

Approach to Low Carbon of OBAYASHI CORPORATION Technical Research Institute Main Building (TECHNO-STATION)

Low-Emission Buildings TOP 30
in Tokyo

2011/9/26

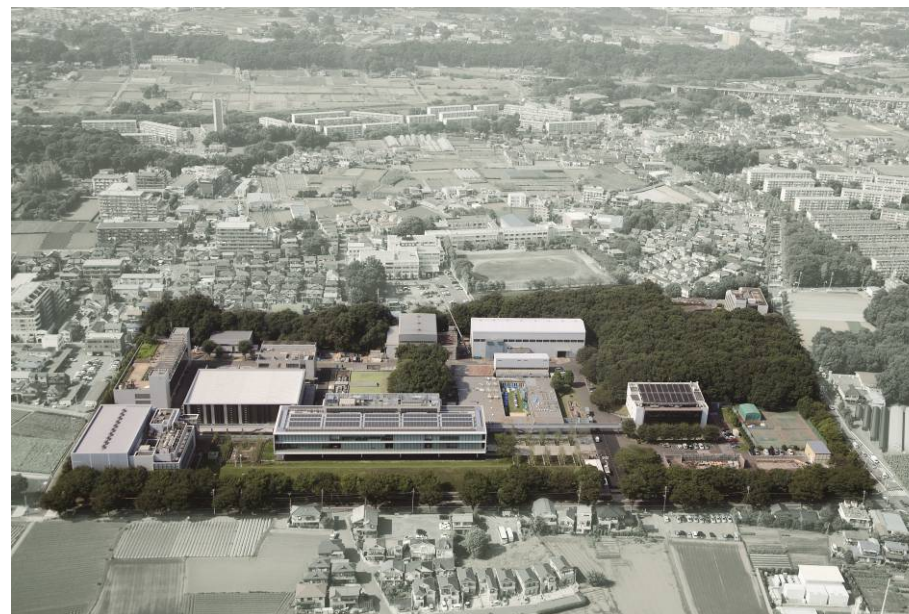
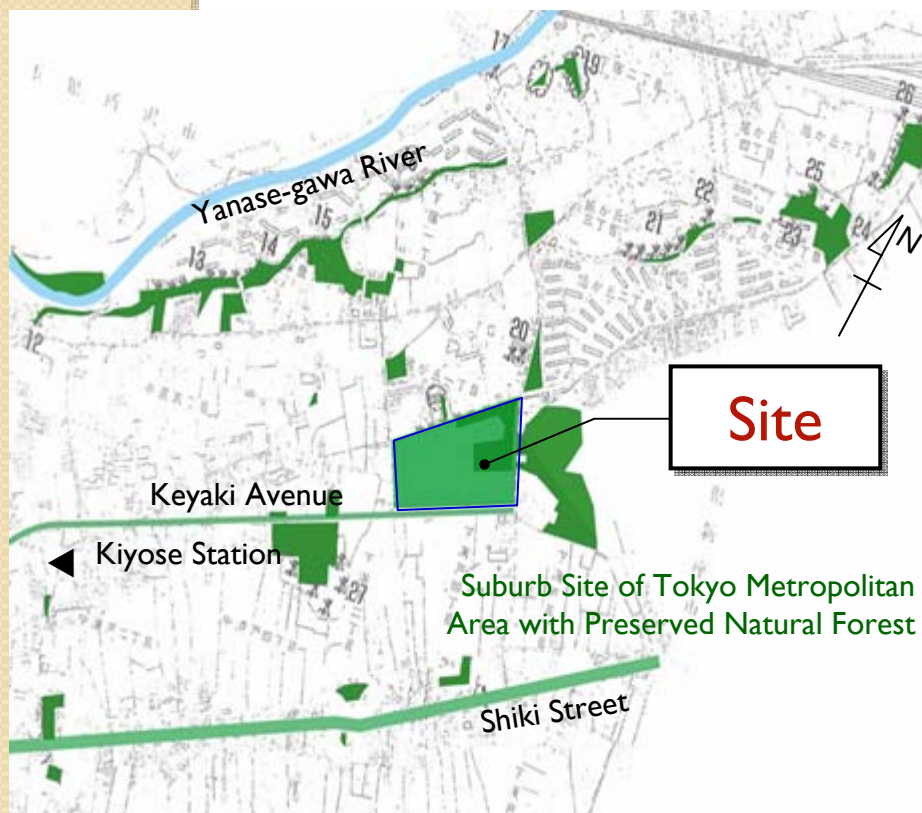
Obayashi Corporation

Hajime Onojima



Fact Sheet on Buildings

**Intellectual Workspace with
Consistency of Productivity
Promotion and CO₂ Emission
Reduction**



Address: 4-640 Shimokiyoto, Kiyose City

Type of building: Office building

Site area: 69,401 sq. m

Total floor area: 5,535 sq. m

3 stories above ground

Completion: September, 2010

Environmental Rating:

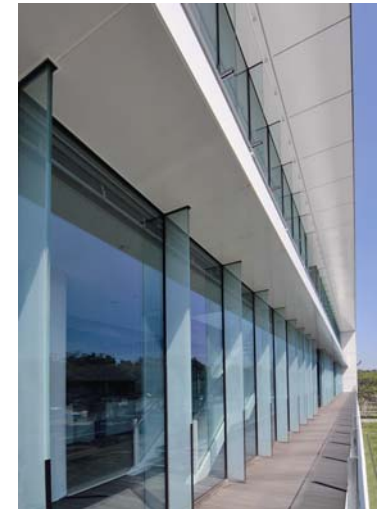
CASBEE New Const. 2008 S rank

BEE=7.6

Model project by MLIT that Reduce CO₂
Emissions

Major Measures to Lower Emissions

- **I Heat load resistance of the shell (PAL Reduction : 35.9%)**
 - Perimeter buffer system (Eave ▪ External vertical glass fins ▪ Automatic control blind ▪ Air barrier) , Low-e Glass
- **II Energy efficiency in equipments (ERR : 42%)**
 - Sensible/latent heat separated air-conditioning, Medium chilled water latent heat storage system, personal air-conditioning, Lighting/Air-conditioning control system using IC tags, Top light for install daylight, Displacement natural ventilation system
- **III Building management system**
 - Advanced building energy management system, commissioning, Visualization system
- **IV Renewable energy (Introduced : 152kW)**
 - Photovoltaic generation 150kW, Wind power generation 2kW



Large One-Box Workspace



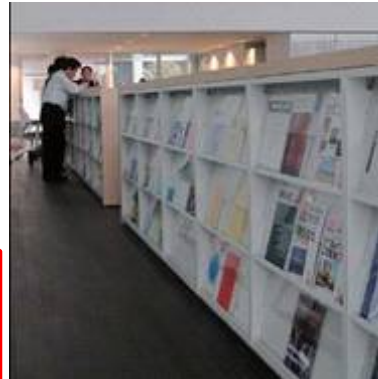
Creative Work Place (2F)

Visibility and Uniformity, Perimeter planning of Magnet Space
Activate the communication of researchers

■ Meandering traffic
(Searching encounter)



■ Library
(Information sharing)



■ Public Garden



■ Private Living



Passage

Stair

Communication
Void



Center isle

Collaboration and
Meeting Area

Stair

Map of Technologies of CO₂ Reduction

Passive methods

Ecological roof system

- top light for install daylight
- exhaust air and reuse
- photovoltaic power generation

Perimeter buffer system

- block insulation and buffer air-conditioning

- wind power generation
- wet type of exterior pavement materials
- cool and warm pit
- solar water heater
- ground source

- low-rise structure low convection energy
- flat plan for install prevailing wind

Natural ventilation system

- displacement natural ventilation

Cascade using natural water

- rainwater/well water treatment system

etc

Active methods

Sensible/latent heat separated personal radiant air-conditioning system

Medium chilled water latent heat thermal storage system

- high efficiency heat pump module chiller
- water thermal storage system
- large temperature difference water supply
- outdoor air cooling
- LED lighting / CO₂ control / valuable air volume control
- cogeneration system
- new type rechargeable battery

etc

Hybrid heat pump system of geothermal and well-water heat

Lighting/Air-conditioning control system using IC tags

Management methods

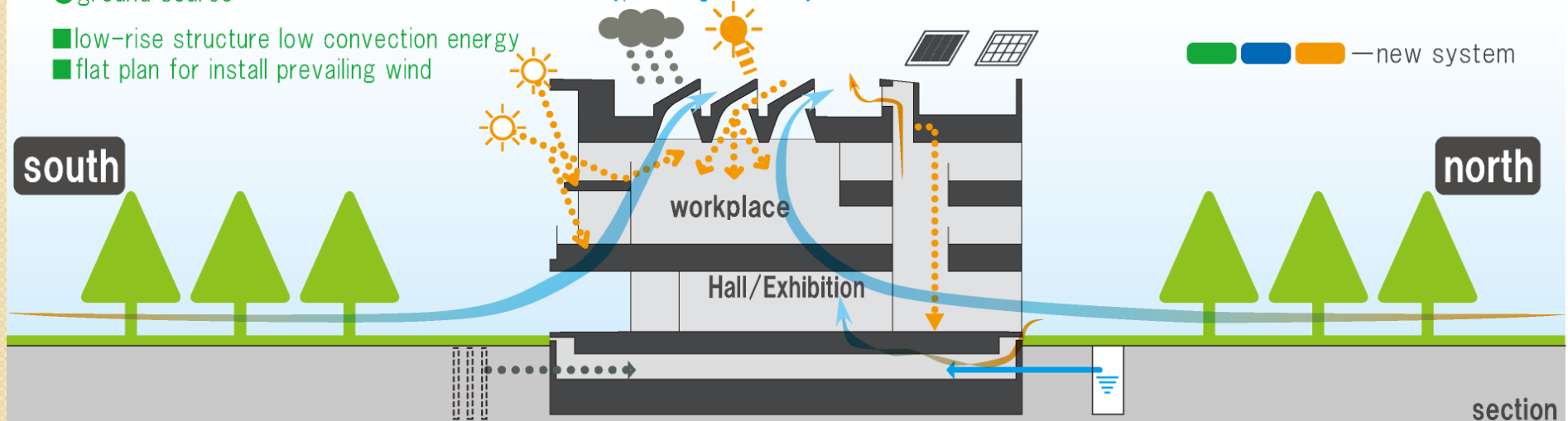
CO₂ reduction activities by natural convection in workplace

Visualization system

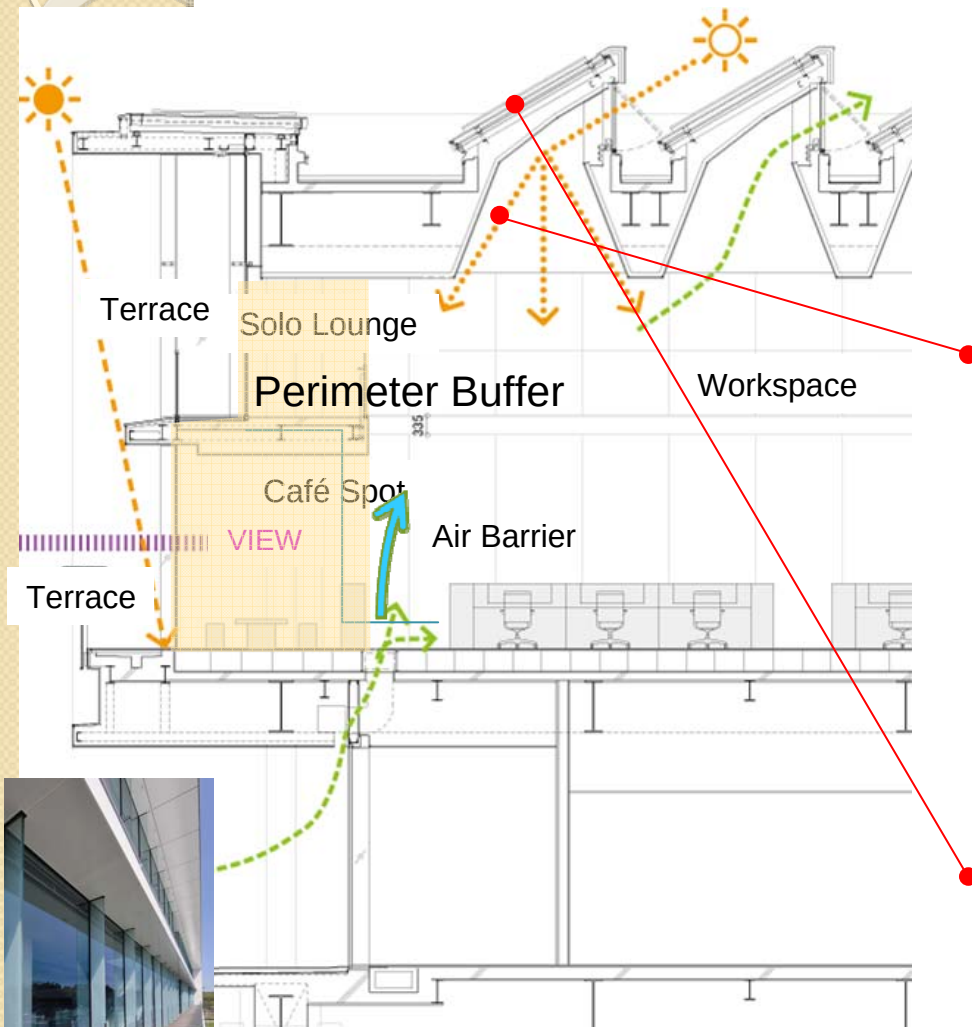
- BEMS
- feedback by commissioning
- showroom of CO₂ reduction technology/transmission of information
- CO₂ reduction technology expansion
- environmental education activity

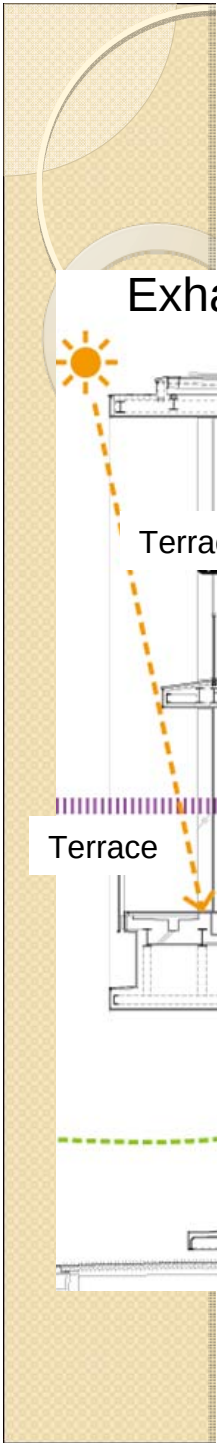
etc

—new system



Ecological Roof, Perimeter Buffer





Organized Integration of HVAC System

- Hybrid Heat Pump System of Geothermal and Well Water
- Medium Chilled Water Storage System using Latent Heat Storage Material

Jointly Developed with Jx Nikko Nippon Oil and Energy Corporation and prof. Yamaha Chubu University

- ## ● Lighting and HVAC Control by RFID IC Tag

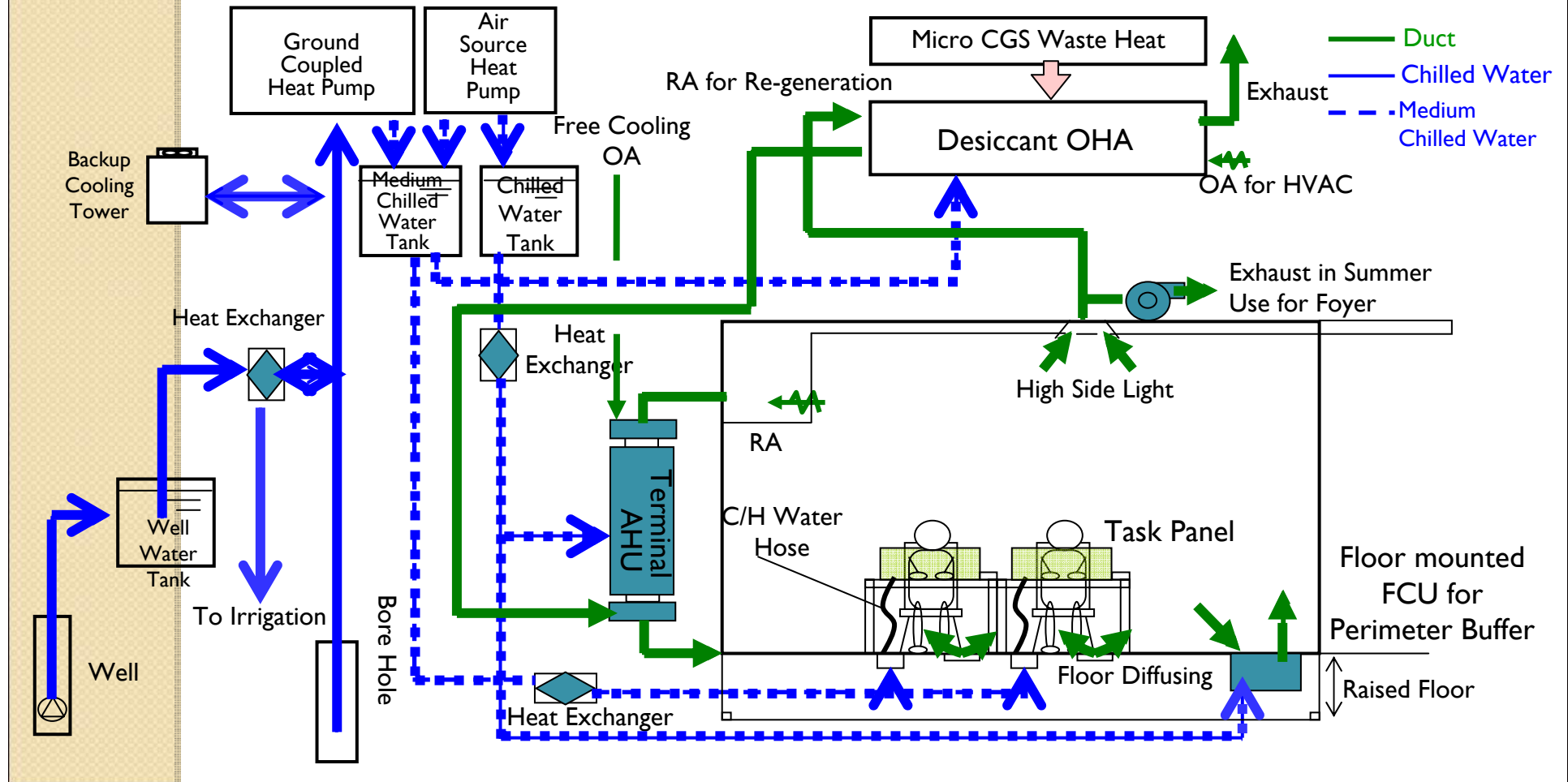
Manufactured by NEC Corporation & Obayashi Corporation

- ## ● Latent and Sensible Heat Separated Personal Radiant HVAC System

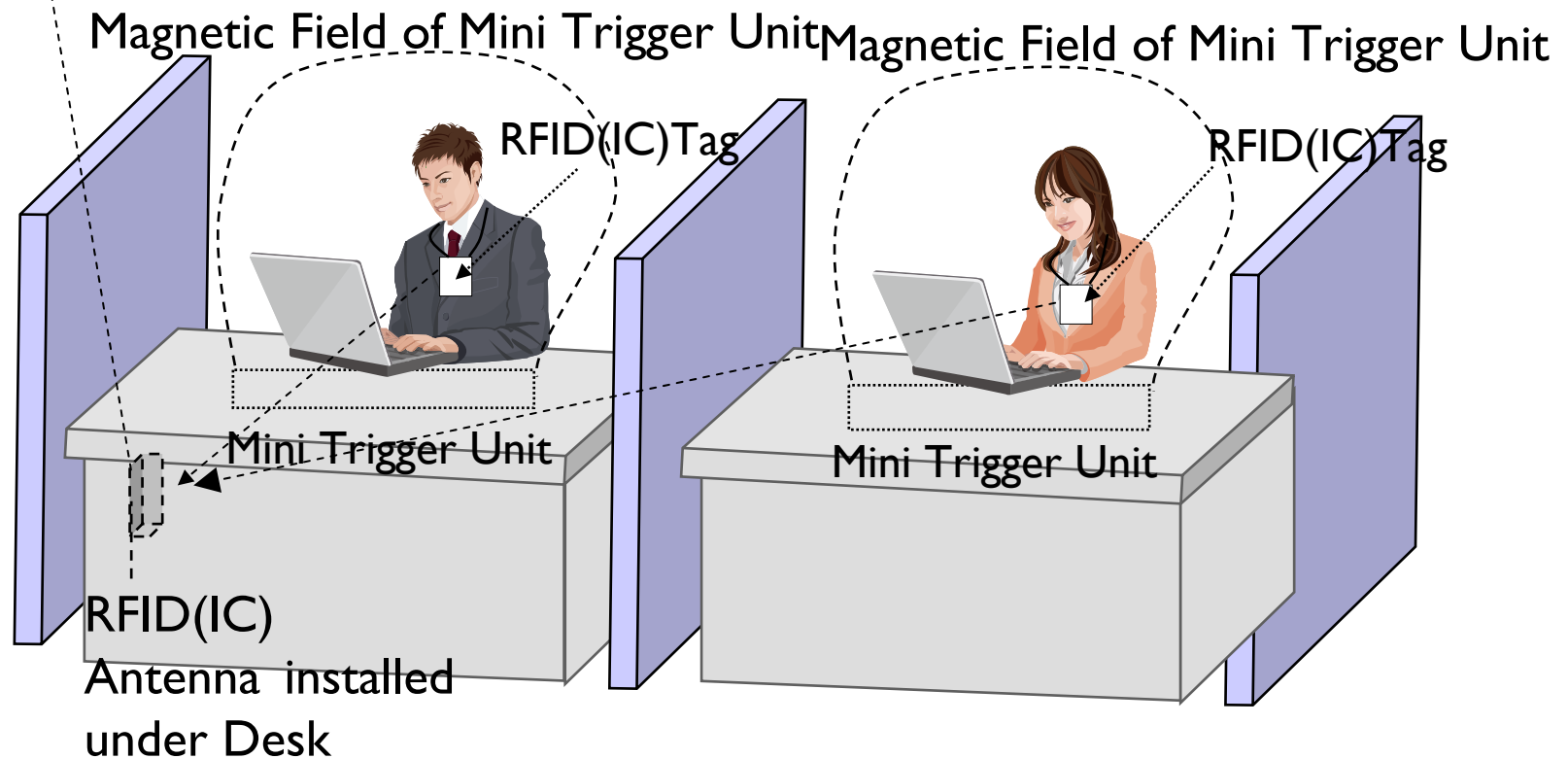
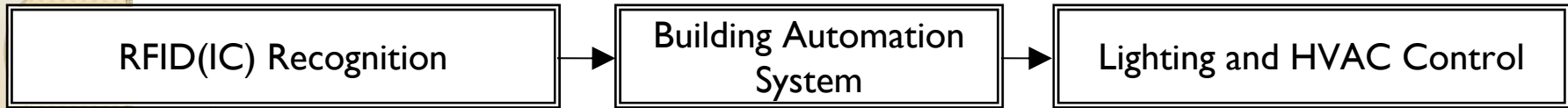
Jointly Developed with PS Company Ltd. and supervised by Nobe Laboratory of Kogakuin University



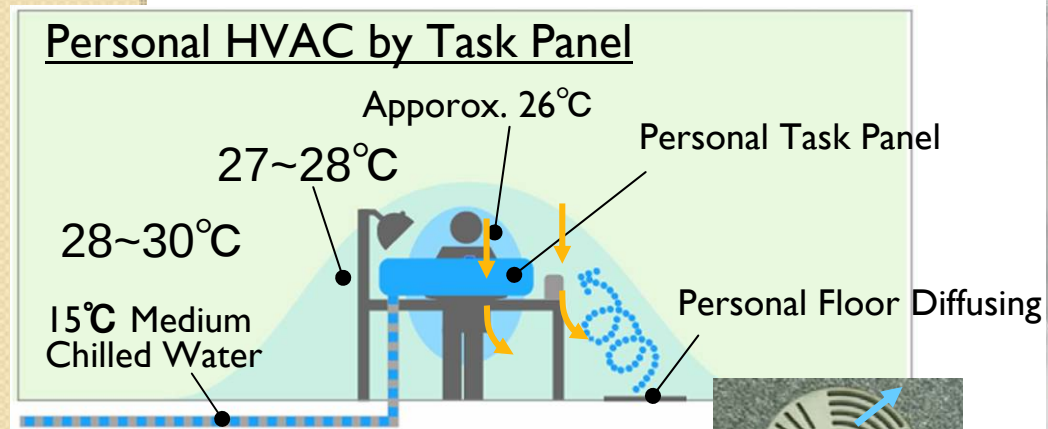
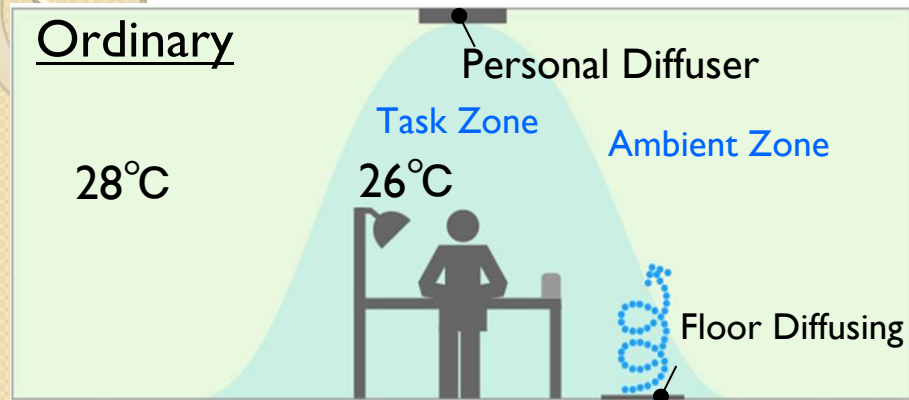
Latent Heat Storage Material



RFID Tag for Access Control and Lighting/HVAC Control



Personal HVAC by Task Panel



CO₂ Emission Reduction

