

# Shimizu's approach to building resilient and smart cities

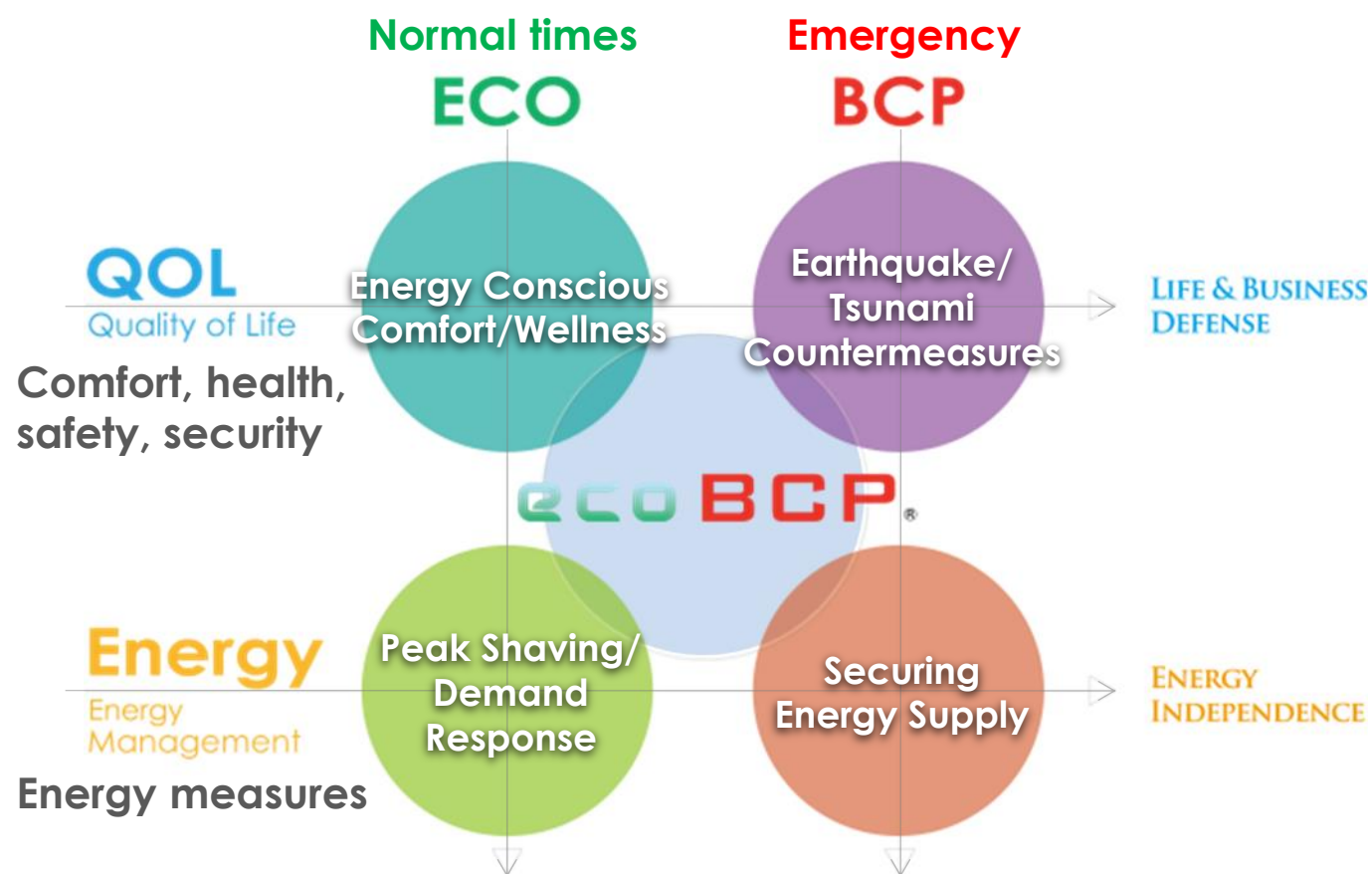
October 29, 2015  
Masaya Tachibana



# Approach: The “ecoBCP” concept core competence for sustainability

## Low Carbon/Wellness (eco) + Business Continuity/Energy Independence (BCP)

Applying energy conservation measures during normal times to build facilities and communities, while assuring business continuity and energy independence in the event of an emergency.



Resilient and smart cities

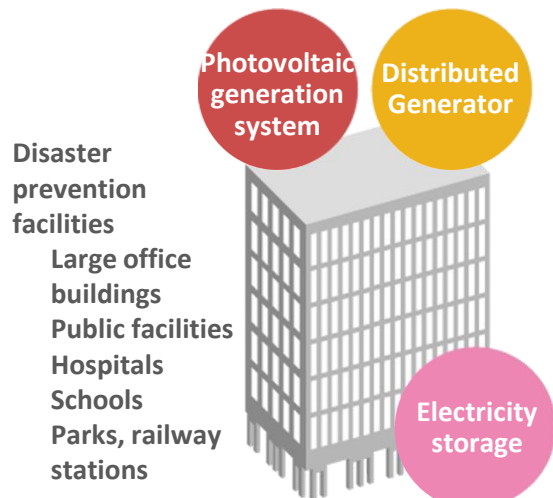
# 2 Approach: ecoBCP urban regeneration

- Staged “ecoBCP” solutions from facility-level to district-level and area-level.
- Increasing **community value and competitiveness** by enhancing “ecoBCP”.

Enhancing “ecoBCP” of disaster prevention facilities

## ① Facility level

- Energy conservation and the improvement of QOL during normal times
- Securing energy supply during emergency



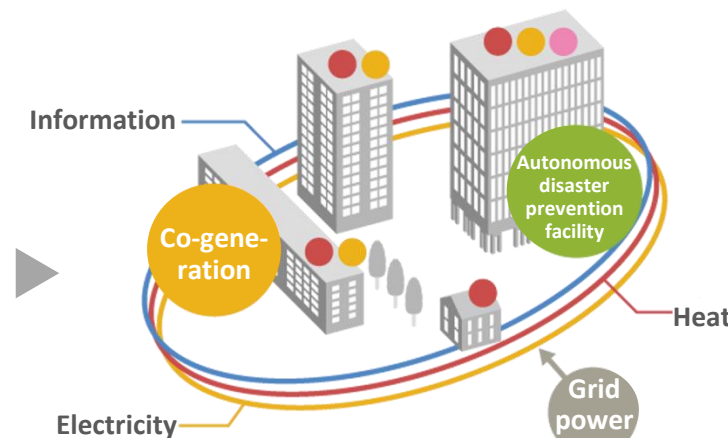
BC: Business Continuity

LC: Life Continuity

District-wide energy utilization

## ② District level

- Utilizing district heating/cooling/power supply
- Accommodating those unable to return home in the event of an emergency

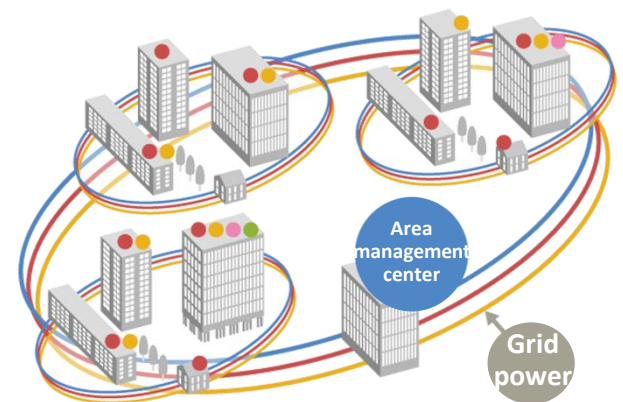


DC: District Continuity

Area-wide “ecoBCP” management

## ③ Area level

- Area energy management
- Area business/life continuity management



CC: Community Continuity



# Kyobashi Smart Community

- ecoBCP management and enhancing community value and competitiveness in the area around Shimizu's head office.

A high-performance, eco-friendly, and disaster prevention facility

## ① Facility level

- A high-performance, eco-friendly office building
- Accommodating those unable to return home in a disaster

- CASBEE: rank S  
BEE score: 9.7 pts.  
(highest score ever)

- Community disaster prevention facility: Accommodates 4,000, employees and others unable to return home.

Shimizu's  
head office

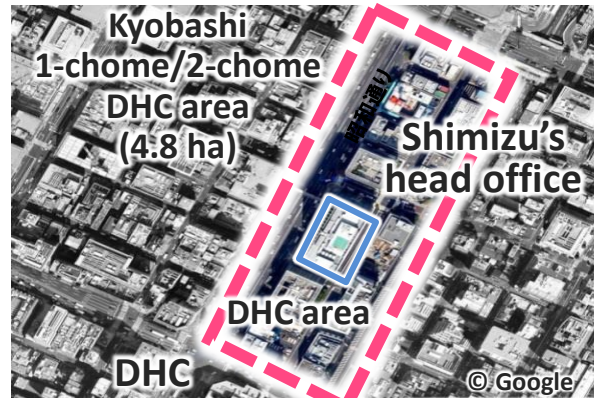


District-wide high-efficiency energy utilization

## ② District level

- District heating/cooling, effective use of waste heat
- Mutual exchange of supplies in the event of an emergency

- DHC system: comprehensive energy efficiency rate of 1.39  
(most efficient in Japan)



Area-wide "ecoBCP" management

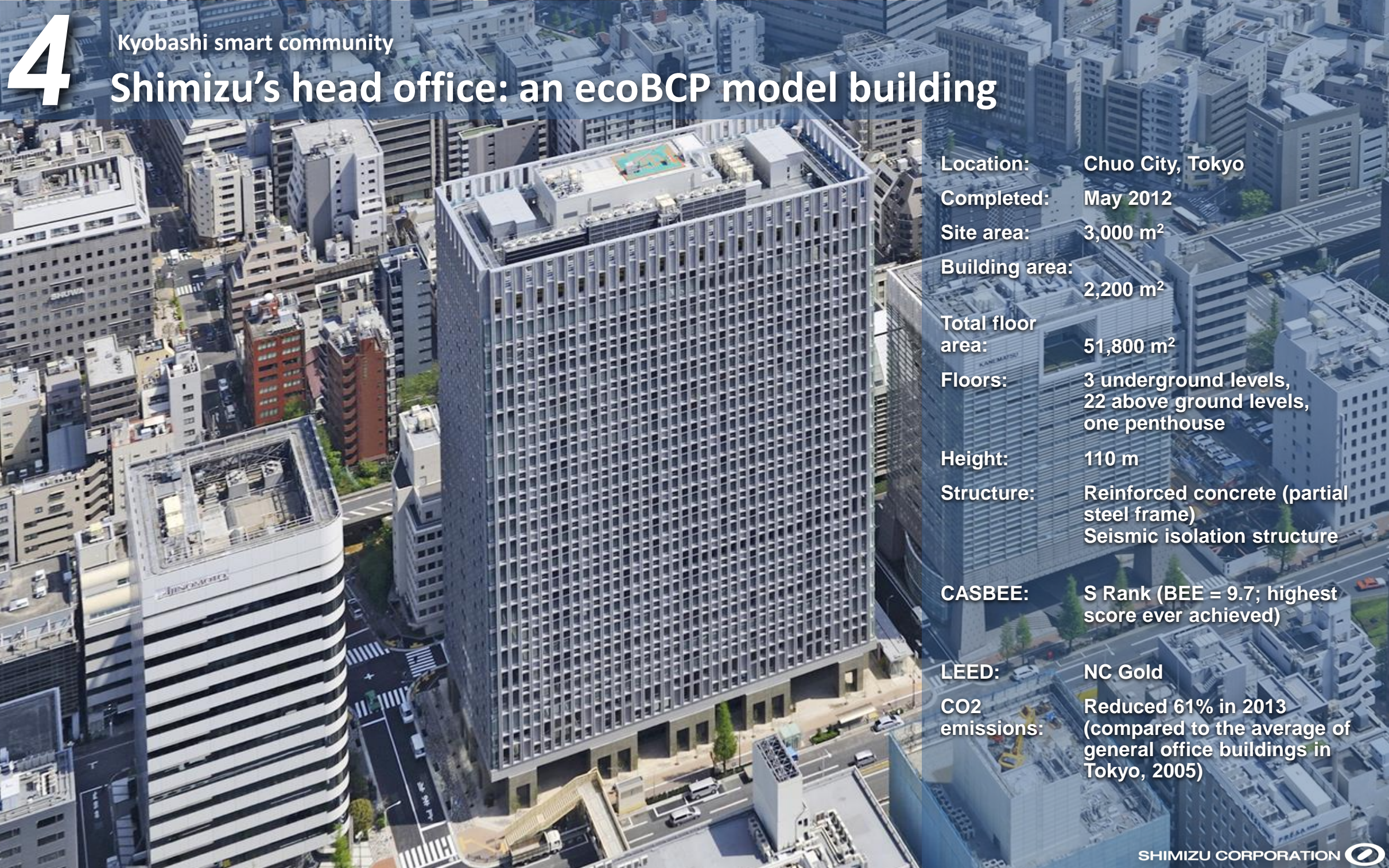
## ③ Area level

- Area energy management
- Area business/life continuity management

- ISO 22301 (Business Continuity)
- ISO 50001 (Energy Management)  
(certified as the first area-wide cases in Japan)







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Kyobashi smart community

## Shimizu's head office: an ecoBCP model building

Location:	Chuo City, Tokyo
Completed:	May 2012
Site area:	3,000 m <sup>2</sup>
Building area:	2,200 m <sup>2</sup>
Total floor area:	51,800 m <sup>2</sup>
Floors:	3 underground levels, 22 above ground levels, one penthouse
Height:	110 m
Structure:	Reinforced concrete (partial steel frame) Seismic isolation structure
CASBEE:	S Rank (BEE = 9.7; highest score ever achieved)
LEED:	NC Gold
CO2 emissions:	Reduced 61% in 2013 (compared to the average of general office buildings in Tokyo, 2005)



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## Shimizu Head Office

- CASBEE: S Rank (BEE = 9.7; highest score ever achieved).
- LEED: NC Gold
- Reduction of CO<sub>2</sub> emissions: 58% in 2013 compared to office buildings in Tokyo, 2005.
- Hybrid exterior panel system/task & ambient system/all IP building system.
- Community disaster prevention facility.

Seismic panels

Low-E double-glazed glass

Shading effect

Exterior thermal insulation

Solar panels



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## Shimizu Head Office

- **Community disaster prevention facility** accommodating 2,000 employees and up to 2,000 others unable to return home in the event of an emergency.
- Reception rooms accommodate those requiring assistance, including the elderly, the disabled, expectant mothers, overseas visitors, and the sick or injured.

### Protecting the building

Preventing building damage  
Saving lives

- Seismic isolated structure

### Protecting business functions

Maintaining head office  
functions

- Maintaining head office functions for 72 hours (three days)
- Measures to respond to underground flooding

### Protecting the community

Working with the community

- People unable to return home  
Accommodating the following people on floors 1–9:  
Employees: 2,000  
Others: 2,000  
Total: 4,000

Storage facilities for emergency supplies, including water, food, blankets, and other necessities

Emergency Task Force  
(fourth-floor dining hall)

Air-conditioning/ventilation  
available (floors 1–9)

DHC heat storage tanks used to supply heat (released directly using office heat pumps)



Electrical substation room on rooftop  
Micro-grid, generators, oil tanks (fuel for three days)

Elevators available  
(One for lower floors, one for higher floors)

Lighting and power outlets available  
(floors 1–9)

Office and business servers installed  
on above-ground floors (5th-floor servers)

Restrooms available  
(floors 1–9)

Tap water and reclaimed water storage  
(for three days)  
(Uses water receiving tanks and heat storage tanks.)

Storage of sewage and miscellaneous  
wastewater (three days' capacity)  
(Uses an underground pit.)



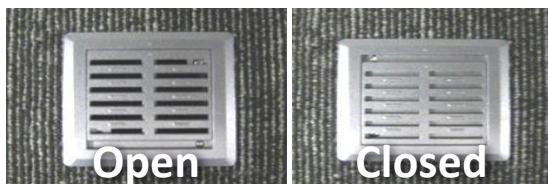
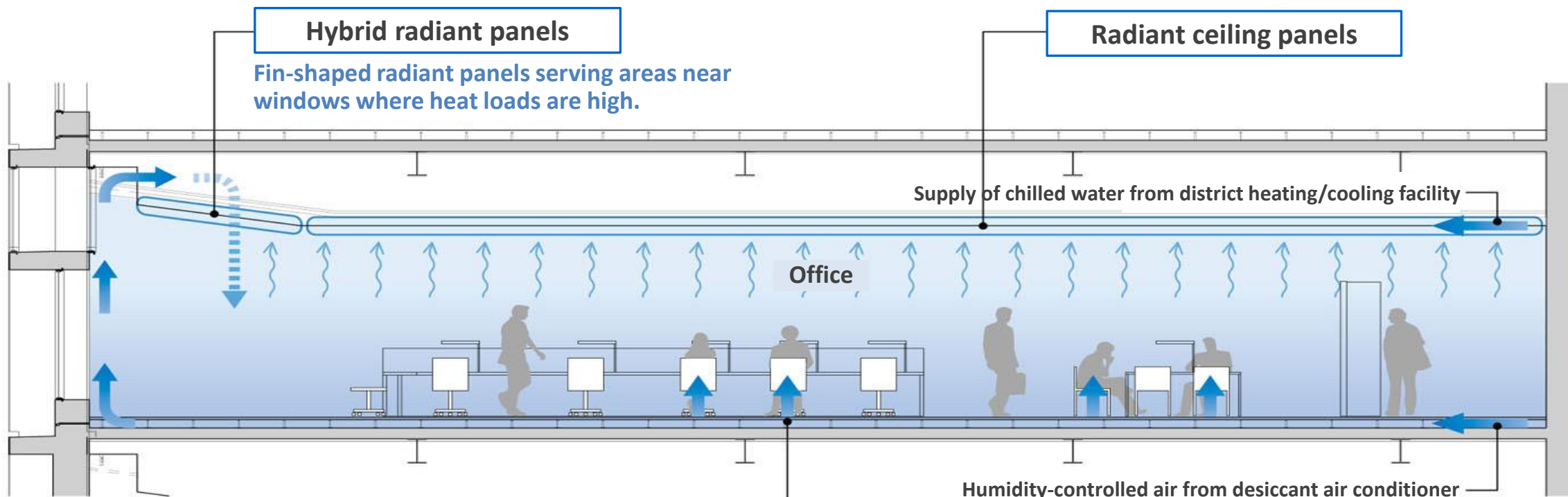
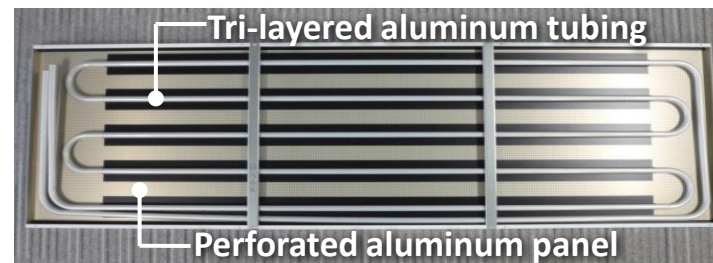
Seismic Isolation



Oil Damper

# Task and ambient air-conditioning system

- Power reduction of approximately 50% compared to standard air-conditioning system.
- Comfort and low-carbon performance, improved intellectual productivity.



Personal floor vents

Sliding controls allow workers to adjust airflows to suit personal preference.



# 8 Shimizu's head office

## Task and ambient LED lighting system

- Power reduction of approximately 90% compared to standard lighting system.

Sensor-controlled ambient lighting brightness automatically adjusts to available natural light.

Ambient lighting

Use of daylight

Lighting

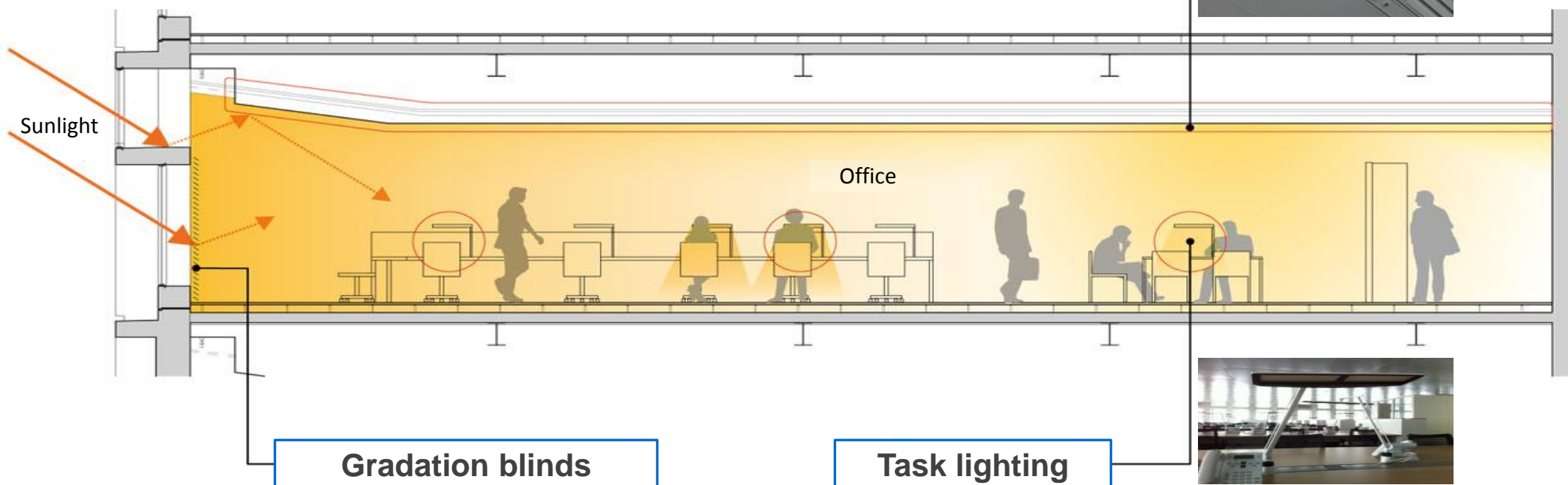
Task lighting

Use of daylight

Lighting

Interior lighting deliberately set to achieve dimmer lighting levels.

Ambient lighting



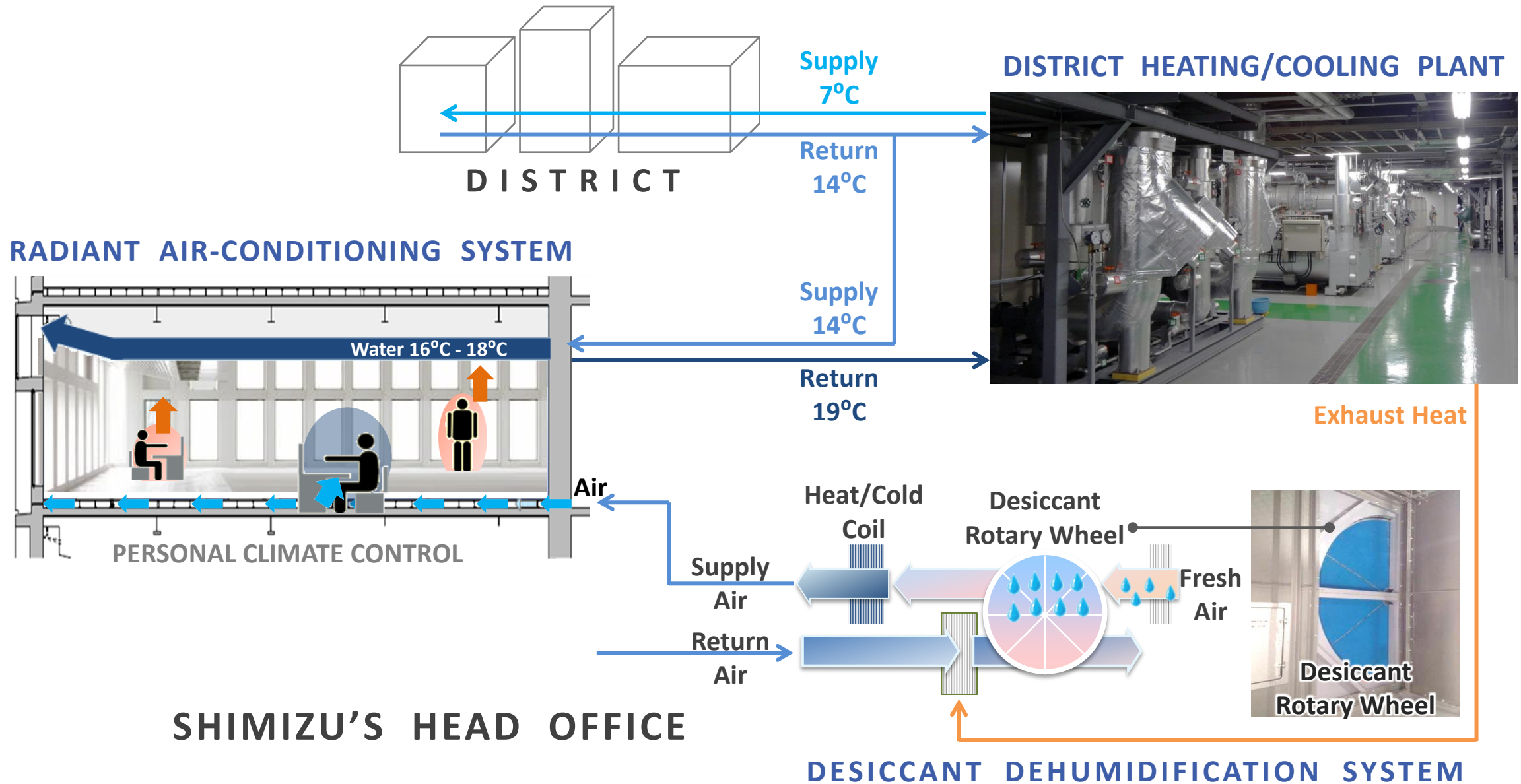
Angle of blinds adjusts to match the position of the sun.

Task lighting

Bright and targeted lighting for individual desks.



# Effective utilization of waste heat by connecting with DHC plant





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