

『Low Carbon – Green Growth』

3R Policy of Korea

October 2010

순서

I. Why Green Growth?

II. Green Growth and 3R Policy

III. Key 3R Policies

IV. Future Direction

I. Why green Growth? – Global Challenge



Environmental Crisis

Minable Reserves of Natural Resources (Petroleum: 40Y, Natural gas: 58Y, Copper: 28Y)

1/3 reduction in fresh water supply per capita in 25 years

5-20% decline in global GDP per annum with the existing industrial structure (likely to cause the 2nd Great Depression)

50% increase in global energy consumption by 2030

Shortage of agricultural water

Exhaustion of Natural Resources

Water Shortage Problem

Increasing GHG emissions

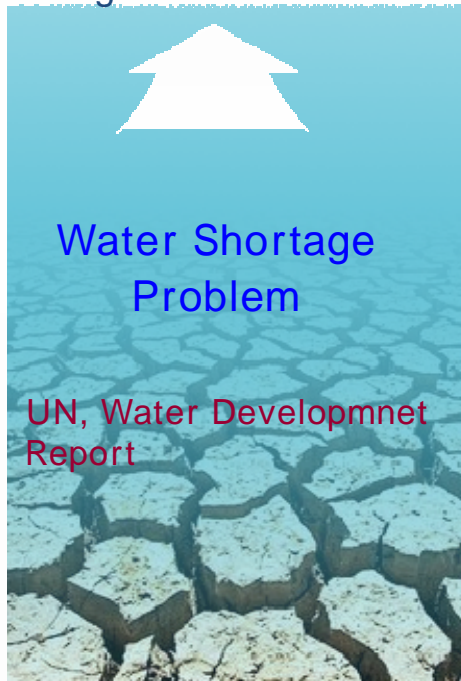
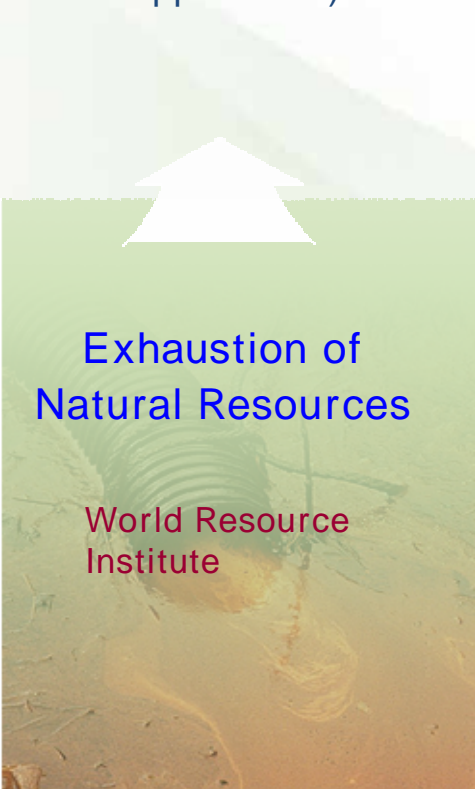
Increase of Energy Consumption

World Resource Institute

UN, Water Development Report

Stern Review

IEA

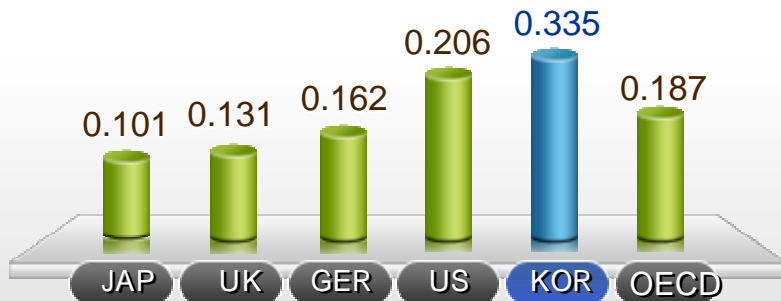


I. Why green Growth? – Domestic Challenge



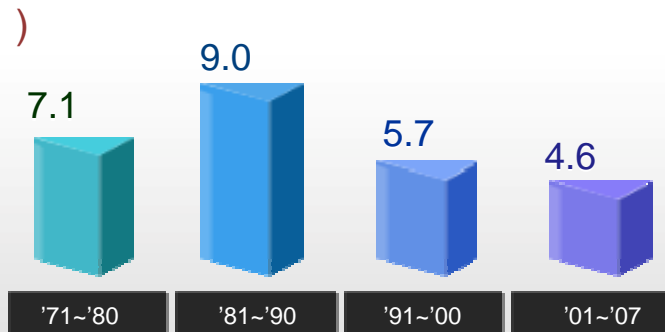
Low Energy Efficiency

* unit of energy source: mil TOE/ 1thou dollars, as of 07, IEA

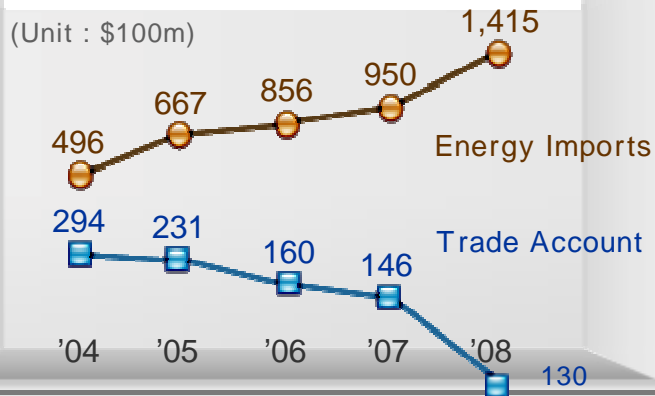


Slow Economic Growth

* GDP Growth(%)



97% dependency on energy imports, 83% among which are fossil fuels (unit: \$100m)



Declining Employment



I. Why green Growth?

Internal and External Conditions

Environmental crisis
Getting worse due to climate change

Imbalance b/w energy supply and
demand and resource crisis

Continuous increase in energy demand
and rising dependence on energy imports

Increased emissions resulting
from fossil fuel-centered economy

Slowing economic growth
And weakening growth momentum

“Green Growth is not a choice, but a must..”

International Community...

*Fierce competition for gaining the upper
hand in green markets*



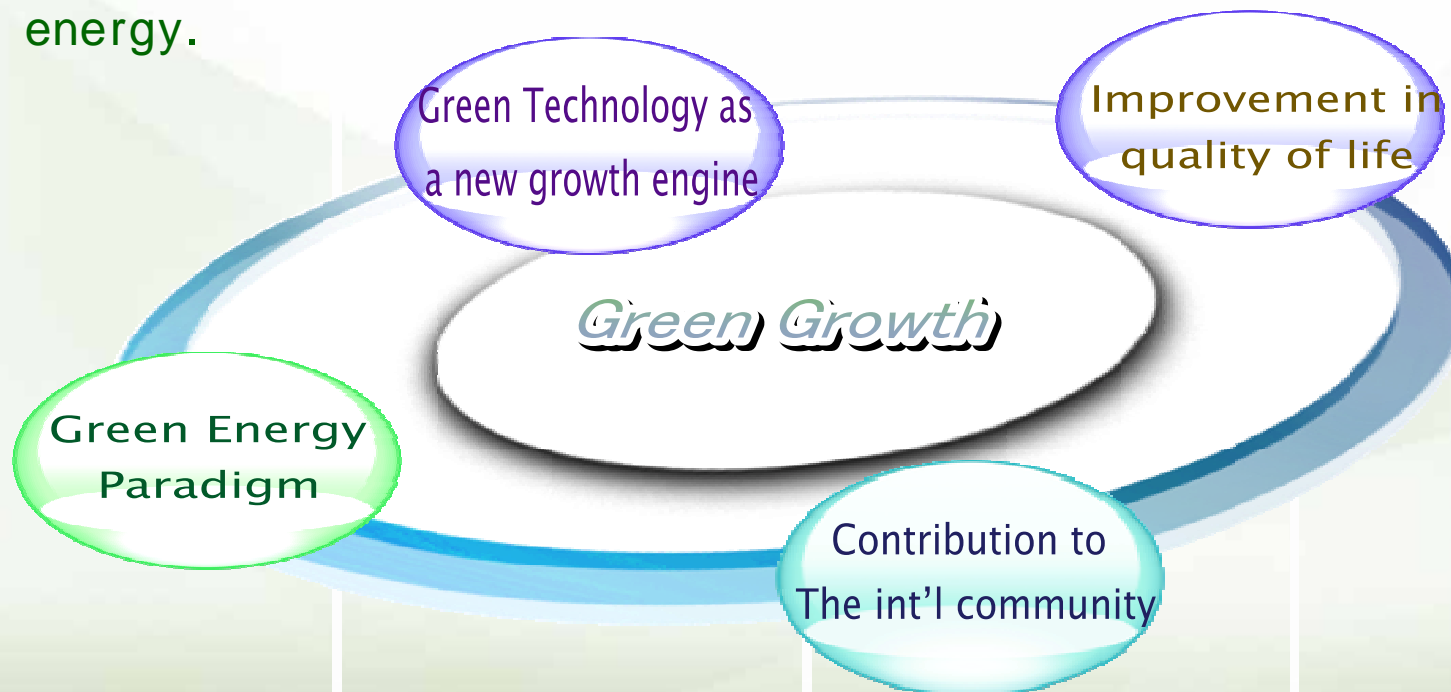
Korea...

*Need to address environmental /resource
crises and to create new growth engines*

I. Why green Growth?

Presidential Speech(15 Aug. 2008)

- “Green Growth” is sustainable growth that reduces GHG emissions and environmental pollution, serving as a new national development paradigm that creates new growth engines and new jobs with green technology and clean energy.



I. Why green Growth?



Roadmap to Green Growth

VISION

Top 7 Green Nation by 2020,
Top 5 Green Nation by 2050

3 STRATEGIES & AGENDAS

Low-carbon Society /Energy Security

- 1 Effective GHG Mitigation
- 2 Reduced use of fossil fuel & improved energy security
- 3 Capacity building for climate change adaptation

New Engine for Growth

- 4 green tech development
- 5 Greening of existing industries
- 6 Advancement of Industrial structure
- 7 Establishment of the Foundation for green economy

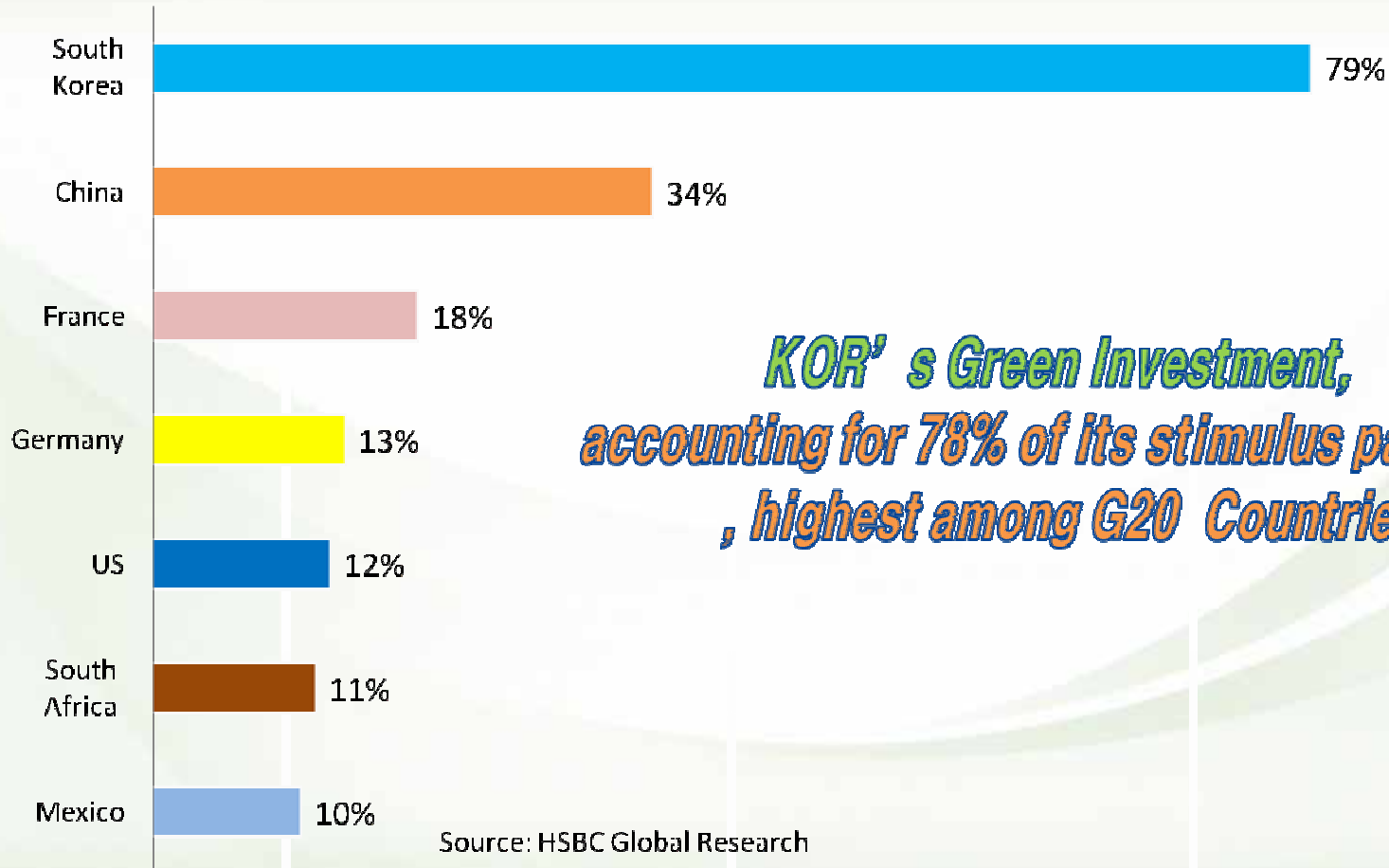
Enhanced Quality of Life & Int'l Leadership

- 8 Green transportation & Green land use
- 9 Green lifestyle
- 10 Green global leadership

I. Why green Growth?



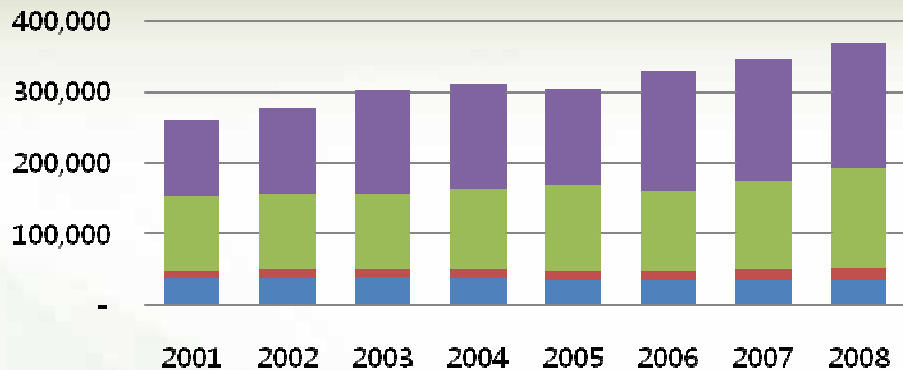
Green Stimulus Ranking as % of Total Stimulus of August 2009
(UNEP GGND Update to the G20 - September 2009)



II. Green Growth & 3R Policy



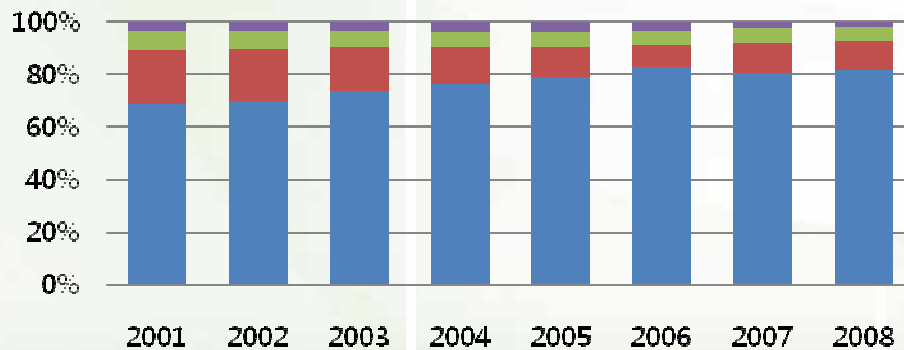
Waste Generation(ton/day)



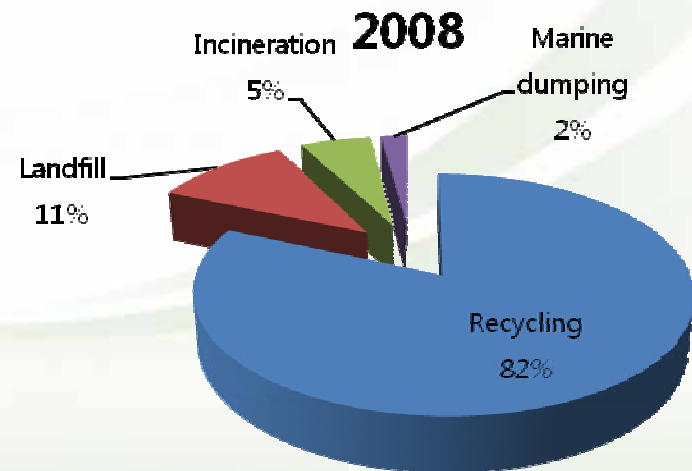
As of 2008, KOR's waste volume was 370 thousand ton/day since 2001, it has been gradually increasing, but the ratio of recycling has been on the gradual rise, too.

■ Municipal Waste ■ Food Waste ■ Industrial Waste ■ Construction Waste

Waste Disposal



■ Recycling ■ Landfill ■ Incineration ■ Marine Dumping



Waste and Green Growth

● Waste : (Before) used to be simply abhorred (Now & After) regarded as



**Continued increased
Because of rising
population & economic
growth**



**Waste generation as
of 2008 is about 370K
ton/day**

Gradual increase

Safe disposal
(Incineration, Landfill,
Marine dumping)



GHG emissions
(2.6%)

- * Energy 84.3%
- * Industry 10.6%
- * Agriculture 2.5%



■ WtE – new growth engines &
creation of new jobs



- Substitute raw
materials and fossil fuels
- Contribute to GHG
emissions
reduction

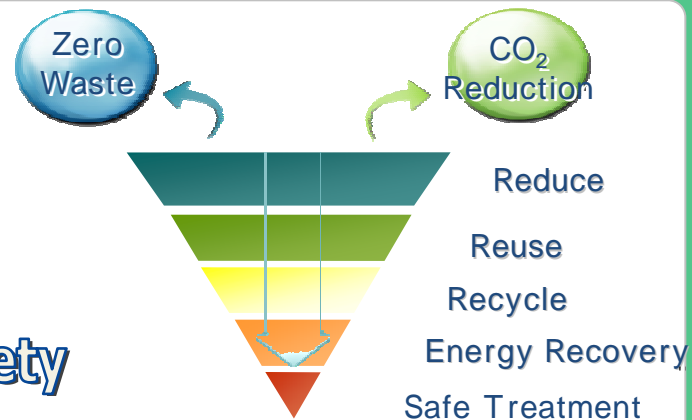
II. Green Growth & 3R Policy



4R Policy & 4E Goal

- Reduce Reuse Recycle Recovery
- CO2 emission reduction and 'Zero Waste' by converting 3R to 4R

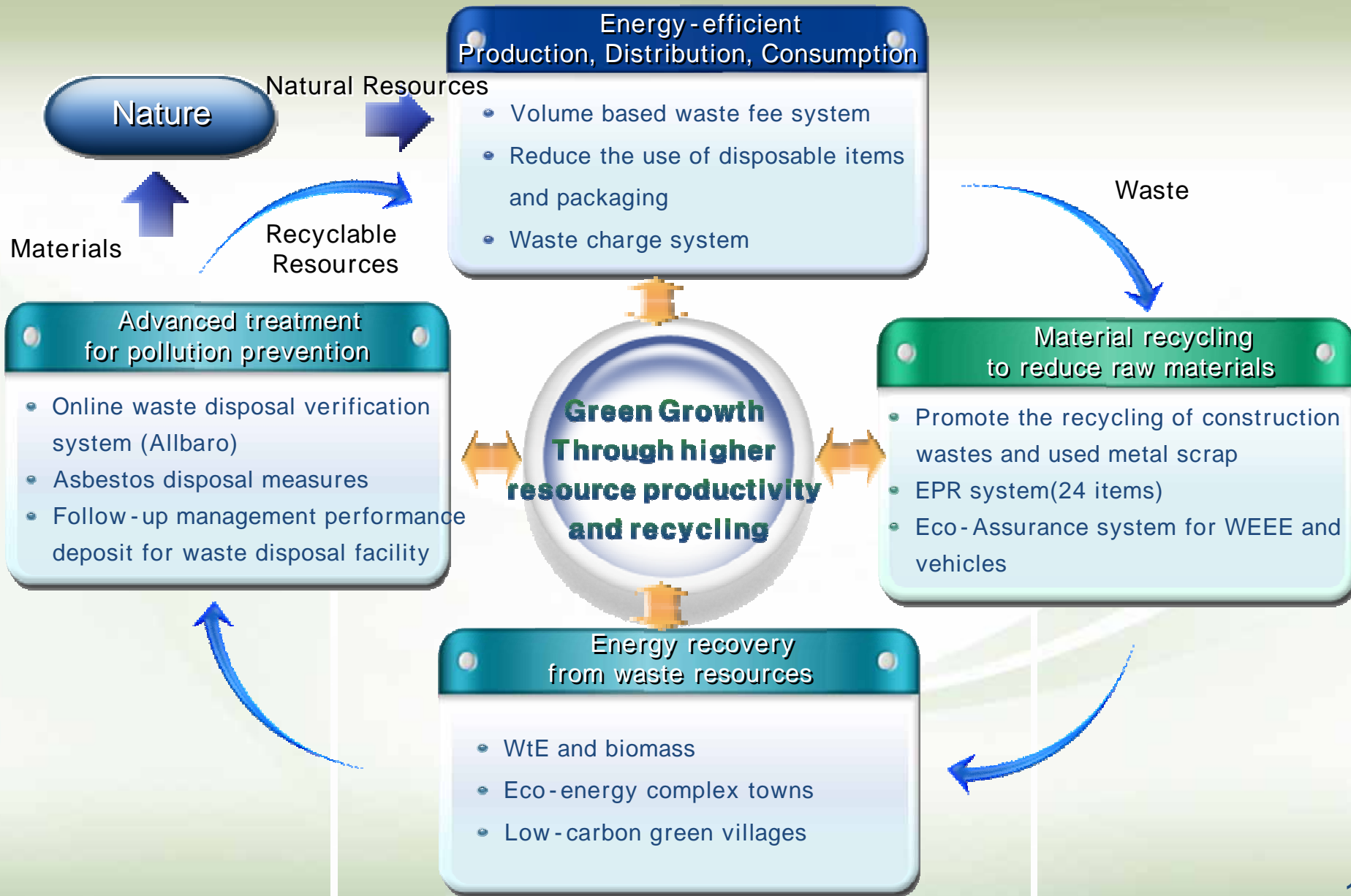
➔ **Resource Recirculation Society**



- A new paradigm covering energy and employment along with economy and the environment



III. Key 3R Policies – Policy Framework



Policy Volume Based Waste Fee System

Fee system for MSW since 1995

- Impose disposal cost in proportion to the quantity of discharged waste
 - The sales of standard plastic garbage bags are used for collection/disposal costs
- ➔ MSW is reduced 26%, Recyclable waste collected is doubled from 1994 to 2007

Fee system for food waste from 2011



- The shift of policy focus: food waste treatment ➔ food waste reduction
- Chip, Sticker, RFID are attached to collection bins and fees are charged in proportion to the waste volume or collection frequency

Policy 2 Reduction and Recycling of Packaging and Plastic Waste

● Regulate packaging material & methods

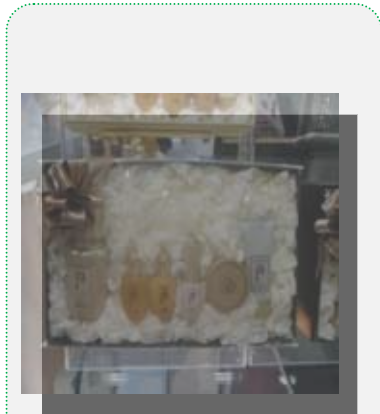
- Packaging should account for 10~35% of the total space and be limited to less than twice
- Manufacturer, importer, sailor of 23 items(Processed food, etc.)
- PVC packaging is banned
- Compulsory reduction for plastic packaging in order of year

● Restriction on **disposable products**

- Ban on the use and free distribution of 18 item in 120 business sites including disposable cups, plates, containers, bags, etc.

● **Waste charge system on plastic products**

- Collected about \$ 500 million(1992~2009)
- **Voluntary agreement** with MoE on the recycling of 18 items
PE pipe, PVC pipe, agricultural film, electrical wire, etc.
- 100K recycled, \$ 80M economic effect, and 111K CO₂ reduction(2009)



Policy 3 Construction Waste Recycling

● Construction Waste Recycling Promotion Act(2005)

- Construction waste: 6.4M ton/yr generated, 55% of the total industrial waste
- 98% recycled as aggregates
- Promotion to produce and use quality recycled aggregates
- Possible to substitute 20% of raw aggregates by 2020



● Expand the obligatory use of recycled aggregates to other construction projects

- Walk block, industrial complex, distribution complex, etc.
- **Compulsory use of recycled Ascon(Jun. 2010)**
 - Limited its application to GR(Good Recycling) and environmental Mark certified Ascon products and SOC projects (road, parking area, sewage conduit, etc.)

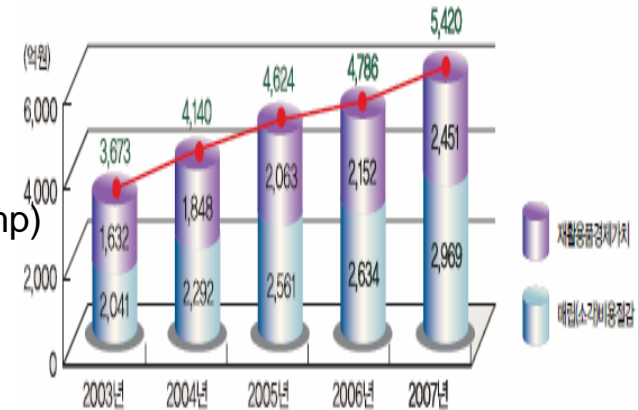


Policy 4 Extended Product Responsibility(EPR)

● **Initiated in 2000 and enforced in 2003**

● **Achievements**

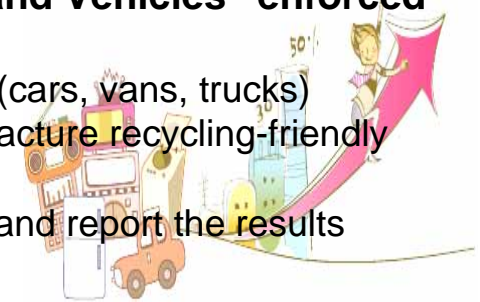
- (Items) Packaging(Paper, Glass, Iron, Aluminum, Plastic) and Products(Battery, Tire, Lubricating oil, Fluorescent lamp)
- (Outcome) 9,356K ton recycled(2001~2008)
- (Recycling Rate) about 46% increase
- (Economic benefit) about USD 3 billion



Policy 5 Eco - Assurance System

● **“Act on the Recycling of Electrical and Electric Equipment and Vehicles” enforced as of Jan. 2008**

- (Items) Electronic Products(Refrigerator, Washer, TV, etc.), Vehicles(cars, vans, trucks)
- (Manufacturing stage) restrict the use of hazardous materials, manufacture recycling-friendly products and provide recycling information
- (Disposal state) comply with the recycling target ratios and methods and report the results
Recycling result as of 2008 : 2.3kg/capita(WEEE), 82.5%(vehicle)



Policy 6 Reinforce the measures for metal scrap recycling

Promote the recycling of metal scrap

Collection System

- Regular collection and campaign for scrap cell phones
- Collection council among the central and local governments (Mar.2010)



Improvement of recycling system

- Expand the coverage of EPR & increase mandatory recycling target
- Treat scrap vehicles in an efficient manner



Technological development

- Roadmap for recycling technology development (June 2010)
- Coordination with the globally-renowned businesses and R&D activities



Support for relevant industry

- Increase loans for scrap metal recycling industry (\$ 8M)
- Continuously increase local government-run recycling selection facilities

Recycling TV Cathode-ray Tubes

- **Voluntary agreement with manufactures and recyclers(Mar.2010)**
 - Set recycling rate, develop glass recycling tech. and improve efficiency of scrap TV sets collection (The end of analogue broadcasting in '12 will result in a huge number of scrap TV sets)



Policy 7 Local-based Resource Recirculation Specialized Complex (RRSC)

RRSC establishment

- Establish demand-supply system of waste resources in local communities
- RRSC Plan from 2010 to 2013
 - (Dang-yang City) Cooperation with cement industry, garlic farmers and livestock breeders by 2013
 - (Jeon-ju City) Establishment of RRSC of scrap home appliances by 2012
- Set up the national master plan for RRSC(2010)



Building Infrastructure for recirculation of waste resources

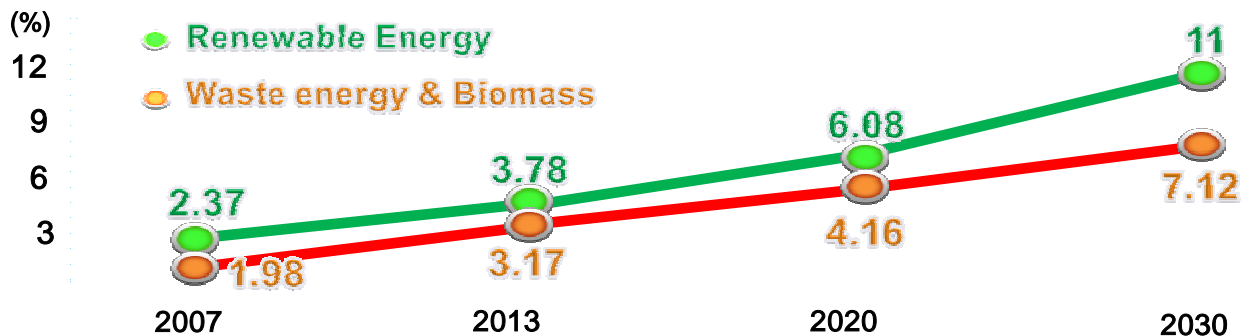
- Establish the waste resource recirculation information system by 2012
- Launch local-based RR support centers (2011, Jeon-ju City)

Policy & WtE and Biomass

About WtE

- Convert combustible waste(paper, vinyl, plastic, wood, etc.), organic waste(food, sewage sludge, etc.), remaining heat f/r incineration, landfill gas, etc. to energy
- Create energy from waste source & bring immediate outcome at low cost (Production cost – 10% of solar PV, 66% of wind power)
- Reasonable tool for fossil fuel substitution & GHG emissions reduction (GWP of methane is 21 times that of CO₂)

National Target for Renewable Energy Use



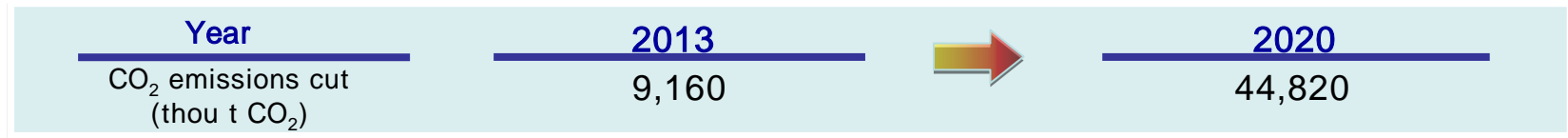
Policy & WtE and Biomass

Expected Effects

● Energy production from WtE and biomass

- Substitute 820M barrel of crude oil by 2020

● GHG emissions reduction effect

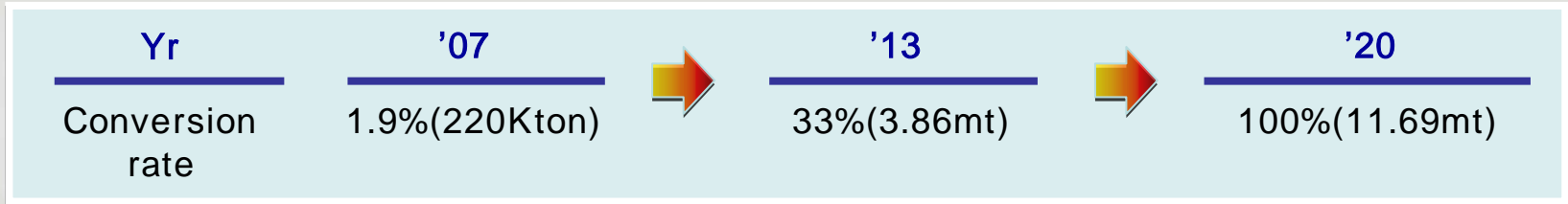


● Green job creation effect



1 Expanding WtE facilities

- Convert 33% of available waste source to energy by 2013 and 100% by 2020



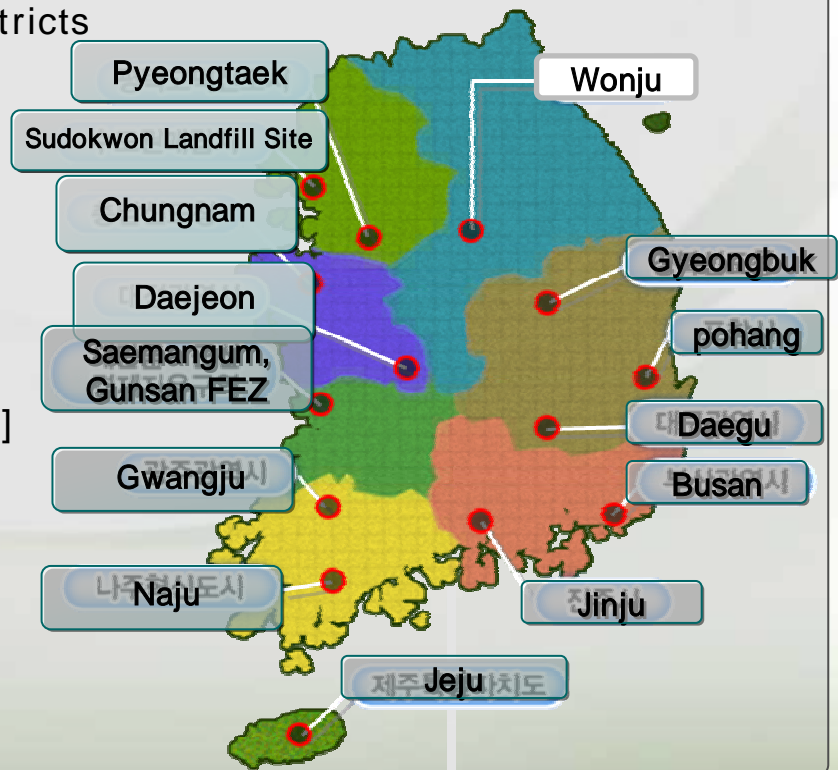
- Create 14 clean energy towns in 8 regional districts

* Remove redundancy & inefficiency in local governments & establish regional WtE hubs, thereby gaining economies of scale'

* What used to be NIMPY becoming PIMFY by utilizing existing landfill areas

- Build a total of 48 facilities (total 14thou t/day] by 2013(RDF+Bio-gas)

- 17 recovery facilities for remaining heat from incineration 25 landfill gas recovery facilities



2 Clean Energy Parks in the metropolitan area as a global brand

- Establish 4 Parks under the themes of waste resource, forces of nature, biomass & environment· culture
 - ➔ With WtE process which streamlines the establishment and operation of landfill facilities , 50% or more can be saved

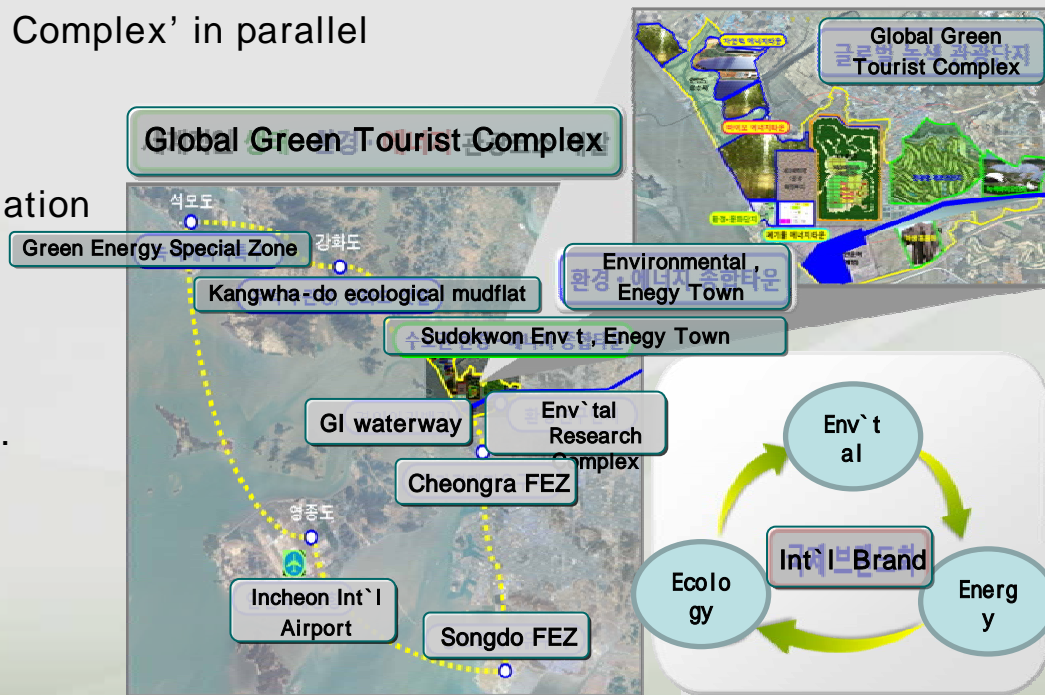
- Grow the towns as a globally renowned green areas

* Establish 'Global Green Tourist Complex' in parallel with Clean Energy Park

* Develop global, environmental & energy tourist spots in association with Kangwha-do

'ecological' mudflat

➔ Attract 9.44m tourists (aprx. 470thou foreign visitors) & make 165.8b profits



Sudokwon Eco-Energy Complex Town



- ➔ Project period : Mar, 2004 ~ Dec. 2006
- ➔ Production : 363,259MWh(2009)
- ➔ World No.1 CDM Project

“GHG Reduction Effect”

- 7 million ton CO₂ (2007~2017)



“Oil Substitution Effect”

- 530 thousand barrels ('09)



(50MW Power Plant in Sudokwon Landfill)



“Economic Benefits”

- USD 123 million(2007~2017)



3 Develop WtE technologies & nurture professionals

Support R&D for securing globally advanced technologies

- Lay the foundation for domestic demand through systematic and comprehensive technological development and enter neighboring countries' markets

Nurture professional talent with practical skills

- Establish clean energy professional grad schools & continuously produce professional talent partnering with industries

Recent Trends

- **(Local)** Require an integrated policy approach in order to expand the green growth paradigm to resource recirculation
- **(International)** Raise the resource recirculation ratio through establishing the pan-governmental mid- and long-term resource recirculation plan
 - OECD Secretariat required the member countries to carry out MFA, taking into account resource recirculation as an environmental performance assessment standard(May, 2005)
 - (Ex) Japan : master plan on building circular society, U.K : Mass Balanced analysis, Germany : Integrated environmental account

Direction

- Integrate the diverse local resource recirculation plans, develop the new index for improving resource recirculation, set the proper target(ex: recycling rate resource productivity or resource recirculation rate), and formulating the mid- and long-term policy direction and vision
 - Act on the Promotion of Saving and Recycling of Resources (amended in Mar.,2009)

Direction for master plan on national resource recirculation

Set new targets

Resources productivity
Resources recirculation ratio
Reduction of ultimate disposal

Impose sector-specific roles and tasks

Establish sector-specific roles and tasks
Sector-specific policy task at the stage of production, transaction, consumption, and disposal

Implementation and assessment

Reduce the ultimate volume of disposal and set recycling goals for individual industry and product
Create yearly implementation plans, execute and evaluate the achievements

Future Plan

● Discussion on each task via forum(2010)

- (Topic) the influence of master plan on resource recirculation and correlation to the relevant plans
- Developing the new index for improving resource recirculation
- Optimizing measures on the investment in national waste treatment facilities
- Maintaining the proper level of material recycling and waste to energy

Waste Management is a shortcut to Green Growth

Not the one you go, if you choose
But the one you must go
And we've already embarked on the journey

Crossing the Chasm
Bringing about the change
Opening all the possibilities

Whether to take smart action faster than others
Will decide the winner