Korea’s Green Growth Vision, Strategies and Progress

To be presented at the Conference on South Korea’s Green Growth Strategy: Where It Stands and Where It’s Going, held in Washington, D.C., on June 23, 2011, organized by the Center for U.S.-Korea Policy

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Chairman

Presidential Committee on Green Growth
I. Green Growth Developments in Korea

II. Korea’s Green Growth Strategy and Policies

III. International Green Growth Initiatives

IV. Prologue: The Cheonggye-cheon Stream Restoration Project
Green Investment by Big Businesses (1)

- Green Investment by Big Businesses: 2008~2010

- New & Renewable Energy
- Next-generation Electric Equipment
- Green Cars
- Climate Adaptation
- Others

15.1TW (14B $)
Green Investment by Big Businesses (2)

Green Investment by Big Businesses:
2008~2010 & 2011~2013

Green Investment (USD: Billion)

- 0% ~ '10
- 11~'13

48%

Green Investment by Big Businesses:
2011~2013

- Total $20 bn.
- New & renewable energy 42%
- Next-generation equipment 18%
- Green car 23%
- Climate change 10%
- Others 7%
Leading Areas for Green Investment by Big Business (2)

Composition of Green Investment in N&R Energies: 2011~2013

- New Renewable Energy
  - Photovoltaic 86.4%
  - Wind 7.6%
  - CTLGT 3.2%
  - Bio 2.2%

Composition of Green Investment in NG Electric Equipment: 2011~2013

- Next-Generation Electric Equipment
  - LED 63.9%
  - Electric Storage 27.0%
  - Fuel Cell 9.1%
Green Investment as Big Businesses’ New LT Strategic Focus

- The Samsung Electronics proposed to invest 23TW(21B$) in environment, energy, bio and medical businesses during 2010~2030.

- LG will invest 20.4TW(18.5B$) in green car solutions, green building solutions, and green energy solutions during 2010~2020.

- POSCO proposes to be a global green leader by investing 7TW in reduction of its energy intensity by 9% by 2020, and to reduce its GHG emission by 14 million eCO2 tons.

All big businesses proposed to extend ‘green partnership’ to help SMEs turn green.

Sources of competitive advantages: aggressive CEO leadership, R&D and engineering capabilities, and strength in semi-conduction, shipbuilding, IT, etc.
Green Businesses as New Growth Engines for SMEs

- SMEs have been increasingly participating in green businesses.
- Certified ‘Green Venture Businesses’:
  2008: 1,133 or 7.4% of all VB -> 2010: 1,785 or 9.5% of all VB.

**Millinet Solar**
- Solar Cell
- Solar cell contract with module company in Spain in 2010
- MOU to construct solar photovoltaic plant in Saudi Arabia

**Dongkuk S&C**
- Wind Tower
- 13% market share in the global market

**Fawoo Technology**
- LED
- First KS mark for LED lighting
- License contract with GMG in U.S.
### Investment Plan in Green Cars (1)

**2011 ~ 2015**

4 major auto companies are investing 2.6 TW

Major component companies 440 BW

<table>
<thead>
<tr>
<th>Company</th>
<th>Investment Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyundai-KIA</td>
<td>HEV, PHEV, EV, FCEV and CDV</td>
</tr>
<tr>
<td>Renault Samsung</td>
<td>Yansan line for EVs (SM3)</td>
</tr>
<tr>
<td>GM Daewoo</td>
<td>Three EVs and Euro 6 engine</td>
</tr>
<tr>
<td>Auto Parts</td>
<td>6 major component companies investing 181 BW in R&amp;D and 269 BW in Facility</td>
</tr>
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</table>
Investment Plan in Green Cars

- Hyundai Motors and GM Daewoo plan to supply their new EVs, *BlueOn*, and *Lacetti Premier* to the market by the mid-2010s.

- Korea hopes to rise as one of four green car leaders by 2015 with combined production of green cars increasing from 0.9 million (2011) to 1.2 million (2015), and to 1.6 million (2020).

- Green cars’ combined share in domestic cars are planned to increase from 14% (2011) to 21% (2015) and to 43% (2020).

- Hyundai’s *BlueOn* is a product of collaboration among 10 big businesses and 34 SMEs, with domestic firms responsible for 90% of the whole project.

- LG Chemistry, Samsung SDI, and three other firms supply EV batteries to the world market.
Investments in Green Infrastructure

- Green New Deal (2009~2012) consists of 9 main, and 27 related projects, amounting to 50TW(45.B$) including matching investment by local governments and the private sector. Expected to create 0.96 million jobs.

- The Four Major Rivers Restoration Project, accounting for 22% of GND, addresses five objectives: secure water, prevent floods, improve quality of water and restore ecology, create water-friendly public spaces, and promote river-side community development.

- In partnership with the private sector, the government has built a smart grid test bed on the Jeju Island, under a plan to create a nation-wide smart grid by 2030.

- Korea will complete a green transportation system, including a national HSR network, by 2020.
## Deployment of Renewable Energies: 2010 & 2030

(1,000 TOE)

<table>
<thead>
<tr>
<th>Energy Source</th>
<th>2010</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar thermal</td>
<td>40</td>
<td>1,882</td>
</tr>
<tr>
<td>Solar photovoltaic</td>
<td>138</td>
<td>1,364</td>
</tr>
<tr>
<td>Wind</td>
<td>220</td>
<td>4,155</td>
</tr>
<tr>
<td>Bio</td>
<td>987</td>
<td>10,357</td>
</tr>
<tr>
<td>Hydraulic</td>
<td>972</td>
<td>1,447</td>
</tr>
<tr>
<td>Geothermal</td>
<td>43</td>
<td>1,261</td>
</tr>
<tr>
<td>Ocean</td>
<td>70</td>
<td>1,540</td>
</tr>
<tr>
<td>Waste</td>
<td>5,097</td>
<td>11,021</td>
</tr>
<tr>
<td>Total</td>
<td>7,566</td>
<td>33,027</td>
</tr>
<tr>
<td>Share</td>
<td>2.98%</td>
<td>11.0%</td>
</tr>
</tbody>
</table>

- Eight renewable energies for government-supported deployment: solar thermal, solar photovoltaic, wind, bio, hydraulic, geothermal, ocean, and waste energies.

- Three ‘new’ energies for government-supported deployment: hydrogen, fuel cell, and clean coal energies.
KOSPI and Green Industry Index: 2009~2010

- KRX Green Index: 1,210.06
- KOSPI: 1,157.40

Change:
- KRX Green Index: 128.5%
- KOSPI: 77.2%
Green Growth Declared a New Development Vision

- All this began with the declaration of ‘low carbon, green growth’ as Korea’s new development vision by President Lee Myung-bak in August 2008.

“Green growth seeks sustainable growth by reducing GHG emission and environmental pollution. It is a new development paradigm which creates new growth engines and new jobs from green technologies and clean energies.”

Last 60 years

Brown growth

Next 60 years

Green growth
Laying the Foundation for Green Growth: Milestones

- Presidential Committee on Green Growth launched in February 2009 as the highest body for deliberation and coordination.


- President Lee declares Korea’s MT GHG emission reduction target of 30% BAU by 2020 in Copenhagen in 2009.

National Green Growth Strategy: Framework

**Vision**

A Model Green Nation - through creating virtuous harmony of environment & economy

**Objectives**

- Low Carbon Society & Energy Security
  - Build Low Carbon Society
  - Greater Energy Security
  - Addressing Climate Change
- New Engine for Growth
  - R&D for Green Tech.
  - Foster Green Industry
  - Greening the Industry
  - Lay the Foundation for Green Economy
- Enhanced Quality of Life & Int’l Leadership
  - Green Transportation & Land Management
  - Green Life-style
  - Int’l Leadership

**10 Key Agenda**
Policy Programs by Agenda: 1) Mitigate GHG Emissions

- **Setup and Manage National Mid-long Term GHG Reduction Goal**
  - '09 Setup mid-term goal → '10 Manage Emission

- **Manage & Expand GHG Emissions Reporting**
  - GHG Emission Info Management System: '09 Policy Formulation → '10 System Implementation

- **Foster Carbon Cycle Activity (Carbon-3R) and Carbon Sink**
  - Carbon Storage of Forests:
    - ('09) 1,452 → ('13) 1,613 million tCO₂

- **Support Regeneration of Forests in North Korea**
  - Forestation area of North Korea: '09 - '13 50,000 ha
Policy Programs by Agenda: 2) Reduce Fossil Fuels

- Manage Energy Efficiency and Energy Demand
  - Expand use of high efficient instruments: ('13)
  - Eliminate incandescent lamp
  - Energy base unit: ('09)0.32→('13)0.29 toe/$1k
  - Introduce and run Energy Target Mgmt. System

- Foster Industrialization of Renewable Energy
  - The diffusion rate of renewable energy: ('09)2.7→('13)4.0%
  - Green Home: ('13)140,000→('20)1 million houses
  - Build Environmental Energy Town: ('09)→('20)14 towns

- Expand of Global Resource Development Infrastructure
  - Independent Exploitation Rate of Petroleum gas: ('09)7.4→('13)20%

- Increase Reliability and Relative Importance of Nuclear Energy
  - KR's 1st Nuclear Energy Plant Export (1~2+)
  - Develop KR's own technology for foreign-dependent nuclear energy technology ('12)
Policy Programs by Agenda: 3) Adapt to Climate Change

- Revitalization of 4 Major Rivers
  - Secure water resources: '09)186 → ('13)200 bil.㎥
  - Water Quality of 4 major rivers: ('12) Level 2

- Climate Change Friendly Ocean & Crisis Prevention System
  - Evaluation of vulnerable Coast: ('09) - ('13)800㎢
  - Capacity of Disaster Countermeasure: ('09)40 → ('13)60%

- Obtain Climate Change Forecasting Technique & Scenarios

- Secure Water
- Use of Marine Energy
- Disaster Prevention

- Promote Healthy Forest Ecosystem
  - National Forest Resource: ('09)862 → ('13)953 million ㎥

- Management of Climate Change Friendly Health & Food Products
  - Mitigation Strategy for Health: ('09) establishment complete
  - Environmentally friendly agricultural products: ('09)4.5 → ('13)10%
Policy Programs by Agenda: 4) Develop Green Technologies

- **Green Tech Initiative - Use of Core Technologies**
  - Commercialize Green Technology: LED, Solar Battery, Hybrid Car, measuring Light-Water Reactor, Fuel Cell, etc.

- **Expansion of Green R&D Investment**
  - Green Tech R&D Investment: ('09)16→('13)20%

- **Strengthen Green IT - Greening of IT, Greening by IT**
  - Develop and Export World Best 3 Green IT Products (Green PC-TV Server) ('12)

**Investment Plan (Tril. KRW) and Job Creation (1 million ppl)**

- CAGR: 5.1%
- Investment Plan: 2.0→4.3→5.0
- Job Creation: '09→'10→'11→'12~'13→'09~'13
- HR for Plant Engineering, Tech-commercialization, Manufacturer, Facilities, Construction

- **“Green TCS* System”**

- **Expand Green Tech, Industrial Infrastructure**
  - Market Share of Green Tech Exam
  - International Certification: ('09) less 0.5→('13)8%
  - TCS: Testing, Certification, Standard

- **Education for Green Tech Professionals with Int’l Cooperation**
  - Green Tech Human resource: ('09)→('13)1 million ppl
  - Induce Masters degree+ level high profile Human resource: ('09)25,000→('13)100,000 ppl
Policy Programs by Agenda: 5) Green the Industries & Nurture Green Industries

- **Expand Green Industrial Complex**
  - Number of target industrial complex: ('09)5 → ('13)10 complexes (resource reuse, renewable energy, IT based system, etc.)

- **Enhance Green Partnership with Large-Mid-Small Companies**
  - Number of joining Green partnership: ('09)- → ('13)1,500 companies

- **Green Main Industry & Disseminate Green Business Structure**
  - Greening 9 main industries for Petrochemical, Steel, etc.
  - Proportion of Green Product Export: ('09)10 → ('13)15%

- **Implement Structure of Resource Circulating Economy • Industry and Vitalize Urban Mining**
  - Rate of Resource cycle: ('09)15 → ('13)17%
  - Urban mining related R&D Support: ('09)90 → ('13)375 billion KRW
Policy Programs by Agenda: 6) Advance the Industrial Structure

- Broadcasting-Communication, IT, Robot Industries
  - World Robot Market Share: ('08)8.9→('13)13.3%
  - Amount of Exporting Broadcasting-communication Integrated Industry: ('08)520→('13)1,237 billion USD
  - Next Generation Wireless Communication, Life-care Robot, etc.

- Vitalize New Materials-Nano Fusion, Bio-medicine Industries
  - Local productivity of Bio Industry: ('08)6→('13)22 tril. KRW
  - Nano Integrated Solutions: ('08)0→('15)30 products
  - High-tech medical image examination machine, ultralight magnesium material, etc.

- Promote High Value-added Sightseeing and S/W Contents, etc.
  - Amount of S/W export: ('09)58→('13)81 billion USD
  - Number of MICE tourists: ('09)58→('13)1.58 million ppl.
  - Meeting, Incentive Travel, Convention, Exhibition
  - Virtual reality Contents, Embedded*S/W, etc.
  - *loaded S/W to support specific operation

- Strengthen Global Healthcare & Educational Service
  - Utilization Rate of U-Health: ('09)0.02→('13)14.8%
  - Utilization Rate of U-Learning usage: ('09)45→('13)65%
Policy Programs by Agenda: 7) Introduce Green Institutions

- Introduce Carbon Emission Trading by Stages
  - Local carbon market size: ('09) → ('13) 0.5 trillion KRW

- Revitalize Green-Tech & Green Finance Industry
  - Market Share of Green Investment Fund: ('09) → ('13) 5%

- Create Green Jobs
  - Managing integrated DB for green employment ('13)
  - Cultivation of Green labor
  - Support Green Specialized Schools

- Support and Maintain Carbon Emission Reduction & Regulation and Support Low-income Bracket
  - Introduce Standard of Eco-vehicle & GHG emission
  - Number of energy shortage households: ('09) 7.3 → ('13) 5.0%

- Environmental Tax System Reform
  - Expand tax favor for eco-products and eco-vehicle
9) Green Life Style Revolution

**Green Consumption**
- Amount of Green Purchase: ('09)2.5→('13)4tril. KRW
- Number of Carbon Labeling Certificate Products: ('09)50→('13)500 products
- Number of Green Store: ('09)387→('13)600 stores

**Expand Green Villages**
- Number of Green Village Centers: ('09)50→('13)100 centers
- Low-Carbon Green Village (disposed Bio-mass) Test Operations: ('12)12 villages

**Green Citizens • Green Families**
- Number of Green Citizens: ('09)50→('13)100 million ppl
- Number of Green Families: ('09)16→('13)0.3 million houses

**Develop and Expand Korean Model of Ecology Sightseeing**
- Change to eco-tourism: ('12) 5% of domestic/international tourists

- Green Growth Professionals
- Tour-guides for ecology sightseeing, etc.

**Investment Plan (Tril. KRW)**
- CAGR: 3.0%
- Job Creation (1 million ppl)
- Educated Green Growth Professionals
- Tour-guides for ecology sightseeing, etc.
Policy Programs by Agenda: 10) Become a Global GG Leader

- Support Developing Countries in Green Growth
  - Portion of Green ODA (Both Parties): (09)14 → (13)20%
  - GEF Contribution: (09)0.23 → (20)0.25%

- Green Growth Role-Model
  - Environmental Performance Index, World Ranking: (08)51st → (13)30th

- Green Hub Korea
  - Integrated with Green Technology and System including green growth city and green FEZ (Free Economic Zone)
  - The center of Asia Climate Change that leads Asia’s Green Growth

- Cooperation to Realize Global Green Growth
  - Through ‘East Asia Climate Partnership’, Extend Green leadership
  - Bridges between developing countries and advanced countries for climate change negotiation
  - Enhance diverse technique
Korea’s GG Strategy seeks to transform its economy’s entire system of resources and energy uses across the whole range of sectors for sustained green growth, assisted by a new ‘green’ export dynamism.

The key to sustained green growth will be a pervasive and continuing process of innovation, technological and institutional. This is key to delinking economic growth and environmental degradation.

The ultimate driver of innovation is the need to reduce GHG emissions to meet the declared target.
Need for Technological Innovation to Meet GHG Target

Means for Emission Target

**Green Building**
- Promote Green Building
  - Promote Insulation, Solar, Geothermal
- Promote green products
  - LED, Green IT
- Electricity saving through real-time information on demand

**Green Transportation**
- Promote Low-carbon Cars
- Modal Shift – Shift to public transportation
- Promote Hybrid cars
- Promote Biofuel
- Next Generation Green Cars replace the traditional engine cars

**Low-Carbon Industry**
- High-efficiency process
- Low-Carbon Energy
  (Renewable, Nuclear, Natural Gas)
- Introduce Smart Grid
- Apply CCS Technology

**Green Consumption**
- Green Consumption
  (Carbon Labelling, etc)
- Green Living
  (Eco-Driving, etc)
- GreenStart
  Green Life Campaign