

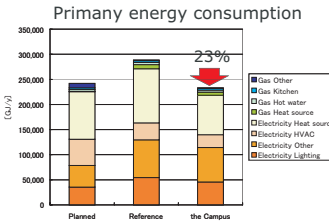


## Building Performance

- Measures taken by Architectural design in each building**  
 Multi-glazing glass, horizontal and vertical louvers for sun-shading  
 Light shelves by horizontal Louver  
 Natural ventilation through staircases and atria  
 Reducing heat load of outdoor air by cool/heat tunnels
- Multiple Energy saving system taken throughout campus**  
 Cascade usage of well water for heat source in Media center and service water through out in Campus  
 VAV, VVW, Outdoor air volume control by CO2 concentration, Building Management System, and so on
- Thermal environment design in outdoor space**  
 Cool spot throughout campus  
 Alleviation of heat island phenomena

Building Type/Use Existing Office Building /School  
 Country Japan  
 Client Aoyama Gakuin  
 Architect NIKKEN SEKKEI Ltd  
 Occupation January 2003

Site area : 161,162m<sup>2</sup>  
 Total floor area : 151,398m<sup>2</sup>  
 Number of Floor : -1F,+9F  
 (Media Center)  
 Structure : RC, SRC, S



## Architectural Features

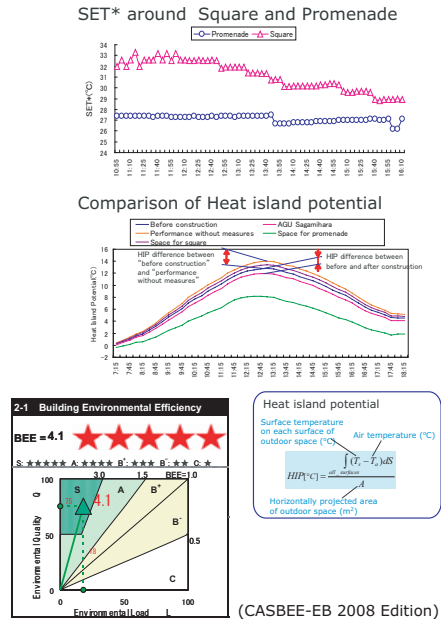
**Design method[1]**  
 Existing tall trees were rearranged to form a large cool spot.

**Design method[2]**  
 Tall trees planted around main building in campus block sunlight, helping to reduce facade surface temperatures.

**Design method[3]**  
 Ground cover Planting around buildings improves radiation environment.

**Method [2]+[3]**  
 The tall tree canopy blocks sunlight from reaching building walls.  
 The gallery corridors also form a comfortable semi-outdoor space in summer.

## Assessment Results



## Conservation of Existing Trees



The project site before construction



Temporarily nursery site during construction

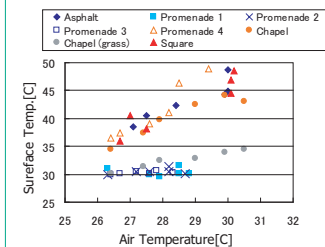


Transportation work of an existing tree

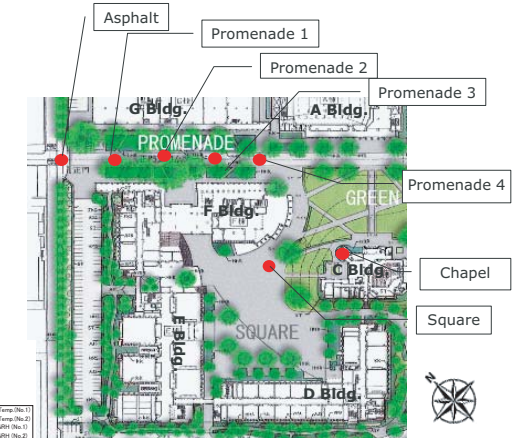
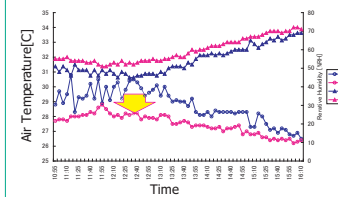
- 1,700 large trees were existed at the project site.
- Some more trees were transplanted from other campuses. Only a few trees were newly purchased.
- Planting index increased by 20% from existing site.

## Site Measurement of Outdoor Environment

Comparison between surface temp. and air temp. at each measured point

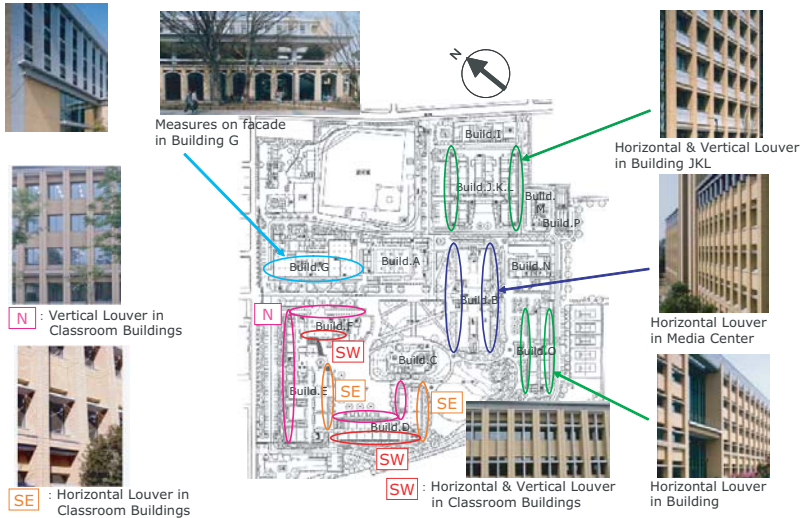


Effect of green sun shading at Promenade



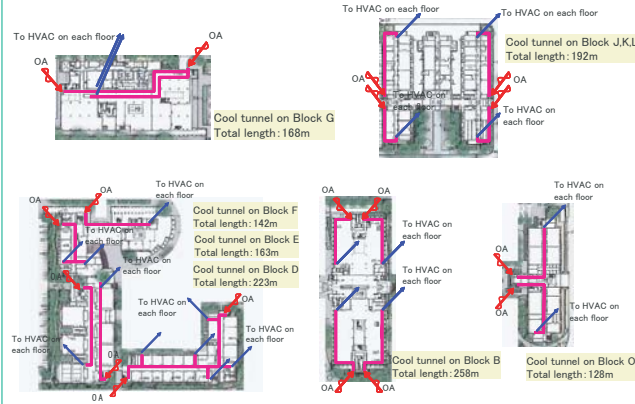
Measured Points

## Sun-shading and Day-lighting by louver throughout campus



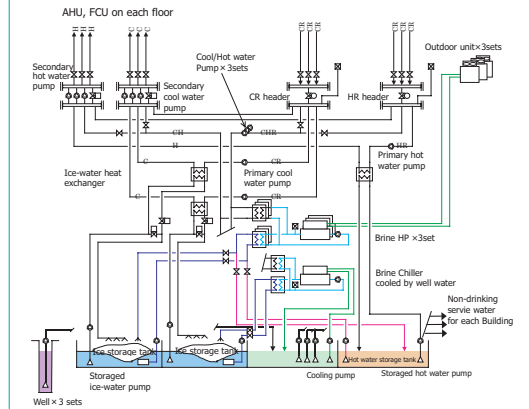
## Heat load reduction of outdoor air by Cool/Heat tunnels

Arena(Build. A), Classroom(Build. DEF), Media center(Build. B), Welfare Building (Build.G), Dep. of science and engineering (Build. JKL and O)



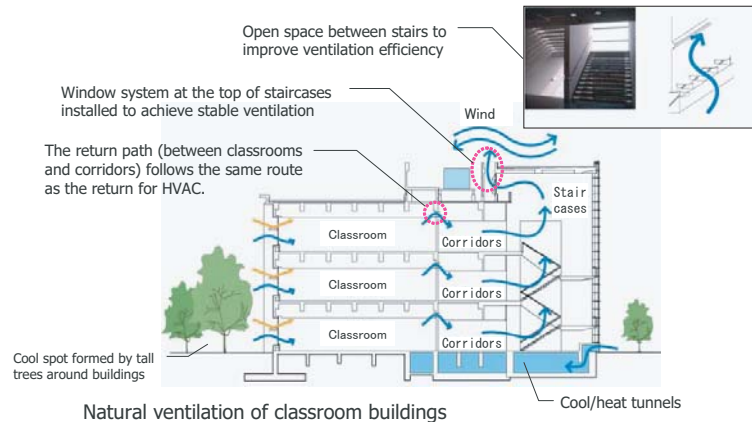
## Cascade usage of well water for heat source and service water

Ice storage system of Building B



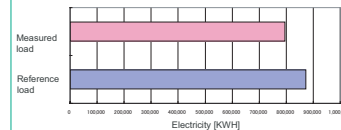
## Natural ventilation through staircases and atria

Arena(Build. A), Classroom(Build. DEF), Media center(Build. B), Welfare Building (Build.G), Dep. of science and engineering (Build.O), Clubhouse (Build. M)

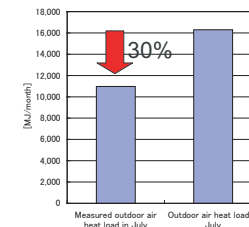


## Performance of Energy Saving

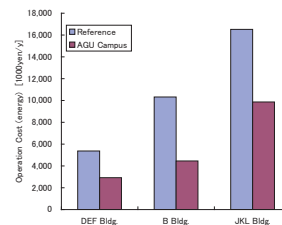
Performance of Natural ventilation on Heat source and HVAC energy reduction (D,E,F Bldg.)



Performance of Cooling/Heating Tunnels(F Bldg. 2003.7)



Reduction in operation cost for heat source energy by ice storage system



## Result of CASBEE-EB

