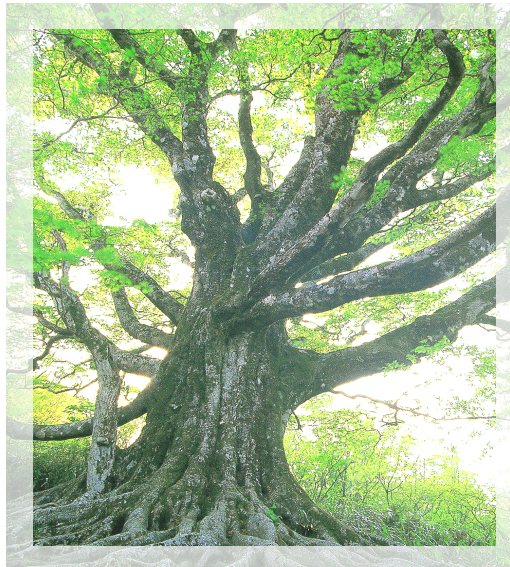


Forest City
-E G E C-

*Eco
Green
Energy
City*



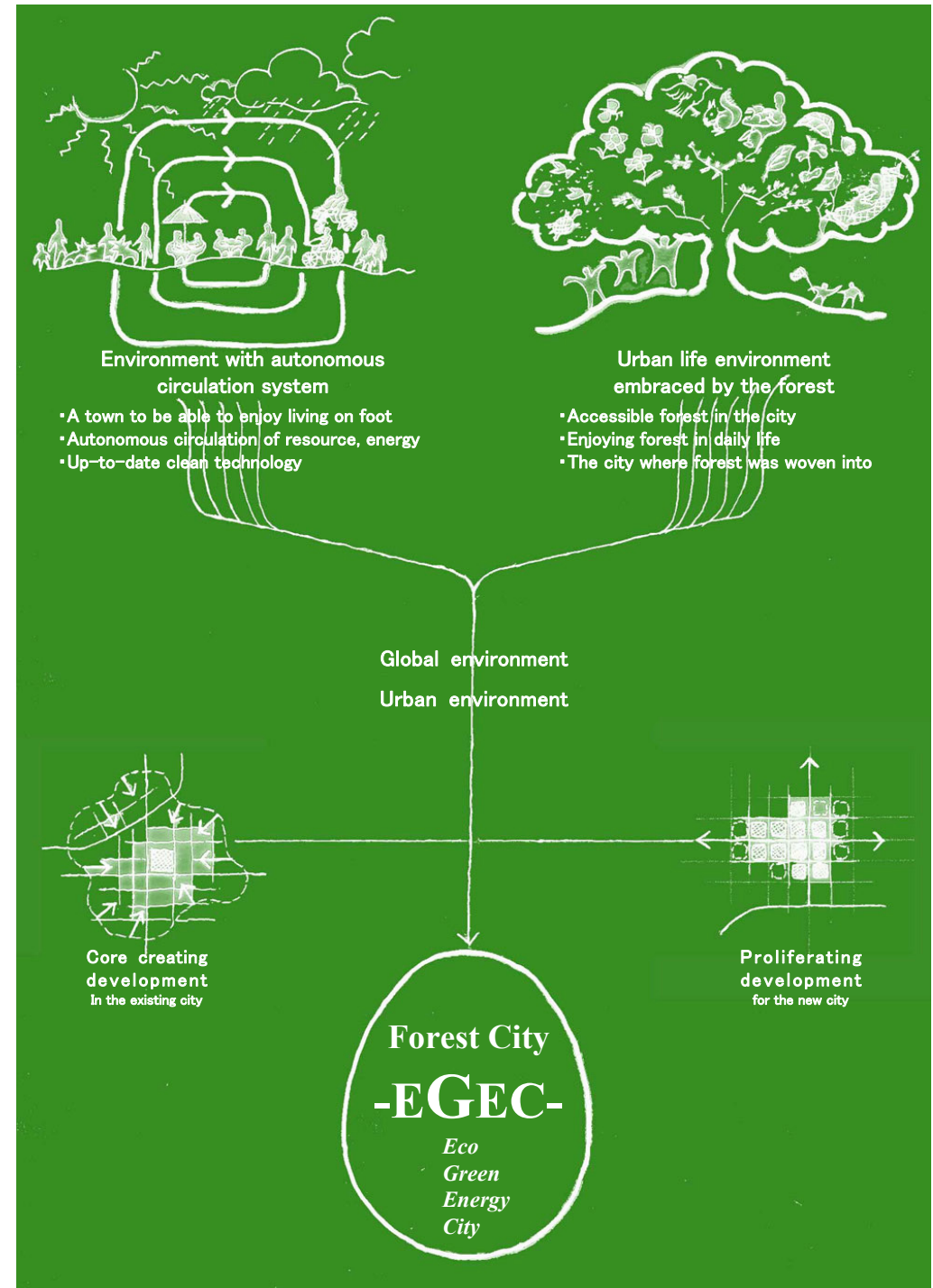
C O N C E P T B O O K

Concept



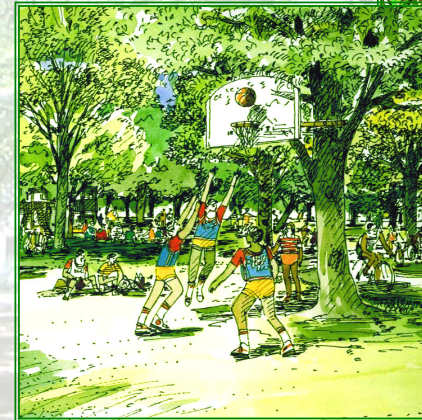
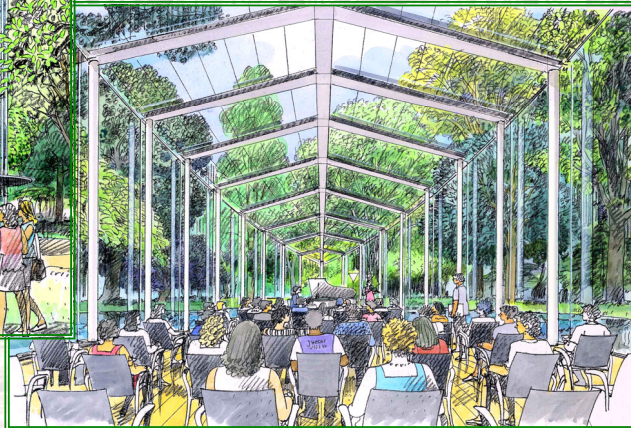
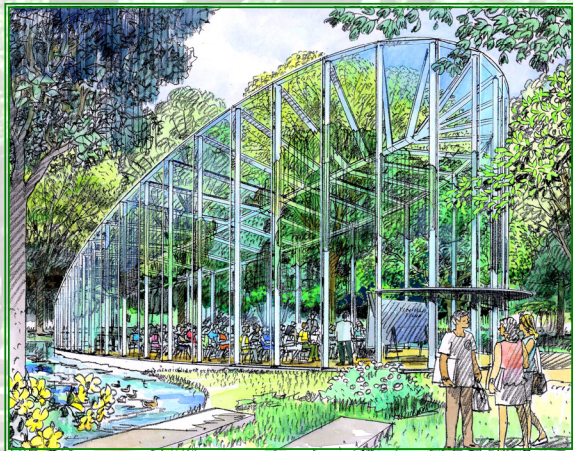
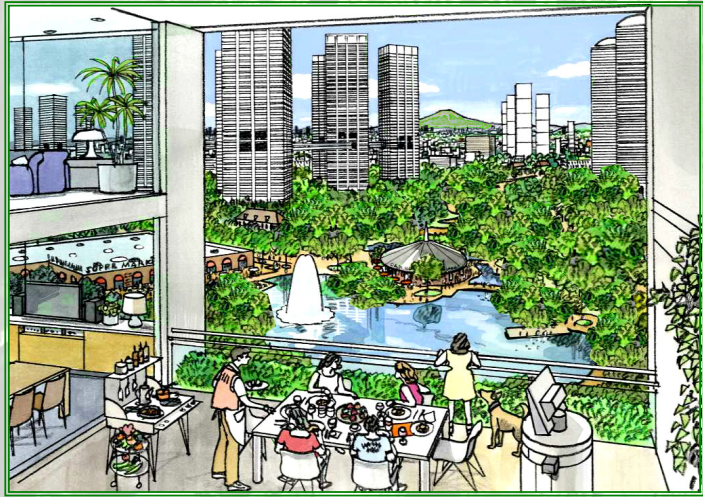
From the 21st century toward the future

Nowadays, the greatest themes of global environment and life environment can observe various problems in human life, especially we can see many problematic factors in the environment of the city. On the other hand, the conventional styled urban development that prioritized economic convenience and the cost oriented efficiency is still under way of acceleration in many urban area and surrounding area of each country. In this circumstance, the concept of development that stands on global environment is just started even in so called advanced countries. Along with this flow, conventional styled urban development is accelerated in full speed in many developing countries, where appears serious situations from the aspects of both global environment and life environment. Standing on such footsteps, we here propose the urban development method of 21st century and continue to future world, named Forest City 「EGEC」, which is the harmonized unification of environmental high-tech engineering and an origin of the nature – Forest. Our proposal is the designing of such city where people can enjoy comfortable and convenient life without wasting energy and natural resources and where people can feel and receive blessing of Nature – Forest. The city with autonomic characteristics that can create the best harmonized environment as time pass by – That is the Forest City 「EGEC」.





Encountering of man and forest
...urban recycling city - EGEC



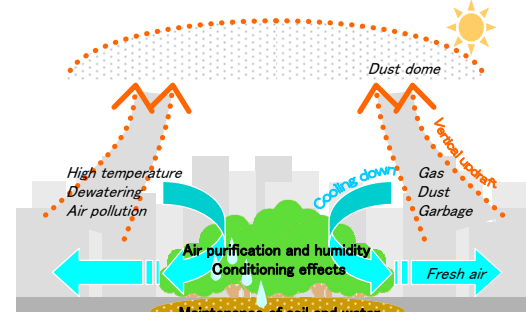
Creating a forest in the city, Creating a forest in the neighborhood – Life environment embraced by a forest



So far man opened up a forest to make cities,
Now we **grow a forest** to make cities

- Forest creating in Forest City –
- Forest covers 20% of development area
- 20 to 30% forest rate in the city

Forest that maintains urban environment



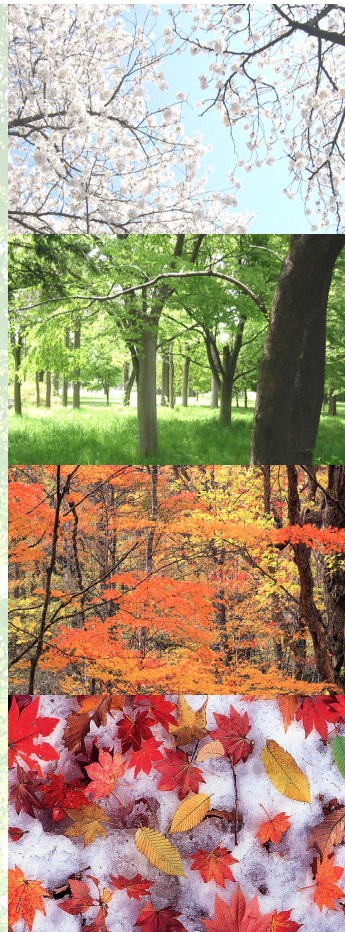
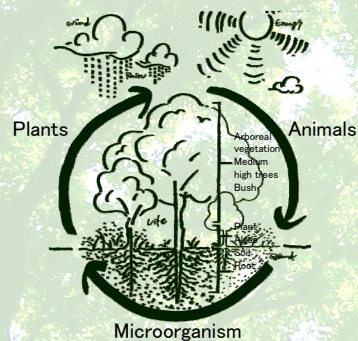
From the epochs beyond historical reach, we human being receive uncountable blessing from forest that brought up alive and many creatures. Non replaceable precious value of a forest to human being. We believe daily accessible forest can give an entrance of natural environment and can guide us to cooperation of human being with the nature. Comprehensive environment preserving function of the forest (soil, water, climate, and etc) is doubtlessly critical and indispensable to daily human life and environmental foundation under disaster of modern cities.



Forest City requests a forest i.e. in the city, in the neighborhood.

Why is it forest?

Forest, makes a great 3-D space from the ground with a root to the green canopy, where many creatures live in. And then, natural circulation system supported by the blessed sun beam and ecological system makes a forest called the origin of the nature.



Understanding richness of natural environment through daily accessible forest



Comfortable sweet wind
Pure fresh air
Panoramic view in green color
Colors and harvest of seasons
Bright natural space of forest with sunbeam through green leaves
Quiet happiest moment in the nature

Real estate value and high ranking grade
Endorsed by the location facing a forest



One of the world's top modern cities, New York
No necessary to say that the value of the Central
Park facing residential area is of course 20 to 30
percent higher than the surrounding area.
The photo shows the park side residences and
the park side hotels

Why creating forest in the city? Why it should be created in the neighborhood?

Varieties of natural blessing factors and characters of forest;such as green fresh air, sounds, colors, light, changing seasons, slowly passing time in the forest, including environment preservation function, all of such points can be received by us human being only when we can have direct contact with the forest. How wonderful, How precious thing if we can have direct contact with forest in very usual daily life. Forest City, it start from creating beautiful forest in the city very close to our daily life.

*Time spending in the forest,
Environment of forest,
Small creatures of forest,
Dialog with forest,
etc*

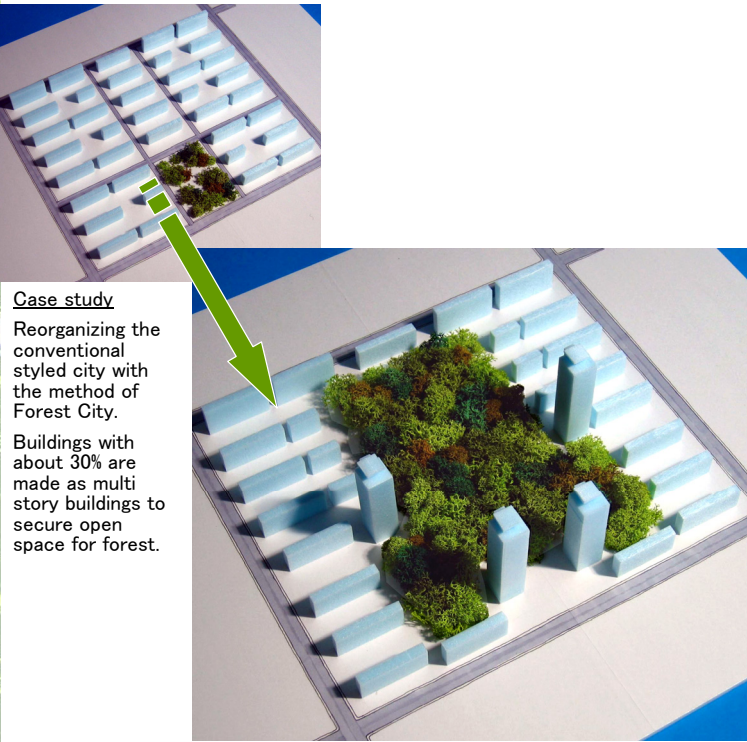
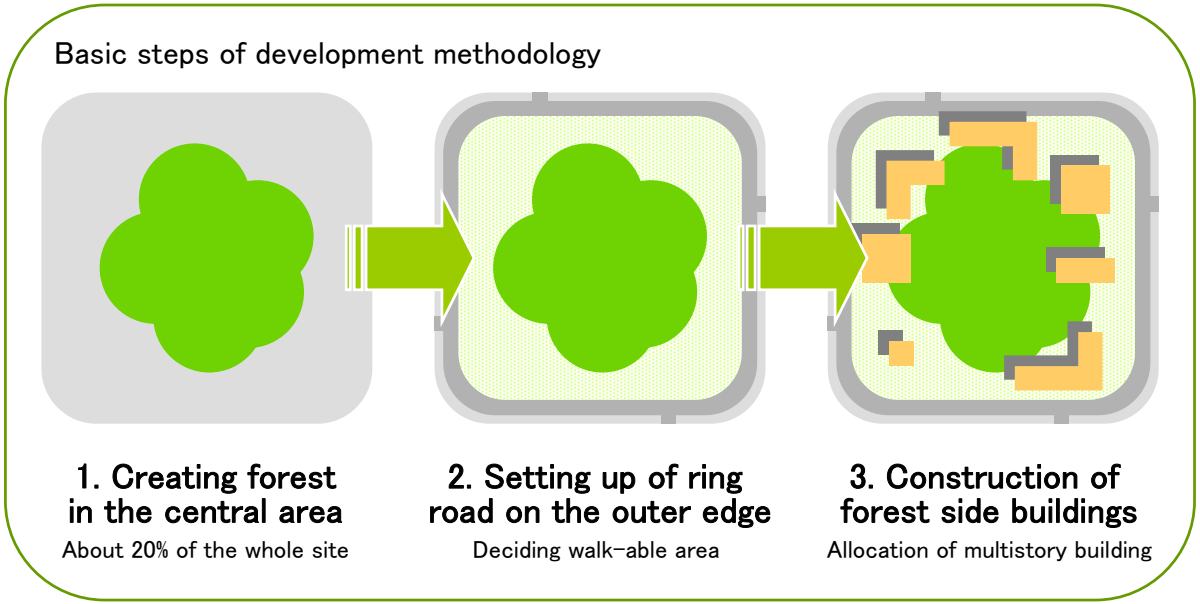
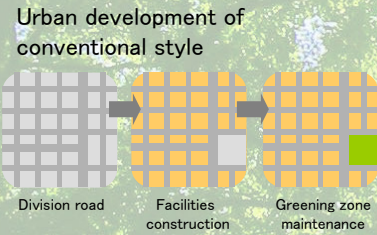
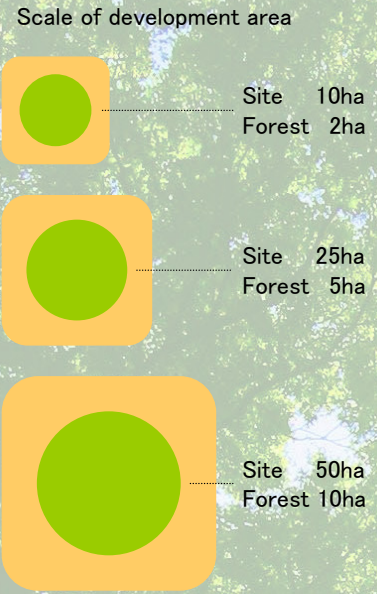


*What connecting us with
Natural environment*

Topic – Greening environment compared by amount of green plant

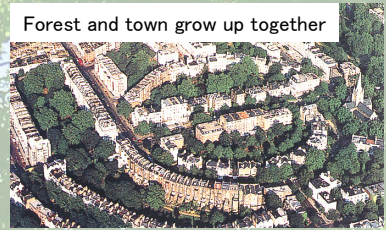


Development method of 「EGEC」- Urban environment that connects the forest and people

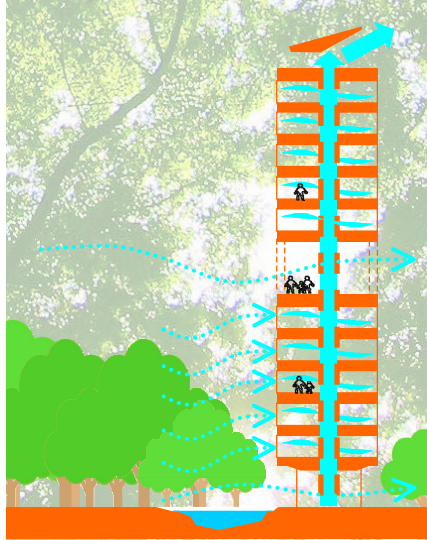


Green effect of Forest City development

- Forest rate 20%
- Greening rate 50%
- Green area per resident 15m²
- Distance between living area and forest 0 to 100m



The daily accessible forest are important as well as large scaled forest in the city





Planned number of houses: 2000 houses
Planned population: 6,000 to 8,000 residents
Population density: 300 people / ha
Development volume: 100 to 200%



Planned number of houses: 3000 houses
Planned population: 9,000 to 12,000 residents
Population density: 400 people / ha
Development volume: 200 to 300%

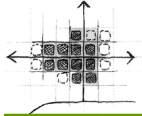


Planned number of houses: 4000 houses
Planned population: 12,000 to 16,000 residents
Population density: 500 people / ha
Development volume: 300 to 400%

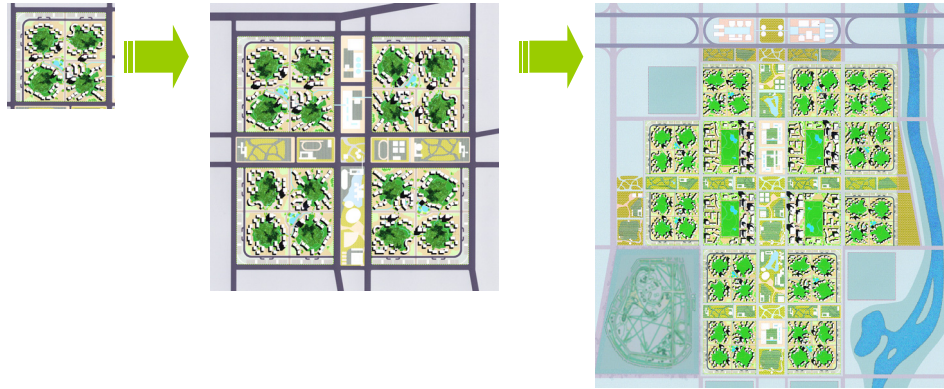


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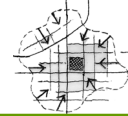
Step processing of development – Standing on global environment



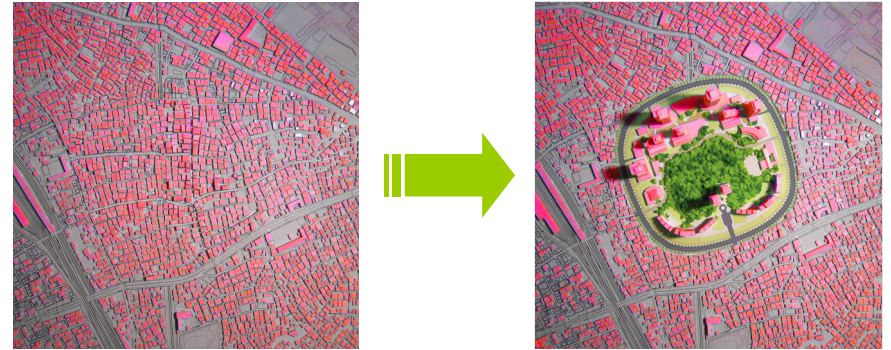
New town development



“Relational growing up of city with forest”



Redevelopment of existing city



“Forest cell reproduces the city”

Forest City 「EGEC」 that connects ecology environment of the city

Global environment

Urban environment

- The power to support comprehensive potentiality and fascination of forest



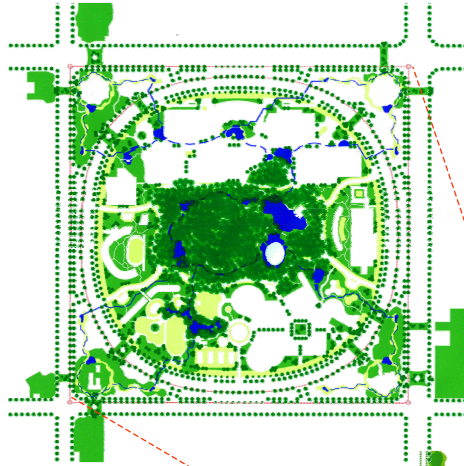
Diversified but stable environment such as forest is time-wise, space-wise supported by varieties of vegetation, animals and microorganisms that give mutual inter relative connection each other.

- Forest-creation standing the original nature of the area

Rich and strong original ecologic environment of the area – Forest is necessary for urban human life and neighboring environment.

- Forest restoration technology

Ground was once covered with rich forest. Nowadays, the research made on the utilization of the microorganism "Mycorrhiza" that makes cooperation with tree root is actively executed and glorious success is achieved in restoration of forest in severe conditioned area of natural conditions.



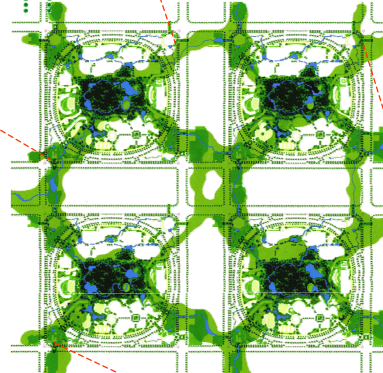
① Forest is the nest of the creatures

Forest as large mass of nature

Large forest can supply chances to small creatures to find the way of maintaining their life and place to live in. When the forest exist as large mass of nature in the environment, it can afford varieties of conditions from sun-beam blight edge area to deep dark green forest where varieties of species can live in. Especially for such ecologically sensitive species and period the deep green forest in the center where influence given from outer world becomes mild can supply precious inhabitation area.

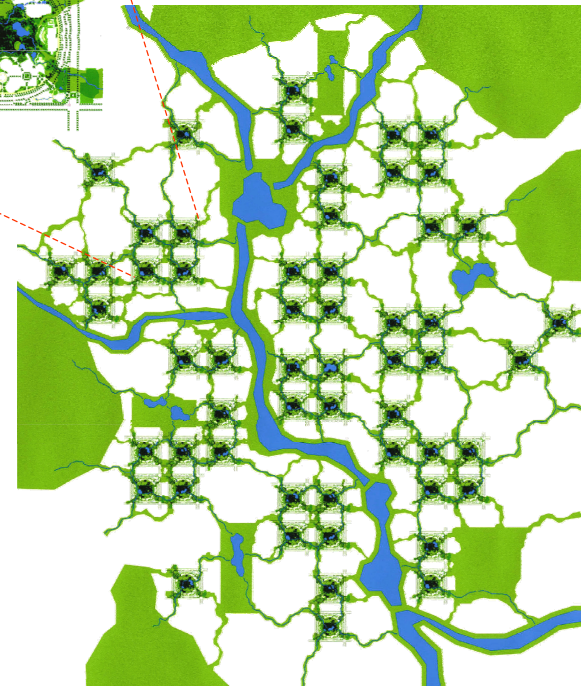
Ecology that expands around forest

Diversified ecologic environment with more multiform aspects can be formed along with the growing up of roadside trees, meadows, field, as well as waterside spaces such as brooks and ponds around forest.



② Ecology network formed by connecting forests

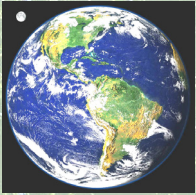
Sustainable ecologic environment in the urban area can be founded by the diversification of forest and flexible degrees of free accessibility of creatures moving route, because it enables active life of creatures and various living forms (breeding, diet, rest, and etc) of them.



③ Combination of ecologic infrastructure and the city

The city system connected with regional large environment system – Ecologic Infrastructure is finally build up when the network of forest and ecology extends gradually along with the growing up of Forest City. In this moment peoples accessible living environment can become vital one based on the green effect supported by the diversification of nature such as forest creatures, light, wind, and air etc.





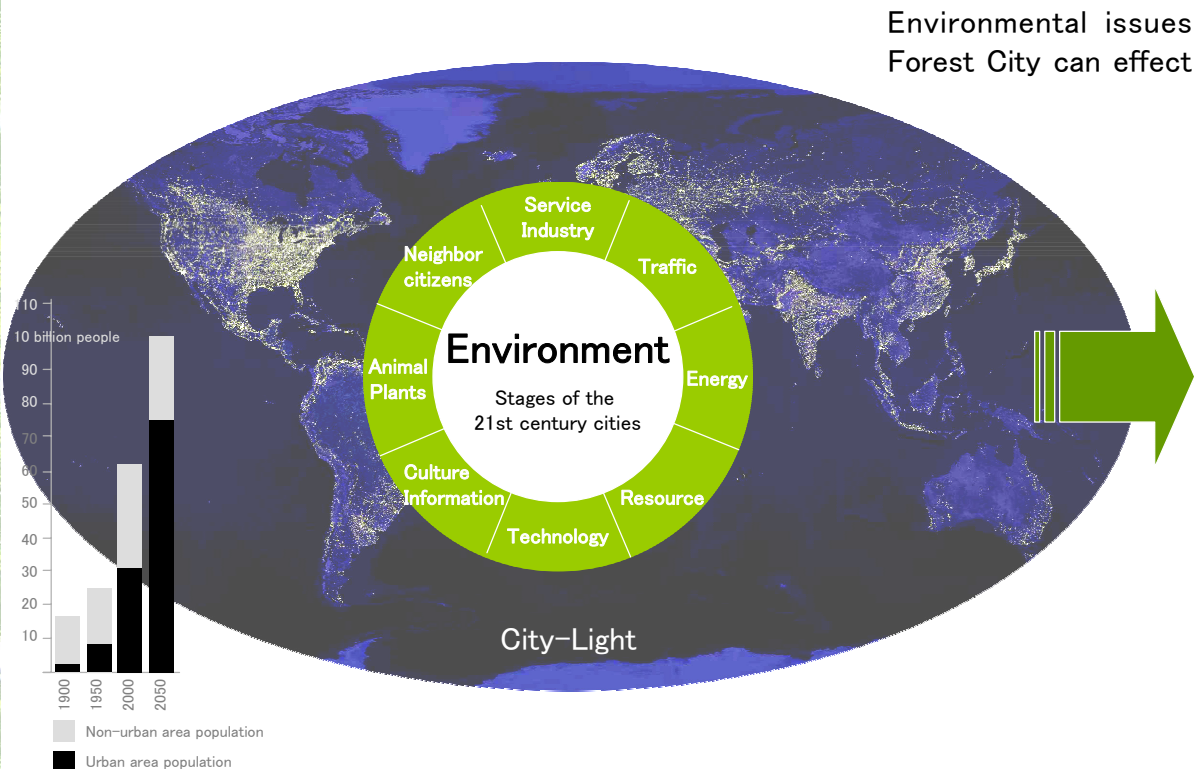
Limitation of global resources
Natural ecologic living right
Responsibility to future generation

Environmental problem of global level

- **Global warming**
Heat-trapping gas (CO₂ and others total six gases) became thicker by 3–4% in this ten years and it is increasing annually by about 0.1% of atmospheric density ratio.
- **Depletion of ozone layer**
The rate of ozone layer destruction became 1.5 times in ten years.
- **Acid rain**
- **Oceanic pollution**
- **Waste**
- **Deforestation**
30% of global land is covered by forest, however, deforestation is wrecking it with the annual average deforestation ratio of 0.24% (9,400,000ha) which equals to 43 times higher than the same area of Tokyo city.
- **Biodiversity**
Now 5,611 species are recognized as extinct and threatened animals. (which equal to 2% of all types of animal)
- **Desertification**

Global environmental solutions achieved by aggressive activities through urban development

Forest City can indicate solution for global environmental issues from the standpoint of urban development aiming creation of the new urban development where people can continue urban lifestyle and in the same time can contribute for global environmental issues



Urban population reaches twice or more than today in 40–50 years

About 6.2 to 6.3 billion people live in the world, and about **60%** of them live in urban area. It is considered that the global population reaches 10 billion people in about 40 to 50 years, and it is expected that **80%** of them will be living in urban area. Furthermore, even those who live outside of urban area, they are considered to have much stronger relation with cities than today. In other words, subjects of urban development might become large factor and have closest relation with various problems that may be generated in the future.

1

Energy saving

- Natural energy
- Next generation energy (fuel cell)
- Energy recycling
- Cosmopolitan/Building heat load
- etc

2

Resource saving

- Water
- Waste
- Construction material
- etc

3

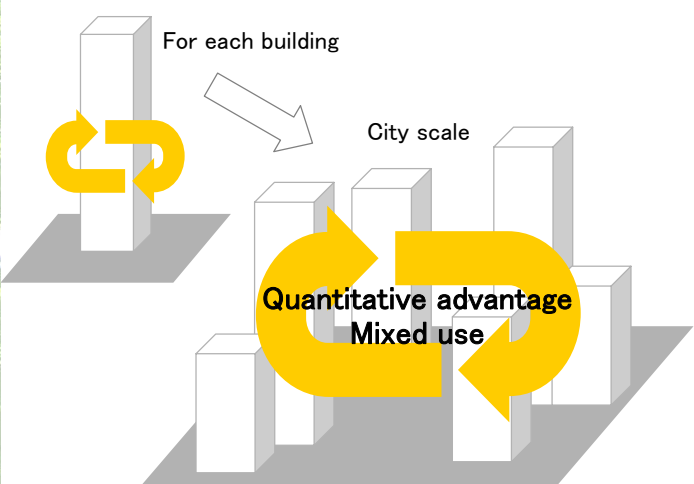
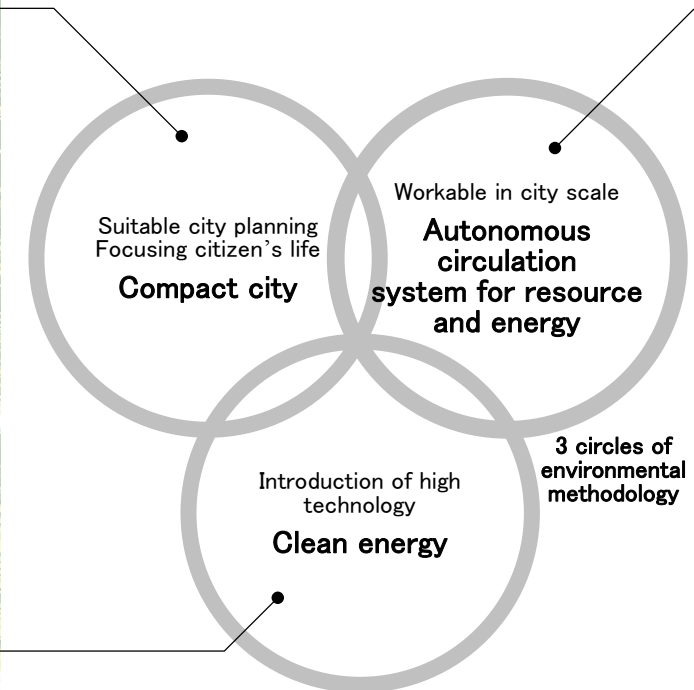
Urban pollution alleviation

- Heat island
- Air pollution (CO₂, etc)
- Traffic hindrance
(Exhaust gas, noise, and accident)
- etc

3 circles and their effects to be introduced to Forest City 「EGEC」- Environment with autonomous circulation systems



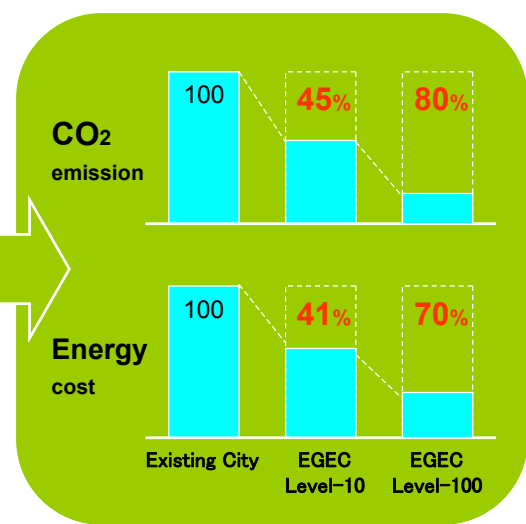
Foundation of city with less negative environmental impact is projected through designing of walk-able urban area



EGEC system implemented under entire city scale
Energy saving, Resource saving and alleviation of urban pollution

Environmental effect target

Case study in the development model



*Level-10 and 100 indicate the availability of clean energy.
*In Level-100, such technology as fuel cells that practical use is expected in the near future is employed.

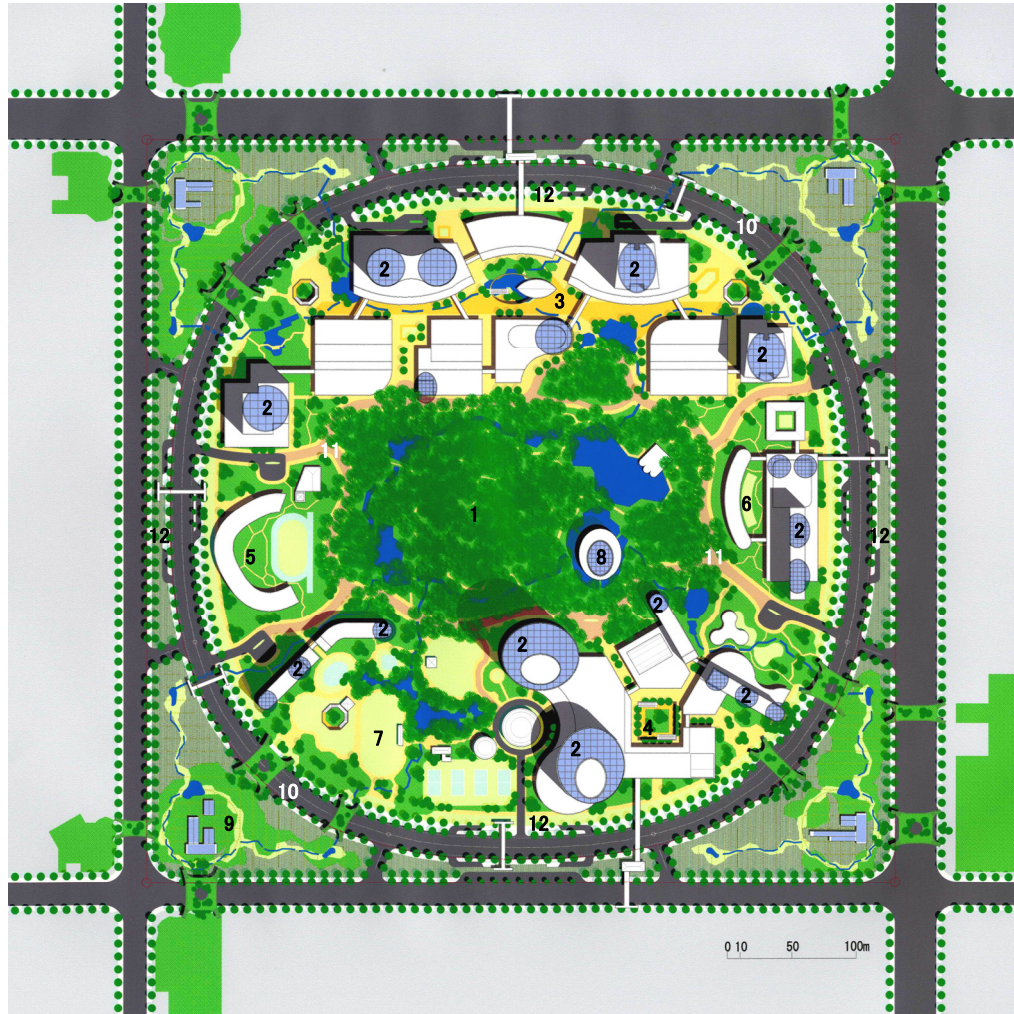
- Major technologies to be introduced
- Photovoltaic generation
 - Power supply storage
 - Cogeneration
 - Fuel cell
 - Garbage recycling
 - Water recycling
 - Super durable building

We can expect effective and full utilization of city scaled autonomous circulation system from the view of economic standpoint when this is mixed under large scaled volume merit of energy, waste recycling system and compact sized urban recycling facilities. In the urban development model used in this study, it was succeeded to achieve large environmental effect under entire city scale by consolidating total energy supply and by leveling the fluctuation of energy load required from each building.



Topic - In one of the energy measures of Japan, there indicated reduction of CO2 emission in the public welfare and the traffic private sectors. If the method announced in this Forest City plan are adopted at all residential areas of Japan, 34% of the total cut down amount required in the Kyoto Protocol target might be achieved only in the public welfare and the traffic private sectors, from which you can understand its large effect.

Basic development model 「EGEC」 3000 – Outlines



EGEC 3000

Site area : 25ha (inside the ring road), 8.6ha (outer edge area)

Planned number of houses : 3000 houses (120m²/floor area of each house)

Planned population : Residential 9,000–12,000 /Working 3,000–4,500 people
(population proportion day and night = 1:1)

Population density : 400 people/ha

Total floor area : 741,000m² (above the ground 600,000m²)

Development ratio : 240%

Area of each facilities :

·Residential houses 476,000m² ·Urban facilities 111,000m² ·Urban recycling facilities 10,000m²
·Traffic 144,000m² (underground parking lot for 3600 cars)

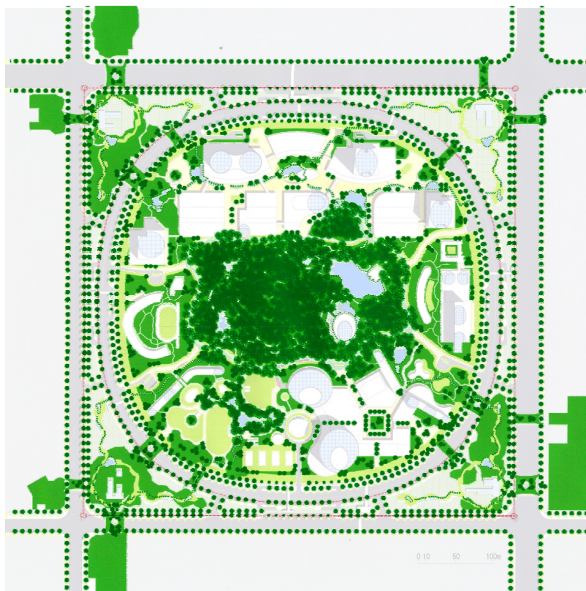
Ground utilization :

·Facility zone 14ha ·Forest zone 6ha ·Public park zone 2.6ha ·Productive green zone 5ha
·Road and passage 6ha

Plot

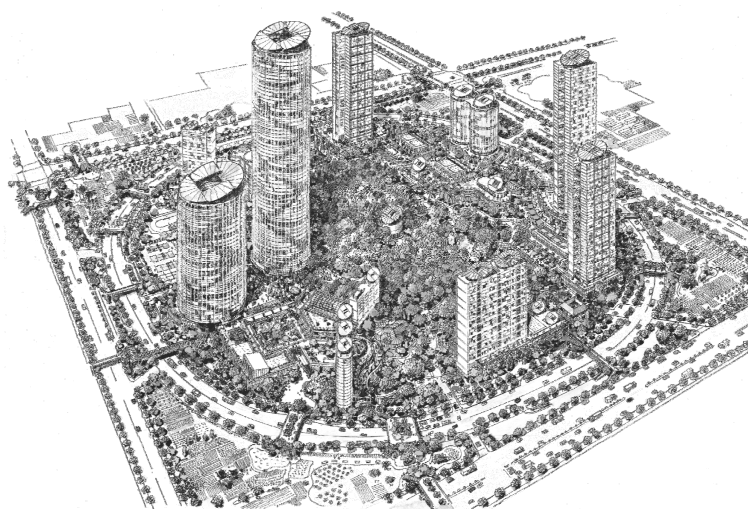
- 1 Forest
- 2 Residential buildings
- 3 Community commercial area
- 4 Community commercial plaza
- 5 Educational and cultural facilities
- 6 Medical and welfare facilities
- 7 Sports plaza
- 8 Urban Recycle Center
- 9 Vegetable field
- 10 Ring road (trunk line in the area)
- 11 Pedestrian major passages
(maintenance and emergency use route)
- 12 Parking lot gateway





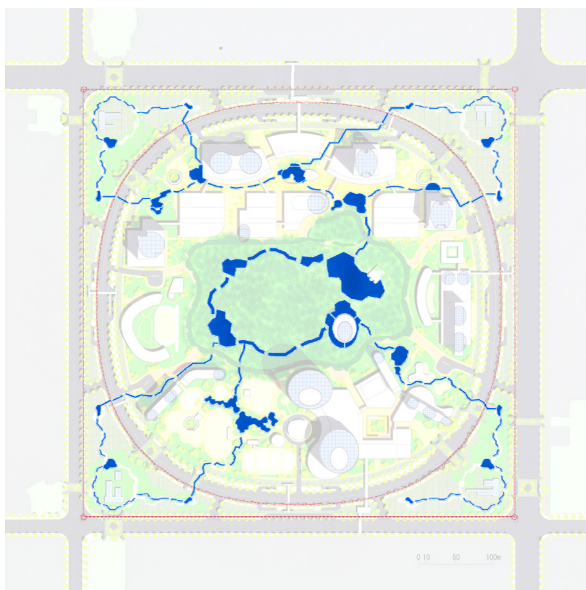
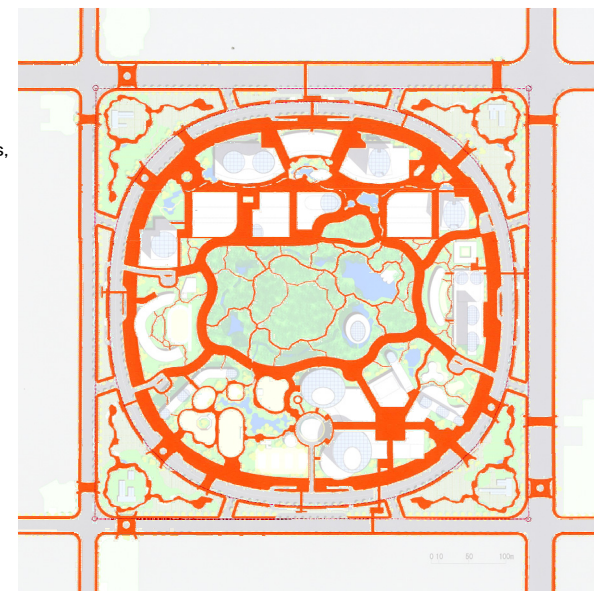
Forest and Green Network

Surrounding the central forest area, roadside trees, meadow, vegetable field, and waterside, etc. are properly arranged as if it made a picture of mosaic in order to create organic connection with diversified green environment and creatures' habitat. Ecologic connection between these greens, may create repercussion effects of area ecology and familiarizing with nature to urban living area.



Pedestrian Network

In the walk-able area (500m × 500m), people can freely walk around without being disturbed by automobile traffic. Pedestrian can enjoy such changes as properly allocated urban designed streets, squares and sunken areas that supports daily life convenience and bustle.

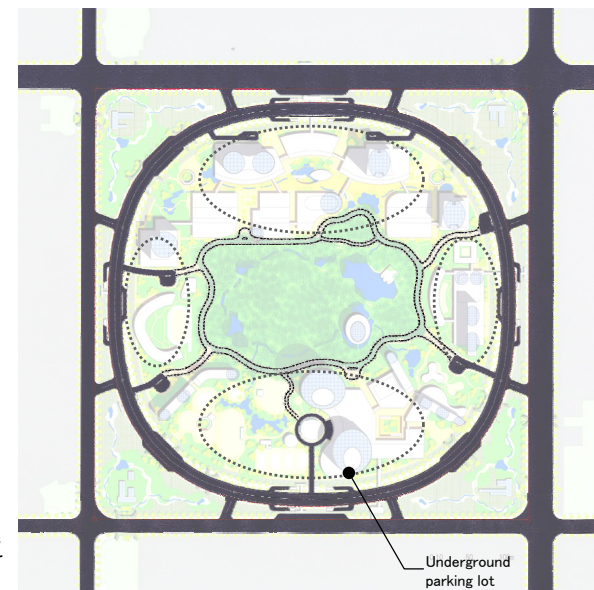


Water flow Network

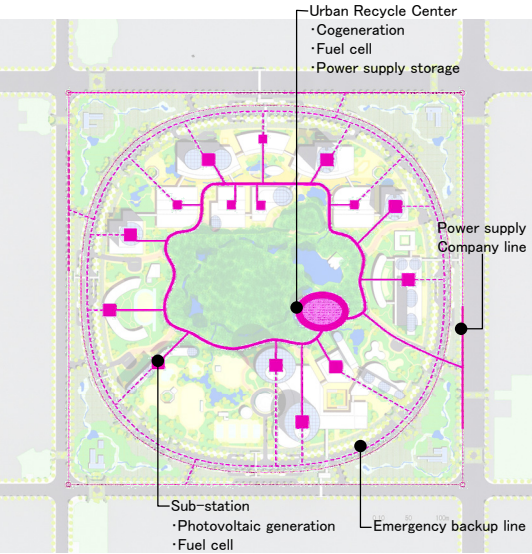
Water flow is positively arranged in the designing of each street, plaza, and in the forest area to vitalizing the landscape of urban view and ecological environment. Not only active utilization of rain water and waste reused water, but creation of water flow network with regional water system may form diversified ecosystem and high leveled living environment of the area.

Automobile Traffic Network

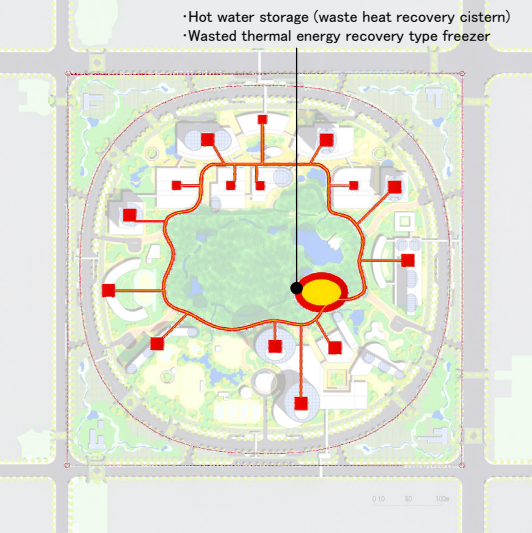
Ring road that circles the edge of the development area is allocated to secure walk-able area and to improve approach, accessibility to each facility. Entrance/exit of parking lot is limited to face this ring road for the purpose to restrict traffic inside the development area only for maintenance and emergency use vehicles. Another idea to introduce the new traffic system such as electric cart system might be feasible for better convenience.



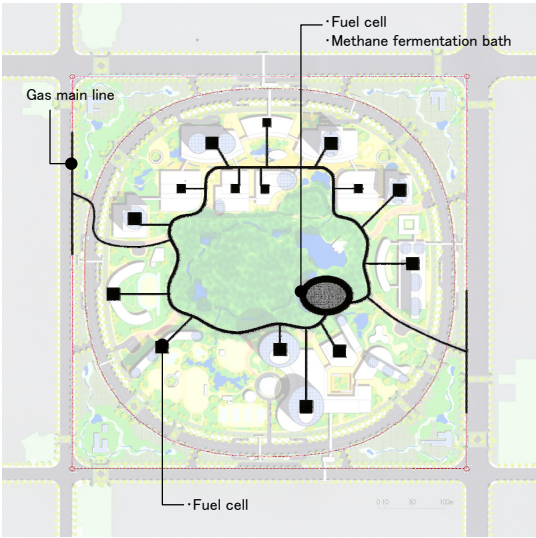
Urban recycling system
Power supply network



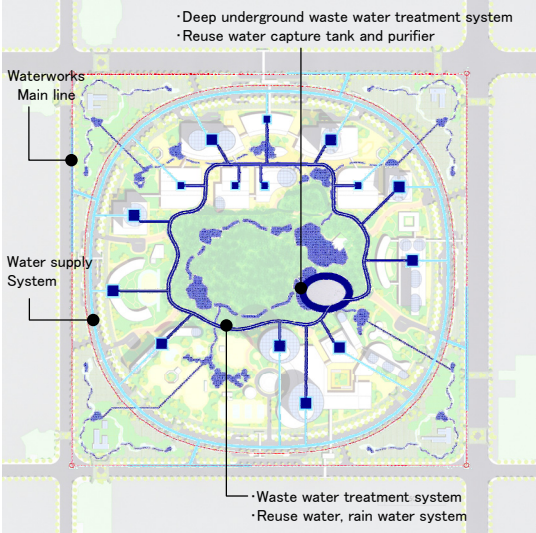
Urban recycling system
Thermal energy utilization network
Hot water and chilled water (air conditioning for facilities)



Urban recycling system
Hydrogen (gas) network

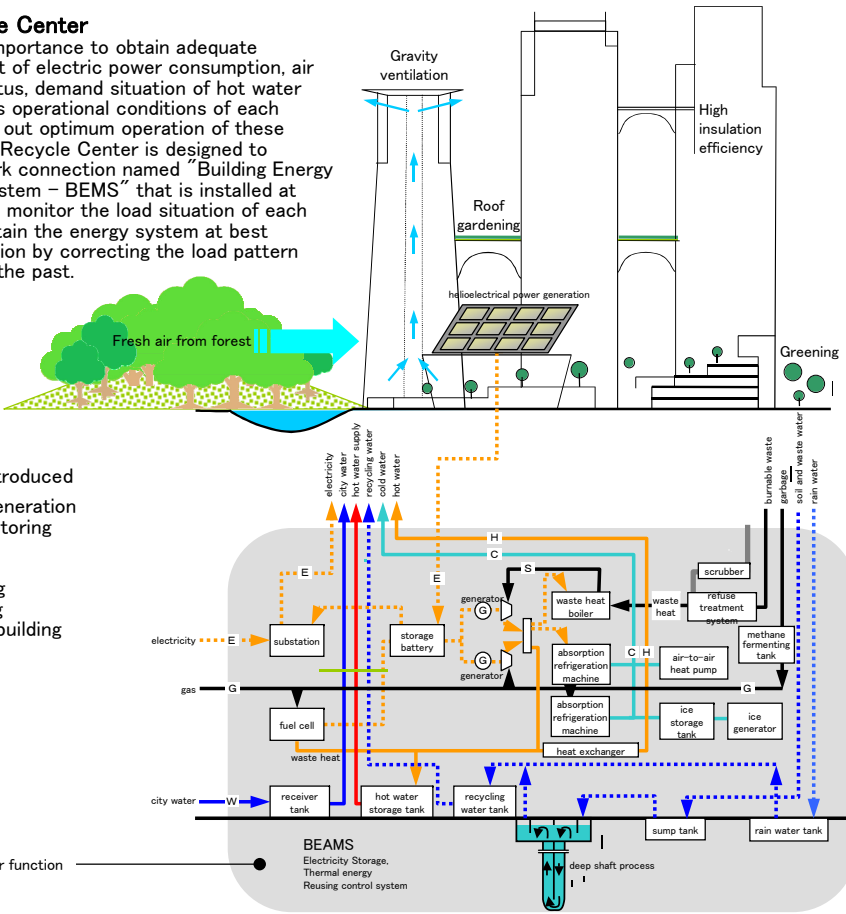


Urban recycling system
Water supply network



Urban Recycle Center

It has the key importance to obtain adequate monitoring result of electric power consumption, air conditioning status, demand situation of hot water supply as well as operational conditions of each system to carry out optimum operation of these systems. Urban Recycle Center is designed to establish network connection named "Building Energy Management System – BEMS" that is installed at each building, to monitor the load situation of each building to maintain the energy system at best operating condition by correcting the load pattern accumulated in the past.



Technologies introduced

- Photovoltaic generation
- Power supply storing
- Cogeneration
- Fuel cell
- Waste recycling
- Water recycling
- Super durable building

Urban Recycle Center function

Super durable building
LCCO₂ comparison of concrete

		Normal Concrete	Super Durable Concrete		
			100 years type	200 years type	500 years type
LCCO ₂ (Amount of t-CO ₂ per 100m ³)	Manufacturing stage	47.51	51.22	54.91	69.52
	Construction stage	6.29	6.29	6.29	6.29
	Demolition stage	2.88	2.88	2.88	2.88
	Recycling stage for road material	0.76	0.76	0.76	0.76
	Total	57.44	61.15	64.84	79.45
	Amount per one year's use	0.8837	0.6115	0.3242	0.1589

Remarks:

- 1) Lifetime of normal concrete has been assumed to be 65 years.
- 2) Manufacturing, construction and demolition of re-bars and forms have been taken into account.

Details of Forest City EGEC announcement

August, 2005, Urban renewal and environmental forum

- Sponsoring
Nikkei Business Publications,Inc.
- Backup
Japanese Ministry of Land, Infrastructure and Transport
Japanese Ministry of Environment
Japanese Cabinet Office
Japanese Ministry of Economy, Trade and Industry
Municipality government office of Tokyo Japan

September, 2005, World Sustainable Building Conference in Tokyo (SB05 TOKYO)

- Sponsoring
Japanese Ministry of Land, Infrastructure and Transport
- Co-sponsoring
International Council for Research and Innovation in Building and Construction (CIB)
International Initiative for a Sustainable Built Environment (IISBE)
United Nations Environment Program (UNEP)

Cooperated research and development team



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