



Building Type/Use Country
 Country
 Client Architect Occupation
 Psychiatric Hospital Amami island, Kagosima Prefecture, Japan
 Foundation Jiaikai NIKKEN SEKKEI LTD
 Shimomai Architects & Engineers, Inc. 2003

Building Performance

Distance from public stop
 Within 500m from the nearest bus stop.
 Predicted km traveled per year by motor car.
 290,000 km (assuming that all outpatients and the employees travel by car).
 Development density as ratio of density of surrounding uses
 Not so densely developed.
 Actual MJ/m² per year primary operating energy
 987MJ/m² per year.
 Predicted or actual kg/m² per year eCO₂.
 44 kg-CO₂/m² per year.
 GJ/m² of embodied energy
 Out of the subject (existing building)
 Tons /m² or kg/ m² of total weight of new materials
 New materials are not used.
 Actual L/m² per year of potable water consumption
 478 L/m² per year.
 Predicted CO₂ concentrations in ppm
 From 400ppm to 600ppm.
 Capital cost and actual operating cost
 Capital cost :2,520,000,000, Energy cost :40,792,000/a.
 Percent of construction cost spent within the greater urban area
 From 110% to 120%
 Other performance information
 CO₂ emission of ducting and plumbing works is reduced to 20%.

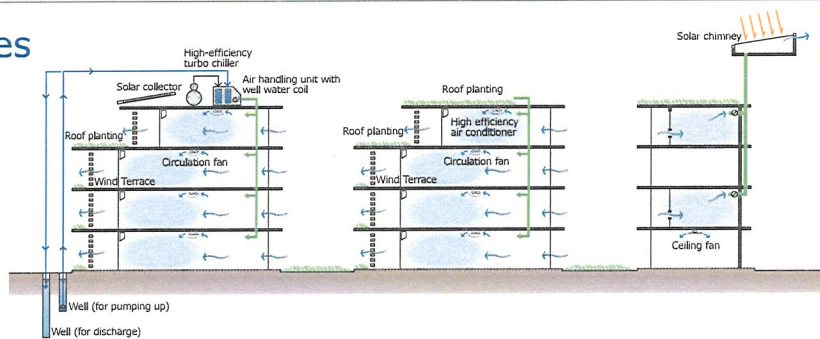
Key Concept (for LOHAS hospital)

The aim of this project was to construct not a typical type of psychiatric hospital but a "LOHAS (Lifestyles of Health and Sustainability) hospital where patients can enjoy abundant nature of the island. The other aim was to utilize this abundant nature for energy saving. As a result, patients can have physically experience of the changing seasons and the flow of time. Energy consumption is approximately one third times that of a general hospitals in Japan.



Architectural Features

Location and climate Amami-shi, Kagoshima pref., Japan
 Climate Hot and humid area
 - Site area 23,771m²
 - Total floor area 16,839m², 5 stories
 Estimated population Beds 370, Outpatient 60/day
 Employees 230 persons

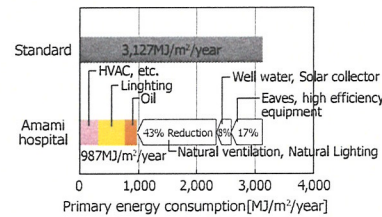
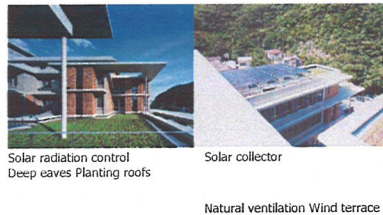


Design Procedure for this Green Hospital

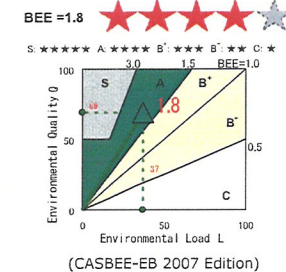
1. Analysis of characteristics of climate in Amami island.
2. Selection of green plans based on climate characteristics. - solar radiation control- natural ventilation - natural lighting- utilization of well water- adoption of high-efficiency equipment
3. Measurement of energy and water consumption, and improvement, and evaluation with CASBEE.



Assessment Results



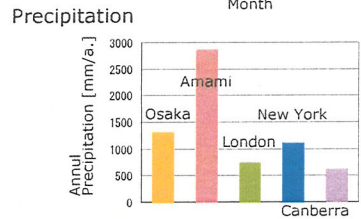
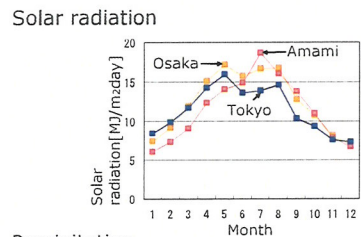
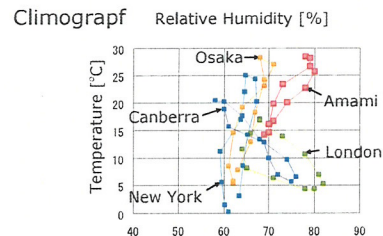
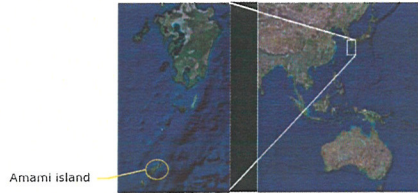
The hospital recorded 987 MJ/m²-yr energy consumption, achieved 68% reduction in the primary energy consumption compared to 3,127 MJ/m²-yr, the standard value for hospitals. This reduction is mainly from natural ventilation and natural light systems by 43%, groundwater use and solar heat use by 8% and the top performance equipments by 17%.



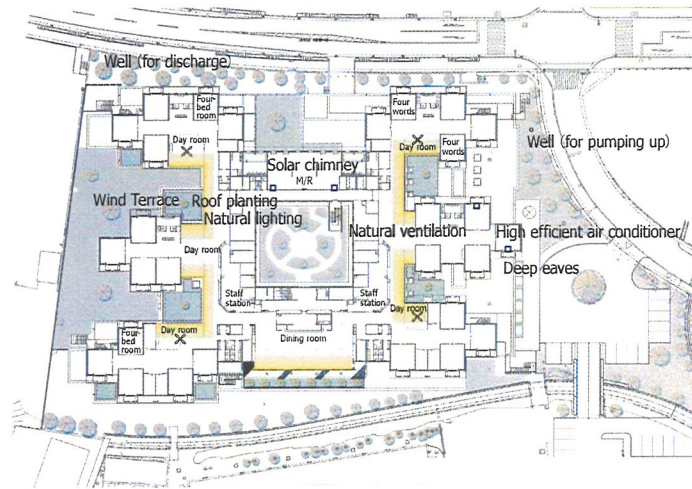
The hospital is assessed as Rank A with CASBEE. The result showed that the hospital keeps the low environmental load and satisfactory levels in the environmental quality. Also the result indicates that groundwater is not well evaluated in CASBEE as criteria consider only buildings in the city.

Characteristics of Climate in Amami

Amami hospital is located in Amami island, 380 km south from Kagoshima prefecture in Kyusyu, Japan. Amami island has sub-tropical climate with the hot sun, a lot of rain and unpolluted air. Cooling is necessary almost all the year around.



Plan



Natural ventilation and natural lighting

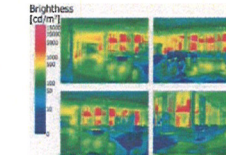
Natural ventilation
In order to provide large openings for fresh air intake, brick terraces "Wind Terrace" are installed outside the bed room windows. Wooden ventilation grilles are installed at common space.



Wind Terrace bed room

Wooden grille common use space

Natural lighting
Common use space has big windows with deep eaves. Occupants can spend their time comfortably with only natural light.



Brightness distribution 300 to 500 cd/m²



Natural lighting common use space

Solar radiation control

Deep eaves
Deep eaves are employed to avoid direct solar radiation.



Long eaves and roof planting

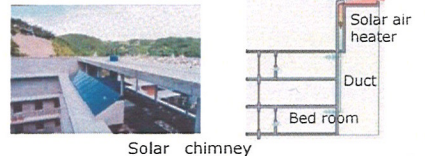
Roof planting
The roof is planted for heat insulation.

Solar collector
Solar collector on the roof is used to supply hot water for the baths.



Solar collector

Solar chimney
Solar chimney naturally enhances ventilation with solar heating effect.



Solar chimney

Utilization of high efficiency equipment

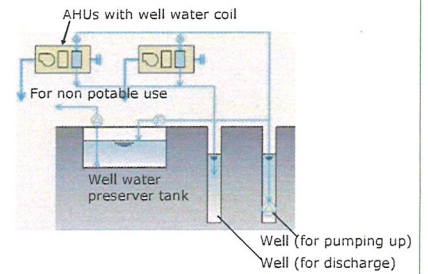
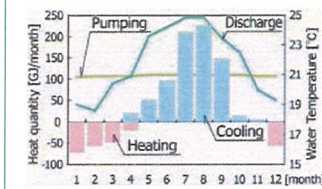
Top runner equipment
Each bed room is equipped with the most-advanced (so called "top-runner") air conditioners. A High- efficiency turbo chiller is employed for outdoor air cooling.



Top runner air conditioner

High efficient turbo chiller

Well water utilization
Well water is used for domestic water supply and for cooling and heating of the outdoor air intake. Well water is almost 21°C through the year.



Utilization of well water