녹색은 생활이다

Ministry of Environment

Countermeasures for Climate Change in Korea

October, 2011

Climate Change Cooperation Division

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환경부

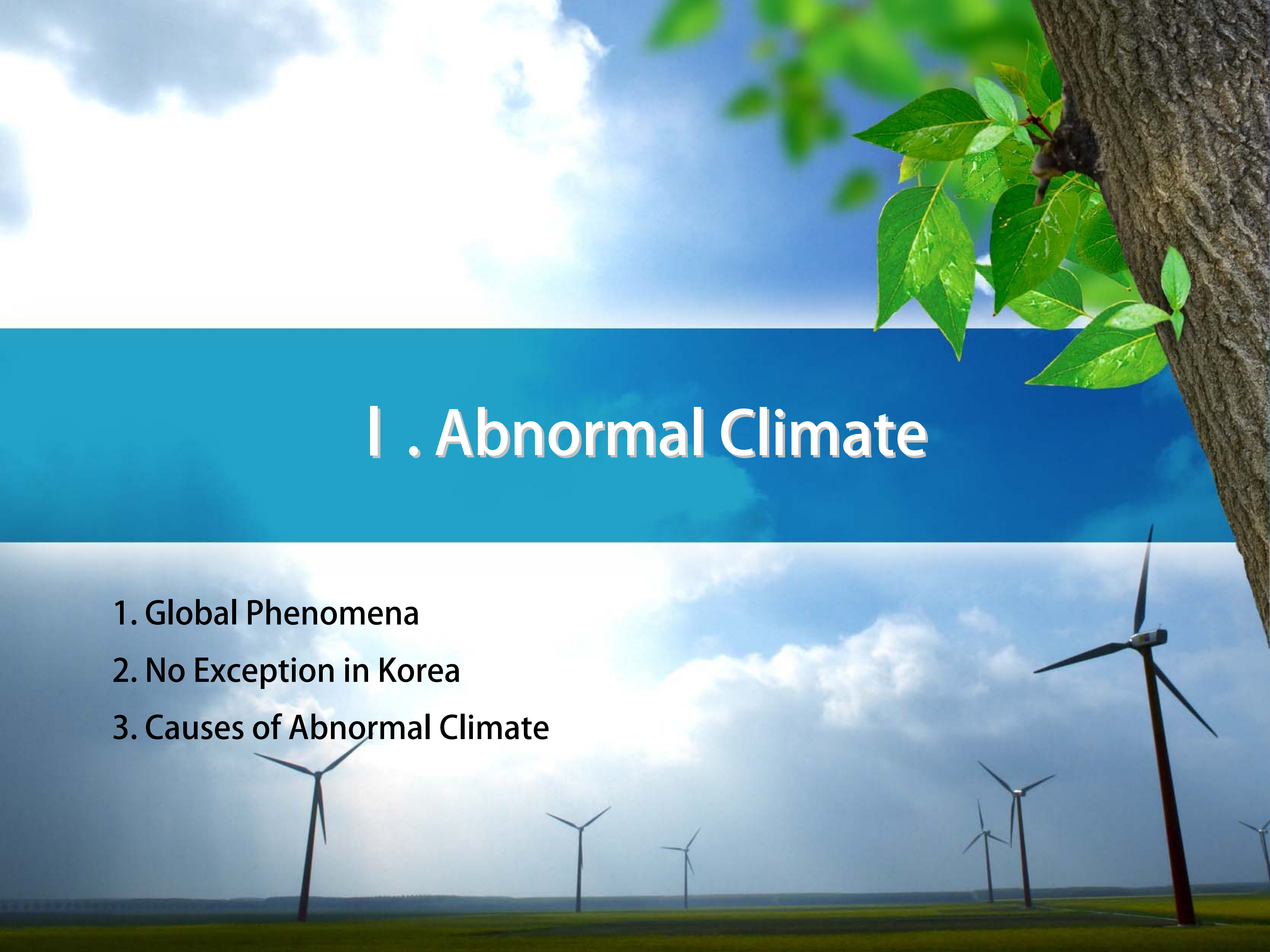
Contents

Ⅰ. Abnormal Climate

Ⅱ. Forecasting Climate Change

Ⅲ. Impact from Abnormal Climate

Ⅳ. Climate Change and Green Growth



Ⅰ. Abnormal Climate

1. Global Phenomena
2. No Exception in Korea
3. Causes of Abnormal Climate

1. Abnormal Climate

1-1. Global Phenomena

❍ (Japan) Dottori Prefecture 186cm, Aomori Prefecture 171cm Heavy snow(Dec 31, 2010-Jan 2)

- Sank 190 fish boats, 120,000 households suffered blackout due to broken power-transmission towers

❍ (China) Shandong Province suffered winder drought in 60 years (‘10.9 ～ ‘11.2)

- 240,000 people and 4 million ha of farmlands suffered water shortages

❍ (US) Minus 50° C wind chill in New England, cold wave warning (Jan 25, 2011)

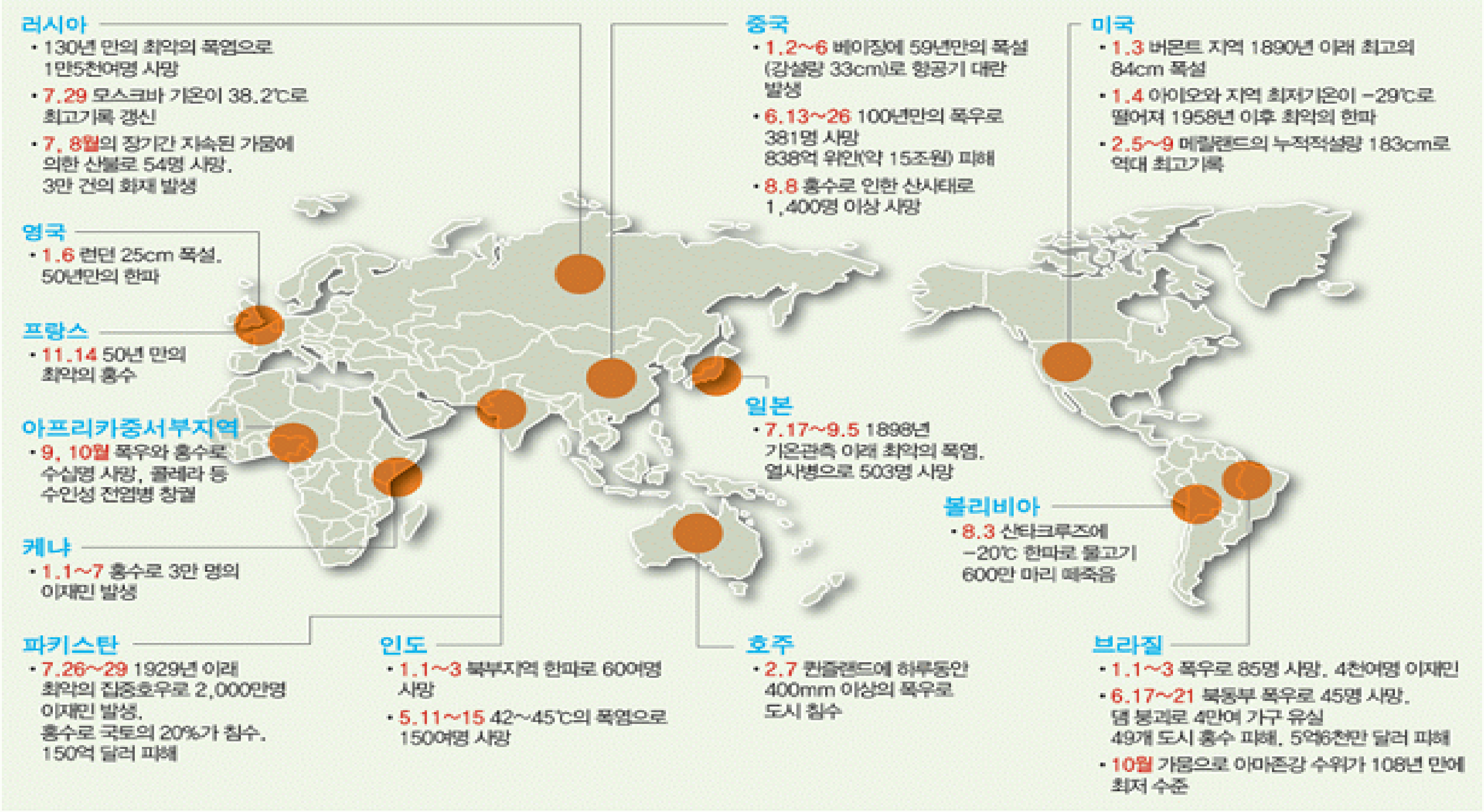
❍ (Brazil) Rained 300mm for 24 hours in Rio de Janeiro (Jan. 11 — 12, 2011)

- 800 people killed and 400 missing

1. Abnormal Climate

1-1. Global Phenomena

☐ Global Abnormal Climate in 2010



러시아
- 130년 만의 최악의 폭염으로 1만5천여명 사망
- 7.29 모스크바 기온이 38.2℃로 최고기록 갱신
- 7, 8월의 장기간 지속된 가뭄에 의한 산불로 54명 사망, 3만 건의 화재 발생

영국
- 1.6 런던 25cm 폭설, 50년만의 한파

프랑스
- 11.14 50년 만의 최악의 홍수

아프리카중서부지역
- 9, 10월 폭우와 홍수로 수십명 사망, 콜레라 등 수인성 전염병 창궐

케냐
- 1.1~7 홍수로 3만 명의 이재민 발생

파키스탄
- 7.26~29 1929년 이래 최악의 집중호우로 2,000만명 이재민 발생, 홍수로 국토의 20%가 침수, 150억 달러 피해

인도
- 1.1~3 북부지역 한파로 600여명 사망
- 5.11~15 42~45℃의 폭염으로 1500여명 사망

중국
- 1.2~6 베이징에 59년만의 폭설(강설량 33cm)로 항공기 대란 발생
- 6.13~26 100년만의 폭우로 381명 사망 838억 위안(약 15조원) 피해
- 8.8 홍수로 인한 산사태로 1,400명 이상 사망

일본
- 7.17~9.5 1898년 기온관측 이래 최악의 폭염, 열사병으로 503명 사망

호주
- 2.7 퀸즐랜드에 하루동안 400mm 이상의 폭우로 도시 침수

미국
- 1.3 버몬트 지역 1890년 이래 최고의 84cm 폭설
- 1.4 아이오와 지역 최저기온이 −29℃로 떨어져 1958년 이후 최악의 한파
- 2.5~9 메릴랜드의 누적적설량 183cm로 역대 최고기록

볼리비아
- 8.3 산타크루즈에 −20℃ 한파로 물고기 600만 마리 떼죽음

브라질
- 1.1~3 폭우로 85명 사망, 4천여명 이재민
- 6.17~21 북동부 폭우로 45명 사망, 댐 붕괴로 4만여 가구 유실 49개 도시 홍수 피해, 5억6천만 달러 피해
- 10월 가뭄으로 아마존강 수위가 108년 만에 최저 수준

1. Abnormal Climate

1-2. No Exception in Korea

☐ Heavy Snow

❍ 100cm of snow fell in Gangwon Province in this February (Samcheok: 110cm, Donghae: 100cm)

- Damaged 6.6 billion KRW of crops (estimate), sank 24 ships
- Spent 60 billion KRW for removing snow in 6 local governments (estimate), 1,300 people were isolated

❍ Ulsan was blocked in February due to heavy snow in 80 years, Hyundai Motors stopped its operation (Feb. 4)

❍ Pohang recorded 52cm of snowfall in this January (record high in 60 years)

- About 100 billion KRW lost in farms and steel distribution sectors, 97% of flights were canceled

❍ In January, 2010, Seoul recorded the highest snowfall since 1937 (25.8cm)

- Estimated economic lost of 2.4 trillion KRW

1. Abnormal Climate

1-2. No Exception in Korea

☐ Heavy Snow in Gangwon Province

YONHAP NEWS

[Left: Samcheok recorded heaviest snowfall in 100 years]

[Right: Removing snow in Gangneung City]

1. Abnormal Climate

1-2. No Exception in Korea

☐ Cold Wave

❍ In this January, Seoul and Pusan recorded lowest temperature in 10 and 96 years, respectively

- Only 44 minutes showed temperature above 0˚ C in this January in Seoul (lowest temperature in 30 years)

- 7,000 water pipes were frozen and showed largest power demand (73.14 million KW, Jan. 17)

❍ Cold wave in Korea in Early January, 2010 (Lower than -20˚ C in the lowest temperature)

- Delayed and canceled subways in the Metropolitan Area (48), damaged fruits and vegetables

1. Abnormal Climate

1-2. No Exception in Korea

☐ Localized Heavy Rain

❍ Heavy rain in July, 2010 came nuclear reactors 1 and 2 to halt in Gori

❍ August, 2010 recorded 374.5mm of rainfall (41.3% increased compared to common years)

- 5 people were killed due to lost and submerged roads and farmlands, lost 116.9 billion KRW

❍ The typhoon ‘Kompasu’ killed 6 people and lost 167.4 billion KRW

❍ Heavy rain in the Metropolitan Area (98mm in Seoul) during Chuseok

- Central areas like Gwanghwamun flooded, 2 people were killed and lost 59.3 billion KRW

1. Abnormal Climate

1-2. No Exception in Korea

☐ Flood in Pusan and Seoul

[Left: Flood in Pusan in July, 2009

[Right: Flood of Gwanghwamun in September, 2010]

1. Abnormal Climate

1-2. No Exception in Korea

□ Scorching Heat and Drought

❍ 10.5 days of heat waves (over 33° C) in 2010, increased 2.3 days

- 455 people had emergency treatments and 8 were killed

❍ The maximum power demand in summer of 2010 (70.7 million KW), 11.8% increase

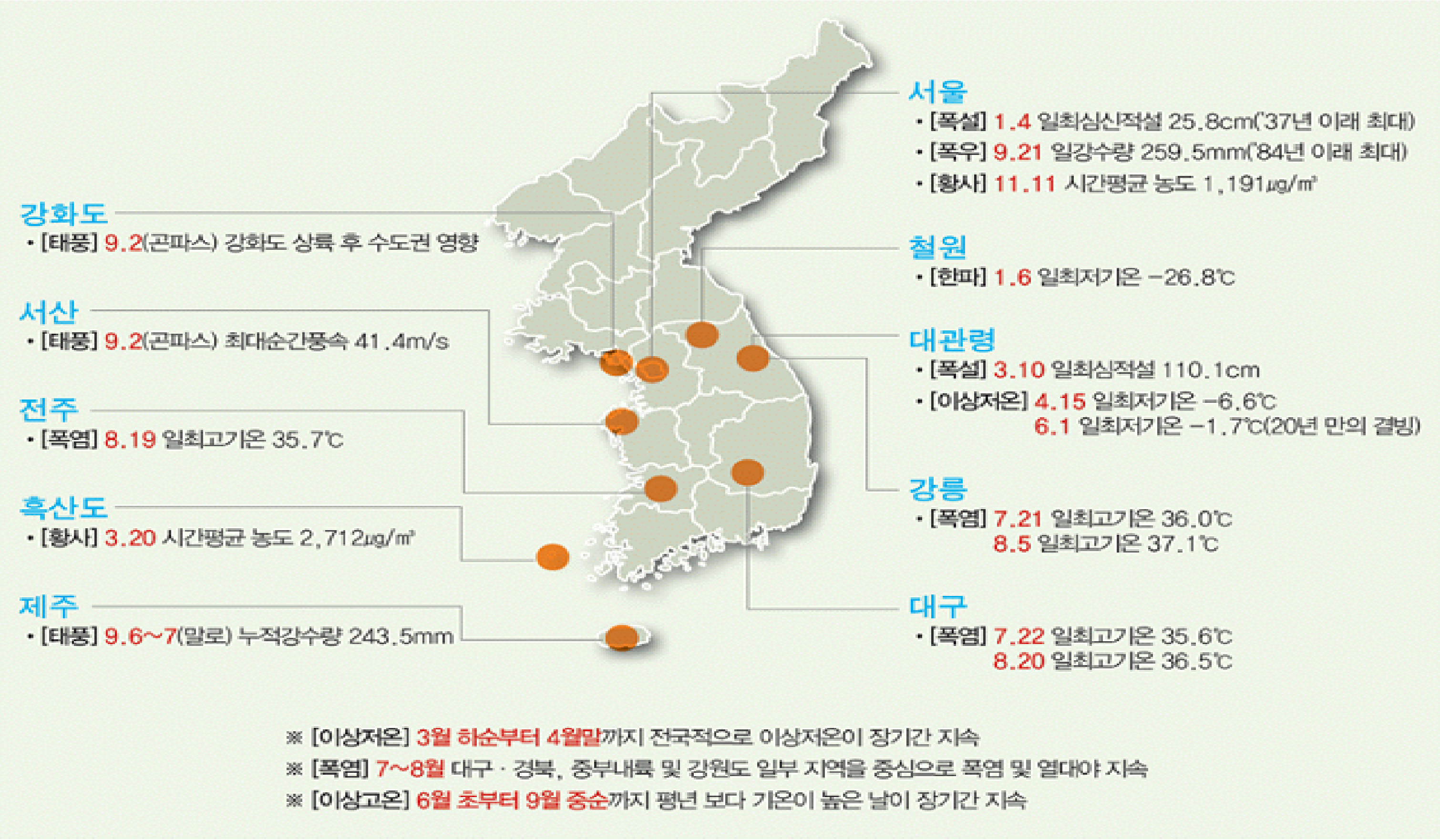
❍ Heat waves in Daegwanryeong in the summer of 2010 and increased rainfall in the autumn led sharp increase in vegetable prices (Over 15,000 KRW per Chinese cabbage)

❍ Limited water supply due to drought in winter and spring (limited water supply for 3 months in Taebaek from November, 2009)

1. Abnormal Climate

1-2. No Exception in Korea

□ Abnormal Climate of Korea in 2010



강화도
- [태풍] 9.2(곤파스) 강화도 상륙 후 수도권 영향

서산
- [태풍] 9.2(곤파스) 최대순간풍속 41.4m/s

전주
- [폭염] 8.19 일최고기온 35.7℃

흑산도
- [황사] 3.20 시간평균 농도 2,712㎍/㎥

제주
- [태풍] 9.6~7(말로) 누적강수량 243.5mm

서울
- [폭설] 1.4 일최심신적설 25.8cm('37년 이래 최대)
- [폭우] 9.21 일강수량 259.5mm('84년 이래 최대)
- [황사] 11.11 시간평균 농도 1,191㎍/㎥

철원
- [한파] 1.6 일최저기온 −26.8℃

대관령
- [폭설] 3.10 일최심적설 110.1cm
- [이상저온] 4.15 일최저기온 −6.6℃
  6.1 일최저기온 −1.7℃(20년 만의 결빙)

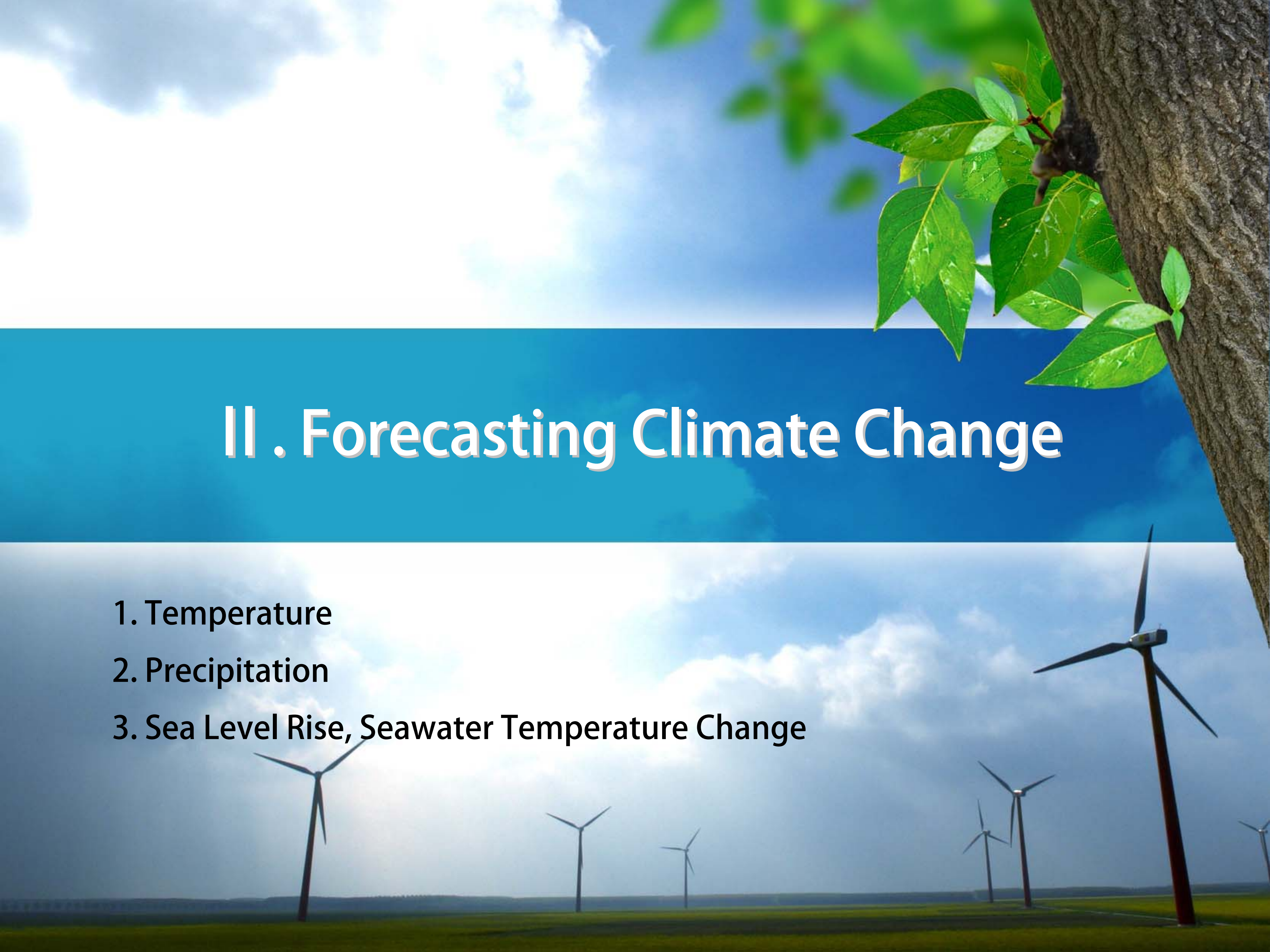
강릉
- [폭염] 7.21 일최고기온 36.0℃
  8.5 일최고기온 37.1℃

대구
- [폭염] 7.22 일최고기온 35.6℃
  8.20 일최고기온 36.5℃

※ [이상저온] 3월 하순부터 4월말까지 전국적으로 이상저온이 장기간 지속

※ [폭염] 7~8월 대구 · 경북, 중부내륙 및 강원도 일부 지역을 중심으로 폭염 및 열대야 지속

※ [이상고온] 6월 초부터 9월 중순까지 평년 보다 기온이 높은 날이 장기간 지속



Ⅱ. Forecasting Climate Change

1. Temperature
2. Precipitation
3. Sea Level Rise, Seawater Temperature Change

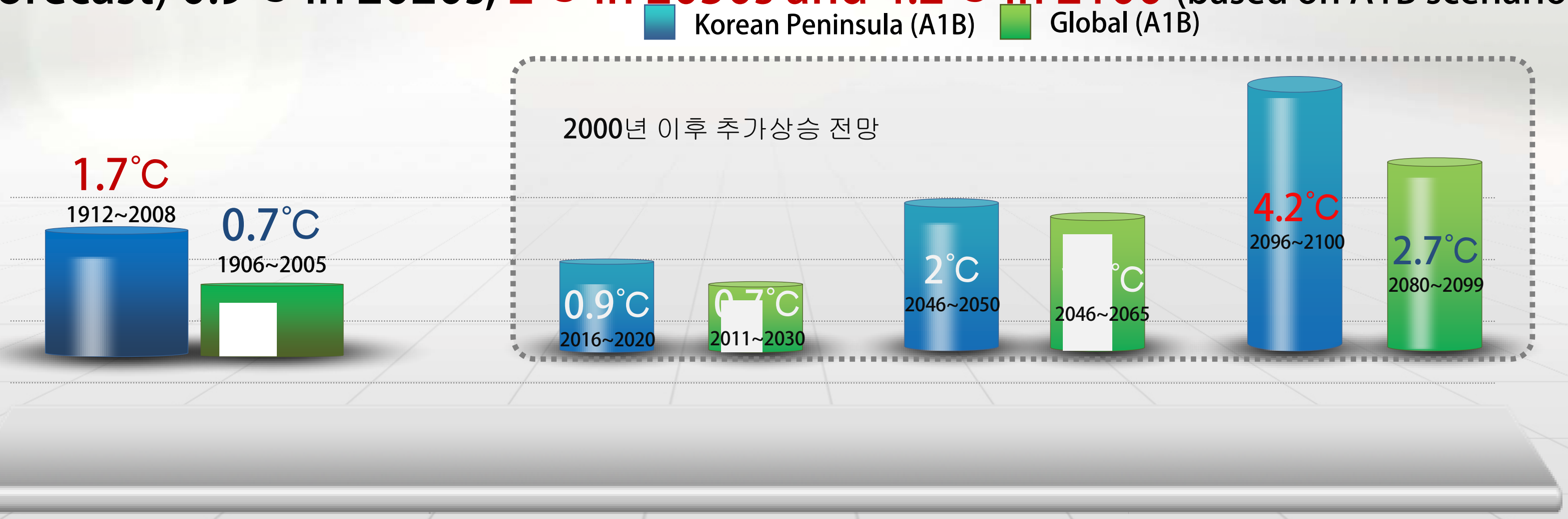
2. Forecasting Climate Change

2-1. Temperature

❍ (Status) 6 major Korean cities experienced 1.7° C increase for the last 100 years (1912 — 2008)

- Pretty higher than 0.74℃(land: 0.9℃, ocean: 0.6℃) of global average increase

❍ (Forecast) 0.9℃ in 2020s, 2℃ in 2050s and 4.2℃ in 2100 (based on A1B scenario)



▲ Status and Forecast of Temperature Rise in Korea and the World (Source: KMA)

2. Forecasting Climate Change

2-2. Precipitation

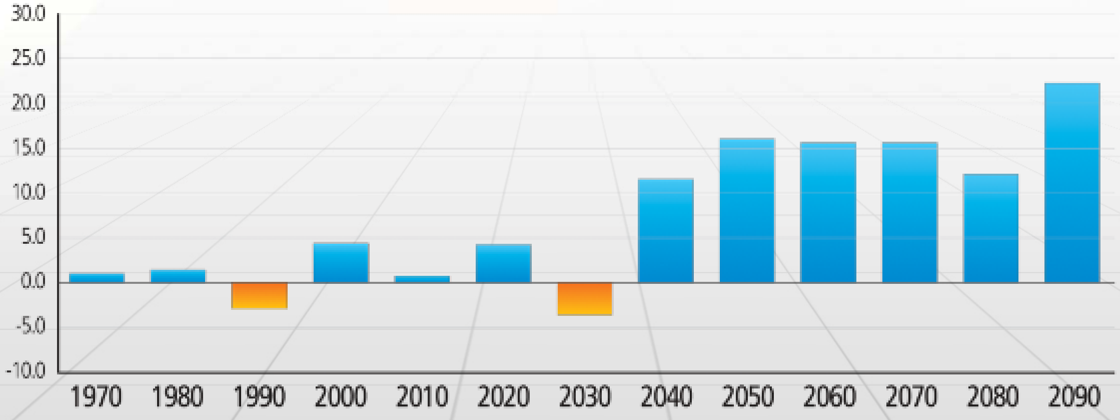
❍ (Status) 6 major Korean cities experienced 19% increase in precipitation for the last 100 years

- 14% decrease in rainfall days, 18% increase in density (southern part of Korea)

  * Days with heavy rain of more than 80mm a day doubled compared to 1970s

❍ (Forecast) Increasing precipitation of 15% in 2050 and 17% in 2100 compared to 2000 (based on A1B scenario)

- Increasing volatility in time and space, intensifying drought and rainfall, more rains in August and September



▲ Precipitation in the Korean peninsula compared to the late 20th century (1970 — 2000)

2. Forecasting Climate Change

2-3. Sea Level Rise

❍ (Status) The sea level around the Korean peninsula rose by 8cm for the last 43 years (1964 — 2006)

- Jeju showed 22cm (5.1mm for a year) rise

❍ (Forecast) 9.5cm in 2050 and 20.9cm in 2100 will rise compared to 2008

Spec	East Sea	South Sea	West Sea	Korean Peninsula Average
2050	9.6cm	13.9cm	5.0cm	9.5cm
2100	21.2cm	30.4cm	11.0cm	20.9cm

▲ Estimate of sea level rise around the Korean peninsula (compared to 2008)

2. Forecasting Climate Change

2-4. Sea Water Temperature Change

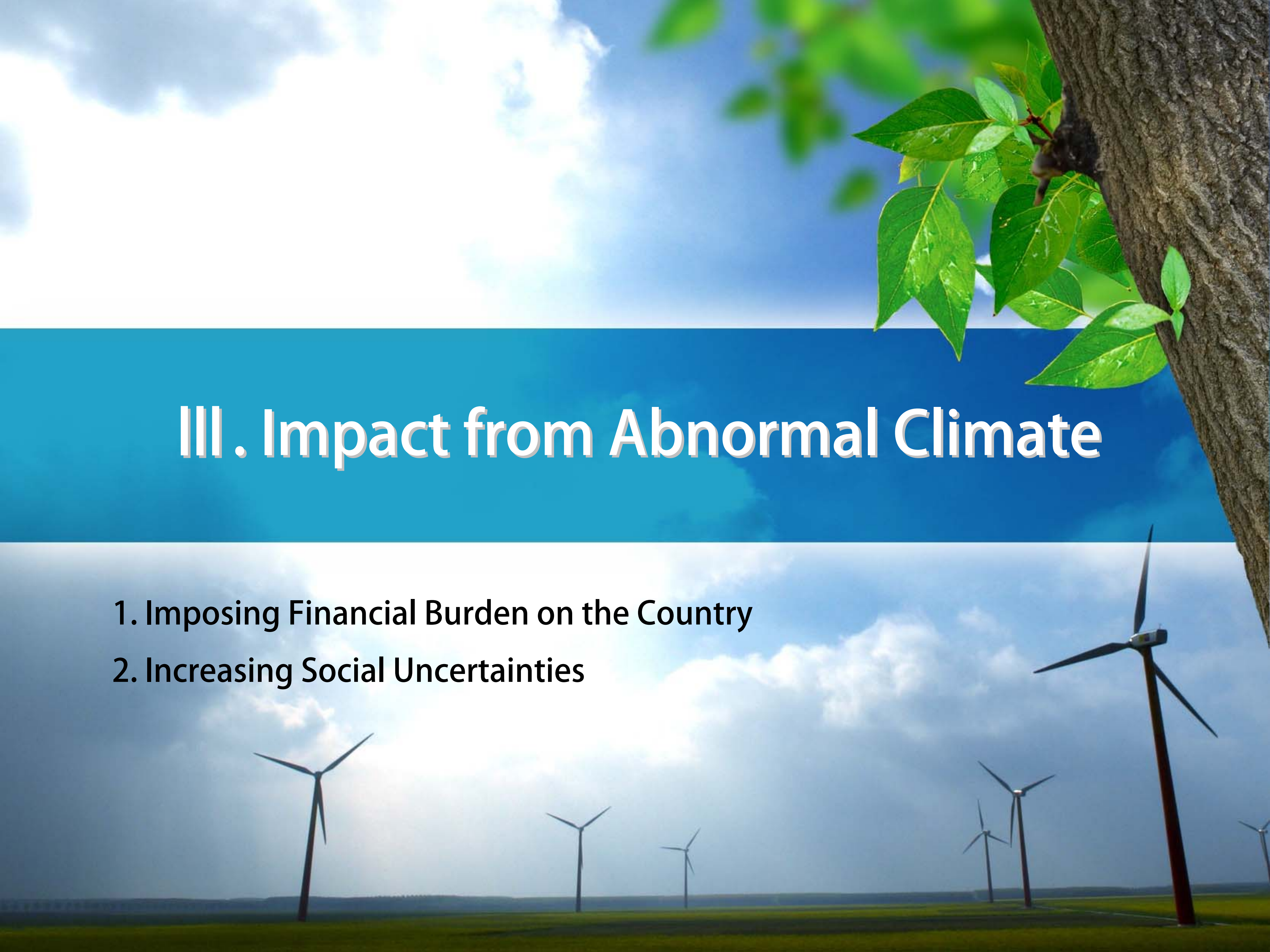
❍ (Status) Coastal surface water temperature of Korea rose on the average of 1.31 for the last 41 years (1968 — 2008)

- The figure is much higher than 0.5C of global average

❍ (Forecast) 1.3˚ C in 2050 and 2.9˚ C in 2100 will rise compared to 2008

Spec	East Sea	South Sea	West Sea	Korean Peninsula Average
2008	17.64℃	15.74℃	19.35℃	17.61℃
2050	19.06℃	17.01℃	20.67℃	18.95℃
2100	20.82℃	18.52℃	22.24℃	20.55℃

▲ Estimate of coastal surface sea water of the Korean peninsula (2008)



Ⅲ. Impact from Abnormal Climate

1. Imposing Financial Burden on the Country
2. Increasing Social Uncertainties

3. Impact from Abnormal Climate

3-1. Imposing Financial Burden on the Country

❍ Skyrocketing Losses due to Abnormal Climate Change

- Yearly average losses (2001 — 2008) of 2.3 trillion KRW, more than tripled compared to 1990s

❍ Requiring Changes in Supply, Demand, Construction and Operation of Infrastructure

- Abnormal climate change caused 3.6 million TOE increase in 2010 (accounting for 21.8%)
- Infrastructure accounted for 62% of total losses of 251.8 billion KRW in 2007

[Rank of Annual Property Losses (1916 — 2008)]

Rank	1st	2nd	3rd	4th	5th
Year	2002	2003	2006	1987	1998
Losses (Trillion KRW)	7.52	5.31	2.14	1.97	1.93

3. Impact from Abnormal Climate

3-2. Increasing Social Uncertainties

❍ (Abnormal cold wave, heavy snow) Halt transportation by vehicles, ships and airplanes, crop losses

Adversely affecting consumers sentiment, impeding economic recovery, delaying raw material supplies

※ Heavy snow in January 2010 halted subways in the Metropolitan area (537 times, 8.3% of total scheduled operations)

❍ (Heavy rain) Energy supply stopped, flood, inconvenient lives

※ Lightning hit electricity transmission lines in July, 2010, automatically stopped power transmission from nuclear reactors 1 and 2 in Gori, landslide (194ha, about 25 billion KRW)

❍ (Heat wave, tropical night) Lost lives, caused various infectious diseases, increased energy consumption

※ Malaria: 826 (2004) → 1,334(2009, 1.6 times increase)

Tsuisugamushi (mite): 1,415 (2003) → 5,006(2009, 3.5 times increase)

❍ (Drought) Inconvenient lives due to water shortages, industrial losses

Requiring pre-emptive measures on climate change and administration

VI. Climate Change and Green Growth

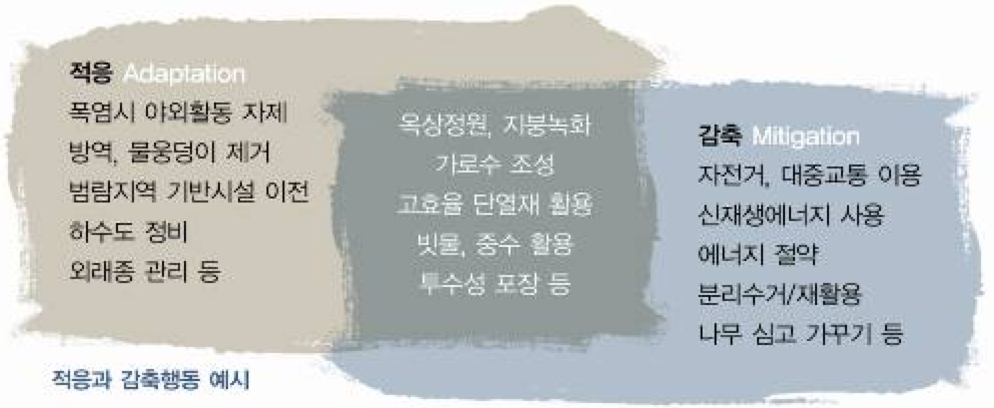
1. Implementing Measures against Climate Change at the National Level
2. Promoting Carbon Point System and Introducing Green Card
3. Expanding Carbon-labeled Products
4. Distributing Electric Cars and Lowering Pollution from Car Emission Gases
5. Expanding Me First Movement

1. Propelling Countermeasures against Climate Change

How to Cope with Climate Change

□ Mitigation and Adaptation

- **Mitigation:** Eliminating causes of climate change and taking measures against climate change through reducing greenhouse gas emissions
- **Adaptation:** Reducing losses from adverse effects of climate change by adjusting natural and artificial systems, as well as, exploiting as better chances


적응 Adaptation
폭염시 야외활동 자제
방역, 물웅덩이 제거
범람지역 기반시설 이전
하수도 정비
외래종 관리 등
옥상정원, 지붕녹화
가로수 조성
고효율 단열재 활용
빗물, 중수 활용
투수성 포장 등
감축 Mitigation
자전거, 대중교통 이용
신재생에너지 사용
에너지 절약
분리수거/재활용
나무 심고 가꾸기 등

적응과 감축행동 예시

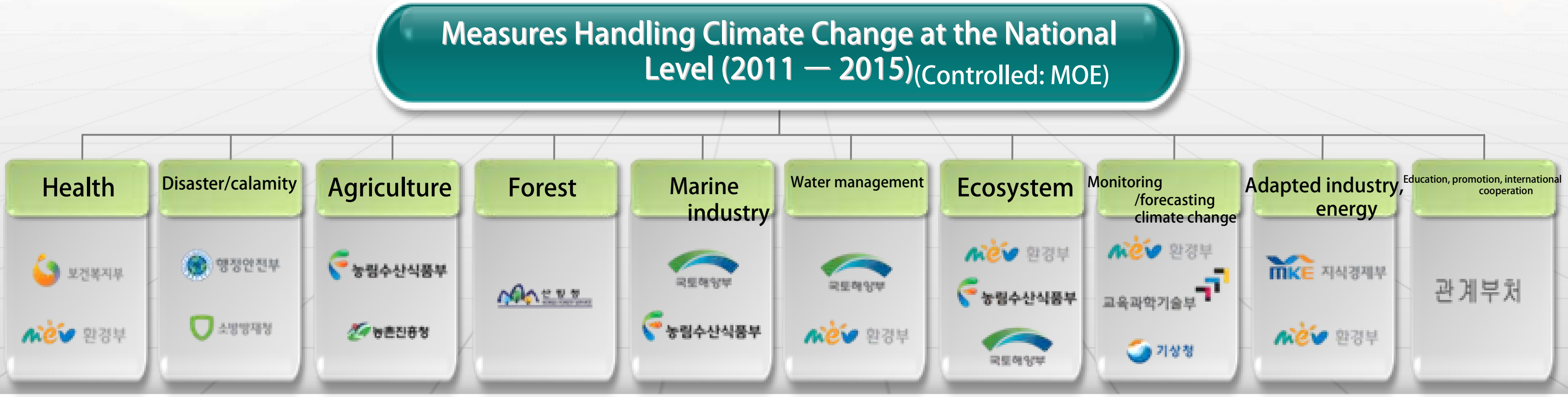
1. Propelling Countermeasures against Climate Change

Handling Climate Change at the National Level (2011 — 2015)

☐ Ground and Features

- Ground: Article 48.4 of the Framework Act on Carbon and Green Growth and the Article 38 of the same Act
- The first measures at the national level following the implementation of the framework Act (Apr 14, 2010)
- Master plan for the central and local governments to set up specific plans
- Rolling plan for every 5 years considering uncertainties in climate change

☐ Consultative Groups among Government Administrations


Measures Handling Climate Change at the National Level (2011 — 2015)(Controlled: MOE)

Health

Disaster/calamity

Agriculture

Forest

Marine industry

Water management

Ecosystem

Monitoring /forecasting climate change

Adapted industry, energy

Education, promotion, international cooperation

보건복지부
환경부
행정안전부
소방방재청
농림수산식품부
농촌진흥청
산림청
국토해양부
농림수산식품부
국토해양부
환경부
환경부
농림수산식품부
국토해양부
환경부
교육과학기술부
기상청
MKE 지식경제부
환경부
관계부처

1. Implementing Measures against Climate Change at the National Level

Handling Climate Change at the National Level (2011 — 2015)

☐ Vision and Measures (Summary)

VISION Securing safe society and supporting green growth through adapting climate change

Measures for Sectors	**Health**	Protecting citizens from heat wave and air pollution
	Disaster/calamity	Strengthening prevention basis and infrastructure
	Agriculture	Shifting production system adapted to climate and finding opportunities
	Forest	Increasing forest health and lowering damages
	Marine Industry	Tackling sea level rise and securing stable marine resources
	Water management	Securing safe water management system against flood and drought
	Ecosystem	Securing biodiversity by protecting and restoring ecosystem
Adaptation Ground	**Monitoring/forecasting climate change**	Providing basic data and minimizing uncertainty
	Adapted industry/energy	Discovering new and potential industries adapting climate change
	Education, promotion, international cooperation	Enhancing internal and external adaptation and cooperation

2. Promoting Carbon Point System and Introducing Green Card

2-1. Expanding Carbon Point System

☐ Carbon Point System

- A system which the central and local governments provide economic incentives when households or businesses reduce electricity, water or gas uses (benchmark: average uses of 2 previous years before subscription)

- About 1.78 million households as of the end of 2010

※ 46% of participants reduced energy uses in 2010

Total	Households using more energies	Households reducing 0~5% of energy uses	Households reducing 5~10% of energy uses	Households reducing more than 10% of energy uses
100%	54%	12.8%	10.3%	22.9%

2. Promoting Carbon Point System and Introducing Green Card

2-1. Expanding Carbon Point System

☐ Incentives

(Unit: KRW)

Total	Annual reduction rates of greenhouse gases	
	Reducing 5 - 10%	Reducing more than 10%
Electricity	20,000	40,000
Water	5,000	10,000
Gas	10,000	20,000

☐ Expanding to 6 million households by 2015 (1.7 million in 2010 → 4.5 million in 2013 → 6 million in 2015)

- Link with the green card system, implementing energy-saving society connecting green life to economic benefits

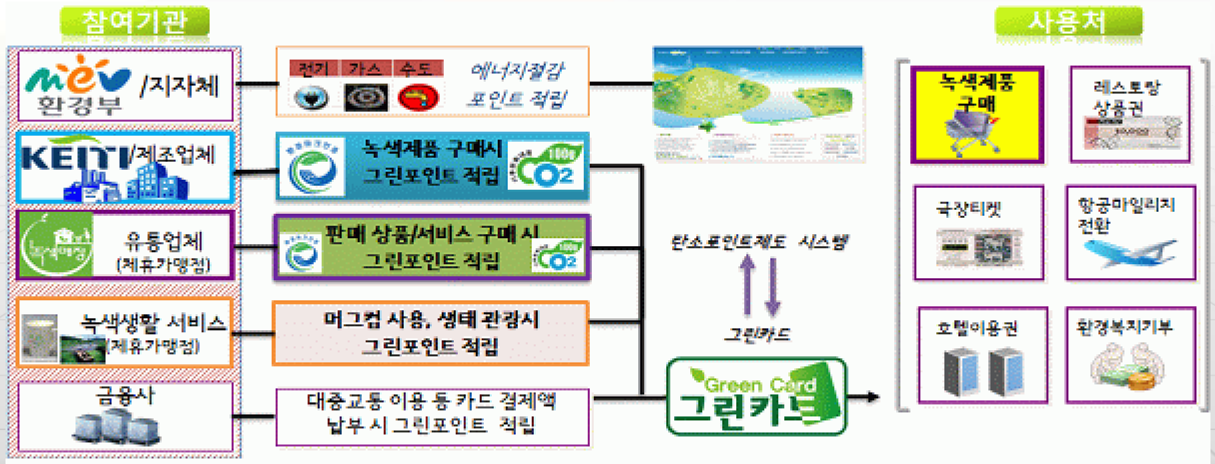
2. Promoting Carbon Point System and Introducing Green Card

2.2 Introducing Green Card

☐ Overview and Status

- A system for consumers to enjoy green life by adapting point system of credit cards and accumulating points to use as cash
- A system linking green life with economic activities and maximizing benefits for all the participants

<Operation Model>


참여기관
환경부 /지자체
KEITI/제조업체
유통업체
(제휴가맹점)
녹색생활 서비스
(제휴가맹점)
금융사
전기
가스
수도
에너지절감
포인트 적립
녹색제품 구매시
그린포인트 적립
판매 상품/서비스 구매 시
그린포인트 적립
머그컵 사용, 생태 관광시
그린포인트 적립
대중교통 이용 등 카드 결제액
납부 시 그린포인트 적립
탄소포인트제도 시스템
그린카드
Green Card
그린카드
사용처
녹색제품
구매
레스토랑
상품권
극장티켓
항공마일리지
전환
호텔이용권
환경복지기부

2. Promoting Carbon Point System and Introducing Green Card

2.2 Introducing Green Card

greencard
MasterCard

☐ Plan

- Subscription Goal

	2012	2013	2014	2015
Issuing green cards	1 million	2 million	3.5 million	5 million
Manufacturer/distributor	100	150	300	400
Partners of green life points	5	10	15	20
Support center for green purchase	5	8	11	16

- Expanding Government Support for Green Card Partners

  - Reducing burden on environment improvement, treating donation as expenses

- Early Maintenance of Infrastructure

  - Developing green product identification system and green card platform, establishing point system

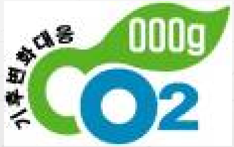
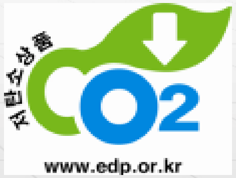
- Integrating Similar Systems: Integration with Seoul City (eco mileage card)

3. Expanding Carbon-labeled Products

3-1. Carbon Labeling System

☐ Background

- Displaying greenhouse gas emission on products generated from all the process of services, securing consumers' rights and leading low-carbon, green consumption
- Consisting of 'Carbon Emission Certificate' and 'Certification of Low-carbon Products'

<Stage 1: carbon emission certificate>	<Stage 2: Certification of low-carbon products>
Grant certificate by quantitatively identifying greenhouse gas emission from the whole process	Grant certificate if a product with carbon emission certificate meets low-carbon product standards
	

- (Performance) 447 products of 93 companies in the late September, 2011
- (International trend) 12 countries like the UK and Japan implemented

4. Distributing Electric Cars and Lowering Pollution from Car Emission Gases

4-1. Distributing Electric Cars

Goal

- Distributing 1 million electric cars by 2020

※ Reducing 300,000 tons of air pollutants and 6.7 million tons of greenhouse gases

Contents

Electric Car

- Subsidizing 50% of price difference between gasoline and electric cars with same capacity by 2010 for the central government, local governments and public organizations, distributing more than 4,000 vehicles

Infrastructure

- Supporting installation of at least 3,000 fueling facilities for electric cars

※ Purchasing 800 electric cars and installing 240 charging facilities in 2011 (16,710 million KRW)

Expansion

- Improving systems including percentage for public organizations to purchase low-pollution vehicles, nurturing leading cities for electric car distribution, promoting to use electric cars in national parks

4-2. Expanding Low-carbon Cars

Policy direction

Growing number of low-carbon cars by developing and distributing new “compact” cars

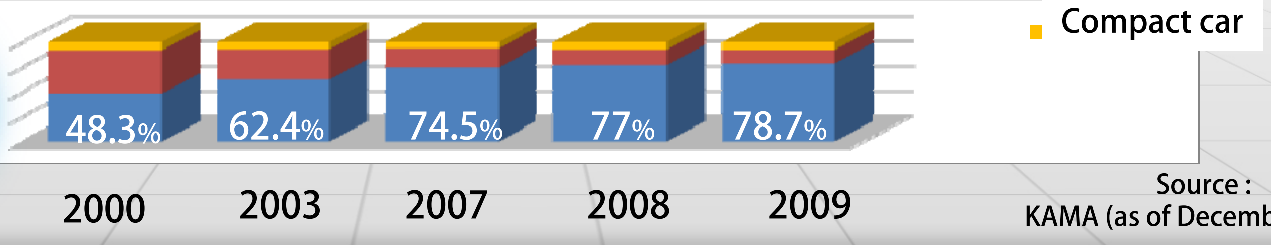
Distribution rates of low-carbon cars: 7.9% (2009, compact cars) ⇒ 30% (2020)

- Despite various policies, the distribution rates of compact cars was just 7.9% in 2009 (30% for advanced countries)

  - Rates: 55% (Italy), 39% (France), 31% (UK), 30.6% (Japan)

  - Average engine capacity (2007): Korea (2,113cc, EU: 1,744cc)

Number of registered cars for years



Source : KAMA (as of December, 2009)

4. Distributing Electric Cars and Lowering Pollution from Car Emission Gases

4-2. Expanding Low-carbon Cars

Compact Car		Low Carbon Car
Less than 1,000 cc	Engine capacity	Less than 1,600 cc
135g/km	CO2 emission	Less than 100g/km
Tax benefit, tollgate fare, public parking lot discount	Benefit	Same for compact cars + incentive to supporting purchase based on CO2 emission

* Reviewing links to massively emitting CO2 cars (Malus)

5. Expanding Me First Movement

5-1. Overview

Overview

- Expanding Me First national movement based on the green start network

  → Settling as core reduction in non-industry sector → Contributing to 30% reduction in 2020 compared to BAU

Strategy

Mature 2 Step Modes

Integrating distributing human and materials resources
→ Producing visible outcome (2012, 24 million people with green lives)

Integrated Space

- Establishing hub for climate change education

  * on and off-line

Users

- Expanding participants joining greenhouse gas reduction (1.48 million in June, 2011)
- Establishing organic promotion networks

Promotion Infrastructure

- Developing various contents
- Green life education based on levels or grades
- Promotion for seasons or themes

5. Expanding Me First Movement

5-2. Implementation Plan for Green Lives

- Implementing various policies to reduce greenhouse gases from non-industrial sectors and lead nationwide participation

(1) **Promoting green families and consumption** (Distributing guidelines for low-carbon and green lives)

(2) **Green workplace** (cool dress codes, green office)

(3) **Green public transportation** (using public transportation, eco-driving)

(4) **Incentives to households/businesses** (carbon point system)

(5) **Production/distribution incentives** (carbon labeling, green store certificate)

(6) **Nurturing core human resources** (green leader)

(7) **Communication center for green lives**

<Reference> Specific Plans for Green Lives

Distributing “low-carbon” green life

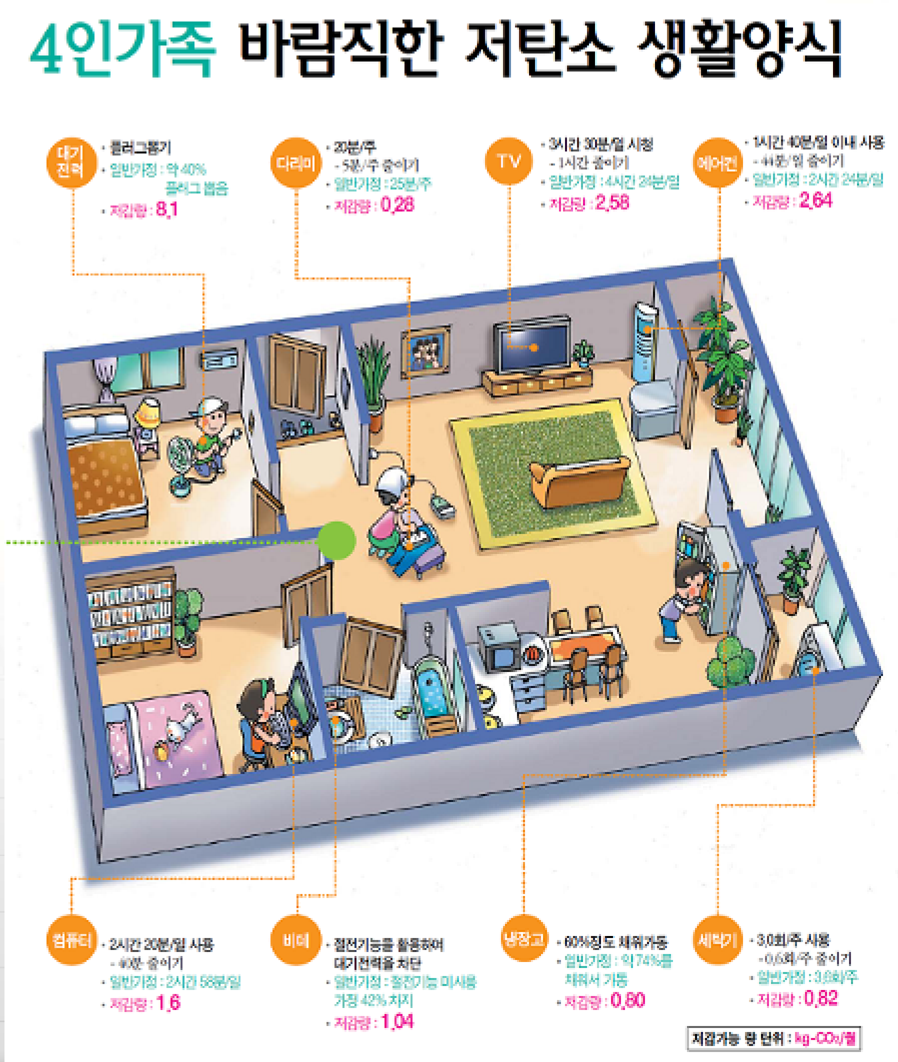
- Reducing 10% of greenhouse gases by proposing guidelines for heating, electricity and water uses (Sep, 2009)
- Using green leaders, diagnosing greenhouse gases

Settling eco-friendly food cultures

- National movement for no leftover
- Expanding eco-friendly agricultural productions (5% in 2009 → 9% in 2012)

Using less disposable goods, expanding green consumption

- Expanding “guideline for using less disposable goods” in public organizations
- Expanding “stores with no disposable plastic bags” among mega stores
- Campaigning “green consumption week (June)”


4인가족 바람직한 저탄소 생활양식
대기전력
· 플러그뽑기
· 일반가정 : 약 40% 플러그 뽑음
· 저감량 : 8,1
다리미
· 20분/주
- 5분/주 줄이기
· 일반가정 : 25분/주
· 저감량 : 0,28
TV
· 3시간 30분/일 시청
- 1시간 줄이기
· 일반가정 : 4시간 24분/일
· 저감량 : 2,58
에어컨
· 1시간 40분/일 이내 사용
- 44분/일 줄이기
· 일반가정 : 2시간 24분/일
· 저감량 : 2,64
컴퓨터
· 2시간 20분/일 사용
- 40분 줄이기
· 일반가정 : 2시간 58분/일
· 저감량 : 1,6
비데
· 절전기능을 활용하여 대기전력을 차단
· 일반가정 : 절전기능 미사용 가정 42% 차지
· 저감량 : 1,04
냉장고
· 60%정도 채워가동
· 일반가정 : 약74%를 채워서 가동
· 저감량 : 0,80
세탁기
· 3,0회/주 사용
- 0,6회/주 줄이기
· 일반가정 : 3,6회/주
· 저감량 : 0,82
저감가능 량 단위 : kg-CO_2/월

Thank You