Role of circular economy in achieving Sustainable Development Goals (SDGs): A Case Study of China

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2. The process of transfer to circular economy
3. Circular economy in achieving SDGs in China
4. Challenges in the development of circular economy
5. Suggestion on the promotion of Circular economy
1. Background

From 1978, China's economy has a rapid growth, in recent years, the GDP growth rate gradually slow down.

- Intensive economic growth mode
- Un-sustainable development mode
- Resource consumption at high level, and damaged the ecological environment

The linear “take-make-consume-dispose” economic model
## 1. Background

<table>
<thead>
<tr>
<th>Resource Scarcity</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Metal resource per capita lower than world average level: ferrous ore 17%, copper ore 17%, alumina 11%, oil 11%, nature gas 4.5%</td>
</tr>
<tr>
<td>• external dependency: 70% copper, 58% iron, 50 alumina, 35% lead, 13% zinc rely on import</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental Pollution</th>
</tr>
</thead>
<tbody>
<tr>
<td>• In 2010, raw metal relative industry generated <strong>1.8 billion industry solid waste</strong>, and discharge <strong>2.73 million tons SO₂</strong></td>
</tr>
<tr>
<td>• product waste cause the environment pollution and risk by the un-regular treatment</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>High carbon emission</th>
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</thead>
<tbody>
<tr>
<td>• <strong>coal-smoke pollution</strong> - 85% of SO₂, NOₓ, CO₂ emissions and 70% of dust come from coal</td>
</tr>
<tr>
<td>• Total GHGs emissions in China has ranked first in the world since 2007.</td>
</tr>
<tr>
<td>• In 2012, the primary consumption proportion of raw coal and crude in China was 86%, compare to world average 63%</td>
</tr>
</tbody>
</table>
1. Background

Sustainable development

--an international consensus

Sustainable economic development

• Encourage economic growth
• Improve the quality of economic growth

Sustainable environmental and ecological development

• Developing under resource and environmental capacity

Sustainable social development

• Improve life quality and healthy level
• Equality, free education and peace

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1. Background

Circular economy

To achieve
• Less resource consumption
• Less environmental deterioration
• Harmonized development among economy, environment and society
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2. The process of transfer to circular economy

China’s history of legislation related to circular economy:

- Environmental Protection Law (1989)
- Law on the Prevention and Control of Environmental Pollution by Solid Waste (1995)
- Clean Production Promotion Law (2003)
- Circular Economy Promotion Law (2009)
- Revised Environmental Protection Law (2015)
2. The process of transfer to circular economy

Development of Policies, regulations and plans of related to circular economy

- Several Opinions on Accelerating the Development of Circular Economy (Document of the State Council [2005]No. 22)
- The 12th five year implementation plan on crops straw comprehensive utilization, issued in 2011
- Guide Plan for Circular development (Draft open to public advice)-by NDRC, 2016

- Recovery and Management measures on renewable resources (MOFCOM Announcement No.8 of 2007)
- Notice on demonstration base construction of Urban mining (NDRC No. 977 of 2010)
- 1. The 12th five year construction program on the environmental treatment facilities of municipal solid waste, issued by state council in 2012.
2. The 12th five year specialized program for waste recycling technology, issued in 2012.
3. The 12th five year construction program on urban sewage treatment and recycling facilities, issued in 2012
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3. Circular economy in achieving SDGs in China

urban mining demonstration base construction

Until now, the national development and reform commission and the ministry of finance has approved 6 batch of a total of 49 countries "urban mining" demonstration bases.

Mainly locating at the eastern China.
3. Circular economy in achieving SDGs in China

Part of waste collection and recycling in China

<table>
<thead>
<tr>
<th>Year</th>
<th>Domestic Consumption of paper and paperboard</th>
<th>Domestic Comprehensive utilization of waste paper</th>
<th>Comprehensive utilization rate</th>
<th>Waste paper imports</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>85.69</td>
<td>37.62</td>
<td>43.90%</td>
<td>25.70</td>
</tr>
<tr>
<td>2010</td>
<td>91.73</td>
<td>40.16</td>
<td>43.80%</td>
<td>26.10</td>
</tr>
<tr>
<td>2011</td>
<td>97.52</td>
<td>43.47</td>
<td>44.57%</td>
<td>27.28</td>
</tr>
<tr>
<td>2012</td>
<td>100.48</td>
<td>44.72</td>
<td>44.51%</td>
<td>30.07</td>
</tr>
<tr>
<td>2013</td>
<td>98.10</td>
<td>43.77</td>
<td>44.75%</td>
<td>29.24</td>
</tr>
</tbody>
</table>

Recycling status of some types waste in China in 2013 (million tons)

- Steel: Recycling 84, Production 11,60%, Rate 14.36%
- Nonferrous metal: Recycling 5.3, Production 36.91%
- Plastics: Recycling 16, Production 53.31%

Recycling situation of waste papers in China (million tons)
3. Circular economy in achieving SDGs in China

Re-manufacture industrialization progress

- 2008, 14 enterprises were chosen as the auto parts pilots.
- 2013, 18 enterprises were chosen as the auto parts pilots.
- 2014, 10 enterprises were chosen as the auto parts pilots.
Until 2015, 109 WEEE recycling enterprises have obtained the License of the WEEE Treatment and been included in the list of WEEE Treatment Fund of e-waste via five batches.
3. Circular economy in achieving SDGs in China

WEEE implementation effect

![Chart showing recycling rate of 1st batch WEEE](chart)

- **2012**: 4% recycling rate, 3.0 million tonnes generated, 0.12 million tonnes dismantled.
- **2013**: 19% recycling rate, 4.0 million tonnes generated, 0.76 million tonnes dismantled.
- **2014**: 35% recycling rate, 5.0 million tonnes generated, 1.75 million tonnes dismantled.

The proportion of dismantled and recycled WEEE in 2014:

- **TV**: 81.8%
- **Refrigerator**: 4.7%
- **Washing machine**: 11.1%
- **Air conditioner**: 0.2%
- **Computer**: 11.1%

Circular economy in achieving SDGs in China
At present, the number of kitchen waste demonstrative city has reached 100 in China. NDRC and MF has established five batches of pilot city of utilization and harmless treatment of kitchen wastes in 2011, 2012, 2013, 2014, and 2015 of which the first batch was 33 city (District), the second batch was 16 city, the third batch was 17 city, the fourth batch was 17, and the fifth batch was 17.
3. Circular economy in achieving SDGs in China

Industrial waste collection and disposal in China

Generation (↑)
Comprehensive utilization (↑)
Harmless disposal (↑)
Utilization rate and disposal rate (↓)

(due to fast increasing of industrial waste in 2011 and 2012,)
3. Circular economy in achieving SDGs in China

Impact of circular economy on environment and resource

**Improvement of resource efficiency**

In 2011, 1.22 tons of coal to generate 10 thousand RMB GDP

↓

In 2015, 0.76 tons of coal to generate 10 thousand RMB GDP

In 2005, 357 m³ of water to generate 10 thousand RMB GDP

↓

In 2010, 139 m³ of water to generate 10 thousand RMB GDP

In 2015, 104 m³ of water to generate 10 thousand RMB GDP

**Improvement of comprehensive utilization**

by recycling iron and steel:

2500 million tons of coal, 17 tons of billion of water can be saved per year,

6000 million tons of CO₂ and 5 billion tons of solid waste was reduced per year

**Water resource recycling**

2010-2013, annual water recycling volumes was 6 billion tons.

> 60% of mining water was recycled

**Carbon Recycling**

In 2013, around 10 million tons of CO₂ was recycled

- Primary resource waste replaced, reduce reliance on natural resource
- Reduce used of coal and crude and reduce Carbon emission
- Reduce production of waste

**Improvement of comprehensive utilization**

- Reduce production of waste
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4. Challenges in the development of circular economy

**Economic incentives**
- Economic incentives—useful tool for guiding the development direction
- Unwillingness to pay by government

**Governmental management system**
- Complexity—difficulties in management and monitoring

**Systematic information network**
- Information—key to decision making
- Require information exchange platform
- Require systematic information network

**Systematic assessment standards**
- Lack of standard for data collection, calculation and submission
- Lack of transparency monitoring and inter-city inequity of auditing

**Enforcement of legislation**
- Circular Economy Promotion Law—not compulsive
- Punishment for noncompliance is inadequate

**Technology development**
- Technology—primary productive forces and key to improve resource efficiency
- Financial support on technology development
- Encourage academic institution
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5. Suggestion on the promotion of Circular economy in regional Level

- Institution establishment- relative legislation regulations, standards and guidelines
- encourage economic incentives by local government
- Make use of existing organizations- information exchange platform, technology transfer and support, Consulting service
- A standard assessment system in national level and international level- benefit corporations and competitions among countries.
- Multi-stakeholder involvement
- Explore different cooperation modes among different type of enterprises the Belt and Road initiative- form 3R group with neighboring countries – international cooperation.
Thanks for your attention!

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