



Research Activities for Low Carbon Society in KOREA

2009. 4.

National Institute of Environmental Research KOREA

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National Institute of Environmental Research



History

July 1978

- Established as the National Environmental Protection Institute (NEPI) under the Ministry of Health and Social Affairs

Jan. 1980

- NEPI was incorporated into Environmental Administration

Oct. 1986

- NEPI was reorganized the National Institute of Environmental Research (NIER) (3 departments, 2 divisions and 14 offices)

July 2000

- Moved to Environmental Research Complex at Incheon

July 2005

- Reorganized focusing on research functions covering an Environmental Media

March 2007

- Created Environmental Health Research Department
- (6 departments, 24 divisions and 6 centers)

April 2008

- Reorganized focusing on Climate Change Research

Vision

- Sustainable environmentally friendly country establishment

Mission

- Provide environmental policy supports based on sound science

Aim

- Develop into one of the 6 largest environmental research centers in the world in 10 years

Staff

Total	Research	Administration	Technician
297	222	31	44

※ Temporary researcher : 450, Postdoctoral researcher : 5

Budget

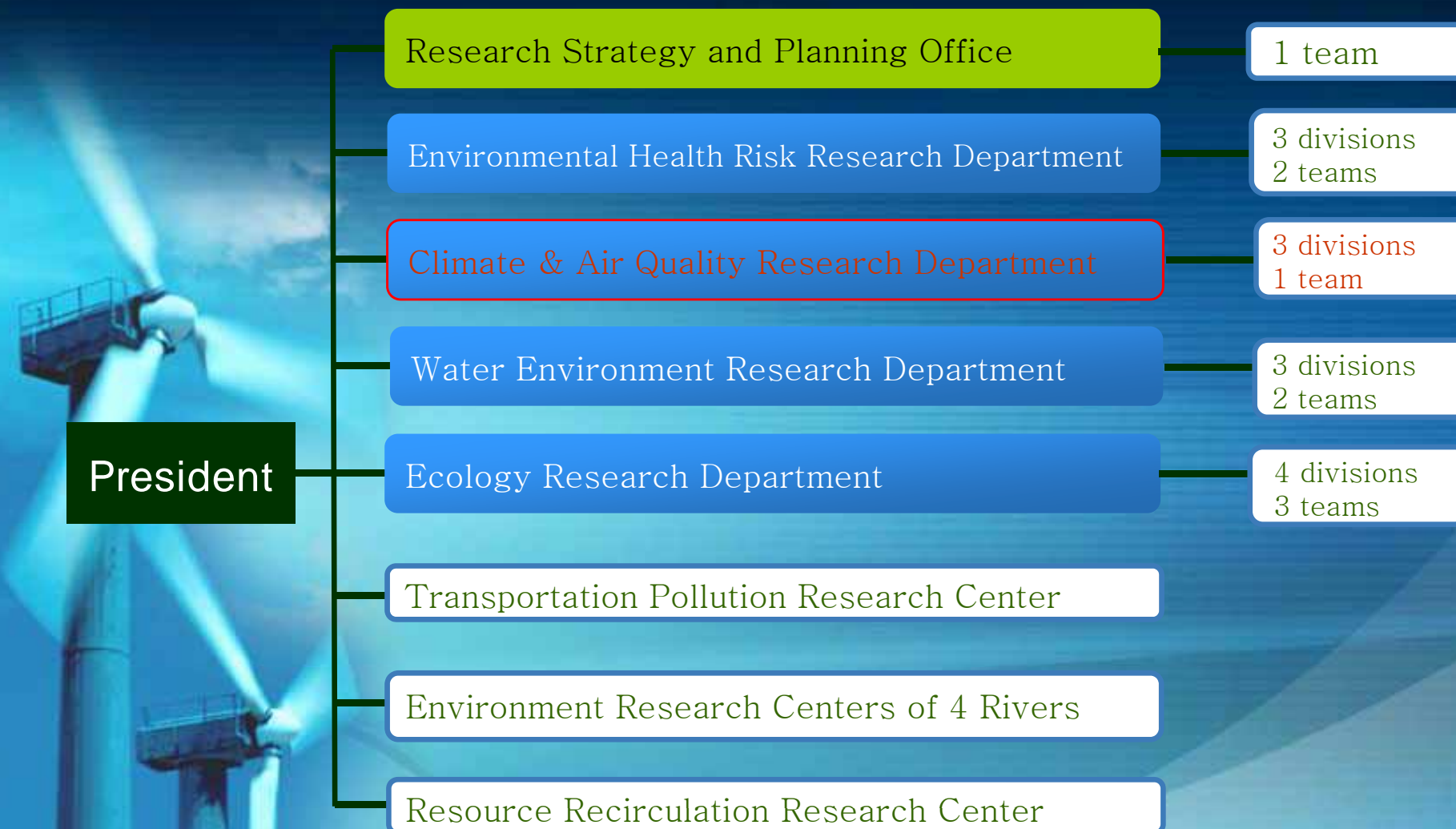
(Millions of USD)

Section	2007	2008
Total	36.683	43.786
Environment Research Project	10.153	12.126
Research Infrastructure	4.006	6.842
Salary	11.520	12.904
Operation Cost	11.914	11.914

※ Exchange Rate : USD 1 = KRW 1,150 as of September 2008

Organization

- 4 Departments, 13 Divisions and 6 Research Centers



Location



II

Toward Low Carbon Society



Toward Low Carbon Society

Housing, Food, Clothing

- Cool Biz
- Food Mileage
- Carbon zero building

Transportation

- Carbon zero town
- Public transportation
- Distribution system improvement

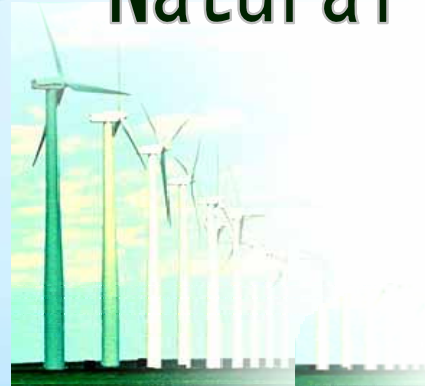
LCS

Industry and Economy

- Energy efficiency
- Low energy industry
- Resource-recycling economy

Natural Energy

- Sun light
- Wind power
- Ground heat



Clothing

High Carbon Society (Present)

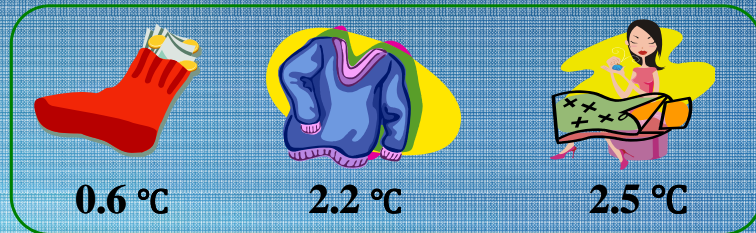
- Fast clothing
 - CO₂ emissions : production 56%, laundry 33%
- Fully dressed up at work in summer??



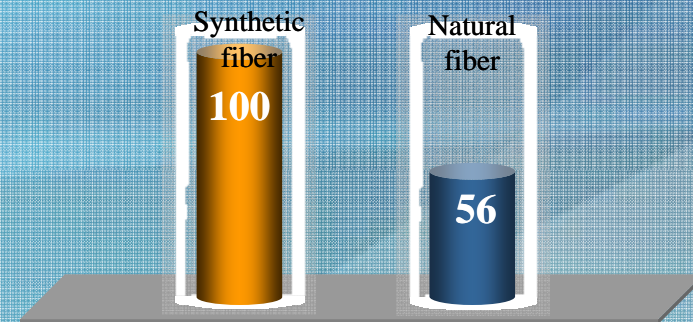
- Short pants at home in winter??
 - To raise 1°C , energy consumption increase 5%

Low Carbon Society (Future)

- Slow clothing
- Cool Biz and Warm Biz
 - without a tie : wind-chill 2°C ↓
 - with a blanket : wind-chill 2.5 °C ↑



- Buying low CO₂ emission clothing

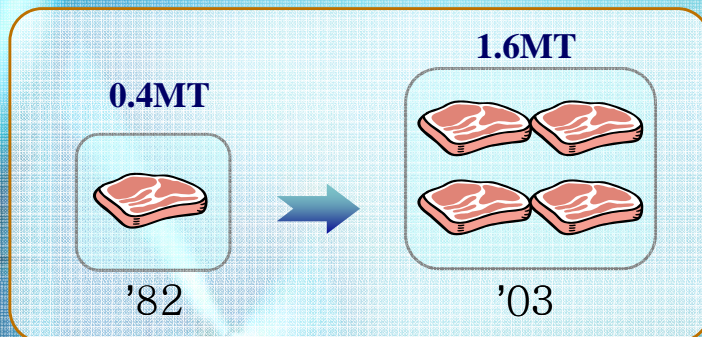


GhG emission comparison

Food

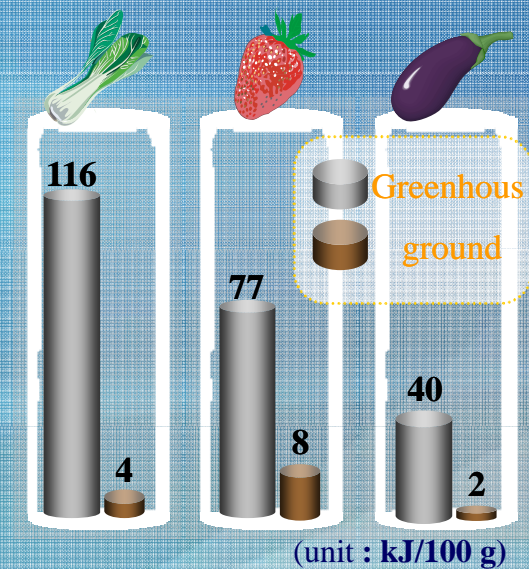
High Carbon Society (Present)

- High food mileage (2nd after Japan)
 - Japan (7,032 ton·km/yr·cap), Korea (6,620), U.S.A (1,015)
- Meat consumption in Korea : increased 4 times from '82 to '03
 - Meat emit 25 times more CO₂ than vegetable



Low Carbon Society (Future)

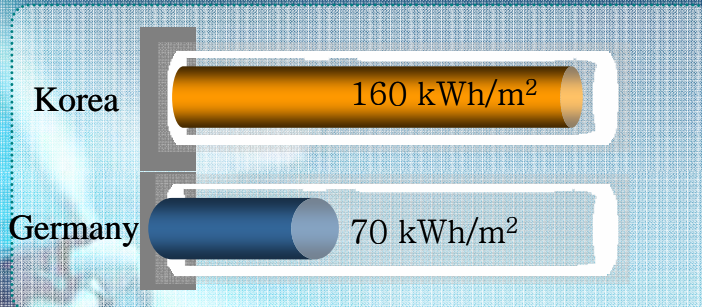
- Low food mileage food consumption
 - Local food
- Decrease meat consumption
Increase vegetable consumption
- Food of the season consumption



Housing

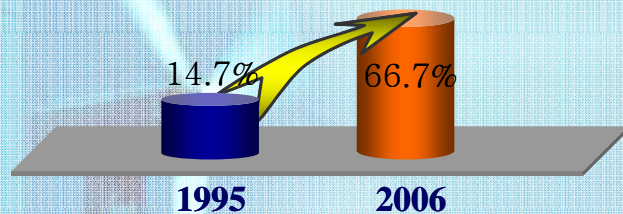
High Carbon Society (Present)

- High heating and cooling energy consumption (2.3 times higher than Germany)



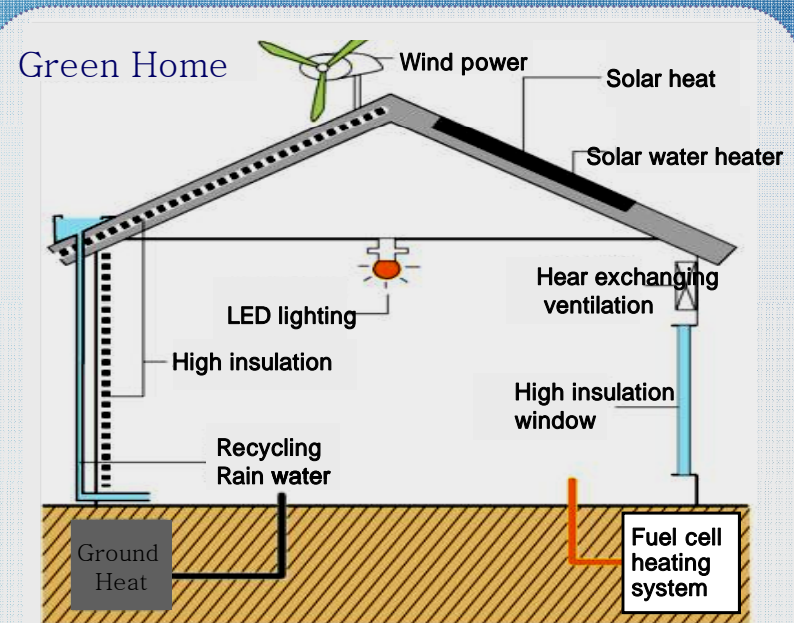
- Building structure losing a lot of heat - ceiling/outer wall/window etc.
- Home appliance becoming bigger

Over 500 L regrid. diffusion



Low Carbon Society (Future)

- High insulation & eco-friendly materials
- High efficiency appliance, lighting & heater
- Recycle rainwater and roof planting

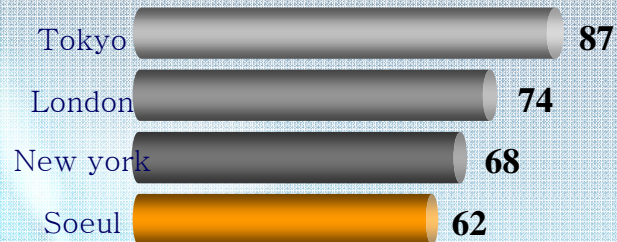


Transportation

High Carbon Society (Present)

- A Less use of public transportation

Use of Public Transportation(%)

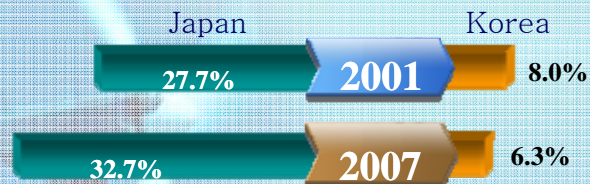


- Low efficiency transportation system

- Empty carriage rate : Korea('05, 32%), U.S.A(27), U.K.(28)
- Goods traffic('05 Road 95.9%, Railway 1.2%)

- Preferring bigger cars

Small car



Low Carbon Society (Future)

- Establishing ITS

- Improve LRT system
- Reducing empty carriage
- Increase railway traffic



- Walking and biking

- Small car, Electric vehicles etc

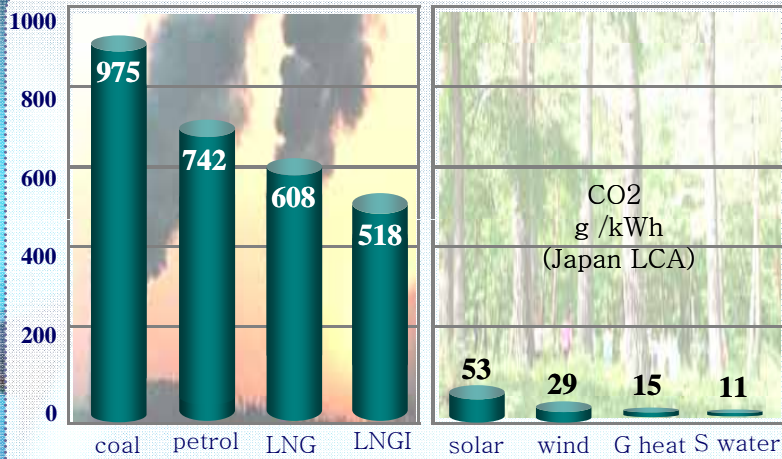
- Minimize moving distance



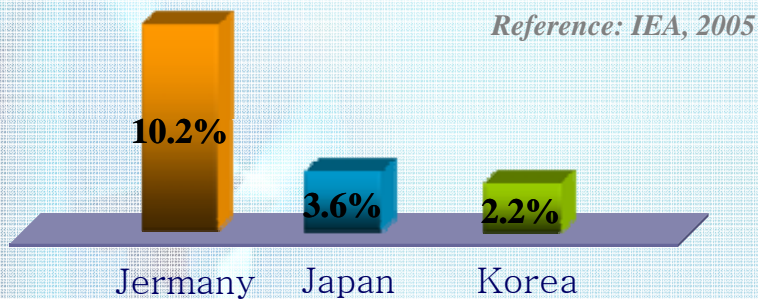
Natural Energy

High Carbon Society (Present)

- GHG emission from fossil fuels



- Renewable energy ('05 :2.2%)

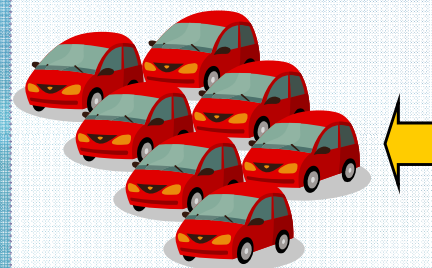


Low Carbon Society (Future)

- Small scale power generation with natural energy



- Increase sinks of GHG by planting
- 7 passenger cars = forest 1 ha



III

On going Researches and Future Plans



Major 5 research field of NIER

Low Carbon Green Growth

Priority

Deciding priority of tasks

Network

Expert & specialist network

GHG emission
Inventory

Low
Carbon
Society

Adaptation
&
Monitoring

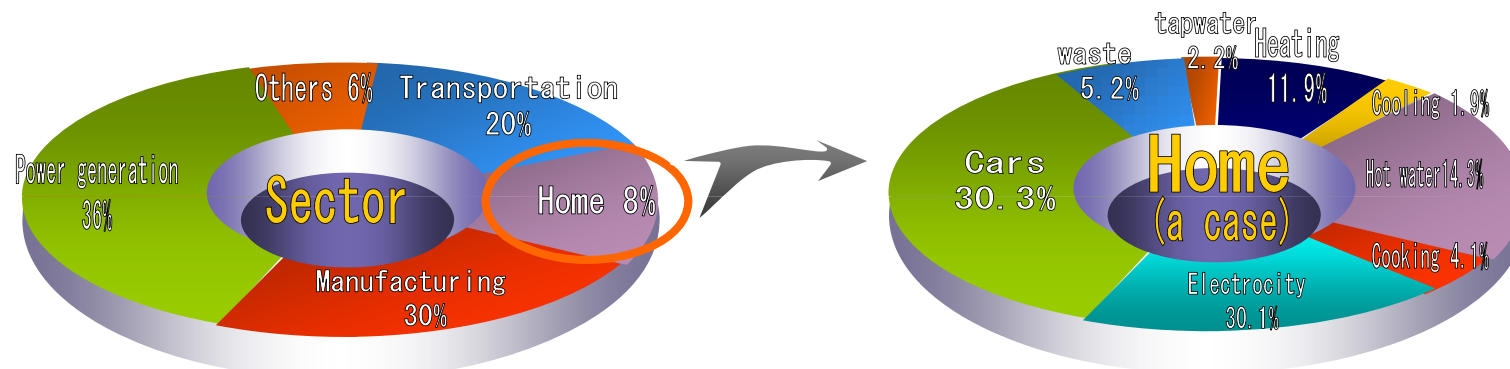
GHG reduction
from
Infra facilities

Carbon
Zero Building

GHG Emission Inventory

- GHG emission inventory development
- Prospect future GHG emission and reduction assessment

- Establish GHG emission Data base (GHG-CAPSS)
 - Developing Country specific emission factor

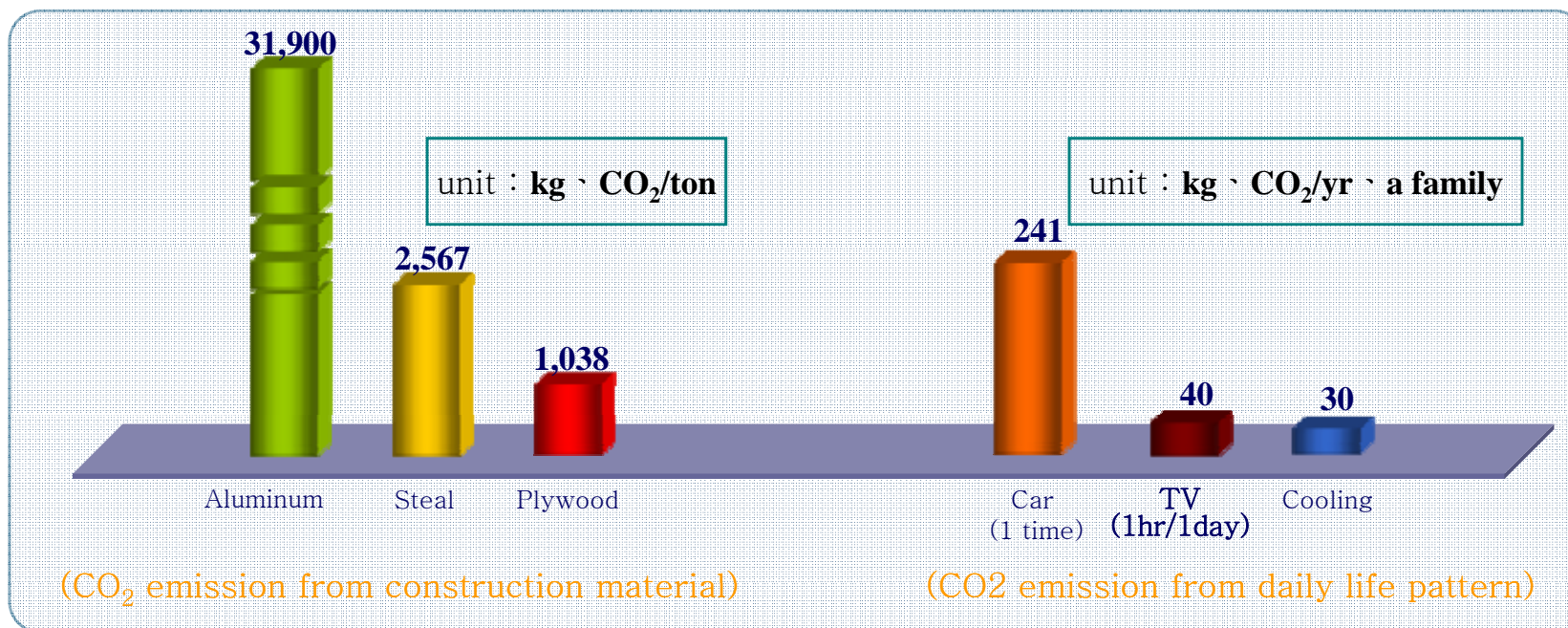


- Develop GHG prospect & reduction assessment model (modifying AIM, MARKAL etc)
- Assess GHG reduction technologies and policies

Establishing low carbon society

- Basic CO₂ emission factor calculation for products, daily life pattern
 - ➔ To guide people to practice saving energy

- Food mileage calculation
- Life cycle assessment (LCA) for major products and establishing D/B
- Investigate CO₂ emission from daily life pattern

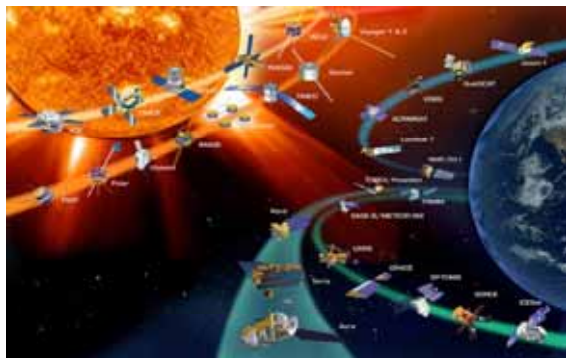


Adaptation and Monitoring

- Climate Change Risk Assessment and Long term monitoring of the impact

➔ Minimize the impact and risk of climate change

- Long term monitoring of climate change
 - Develop integrated modeling system
 - Monitor CO₂, Ozone, Aerosol by a satellite
- National Comprehensive Plan for Climate Change Adaptation
 - Ecosystem adaptation program



GHG reduction from infrastructure

🔦 assessing GHG emission of environmental infrastructure

➔ GHG reduction form env. infrastructure

🔦 Determin GHG emission by facilities

- waste water treatment, waste incineration, land fill , etc

🔦 Assessing GHG reduction and cost effectiveness

🔦 Distribution optimized technologies t



incineration



Food waste treatment



Waste water treatment

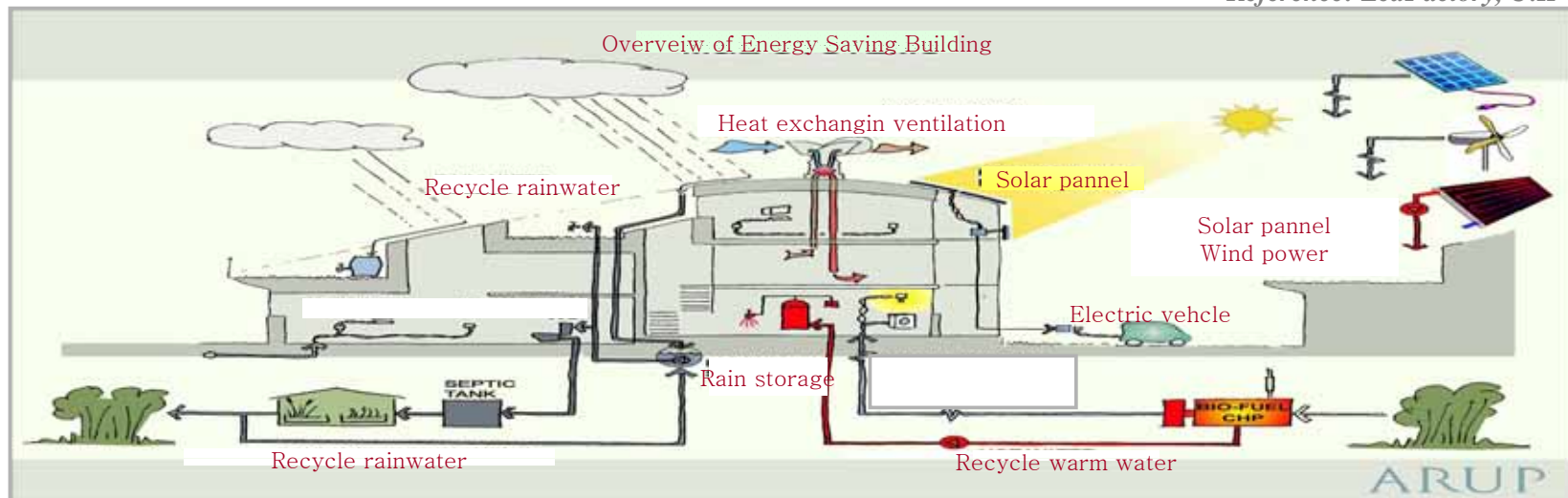


Bio treatment

Carbon zero building and eco-village

- Climate change research building will be constructed as the first carbon zero office building in Korea in '09~'10
- Minimizing energy consumption by optimizing insulation
 - High efficiency window, outer wall, roof planting
- All energy supplied by natural energy
 - Power generation by Solar light, wind, ground heat
 - surplus energy will be used for fuel cell

Reference: ZedFactory, U.K



IV

Expectations on LCS-RNet


 V

Expectations on LCS-RNet

- Promote information exchange and research cooperation among research institutions
 - Joint research on specific areas

- Promote dialogues between participating researchers and various stakeholders
 - International symposium on LCS

- Contribute to international political processes on climate change
 - Recommendations based on research outputs under the LCS-RNet

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Thank you for your attention!!!

