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*NRE: New and Renewable Energy
The Status of New and Renewable Energy in Korea
1. The Status of New and Renewable Energy

- NRE Share in TPES: 3.18% (2012)
  - TPES(278,698,000TOE) vs. NRE Supply(8,851,000 TOE)

- NRE supply has been increased by annual average of 9.6% (2007-2012)
  (while annual average of TPES growth is 3.3%)

**NRE Share in TPES**

**NRE Supply by Sources**

**RE : 8 Sources**
- PV, Solar Thermal, Wind, Waste, Bio(LFG, Bio-Fuels), Hydro, Geothermal, Marine

**New Energy : 3 Sources**
- Fuel-cell, Hydrogen, Coal Liquefaction or Gasification
2. The Status of NRE Industry

- Rapid growth of NRE Industry
  - Compared to 2007, the number of manufacturers was **doubled** in 2012
    \[100(’07) \rightarrow 200(’12)\]
  - The revenue size was **increased by 5.3 times** (2007→2012)

- Despite of the global economic crisis, steady growth of the industry achieved 6.4 billion dollars of revenue in 2012

* Manufacturers based on 6 Sources (PV, Wind, Bio, Fuel Cell, Solar Thermal, Geothermal)
Main Policies and Strategies in New and Renewable Energy
### 3. Main Policies and Strategies in NRE

- **Budget for 2014 NRE Deployment and Infrastructure**: 562.2 million USD
  - (Deployment: 553.5 million USD; Infrastructure: 8.7 million USD)

<table>
<thead>
<tr>
<th>Function</th>
<th>Object</th>
<th>Method</th>
<th>Program</th>
<th>2014 Budget (Unit: 1 million USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NRE Deployment Program</strong></td>
<td><strong>Private Sector</strong></td>
<td>Subsidy</td>
<td>Home Subsidy Program (1 Mil. Homes)</td>
<td>54.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Building Subsidy Program</td>
<td>22.5</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Feed-in-Tariffs (FIT)</td>
<td>336</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Overseas Business Support</td>
<td>4.5</td>
</tr>
<tr>
<td></td>
<td><strong>Public Sector</strong></td>
<td>Loan</td>
<td>Financial Support Program</td>
<td>103.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mandatory</td>
<td>Renewable Portfolio Standard (RPS)</td>
<td>0.2</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Regional Deployment Program</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Combined Support Program</td>
<td>10</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Establishment of NRE Test-bed</td>
<td>1</td>
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<tr>
<td></td>
<td></td>
<td>Mandatory</td>
<td>NRE Mandatory Use for Public Buildings</td>
<td>-</td>
</tr>
<tr>
<td><strong>Infrastructure-building Program</strong></td>
<td><strong>Private &amp; Public Sector</strong></td>
<td>-</td>
<td>Certification, Standardization, and International Cooperation</td>
<td>3.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>R&amp;D(Policy and Regulation)</td>
<td>5.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total</td>
<td>562.2</td>
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</tbody>
</table>
4. 2\textsuperscript{nd} Energy Basic Plan

2\textsuperscript{nd} Energy Basic Plan (2014)

- Goal of Supply 11\% from New & Renewable Energy Sources by 2035
- 4\textsuperscript{th} New & Renewable Energy Basic Plan will be announced in 2014

Target for NRE Production Share(\%)

- Waste and Hydro will be decreased / PV, Wind, Geothermal, Solar thermal will be increased

<table>
<thead>
<tr>
<th>NRE Sources</th>
<th>Waste</th>
<th>Hydro</th>
<th>Bio</th>
<th>PV</th>
<th>Wind</th>
<th>Geothermal</th>
<th>Solar-thermal</th>
<th>Marine</th>
<th>Total(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>47.3</td>
<td>6.3</td>
<td>17.6</td>
<td>11.1</td>
<td>11.3</td>
<td>2.5</td>
<td>1.4</td>
<td>2.4</td>
<td>100</td>
</tr>
<tr>
<td>2025</td>
<td>40.2</td>
<td>4.3</td>
<td>19.6</td>
<td>13.3</td>
<td>12.5</td>
<td>4.6</td>
<td>3.9</td>
<td>1.6</td>
<td>100</td>
</tr>
<tr>
<td>2035</td>
<td>29.2</td>
<td>2.9</td>
<td>17.9</td>
<td>14.1</td>
<td>18.2</td>
<td>8.5</td>
<td>7.9</td>
<td>1.3</td>
<td>100</td>
</tr>
</tbody>
</table>
5. Future Policy Plan

**Integrated Market**

- **RPS (Electricity)** (2012)
- **RHO (Heat)** (2016)
- **RFS (Transport)** (2015)

**RPS (Renewable Portfolio Standard)**
- Enforces 14 power producers to supply a certain amount of the total power generation by NRE

**RHO (Renewable Heat Obligation)**
- Obligate new buildings to provide a fixed ratio of the heat energy from NRE (will be implemented in 2016)

**RFS (Renewable Fuel Standard)**
- Obligate fuel providers to apply a certain rate of renewable energy in fuel (will be implemented in 2015)

**Goal of Supply 11% from NRE Sources by 2035**

- Mutual Transaction of Certificates
- Reinforced Policy
Biodiesel in Korea
The total primary energy supply of oil in transportation sector continuously increases.
7. RFS-Expanding NRE Deployment

Target

- The 3rd NRE Basic Plan (2008.12) [The 4th NRE Basic Plan to be announced in 2014]

Prospect of NRE deployment in transportation

- Biogas: 2.0 times increase
- Ethanol: 3.9 times increase
- Bio Diesel: 4.4% increase

Prospect of NRE share in transportation sector

- Transportation: 7%
- NRE Total: 90%

(Except Transportation)

- Transportation: 10%
- NRE Total: 87%

(Except Transportation)
The share of NRE utilized in transportation out of total NRE: 4% (2012)
The share of energy utilized in transportation sector out of TPES: 17% (2012)
9. Summary of Biodiesel Deployment Progress

**Voluntary Mix**
- Induced voluntary usage of biodiesel by setting the mixing ratio of fuel-biodiesel and offering tax exemption incentive (tax credit) in 2007
  - Mixing Ratio(%) : ('07)0.5 → ('08)1.0 → ('09)1.5 → ('10)2.0 → ('11)2.0

**Fuel-Biodiesel Mix Mandatory**
- Enforcing BD2 Mix Mandatory from 2012 (extermination of tax credit)
  - * Amending “Notification of oil product quality standard and testing fees” (12.30.2011)

**Legislation and Amendment**
- Amend the law including implementation of RFS system
  - (proclaimed in 30 July 2013, will be enforced in 31 July 2015)
10. Current Status of BD Deployment

- BD Producing Companies (15), Total Capacity (1.2 Million kℓ) by 2013
- Sales to oil refinery companies
  - 9 companies, Produced 0.52 Mil. kℓ, Domestic Sales 0.39 Mil. kℓ

![Graph showing the number of BD Producing Companies and the number of Whole BD Companies from 2009 to 2012.](chart.png)
11. Current Status of BD Deployment

**Supply**

- **0.11 Mil. kℓ (2007)** → **0.28 Mil. kℓ (2009)** → **0.389 Mil. kℓ (2011)** → **0.393 Mil. kℓ (2013)**

  *Domestic Supply*

(Unit: kℓ)

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>BD20</td>
<td>345</td>
<td>326</td>
<td>158</td>
<td>150</td>
</tr>
<tr>
<td>BD2~5</td>
<td>394,836</td>
<td>388,913</td>
<td>397,697</td>
<td>393,000</td>
</tr>
<tr>
<td>Domestic</td>
<td>395,181</td>
<td>389,239</td>
<td>397,855</td>
<td>393,150</td>
</tr>
<tr>
<td>Export</td>
<td>-</td>
<td>27,281</td>
<td>54,457</td>
<td>129,000</td>
</tr>
<tr>
<td>Total</td>
<td>395,181</td>
<td>416,520</td>
<td>452,312</td>
<td>522,150</td>
</tr>
</tbody>
</table>

*Ref: Korea Bio-energy Association*
### 12. RFS Process (Tentative)

<table>
<thead>
<tr>
<th>Process</th>
<th>Details</th>
</tr>
</thead>
</table>
| **Selecting Obligation body & Set Up Ratio of Mixing** | [Government Agency] Selecting Obligation body & Set up Amount  
[Government] Announcing Obligator & Mixing Ratio |
| **Implementation of Duty**     | [Obligator] Implementation of Duty(Mixing Ratio) |
| **Evaluation**                 | [Government Agency] Verification Performance Using Data from Obligators’ Report, KNOC etc and Physical Inspection |
| **Penalty**                    | [Government Agency] Penalty Assessment  
[Government] Decision of Imposing a Fine  
[Obligators] Submit Explanatory Materials or Paying a Fine |
Status Update of RPS
13. Renewable Portfolio Standard (RPS)

Overview
Enforces 14 power producers to supply certain amount of the total Power generation by NRE (Implemented in 2012)
※ Obligators: power producers with capacity of 500MW or above

Goal and Current Status
Goal: ('12) 2.0% → ('13) 2.5% → ('14) 3.0% → ('17) 5.0% → ('20) 8.0% → ('22~) 10.0%
Current Status: RPS achieved 1.7 times of total FIT installed capacity (proceeded for 10 years) in 2 years

<table>
<thead>
<tr>
<th>RPS ('12~'13)</th>
<th>FIT ('02~'11)</th>
<th>Rate of change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,751MW (Solar PV 589MW)</td>
<td>1,030MW (Solar PV 497MW)</td>
<td>170.0%↑ (Solar PV 118.5% ↑)</td>
</tr>
</tbody>
</table>

Best Practice
Converting rooftop of the factory and parking lot into Solar PV Power Plant (Busan) (2013)
The largest Solar PV Plant for the single factory utilized existing facilities in the world (20MW, Renault Samsung Motors)
Generated electricity (26GWh/yr.) provides 7,300 households
*Ave. usage rate 15%, 1 household uses 300kWh/month*
Thank You