Green Growth

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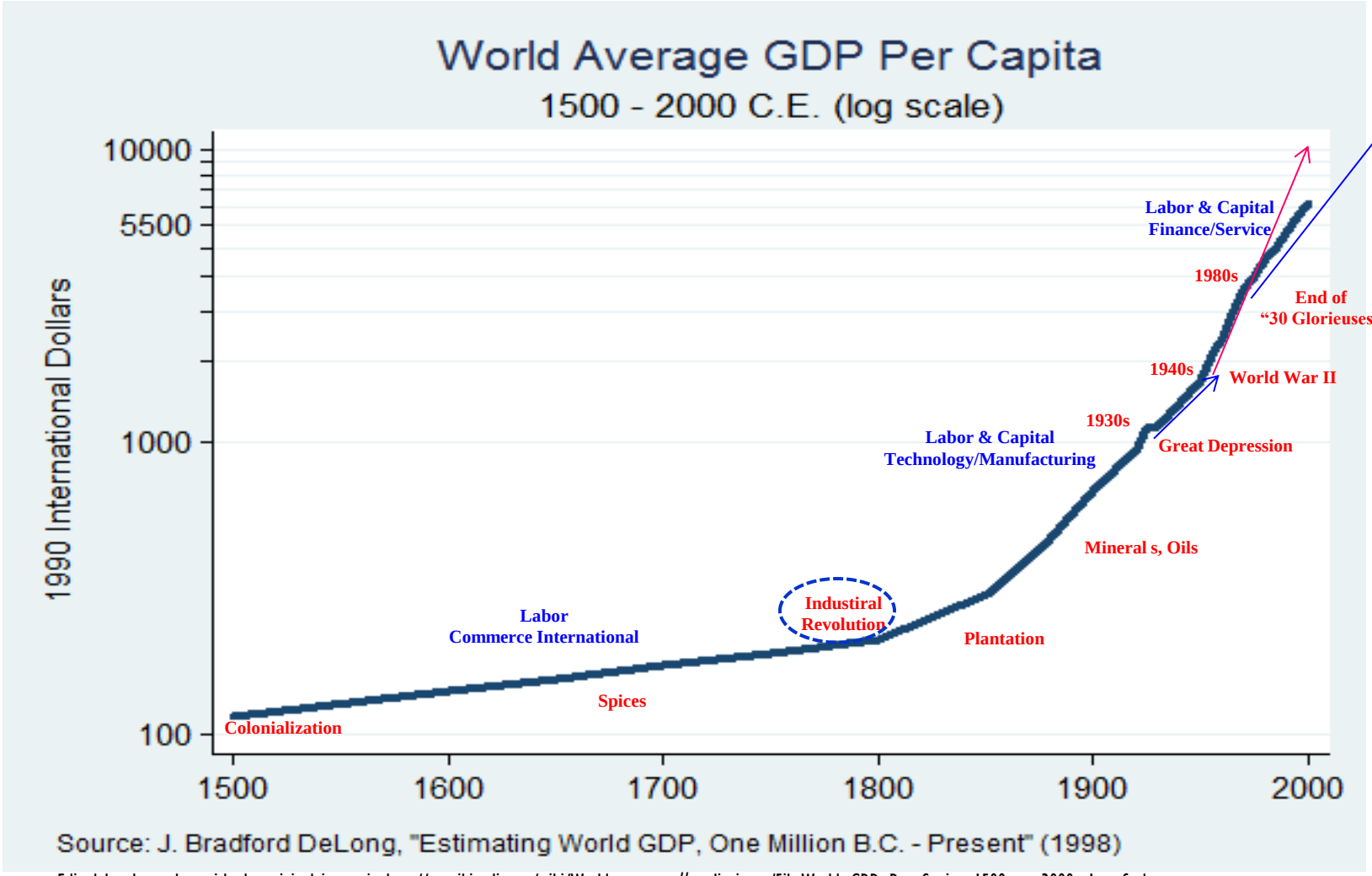
- Sustainable Development & Green Growth
- Korean experiences
- Development Cooperation

SD & Green Growth

Backcasting _ World Economic Growth



Edited by the author with the original image in http://en.wikipedia.org/wiki/World_economy#mediaviewer/File:World_GDP_Per_Capita_1500_to_2000,_Log_Scale.png

Review on the sustainability of development(Our Common Future, Chairman's Foreword)

- Globalization of Market Economy _ International Interdependency:
  - ✓ "Many of the development paths of the industrialized nations are clearly unsustainable. And the development decisions of these countries, because of their great economic and political power, will have a profound effect upon the ability of all peoples to sustain human progress for generations to come."
  - ❖ Depletion of carrying capacity, Loss of cultural diversity and social cohesion.
- Gaps _ Interlinked Development and Environment Challenges:
  - ✓ "Many critical survival issues are related to uneven development, poverty, and population growth. They all place unprecedented pressures on the planet's lands, waters, forests, and other natural resources, not least in the developing countries. The downward spiral of poverty and environmental degradation is a waste of opportunities and of resources. In particular, it is a waste of human resources."
  - ❖ Market prices ignoring the costs of environmental degradation, Negative impact of speculative financial flows uncontrolled in volatile money market.

Case of Climate Change (www.gcf..)

SD Agenda since 1987

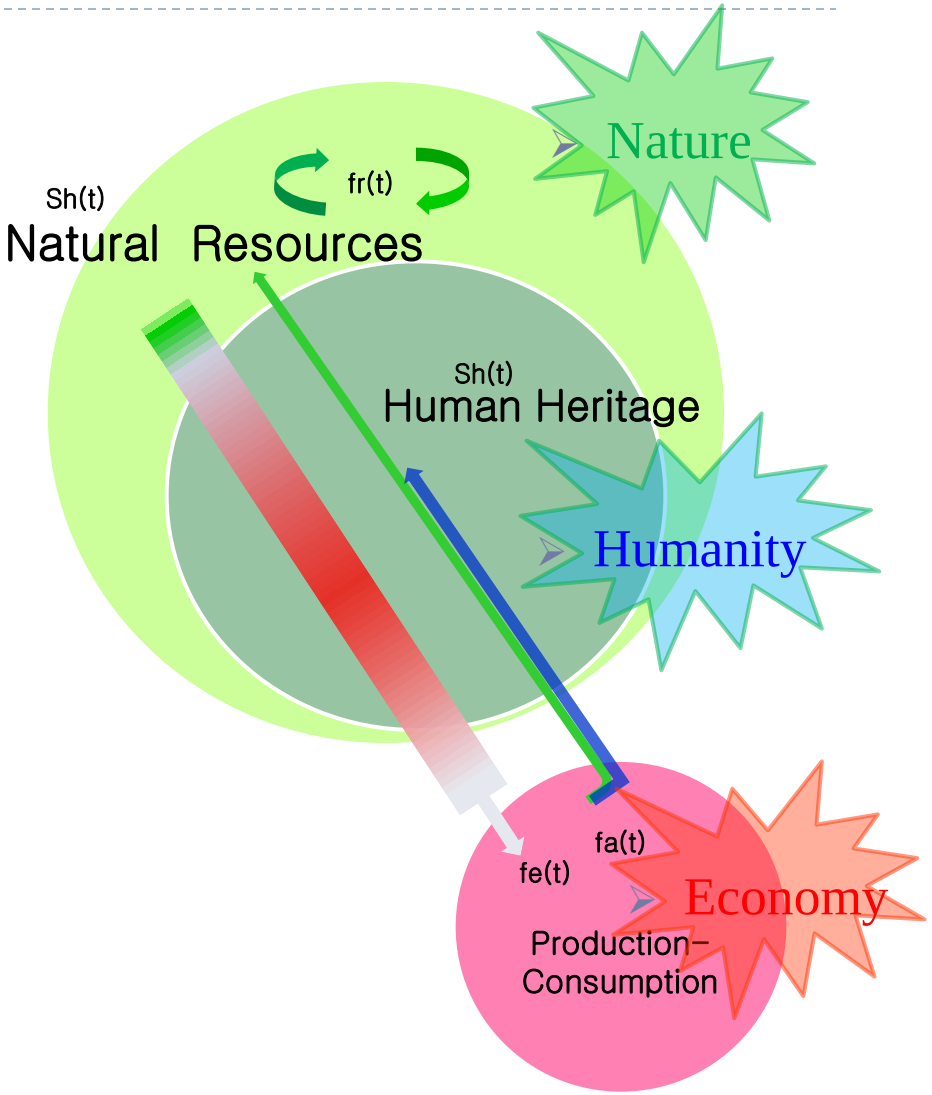
Milestone	Outcome/Recommendation
Brundtland Commission (1987)	Our Common Future
UNCED (1992)	Agenda 21 and National Coordinating Structure for SD
Rio+5 (1997)	Agenda 21 progress review and NCSD for NSDS
UN Millennium Summit (2000)	MDG 7 Target 9: SD into national policies/programmes
WSSD (2002)	JoPI recommends NSDS submission by 2005
as of 2009	106 member states of the UN implement NSDS
Green Growth/Green Economy	UNESCAP(2005), OECD(2009),UNEP(2008)
Rio+20 (2012)	The Future We Want: GE in the Context of SD and PR

- "SD two key concepts:
  - ✓ the concept of 'needs', in particular the *essential needs of the world's poor*, ..;
  - ✓ and the idea of 'limitations' imposed by the *state of technology and social organization on the environment's ability* ..to meet present and future needs." (Our Common Future, Ch. 2. Para. 1)

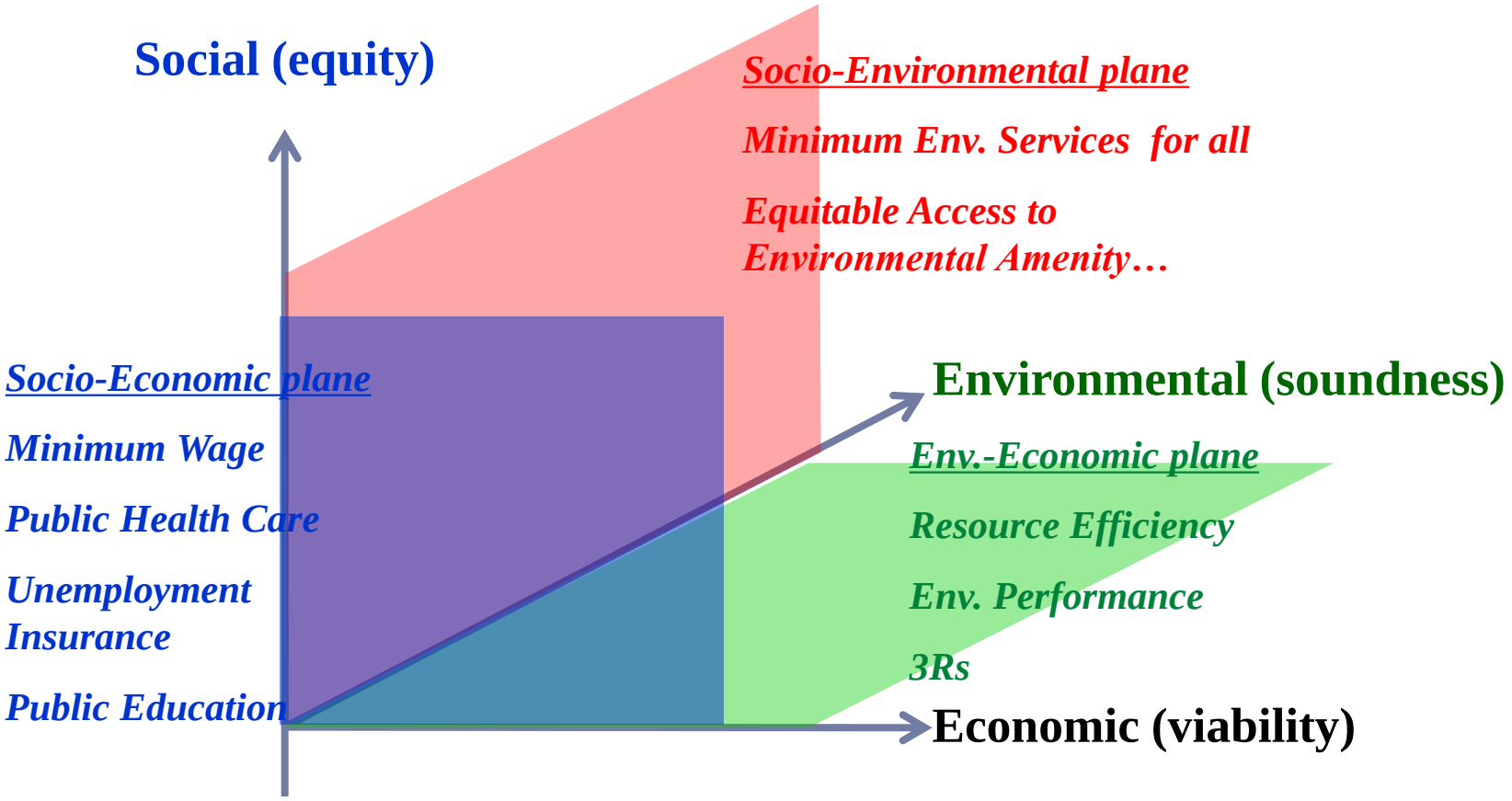
Technical definition of SD

- **Development** means to 'de-velop' what is enveloped as natural resources and human heritage.
- **Sustainability** depends on
  - Available stock of resources and heritage: **Sr(t), Sh(t)**
  - Exploitation : **fe(t)**
  - Renewal and Accumulation : **fr(t), fa(t)**
- **Sustainability means** a non-negative time derivative of **per capita net stock of natural resources and human heritage in quantity and quality**:

(d(Sr+Sh+fe+fr+fa)/dt≥0).

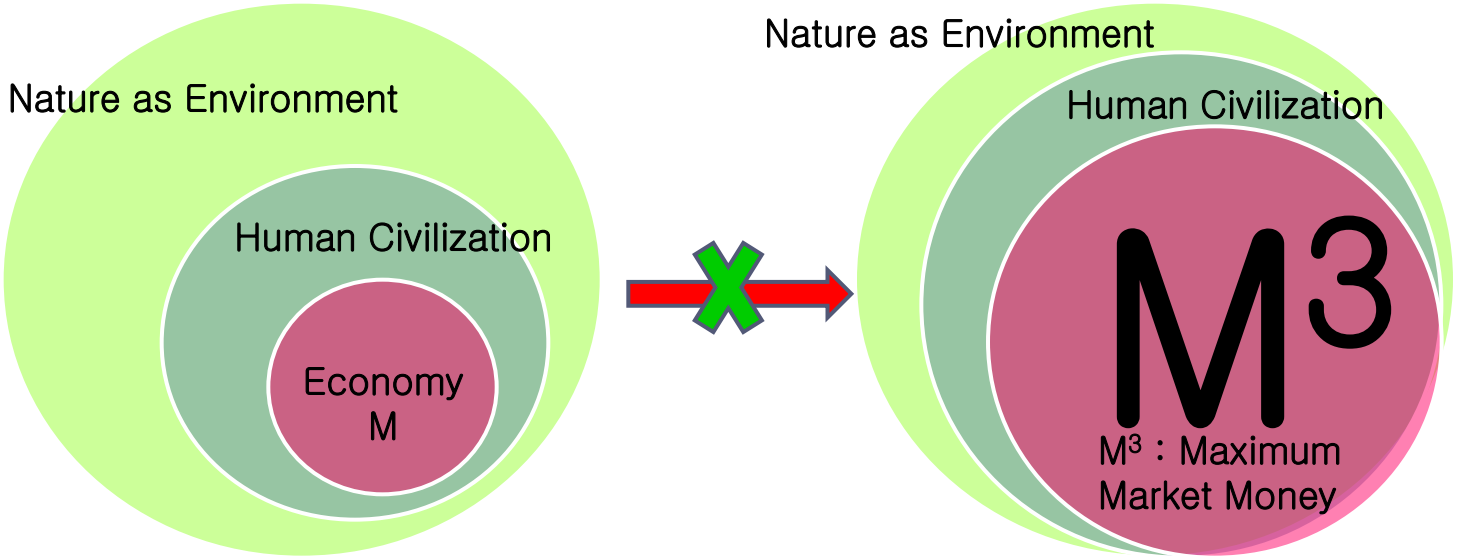


Goals, values and tools in 3 dimensions



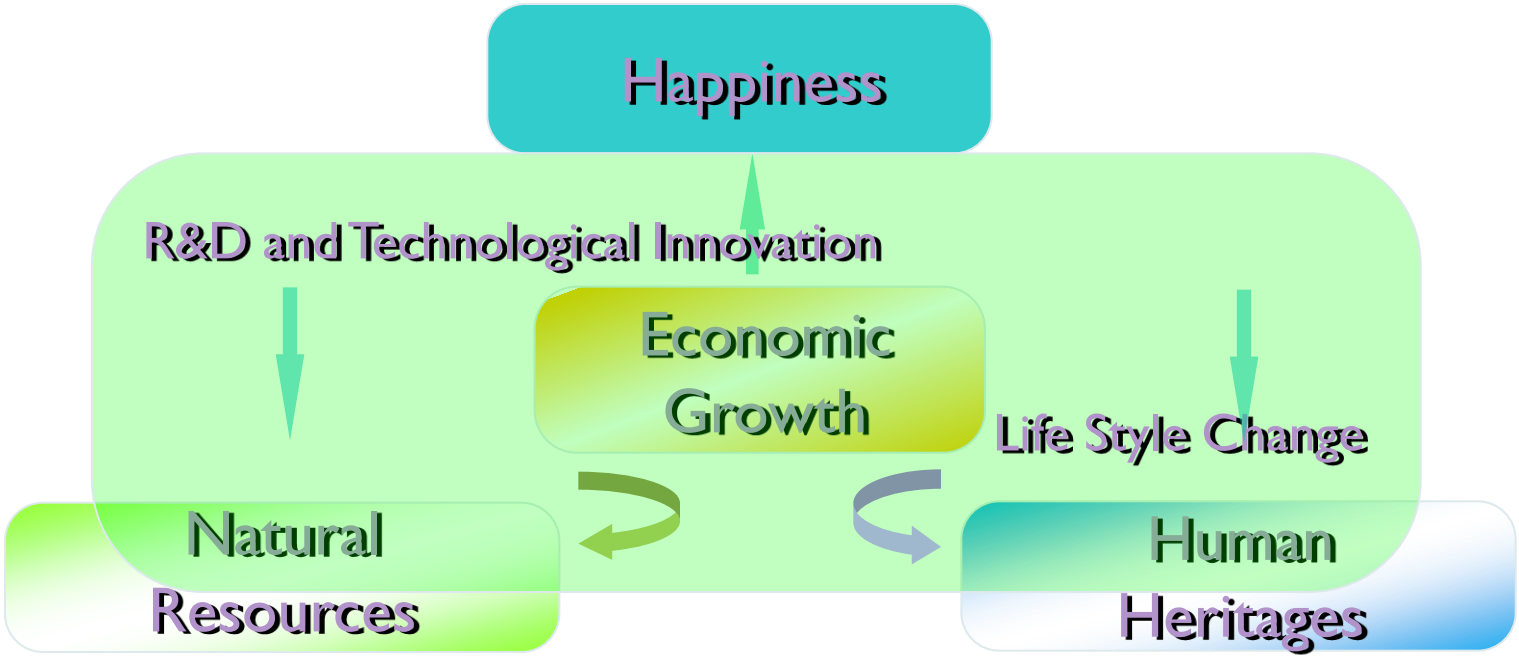
Optimum solution balancing 3 dimensions

- The object is to get an "economic growth that is forceful and at the same time socially and environmentally sustainable."
- For a decision making in practice, it is not a maximization but an optimization that works for the sustainability of the Earth System form "triple D" to "triple C".
- A maximum-profit only development strategy may destroy the socio-economic and ecological life support system for a sustainable humanity.



Vision for a Creative Green Economy

CGE makes an economic growth minimize degradation and depletion and contribute to the creation of new resources and heritage with innovations and life style change, and share it with whom in needs.



Reference:

Rising attention to the green with the Global Crisis in 2008

"**Low Carbon, Green Growth**", Korea, August 2008

"**Green New Deal**", UN Secretary-General, speech to the UNFCCC Poznan, Dec. 2008

"**Green Recovery**: The way out of the Economic Crisis", BMU, Germany, April 2009

"**Green Economy**", House of commons, UK, March 2010

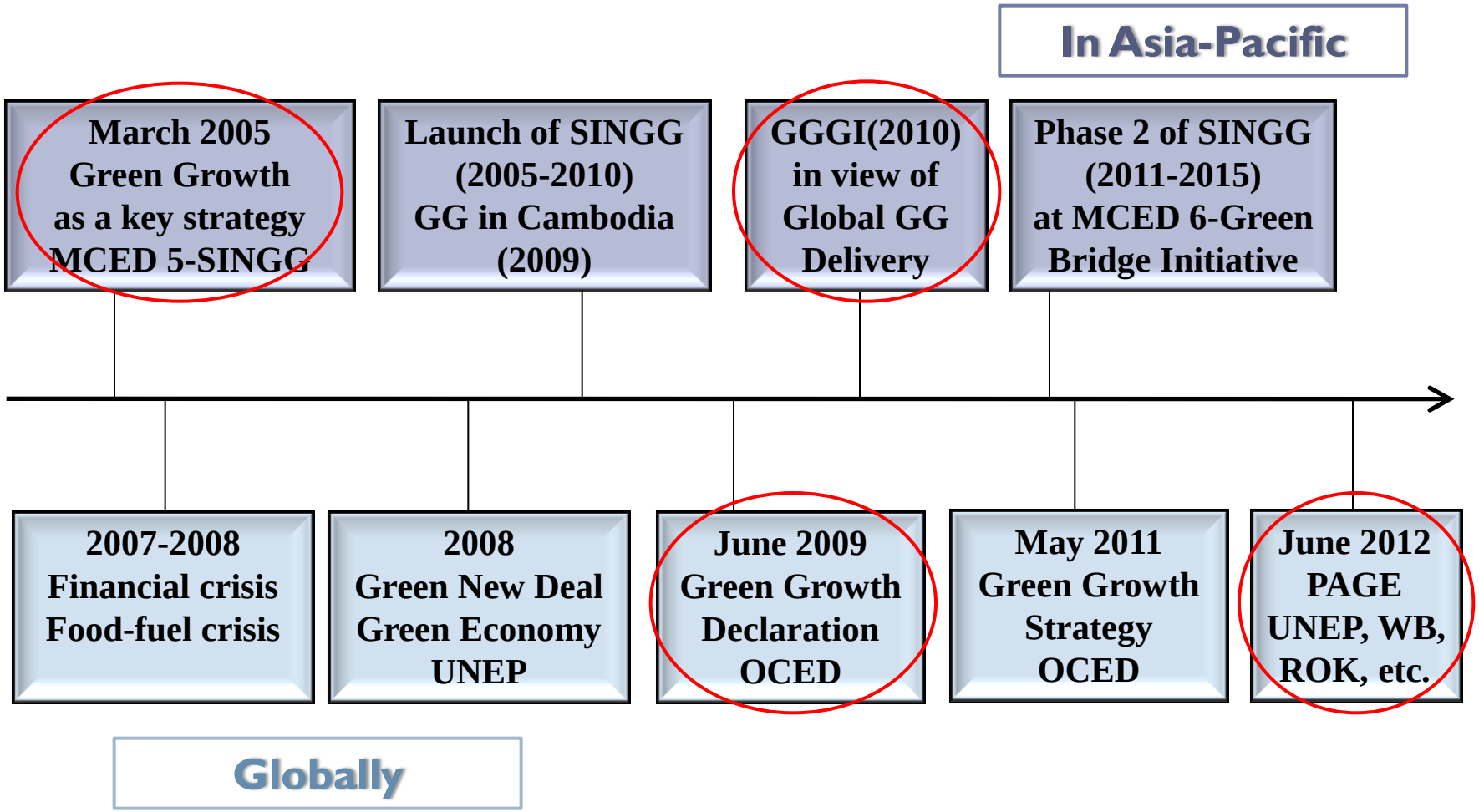
Green Economy (a body)

is an economy that results in improved human well-being and reduced inequalities over the long term, while not exposing future generations to significant environmental risks and ecological scarcities **(working definition of GE, UNEP/ ETB, 2008).**

Green Growth (an action)

is to promote economic growth and development while reducing pollution and greenhouse gas emissions, minimizing waste and inefficient use of natural resources, and maintaining biodiversity **(C/MIN(2009)5/ADD1/FINAL, OECD).**

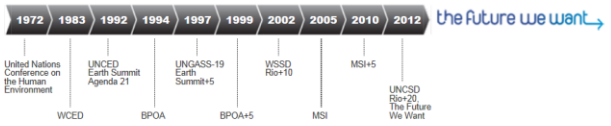
Reference: Green Growth & Green Econmy



UN/ESCAP_ESDD(2011) revised as of 2013

Reference: the 'Future We Want' 2012

- **United Nations Conference on Sustainable Development 2012**
  - ✓ held in Rio de Janeiro, Brazil on 20-22 June 2012.
  - ✓ themes: (a) a green economy in the context of sustainable development and poverty eradication; and (b) the institutional framework for sustainable development.
  - ✓ Political outcome document: The Future We Want.



Since the 1972 UN Conference on the Human Environment the reach of sustainable development governance has expanded considerably at local, national, regional and international levels.

The need for the integration of economic development, natural resources management and protection and social equity and inclusion was introduced for the first time by the 1987 Brundtland Report (Our Common Future), and it has become central in framing the discussions at the 1992 United Nations Conference on Environment and Development (UNCED) also known as the Earth Summit. In 1993 the General Assembly established the Commission on Sustainable Development (CSD), as the UN high level political body entrusted with the monitoring and promotion of the implementation of the Rio outcomes, including Agenda 21.

The 2002 World Summit on Sustainable Development advance the mainstreaming of the three dimensions of sustainable development in development policies at all levels through the adoption of the Johannesburg Plan of Implementation (JPOI).

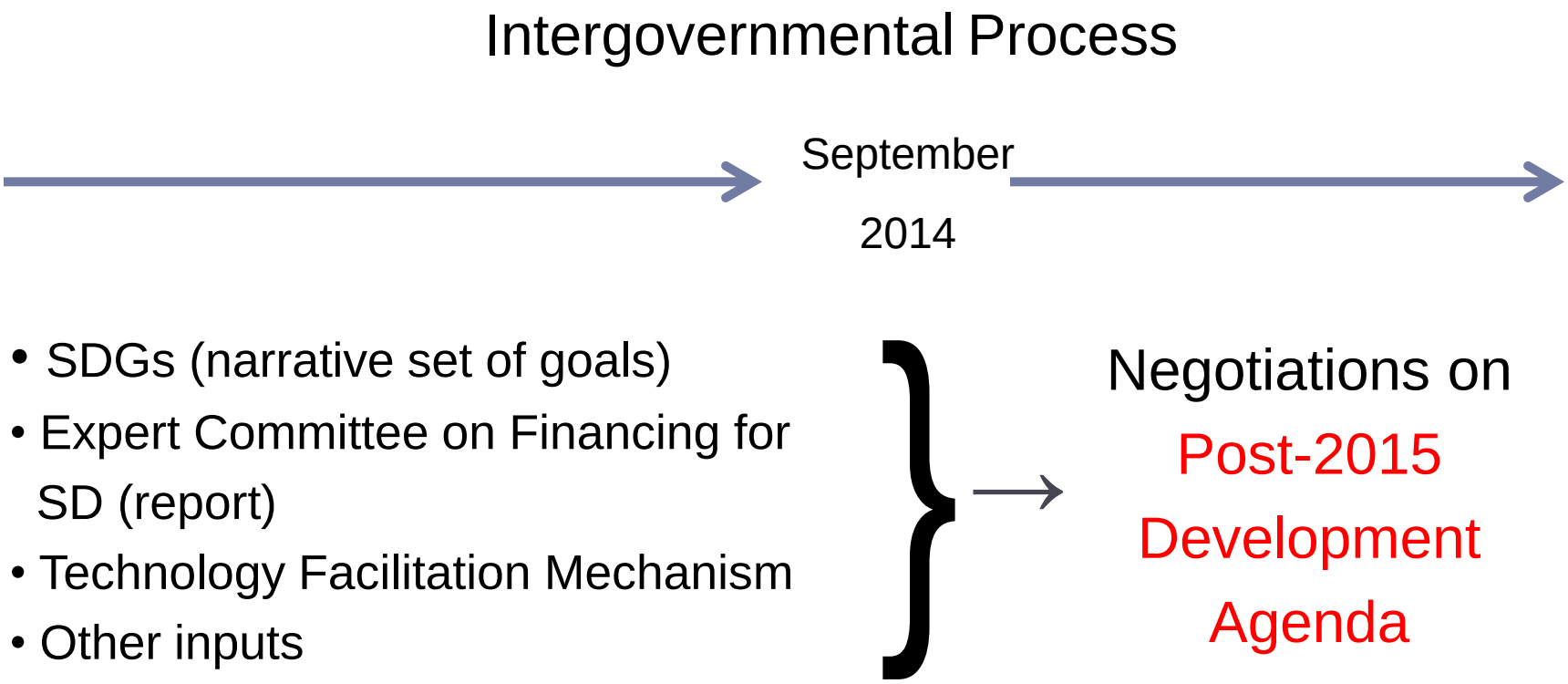
A process was created for discussing issues pertaining to the sustainable development of small island developing States resulting in two important action plans - Barbados Plan of Action and Mauritius Strategy. A planned Conference in 2014 will take these processes forward.

In 2012 at the Rio+20 Conference, the international community decided to establish a high-level political forum for sustainable development to subsequently replace the Commission on Sustainable Development . Decisions on mandate, form and methods of work are expected to be adopted during the 67th session of the General Assembly with the aim of having the first session of the forum at the beginning of the 68th session of the Assembly (September 2013).

http://sustainabledevelopment.un.org/intgovmental.html

RIO+20
United Nations Conference on Sustainable Development

Reference: intergovernmental process since 2012



Calendar of Events at http://sustainabledevelopment.un.org/index.php?menu=1634

Implications for member states

✓**Follow-up on the current status and perspective of Post 2015 DF and DA progressing under the UN system (GA, EcoSoc, the preparatory of HLPF, OWG on SDG, Expert Committee on Finance for SD, etc.)**

✓**National preparation for Post 2015 DA implementation: What is expected to be done by the member states for coming years?**

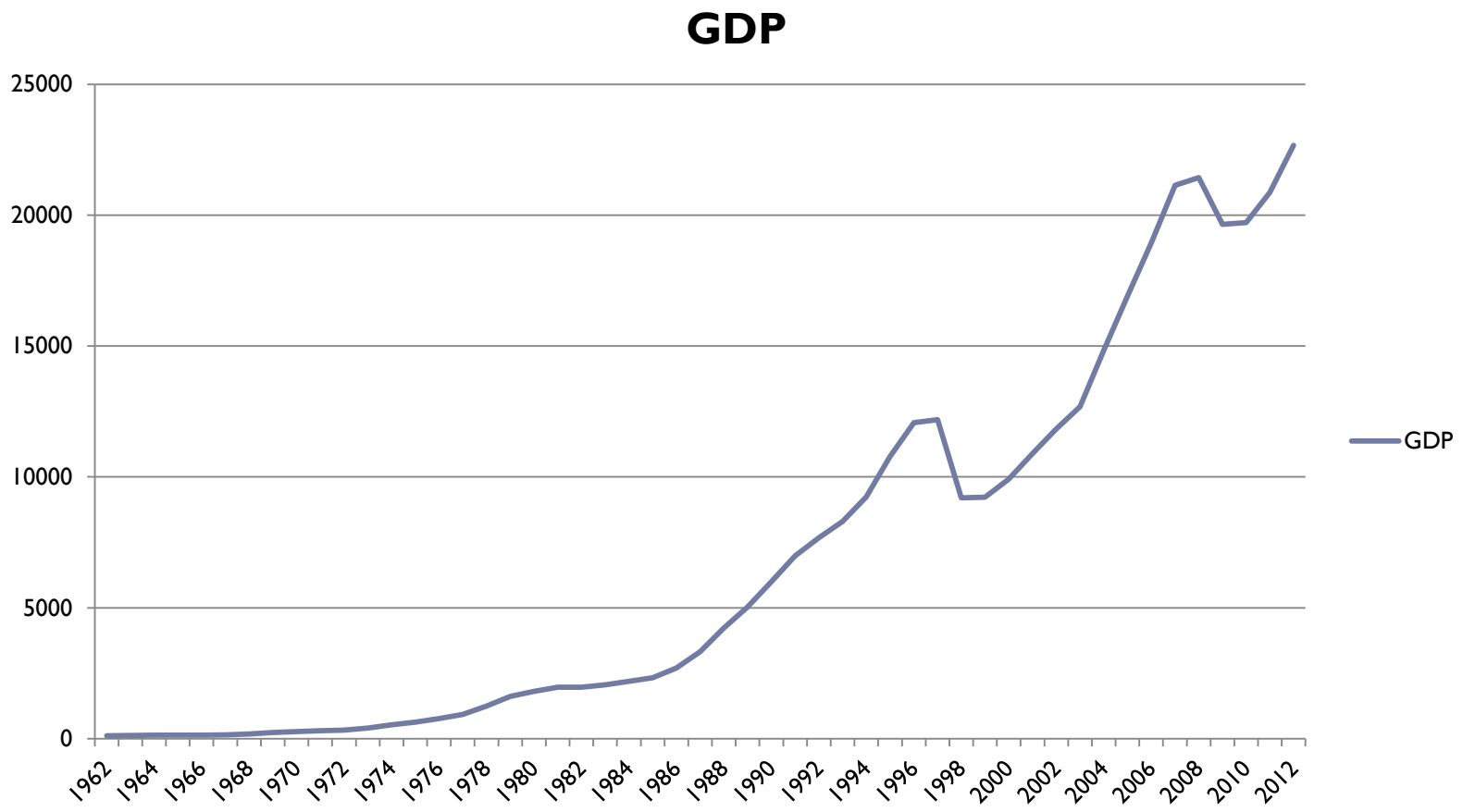
- **Integration of SDGs into Development Strategy and Planning:** Restructuring Post 2015 development agenda including SDGs to be fitted into a national/local implementation framework: Technology Facilitation, Financing SD, etc…
- **Preparation of Implementation Plan of SDGs**
- **Establishment of Monitoring & Reporting System on the achievement of SDGs (HLPF, The Ministerial)**

Korean Experiences

Korea offers an original ‘trade cum development’ case in the 20th century

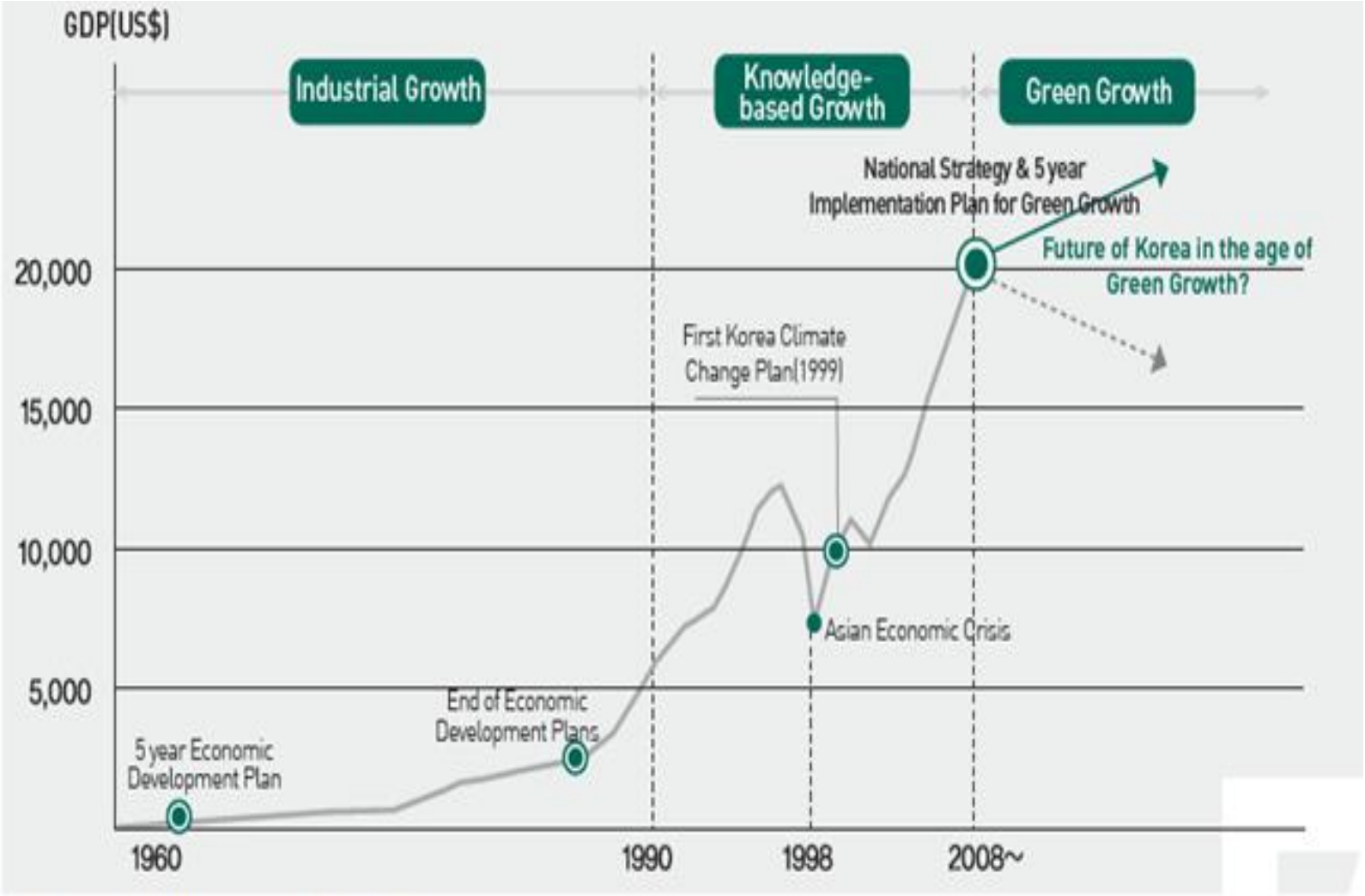
Territory(109th, 99,720km2), Population(25th, 49.0 Millions, 0.7% of World Pop.)

Growth path 1962-2012



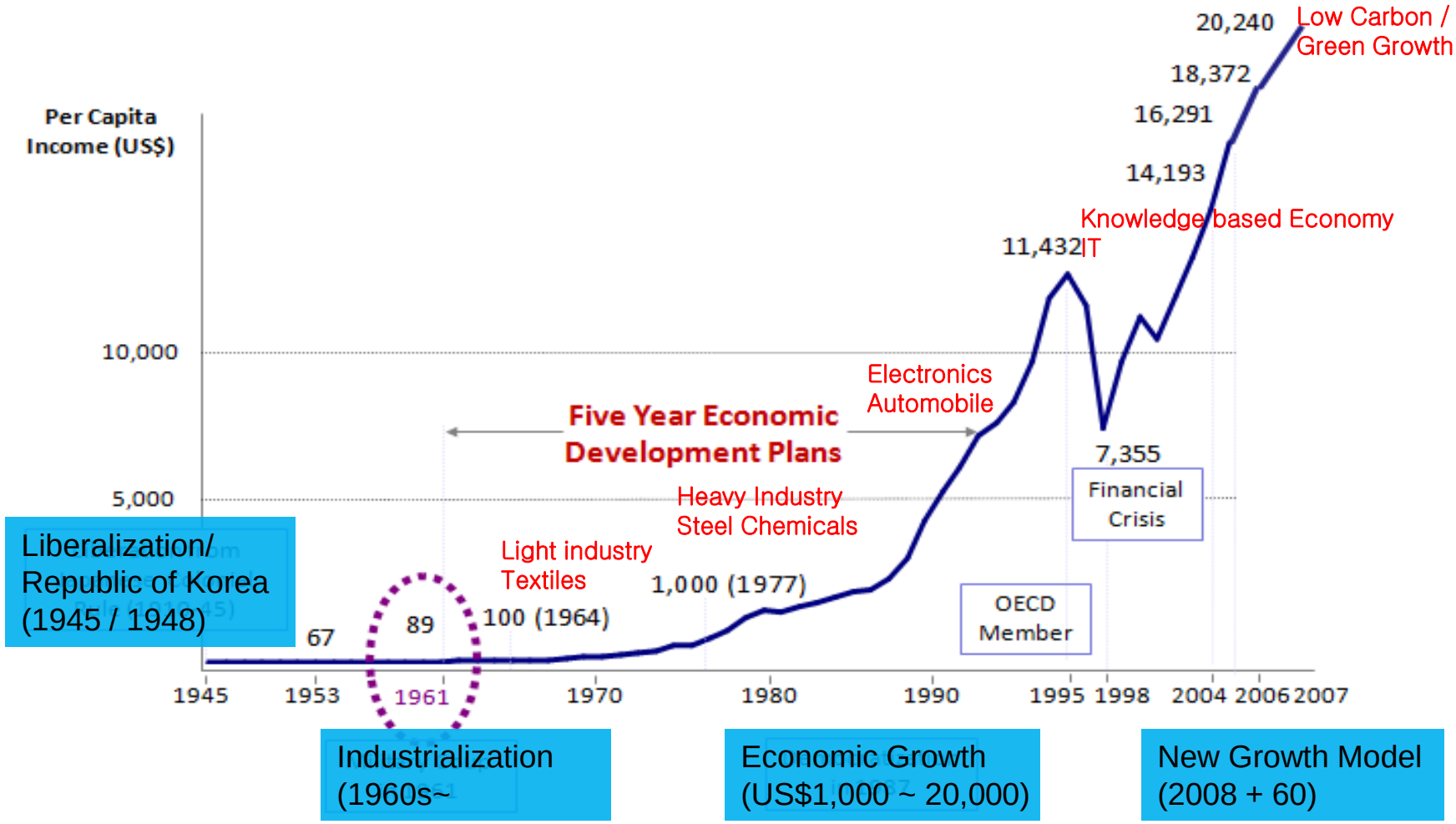
Development driven by human resources (1960 -2010)

Development driven by Human Resources…



Source : Presidential Committee on Green Growth

With strategic planning for world market



Source : KDI School of Public Policy and Management

Trade cum development strategy”

- **A country of substantial ecological deficit (global ha/person)**

  Bio-capacity 0.5 Ecological footprint 4.1 Deficit –3.5

- **During 7.5 times GDP increase during 1975-2006, the crisis was an opportunity to growth!**

1973 Oil Crisis	**Investment in heavy industries**
1979 Oil Crisis	**Investment in semiconductors, autos**
1998 Foreign Exchange Crisis	**ICT ventures, R&D investment, Corporate Restructuring**
2008 Global Economic Crisis	**Low Carbon Green Growth - Green & Clean Technologies**

- **High proportion of manufacturing and energy-intensive industries in GDP**

  Korea(9.2%) > Japan(6.5%) > U.S(5.1%) > UK(4.2%) energy intensive industry(‘06)

- **Heavily dependent on the imported energy and natural resources**

  weight of imported energy 96%

- **GHG emissions doubled since 1990s**

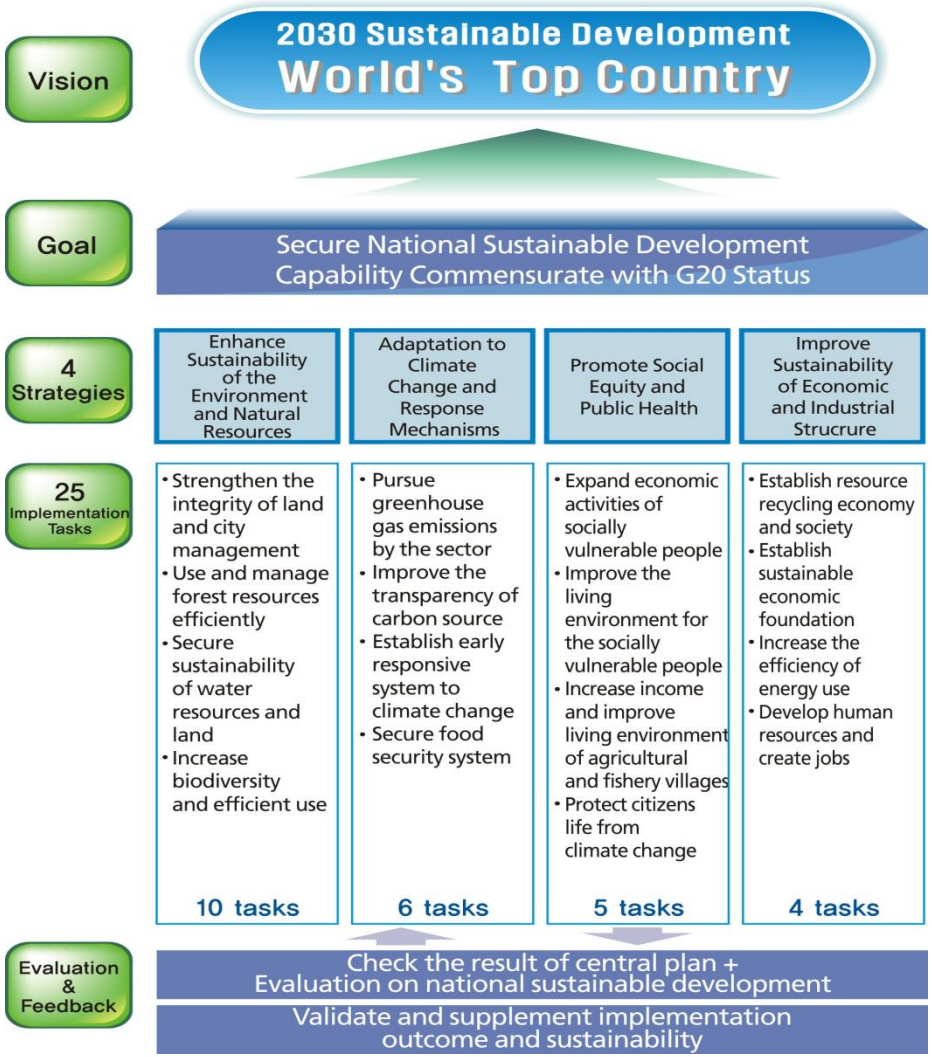
	298.1 Mill. tCO_2 (1990)	**620.0 $MtCO_2$ (2007)**
energy	**83.1%**	**84.7%**
industrial process	**6.7%**	**9.8%**
agriculture & Waste	**10.2%**	**5.4%**

- **Korea took “Low Carbon Green Growth” as a paradigm shift toward sustainable development**

SD Implementation Plans for 2006~2015

Period	Main Events
2006.10	▪ Establishment of the 1st NSSD (2006~2010) - 4 Strategies, 48 Implementation Plans, 238 action plans
2010.11	▪ Settlement of the 2nd NSSD draft - related research by Korea Environment Institute (2009.9~2010.11)
2010.11 ~2011.6	▪ Agreement between related departments - Ministry of Strategy and Finance, Ministry of Knowledge Economy, Ministry of Land, Transport, and Maritime Affairs, Ministry of Health and Welfare, etc., for opinion gathering
2010.12 ~2011.5	▪ Advanced review by the Sustainable Development Committee - Comprehensive Plan (Draft) through pre-review - 4 professional committee and detailed review - Disagreement over the pre-meeting adjustments
2011.6	▪ Sustainable Development Commission vote for deliberation - 4 strategies, 25 implementation plans, 84 action plans
2011.7	▪ Green Growth Committee vote
2011.8	▪ Cabinet Council vote for deliberation

Structure of the Second SD Implementation Plan 2011~2015



■ Goals

Indicators	2010	→	2015
Park area per capita within a city (㎡)	7.6	→	14.4
Water quality (BOD, ppm)	1.48	→	0.95
Number of national species	36,921	→	40,000
Amount of water consumption per capita (L/day)	333	→	308
ODA to GNI ratio (%)	0.12	→	0.25

■ Goals

Indicator	2010	→	2015
GHG emissions per capita (tCO_2)	12.5 ('09)	→	8
Forest carbon stocks (million tCO_2)	1,494	→	1,695
Weather-climate industry development (100 million won)	540	→	2,315
Food self-sufficiency (%)	54.7	→	57
Transportation shares of public transport mode (Seoul metropolitan area, %)	54	→	60

■ Goals

Indicator	2010	→	2015
Gini index of income inequality	0.310	→	0.300
Public revenue to national health expenditure ratio (%)	58.3	→	60.0
Metropolitan concentration of particulate matter (㎍/㎥)	48.7	→	40
Number of houses below the minimum housing conditions (%)	10.6	→	10
Percent of children material goods for Risk Assessment (%)	4.4	→	100

■ Goals

Indicators	2010	→	2015
Share of renewable energy supply (%)	2.54	→	4.33
Energy unit (TOE/1,000$, based on PPP of 2000)	0.197 ('09)	→	0.178
Number of companies issuing sustainability reports	140	→	180
Market share for green products (trillion won)	14.8	→	20
Employment rate (%)	63.8	→	64.3

Case of "Strategy1-Task5-Sub_Task1" in Implementation Plan 2011~2015

1-5 Design basis for sustainable wetland management

▣ Status Analysis

☐ Establish 1st Wetland Conservation Basic Plan following the Wetland Conservation Act enacted in 1999, designate wetland protected areas (26 areas) and initiate Ramsar convention policy.

☐ Enhance the environmental diplomacy of Korea by successfully hosting Ramsar Convention, raise eco-tourism attractions of the wetland protected areas (Suncheon Bay, Upo wetland, etc.) and step up national attention.

☐ Draw out problems like limit in effective management of entire wetlands and ecological resource value drawn aside due to lack of policy objectives.

○ Absence of scientific research institute with a function of implementing research, survey and wetland restoration and management on the wetland functions and value.

○ Lack of leverage valuable ecological resources like ecology of wetlands: landscape and education policies.

○ Absence of institutional incentives on laws and plans that protect wetland conservation areas that has large preservation value.

○ Absence of civil, administrative and science cooperation system for promoting wise use and awareness on wetland conservation.

▣ Direction of Promotion

☐ Create living peninsula where mountain - swamp - tidal ecosystem composition is connected.

☐ Prepare efficient and rational management user system of wetlands.

Indicator	Performance goal '10	Performance goal '15	Measurement method
Ecological river and wetland restoration projects (locations)	214	285	Number of river ecology and wetland restoration projects the current year
Open Ramsar Registration	14	20	Registered Ramsar areas (cumulative)

1-5-① Convert from sporadical to broad-based wetland management

< Goal >

Restore damaged wetlands through systematic management of broad-based ecology.

■ Departments organized : Ministry of Environment, Ministry of Land, Transport and Maritime Affairs

■ Cooperating Authorities : Ministry for Food, Agriculture, Forestry and Fisheries, Korea Forest Service

▣ Execution Plan

☐ Restoration of wetland management for restoring healthy wetland ecosystems peninsula.

○ Convert into district and area based wetland management for restoring wetlands that are connected to the National Broadband of wetland areas.

○ Enlarge the land area and wetland protected areas up to 1% as based on catchment area and territories.

○ Restore the damaged inland and coastal wetlands and establish and promote medium - long term plan (REP plan) for "constructing wetlands."

※ R.E.P : Restoration, Replacement, Establishment, Enhancement, Protection, Preservation

☐ Promote construction of National Wetlands DB and its accessibility

○ Conduct 'survey on inland and coastal wetland' that can be basis for nationwide wetlands layout.

○ Apply marsh wetlands information obtained through research to apply its data on establishing national policy on wetlands.

○ Frame out national wetlands mapping and share it by establishing National Wetlands Information website.

▣ Performance indicator

○ Performance on river ecosystem and wetland restoration

○ Construction rate of DB on national wetlands information

Persistent challenges

- Loss of Growth Momentum since 1990s
  - Annual average GDP growth (%)
    - (1971~1980)**7.1** (1981~1990)**9.0** (1991~2000)**5.2** (2001~2010)**4.6**
- High Level of Energy Dependency, GHGs Emission
  - Energy Intensity (TOE/1,000(US$), 2008)
    - **0.30**(Korea) > **0.19**(US) > **0.18**(OECD Average) > **0.10**(Japan)
  - Energy consumption grows faster than GDP (%, 2009~2010)
    - **6.7**(Energy consumption) > **6.1**(GDP)
  - **9th** in Volume of GHG Emission, **1st** in GHG Emission Increase(1990~2007)
- Heavy Impacts from Local Climate Change
  - Annual mean temperature increase for the past 100 years (1906~2005)
    - **2.4°C**(Seoul, Korea), three times higher than **0.74°C**(World Average)
  - Annual average damage from extreme weather events (US$, 1,000Won/Dollar)
    - **1.8 billion**(2000s), 3.6 times higher than **0.5 billion**(1990s)

Turning Point

Announcement at the 60th Anniversary of the Republic of Korea (August 15, 2008)

Address of the President:
"Today, I want to put forward 'Low Carbon, Green Growth' as the core of the Republic's new vision. Green growth refers to sustainable growth that mitigates greenhouse gas emissions and prevents environmental degradation. It is also a new national development paradigm that creates new growth engines and jobs through green technology and clean energy."

GREEN GROWTH KOREA

"Low Carbon Green Growth" launched in 2008.

❖ **Establishment of National LCGG Policy Framework**

- **Presidential Committee on Green Growth (2008)**
  Ministries, Local Governments, Academics, Civil societies …

- **Framework Act on Low Carbon Green Growth ("Green Growth Act", 2008)**

- **Enforcement Decree of FALCGG (2009)**
  Role of Committee on Green Growth
  Green Growth National Strategy
  National and Local Implementation Plan
  Policy linkages and Coordination of Central and Local governments

National GHG Reduction Target	**-30% BAU in 2020**
Tools and Measures to implement	**GHG Registry, FIT, RPS, TMS, ETS, Carbon Tax, Building & Vehicles**

Supportive measures to Green Technology and Industry Development

- **5-year Green Growth Plan as a new cycle of economic planning**
  Six 5-year economic development plan(1962-1991), New economy 5-year plan

- **GGGI, Green Technology Center, Green Growth Research Division in NRCS, …**

Green Technology & Industry at the center of LCGG

Source : Presidential Committee on Green Growth, 2009

Structure of the first five year GG implementation plan for 2009-2013

- 3 Key Strategies and 10 Policy Directions with 50 Major Targets

  - Measures for Climate Change and Securing Energy Supply
    - Reduce carbon emissions
    - Decrease fossil energy dependency
    - Support adaptation to climate change impacts

  - Creation of New Growth Engine
    - Develop green technologies as future growth engines
    - Greening of industry
    - Develop of cutting-edge industries
    - Set up policy infrastructure for green growth

  - Contribution to International Community
    - Green city and green transport
    - Green revolution in life style
    - Enhance national contribution as a global promoter of green growth

- 50 Policy Targets are identified from the 10 policy directions…

Budget Plan

Budget for 1st Five-Year Plan(2009~2013)

- **Adopted in July 2009 to serve as a mid-term plan for implementing a 'Green Growth Strategy'**
- **Predicted fiscal spending was 107 trillion KRW(86 billion US$)**
- **Fiscal budget will be mainly spent on R&D in green technology (solar energy and fuel cells, restoration of the four major rivers and green transportation)**
- **Approximately 2% of annual GDP is allocated to green investment**

Fiscal Expenditure on Green Growth for 2009-2013

(trillion KRW, %)

Key Category	Total[1)]	'09	'10~'11	'12~'13	Rate of Increase
Total	107.4	17.5	48.3	41.6	10.2
■ Mitigation of climate change & energy independence	56.9	8.6	29.2	19.2	14.0
■ Creating new engines for economic growth	28.6	4.8	10.7	13.1	9.4
■ Improvement in quality of life and enhanced international standing	27.9	5.2	10.5	12.2	3.6

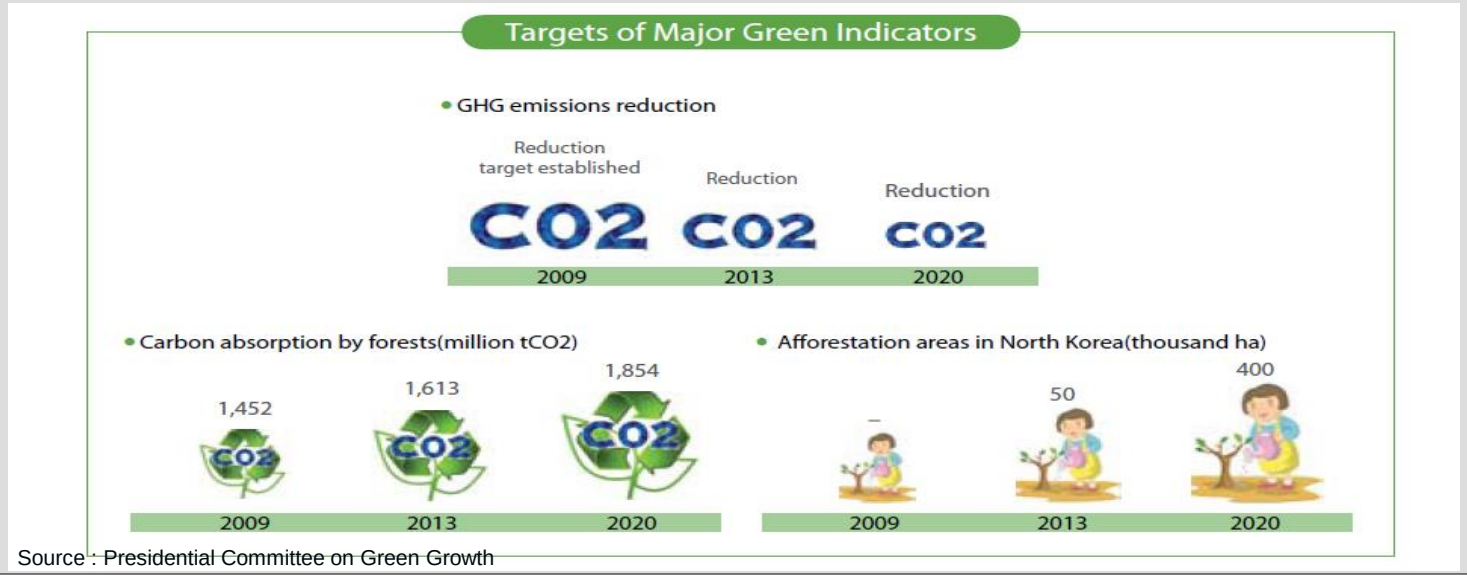
1) The total amount eliminated overlaps among allocations to projects under the 10 policy directions.

Source : Presidential Committee on Green Growth

1. Effective Mitigation of GHGs

Low Carbon Society

-Achieve its **mid-term(2020) mitigation target** for GHG
- Establish carbon monitoring and mitigation system
- Make it mandatory for relevant economic players to report their GHG emission
- Pursue forestation and sustainable forest management to increase carbon absorption.
- Support a 'Green Korean Peninsula' through the rehabilitation and restoration of degraded forests in North Korea

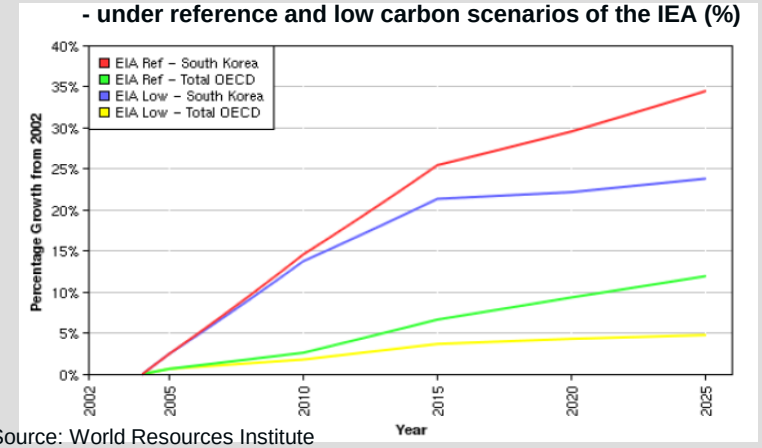


Source : Presidential Committee on Green Growth

GHG Reduction Target Scenarios

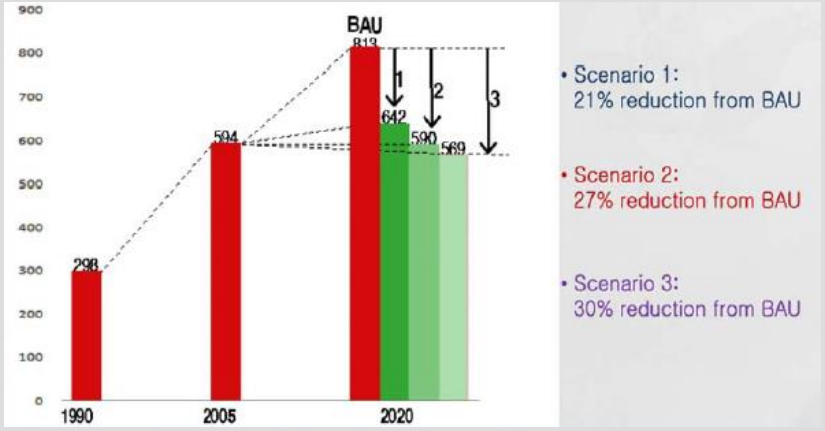
- **Scenario 1: 21 % reduction from BAU(8% increase from 2005 level)**
  - Achieved Through implementation of measures with short – term cost but potential long – term benefits.
- **Scenario 2: 27% reduction from BAU (Return to 2005 level)**
  - Implementation of additional measures from scenario 1, which have a mitigation cost of less than 50,000 won (approx. US$ 28) per ton of CO2
- **Scenario 3: 30% reduction from BAU (4 % reduction from 2005 level)**
  - Implementation of aggressive measures with high mitigation cost

Projected growth in CO2 emissions
- under reference and low carbon scenarios of the IEA (%)



Source: World Resources Institute

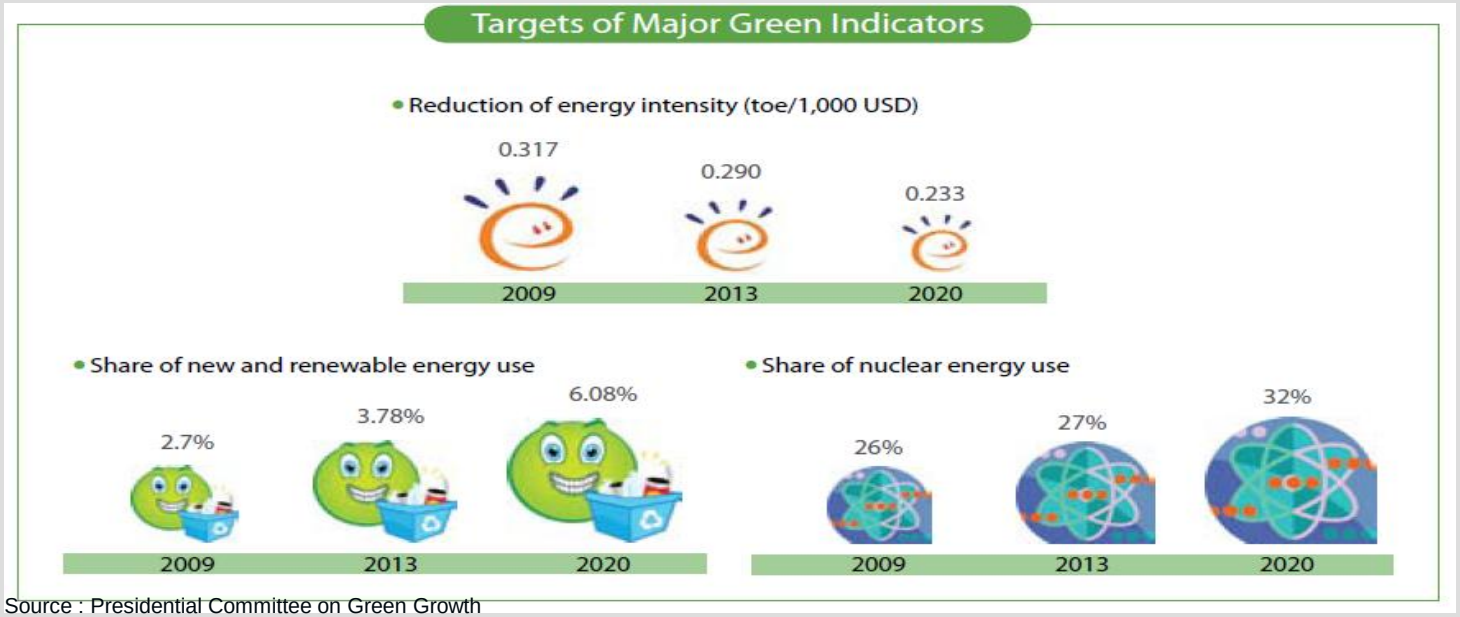
Mid-term Target for 2020



2. Enhancing Energy Independence

Energy Security

- Reduce energy intensity : (toe/1,000 US$)
  0.37 in 2009 → 0.29 in 2013 → 0.23 in 2020
- Increase new and renewable energy supply
  : 2.7% in 2009 → 3.8% in 2013 →6.1% in 2020
- Enlarge the use of nuclear energy
  : 26% in 2009 → 27% in 2013 → 32% in 2020



Source : Presidential Committee on Green Growth

Renewable Energy

- **Given its high energy import dependence, Korea is seeking to expand its renewable energy generation (Korea is the world's fifth largest importer of oil)**
- **New and renewable energy in total energy supply :**
  2.7% (2009) → 3.78% (2013) → 6.08% (2020)

New and renewable energy (NRE) development in Korea : Status and projections

(Unit : Thousand TOE,%)

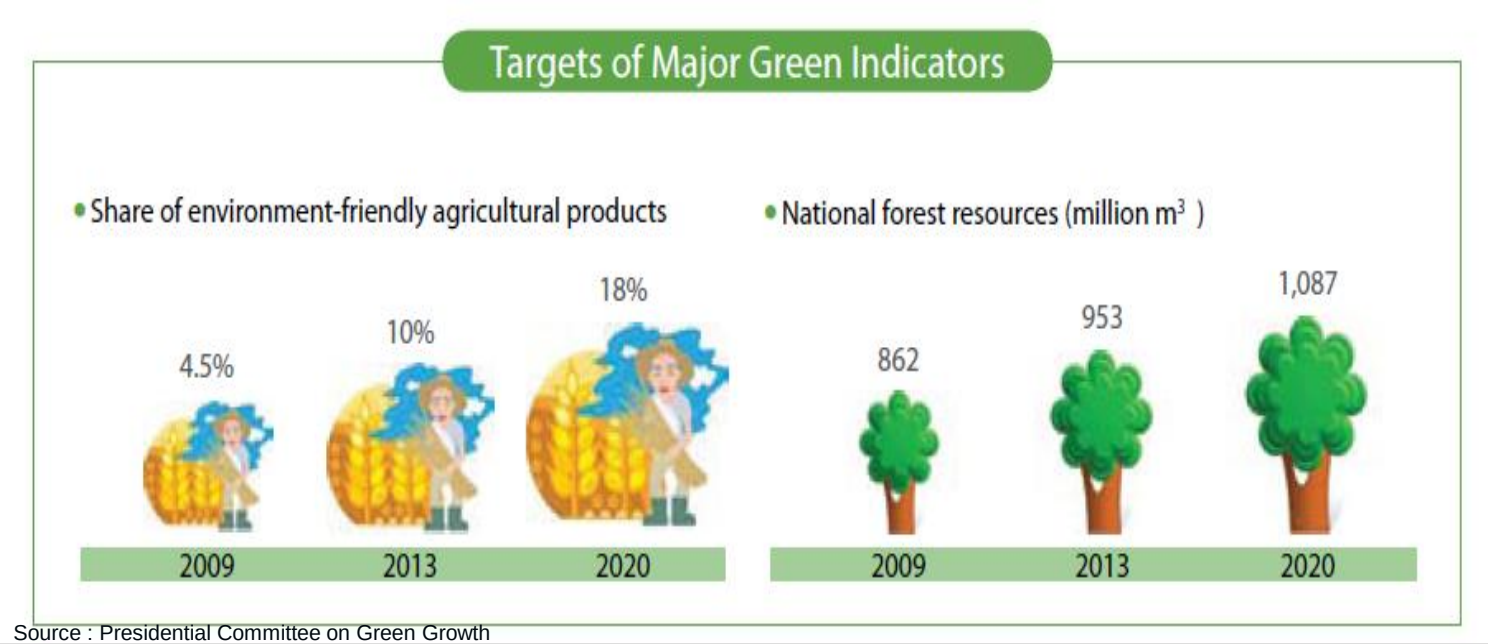
	2008	2010	2015	2020	2030	Annual increase (%)
Solar thermal	33 (0.5)	40 (0.5)	63 (0.5)	342 (2.0)	1,882 (5.7)	20.2
PV	59 (0.9)	138 (1.8)	313 (2.7)	552 (3.2)	1,364 (4.1)	15.3
Wind	106 (1.7)	220 (2.9)	1,084 (9.2)	2,035 (11.6)	4,155 (12.6)	18.1
Bioenergy	518 (8.1)	987 (13.0)	2,210 (18.8)	4,211 (24.0)	10,357 (31.4)	14.6
Hydro	946 (14.9)	972 (12.8)	1,071 (9.1)	1,165 (6.6)	1,447 (4.4)	1.9
Geothermal	9 (0.1)	43 (0.6)	280 (2.4)	544 (3.1)	1,261 (3.8)	25.5
Marine	0 (0.0)	70 (0.9)	393 (3.3)	907 (5.2)	1,540 (4.7)	49.6
Waste	4,688 (73.7)	5,097 (67.4)	6,316 (53.8)	7,764 (44.3)	11,021 (33.4)	4.0
Total	**6,360**	**7,566**	**11,731**	**17,520**	**33,027**	**7.8**
Primary Energy (M TOE)	**247**	**253**	**270**	**287**	**300**	**0.9**
Share (%)	**2.58%**	**2.98%**	**4.33%**	**6.08%**	**11.0%**	

Source : Korea Energy Management Corporation (2010)

3. Strengthening the Capacity to Adapt to CC

Adaptation to Climate Change

- **Establish climate change monitoring and early warning system**
- **Improve climate adaption and address related health risks**
- **Improve water resources management by '4 Major River Restoration Project'**
- **Build urban forests and green areas to increase and protect forest resources**
- **Strengthen the protection of forest ecosystems**

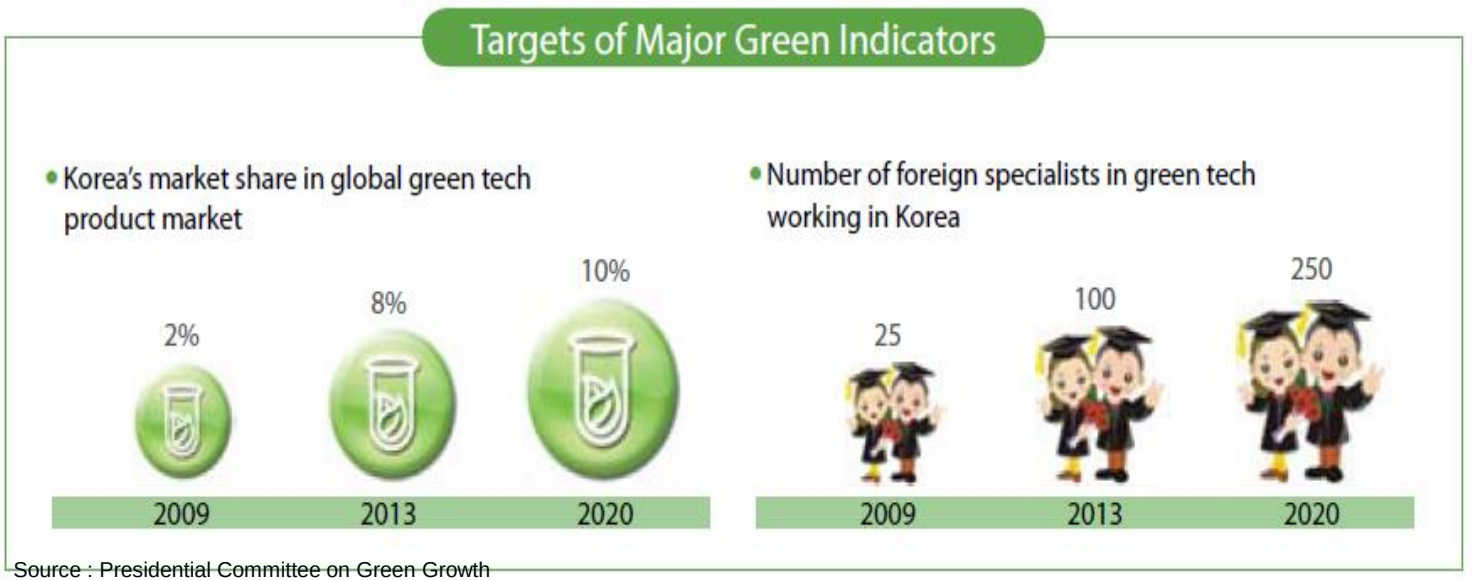


Source : Presidential Committee on Green Growth

4. Developing Green Technologies

Green Technologies

- **Development of Green tech innovation**
- **Increase global market share in green technology sectors to 8% in five years**
  * **silicon-based solar cells, bio-energy, high-efficiency fuel cells, smart grids**
- **Increase in Green R&D : 1.2 billion US$ in 2008 → 2.4 billion US$ in 2013**
- **Encourage and foster collaborative projects with world's leading green research institutes**



Source : Presidential Committee on Green Growth

Green Technology

- **The National R&D Plan for Green Technologies was established in January 2009 in order to advance sustainable economic growth through green technology development.**
- **The government plans to double the investment in green technology R&D in 2012 compared to that of 2008, focusing on the 27 key promotional technologies.**

List of 27 core technologies in Korea green growth national plan

Sector	27 Core Technologies
Climate change	1. Monitoring and modelling for climate change
	2. Climate change assessment and adaptation
Energy source technology	3. Silicon-based solar cells
	4. Non silicon-based solar cells
	5. Bio-energy
	6. Light water reactor
	7. Next-generation fast reactor
	8. Nuclear fusion energy
	9. Hydrogen energy R&D
	10. High-efficiency fuel cell
Efficiency improvement technologies	11. Plant growth promoting technology
	12. Integrated gasification combined cycle
	13. Green cars
	14. Intelligent infrastructure for transportation and logistics
	15. Green city and urban renaissance
	16. Green building
	17. Green process technology
	18. High-efficiency light-emitting diodes / Green IT
	19. IT-combined electric machines
	20. Secondary batteries
End-of-pipe technology	21. CO_2 capture, storage and processing
	22. Non- CO_2 processing
	23. Assessment of water quality and management
	24. Alternative water resources
	25. Waste recycling
	26. R&D in monitoring and processing of hazardous substances
R&D in Virtual Reality	27. Virtual reality

Source:United Nations Environment Programme

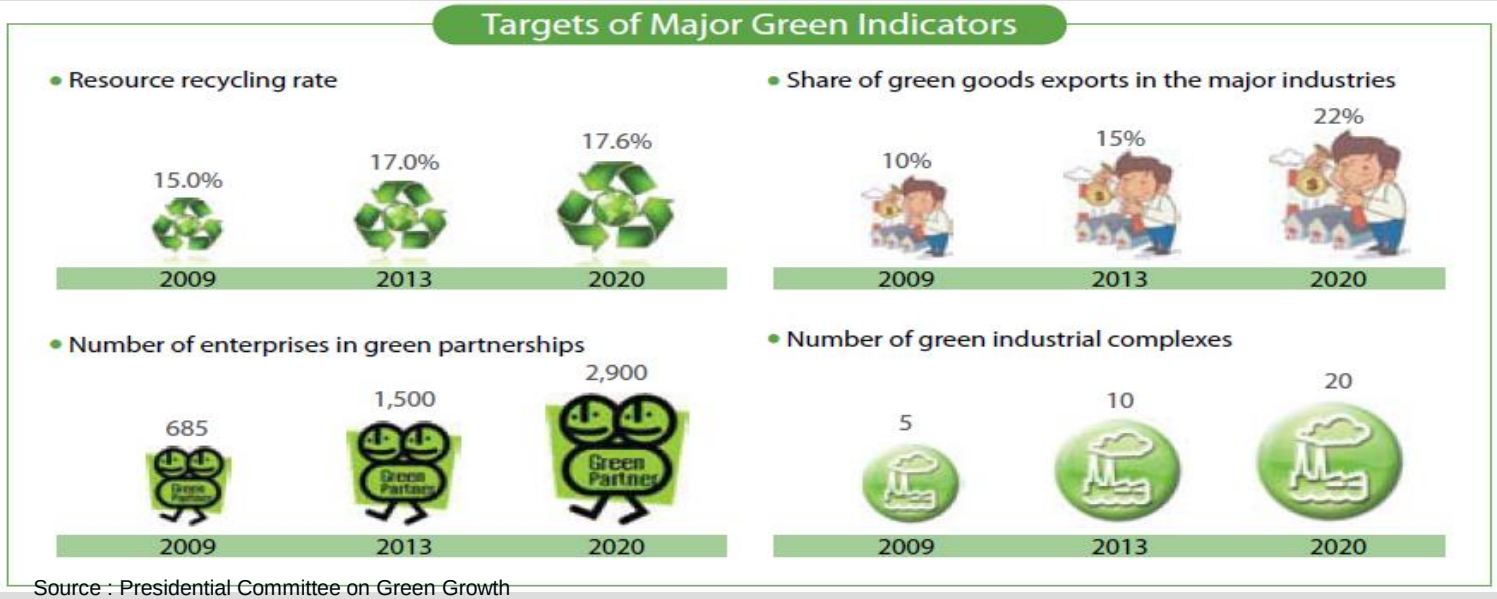
Green Tech R&D Investment Expansion

Source: 'the National R&D Plan for Green Technologies'

5. Greening Industries

Green Industries

- Greening conventional industries : steel, ship building, etc
- Innovate each link of value chain
- Apply energy efficient technology
- Increase the number of participating enterprises in green partnerships
  : 685 in 2009 → 1,500 in 2013 → 2,900 in 2020
- Raise the resource recycling rate

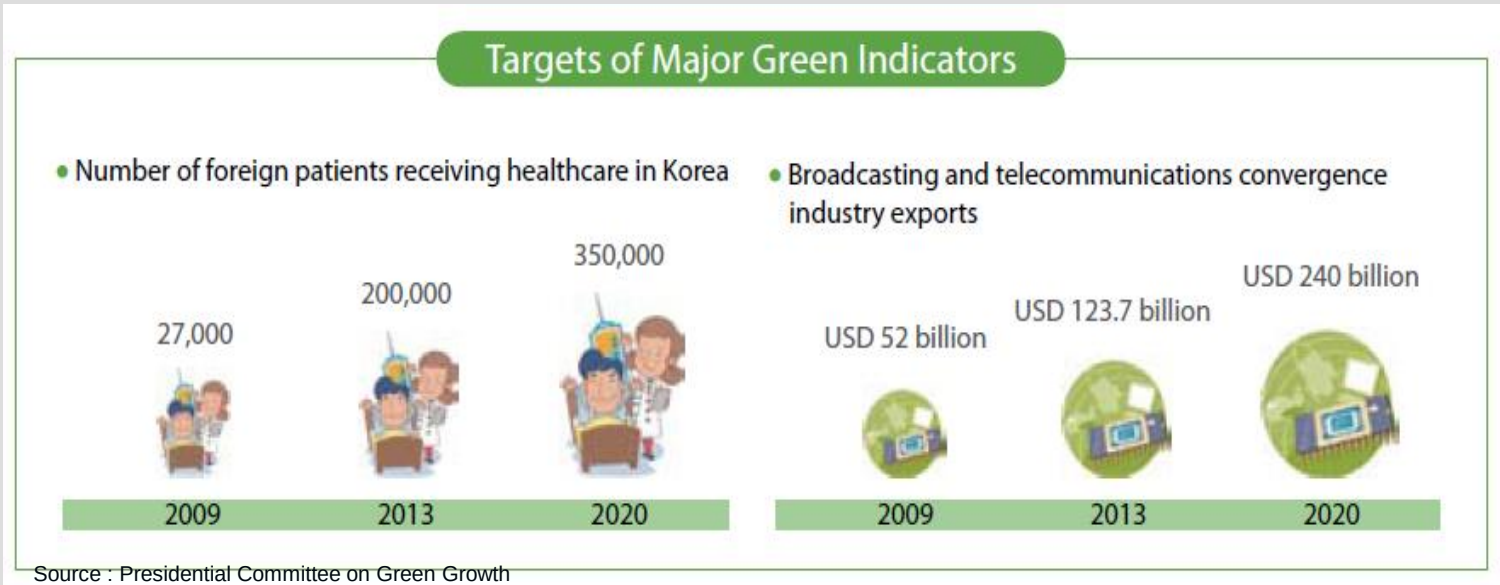


Source : Presidential Committee on Green Growth

6. Advancement of Industrial Structure

Knowledge-based Economy

- Innovate economy and make it eco-friendly
-The state-of–the art convergence technology industry : broadcasting and telecommunications, ICT, robotics, new materials, nano-materials, bio resources, medical appliances, and green food industry
- High value-added industry : healthcare services, education, financing and banking contents industry, software, and tourism industry

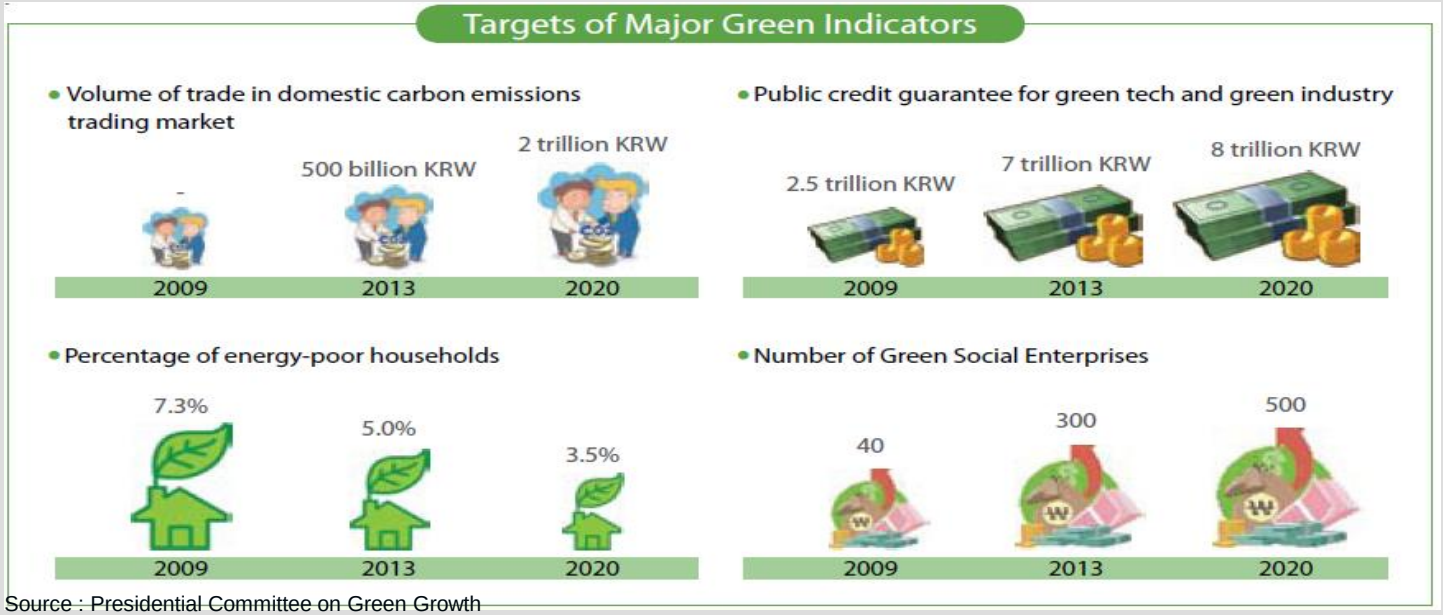


Source : Presidential Committee on Green Growth

7. Building a Structural Basis for a Green Economy

Green Economy Basis

- **Develop carbon market : 0.4 billion US$ in 2013, 1.6 billion US$ in 2020**
- **Introduce cap and trade system/carbon tax**
- **Promote Green Financial Infrastructure**
- **Expand green certificate system**
- **Create green jobs : green social enterprises will be intensively cultivated 300 companies by 2013, 500 companies by 2020**

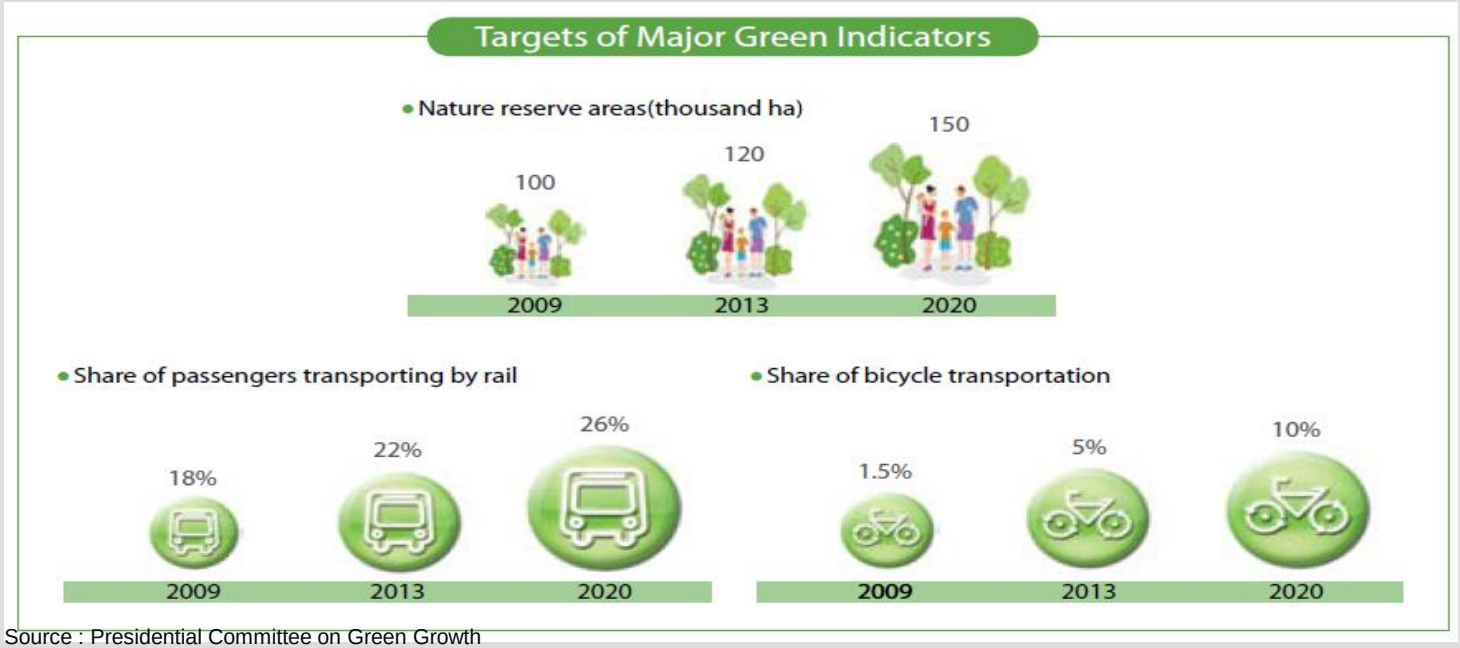


Source : Presidential Committee on Green Growth

8. Greening Infrastructure

Green Land-Transportation-Building

- **Green Home & Green Building rating system**
- **Green city model**
- **Green Transportation: promote green cars (hybrid, EV), bicycle, railway**

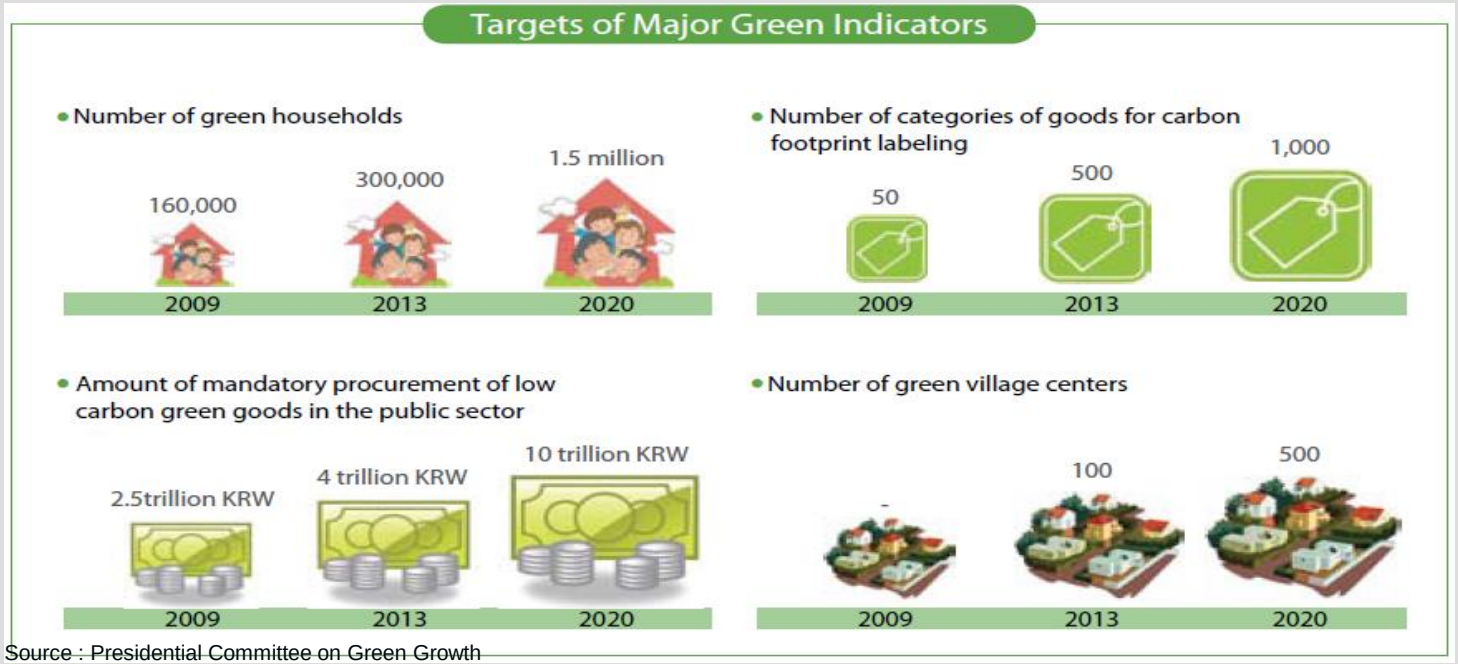


Source : Presidential Committee on Green Growth

9. Bridging Green Revolution into Our Daily lives

Green Lifestyle

- **Promote green consumption and green lifestyle**
  - **Introduce Eco-point system and expand carbon footprint labeling**
  - **Launch green growth campaigns and education for public awareness**



Source : Presidential Committee on Green Growth

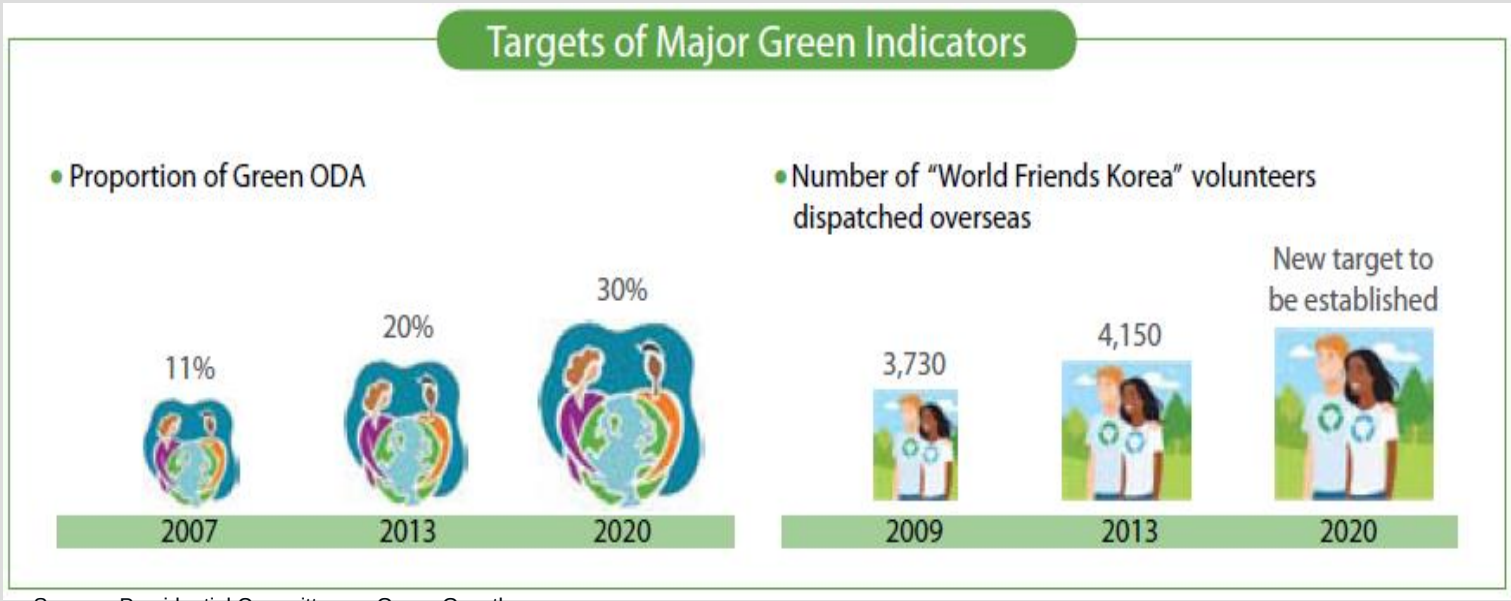
10. Becoming a Role-Model as a Green Growth Leader

Global Green Partnership

- Play its part in promoting green growth by providing full cooperation on the global stage

• East Asia Climate Partnership , World Friends Korea (volunteers program)

- Increase the amount of official development assistance (ODA): increase 20% by 2013, 30% by 2020 (compared to 11% in 2007)



Source : Presidential Committee on Green Growth

Regulations

National GHG info Management System

- 'Integrative GHG management center' will support the goal-setting process for each sector, while the sectoral statistics are produced by each relevant ministry

Emissions Target Management Scheme

- mandatory reporting of GHG emission for (large) entities.
- set targets for each (large) entity that emits greenhouse gases.

Emissions Trading System & Eco-friendly Tax system

- enacts another act on emissions trading system this year
- consider tax reform into eco-friendly system including carbon tax

Green Innovation

Developing Green Technology

- Select 27 green technologies, and make strategies for R&D and commercializing
- Increases government spending on green tech
  * '08($1.3bil) → '12(more than 2 times as large as '08)

Implementing Green ICT Strategy

- Green of ICT : CO2 reduction in ICT sector (products and services)
  - develop green PC·TV·Server and green IDC,
- Green by ICT : CO2 reduction in other sectors by using ICT
  - Smart Grid, teleconference, smart work center, U health, e-education, BEMS

Green Industries

- certification for green technology, green project, accreditation of specialized green enterprises.
- develop countermeasures to support green enterprises (gov't purchase, R&D, marketing, etc)
- Boosting of finance for green SME's and green projects

Structure of the second five year green growth plan for 2014-2018

Vision : Realization of People's Happiness through the Harmonious Development between Economy and Environment

3 Strategies	Establishing a Low-carbon Socioeconomic Infrastructure		Achieving a Creative Economy through the Convergence of Green Technology and ICT		Building a Pleasant Living Environment Safe from the Harms of Climate Change
5 Directions	Effective GHG Reduction	Establishing a Sustainable Energy System	Forming an Ecosystem for Green, Creative Industries	Realizing a Sustainable Green Society	Strengthening Global Green Cooperation
20 Core Tasks	Systematic implementation of GHG reduction roadmap	Reinforcing energy demand management	Developing cutting-edge green technology	Strengthening the capacity for climate change adaptation	Effectively responding to climate talks
	Establishing the ETS and vitalizing the carbon market	Increasing the supply of new and renewable energy	Fostering green, creative industries	Enlarging the basis for eco-friendly living environment	Extending regional cooperation in green growth and its global spread
	Setting a long-term national reduction target	Building a dispersion type generation system	Setting an economic structure for resource circulation	Forming green space in the national territory	Enhancing cooperation with developing countries and internal stability
	Expanding carbon sinks	Securing the safety of energy facilities	Rationalizing regulation and cultivating green talent	Expanding the bases for green welfare and governance	Reinforcing cooperation with and support of GGGI and GCF

Source: www.greengrowth.go.kr

Technologies in the Korean green growth strategy

17 New Growth Engines (PCFV, 2009a)	Green Technologies(27) (NSTC, 2009)	Green Energy(15) (MKE, 2009b)
-Renewable Energy	-High Efficiency Low Cost Silicon-based Solar Cell -Non Silicon-based Solar Cell Production Technologies -Bio-energy Production Related Technologies and Systems -High Efficiency Hydrogen Creation and Storage Technology -Next Generation, High Efficiency Fuel Cell Technology -High Efficiency Secondary Battery Technology	-Photovoltaic Panel -Wind -Fuel Cell -Clean Fuel -Energy Storage
-Low Carbon Resource Industry (CO2 Capture)	-Carbon Capture and Storage (CCS) Technologies -Non CO2 Manufacturing Process	-Carbon Capture and Storage
Low Carbon Resource Industry (Nuclear Energy)	-Technologies for Advanced Light Water Reactor Construction -Technologies for Eco-friendly Non Proliferating Fast Reactor -Technologies for Design and Construction of Fusion Reactor	-Nuclear Energy
-Advanced Water Treatment	-Technology for Water Quality Management and Assessment -Technology for Alternative Water Resources -Monitoring of Harmful Substances/ Environmental Cleansing	
- Light Emitting Diode (LED) Appliances	-LED lighting, Green Information Technology (IT)	-Light Emitting Diode
-Green Transportation	-High Efficiency, Low Pollution Vehicle Technologies	-Green Car
-Cutting Edge Green City	-Ecosystem and Green Rehabilitation	
-Information Technology (IT) Fusion System	-Power IT and Technology for Enhancing Efficiency of Appliances	-Power IT -Super conduction
-Broadcast, Communications Fusion Industry -Robot Applications -New Materials, Nano Fusion -Bio-pharmaceuticals/Medical equipment -High Value-added Food Industry -High Value-added Medical Service -Global Education Service -Green Finance -Cultural Contents & Software -Convention & Tourism	-Virtual Reality Technology	
	-Technology for Eco-friendly, Low Energy Buildings	-Building Energy
	-Technology for Integrated Coal Gasification Combined Cycle(IGCC)	-IGCC
	-Climate Change Prediction and Modelling -Climate Change Effects Assessment and Adaptation -Waste Reduction, Reuse Technology -Green Process with Low Environmental Load and Energy Use -Eco-friendly Plants Cultivation Catalyst Technology -Intelligent, Transport System	
		-Small Cogeneration -Heat Pump

Sources: Presidential Council for Future and Vision (2009), National Science and Technology Council (2009), Ministry of Knowledge Economy (2009).

Green technology investment schedule (2008-2012) Unit: Billions USD

Category		2008	2009	2010	2011	2012	Note
National R&D	Target	10.26	11.37	12.66	13.77	15.34	
Green Technology R&D	Target (Weight, %)	1.29 (12.6)	1.76 (15.4)	2.03 (16.1)	2.31 (16.8)	2.59 (16.9)	19% (annual growth rate)
	Planned	1.35	1.89	2.14	2.43	2.75	
Core Green Technology R&D (27)	Target (Weight, %)	0.92 (71.7)	1.29 (72.0)	1.57 (77.3)	1.85 (80.0)	2.13 (82.1)	23.4% (annual growth rate)
	Planned	0.97	1.31	1.65	1.94	2.26	
Note	This table is based on reports of "10 Year Plan for Green Technology R&D" submitted by related government agencies. The planned figure for 2008 and 2009 represent actual R&D investment realised, and the figure for the years of 2010-2012 represent planned investment adjusted to the target proposed. 1,082 Won/US$ is applied to convert Korean won into U.S. Dollar equivalent from the original data in the source MEST(2010).						

Source: MEST (2010)

Role sharing in green technology R&D coordination

PCGG	NSTC	MOSF
Allocation Principles for Green R&D Budget (early or mid of July)	Allocation Principles for Gov't R&D Budget (late July)	Compilation of Gov't R&D Budget
-Expansion of investment in Green R&D -Investment priorities by major technologies -Adjustments between relevant projects -Division of roles between industries by technologies	-Investment priorities by areas/projects -Adjustment between projects -Investment suitability and feasibility -Division of roles between ministries	-Drawing up the government's R&D budget, reflecting the assessment of NSTC

Sources: NRCS 2011

Development Cooperation

Cooperation Channels

East Asia Climate Partnership with assistance package (2008~2012) of 200 million USD for developing countries in East Asia (used for policy consultations on low carbon development, facilitating technology transfer and mobilization of financial resources, and pilot projects for mitigation and adaptation technologies)

Global Green Growth Institute (GGGI), an international organization dedicated to promotion of Green Growth (hosted in Korea)

Green Climate Fund, a new financial mechanism for climate change mitigation and adaptation (hosted in Korea)

Korea is proactively assuming role in the achievement of sustainable development of developing countries as well as Millennium Development Goals. I would like to take this opportunity to note with satisfaction that Korea will increase ODA from 0.1% of GNI in 2009 to 0.25% by 2015. And Korea will scale up Green ODA from 14% in 2009 to 30% by 2020.

Development driven by human resources

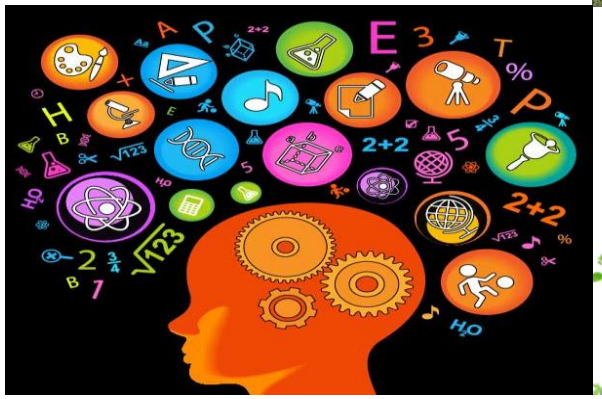
Development driven by Human Resources…

Development driven by natural resources

Development driven by Natural Resources

a new development paradigm with creative humanity

Development driven by
Creative Humanity



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