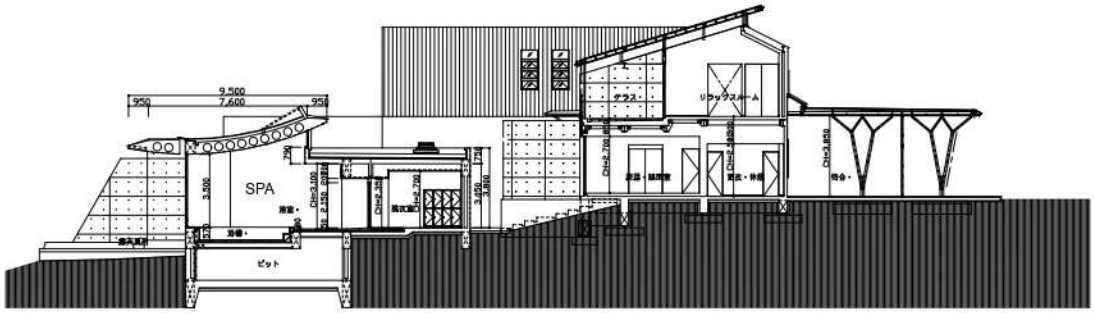
HOTEL

PROJECT OUTLINE

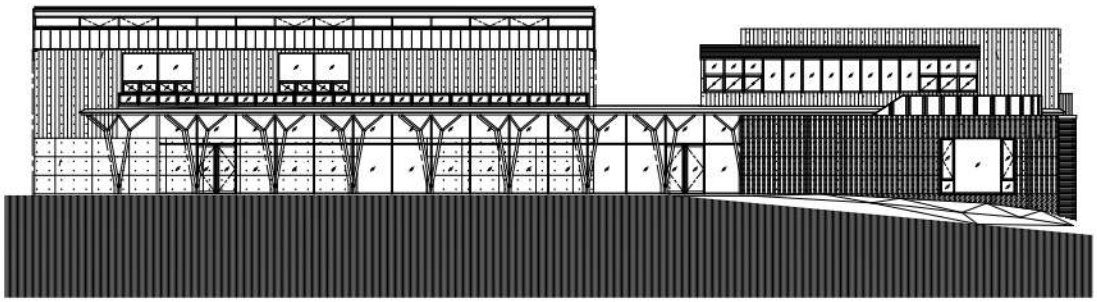
Owner	Japan Railroad -Shikoku Company
Structure	reinforced concrete and steel frame; 2 Stories
Site Area	2,159.86 ㎡
Building Area	554.93 ㎡
Total Floor Area	1,131.03 ㎡
Completion Date	July 2, 2002
Number of Rooms	30 rooms All different types of Interiors



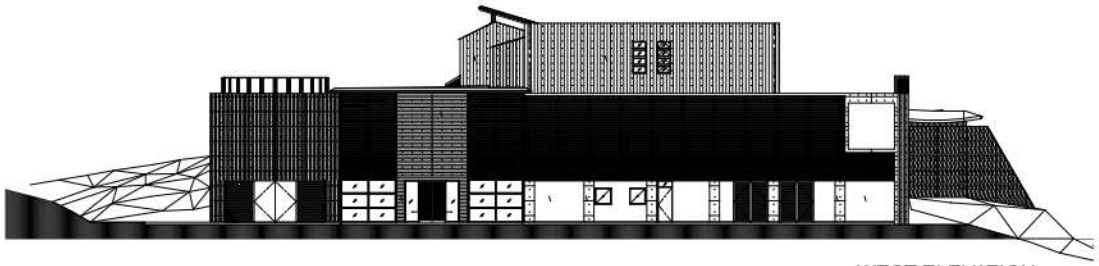
NORTH - SOUTH SECTION 1



NORTH - SOUTH SECTION 2



NORTH ELEVATION



WEST ELEVATION

Green Development / Process

1. Design Phase

- Charrette

  At the beginning of the project, collaboration of all project stake holders joined the discussion about how to develop environment-friendly.

- Restoration of woodland

  Originally hilly woodland spread around here.
  One day a decision to develop this woodland was made to construct buildings.
  What happened to many trees around here?
  Those trees were temporarily planted in a different place during construction.
  Then the trees were put back when the buildings were completed.

2. Construction Phase

- Under construction
  - ① Environmental education to the constructors at the first stage
  - ② Use of an bicycle to move within the construction site
  - ③ Use of construction machinery that emits less exhaust gas and noise
  - ④ Construction wastes sorting
  - ⑤ Spreading excavated soil in the site
  - ⑥ Collecting micro climate data on site by measuring the temperature, humidity, earth temperature and rainfall in order to make use of it
  - ⑦ Use of steel deck instead of rainforest wood for form board
  - ⑧ Delivery with minimum packing
  - ⑨ Utilization of harvested rainwater for cleaning, washing cars and flushing toilet.
  - ⑩ Use of energy saving equipments for the on site house

3. Preparation for the future

- Photovoltaic system

  Foundation base is provided on the roof for photovoltaic panels

- Recycling system of gray water

  Piping is provided for the future adaptation.

Features of Green Development

1. Co-existence with Surrounding Nature

- Preserved topography
- Green roof and wall
- Effective use of local materials
- Landscape design unified the nature

2. Use of Solar heat / light

- Day lighting
- Light shelf
- Daylight sensor, Occupancy sensor
- Solar hot water system
- Photovoltaic system

3. Soil

- Earth tube (Earth Tempering)
- Use of Natural Materials (Soil, Tosa plaster)
- Fermentation of Kitchen Refuse

4. Wind

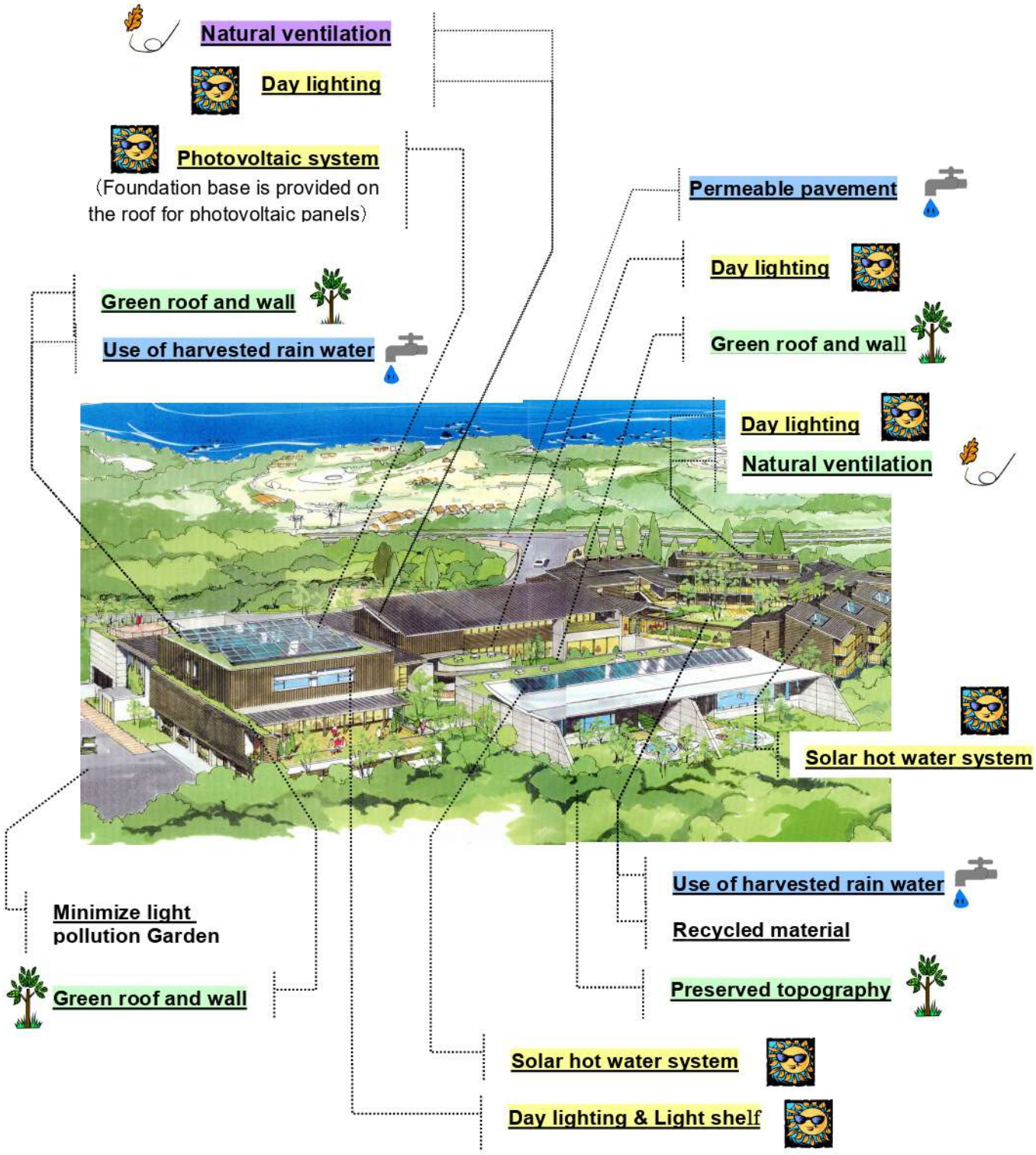
- Natural ventilation

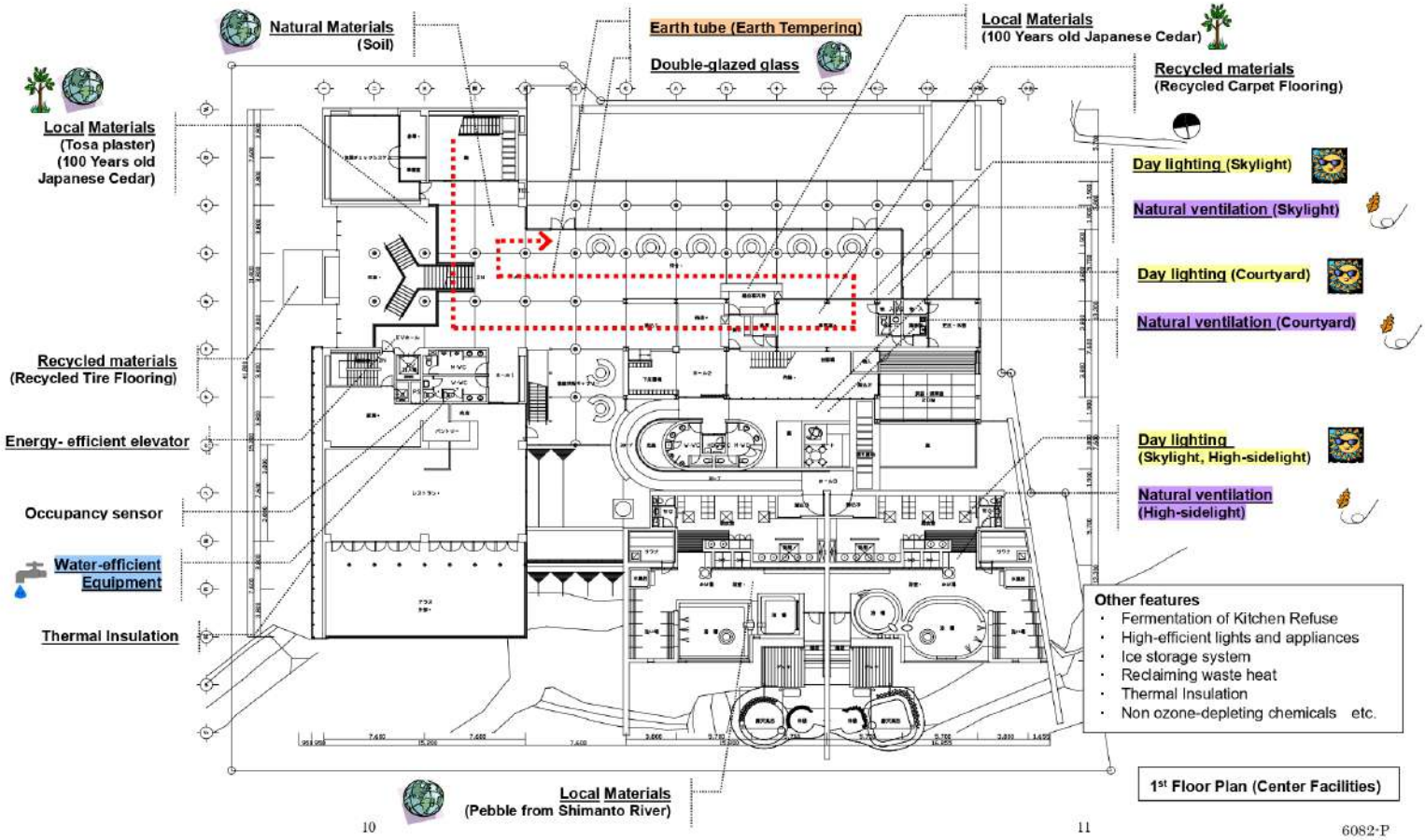
5. Water

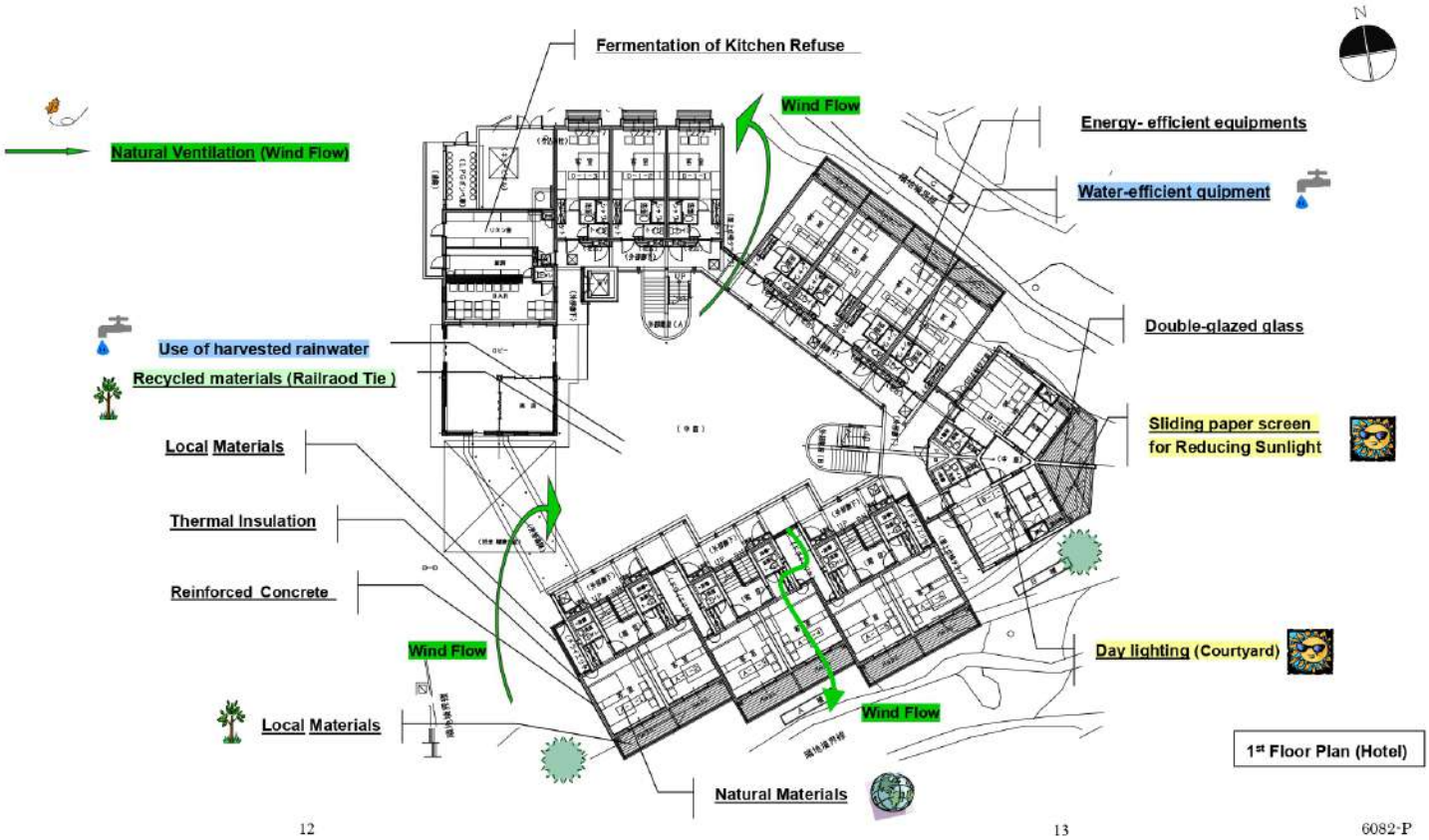
- Use of harvested rain water
- Water-efficient equipment
- Permeable pavement
- Recycling system of gray water

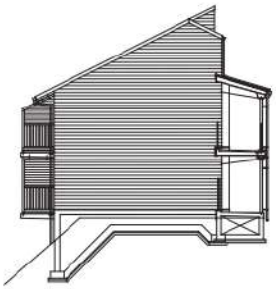
6. Other features

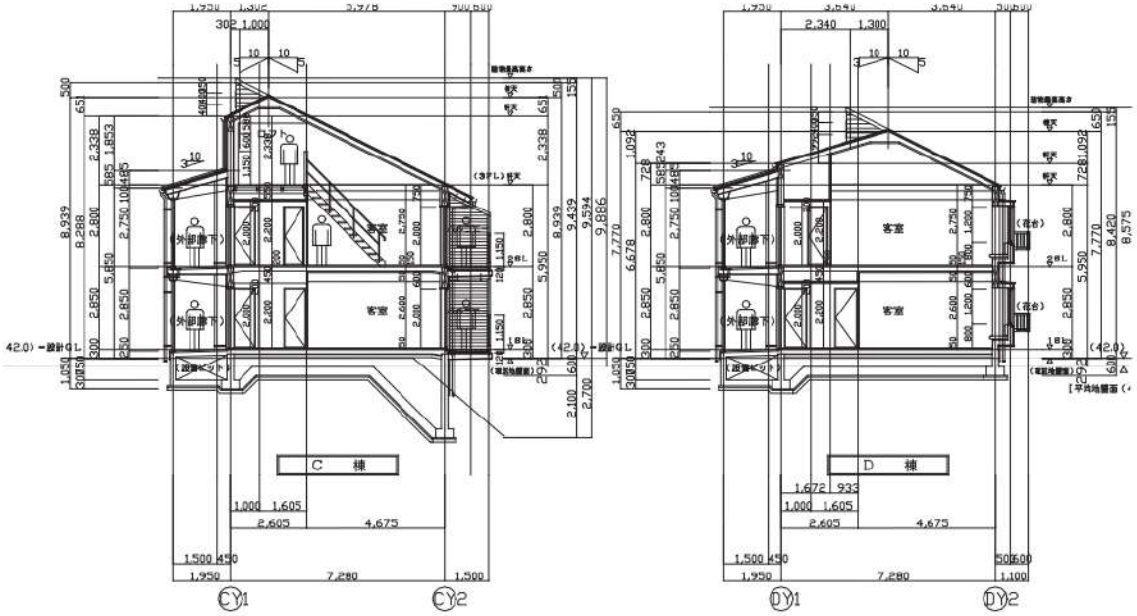
- High- efficient lights and appliances
- Minimize light pollution
- Double-glazed glass
- Thermal Insulation
- Ice storage system
- Reclaiming waste heat
- Non ozone-depleting chemicals
- Energy- efficient elevator
- Recycled materials


Natural ventilation
Day lighting
Photovoltaic system
(Foundation base is provided on the roof for photovoltaic panels)
Permeable pavement
Day lighting
Green roof and wall
Use of harvested rain water
Green roof and wall
Day lighting
Natural ventilation
Solar hot water system
Use of harvested rain water
Recycled material
Minimize light pollution Garden
Green roof and wall
Preserved topography
Solar hot water system
Day lighting & Light shelf


Natural Materials
(Soil)
Earth tube (Earth Tempering)
Double-glazed glass
Local Materials
(100 Years old Japanese Cedar)
Recycled materials
(Recycled Carpet Flooring)
Local Materials
(Tosa plaster)
(100 Years old
Japanese Cedar)
Day lighting (Skylight)
Natural ventilation (Skylight)
Day lighting (Courtyard)
Natural ventilation (Courtyard)
Recycled materials
(Recycled Tire Flooring)
Energy- efficient elevator
Occupancy sensor
Water-efficient
Equipment
Thermal Insulation
Day lighting
(Skylight, High-sidelight)
Natural ventilation
(High-sidelight)
Other features
・ Fermentation of Kitchen Refuse
・ High-efficient lights and appliances
・ Ice storage system
・ Reclaiming waste heat
・ Thermal Insulation
・ Non ozone-depleting chemicals etc.
Local Materials
(Pebble from Shimanto River)
1st Floor Plan (Center Facilities)


N
Fermentation of Kitchen Refuse
Wind Flow
Energy- efficient equipments
Natural Ventilation (Wind Flow)
Water-efficient quipment
Double-glazed glass
Use of harvested rainwater
Recycled materials (Railraod Tie)
Sliding paper screen for Reducing Sunlight
Local Materials
Thermal Insulation
Reinforced Concrete
Wind Flow
Day lighting (Courtyard)
Wind Flow
Local Materials
Natural Materials
1st Floor Plan (Hotel)




C 棟
D 棟
客室
(外部廊下)
(花台)
CY1
CY2
DY1
DY2

Eco Lodge Shimanto, Kouchi-Prefecture

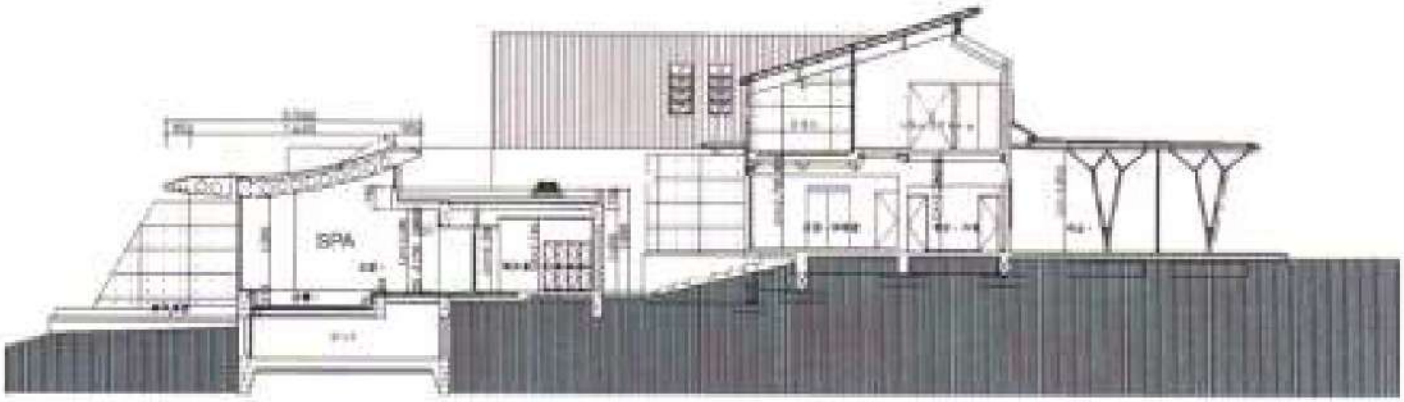
North View

West View (Main Entrance)

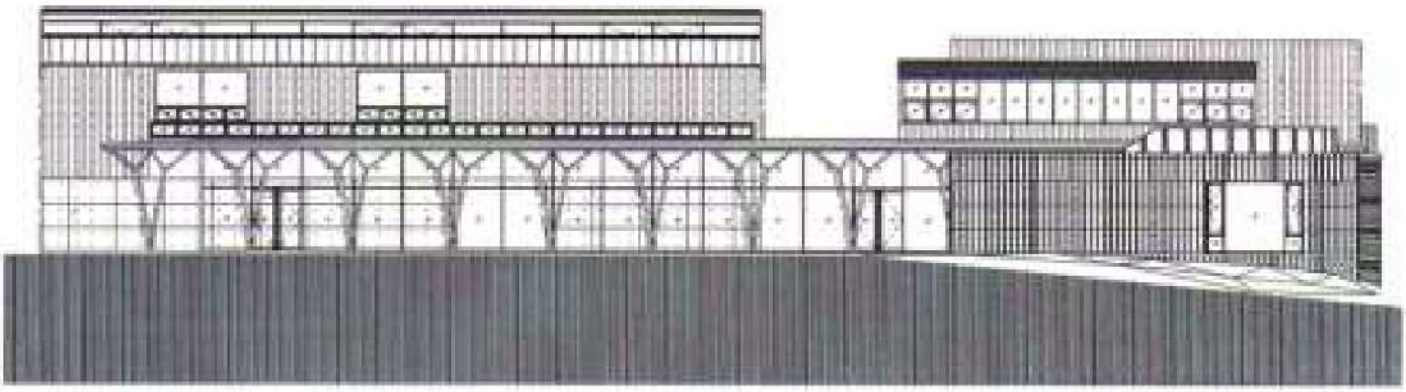
Hotel Courtyard

View from Above

「Eco Lodge Shimanto」is a complex facility to heal the people and the earth totally, consists of three parts, Eastern-Chinese Clinic, Center Facility with spa and restaurant , and 30 rooms hotel.



NORTH - SOUTH SECTION 2

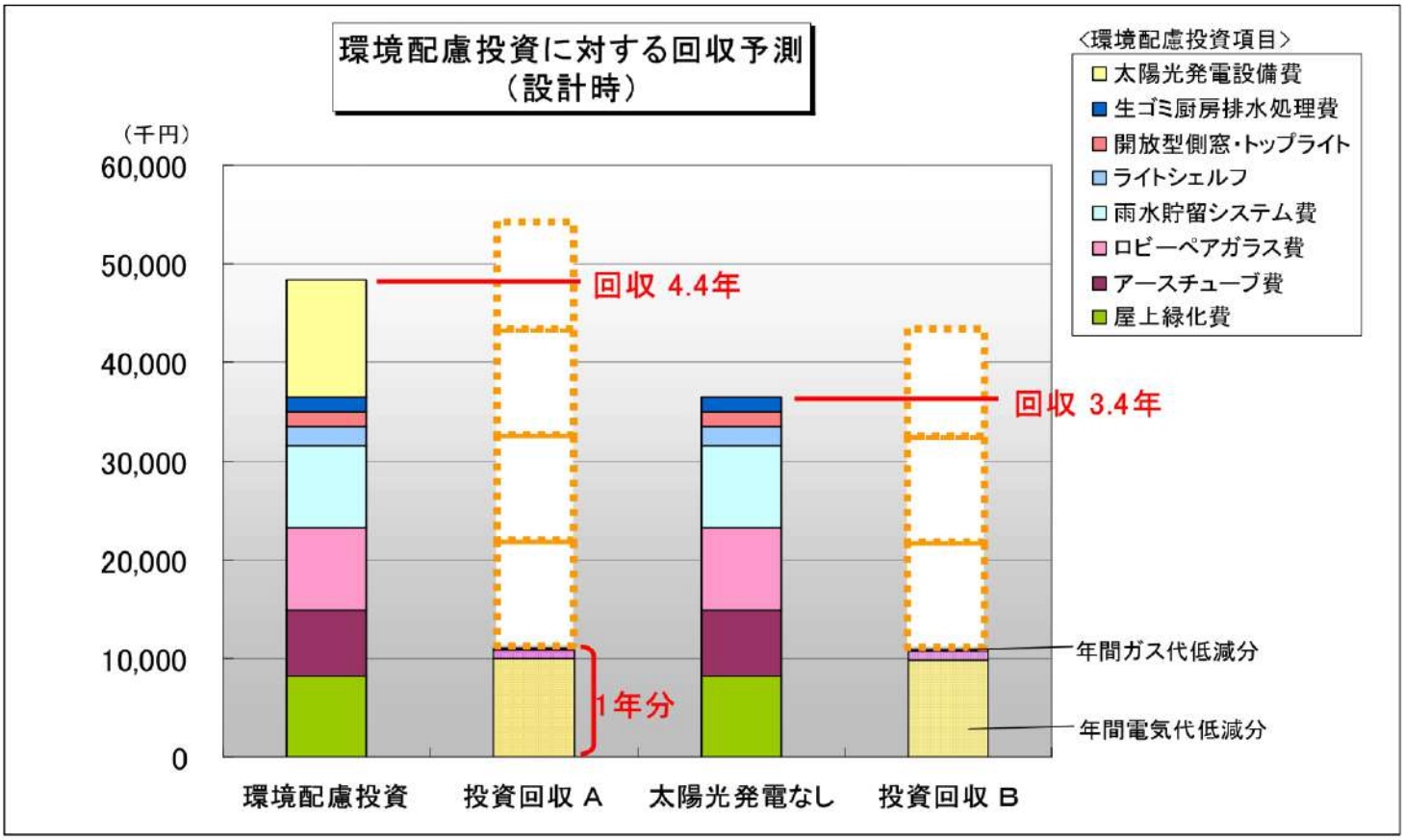


NORTH ELEVATION

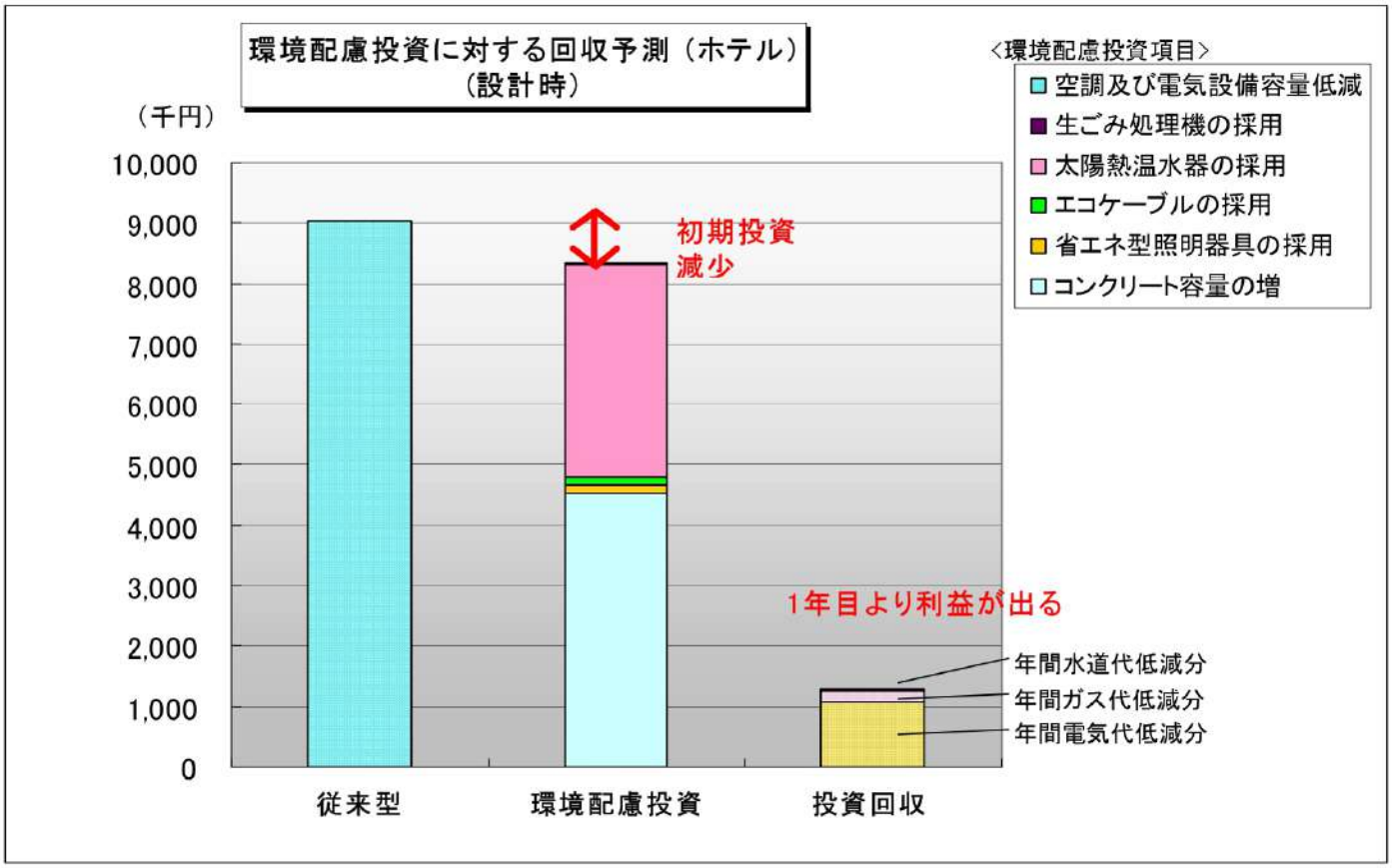
Charrette

At the beginning of the project, collaboration of all stake holders joined the discussion about how to develop environment-friendly project.

資金運用試算 Pay Back（センター）



資金運用試算 Pay Back（ホテル）



Construction Site

Bicycles are used to move within the construction site

Collecting micro climate data on site by measuring the temperature, humidity, earth temperature and rainfall in order to make use of it.

Utilization of harvested rainwater for cleaning, washing cars and flushing toilet.

Environmental Education to the user

Landscape

夏季（6月～8月）

花；ハマボウ、ネム、ニセアカシア、
　　オリーブ、カキノキ
実；アンズ、ブルーベリー

Green Features

Restoration of Woodland

Originally hilly woodland spread around here.
One day a decision to develop this woodland was made to construct buildings. What happened to many trees around here? Those trees were temporarily planted in a different place during construction. Then the trees were put back !

Preserved topography

Site plan and buildings form reflect the original topography.
Building design responds to the surrounding nature.

Green roof and wall

Rooftop of the spa : Green roofs and walls, which correspond with the surrounding nature, help energy conservation by reducing heat loss.

Solar hot water system

Solar collectors placed on the roof. Storage tank placed in the mechanical room : The sun heats the water as it passes through the collector and then is circulated to a storage tank.

Earth tube (Earth Tempering)

Trench under the floor
(view during the construction)

The temperature of the ground several feet below the surface does not fluctuate much. It is warmer in winter and cooler in summer than the air temperature above. The earth tube system can cool incoming ventilation air in summer and warm it in winter.

Light shelf

Exterior view of light shelves in the south facing windows
Interior view of light shelves
Light shelves distribute daylight throughout the space, by reflecting light off its top surface to the ceiling.

Day lighting & Heat exhaust

North facing high-side windows
Natural light coming through the skylight windows
Openable window

Natural ventilation

Interior view of the upper windows for air exhaust (Bathhouse)

Exterior view of the lower windows for air supply (Bathhouse)

The range of temperature could move the air such as natural wind. The vertical distance between the inlets and outlets causes the air movement without electricity.

Double-glazed glass

View of Lobby from outside
Double glazed glasses, compared to single glazing, cuts heat loss in half due to the insulating air space between the glass layers. In addition to reducing the heat flow, a double-glazed unit allows the continuity between inside and outside nature with high visibility.

Ice storage system

Ice storage systems make ice during the night when electric utilities charge less for energy. The ice supplements or even replaces mechanical cooling during the day and can result in significant operating cost savings

Reclaiming waste heat

Air to air heat exchanger
: Without heat recovery device, the air conditioner operates less efficiently because it has to work with heat loss when it changes the outdoor air and indoor air.

Permeable pavement

The earth filters rainwater Absorbed through soil on its way to groundwater aquifers, streams, and rivers. Permeable pavement allows storm water to drain naturally through the soil below, rather than becoming runoff.

Use of harvested rain water

Collecting rain water from the roof into the storage tank for irrigation of plants and sanitary usage.

Water-efficient equipment

Water-efficient automatic faucet
Water closet which save water
Urinal sensor flush valve

High-efficient lights and appliances

Compact fluorescent lamps (Slope) (Entrance)
High efficient fluorescent lamps (Office)
These high efficient lighting fixtures save energy and last longer

Daylight sensor／
Occupancy sensor

Ceiling daylight sensors: it is automatically switched on or off when day lighting reaches a certain level.
Ceiling occupancy sensors: it is automatically switched on or off with sensing the occupant

Minimize light pollution

Outside lighting in the garden
Too much artificial illumination in the nighttime environment affects the growth of animals / plants and obstructs stargazing. Lighting fixtures used outside minimize these impacts

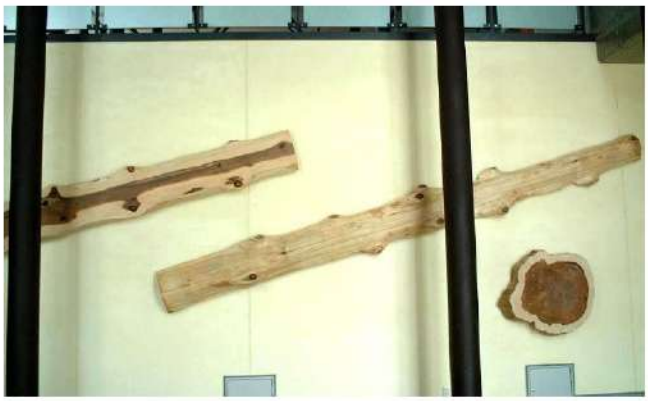
Energy- efficient elevator

In addition to the high efficient motor, the electronic controller that adjusts the usage of electricity to the required operation is used in the elevators to save energy.

Fermentation of Kitchen Waste

Device of kitchen waste fermentation with pieces of cedar that could help fermentation
: It reuses fresh garbage as fertilizer, reducing

Effective use of local materials（1）

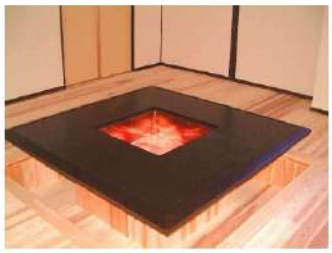


Symbolized pillar is 100 Years old Japanese Cedar from local forest
Art pieces made of 100 Years old Japanese Cedar from local forest Local and domestic materials are chosen as many as possible
in order to minimize CO2 discharge from transportation and respect the local history, culture, and economy.

Effective use of local materials（2）

Front staircase made of local cypress.
Information counter board made of 100 Years Cedar.
Spa floor using pebbles from Shimanto River.

Use of Natural Materials
(Soil,Tosa plaster,・・・)



Local plaster wall, Tatami and Cedar flooring / Earth flooring / Cedar flooring.

Human-friendly Natural materials are used,, because they have function of moisture absorbing /discharging and deodorizing.

Recycled materials

Recycled PET Bottle Carpet at office
Recycled Tire Flooring at entrance hall
Environmentally friendly materials are chosen as many as possible for interior finishes.
(recycled materials/ natural materials/ local materials)

Thermal Insulation

Polystyrene Form Fiberglass
Thermal insulation of the exterior wall could reduce the heat transfer through the wall between inside and outside to save energy for an air conditioner.

Photovoltaic system（Future）

Foundation base is provided on the roof for photovoltaic panels

Hotel Guest Room Finish Materials

Guest room A

FINISH SCHEDULE [A Type]

Floor	Soil Ceramic Tile (Waste heat used)
Wall	Rice Paper
	Cedar / Cypress Board
	Diatom Soil Plaster
	Ceramic Tile (Moisture Control)
Ceiling	Rice Paper

FINISH SCHEDULE [B Type]

Floor	Tatami Mat
	Soil Ceramic Tile (Waste heat used)
Wall	Diatom Soil Plaster
	Cedar / Cypress Board
Ceiling	Rice Paper

Guest room B

Guest room B

FINISH SCHEDULE [C Type]

Floor	Hemp Mat
Wall	Rice Paper
	Cedar / Cypress Board
Ceiling	Rice Paper

Guest room C

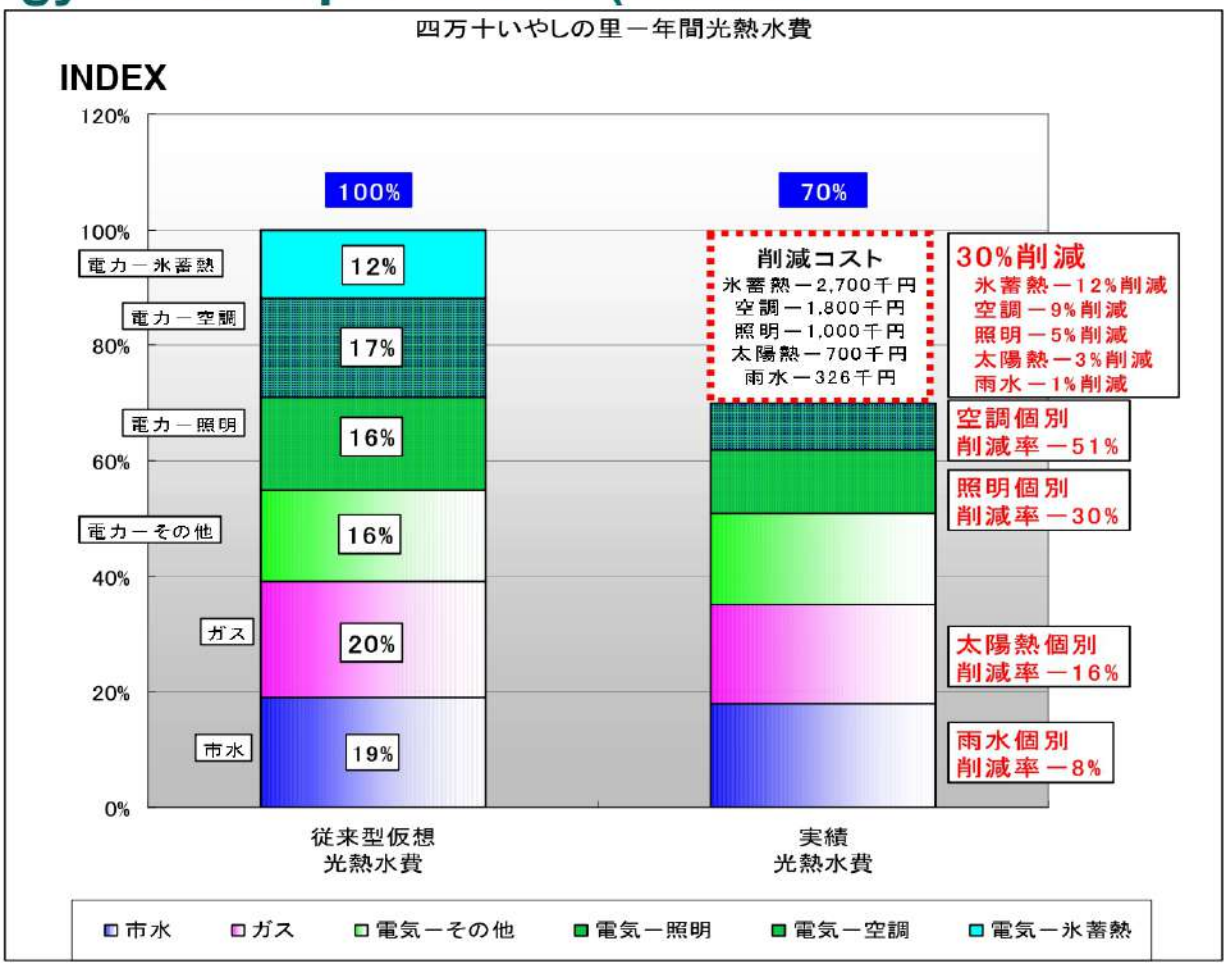
Guest room D

FINISH SCHEDULE [D Type]

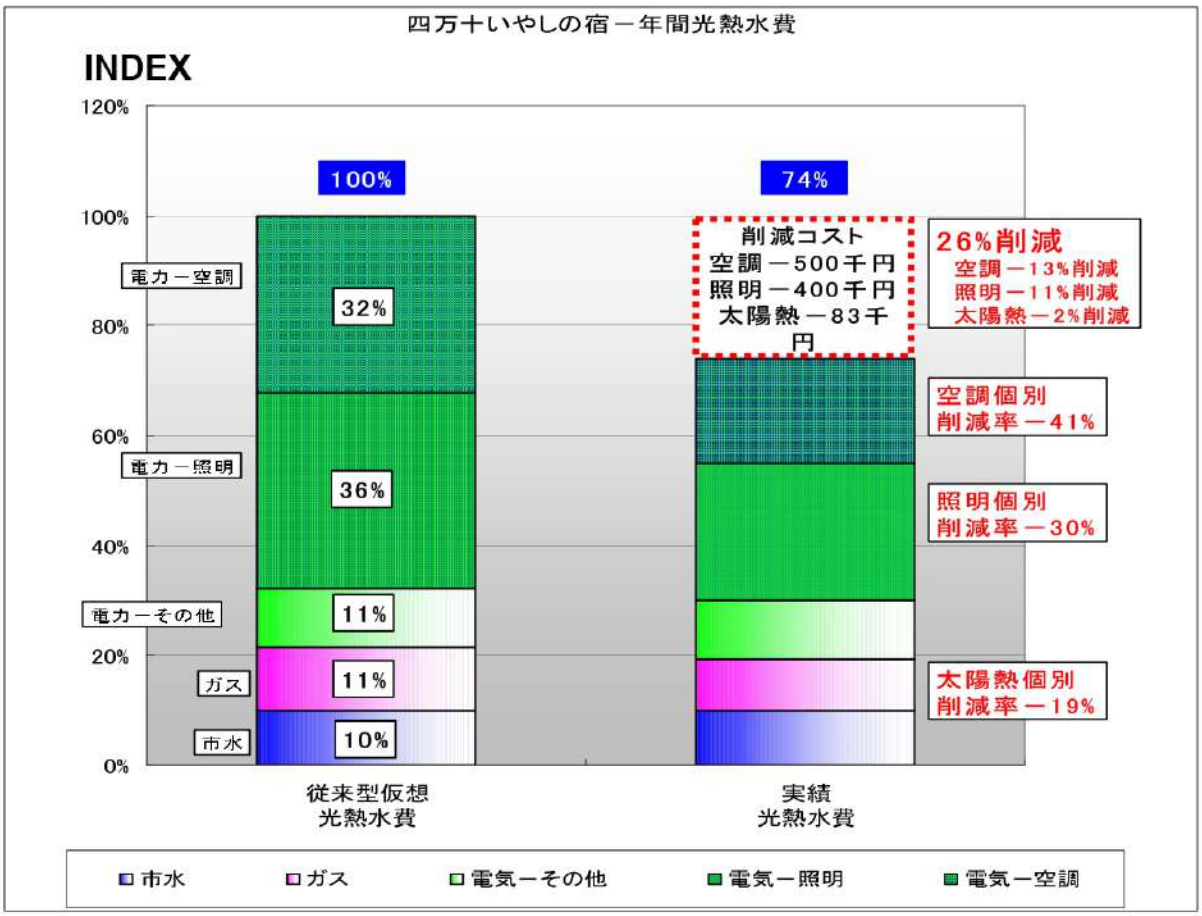
Floor	Cedar / Cypress Flooring
Wall	Diatom Soil Plaster
Ceiling	Cedar Board

Result

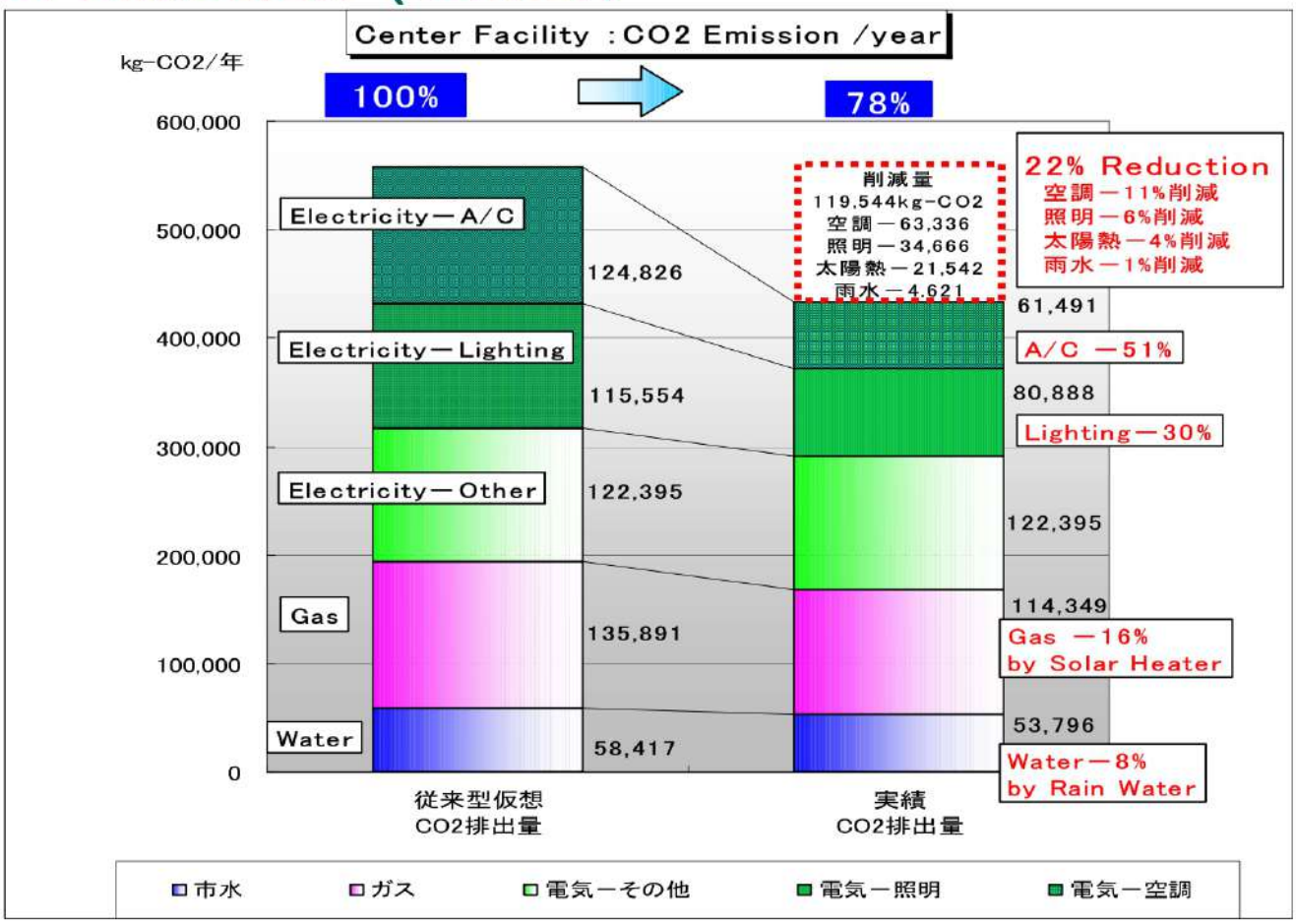
Energy Consumption Cost (Center)



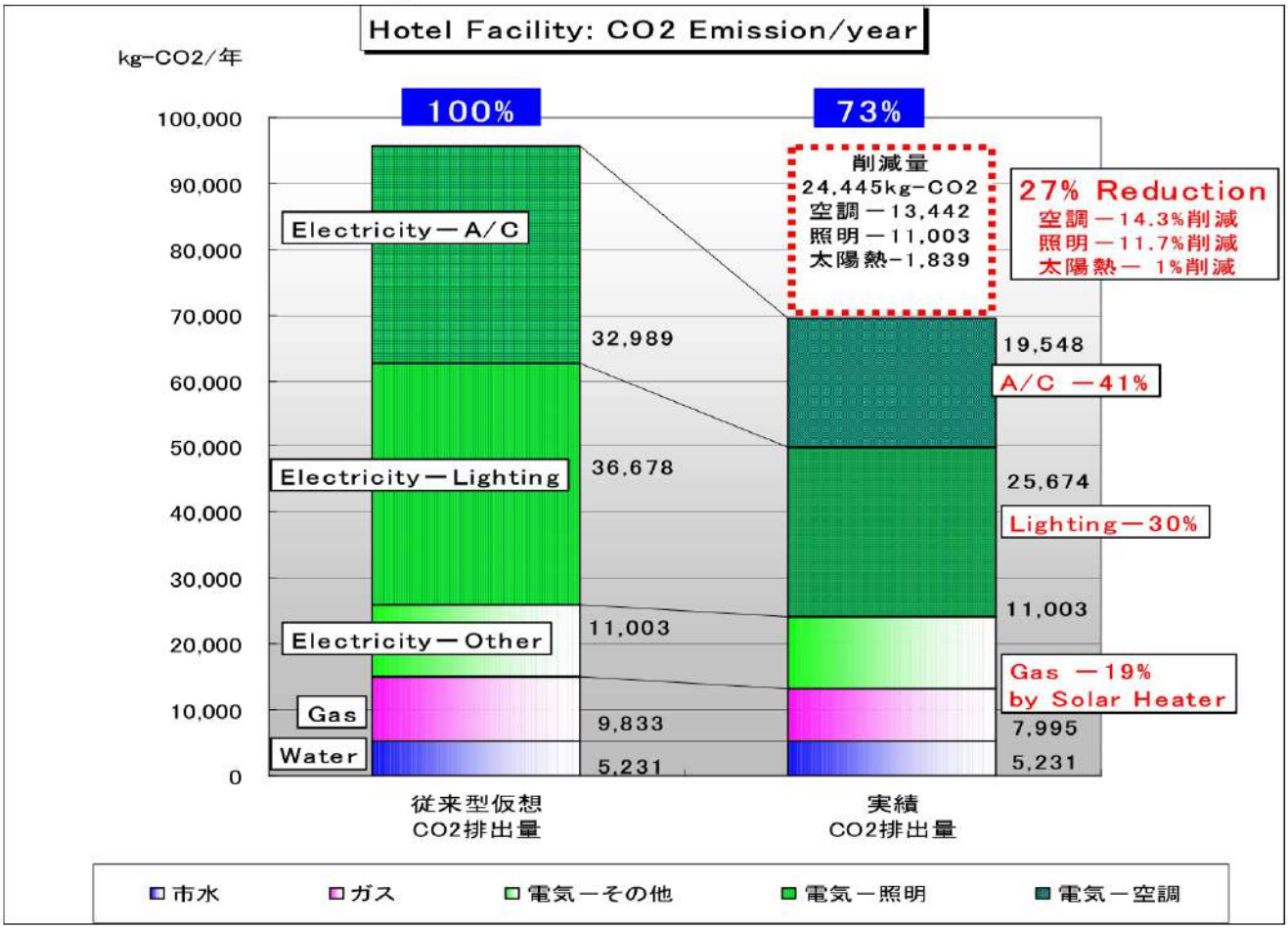
Energy Consumption Cost (Hotel)



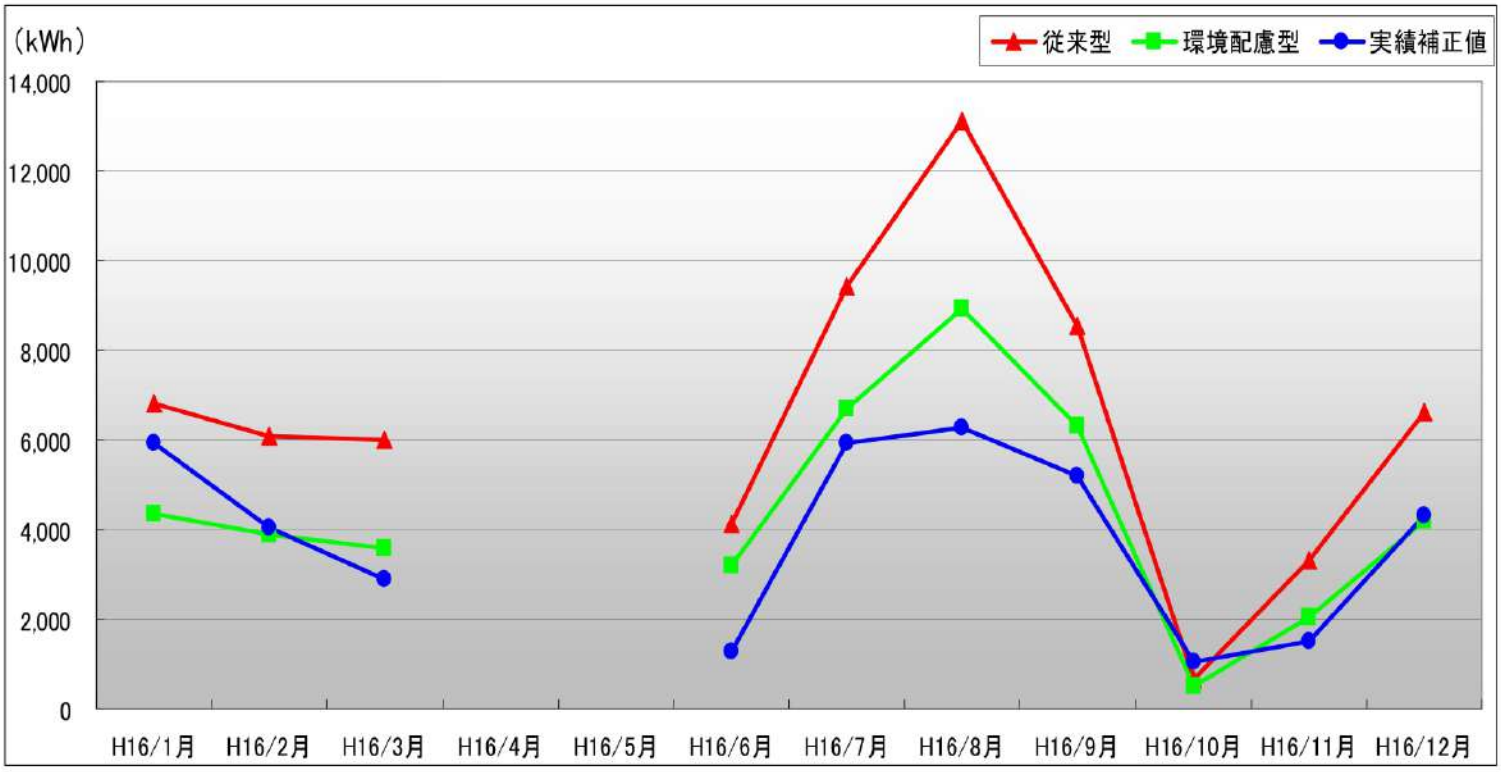
CO2 Emission (Center)



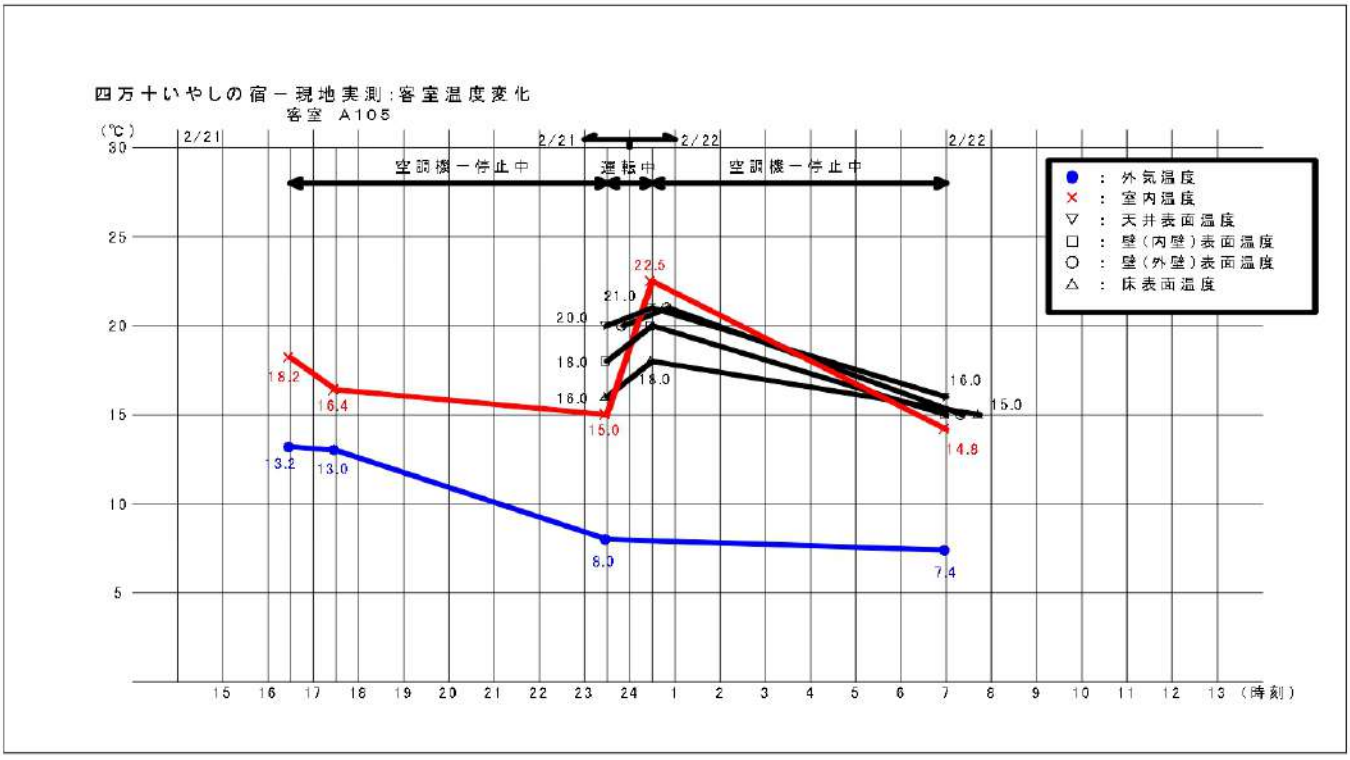
CO2 Emission (Hotel)



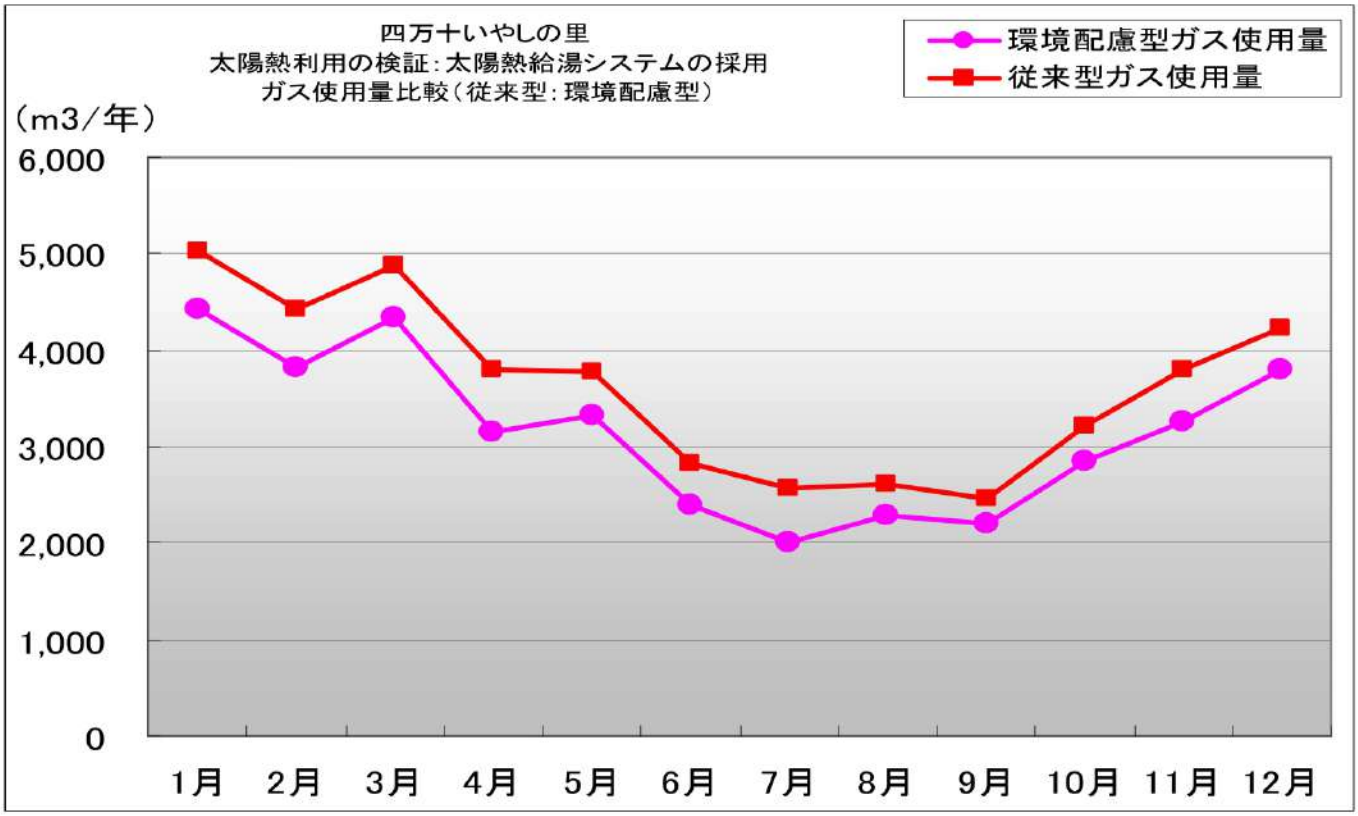
四万十いやしの宿－空調負荷低減　月別空調エネルギー使用量（電力使用量）比較



四万十いやしの宿－現地実測:客室温度変化

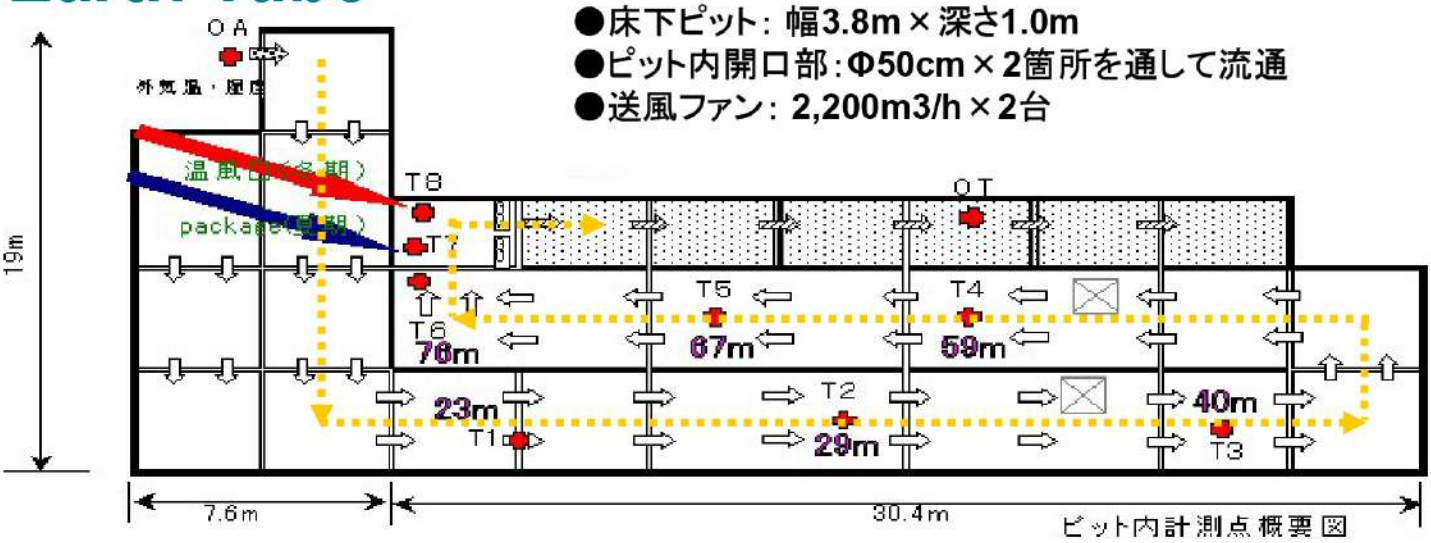


四万十いやしの宿ーガス使用量比較（従来型：環境配慮型）
太陽熱給湯システムの採用

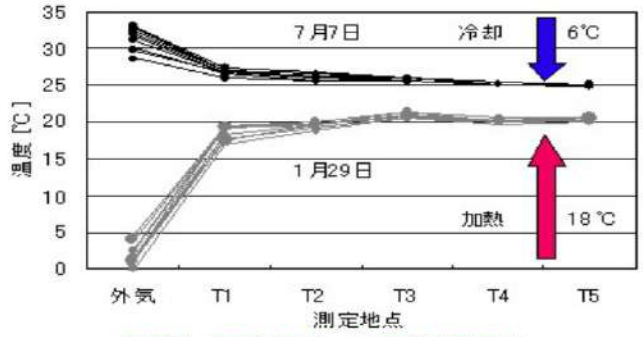


Earth Tube

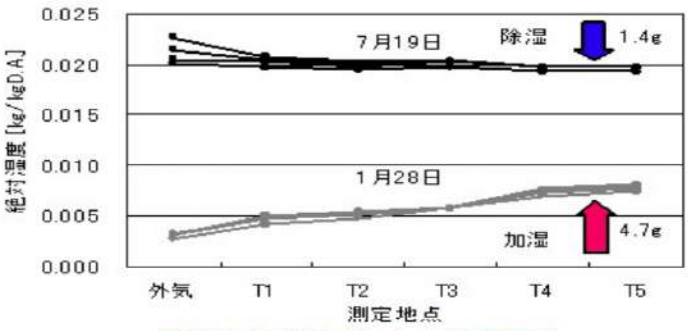
●長さ　　：約80m（外気取入口～吹出手前）
●床下ピット：幅3.8m×深さ1.0m
●ピット内開口部：Φ50cm×2箇所を通して流通
●送風ファン：2,200m3/h×2台



ピット内計測点概要図

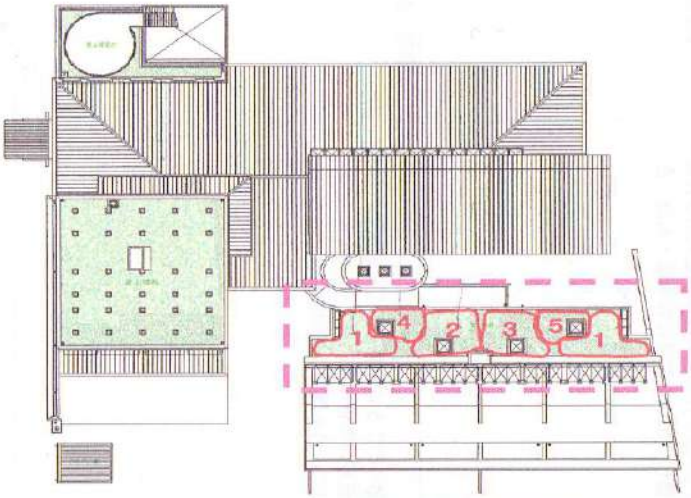


夏期と冬期のピット内温度変化



夏期と冬期のピット内湿度変化

Green roof ; winter

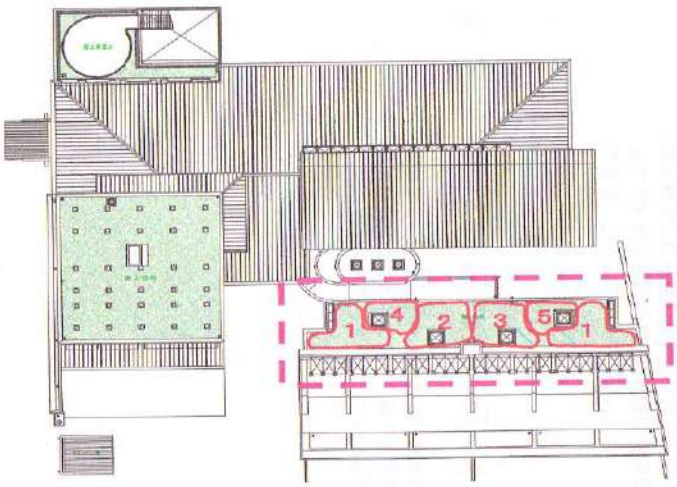


1　葉が茶色く枯れている。

2　よく育っている。
外壁側の浴室排気の当たる場所は特によく繁殖している。

1	アシズリノジギク
2	メキシコマンネングサ
3	タイトゴメ
4	オノマンネングサ
5	ツルマンネングサ

Green roof ; summer



1	アシズリノジギク
2	メキシコマンネングサ
3	タイトゴメ
4	オノマンネングサ
5	ツルマンネングサ