附件一、南韓「公共場所室內空氣管制法」

INDOOR AIR QUALITY CONTROL IN PUBLIC USE FACILITIES, ETC. ACT

Act No. 6911, May 29, 2003
Amended by Act No. 7562, May 31, 2005
Act No. 8011, Sep. 27, 2006
Act No. 8038, Oct. 4, 2006
Act No. 8155, Dec. 30, 2006
Act No. 8654, Oct. 17, 2007

Article 1 (Purpose)

The purpose of this Act is to protect health of the people using the following facilities and to prevent environmental hazards, by adequately maintaining and controlling the indoor air quality of the public use facilities and the newly-built collective housing.

Article 2 (Definitions)

The definitions of terms used in this Act shall be as follows: *<Amended by Act No. 7562, May 31, 2005>*

1. The term "public use facilities" means the facilities used by many unspecified persons;
2. The term "collective housing" means the collective housing under the provisions of Article 2 (2) 2 of the Building Act;
3. The term "pollutants" means gases and floating matters in the form of particles, etc., which cause air pollution in the indoor spaces, and are prescribed by the Ordinance of the Ministry of Environment;
4. The term "ventilation equipment" means equipments which let out the polluted indoor air, and let in fresh outdoor air, and maintain the air of indoor space in the comfortable status; and
5. The term "equipment for purifying air" means equipments which eliminate or reduce the pollutants of indoor space, and have been installed either within the ventilation equipment or separately from the said equipment.

Article 3 (Objects of Application)

(1) The public use facilities, which shall be governed by this Act, mean those of a size as prescribed by the Presidential Decree from among the facilities falling under each of the following subparagraphs: *<Amended by Act No. 7562, May 31, 2005; Act No. 8011, Sep. 27, 2006; Act No. 8654, Oct. 17, 2007>*

1. Subway stations (including passages for entrance, waiting rooms, station platforms and passages for transfer, and facilities attached thereto);
2. Underground road shopping districts (including the facilities of underground floor attached to a building on the ground);
3. Waiting rooms in the passenger terminals under the Passenger Transport Service Act;
4. Passenger terminals from among airport facilities under the Aviation Act;
5. Waiting rooms from among harbor facilities under the Harbor Act;
6. Libraries under the Libraries and Reading Promotion Act;
7. Museums and art galleries under the Museum and Art Gallery Support Act;
8. Medical institutions under the Medical Service Act;

9. Indoor parking lots;
10. Waiting rooms in the railway stations;
10-2. National and public nurseries, corporation nurseries, workplace nurseries and private nurseries under Article 10 of the Infant Care Act; and
11. Other facilities as prescribed by the Presidential Decree.

(2) Collective housing subject to application of this Act shall be those falling under each of the following subparagraphs, and those newly built above the size as prescribed by the Presidential Decree: *<Amended by Act No. 7562, May 31, 2005>*

1. Apartment houses;
2. Tenement houses; and
3. Boarding houses.

Article 4 Deleted. *<by Act No. 8038, Oct. 4, 2006>*

Article 5 (Standards for Maintenance of Indoor Air Quality, etc.)

(1) Persons liable for managing the public use facilities, such as their owners, occupants or managers (hereinafter referred to as the "owners, etc.") shall manage the facilities by satisfying the standards for maintenance of comfortable air quality within the public use facilities.

(2) Standards for maintenance of air quality under the provisions of paragraph (1) shall be prescribed by the Ordinance of the Ministry of Environment.

(3) When it is deemed necessary by taking account of the peculiarities of local environments, the Special Metropolitan City, Metropolitan City or *Do* (hereinafter referred to as the "City/*Do*") may lay down the standards for maintenance of air quality to be applied to the relevant City/ *Do* by the Municipal Ordinance of the said City/*Do* in a way stricter than the standards for maintenance of air quality as referred to in paragraph (1).

(4) When the standards for maintenance of air quality as referred to in paragraph (3) are laid down or altered, the Special Metropolitan City Mayor, Metropolitan City Mayor or *Do* governor (hereinafter referred to as the "Mayor/*Do* governor") shall promptly file a report thereon with the Minister of Environment.

Article 6 (Standards for Recommendation of Indoor Air Quality)

The Mayor/*Do* governor may make a recommendation to the owners, etc. of public use facilities so as to have them manage the facilities by satisfying the standards for recommendation as set by the Ordinance of the Ministry of Environment for maintaining a comfortable air quality, separately from the standards for maintenance of air quality under the provisions of Article 5 (1) in accordance with the peculiarity of the public use facilities. *<Amended by Act No. 8155, Dec. 30, 2006>*

Article 7 (Education, etc. for Owners, etc. of Public Use Facilities)

(1) Owners, etc. of the public use facilities shall undergo the education concerning a control of indoor air quality to be conducted by the Minister of Environment under the conditions as set by the Ordinance of the Ministry of Environment.

(2) The Minister of Environment may collect the expenses for education under the provisions of paragraph (1) from persons subject to the education, under the conditions as set by the Ordinance of the Ministry of Environment.

(3) The Minister of Environment may entrust the education under the provisions of paragraph (1) to the head of specialized institution concerned under the conditions as prescribed by the Presidential Decree.

Article 8 Deleted. *<by Act No. 8155, Dec. 30, 2006>*

Article 9 (Control of Indoor Air Quality of Newly-Built Collective Housing)

(1) Work executors of newly-built collective housing shall measure the indoor air quality of collective housing whose construction has been completed, and submit the results of said measurement to the head of *Si/Gun/Gu* (referring to the head of autonomous *Gu*; hereinafter the same shall apply), and make a publication thereof at the place of easy sights by the occupants, before commencing their occupation.

(2) Matters necessary for the items and methods of measurement of indoor air quality and the submission of measurement results and publication period and places, etc. under the provisions of paragraph (1) shall be prescribed by the Ordinance of the Ministry of Environment.

(3) Criteria for recommending the indoor air quality for maintaining the comfortable air quality of newly-built collective housing shall be provided by the Ordinance of the Ministry of Environment. *<Newly Inserted by Act No. 7562, May 31, 2005>*

Article 10 (Improvement Order)

In case where the public use facilities are not managed in conformity with the standards for maintaining the comfortable air quality provided for in Article 5, the Mayor/*Do* governor may order the owner, etc. of the relevant public use facilities to take measures necessary to improve or replace air cleaners or ventilation equipment in the public use facilities (hereinafter referred to as the "improvement order") for a fixed period under the conditions as prescribed by the Ordinance of the Ministry of Environment.

[This Article Wholly Amended by Act No. 8155, Dec. 30, 2006]

Article 11 (Restriction on Use of Construction Materials Generating Pollutants)

(1) The Minister of Environment may determine the construction materials which generate a lot of pollutants as prescribed by the Ordinance of the Ministry of Environment (hereinafter referred to as the "construction materials generating pollutants") in consultation with the heads of related central administrative agencies, and make a publication thereof under the conditions as prescribed by the Ordinance of the Ministry of Environment.

(2) Persons who establish the public use facilities (including the improvement and repairs of existing facilities) shall not use the construction materials generating pollutants which have been publicly announced by the Minister of Environment in accordance with paragraph (1).

Article 12 (Measurement of Indoor Air Quality)

(1) Owners, etc. of the public use facilities shall either measure the indoor air quality by themselves or have the persons as prescribed by the Ordinance of the Ministry of Environment measure it, and shall record and preserve the relevant results.

(2) The pollutants subject to measurement of indoor air quality, the frequency of measurements under paragraph (1), and other matters necessary for a measurement of indoor air quality shall be prescribed by the Ordinance of the Ministry of Environment.

Article 13 (Report and Inspection, etc.)

(1) When the Mayor/*Do* governor or the head of *Si/Gun/Gu* deems it necessary for the control of indoor air quality, he may have the owners etc. of the public use facilities or the work executors of newly-built collective housing file the necessary reports or submit the data, and may have the related public officials gain access to the relevant public use facilities or the newly-built collective housing and gather the pollutants, or inspect the related documents and facilities or equipments etc.

(2) When the Mayor/*Do* governor or the head of *Si/Gun/Gu* has gathered the pollutants under the provisions of paragraph (1), he shall entrust inspection agencies as referred to in the Ordinance of the Ministry of Environment with the inspection of polluted levels: *Provided*, That the same shall not apply to the case where the results of inspection may

be judged on the spot.

(3) Public officials who gain access thereto or perform investigations under paragraph (1) shall carry a voucher indicating their authority and present it to the interested parties.

Article 14 (Penal Provisions)

(1) Any person who fails to execute the improvement orders under the provisions of Article 10 shall be punished by imprisonment with prison labor for not more than one year or by a fine not exceeding 10 million won.

(2) Any person who has committed any acts of refusal, obstruction or avoidance of the access, inspection or gathering of pollutants by the related public officials under the provisions of Article 13 (1) shall be punished by a fine not exceeding two million won.

Article 15 (Joint Penal Provisions)

If the representative of a corporation, or an agent, an employee or any other employed person of a corporation or an individual has committed an act in violation of Article 14 in connection with the affairs of said corporation or individual, not only shall such an actor be punished accordingly, but the corporation or individual shall be punished by a fine as prescribed in the same Article.

Article 16 (Fine for Negligence)

(1) Any person who falls under any of the following subparagraphs shall be punished by a fine for negligence not exceeding 10 million won:

1. Person who has failed to comply with the standards for maintenance of air quality in contravention of provisions of Article 5; and
2. Person who has used the construction materials generating pollutants in contravention of provisions of Article 11 (2).

(2) Any person who falls under any of the following subparagraphs shall be punished by a fine for negligence not exceeding five million won:

1. Person who has failed to undergo the education concerning the control of indoor air quality in contravention of provisions of Article 7;
2. Person who has failed to submit and publicize the results of measurement of indoor air quality of the newly-built collective housing in contravention of provisions of Article 9, or has submitted and publicized in falsity;
3. Person who has failed to measure the indoor air quality in contravention of provisions of Article 12 (1), or failed to record and preserve the results of measurement, or recorded and preserved in falsity; and
4. Person who has failed to make a report or to submit the data under the provisions of Article 13 (1), or made a report or a data submission in falsity.

(3) Fine for negligence under the provisions of paragraphs (1) and (2) shall be imposed and collected by the Mayor/*Do* governor or the head of *Si/Gun/Gu* (hereinafter referred to as the "imposing authority") under the conditions as prescribed by the Presidential Decree.

(4) Any person who is dissatisfied with a disposition of the fine for negligence as referred to in paragraph (3) may appeal to the imposing authority within 30 days from the date of receiving a notice of the said disposition.

(5) When any person subjected to a disposition of the fine for negligence under paragraph (3) raises an objection under paragraph (4), the imposing authority shall promptly notify the competent court thereof, and the court in receipt of said notice shall bring the case to a trial for the fine for negligence under the Non-Contentious Case Litigation Procedure Act. *<Amended by Act No. 7562, May 31, 2005>*

(6) If neither an objection is raised nor is a fine for negligence paid within the period as referred to in paragraph (4), it shall be collected by referring to the practices of dispositions on default of local taxes.

ADDENDA

(1) (Enforcement Date) This Act shall enter into force one year after the date of its promulgation.
(2) (Transitional Measures on Existing Public Use Facilities) The owners etc. of the public use facilities at the time of enforcement of this Act shall be deemed to have installed the air cleaners and ventilation equipments under the amended provisions of Article 8: *Provided*, That the Mayor/*Do* governor may issue the improvement order under the provisions of Article 10 to the public use facilities managed not to meet the maintenance standards for air quality under the provisions of Article 5 to install the air cleaners and ventilation equipments under the provisions of Article 8. *<Amended by Act No. 7562, May 31, 2005>*
(3) (Application Example concerning Control of Indoor Air Quality of Collective Housing) The amended provisions of Article 9 concerning a control of indoor air quality of the collective housing shall apply starting with the portion of first applications after the enforcement of this Act for the approval of business plan under the provisions of Article 16 of the Housing Act, or for the permission of construction under the provisions of Article 8 of the Building Act.
(4) (Transitional Measures on Fine for Negligence) Previous provisions shall govern any imposition of fine for negligence on the offenses committed prior to the enforcement of this Act.
(5) (Amendment of Other Acts) Omitted.
(6) (Relations with Other Acts and Subordinate Statutes) In case where the previous Air Quality Control in Underground Locations Act or its provisions are quoted in other Acts and subordinate statutes at the time of enforcement of this Act, if there exist any corresponding provisions in this Act, this Act or the corresponding provisions in this Act shall be deemed to have been quoted in lieu of the previous provisions.

ADDENDA *<Act No. 7562, May 31, 2005>*

(1) (Enforcement Date) This Act shall enter into force on January 1, 2006.
(2) (Application Example to Control of Indoor Air Quality of Boarding House) In applying the provisions of Article 9 (1) and (2) and the amended provisions of paragraph (3) of the same Article, the amended provisions of Article 3 (2) 3 shall apply starting from the boarding house applying for an approval for project plans under Article 16 of the Housing Act or for construction permit under Article 8 of the Building Act.

ADDENDUM *<Act No. 8011, Sep. 27, 2006>*

This Act shall enter into force on January 1, 2008.

ADDENDUM *<Act No. 8038, Oct. 4, 2006>*

Article 1 (Enforcement Date)
This Act shall come into force one year after the date of its promulgation. (Proviso Omitted.)
Articles 2 through 11 Omitted.

ADDENDA *<Act No. 8155, Dec. 30, 2006>*

(1) (Enforcement Date) This Act shall enter into force on January 1, 2007.

(2) (Transitional Measures concerning Penal Provisions for Violating Improvement Order) The application of the penal provisions to the violation of the improvement order prior to the enforcement of this Act [including the improvement order provided for in the proviso of paragraph (2) of the Addenda of the Air Quality Control in Underground Locations Act amended by Act No. 6911 (referring to the contents of the Indoor Air Quality Control in Public Use Facilities, etc. Act, which are partially amended by Act No. 7562)] shall be governed by the previous provisions.

ADDENDA *<Act No. 8654, Oct. 17, 2007>*

(1) (Enforcement Date) This Act shall enter into force on the date of its promulgation. (Proviso omitted.)

(2) Omitted.

附件二、南韓空氣品質監測簡報資料

Eco-Harmonist
Korea Environment Corporation

Air Pollution

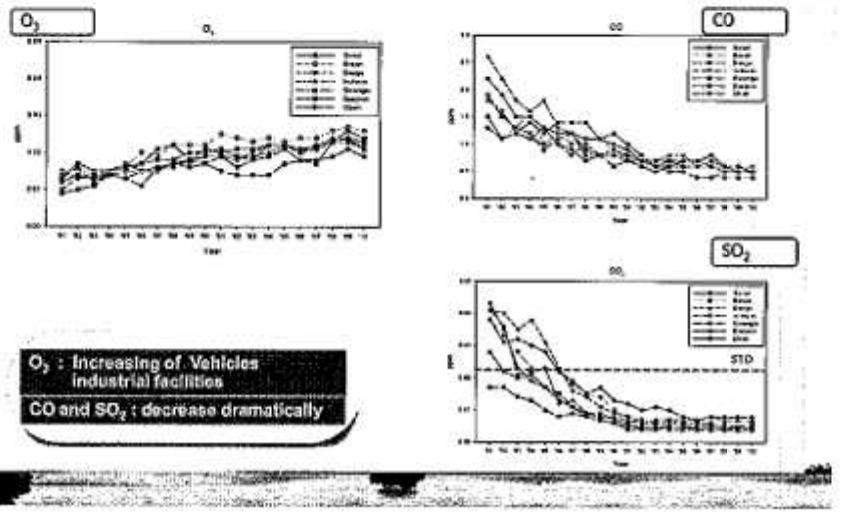
From Measurement to application

Air quality monitoring team

I Current status of air quality

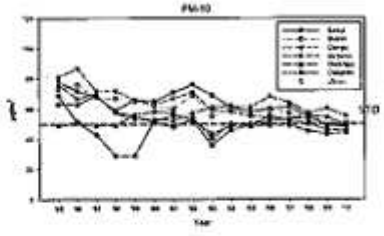
Contents

Current status of air quality : Annual trend



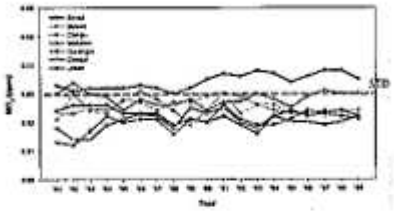
Current status of air quality : Annual trend

PM-10



Totally decrease, but over annual STD(50 ㎍/㎥)
- 78 ㎍/㎥ (1995) → 54 ㎍/㎥ (2009) in Seoul

NO_2



Totally steady, and over annual STD(0.03ppm)

II Air quality monitoring networks

Current status of air quality

- Asian dust

- Increasing number of Cars
  - ✓ 138 times increase from the 1970's level
  - '70yr: 0.13 m → '80yr: 0.5 million →
  - '90yr: 3.4 million → '00yr: 12 million →
  - '10yr: 18 million
- Weather conditions, geographical features
  - ✓ 70% Rainfall in summer season(Jun~Aug)
  - ✓ Area directly affected by the Westerlies
  - ✓ Cities surrounded by Mountains

Air Quality Monitoring Networks

Purpose

- To assess how far air quality standards
- Evaluation of current air pollution situation
- Effect evaluation of Long-range transport of pollutants
- Provide the public with reliable and up-to-date information on air pollution

Status of Monitoring Network

	General Networks				Special Networks						Super site
Total	Urban	Suburban	National Background	Road side	Air Toxics	Heavy Metals	PAMS	Acid Deposition	Global Climate Change	PM-2.5	Super site
488	251	19	3	38	31	52	27	40	1	20	6
National (138)	-	19	3	-	31	-	18	40	1	20	6
Local (350)	251	-	-	38	-	52	9	-	-	-	-

대기오염 측정항목

Air Korea

■ 일반측정망 ■ 특수측정망

NATIONAL	Suburban	SO_2, CO, NO_X, O_3, PM-10, WD, WS, T, Hum
	National Background	SO_2, CO, NO_X, O_3, PM-10, PM-2.5, WD, WS, T, Hum
	Air Toxics	VOCs(13 type), PAHs(7 type)
	PAMS	NOx, NO_Y, O_3, PM-10, PM-2.5, Trace CO, VOCs(56 type)
	Acid	PM-2.5, Cation, Anion, PH, Hg (HgT, HgP, ..), Precipitation
	Global Climate	CO_2, CFC(-11,-12,-113), N_2O, CH_4
	PM-2.5	PM-2.5, Mass Con, Carbon(OC, EC), Ion, Heavy Metals
	Super Site	SO_2, CO, NO_X, O_3, PM-10, PM-2.5, Carbon, Ion, Heavy Metals
LOCAL Gov.	Urban	SO_2, CO, NO_X, PM-10, O_3, WD, WS, T, Hum
	Roadside	SO_2, CO, NO_X, PM-10, O_3, (If needed : Pb, PM-2.5, HC, Traffic)
	Heavy Metals	Pb, Cd, Cr, Cu, Mn, Fe, Ni, As, Be(Asian Dust: Al, Ca, Mg...etc)

Work process chart

Data produced at stations are collected by NAMIS and delivered to the public in various forms on real-time internet web service(Airkorea)

Production

Ministry of Environment (National Air Quality Monitoring)

Municipal and Provincial Government (Local Governments Air Quality Monitoring Network)

Korea Meteorological Administration

Collection and Validation of Data

National Ambient air Monitoring Information System (NAMIS)

Application

Real-time Air Quality Release Web Service (Airkorea)

Data Collection process

Measuring station | Collect data | Air monitoring center | Release data

National

Local Government

Internet

Interior Gateway

Web server

Communication server

DB server

Web service

NAMIS

Airkorea

Frame of Air Quality Monitoring

Local Gov.
Manage & Operate Local gov Networks

Central Gov.
ME
Strategy
Fund

NIER
Research
Develop strategies
Final Validation
Annual reporting

Guideline

Allocate Fund

Strategy

Data

Delegation

Allocate Fund

Basin Environmental Office
Basin air quality management

Keco
Manage & Operate National Networks
Airkorea & NAMIS

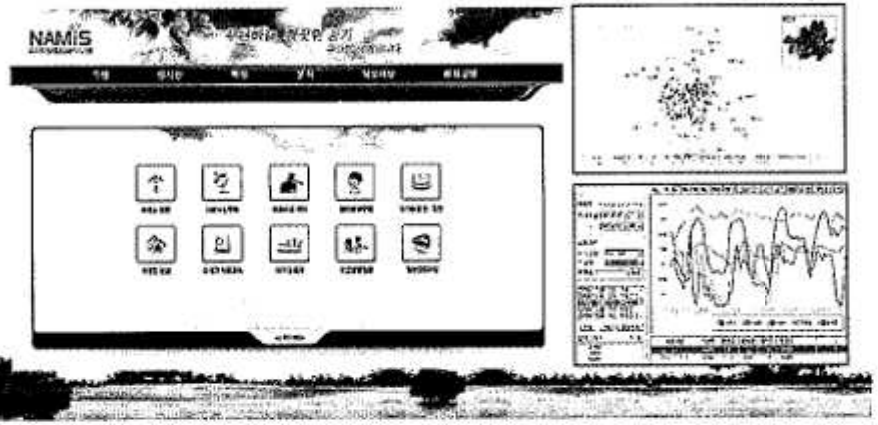
2nd val data

1st val data

III Airkorea & NAMIS system

What is NAMIS?

- National Ambient air quality Monitoring Information System
- NAMIS is computerized system for collection, validation, statistics and analysis of information relating ambient air quality data
- Only the allowed people can access and use the NAMIS



History of Operation

2000	The Korean Ministry of Environment delegate to operate and manage National Air Quality Monitoring Network to Keco
2004	Establish and Manage **NAMIS** (National Ambient air Monitoring Information System)
2005	Establish and Manage **Airkorea** (Real –time Air Quality Release System)
2007	Establish and open the **English version of Airkorea website**
2008	Connect to the National Digester Information center (SafeKorea)
2010	Reorganize the Airkorea website
2011	Reorganize the NAMIS

Air quality real-time release Homepage

- **Korean Version Homepage**
  - www.airkorea.or.kr
- **English Version Homepage**
  - eng.airkorea.or.kr

Air quality Monitoring & CAI

Target Pollutants

5 National Ambient Air Quality Standard pollutants

Sulfur Dioxide(SO_2), Carbon Monoxide(CO),
Nitrogen Dioxide(NO_2), Ozone(O_3),
Particulate Matter(PM-10)

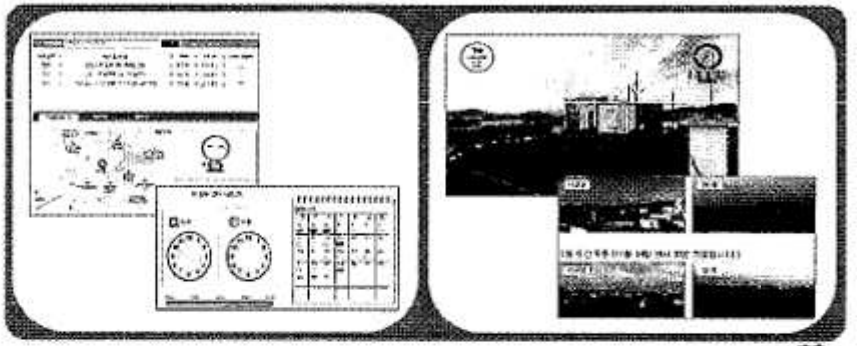
Release Networks

Total : 311 networks

- Urban network : 251
- Roadside network : 38
- National Background network : 3
- Suburban network : 19

Airkorea Main Function

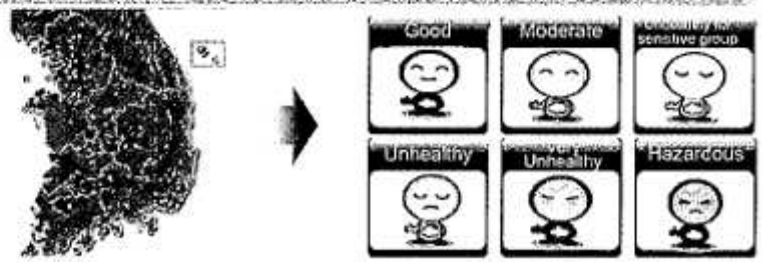
- Air Quality in Living area & Neighborhood
- Monitoring Station Information (VR panorama, Web Cam)



Air quality Monitoring & CAI

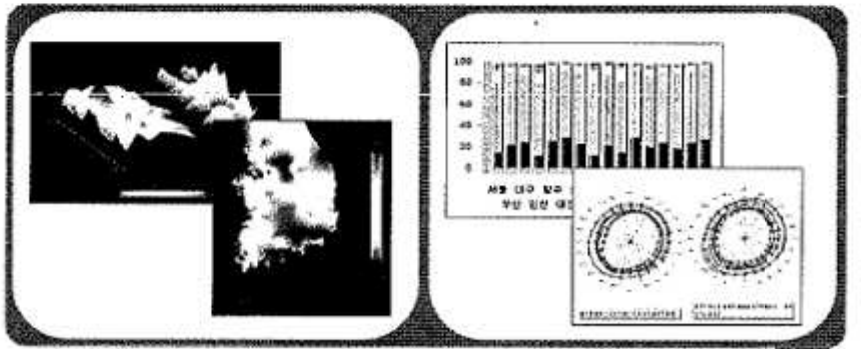
CAI(Comprehensive Air-Quality Index)

- Measured value of air pollutants is difficult for the general people
- CAI was provided the general people to easily understand
- Level of CAI is classified into 6 degrees with reflection of bodily impacts
- Provide what they should do according to CAI air quality level



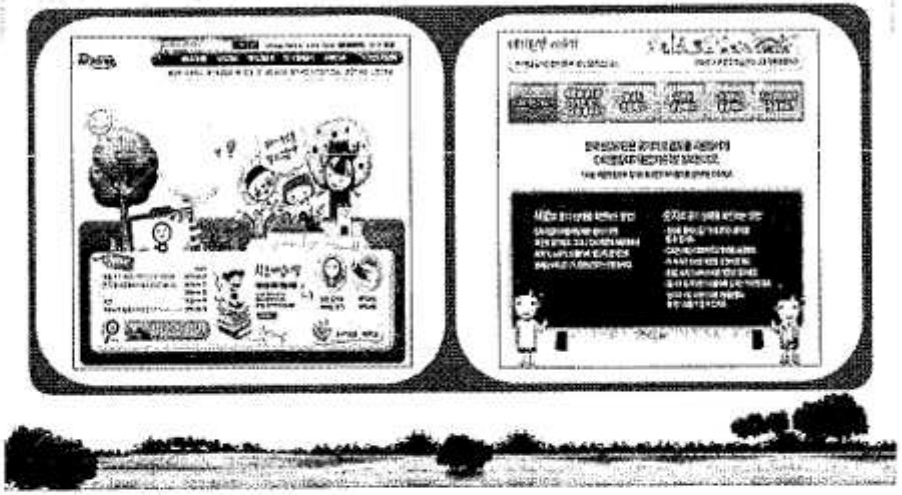
Airkorea Main Function

- Visualized Statistics(Heat map, 3D Chart, Contour map)
- Visualized Data on long-term, hourly, monthly, yearly trend)



Airkorea's Additional Function

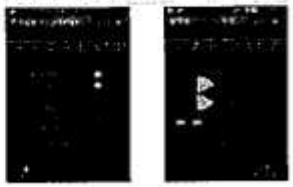
- Children's Education Center



Airkorea's Additional Function

- Smartphone Application Service
- Mobile Web Service(m.airkorea.or.kr)

Application



Mobile

- Number of visitors to Airkorea

2006	2007	2008	2009	2010	2011	2012
160,000	380,000	410,000	600,000	510,000	1,000,000	1,320,000

IV Demonstration

附件三、Climate Change Adaptation It’ s Not An Option

文宣資料

KOREA ADAPTATION CENTER FOR CLIMATE CHANGE

CLIMATE CHANGE ADAPTATION IT'S NOT AN OPTION

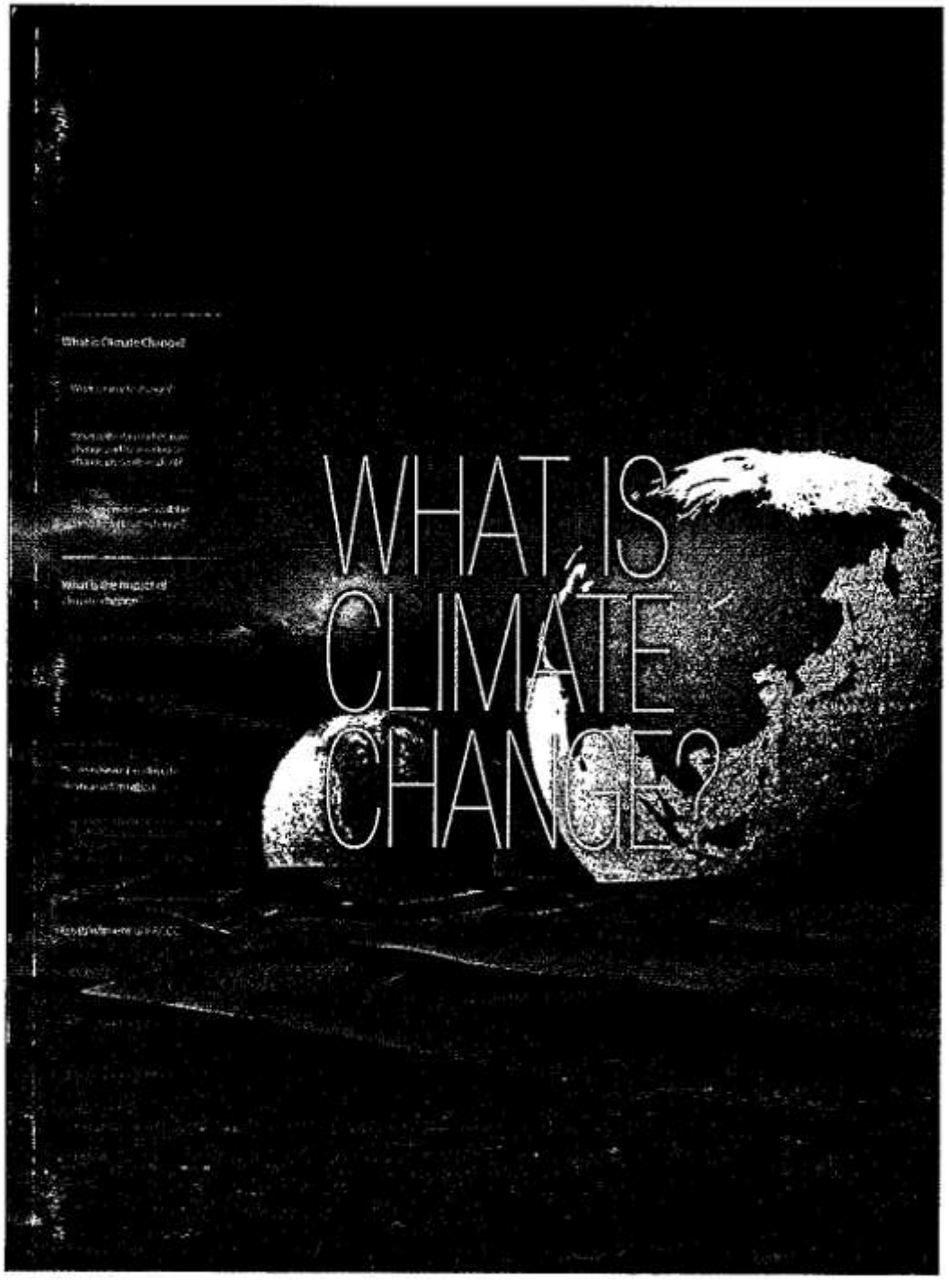
It is time for adaptation!

Though today we take strides to reduce greenhouse gas emissions, global warming will continue due to the previously emitted gases. Thus, it is imperative that we adapt to the changing climate and take further action to reduce the negative effects of global warming. Adaptation techniques are developed to respond to the negative impacts of climate change such as a loss of biodiversity and increasing occurrences of natural disasters. We can find new opportunities under this changing global environment even if these changes are irreversible. Korea Adaptation Center for Climate Change(KACCC) leads adaptation activities.

MINISTRY OF ENVIRONMENT

Korea Environment Institute

Korea Adaptation Center for Climate Change



Constantly Changing Climate, the Future Could Get Worse

What is Climate Change?

Climate change is defined as a change in climate experienced by a specific areas over a long period of time. Recent increases in extreme weather, such as heat waves, droughts, and floods, are caused by global warming; and these events could be considered climate change.

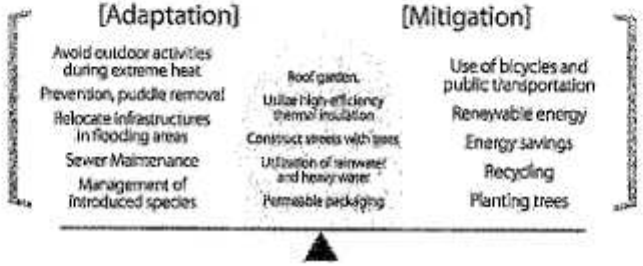
***How is weather different from climate?** Weather is defined as our daily temperature, wind, precipitation, and atmospheric conditions. Climate is defined as average weather conditions of an area over several decades.

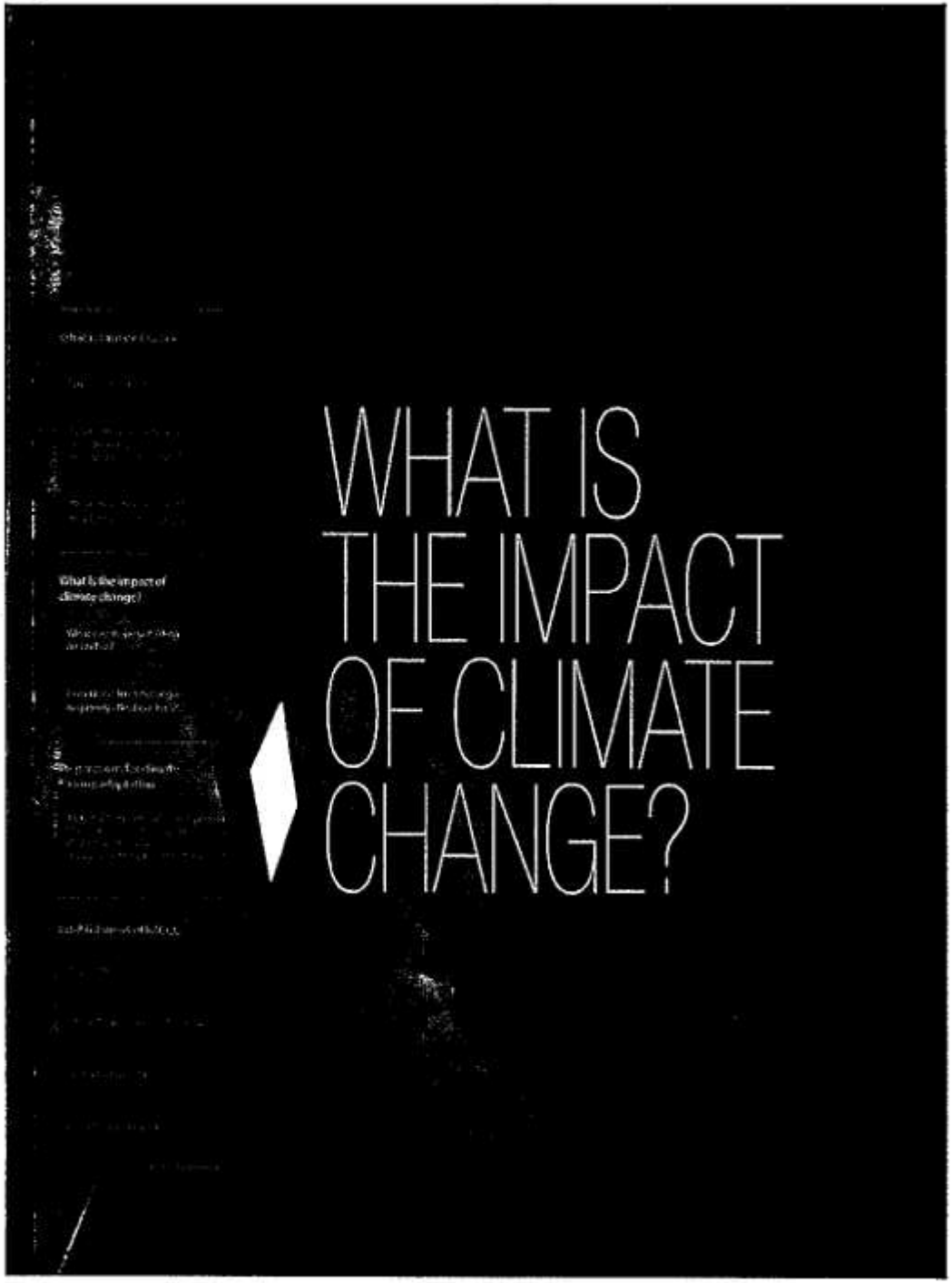
What is the Cause of Climate Change and How is Climate Change Presently Evident?

Due to sustained emissions of greenhouse gases in high quantities, global temperatures have increased (global warming), thus causing to climate change. The global temperatures have increased at a faster rate than ever over the last century. In the last 10,000 years, changes in global temperature have never exceeded 1℃, but over the last 100 years, the global temperature has increased by 0.74℃ (the average temperature of 6 major Korean cities increased by 1.7℃). Presently, the international community confronts a change in climate that has never been experienced before.

What Measures are Available to Address Climate Change?

Measures to address climate change are divided into emissions reduction and climate change adaptation. Climate change adaptation refers to measures that minimize the dangers and maximize opportunities associated with climate change. On the other hand, emissions reduction refers to measures that reduce or absorb greenhouse gas emissions.





Climate Change, the Time is Now for Adaptation

Until recently, the primary concern regarding climate change was the reduction of carbon dioxide emissions. Nonetheless, global warming will continue for the next 50 to 200 years even if greenhouse gas emissions are reduced due to past greenhouse gas emissions. To protect the lives and properties of the Korean public from the negatives effects of climate change, climate change adaptation measures are paramount.

What Events are Unfolding around Us?

Changes in ecosystem For the past 30 years, spring blooming periods have come 6-8 days earlier.

Rise in sea-level An increase of 8 cm over the past 43 years.

Increases in damages from extreme heat waves Estimated 2,131 deaths between 1991 and 2003 and a reported damages worth 61 billion Korean won are tentatively estimated from power outages in 2011

Damages from hurricanes and storms Property damage worth 1.7 trillion Korean won and death of 72 people over the past decade.

Changes in fisheries Increases in mackerel, sardines, and other warm current fisheries.

Change in agriculture plantations A northward shift in areas of main apple production from Daegu to Yeongwol.

Intensification of droughts Water restrictions experienced by 400,000 people in 109 counties over the last decade

Increases in the scale of landslide Due to heavy rain, 1,000 ha landslides occur at Jiri Mountain every year; 16 deaths as a result of a landslide at Woomyeon Mountain.

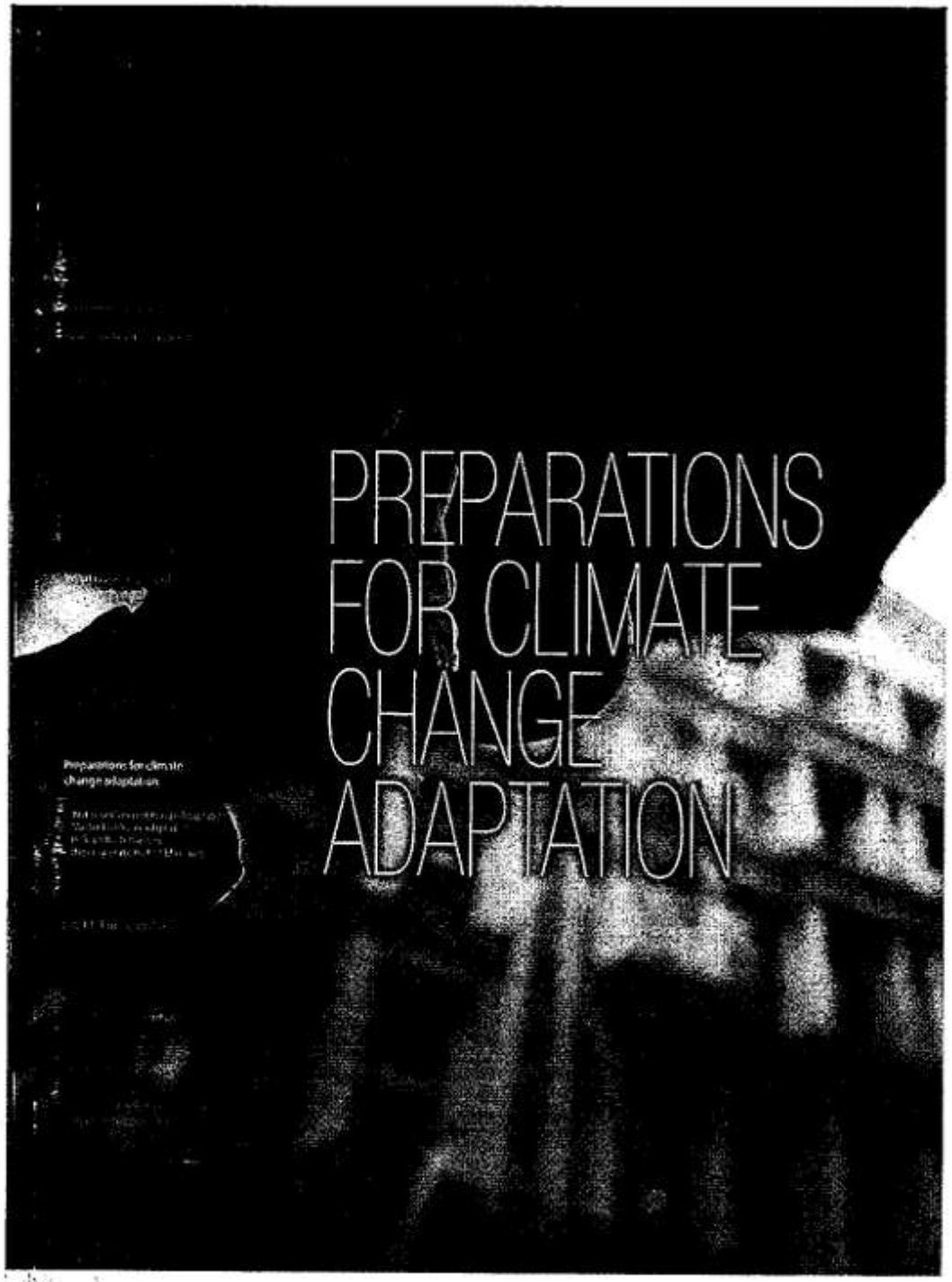
Does Climate Change Only Hurt Us?

No. If we can utilize climate change effectively, we can foster new industries, which previously had no economic potential.

Agriculture and fisheries - Cultivation of mango and tuna
- Cultivation of sub-tropical crops like mango in Jeju Island, expansion of Korea's southern coast when temperatures increase.
- Easily secure fishery resources like tuna and other warm current fishery

New projects - Growth of eco-tourism and disaster insurance
- Demand for eco-tourism is expected to increase due to improvements in education levels and warmer weather
- Expansion of new projects like disaster insurance and adaptation buildings

Meteorological industry - Expansion of the meteorological industry and creation of jobs
- Korean meteorological industry (443 million won) is in a market development phase when compared to other developed countries (2 trillion won)
- Expansion of the market to 200 billion won by 2014 and new job creation are expected



We Must Adapt to the Changing Climate Now

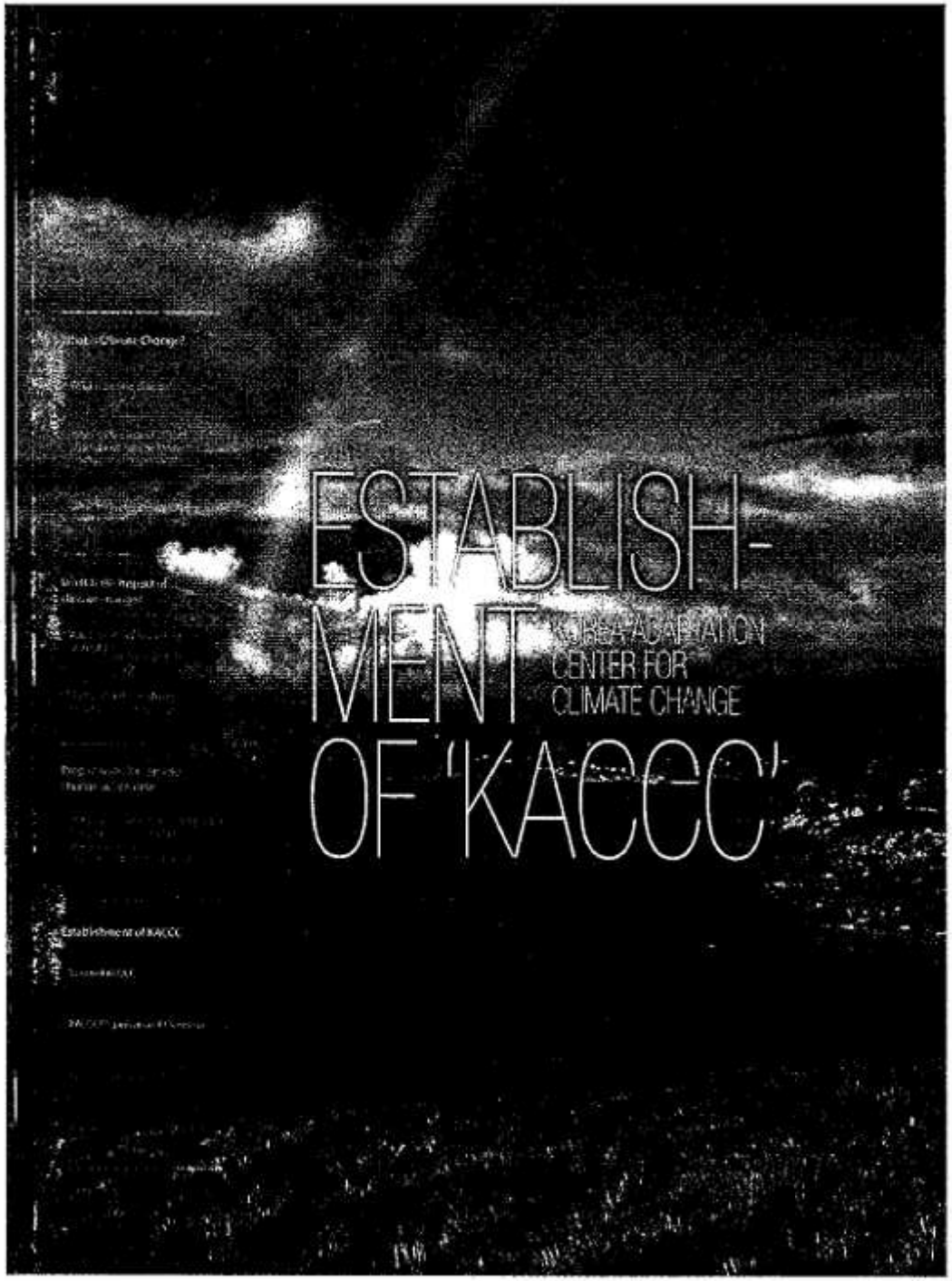
At present time, the existence of global warming is largely accepted as fact, and it is more important than ever to reduce greenhouse gas emissions and adapt to changing climate. Moreover, the Korean government has passed National Plan on Climate Change Adaptation to project the lives and properties and create a safer Korean peninsula that is prepared for a 2℃ increase in average temperature.

2℃ Increase as Target Goal

If greenhouse gas emissions increase in accordance to the A1B scenario, the average temperature of Korea in 2050 is expected to increase by 2℃(Korea Meteorological Administration). If the international community does not implement climate change response measures, the damages from climate change incurred in Korea is expected by exceed 2,800 trillion Won. Nevertheless, proactive adaptation measures could decrease the cost (Korea Environment Institute).

'National Climate Change Adaptation Master Plan' is an Adaptation Policy which Involves the Cooperation of 13 Ministries

'National Climate Change Adaptation Master Plan(2011-2015)', which coordinates the efforts of 13 Ministries and 70 experts from various fields was established with the Ministry of Environment as the ministry-in-charge. Participants of the plan, in cooperation, established seven sector-specific adaptation policies (i.e. health and disaster) and three adaptation measures.



KACCC Leads Adaptation Activities for Climate Change

KACCC was established in July 2009 in response to "Comprehensive Plan on National Climate Change Adaptation (2009 ~2030)" to engage in strategic research and support climate change adaptation policy. KACCC opened in July 2009 when the center was consigned to the Korea Environment Institute (KEI) by the Ministry of Environment (ministry-in-charge of climate change adaptation). Since its establishment, KACCC has set up goals to strengthen Korea's adaptation capacities and withstand the impacts of climate change by building a foundation for its activities (short-term goal, 2009-2010), leading Korea's climate change adaptation programs (medium-term goal, 2011-2012), and exerting global leadership in climate change adaptation (long-term goal, 2013-2018).

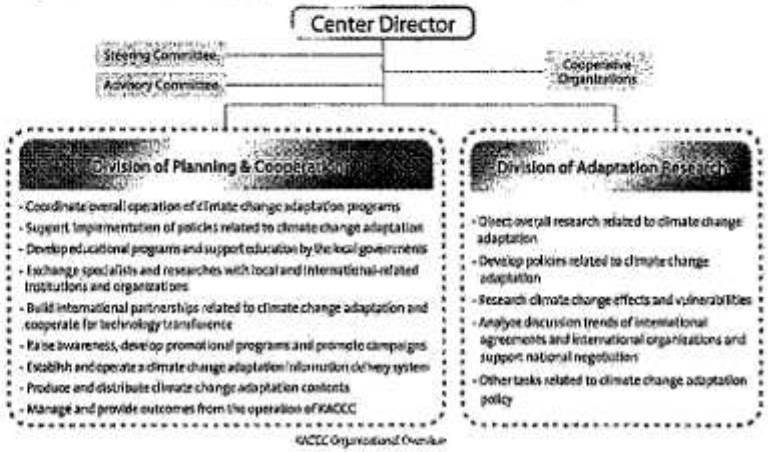
VISION

Leading Policy-Making and Research for the Strengthening of National Climate Change Adaptation

Establishment of a safe society and support for green growth through effective climate change adaptation

Short-term Goal('09~'10)	Mid-term Goal('11~'12)	Long-term Goal('13~'18)
Develop Adaptation Frameworks	Effective Implementation Of National Climate Change Adaptation Strategies	Global Leading Institute For Climate Change Adaptation

Currently, the Korea Adaptation Center for Climate Change (KACCC) consists of the Division of Planning & Cooperation and the Division of Adaptation Research led by the center's director. A total of 43 employees are currently working for the Center, including 16 Ph.D. professional researchers in positions of vice senior researcher or higher, 24 researchers, and 2 employees for administrative support. (As of Jan. 2012)



KACCC Organizational Overview

KACCC has Achieved Various Accomplishments Related to Climate Change Adaptation

01 Support for Climate Change Adaptation Policies

Carry out researches on climate change adaptation

- Evaluate national adaptation policies and construct a policy inventory for effective adaptation
- Impact and vulnerability assessment of climate change
- Measuring economic and social influence in Korea

Supporting local communities for effective implementation

- Support adaptation strategies for local governments
- Evaluate adaptation capacity by vulnerability assessments
- Provide guidelines and manuals of climate change adaptation for local governments

02 Establishment of Climate Change Adaptation Networks

Promote domestic / international cooperation on adaptation

- Raise funds for research projects on adaptation with domestic research institutes
- Build and strengthen a partnership with local governments and stakeholders

Establish an international network for cooperation

- Build partnerships with international adaptation institutes and organizations
- Support ASEAN developing countries adaptation through training programs and technical assistance

03 Climate Change Adaptation Information Dissemination

Build and operate an information delivery system and web portal

- Maintain a "One Stop Shop" network system for disseminating all information concerning adaptation

Build and provide information on climate change adaptation

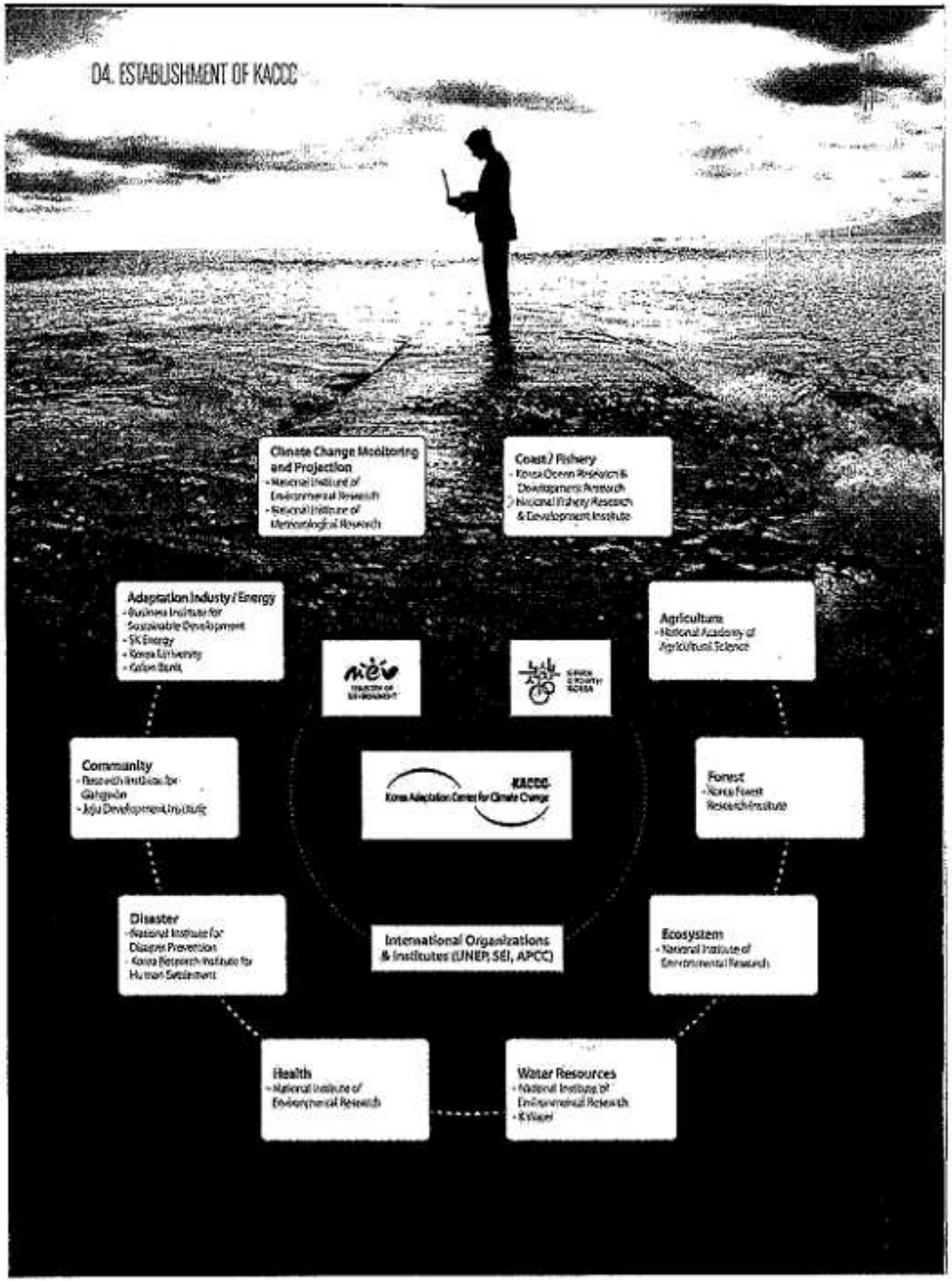
04 Education and Nationwide Promotion

Provide education programs for stakeholders

- Develop education materials and programs on adaptation

Raise awareness of climate change adaptation through media

- National public long-term PR on adaptation
- Introduce successful adaptation examples and major issues via media
- Issue an Online and paper-based Adaptation Newsletter



In two years since its establishment in July 2009, KACCC has accomplished various achievements. The accomplishments of KACCC include engaging in strategic research and policy support related to climate change adaptation, facilitating the establishment of 'National Climate Change Adaptation Master Plan(2011~2015)', developing policy tools and manuals for climate change adaptation, forming various networks to strengthen the capacities for domestic climate change adaptation, creating international climate change adaptation networks, engaging in cooperation activities with developing countries, promoting the growth of climate change base, and expanding its database of climate change-related information.

01. Support for Climate Change Adaptation Policies

Facilitate the establishment of the 'National Climate Change Adaptation Master Plan(2011~2015)'

KACCC collected and produced draft reports on adaptation measures concerning 10 key climate change adaptation sectors, as well as directed the discussions of experts in the advisory council and negotiations of 13 related ministries, in order to facilitate the creation of the 'National Climate Change Adaptation Master Plan(2011~2015)' that was established in October 2010.

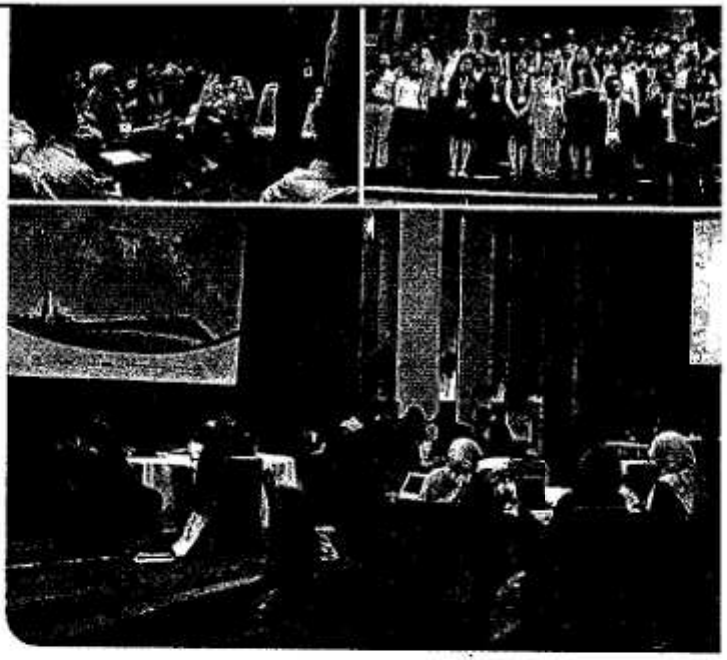
Facilitate the establishment of the 'Municipal Adaptation Action Plan'

In 2010, KACCC established the 'Adaptation Action Plan' as a pilot project for Seoul and Incheon. The project conducted climate change impact assessments on health and disaster (Seoul), marine eco-system and marine disasters (Incheon), and detailed climate predictions. Moreover, KACCC developed a manual for establishing action plans for climate change adaptation, which it constantly supplements and amends.

In 2011, to support the establishment of the 'Municipal Adaptation Action Plan', KACCC has created and operated consulting groups comprised of at least 3 experts from 10 key sectors enumerated in the 'Municipal Adaptation Action Plan,' which aims to facilitate the implementation of local action plans for climate change adaptation.

Build and Assess Climate Change Adaptation Inventory

In 2010, KACCC has built a climate change adaptation policy inventory, reviewed adaptation policy's progress levels, budget, and schedule, and assessed the vulnerabilities of adaptation policies. Using the outcomes of these activities, KACCC has supported the internal stability of establishing the 'National Climate Change Adaptation Master Plan(2011~2015)'. In 2011, KACCC expanded and renewed Korea's national inventory and began collaborations with London, King Country, Ontario, and others to build inventories abroad. Furthermore, KACCC has built an inventory of detailed action plans concerning adaptation measures in 2011 to examine and amend climate change adaptation policies. In the near future, KACCC plans to develop a methodology for the assessment of monitoring adaptation policy implementation to continuously assess and update adaptation policies. KACCC is also developing a web-based decision-support-system toolkit to support and train federal departments and local governments in establishing adaptation policies. This web-based decision-support-system will facilitate the local governments in applying and linking existing adaptation plans of higher-administrative levels to their adaptation action plan when they are establishing their action plans for climate change adaptation.



02. Establishment of Climate Change Adaptation Networks

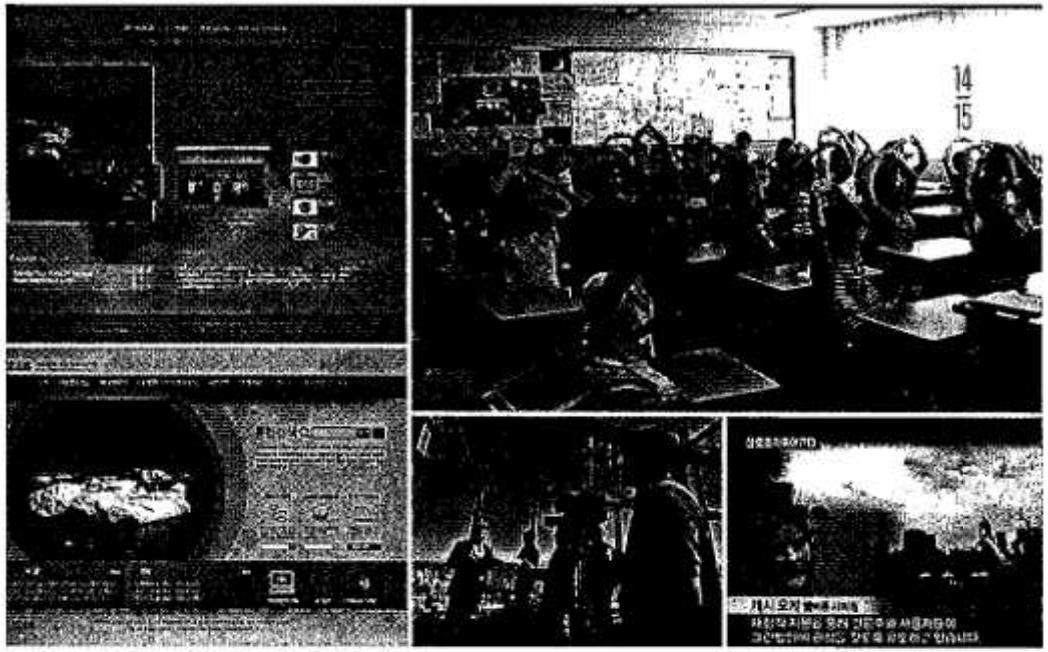
To strengthen the capacity for climate change adaptation, KACCC has hosted panel discussions with experts to build adaptation partnership between the federal and local governments and expand the network of related domestic institutions. Moreover, KACCC has engaged in numerous projects to expand the base for international cooperation, including its participation in scholar exchanges and sharing research materials with related international institutions.

Operation of Domestic Climate Change Adaptation Network

In 2010, to strengthen Korea's climate change adaptation capacities, KACCC has sought to enhance the practicality of its cooperation efforts by increasing the number of partner organizations and collaborative research projects and hosting forums that bring together climate change adaptation experts for the purpose of exchanging information. Furthermore, KACCC has hosted workshops for 120 local government officials responsible for climate change adaptation policies to share climate change adaptation strategies and policy trends, as well as increase their climate change adaptation capacities. In 2011, KACCC has hosted a forum titled, 'Identifying New and Promising Climate Change Industries,' to strategically respond to changing markets conditions brought by climate change.

Operation of International Climate Change Adaptation Network

To build and expand its international climate change adaptation network, KACCC has hosted the 'International Climate Change Adaptation Symposium' every year since its inception in 2009. Through this symposium, KACCC has benchmarked outstanding adaptation policies and tools of other developed countries, shared Korea's adaptation policies with the international community, and strengthened cooperations with related international institutions. KACCC has also conducted climate change adaptation education for developing countries of ASEAN. In cooperation with UNEP, to build international partnership and increase efforts to expand the support for climate change adaptation techniques. To improve Korea's international standing and strengthen its international network, KACCC attends international conferences related to climate change adaptation, including IPCC and UNFCCC conferences, as the Korean government's representatives. Through experiences gained at these conferences, KACCC develops Korea's policy directions and supports the government's negotiations efforts.



03. Climate Change Adaptation Information Dissemination

KACCC is building 'Information Delivery Hub' which could provide bi-directional distribution of desired information, information source, and information path by writing the metadata of climate change adaptation information dispersed throughout federal government departments, research institutions, international organizations (i.e. UNDP, OECD, UNEP, etc), and foreign governments to meet the demands of climate change adaptation experts/groups and the public.

Establish, Operate, and Expand Climate Change Adaptation Information System

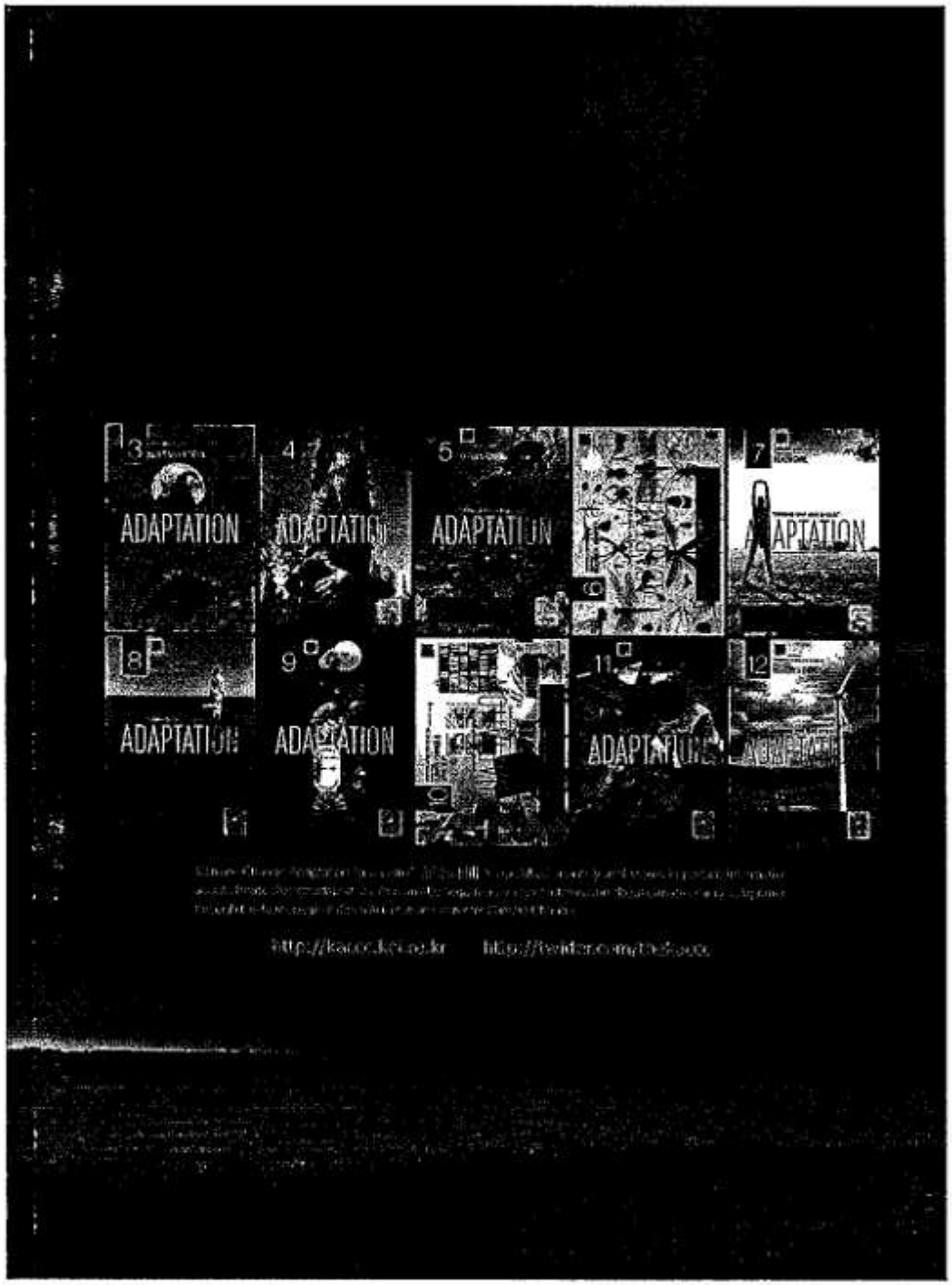
In 2010, KACCC integrated the dispersed climate change adaptation information from government departments, local governments, and related organizations and collected literatures related to climate change adaptation from domestic and international sources using IPCC AR5 WG II system as its base to build a metadata for connecting systems and sharing information. KACCC also created a homepage and a pilot site of climate change adaptation information system that standardized its database.

04. Education and Nationwide Promotion

KACCC seeks to raise the public's awareness of climate change adaptation and increase public participation through a variety of communication methods, including the use of various media and public relations tools (i.e. newspapers, TV broadcasts, online resources, and newsletters) and climate change adaptation programs targeting elementary school students.

Promote Climate Change Adaptation

In 2011, a survey result showed that the public's awareness of climate change adaptation has improved from 2008's insignificant levels. Nonetheless, too many in the general public still regard the reduction of greenhouse gas emissions as the only countermeasure to climate change. To address this situation, KACCC in 2011 has begun to distribute a monthly online/offline newsletter that targets environmental experts, NGOs, public figures, university students, and the general public and contains interesting contents relevant to climate change adaptation and policies by selecting main themes of adaptation policies as its monthly themes. In addition, KACCC has steadily carried out promotions through media outlets of model adaptation case studies from Korea and abroad. It has also organized 'Climate Change Adaptation Supporters' among university students to build a basis for long-term participation and consensus. Using the theme, 'the significance of climate change adaptation', educational contents have been developed and projects to analyze and investigate outstanding international case studies has been carried out in order to promote at the eye-level of future generations.



附件四、The KACCC LAMS 文宣折頁

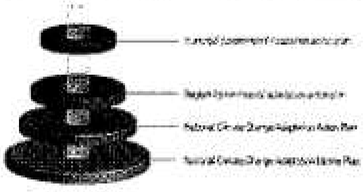
Steps and Giant Leaps for Korea's Climate Change Adaption

Korea has established infrastructure for climate change adaption, including laws and systems, and has been systematically implementing climate change adaption measures.

In particular, for a planned adaptation to climate change, Korea has established and has been implementing adaption measures at the [illegible] municipal government (Si/Gun/Gu) levels.

System and Status of Korea's Adaptation Policy

Legal Basis	• Article 48 of the 'Framework Act on Low Carbon, Green Growth' and the enforcement decree [illegible]
National Level Plans	• Completed (Oct 2010) the establishment of "National Climate Change Adaptation Master Plan (2011~2015)," [illegible] • Completed (Nov 2011) the establishment of "local climate change adaptation action plans of the national government," [illegible]
Local Government Level Plans	• Completed (Dec 2012) the establishment of "local climate change adaptation action plan of regional governments (2012~2016)" for 16 regional governments, [illegible] • Starting in 2015, the establishment and implementation of nationwide municipal level "climate change adaptation action plan of Si/Gun/Gu" will commence. * Establishment and operation (2010-2013, Ministry of Environment) of municipal-level adaptation measures through selection and [illegible] of 35 demonstration local governments in advance



The KACCC Local Adaptation Management and Support Team (LAMS) has been carrying out a variety of basic research and related projects for the strengthening of adaptation capabilities and a smooth and successful establishment of adaptation action plans of local governments.

Main Research Projects of 2013

- [illegible]
- Establishment, operation and support of climate change adaptation action plans for [illegible] local governments
- [illegible]
- [illegible]
- [illegible]
- [illegible]

Using the experiences and expertise attained in the recent years, the Local Adaptation Management and Support Team (LAMS) is planning on international cooperation projects. Those of you domestic and overseas local governments and researchers who are interested, please contact the appropriate personnel listed below.

Co-Leaders	Lim Young-shin	/ [illegible]@kei.re.kr	+82 2 380 7749
	Shin Jiyoung	/ [illegible]@kei.re.kr	+82 2 380 7661
Team Members	Hong Nam-hee	/ [illegible]@kei.re.kr	+82 [illegible] 7600
	Kim Ha-young	/ [illegible]@kei.re.kr	+82 [illegible] 7545
	Bae Chae-young	/ [illegible]@kei.re.kr	+82 [illegible] 7865

215 Jinheungno, Eunpyeong-gu, Seoul, 122-706, Republic of KOREA
TEL 82-2-380-7[illegible] FAX 82-2-380-7[illegible] E-MAIL [illegible]
http://[illegible].kei.re.kr

Korea Adaptation Center for Climate Change
The Local Adaptation Management and Support Team

The Local Adaptation Management and Support Team (LAMS) of the KACCC

The local government is the affected party of climate change effects and, at the same time, [illegible]. As such, the local government level efforts for responding to climate change, through sufficient consideration of regional characteristics and realities, are very important.

For the [illegible] of local government adaptation and the actualization of establishment and implementation of plans, the Local Adaptation Management and Support Team (LAMS) of the Korea Adaptation Center for Climate Change (KACCC) continues to provide support and operate adaptation measures of local governments with the Ministry of Environment.

In particular, through support and operation strategy based on related studies, specialized expertise and experiences, we are promoting the execution and efficiency of the local climate change adaptation action plans (LAAP), and through this, we are extending the [illegible] and capacity of local governments.

Operational Goal and Role of the Team

Specialized Practical Plan Driver

- Overall operation and management of implementation
- Support of utilized study for specialized and efficient plan
- Operation consulting team for adaptation capability
- Strengthening of cooperation networking and sharing information between nation and local governments

By promoting the efficiency and actualization of establishment/implementation of the local climate change adaptation action plans (LAAP), we the LAMS will continue our efforts in creating a society that's strong against climate change.

The local climate change adaptation action plans (LAAP) of Korea

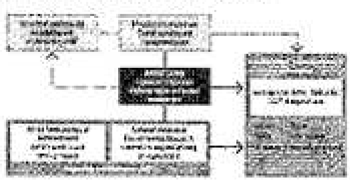
Outline: Adaptation Measures of Local Governments of Korea

- [Name of Plan] The local climate change adaptation action plans (LAAP)
- [Description] Comprehensive measures that include direction and strategy for the [illegible]
- [Legal Basis] Article 38 Clause 1 of the 'Enforcement Decree of Framework Act on Low Carbon, Green Growth'
- [Entities] [illegible]
- [Period] [illegible]

Establishment process of the local climate change adaptation action plans (LAAP)

- [illegible]

Execution system for establishment process of the local climate change adaptation action plans (LAAP)



Operation Strategy and Performance of LAMS

Since 2010, the Local Adaptation Management and Support Team (LAMS) of the KEI Korea Adaptation Center for Climate Change (KACCC) has been endeavoring to raise climate adaptation levels of Korea and strengthen the adaptation capabilities of local governments, through operation and support for the establishment/implementation of local government adaptation measures.

Operation and Support Strategy of Local Government Plan Establishment

Provide instructions such as procedure and elements for adaptation [illegible] and provide continual [illegible] support implementation of adaptation action plans.

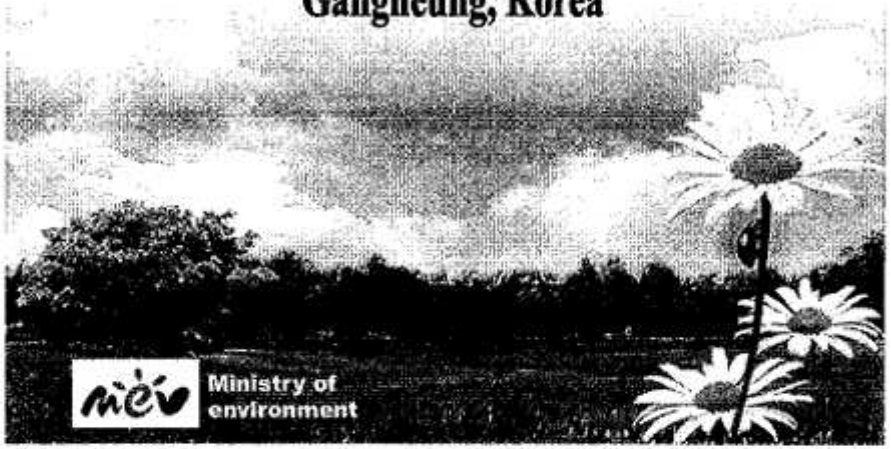
- Prepare and provide instructions for plan establishment [illegible]
- Increase information sharing and cooperative networks through activities such as workshops for the entire related agencies
- Conduct local government adaptation measures and awareness related training
- Support frequent requests such as investigating and providing needed items for each plan establishment step
- Operate and provide region specific [illegible] adaptation expert resource pool
- Operate adaptation measure consulting team and provide customized consultation
- Monitor local government plan establishment and inspection establishment process
- Prepare and provide with policy measure implementation assessment tools

Recent Achievements (2010 - 2012)

- Conducted demonstration projects for climate change effect assessment and adaptation action plan establishment
  - [illegible]
- [illegible] to establishing local government climate change adaptation action plans
- Operated and supported establishment of the local climate change adaptation action plan (LAAP) of regional governments
  - [illegible]
- Supported implementation of [illegible] adaptation action plans
  - [illegible]
- Supported and operated adaptation action plan establishment of 35 demonstration municipal governments
  - [illegible]

附件五、The Low Carbon Green Growth Pilot City, Gangneung, Korea 簡報資料

The Low Carbon Green Growth Pilot City, Gangneung, Korea



Contents

I. Overview

1. Background

A presidential speech, Feb. 10. 2009

We are currently moving toward a green growth era, and advanced nations have already entered into a competition to create green cities. There is a need to form a world-class model for low-carbon green growth and a low-carbon green city in Gangwon province and highlight this as an internationally renowned prestige city

II. Pilot Model Development

1. Vision & Strategy

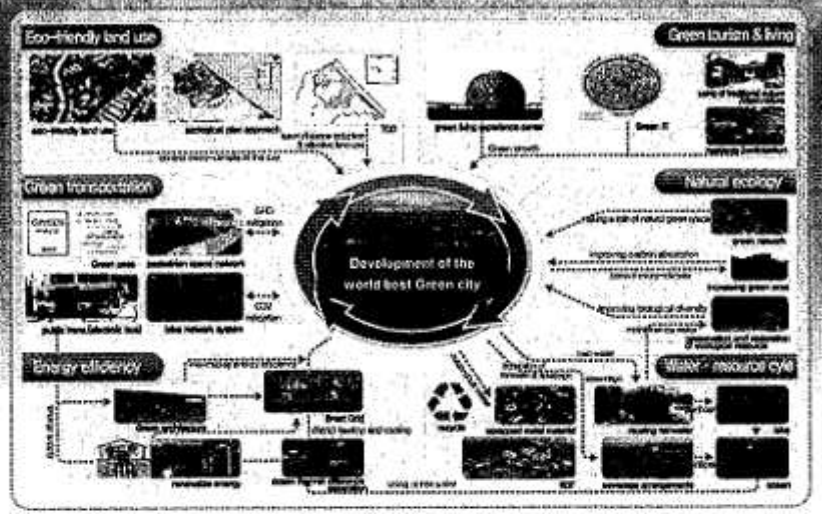
Vision

The global prestige city

Leading the way into low-carbon green growth

Objective	Natural eco-city	Culture & tourism	Zero-carbon city
Strategy	▪ Preservation and restoration of the natural environment ▪ Expansion of the green area within city environment	▪ Utilization of traditions and culture and the assets of local resources ▪ Public participation & Practice of green life	▪ Demonstration for domestic technology and a test-bed for green high-technology ▪ Restructuring land use, energy, transportation to low carbon type ▪ Constructing infrastructure of water&resource cycling system and others

2. Model

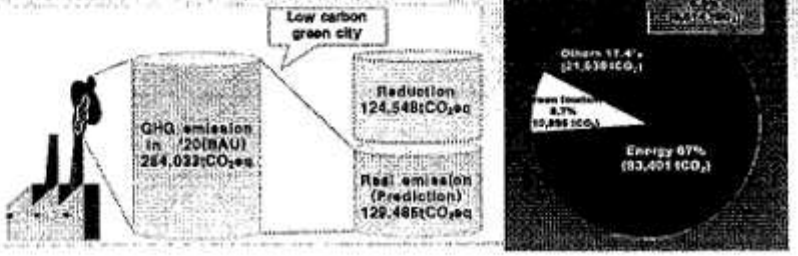


3. Planning objective

Priority policy objective

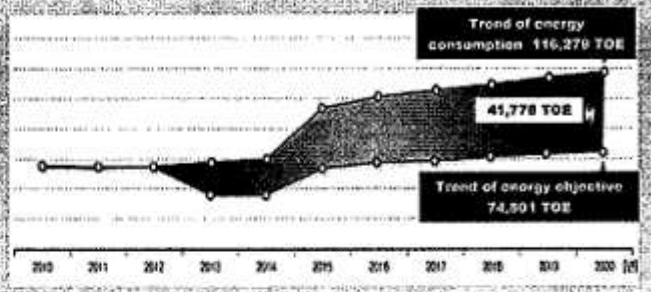
1	Mitigate 49.0% of green house gas	→ Carbon zero city
2	Mitigate 39.5% of energy use	→ Natural ecology city
3	Achieve 60% of ecological green area	→ Green tourism &

Reduction of Green house gas



3. Planning objective

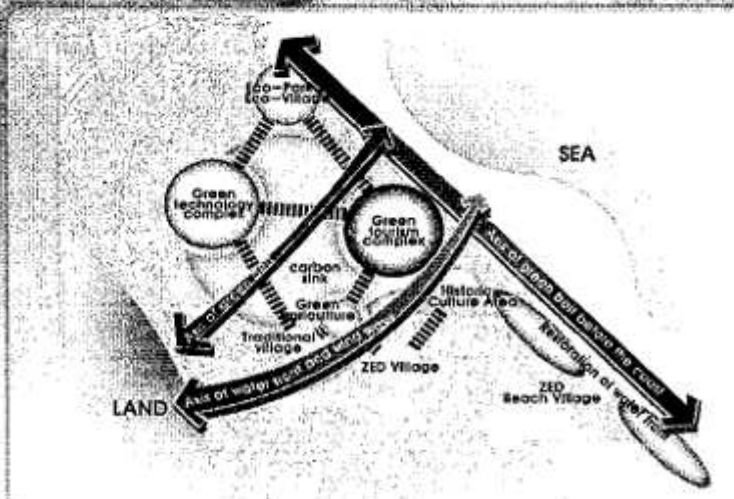
Objective of mitigating energy use



Mitigating energy use quantity by subject

Section	Total	Green transportation	Energy efficiency	Green tourism & living	Others
Mitigating energy use (ton CO_2eq)	41,778 (100%)	2,877 (6.9%)	27,210 (65.1%)	4,750 (11.4%)	6,941 (16.6%)

4. Master plan



Ⅲ. Management policies for Greenhouse gas

1. Plans to reduce

Categories	Available project
Eco-friendly land usage	• Transit-Oriented Development • Multidirectional land usage
Green transportation	• Popularize bicycle and public transportation • Convert road traffic into rail-road traffic • Building infrastructure for green vehicle (hybrid car etc.)
Natural ecology	• Minimize forest clearing • Encourage planting and increasing ecological area • Restore rivers and wetlands
Energy Efficiency	• Production and utilization of renewable energy system • Supply high efficiency energy building • Improve efficiency of day-lighting and artificial lighting • Introduction of Smart Grid
Water & resource cycle	• Install wastewater treatment facilities
Green tourism and living	• Establish eco-friendly support facilities • Activate community culture (green consumer campaign etc.) • Promote an ecological environment

2. Plans to adapt

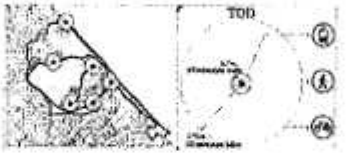
Categories	Available project
Eco-friendly land usage	• Architectural planning and design considering wind ways
Natural ecology	• Boosting inhabitation by restoring the Kyong-po wetland • Preserve a buffer-zone through pest control system • Expand forest biomass through forestation •Build an early warning system for farm animals
Energy Efficiency	• Improve building efficiency through the green curtains
Waste & resource cycle	• Buildings of the water management policies through reusing the rain water in building • Prevent flood damage by replacing with sewer pipe
Green tourism and living	• Making a preparation for extremely cold climate by safety training and Damage Prediction • Building infrastructure for the weak and the vulnerable

Ⅳ. Project plan by subject

1. Eco-friendly land use

- Conservation of restoration area as an ecological biocorridor
- Construction of high efficiency structure through the Multidirectional-intensive land usage
- ReGeve effect on heat island by constructing wind ways and minimizing change of geographical features

Deconcentrate centralized structures and multidirectional usage of land



Eco-friendly arrangement

2. Green transportation

- Urban traffic network to improve the utilization rate of public transportation
- Reducing CO2 by installing a park-and-ride lot
- Introduction of U-bike with IT, and construction of cycle path linked to public transportation
- Improvement of streetscape, and reserving pedestrian space by reducing lanes and setting up auto-restricted zone

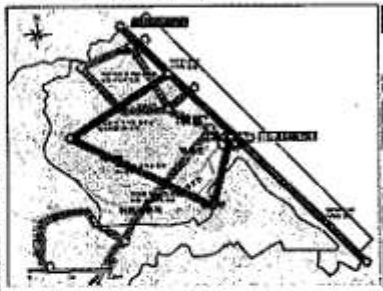
Urban traffic network and a park-and-ride

Cycle path(U-bike)

3. Natural ecology

- Construction of Blue-network focused on river and coast and Green-network focused on green field
- Provide trail and natural park linked local resource
- For preventing costal erosion, apply technology and keep the distance between the coast and buildings

Green-blue network



Technology of coping with coastal

4. Energy efficieny

- Adoption to renewable energy system and improvement of architectural construction considering building age
- Reduce CO2 using renewable energy, not fossil fuels
- Prevent unnecessary power supply and demand by supplying Real-time Information Sharing System

Energy efficiency of building

Passive House

High insulation, High Airtight, High efficiency Shield Window, Natural lighting system, Heat Recovery System

Renewable energy

Power supply using photovoltaics and solar thermal heating

Artificial Greening

Roof planting, Wall planting, balcony planting

Zero Energy

ZERO electrical bills, ZERO fossil fuel

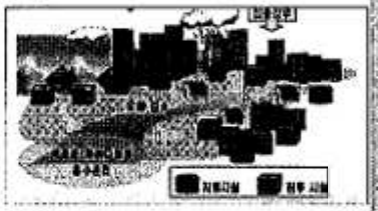
The green technology complex

5. Water&resource cycle

- Construction of water cycle system through the installation of rainwater utilization and permeable block
- Enhance water utilization rate and decrease capacity-inflow ratio in STP by constructing separate sewer system
- Construction of recycling system to reuse the waste resource easily
- Minimize CO2 by reusing food waste and the other organic waste

Rainwater utilization(before)

Rainwater utilization(after)

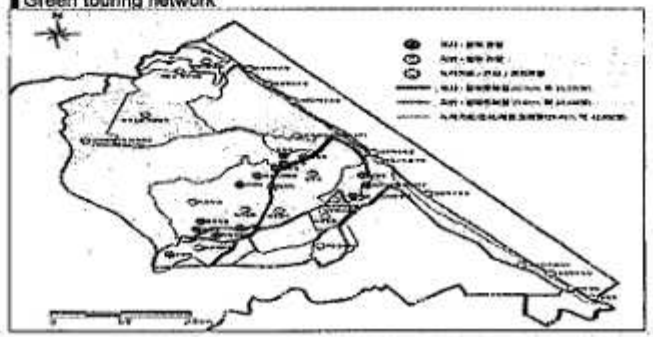


6. Green tourism & living

Construction of Green touring network and Green IT

- Promote a program after accessing customers' demands, and establish a network with local resource, historic cultural environment and green technology
- Designate transportation, environment & preventing disaster and energy management to main factor of U-City, and contain GHG inventory management system

Green touring network



③ Practical Green living

- Participate in the Green living practices to maintain Green-city and provide base in local area for construction of green city
- A consultative organization for green model city consisting of local government, supporters of government authorities, and private supporters
  - Private supporters include experts and residents committee that consist of both residents and NGOs

Strategy	Detailed plans
Cultivating Community Culture of Green-city	• Encourage carbon point system • Green consumption campaign • Draw up guidelines for green, education and living
[illegible]	• Reduction of greenhouse gas • Zero waste campaign • Form a resident watchdog
[illegible]	• Roof planting, Wall planting, flowerbeds planting etc. • Improvement of street environment • Popularize green transportation
[illegible]	• Developing a program of urban agriculture • School meals using organic products • Promoting ecotourism

V. Expected effect & Future plans

- [illegible]
- Area : 18.3
- Expected population : 23,400

Initiative Project (2012)

Put up a good show shortly

- Green square(11,500㎡)
- Green street(28.8㎞)

Mid-term Project (2016)

Proof of technology & make work

- Promote using bicycle
- Environmentally friendly vehicle
- Low carbon streetlamp
- Supply of Green-home

Long-term Project (2020)

Necessity of long-term plan

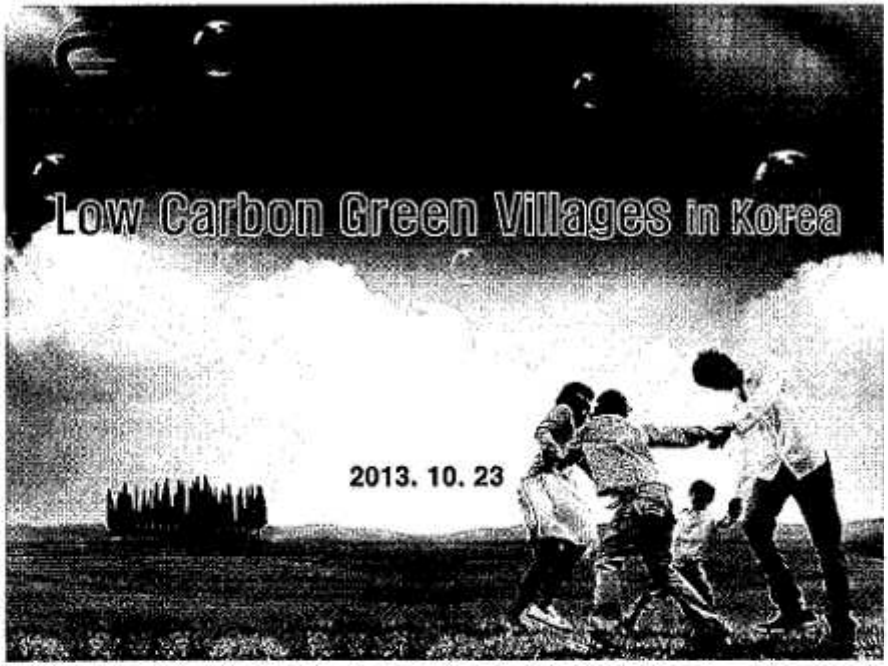
- Green transfer station
- New & renewable energy park
- Smart grid
- Eco-village, traditional housing

V. Expected effect & Future plans

- Carbon dioxide absorption by the increase of the green field
- Making Profit
- Job Creation
- Reduction of Greenhouse-gas Emissions
- Tourist Attraction

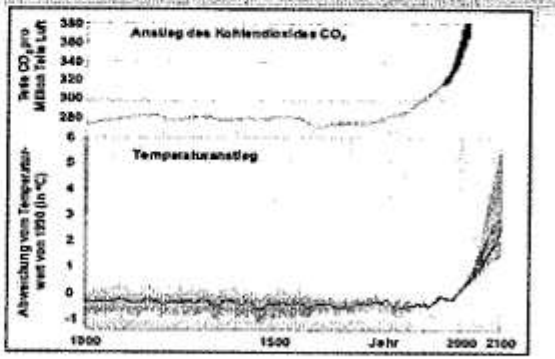
Realization of low-carbon green society

附件六、Low Carbon Green Villages in Korea 簡報資料



Contents

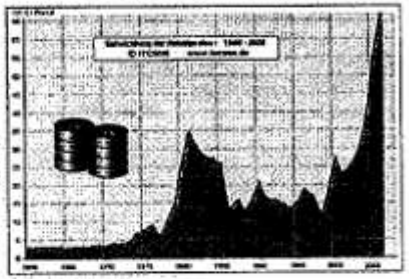
Background



Climate Change : Increase of greenhouse gas emissions

- Rise in global temperature → Environmental disasters
  - ✓ Ozone layer, Antarctic glaciers, Sealevel rise, Flood and Drought

Background



- **Global fuel price hike**
  - Time to change source of energy
- **Ban on ocean dumping**
  - London convention
  - Effect from 2012 in Korea

Master Plan for "Waste & Biomass to Energy"

- **Plan Outline**
  - President : Reduce greenhouse gas 4% by 2020
  - 'Low Carbon, Green Growth' Declaration (2008)
  - 'Energy measures for Waste & Biomass resources' report (2008. Oct)
  - Action plan of energy measures for waste & biomass resources report (2009. Jul)

Securement for Renewable Energy | Daynamic Force for Geen Growth | National New Deal Engine | Action Measure for Climite Change

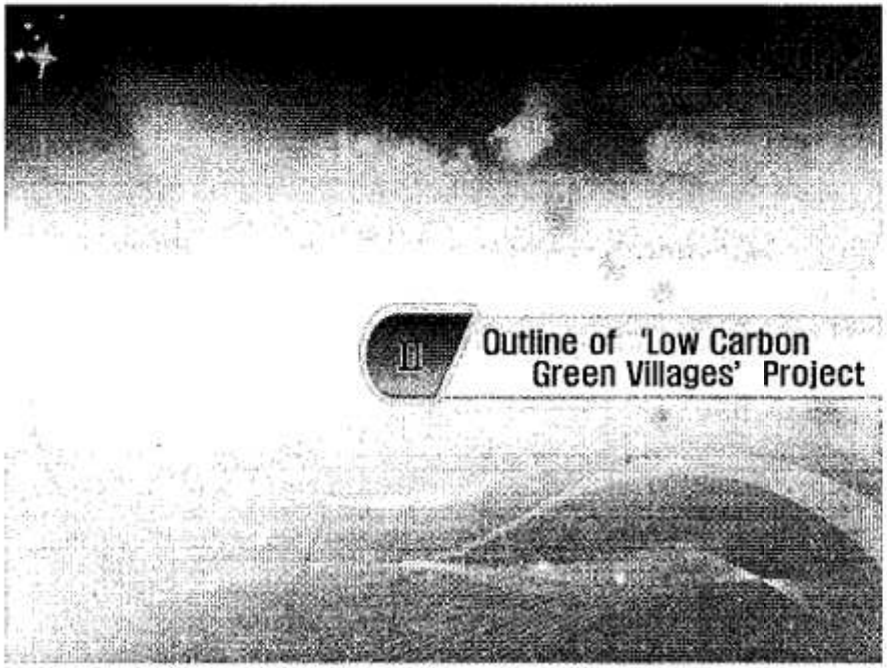
Requirement for promotion

- **Changes of Policies about Waste**

3R: Reduce, Reuse, Recycle

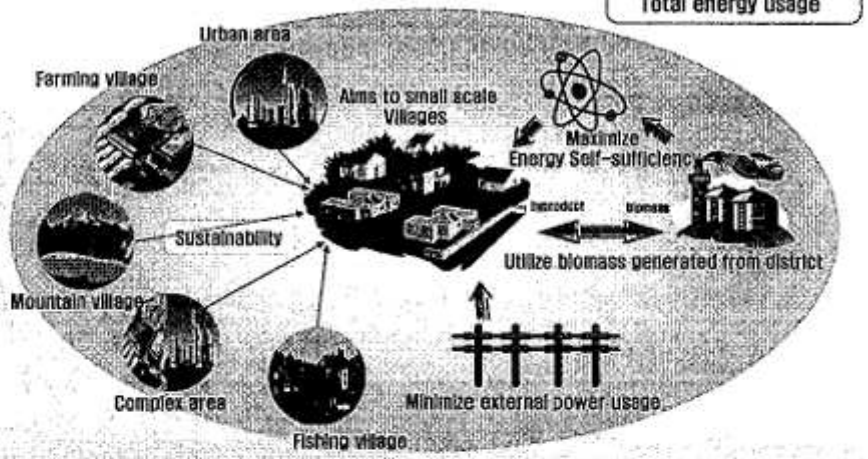
4R: 3R + Recovery

- **Counterplan**
  - Securement of renewable energy
  - Utilization of small amount of biomass
  - Construction of bioenergy town
  - Activation of local community

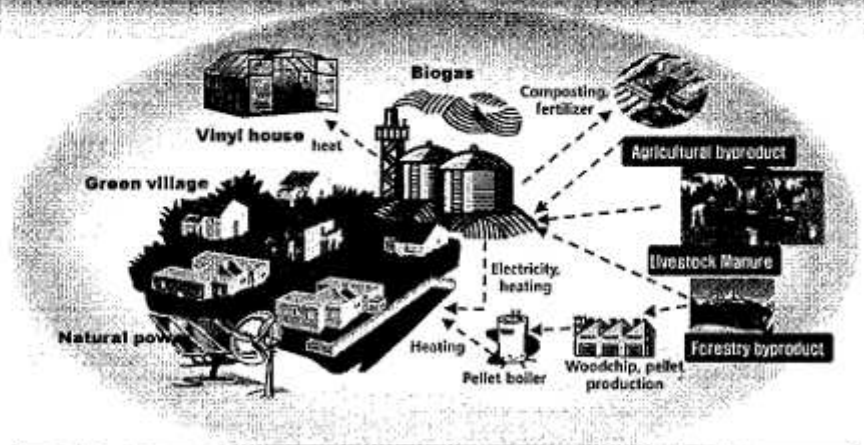


Outline of Low Carbon Green Village

Generation of energy / Total energy usage



Basic Plan



Biomass / Natural power → Integrated process → Energy, material recycling → Carbon neutral, energy self-sufficiency

Model

- **Urban type**
  - Ministry of Environment
- **Agricultural village type**
  - Ministry of Agriculture, Food and Rural Affairs
- **Urban and agricultural complex type**
  - Ministry of Security and Public Administration
- **Mountain village type**
  - Korea Forest Service

Project Goal

Vision

Development for Energy self-sufficient local community for Green Growth

Goal

Raise energy self-sufficiency of rural area up to 40%

Forms 600 Green villages by 2020

Strategy

Creates early success model & Make spread nationwide

Construction of governance among government, local government, and residents

Outline of the Project

Budget	• Total expenses 5billion won, Government support 50% • Local government and residents appropriate 50%
Period	• 2years each
Support	• Facilities: Biogas facility and pellet boiler • Natural power facility : Solar, wind power… ➡ Apply to MOTIE's budget for Renewable energy Supply project
Utilization	• Electricity, heating, hot water, Gas for transportation

Expected Effects

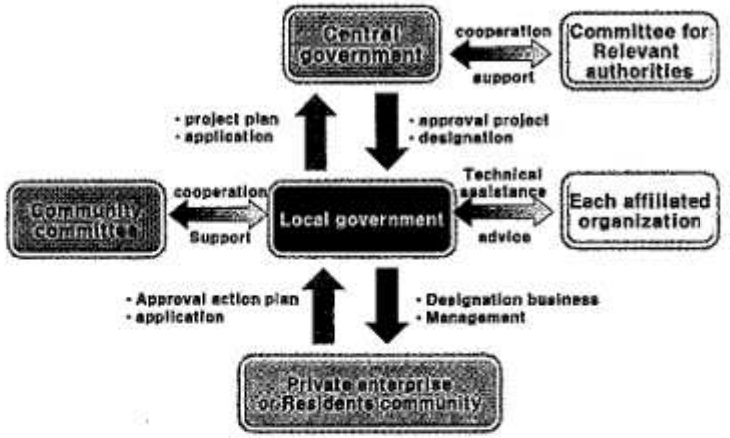
- Hygienic treatment through construction of energy generation facilities
- Energy self-sufficiency improvement in the region
- New incomes generated from the sale of energy and by-products
- Creation of new employment opportunity in small cities and rural areas
- Reduction of greenhouse gas emissions through renewable energy production
- Branding its unique towns as a 'Low Carbon Green village' which can subsequently bring touristic resources

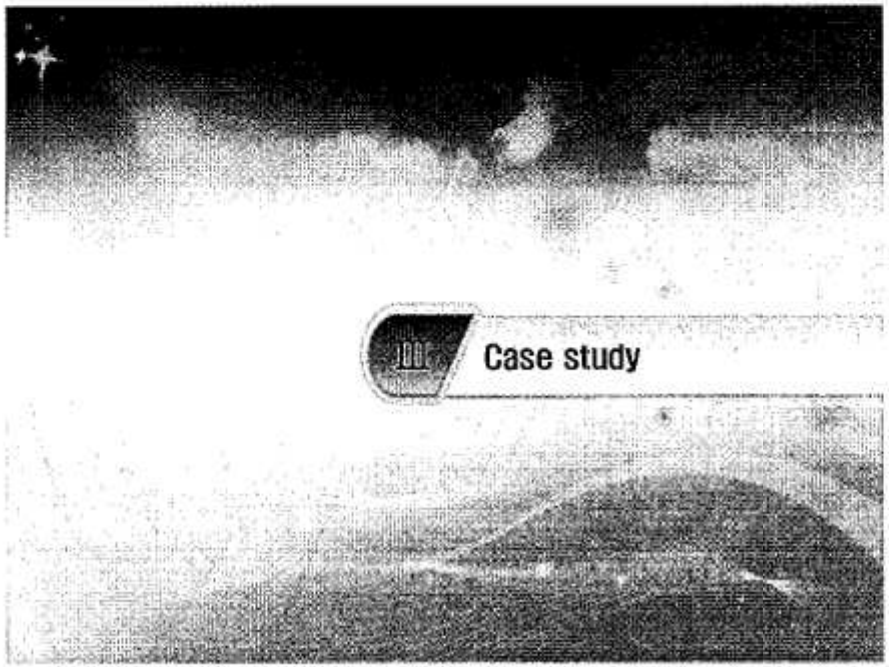
Activation of Town Community

Regional resource Circulation system

Project system

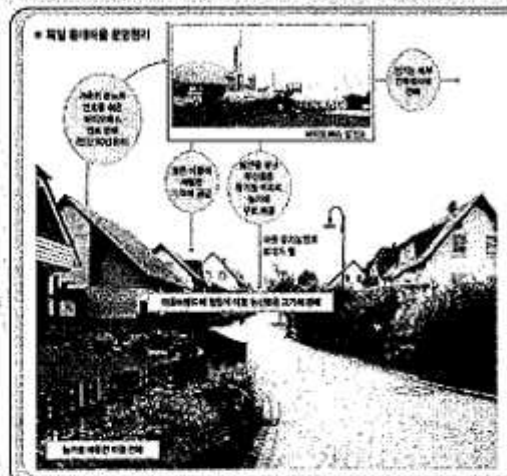
System





III Case study

1. Germany, Juhnde



Sales of the biomass generated from the town (Food waste, hay, agricultural & forestry by-products, night soil)

Sales

Biogas → electricity, heat
- Power generation
- Heat generation
- Sales to the power company

By-products

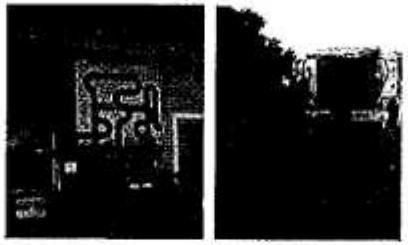
By-products
- High quality fertilizers
- Organic farming (higher price products)

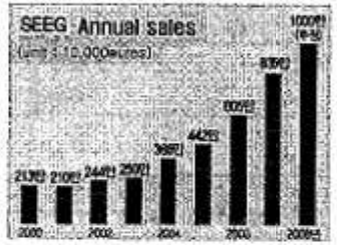
2. Japan, Ogamawachi

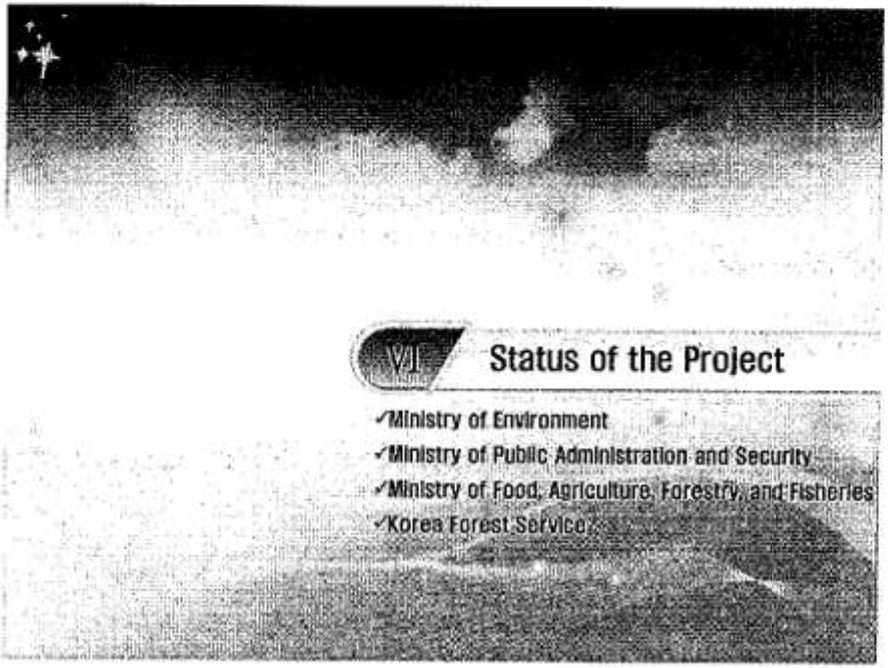
- Biogas plant installation (residents and external investments)
- Local money is provided to the family discharging food waste in the separate garbage bins → can be used in the regional marketplace: residents participation elevated
- Additional income obtained through the generation of electricity and sales of by-products such as liquefied fertilizer

3. Austria, Mureck city

- Bio-diesel production : recycling of waste cooking oil
- 85% of District heating
  - Wood chip boiler
  - cogeneration using livestock manure and agricultural byproduct
- Effect
  - Reduction of 55000ton CO_2 emission
  - 18million liter of oil substitution







VI Status of the Project

- ✓Ministry of Environment
- ✓Ministry of Public Administration and Security
- ✓Ministry of Food, Agriculture, Forestry, and Fisheries
- ✓Korea Forest Service

Ministry of Environment

	First Target
Location	Gwangju Mangwol village
Population (household)	124 (66)
Biomass	Livestock manure
Facility	Anoxic digestion, Solar generation, Construction for town halls, house renovation
Landscape	

Ministry of Security and Public Administration

	First Target
Location	Gongju Gyeryong myeon
Population (household)	380 (150)
Biomass	Land heat
Facility	Geothermal power generation, Glass green house
Landscape	

Ministry of Security and Public Administration

	Second Target
Location	Pocheon Youngbyeong,Youngsong village
Population (household)	909 (373)
Biomass	Livestock manure
Facility	Pellet boiler, Pelletizer
Landscape	

Ministry of Agriculture, Food, and Rural Affairs

	First Target
Location	Wanjugun Deok-am village
Population(household)	154 (61)
Biomass	Solar power, Land heat
Facility	Natural power generation(solar, geothermal) Town hall with natural power system
Landscape	

Korea Forest Service

	First Target	Second Target
Location	Bonghwagun Seobyuk-ri	Hwacheongun Nueruep village
Population (household)	399 (159)	471 (125)
Biomass	Forestry	Forestry
Facility	Pellet boiler, Pelletizer	Pellet boiler, Pelletizer
Landscape		

Committee for relevant authorities

- **Open Committee for relevant authorities regularly**
  - Relevant ministries and affiliated organizations
- **Discuss and share about status, difficulties, and future plan of each government**
- **After operating committee during project period, Main business of Low Carbon Green Village will begin**

Running a website

- **Construction a website for information Provision(KECO)**
  - Becomes 'door for communication' among government, local government, and local residents
  - Offers Guideline, procedures, related information and technology

- http://www.greenvill.or.kr

SORRY!
ENGLISH VERSION
IS NOT READY

Difficulties

- Delay of project due to civil complaint and licensing problem
- Absence of voluntary participation from residents
- Lack of biomass & distrust of technology
- Distrust of sustainability and economic feasibility
- Incomplete legal and institutional system
- Absence of institutional support : incentives

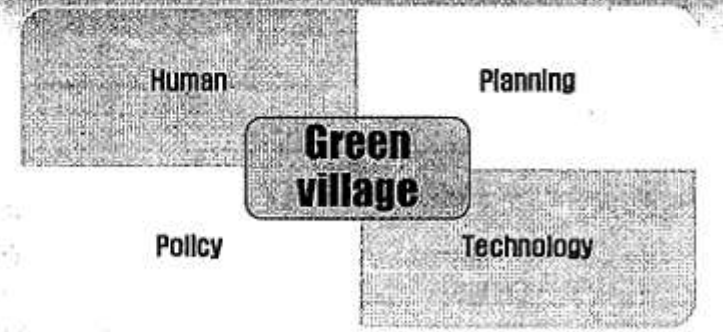
Improvement Plan

- **Extension of business period**
  - 2years → 3 years
- **Accommodation of civil affair**
  - Construction of 'Committee for green village' with residents and local governments' officers
- **Preparation of legal basis for green village**
  - Establishment of concept, notification of system and procedures for green villages
  - Set up specific roles for government, company, and local residences

Outline of the Main Business

Budget	• Total expenses 5.2billion won, Government support 50% • Local government and residents appropriate 50%
Period	• 3years
Support	• Construction of Waste & biomass treatment facilities and Natural power facility • Renovation of energy efficiency in village
Utilization	• Depends on condition of village

4 resources for Green Village



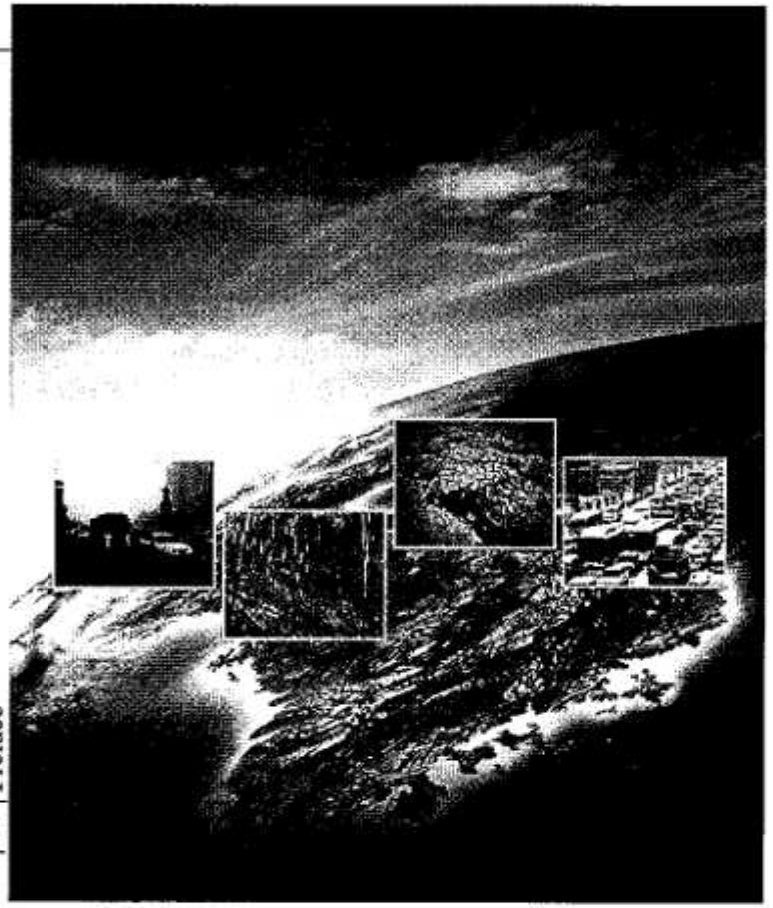
- *Needs to construct People-mattered Korean Bioenergy village combined Value & Philosophy*
  - Combination with centralized and dispersed energy system
  - Activation of local community


Thank you for
your attention!
gsjung@keco.or.kr

附件七、Carbon ZeroBuilding 文宣資料

Carbon Zero Building

National Institute of Environmental Research



A milestone for Eco-friendly Construction

The National Institute of Environmental Research (NIER) of the Ministry of Environment recently built a carbon zero building as a climate change research center that emits no carbon and uses renewable energy.

The center supplies its own energy through renewable energy sources while consuming no fossil fuel. The carbon zero building becomes a landmark for us not only to join efforts of the international society to cut down greenhouse gas emissions, but also to make a significant achievement for our new initiative "Low Carbon Green Growth."

We reviewed various possible technologies for minimizing energy consumption and maximizing the use of natural energy sources for the building using energy analysis simulation. And we applied a total of 66 kinds of technologies including energy saving techniques such as natural lighting and super insulation, and natural energy sources like photovoltaic, solar heat and geothermal energy.

For the inside of the building, we used green interior materials, so that NIER researchers can work in the eco-friendly environment.

We believe this carbon zero building will play a symbolic role for the country's low carbon and green growth policy to raise public awareness of reducing greenhouse gases. On top of that, through our continuous energy monitoring, we will secure basic data for developing policies on low carbon buildings and we hope our efforts can contribute to increasing the number of carbon zero buildings nationwide.

We must not disappoint them or ourselves. If we wish to make any real difference,
the only way is to take action together.
Instead of saying "you first", we should start by doing "me first."
(COP15 Copenhagen, UN Climate Change Conference 2009)

Low Carbon Green Growth

Background

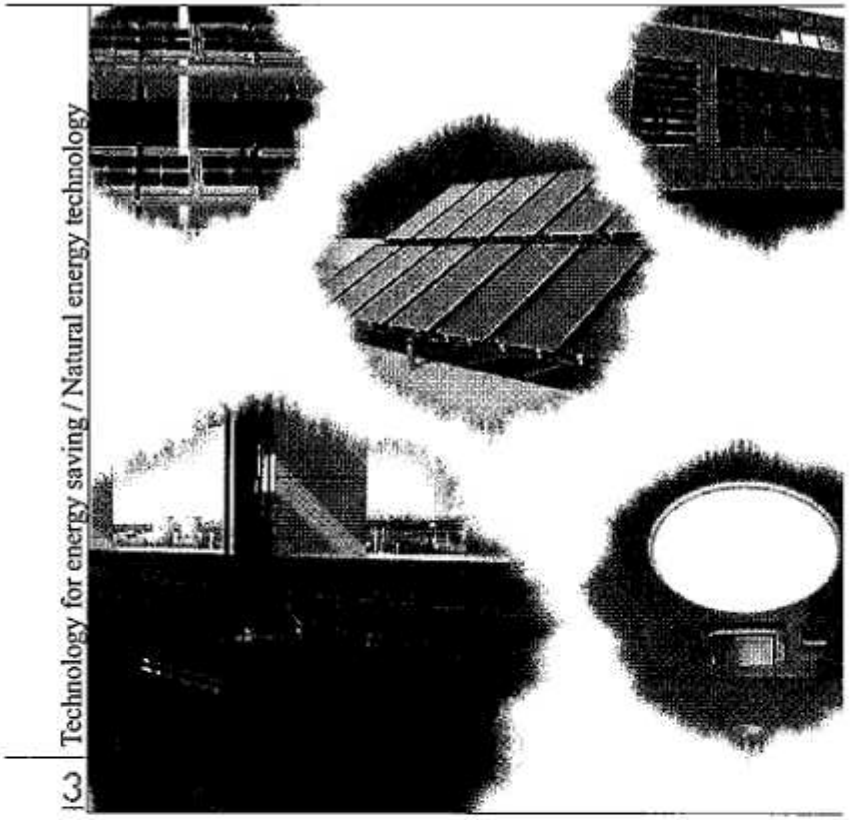
- President Lee Myung-bak announced Korea's mid-term GHG reduction target in the United Nations Climate Change Conference, Copenhagen 2009 (COP15) that Korea will voluntarily reduce greenhouse gas emissions by 30% from BAU by 2020.
- The amount of greenhouse gas emissions that are released from buildings accounts for about 20% of the total GHG emissions in Korea, and it is necessary to cut down GHG emissions from buildings to achieve a low-carbon society.

Building Information

- Construction period : 2008~2010 (3 yrs)
- Floor : 1st floor, 2nd floor, basement (2,500m²)
- Cost : 3.55 million KRW/m² ($ 3,000/m²)

Energy Saving and Carbon Reduction Effect

- Expected annual budget savings through reducing energy consumptions : $ 93,577
- Expected emission reduction : 100 CO_2 ton/yr
(The amount of carbon released from a 2000cc automobile when it drives between Seoul and Busan 500 times)

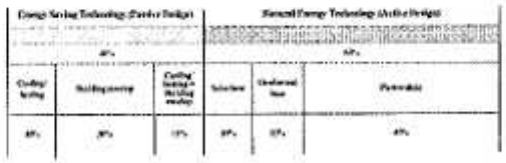


03 | Technology for energy saving / Natural energy technology

What is Carbon Zero?

Carbon Zero is a concept that building emits no carbon by reducing energy consumptions with energy saving technologies and making up for the energy need using natural energy technology.

Energy consumptions and the expected savings are estimated through energy analysis simulation. The total annual energy loading from the Carbon Zero Building is 123.8kWh/m².

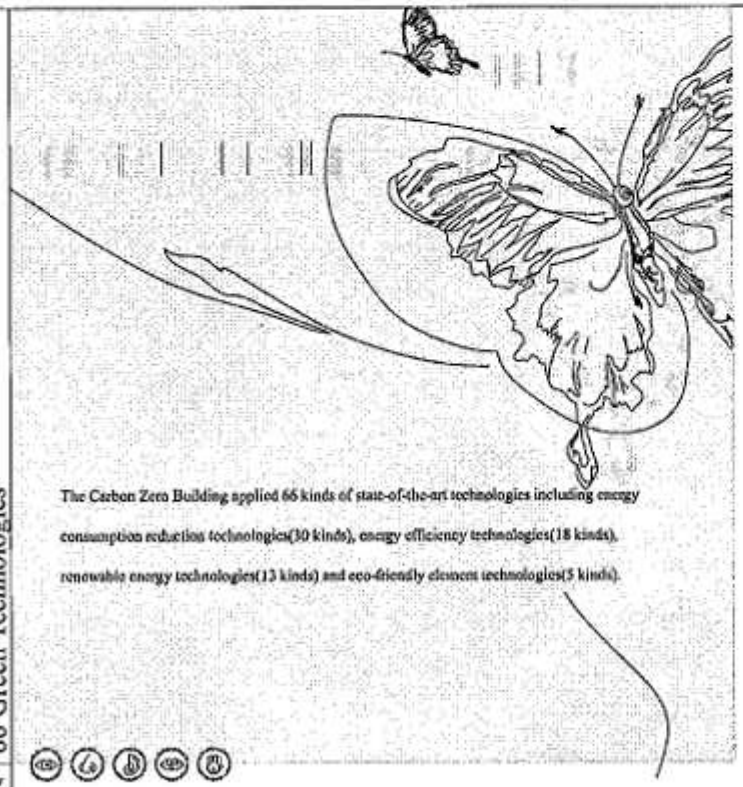


Passive Design

A method of reducing energy consumption by improving building designs without additional energy input, such as effective arrangement, super insulation, natural ventilation and skylight.

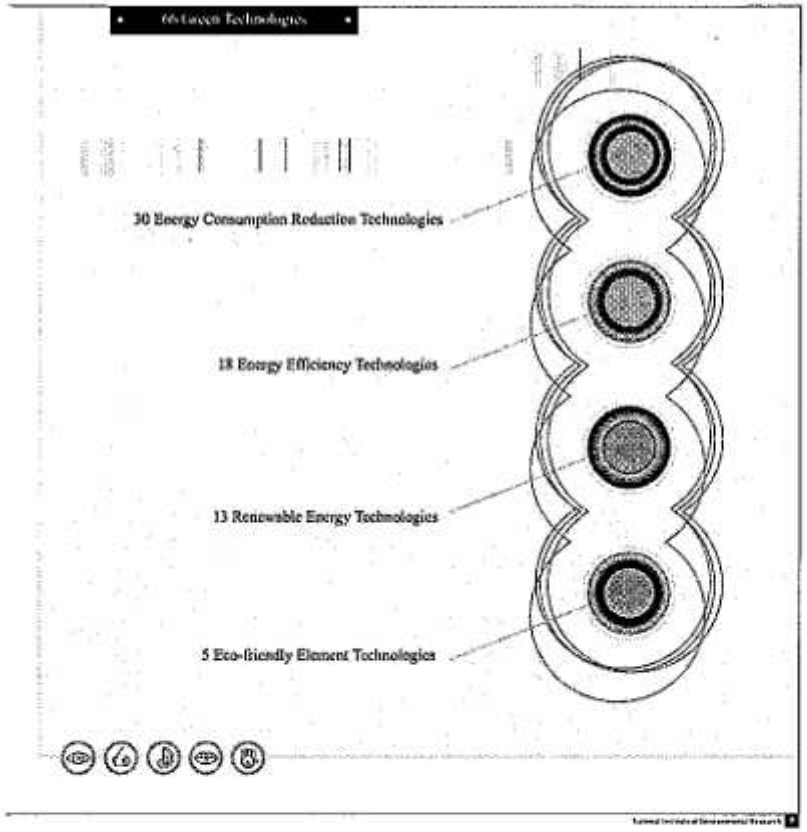
Active Design

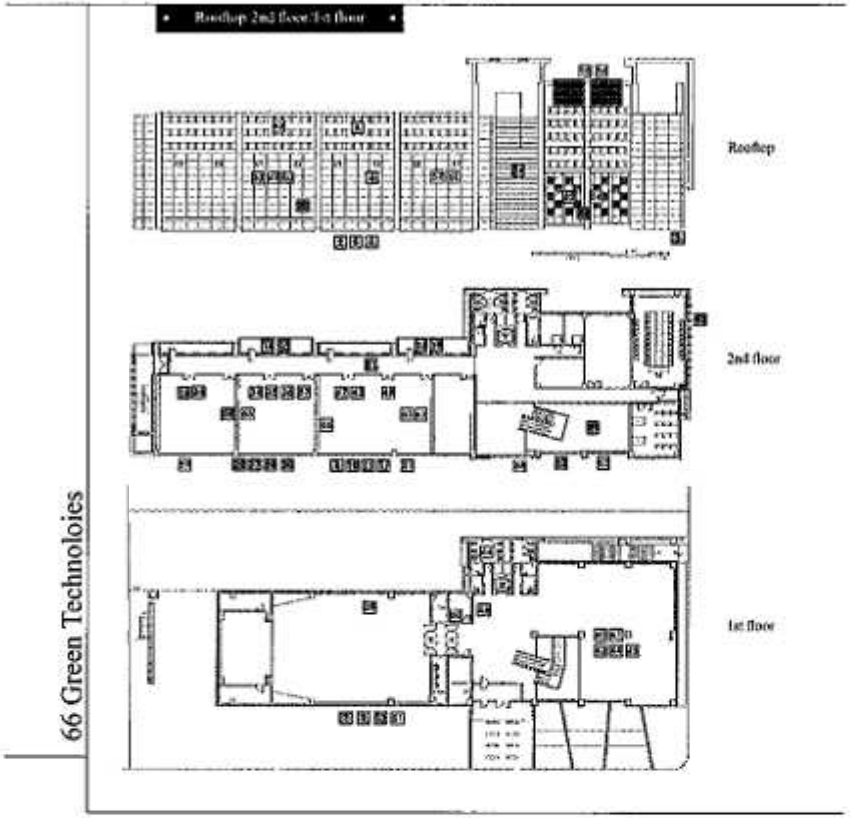
A method of cutting GHG emissions by using natural energy(renewable energy) sources.

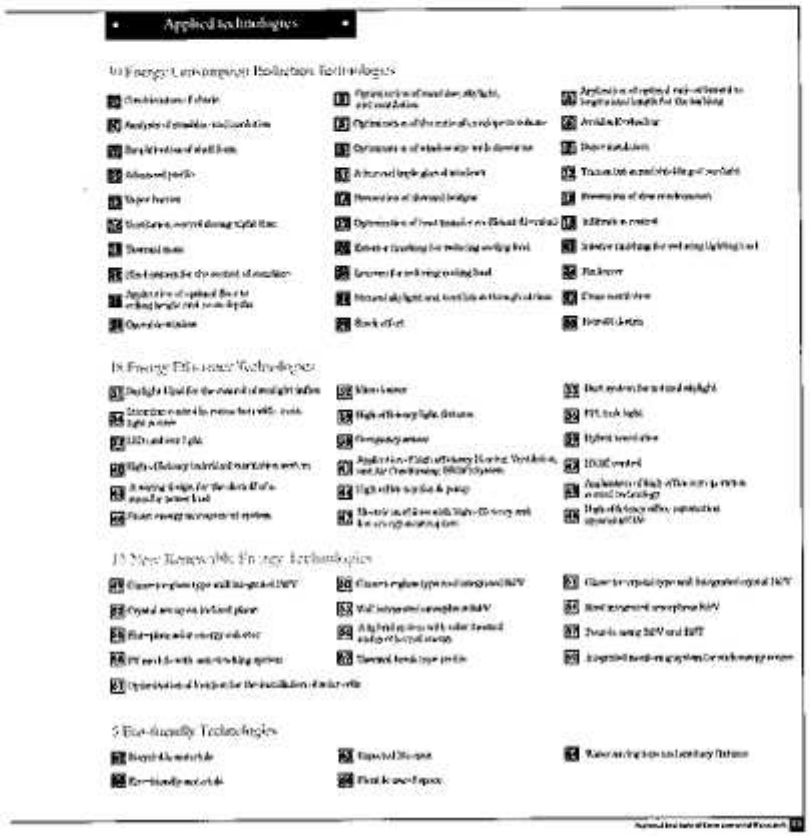


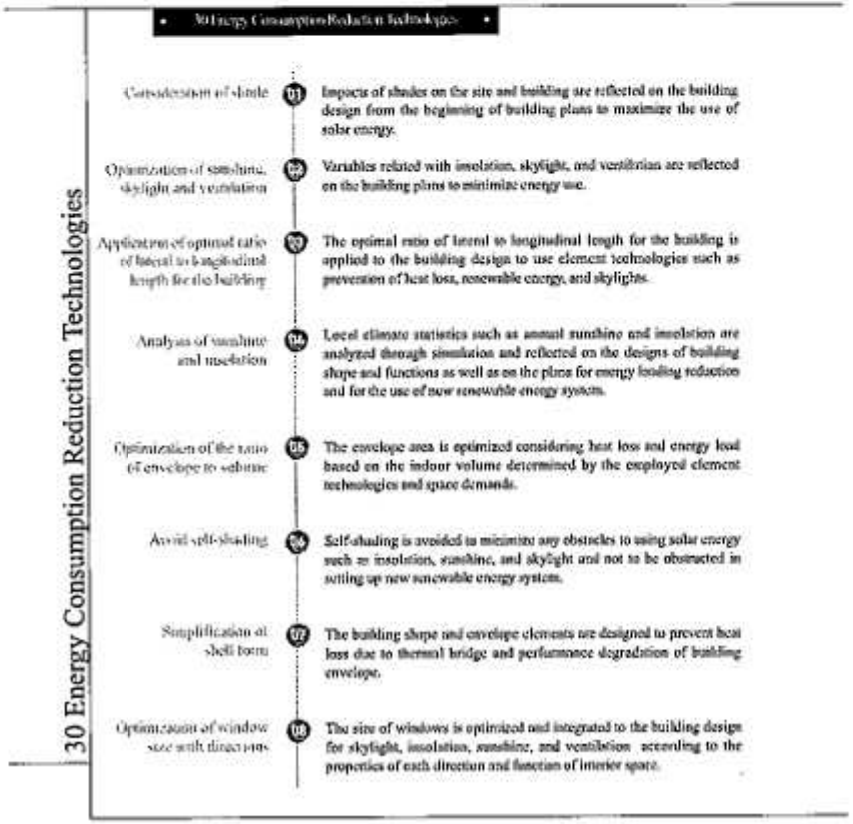
The Carbon Zero Building applied 66 kinds of state-of-the-art technologies including energy consumption reduction technologies(30 kinds), energy efficiency technologies(18 kinds), renewable energy technologies(13 kinds) and eco-friendly element technologies(5 kinds).

66 Green Technologies


66 Green Technologies
30 Energy Consumption Reduction Technologies
18 Energy Efficiency Technologies
13 Renewable Energy Technologies
5 Eco-friendly Element Technologies

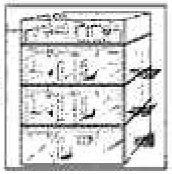

Rooftop 2nd floor 1st floor
66 Green Technoloies
Rooftop
2nd floor
1st floor


Applied technologies
30 Energy Consumption Reduction Technologies
18 Energy Efficiency Technologies
13 New Renewable Energy Technologies
5 Eco-friendly Technologies


30 Energy Consumption Reduction Technologies
Consideration of shade
01
Impacts of shades on the site and building are reflected on the building design from the beginning of building plans to maximize the use of solar energy.
Optimization of sunshine, skylight and ventilation
02
Variables related with insolation, skylight, and ventilation are reflected on the building plans to minimize energy use.
Application of optimal ratio of lateral to longitudinal length for the building
03
The optimal ratio of lateral to longitudinal length for the building is applied to the building design to use element technologies such as prevention of heat loss, renewable energy, and skylights.
Analysis of sunshine and insolation
04
Local climate statistics such as annual sunshine and insolation are analyzed through simulation and reflected on the designs of building shape and functions as well as on the plans for energy loading reduction and for the use of new renewable energy system.
Optimization of the ratio of envelope to volume
05
The envelope area is optimized considering heat loss and energy load based on the indoor volume determined by the employed element technologies and space demands.
Avoid self-shading
06
Self-shading is avoided to minimize any obstacles to using solar energy such as insolation, sunshine, and skylight and not to be obstructed in setting up new renewable energy system.
Simplification of shell form
07
The building shape and envelope elements are designed to prevent heat loss due to thermal bridge and performance degradation of building envelope.
Optimization of window size with direction
08
The size of windows is optimized and integrated to the building design for skylight, insolation, sunshine, and ventilation according to the properties of each direction and function of interior space.

30 Energy Consumption Reduction Technologies

18 Infiltration control — Building is designed to control heat loss caused by infiltration of cold air while maintaining a constant level of ventilation.

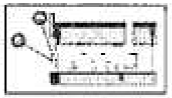


19 Thermal mass — Internal thermal mass is installed at some parts of floors and walls for the comfortable environment and prevention of heat loss.

20 Exterior finishing for reducing cooling load — Colors and layers in consideration of reflectivity are designed and applied to reduce cooling load during the summer time when finishing pavement around the building, wall, and roof.

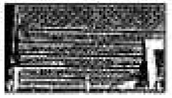
21 Interior finishing for reducing lighting load — Colors and material textures in consideration of reflectivity are applied in order to maximize effects of natural skylight and to reduce lighting load by light fixture and cooling load by heat from lighting.

22 Blind system for the control of sunshine — Automatic exterior blinds which operate in response to the amount of sunshine are installed to reduce cooling load and to create comfortable indoor environment.



23 Louvers for reducing cooling load — A louver, insolation control system, is installed in a fixed form for the reduction of cooling load.

24 Fin louver — Fin louvers are incorporated with building designs and applied element techniques for reducing cooling load and maximizing natural skylight.



25 Super insulation — Heat loss is minimized on walls, roofs, and floors according to energy load during day and night.

26 Advanced profile — Window integrated photovoltaic system is designed considering the heat transfer coefficient (U-value) which minimizes heat loss while satisfying the functions such as water-proof, damp-proof, noise-proof, insulation, and airtight.

27 Advanced triple glazed windows — Advanced triple glazed windows are designed to meet the required performances such as heat transfer coefficient (U-value), noise-proof, and shielding to prevent unnecessary heat transfer between indoor and outdoor.

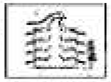
28 Transmission and shielding of sunlight — Windows in the research offices maintain constant solar heat gain coefficient (SHGC) at 0.417 and windows in the atrium can control direct insolation by keeping transmission rate at 10 – 20%.

29 Vapor barrier — Vapor barriers are installed to prevent moisture transfer and performance degradation of insulation layers caused by dew condensation.

30 Prevention of thermal bridges — Possible areas of thermal bridges in the building such as connecting parts are minimized to prevent any heat loss, performance degradation of insulation layers, moisture transfer, and the additional impacts by the thermal bridges.

31 Prevention of dew condensation — The structures and performance of the building envelope are ensured to prevent poor thermal performance of building envelope or possible dew condensation in the weak area such as connecting parts.

32 Ventilation control during night time — A night time ventilation system is set up considering energy load patterns and characteristics during day and night.



33 Optimization of heat transfer coefficient (U-value) — The U-values of walls, roofs, floors, and windows obtained from the annual energy load patterns are optimized according to the usage of indoor space and properties of each direction.

25 Daylight blind for the control of sunlight influx

Double blinds are installed on the exterior of the building to increase the effect of skylight and to reduce cooling load through the control of sunlight influx.

22 Micro louver

A fixed micro louver system integrated with glass reflects direct sunlight and the north-oriented louver passes diffused skylight reducing cooling load and providing comfortable natural skylight conditions.

23 Duct system for natural skylight

Skylight duct system integrated with ventilation is installed to reduce lighting load in the area where natural skylight is unreachable from the windows, which is composed of solar concentrating system, light transfer system, and light diffusing system.

24 Dimming control in connection with main light source

Dimming control combined with daylight blind and light fixture adjusts indoor brightness according to the conditions of natural light to reduce lighting load and to provide comfortable indoor environment.

28 High efficiency light fixtures

Light fixtures with high efficiency and high reflectivity such as LED and CFL are used to reduce lighting load.

26 FPL task light

High efficiency floor stands for the task light are used to meet the local illumination level while maintaining minimum indoor brightness.

27 LED ambient light

High efficiency LEDs are used to maintain minimum indoor brightness at 300 lux.

20 Application of optimal floor to ceiling height and room depths

The heights of ceiling and skylight windows are optimized according to the depth of room when planning natural skylight system to reduce lighting load.

21 Natural skylight and ventilation through atrium

Natural skylight and ventilation systems are designed using an atrium in the center of the building and unnecessary solar insolation are controlled by the thin film transmission module.

29 Cross Ventilation

The concept of horizontal and vertical cross ventilation is used to maximize the effects of natural ventilation.

28 Operable windows

The operable windows which can be opened and shut manually or automatically are installed for natural ventilation.

27 Stack effect

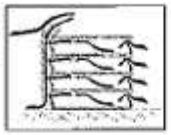
Natural updrafts in the atrium can contribute to natural ventilation and its subsequent stack effect can reduce cooling load.

26 Retrofit design

The building is designed to make it convenient to maintain and replace architectural, mechanical, and electrical elements to improve its performance in the operational stage.

Occupancy sensor 19 Occupancy sensor detects all movement in the office using infrared and sends the information on the room occupancy to the controller for on and off control.

Hybrid ventilation 20 The heat loss by ventilation is controlled by air supply through the window control system and by ventilation control system through light shelf.



High efficiency individual ventilation system 20 An individual ventilation system is set up to maintain heat loss and energy consumption caused by ventilation below a certain level.

Application of high efficiency Heating, Ventilation, and Air Conditioning (HVAC) System 21 HVAC system is set up according to the characteristics of individual space for the improvement of indoor office environment and reduction of related load with HVAC through the analysis of efficiency of individual apparatus and their integrated efficiency.

HVAC control 22 The optimum operation conditions and methods for the HVAC system are set up and operated accordingly.

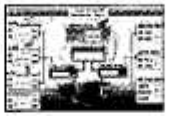
A wiring design for the shutoff of a standby power load 23 A wiring design for the shutoff of a standby power load is used to reduce standby power load.

18 Energy Efficiency Technologies

High efficiency fan & pump 24 High efficiency fans and pumps are used for the reduction of power load.

Application of high efficiency operation control technology 25 A heat pump is installed to reduce energy load through the optimal operation control for energy source and system.

Smart energy management system 26 Smart energy management systems are applied based on the real-time monitoring for each of energy source, system, and load.



Electric machines with high efficiency and low energy consumption 27 Electric machines with high efficiency and low energy consumption are used after reviewing efficiencies of all electronic machines in the building.

→

High efficiency office automation apparatus (OA) 28 High efficiency OA apparatus with low power, low heat, and low emission are used.

Glass-to-glass type wall integrated BiPV

29 The glass-to-glass type solar module, a Building Integrated Photovoltaics (BiPV) technology, is incorporated as a design element of wall facade.

Glass-to-glass type roof integrated BiPV

30 The glass-to-glass type solar module, a BiPV technology, is incorporated as a design element of roof.

Glass-to-crystal type wall integrated type BiPV

31 The glass-to-crystal type solar module, a BiPV technology, is incorporated as a design element of roof.

Crystal set up on inclined plate

32 The glass-to-crystal type crystal module, a BiPV technology, is set up on inclined plane to increase solar concentration efficiency.

Wall integrated amorphous BiPV

33 Penetrating thin film type solar module, a BiPV technology, is incorporated as a design element of facade.

RSC/poly roof amorphous BiPV

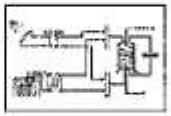
34 Penetrating thin film type solar module, a BiPV technology, is incorporated as a design element of roof.

Flat-plate solar energy collection

35 Flat-plate solar collectors are used to maximize the efficiency of solar energy collection and are installed at an optimal angle to prevent overheating problems in summer.

Hybrid system with solar thermal and geothermal energy

06 Hybrid system, composed of solar thermal and geothermal energy to share heat load, is installed to increase cooling and heating efficiency.



Pergola using BiPV and BiST

32 A pergola using Building Integrated Photovoltaic (BiPV) and Building Integrated Solar Thermal (BiST) system is installed to reduce cooling load in summer and to utilize roof area.

PV module with sun-tracking system

60 A sun-tracking photovoltaic (PV) module is installed to maximize solar concentration efficiency.

Thermal break type profile

62 The thermal performance of building envelope is ensured by designing BiPV as a thermal break type when using BiPV as an insulation layer.

Energy and resource consumption monitoring system

80 Integrated monitoring system is established for monitoring electric power load source, heat load source, and new renewable energy source, respectively.

Optimal zone of location for the installation of solar cells

93 The areas of the building are optimized and integrated for the use of solar energy through technologies such as BiPV and BiST.

5 Eco-friendly Technologies

5 Eco-friendly Technologies

Recyclable materials — Recyclable materials are considered and used systematically.

Expected life span — The life span of the building is extended by an open-ended room layout and the flexible use of space.

Water saving taps and sanitary fixtures — Water saving taps and sanitary fixtures are used to reduce water consumption.

Eco-friendly materials — Eco-friendly materials that do not contain hazardous substances such as VOCs are used for indoor air quality.

Flexible use of space — Rooms are designed with high flexibility in using space to meet the needs of changing research environment.

For a greener future

With our frontier carbon zero construction, we will do our best to raise awareness and provide education to the public on climate change for the reduction of greenhouse gases.

In addition, we will secure basic data by conducting continuous energy load monitoring, achieving the carbon zero goal of the building and developing policy measures for low carbon society, thereby contributing to the increase in the number of carbon zero buildings nationwide.

Carbon Zero
Building
National Institute of Environmental Research

National Institute of
Environmental Research
Environmental Research Complex
Hwangoro-dong, Seo-gu, Incheon, 404-708, Korea
Tel. 82-32-560-7114 Fax. 82-32-568-2038