S&T Policy for Post-Crisis Growth:
A Korean Perspective

Dr. Myung Jin Lee, Research Fellow, STEPI
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S&T Policy for Post-Crisis Growth: A Korean Perspective

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Myung-Jin Lee (leemyjin@stepi.re.kr)

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* Most slides in Chapter 1 are from Choi(2009), and Chapter 2-3 from Kim(2010).
1. Background

1.1 Background

- Countries are seeking new growth paradigm after global financial crisis.
  - G20 adopted “Framework for Strong, Balanced & Sustainable Growth”
  - OECD Declaration on Green Growth (‘09)
  - APEC Growth Strategy (‘10): balanced, inclusive, green, knowledge-based, & secure growth
  - Korea: Green Growth Strategy, 30% reduction of GHG by ‘20
  - USA: Green Economic Recovery
  - Japan: Low-carbon Society
  - Germany: 3rd Industrial Revolution

- This presentation will review Korean S&T policy perspective on post-crisis growth.

1.2 Challenges: Global

- Financial crisis & slow growth

- G20 became a Premier Forum for int’l economic coop
  - MEMS became important economically.

- Climate Change
  - CO2 concentration increase: from 380ppm (2009) to 1,260ppm (2100)
  - Mean surface temp rise: 1.4–5.8°C (2100)
  - Sea-level rise: 9–88cm

- Energy Security
  - All oil demand growth from China (43%), India (20%), Middle East (20%),
  - the rest 97% of CO2 Emissions by 2030 from non-OECD: 7/4 from China, India, and Middle East

- Food Security
- Global Health
1. Background

1.2 Challenges: Global

- Korea
  - also faces global challenges, and
  - will host G20 Seoul Summit (’10.11)
  - became full member of OECD Development Assistance Committee (DAC)
    - in need of global leadership.

In response,

Korea pursue policy for Green Growth, New Growth Engines, Job Creation

1.3 Weak growth ahead: Global

- OECD forecast: world economy would recover but slowly

<table>
<thead>
<tr>
<th>Table 1. Economic Growth Forecast</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>World</td>
<td>-1.7</td>
<td>3.4</td>
<td>3.7</td>
</tr>
<tr>
<td>OECD</td>
<td>-3.5</td>
<td>1.9</td>
<td>2.5</td>
</tr>
<tr>
<td>USA</td>
<td>-2.5</td>
<td>2.5</td>
<td>2.8</td>
</tr>
<tr>
<td>EU</td>
<td>-4.0</td>
<td>0.9</td>
<td>1.7</td>
</tr>
<tr>
<td>Korea</td>
<td>0.1</td>
<td>4.4</td>
<td>4.2</td>
</tr>
</tbody>
</table>

Source: OECD (2009)
1. Background

1.3 Weak growth ahead: Korea

- For the past twenty years, Korea’s potential growth slows down to 3%.

Figure 1. Real & Potential Growth of Korean Economy

Source: SERI (2010)

1.4 Green Growth: IEA

- Growing Global Green Growth Consensus

Table 2. IEA for Clean Tech Roadmap

<table>
<thead>
<tr>
<th>Supply Side</th>
<th>Demand Side</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCS power generation</td>
<td>Energy efficiency in buildings</td>
</tr>
<tr>
<td>Nuclear III + IV</td>
<td>Heat pumps</td>
</tr>
<tr>
<td>Wind</td>
<td>Solar space and water heating</td>
</tr>
<tr>
<td>Biomass: IGCC &amp; co-combustion</td>
<td>Energy efficiency in transport</td>
</tr>
<tr>
<td>Solar – PV</td>
<td>Electric and plug-in vehicles</td>
</tr>
<tr>
<td>Solar – CSP</td>
<td>Fuel cell vehicles</td>
</tr>
<tr>
<td>Sola – IGCC</td>
<td>CCS in industry</td>
</tr>
<tr>
<td>Sola – USCSC</td>
<td>Industrial motor systems</td>
</tr>
<tr>
<td>2nd generation biofuels</td>
<td></td>
</tr>
</tbody>
</table>
1. Background

1.3 Green Growth: G8

- **Italy G8 Summit 2009: Clean Tech Advancement Agreement**
  - 35th G8 Summit/MEF in Italy July 2009: World-Changing 7 Green Technologies Selected and Spearheading Countries Chosen:

<table>
<thead>
<tr>
<th>Spearhead Countries</th>
<th>7 Clean Technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Korea</td>
<td>Smart Grid Technology</td>
</tr>
<tr>
<td>U.S.</td>
<td>Energy Efficiency Technology</td>
</tr>
<tr>
<td>Germany</td>
<td>Solar Energy Technology</td>
</tr>
<tr>
<td>Japan</td>
<td>High Efficiency + Low-Emission Coal Technology</td>
</tr>
<tr>
<td>U.K.</td>
<td>Carbon Capture, Use, Storage(CCS) Technology</td>
</tr>
<tr>
<td>Spain</td>
<td>Wind Technology</td>
</tr>
<tr>
<td>Brazil</td>
<td>Bio-Energy Technology</td>
</tr>
</tbody>
</table>

2. Green Growth Strategy

2.1 National Strategy for Green Growth

- **Declaration on “Low Carbon, Green Growth”**
  - At the 60th anniversary of the founding of the Republic of Korea on August 15, 2008, President Lee Myung-bak proclaimed “Low Carbon, Green Growth” as Korea’s new national vision.
  - “Low Carbon, Green Growth” aims to simultaneously pursue three objectives by creating a synergistic relationship between economic growth and environmental protection:
    1) to promote eco-friendly new growth engines for the national economy
    2) to enhance the quality of life for the members of the society
    3) to contribute to the international efforts to fight climate change

- To implement the national vision of green growth more effectively, the National Strategy for Green Growth was adopted along with the Five-Year Plan (2009–2013) for Green Growth.
2. Green Growth Strategy

2.1 National Strategy for Green Growth

- **10 policy directions to achieve 3 objectives**
  - The National Strategy is divided into ten specific policy directions to achieve three objectives.
  - STEPI played a leading role in making strategy for “Green Technology Development”.

<table>
<thead>
<tr>
<th>Adaptation to climate change &amp; energy independence</th>
<th>Creating new engines for economic growth</th>
<th>Improvement in quality of life</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Effective mitigation of greenhouse gas emissions</td>
<td>4. Development of green technologies</td>
<td>8. Greening the land, water and building the green transportation infrastructure</td>
</tr>
<tr>
<td>2. Reduction of the use of fossil fuels and the enhancement of energy independence</td>
<td>5. The “greening” of existing industries and promotion of new industries</td>
<td>9. Bringing green revolution into our daily lives</td>
</tr>
<tr>
<td>3. Strengthening the capacity to adapt to climate change</td>
<td>6. Advancement of industrial structure</td>
<td>10. Becoming a role-model for the international community as a green growth leader</td>
</tr>
<tr>
<td>7. Engineering a structural basis for the green economy</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Vision of New Growth Engine Projects

- **Vision**
  - Attaining high quality economic growth with sufficient job creation

- **Establishing the base for Low- carbon Green Growth**
- **Advancing industrial structure based on tech. innovation**
- **Creating high quality jobs**

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2. Green Growth Strategy

2.1 National Strategy for Green Growth

- **Vision of New Growth Engine Projects**
  
  *Korea’s green growth strategy is to develop green technology as a vehicle to not only environmental sustainability but also long-term industrial growth as well as short-term economic recovery.…*

- **Actions in addition to GT development are being taken…**
  
  - Introduction of environment-friendly tax system
  - Establishment of an information system to monitor and report on greenhouse gas emission and energy consumption…
  - Introduction of “Cap-and-Trade” system for CO2
  - Green Growth Committee chaired by the Prime Minister to oversee…

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2. Green Growth Strategy

2.1 National Strategy for Green Growth

- **What Korea aims to achieve by 2030**
  
  - Secure energy independence and reduce GHG

<table>
<thead>
<tr>
<th></th>
<th>From (2006)</th>
<th>To (2030)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy independence</td>
<td>3.2%</td>
<td>40.0%</td>
</tr>
<tr>
<td>Share of renewable energy</td>
<td>2.2%</td>
<td>11.0%</td>
</tr>
<tr>
<td>Petroleum dependence</td>
<td>43.6%</td>
<td>33.0%</td>
</tr>
<tr>
<td>Energy-poor population</td>
<td>7.8%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

- Develop GT as new growth engine: G Economy
- Restructure transportation, urban, and land system to be suitable for green culture
- Low-carbon life style
- Green education: diffusion of green culture
3. STP Policy for New Growth Engines & Job Creation

3.1 S&T Policy for New Growth Engines

- **Necessity for new growth engines**
  - Creating new growth engines becomes urgent because of continuous decrease of growth potential in Korean economy
    - continuous decrease of growth rate since 1990s
    - decrease of productive population due to low birth rate and aging
    - weakening of capital formation in the economy

![GDP growth rate and rate of productive population increase](chart)

- **Criteria for selecting new growth engines**
  - Set 「Marketability」 and 「Implications」 as major criteria and utilize 「relation to green growth」 as sub standard

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marketability</td>
<td>Take into account not only the current market size but also market potential</td>
</tr>
<tr>
<td>Implication</td>
<td>Take into possible ripple effects, convergence feasibility and job creation</td>
</tr>
<tr>
<td>Relation to green growth</td>
<td>Take into account a new green growth-based vision for economic growth</td>
</tr>
</tbody>
</table>
3. STP Policy for New Growth Engines & Job Creation

3.1 S&T Policy for New Growth Engines

- **Criteria for selecting new growth engines**
  - Improve effectiveness and pursue systematically by establishing appropriate strategy depending on market maturity such as short-term, mid-term and long-term

<table>
<thead>
<tr>
<th>Short term (3-5 years growth engines)</th>
<th>Mid term (5-8 years growth engines)</th>
<th>Long term (10 years growth engines)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- areas with high potential to create high value added in a short-term based on full market maturity.</td>
<td>- areas with high potential to create new market based on technology capability such as source technology</td>
<td>- areas whose market is in its initial stage but there is a huge potential.</td>
</tr>
<tr>
<td>- areas with high potential to create jobs</td>
<td>- areas with high potential to create new business model through convergence</td>
<td>- areas that can become future’s driving force for green growth through securing source technology</td>
</tr>
</tbody>
</table>

3.2 S&T Policy for Job Creation

- **Growth without employment**
  - Sticking to Growth without employment
    - During 2000s, employment rate has been fixed at around 59%
    - Natural unemployment rate has been increased to 3% or more
  - Severe youth unemployment rate
    - Youth unemployment rate is getting worse than average rate

*Data: Statistics Korea, www.kostat.go.kr*
3. STP Policy for New Growth Engines & Job Creation

3.2 S&T Policy for Job Creation

- **Job creation effect of R&D investment**
  - Job creation effect of R&D investment is different among industries in Korea
  - High tech. industries such as computer, electronic parts, communication equipments, etc. has highest effects.
  - However, low-medium tech or low tech industries such as food, textile, etc. has a negative job creation effects.

![Graph showing job creation effect of R&D investment](image)

- **Expected job creation effect of R&D**
  - Estimated job creation effect of R&D investment
  - If overall R&D intensity of Korea increases up to 5% and growth rate sustains at about 5%, 280 thousand jobs are estimated to be created annually by R&D investment (STEPHI(2009))

![Graph showing expected job creation](image)
3. STP Policy for New Growth Engines & Job Creation

3.2 S&T Policy for Job Creation

- Expected Benefits of Green Growth
  - Production / value addition / job creation
  - As the overall infrastructure for green growth improve and expands, various spillover effects are expected to occur:
    - The production inducement is estimated at 182 to 206 trillion KRW over the next five years.
    - The value-added effect is estimated at 75 to 95 trillion KRW over the next five years.
    - The number of jobs created is estimated at 1.56 to 1.81 million.

<table>
<thead>
<tr>
<th>Key category</th>
<th>Inducement of Production (trillion KRW)</th>
<th>Inducement of Value Addition (trillion KRW)</th>
<th>Inducement of Job Creation (10,000 jobs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario 1</td>
<td>Total</td>
<td>181.7</td>
<td>75.0</td>
</tr>
<tr>
<td></td>
<td>Annual Average</td>
<td>36.3</td>
<td>15.0</td>
</tr>
<tr>
<td>Scenario 2</td>
<td>Total</td>
<td>206.0</td>
<td>94.9</td>
</tr>
<tr>
<td></td>
<td>Annual Average</td>
<td>41.2</td>
<td>19.0</td>
</tr>
</tbody>
</table>

Source: Presidential Commission on Green Growth

4. Closing

In need of global cooperation

- Conceptualization of ‘Green Growth’
  - vs. sustainable growth

- For green/sustainable growth, global S&T cooperation is needed.
  - OECD project on Global S&T cooperation governance
  - Korea-China-Japan Leaders Initiative (’10.5, Jeju Island)

- For strong, balanced growth
  - Not just regulation and reform in financial market
  - But growth in real terms is in need
  - At the KBE, knowledge/S&T-based growth, knowledge-sharing-based growth is needed
4. Closing

In need of global cooperation

Global Challenges
- Financial Crisis
- Climate Change
- Energy Depletion

Domestic Challenges
- Hosting G20 Seoul Summit
- Member of OECD/DAC
- In need of new growth engines & job creation

Korea pursue policy for
- Green Growth
- New Growth Engines
- Job Creation

In need of global cooperation
- Conceptualization of 'Green Growth'
- For green growth: global S&T cooperation governance
- For strong & balanced growth: knowledge-based, knowledge-sharing

Thank you!!