Opportunities and Challenges Facing PET Recycling Industry

Zhao Xiangdong
Vice Chairman
China Chemical Fiber Association
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2. Challenges Facing Recycled Chemical Fiber Industry
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5. Introduction about the Regeneration and Recycling Economy Industry of CCFTISA
6. Perspective of Recycled Chemical Fiber Industry
I. Status quo of Recycled Chemical Fiber Industry

1. Macroeconomic environment

Industry growth of China is slowing down, and domestic demand, with impact from debt crisis in the West and turmoil in the Mid East, is not likely to see fast growth in the short term.

During the 12th Five-year Plan period (2011-2015), China domestic labor cost is expected to grow by around 15% each year.

Tighter credit, higher financing cost, rising utility and transportation charges, as well as RMB appreciation are all bad news to enterprises.

Low-end industries are moving out of China to SE Asia countries.

2. Microeconomic environment

Chinese enterprises are in lack of core competitiveness as the awareness in the importance of brand and innovation had long been absent with them, and so they are heavily depending on distribution channels, a field in which new enterprises could hardly compete with developed ones. New enterprises are at the meantime quite vulnerable to recent ups and downs of raw material prices.

Taking Jiangyin, one of the largest recycling bases in China for example, turnarounds and shutdowns which accounting for more than 50% of local capacities in Q4 2011 and Q2 2012 indicate that the industry will have little room for further development if current developing mode continues.
3. International Environment

China has been involved into totally 8 trading friction issues since 2011, involving an amount of 2.28 billion US dollars, with an increase of 80% year on year, indicating that China had been the nation who saw most such issues for the 17th successive year. With more industries and more countries involved in, new issues such as patent and RMB exchange rate have also incurred disputes with some countries.

For example, On June 26, 2012, Pakistan started an antidumping (AD) probe petitioned by ICI Pakistan Limited and Ibrahim Fibres Limited on polyester staple fibres (HS Code 5503.2010) from China. The dumping investigation period is from April 1, 2011 to March 31, 2012 and the injury investigation period is from April 1, 2009 to March 31, 2012.

According to the data from Global Trade Alert, China is one of the countries who are most vulnerable to trading barriers, as exported goods from China had met more than 100 trading protecting acts during the latest 12 months, and more than 600 since 2008.

4. China PET Recycling Industry is at Turning Point

By the 1990s of last century, chemical fiber industry of China had been closely following the track of European countries, the US and Japan, in a mode of imitating.

In the 21st century, with the country providing more support to the industry in fields of financial, real estate, R&D..., chemical fiber industry of China is getting close to world high level in equipment, technology, product and application.

Around the year of 2010, China chemical fiber industry, particularly recycled chemical fiber industry has gained the world leading edge, and it’s time for the industry to research by itself in equipment and technology innovation (especially integration technology), new raw materials and fiber blending. It’s the time for us to step from Made in China towards Owned by China.
I. Status quo of Recycled Chemical Fiber Industry

5. Capacity Changes of Recycled Chemical Fiber Industry

Graph 1. Capacity Changes

<table>
<thead>
<tr>
<th>Year</th>
<th>Capacity (kt/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>0</td>
</tr>
<tr>
<td>2004</td>
<td>2000</td>
</tr>
<tr>
<td>2006</td>
<td>4000</td>
</tr>
<tr>
<td>2008</td>
<td>6000</td>
</tr>
<tr>
<td>2010</td>
<td>8000</td>
</tr>
<tr>
<td>2012</td>
<td>10000</td>
</tr>
</tbody>
</table>

I. Status quo of Recycled Chemical Fiber Industry

Graph 2. Output Changes

<table>
<thead>
<tr>
<th>Year</th>
<th>Output (kt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>1000</td>
</tr>
<tr>
<td>2003</td>
<td>2000</td>
</tr>
<tr>
<td>2004</td>
<td>3000</td>
</tr>
<tr>
<td>2005</td>
<td>4000</td>
</tr>
<tr>
<td>2006</td>
<td>5000</td>
</tr>
<tr>
<td>2007</td>
<td>6000</td>
</tr>
<tr>
<td>2008</td>
<td>7000</td>
</tr>
<tr>
<td>2009</td>
<td>8000</td>
</tr>
<tr>
<td>2010</td>
<td>9000</td>
</tr>
<tr>
<td>2011</td>
<td>10000</td>
</tr>
<tr>
<td>2012</td>
<td>11000</td>
</tr>
</tbody>
</table>
PET recycling industry of China have entered a stage of fast development in capacity and technology since 2002, benefiting from low costs and scale production.

Domestic PET recycling capacity reached 1,200kt/yr, and is estimated to surpass 8,000kt/yr by end of 2012.

Recycled chemical fiber capacity and production have maintained an annual growth rate of more than 12%.

### I. Status quo of Recycled Chemical Fiber Industry

#### 6. Import and Export of Raw Materials

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012 (est.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flake Imp. Vol.</td>
<td>755.2</td>
<td>1108.1</td>
<td>1060.4</td>
<td>1361</td>
<td>1650.7</td>
<td>1665.5</td>
<td>1800</td>
</tr>
<tr>
<td>Flake Exp. Vol.</td>
<td>6.5</td>
<td>1.4</td>
<td>0.2</td>
<td>0.3</td>
<td>1.8</td>
<td>1.2</td>
<td>0.7</td>
</tr>
</tbody>
</table>

Data source: China Customs
6. Import and Export of Raw Materials

China has become the largest flake processor in the world, with developed countries sending huge volume of their PET wastes into China.

Raw materials (6,150kt/yr total) include:

1. Imported wastes—1,700kt/yr
2. Textile wastes—1,000kt/yr
3. Scraps—300kt/yr
4. Package wastes—(Output 4,500kt—Export 1,000kt)\*90%

7. Import and Export of R-PSF

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>346.2</td>
<td>209.2</td>
</tr>
<tr>
<td>2006</td>
<td>262.9</td>
<td>293.6</td>
</tr>
<tr>
<td>2007</td>
<td>201</td>
<td>417.6</td>
</tr>
<tr>
<td>2008</td>
<td>145.3</td>
<td>462.7</td>
</tr>
<tr>
<td>2009</td>
<td>157.4</td>
<td>406.4</td>
</tr>
<tr>
<td>2010</td>
<td>816.1</td>
<td>595.6</td>
</tr>
<tr>
<td>2011</td>
<td>120.2</td>
<td>700</td>
</tr>
<tr>
<td>2012</td>
<td>110</td>
<td></td>
</tr>
</tbody>
</table>

Data provided by China Customs
I. Status quo of Recycled Chemical Fiber Industry

7. Import and Export of R-PSF

◆ Import volume started to decrease in 2006, with export volume starting to surpass import volume, except for in 2009. In 2012, export is estimated to shrink. What indications does it bring to us?

While Europe and the US are traditional textile bases, rising chemical fiber industry in SE Asia, Turkey, Brazil and Mexico are also competing with China.

◆ Sudden change of certain product in trade volume should be paid with close attention in order to avoid trading friction.

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3. Challenges facing Recycled Chemical Fiber Industry

4. How to Grab Opportunities

5. Regeneration and Recycling Economy Industry of CCFTISA

6. Perspective of Recycled Chemical Fiber Industry
II. CF Industry: Review on H1 and Perspective of H2

1. Performance of Chemical Fiber Industry in H1 2012

1. Stable Operation

2. Lusterless Market

3. Shrinking Profit

II. CF Industry: Review on H1 and Perspective of H2

Production during Jan-Jul 2012

<table>
<thead>
<tr>
<th>Fiber Type</th>
<th>Jan-Jul 2012 (kt)</th>
<th>Jan-Jul 2011 (kt)</th>
<th>Y-O-Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Fiber</td>
<td>21,699.60</td>
<td>19,312.60</td>
<td>12.36%</td>
</tr>
<tr>
<td>Man-made Fiber</td>
<td>2,141.60</td>
<td>1,547.60</td>
<td>38.38%</td>
</tr>
<tr>
<td>VSF</td>
<td>1,254.40</td>
<td>995.60</td>
<td>26.00%</td>
</tr>
<tr>
<td>VFY</td>
<td>150.20</td>
<td>135.20</td>
<td>11.11%</td>
</tr>
<tr>
<td>AAF</td>
<td>167.40</td>
<td>172.70</td>
<td>-3.04%</td>
</tr>
<tr>
<td>Synthetic Fiber</td>
<td>19,562.80</td>
<td>17,765.00</td>
<td>10.12%</td>
</tr>
<tr>
<td>PET</td>
<td>17,101.10</td>
<td>15,732.40</td>
<td>8.70%</td>
</tr>
<tr>
<td>Nylon</td>
<td>1,043.80</td>
<td>902.00</td>
<td>15.72%</td>
</tr>
<tr>
<td>Acrylic</td>
<td>404.90</td>
<td>375.70</td>
<td>7.78%</td>
</tr>
<tr>
<td>Vinylon</td>
<td>33.90</td>
<td>33.60</td>
<td>0.84%</td>
</tr>
<tr>
<td>PP</td>
<td>188.50</td>
<td>161.90</td>
<td>16.44%</td>
</tr>
<tr>
<td>Spandex</td>
<td>175.00</td>
<td>163.00</td>
<td>7.35%</td>
</tr>
</tbody>
</table>

Stable Operation

- Fast growth of output
  - During Jan-Jul 2012, China totally produced 21.7 million tons of chemical fiber, up by 12.36% year on year, among which the output of VSF grew by 26.0%, nylon by 15.72%.
  - The output of PET fiber grew by 8.7%, down by 2.03% from Jan-Mar, and down by 6.52% from the whole year 2011.
Most fibers saw run rates pick up from end 2011, with some in a roll-over year on year, with no large scale run cut.

AF saw the largest import volume due to rigid demand in China.
China chemical fiber industry completed CNY 47.7 billion of fixed assets investment during Jan-Jul 2012, up by 28.16% y-o-y, with growth rate down by 19.91 percentage points y-o-y and down by 19.76 points compared with 2011 the whole year.

## Fixed Assets Investment Growth Changes

- Growth of fixed assets investment returned to normal level

<table>
<thead>
<tr>
<th>Manufacturing Industry</th>
<th>Completed Investment Project (Million yuan)</th>
<th>Y-o-Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Fiber</td>
<td>47,735</td>
<td>28.16%</td>
</tr>
<tr>
<td>Cellulose Fibre and Feedstock</td>
<td>10,112</td>
<td>32.15%</td>
</tr>
<tr>
<td>Pulp</td>
<td>1,412</td>
<td>-32.03%</td>
</tr>
<tr>
<td>Cellulose Fiber</td>
<td>8,699</td>
<td>56.08%</td>
</tr>
<tr>
<td>Synthetic Fiber</td>
<td>37,624</td>
<td>27.13%</td>
</tr>
<tr>
<td>Nylon</td>
<td>5,038</td>
<td>67.48%</td>
</tr>
<tr>
<td>PET</td>
<td>17,279</td>
<td>18.87%</td>
</tr>
<tr>
<td>Acrylic</td>
<td>406</td>
<td>0.93%</td>
</tr>
<tr>
<td>PVA</td>
<td>590</td>
<td>-0.84%</td>
</tr>
<tr>
<td>PP</td>
<td>1,192</td>
<td></td>
</tr>
<tr>
<td>Spandex</td>
<td>1,115</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>12,003</td>
<td></td>
</tr>
</tbody>
</table>

### Newly Added PET Capacities in H1 2011 and 2012

<table>
<thead>
<tr>
<th>No.</th>
<th>Company</th>
<th>Time</th>
<th>Newly Added (kt)</th>
<th>POY</th>
<th>FDY</th>
<th>PIY</th>
<th>Film</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wujiang Hengli</td>
<td>Jan-11</td>
<td>200</td>
<td>40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Xiaozhai Rongsheng</td>
<td>Jan-11</td>
<td>200</td>
<td></td>
<td>120</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Jiangsu Hengyi</td>
<td>Feb-11</td>
<td>80</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Hengli Suzan</td>
<td>Apr-11</td>
<td>200</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Xinxiangming</td>
<td>Apr-11</td>
<td>200</td>
<td></td>
<td></td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Zhangjiagang Xinxin</td>
<td>May-11</td>
<td>150</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Jiangsu Sanxing</td>
<td>May-11</td>
<td>120</td>
<td></td>
<td></td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Shaoxing Cifu</td>
<td>May-11</td>
<td>250</td>
<td></td>
<td>20</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>9</td>
<td>Hengli Nantong</td>
<td>Jun-11</td>
<td>200</td>
<td></td>
<td>200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Zhejiang Guoxiandao</td>
<td>Jun-11</td>
<td>250</td>
<td></td>
<td>250</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H1 2011</td>
<td>1800</td>
<td>200</td>
<td>0</td>
<td>60</td>
<td>610</td>
<td>250</td>
<td>100</td>
</tr>
<tr>
<td>1</td>
<td>Changle Technology</td>
<td>Jan-12</td>
<td>250</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Hongsheng Guoxiang</td>
<td>Feb-12</td>
<td>250</td>
<td></td>
<td>40</td>
<td></td>
<td>210</td>
</tr>
<tr>
<td>3</td>
<td>Wankai</td>
<td>Mar-12</td>
<td>400</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Dongying Hujin</td>
<td>Mar-12</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>China Resources Polyester (Changzhou)</td>
<td>May-12</td>
<td>300</td>
<td>300</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Kuxian Nanya</td>
<td>Jun-12</td>
<td>150</td>
<td></td>
<td>150</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Kaping</td>
<td>Jun-12</td>
<td>300</td>
<td></td>
<td></td>
<td></td>
<td>300</td>
</tr>
<tr>
<td>8</td>
<td>China Resources Polyester (Zhuhai)</td>
<td>Jun-12</td>
<td>300</td>
<td>300</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Taicang Minghui</td>
<td>Jun-12</td>
<td>250</td>
<td></td>
<td></td>
<td></td>
<td>250</td>
</tr>
<tr>
<td>H1 2012</td>
<td>2310</td>
<td>1450</td>
<td>100</td>
<td>40</td>
<td>710</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- There have been totally 2.3 million tons of newly added capacity in H1 2012, increasing by 28% year on year.
- Among the 9 new units of 2012, the capacity of 5 BGPET units(1.45 million tons) accounts for 63% of the total.
II. CF Industry: Review on H1 and Perspective of H2

Bearish Market and High Inventory

Month-end Inventory during Jan-Aug 2012

<table>
<thead>
<tr>
<th></th>
<th>Beginning of 2012</th>
<th>End Jan</th>
<th>End Feb</th>
<th>End Mar</th>
<th>End Apr</th>
<th>End May</th>
<th>End Jun</th>
<th>End Jul</th>
<th>End Aug</th>
</tr>
</thead>
<tbody>
<tr>
<td>PET POY</td>
<td>200</td>
<td>90</td>
<td>170</td>
<td>160</td>
<td>170</td>
<td>165</td>
<td>180</td>
<td>120</td>
<td>45</td>
</tr>
<tr>
<td>PET DTY</td>
<td>90</td>
<td>220</td>
<td>340</td>
<td>330</td>
<td>350</td>
<td>359</td>
<td>370</td>
<td>270</td>
<td>274</td>
</tr>
<tr>
<td>PET FDY</td>
<td>70</td>
<td>100</td>
<td>220</td>
<td>200</td>
<td>210</td>
<td>213</td>
<td>220</td>
<td>200</td>
<td>84</td>
</tr>
<tr>
<td>PSF</td>
<td>18</td>
<td>50</td>
<td>130</td>
<td>150</td>
<td>80</td>
<td>135</td>
<td>130</td>
<td>100</td>
<td>59</td>
</tr>
<tr>
<td>Nylon Avg.</td>
<td>228</td>
<td>130</td>
<td>140</td>
<td>190</td>
<td>220</td>
<td>210</td>
<td>240</td>
<td>230</td>
<td>Mid-to-high</td>
</tr>
<tr>
<td>AF</td>
<td>Mid</td>
<td>Mid</td>
<td>Mid</td>
<td>Mid</td>
<td>Mid</td>
<td>Mid</td>
<td>Mid</td>
<td>Mid</td>
<td>Mid</td>
</tr>
<tr>
<td>Spandex</td>
<td>430</td>
<td>390</td>
<td>300</td>
<td>320</td>
<td>310</td>
<td>222</td>
<td>270</td>
<td>343</td>
<td>350</td>
</tr>
<tr>
<td>VFY</td>
<td>450</td>
<td>500</td>
<td>530</td>
<td>560</td>
<td>570</td>
<td>580</td>
<td>630</td>
<td>620</td>
<td>650</td>
</tr>
<tr>
<td>VSF</td>
<td>250</td>
<td>230</td>
<td>280</td>
<td>300</td>
<td>210</td>
<td>240</td>
<td>250</td>
<td>190</td>
<td>120</td>
</tr>
</tbody>
</table>

High inventory pressure, but relieved in Jul-Aug

As demand was sluggish to pick up after Feb amid pessimistic outlook for market future, chemical fiber inventory kept rising, with inventory of major fibers touching annual height by the end of Jun. In Jul and Aug, confidence picked up a bit thanks to run cuts of suppliers, and inventory fell remarkably, particularly with polyester fibers.
## II. CF Industry: Review on H1 and Perspective of H2

### Profit Shrunk Significantly

Profit of Chemical Fiber Industry during Jan-Jun 2012 (billion yuan)

<table>
<thead>
<tr>
<th></th>
<th>Gross Profit</th>
<th>Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Fiber</td>
<td>7.265</td>
<td>15.22</td>
</tr>
<tr>
<td>Man-made Fiber</td>
<td>2.075</td>
<td>2.948</td>
</tr>
<tr>
<td>Nylon</td>
<td>0.907</td>
<td>1.079</td>
</tr>
<tr>
<td>Polyester</td>
<td>3.597</td>
<td>9.145</td>
</tr>
<tr>
<td>Acrylic</td>
<td>-0.034</td>
<td>0.053</td>
</tr>
<tr>
<td>Vinyon</td>
<td>-0.013</td>
<td>0.031</td>
</tr>
<tr>
<td>Polypolylene</td>
<td>0.165</td>
<td>0.075</td>
</tr>
<tr>
<td>Spanex</td>
<td>-0.007</td>
<td>0.671</td>
</tr>
<tr>
<td>Others</td>
<td>0.362</td>
<td>0.689</td>
</tr>
</tbody>
</table>

- Profit saw heavy decrease while loss grew fast
- During Jan-Jun 2012, the profit of China chemical fiber industry is CNY 7.265 billion, down 52.27% year on year, with total loss rate at 32.07%, and loss amount up by 2.63 times.

### Price Trend for White Flake Ready for Spinning 3-D-crimp R-PSF

#### 2. Recycled Chemical Fiber Industry: Review on H1 and perspective of H2

#### 2.1. Flake Market during Jan-Jun 2012

(1) **Flake Price Trend**

![Price Trend for White Flake Ready for Spinning 3-D-crimp R-PSF](chart-url)
II. CF Industry: Review on H1 and Perspective of H2

2.2. Import and Export of PET Wastes

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>87.7</td>
<td>831</td>
<td>45639</td>
<td>382</td>
</tr>
<tr>
<td>Feb</td>
<td>144.3</td>
<td>870</td>
<td>69353</td>
<td>384</td>
</tr>
<tr>
<td>Mar</td>
<td>177.1</td>
<td>926</td>
<td>81131</td>
<td>564</td>
</tr>
<tr>
<td>Apr</td>
<td>168.3</td>
<td>911</td>
<td>49569</td>
<td>1008</td>
</tr>
<tr>
<td>May</td>
<td>177.5</td>
<td>879</td>
<td>45690</td>
<td>657</td>
</tr>
<tr>
<td>Jun est.</td>
<td>120</td>
<td>829</td>
<td>41121</td>
<td>512</td>
</tr>
</tbody>
</table>

It is estimated that China has totally imported 874.9kt of PET wastes during Jan-Jun 2012, increasing 156.6kt (22%) year on year, while the average import price is estimated at $874/ton, down by $55/ton (6%) year on year.

II. CF Industry: Review on H1 and Perspective of H2

2.2. Analysis on R-PSF Market during Jan-Jun 2012

(1) 3-D-crimped R-PSF:

Prices for 3-D-crimped hollow R-PSF during Jan-Jun 2012
II. CF Industry: Review on H1 and Perspective of H2

(2) Cotton-type R-PSF Market during Jan-Jun 2012

Virgin-like R-PSF prices during Jan-Jun 2012

<table>
<thead>
<tr>
<th>Year</th>
<th>Imp. Vol. (kt)</th>
<th>Imp. Val. ($/t)</th>
<th>Exp. Vol. (kt)</th>
<th>Exp. Val. ($/t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>7.2</td>
<td>1864</td>
<td>50.1</td>
<td>1496</td>
</tr>
<tr>
<td>Feb</td>
<td>10.3</td>
<td>1926</td>
<td>40.8</td>
<td>1523</td>
</tr>
<tr>
<td>Mar</td>
<td>9.8</td>
<td>1900</td>
<td>57.2</td>
<td>1542</td>
</tr>
<tr>
<td>Apr</td>
<td>8</td>
<td>1980</td>
<td>54.2</td>
<td>1522</td>
</tr>
<tr>
<td>May</td>
<td>9.9</td>
<td>1886</td>
<td>63.6</td>
<td>1500</td>
</tr>
<tr>
<td>Jun Est.</td>
<td>8</td>
<td>1780</td>
<td>58</td>
<td>1400</td>
</tr>
</tbody>
</table>

R-PSF export volume during Jan-Jun 2012 is estimated to decrease 171.8kt (35%) year on year, with average export prices estimated to fall by $181/ton (11%) year on year.

(3) Imp. & Exp. of R-PSF
II. CF Industry: Review on H1 and Perspective of H2

2.3. R-PFY Market during Jan-Jun 2012

Price Trend for R-PFY Market during Jan-Jun 2012

Recycled fiber output in Q1 and Q2 2012 are estimated at 1,300kt, and 940kt respectively. Recycled chemical fiber market is entering seasonal lull during Mar-Jun, with run rates of suppliers falling amid sluggish downstream demand.

2.4. Output, Run rate, Sales/production Ratio of Recycling Industry

Run rate, Sales/production Ratio of Recycling Industry Jan-Jun 2012
II. CF Industry: Review on H1 and Perspective of H2

2.5. Profit of Recycling Industry during Jan-Jun

(1) Profit of 3-D-crimped Hollow R-PSF

Recycled chemical fiber sentiment had been deteriorating during H1 2012, but 3-D-crimped hollow R-PSF suppliers had been enjoying comfortable margin.

(2) Profit of Virgin-like R-PSF

Cotton-type R-PSF producers could hardly make ends meet. They managed to get some profit in Jan, but started to see loss in Feb, though their loss reduced somewhat during Apr-Jun, when they had little inventory of flake, prices of which began to fall quickly.
II. CF Industry: Review on H1 and Perspective of H2

(3) Profit of R-POY

Profit of R-POY during Jan-Jun 2012

R-PFY suppliers had been running with loss for most of the time in H1 2012, mainly as a result of intensified competition and high flake costs.

II. CF Industry: Review on H1 and Perspective of H2

2.6. Outlook for 2012

1) Profit: Hollow R-PSF may see some margin loss, with margin of 3-D-crimped hollow fiber at around 300 yuan/ton, cotton-type fiber at positive or negative 200-400 yuan/ton, 2-D-crimped and R-PFY ranging between positive and negative 300-500 yuan/ton.

2) Performance: Run rate 70-75%; sales-production ratio 85-95%

3) Annual production: 5.0-5.5 million tons

4) Investment: New capacity estimated at around 500-800kt/yr

5) Imp & Exp: Export volume around 50kt/month, import volume around 14kt/month

6) Imp & Exp of flake and baled bottles: 2.0-2.5 million tons in 2012
III. Challenges Facing Recycled Chemical Fiber Industry

1. Capacity Surplus?
   Textile raw material saw sharp demand growth, mainly from industry sector.
   - According to forecast of UN, by 2050 the processing volume of chemical fibers in the world will total 253 million tons, among which 41.5 million tons for apparel (16.4%), 41 million tons for home textiles (16.6%) and 170.5 million tons for industry application (67.4%).
   - Population growth will also bring extra demand, with world population expected to reach 9.4 billion by 2050.
   - It is forecasted that fossil resources will be used up by 2050, so chemical fiber industry will have to source new feedstock instead of current feedstock with 96% from crude oil.
   - Textile wastes around the world will reach 40 million tons/yr by that time.

<table>
<thead>
<tr>
<th>Year</th>
<th>World Total (kt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1800</td>
<td>1600</td>
</tr>
<tr>
<td>1900</td>
<td>3920</td>
</tr>
<tr>
<td>1960</td>
<td>14920</td>
</tr>
<tr>
<td>1970</td>
<td>21560</td>
</tr>
<tr>
<td>1980</td>
<td>29370</td>
</tr>
<tr>
<td>1990</td>
<td>38280</td>
</tr>
<tr>
<td>2000</td>
<td>54380</td>
</tr>
<tr>
<td>2010</td>
<td>79300</td>
</tr>
</tbody>
</table>
III. Challenges Facing Recycled Chemical Fiber Industry

2. Public acknowledgement of Recycled Products
   - Acceptance: Recycled products entered the market more than ten years ago with matured certification system in developed countries, where local people generally accept 10-100% extra costs.
   - Safety: Secondary pollution is prevented during the processing of raw materials and producing of products, and the safety reached A grade (qualified for baby wears) according to the test to some domestic producers’ products carried out by renowned international institutes.
   - Performance: After around 30 years of development, most recycled products are close to virgin materials in performance, with some even having better performance than virgin counterparts.

III. Challenges Facing Recycled Chemical Fiber Industry

3. Will raw material cause bottleneck?
   - With countries attaching more importance to recycling, raw materials from other countries will be less available and more expensive, particularly high quality resources.
   - Currently around 26-million-ton textile wastes come into being in China each year, among which chemical fiber wastes accounting for 80% (20.8 million tons), natural fiber wastes around 5.2 million tons. According to statistics, everyone who lives in rural areas has two suits of apparel to dispose each year on average, while the number in urban areas is three. That means in China more than 3.1 billion suits of apparel are disposed every year, amounting to more than 1 million tons, most of which are buried or burned, causing both pollution and wasting of resources. The volume of idled apparels is estimated at around 28 million tons.
   - As a major manufacturer and consumer of uniforms, waste uniforms also causes great wasting in both recourses and stocking space. They will become a huge resource if problems in material sorting and color sorting could be effectively solved.
III. Challenges Facing Recycled Chemical Fiber Industry

4. What are hampering us from achieving comprehensive utilization of textile wastes in China?

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low competitiveness of individual enterprises</td>
<td>Low added-value, small scale, disordered competition</td>
</tr>
<tr>
<td>Lack of industry concentration</td>
<td>Lack of marketing rules and standards</td>
</tr>
<tr>
<td>Lack of leading players</td>
<td>Most enterprises are privately-owned and in small size</td>
</tr>
<tr>
<td>Unintegrated</td>
<td>Lack of an integrated industry chain</td>
</tr>
<tr>
<td>Lack of social recognition</td>
<td>It’s necessary that government provide more guidance and political support in textile waste collecting and recycling</td>
</tr>
</tbody>
</table>

5. Perspective of Future Development

- Physical method to process flakes in large volume
  Lower energy consumption, lower costs, higher quality, suitable for wide application in textile and industry fields

- R&D, promotion and standardization of large capacity units
  However, there are some varieties that large capacity does not apply to
  Functional (anti-bacterial, flame retardant, fragrant, UV-prevent, antistatic, far infrared ray, etc)
  Differentiated (colored, blended, profiled, conjugated, etc)
  Cotton type
  2-D-crimped
  3-D-crimped

- Better utilization of apparel wastes
  Branding products produced with chemical recycling
III. Challenges Facing Recycled Chemical Fiber Industry

6. How to phase out outdated capacity (for reference only):
   (1) Flake washing: one-ton flakes need over two-ton fresh water added
   (2) New single-line washing capacity: ≤ 1000kt/year
   (3) New PSF/PFY single-line capacity: ≤ 1000kt/year
   (4) Spinning bean heating: Originally use electric rods to heat Dowtherm, often causing deposit forming inside melt pipelines and then affecting evenness of aspun filament. Suggestion: Use diphenyl steam instead to achieve even temperature distribution.
   (5) Quenching & oil finishing: VD series spinning machines use inflow circular quenching device and single disk & double-side oil finishing, with unstable uptake. Suggestion: Adopt two-direction circular quenching + central oil finishing + disk or lip oiling before winder. In this way, filament doubling is reduced and aspun filament quality is improved.
   (6) Tow dropping: VD series adopt rotary drum to take the tow from spinning machine, with uneven tow distribution and easy knot. Suggestion: Use reciprocating device to take the tow.
   (7) Drawing complex: VD series originally use collective driving device, with high failure rate and much noise. Suggestion: use individual motor drive and EFC adjusting speed.
   (8) Tension setting: Change previously used Dowtherm heating to steam heating + fleshing system, to make roller surface evenly heated, and cost reduced with steam back to downstream sector.

III. Challenges facing Recycled Chemical Fiber Industry

7. Where lies the competitiveness of China recycling industry?
   Currently the monthly salary of employees in China textiles manufacturing industry averages at CNY 1,450-2,320 (Eur188-300), with that in Bangladesh at Euro80 and in Vietnam less than Euro120. It’s for such a reason that transnational manufacturers are moving their capacities from China to SE Asian countries.

   Industry edges of China are more than low labor costs: a highly integrated value chain and scale production, great market potentiality, rich human resource with improving quality, comparatively sound infrastructure and logistic system, as well as stable economy development...SE Asian countries could hardly compete with China in these fields in the near future, and there are also many obstacles with customs issues involved.
III. Challenges Facing Recycled Chemical Fiber Industry

8. The role of industry associations?

- Social Participation
- Supporting Policies
- Media Publicity
- Technology Support
- Ladder Standards
- Sound Plan
- Market Exploring

III. Challenges Facing Recycled Chemical Fiber Industry

9. Support from state government

- NDRC: Financial supports to resource utilization and environmental protection projects, such as Urban Mining
- MOST: The Science and Technology Supporting project, 863 and 973 projects, and works with the CCFTISA
- MOF and the SAT: Tax preferences for recycling enterprises
- MEP&NDRC&MOC: TO construct industry group of textile wastes utilization
- MEP&NDRC&MOST&MIIT: Enterprises of Resources Comprehensive Utilization Encouraged by the State (7 June 2012)
- Plans for Strategic Rising Industries during the 12th Five-year Plan Period
III. Challenges Facing Recycled Chemical Fiber Industry

9. Support from state government

- On 13 Jan 2012, NDRC approved experiment of carbon emission right trading in Beijing, Tianjin, Shanghai, Sichuan, Guangdong, Hubei and Shenzhen, in an effort to achieve the green gas emission control target by 2020 with relatively low costs by utilizing marketing mechanism. Meanwhile, NDRC requires local administrative governments of these cities and provinces to research for sound and effective measures to monitor and measure carbon emission.

- State government actively supports the works of determination of resources comprehensive utilization, while encourages application of advanced technologies.


- It is required in the outline of the 12th Five-year Plan in Mar 2011 to accelerate construction of waste collecting and sorting network in urban and rural regions.


- In Jun 2012, MOST, NDRC, MIIT and MEP, together with three other ministries issued the 12th Five-year Plan for Waste Utilization Technology Project.
III. Challenges Facing Recycled Chemical Fiber Industry

9. Support from state government

Measures to protect domestic industry from external economic instabilities.

1. To enhance implement of structural tax reduction in order to relieve the tax burden on micro- and small-size enterprises
2. To maintain prudent monetary policy, by lowering benchmark loan rate and deposit reserve rate, and to allow interest rate to float within a relatively wide range.
3. CNY 26.8 billion was allocated from state revenue to support technological upgrade of enterprises.
4. To encourage private investment, the proportion of which in total fixed asset investment of the country have been increased to 62%.
5. The energy-saving household appliances project.

Contents

1 Status quo of Recycled Chemical Fiber Industry
2 Chemical Fiber Industry: Review on H1 and perspective of H2
3 Challenges Facing Recycled Chemical Fiber Industry
4 How to Grab Opportunities
5 Regeneration and Recycling Economy Industry of CCFTISA
6 Perspective of Recycled Chemical Fiber Industry
IV. How to Grab Opportunities

1. Production to meet market demand, supported by policies and R&D,

   To realize the value of Urban Mining by increasing public environment awareness, and establish a comprehensive operation mode integrating collecting, processing and application, and explore new applications for textile wastes.

2. Effective marketing strategy overseas

   To reinforce the distribution system, as well as construction of raw material bases overseas, and provide effective full-range services in equipment, technology, human resource, financial and market ideology.

3. Differentiation strategy

   To encourage large enterprises to enhance their competitiveness through scale production and integration, while small ones could gain their edge through product specialization and differentiation.

4. Active research on industrial gradient transfer

   Enterprises in the eastern region of China have seen high costs restrained by environmental-protection requirements, land, tax, energy, labor force and so on, while those in the central and western regions have seen low costs, but the industry chain is not completed there, which will affect the speed of transfer. The same situation has been detected in Southeast Asia.

5. Make full use of the potential advantage of new equipments

   Combined with the government’s requirements for eliminating backward capacities and no new branches and through the technological retrofit, the advancement of new equipments will be fully made use of to significantly reduce the cost of investment and lower operating costs, especially in energy saving and emission reduction, water saving and consumption reduction, cleaner production, etc.

6. Pay close attention to the R&D and production of new products

   The development pattern of global chemical fiber industry is changing from the previous passive mode like borrowlism to giving the priority to buyer’s market and domestic market, with a stable overseas market as assist. The development of new products must keep pace with the needs of the new era.
IV. How to Grab Opportunities

7. Closely watch the opportunity brought by the capital market
   Utilize the convenience and swiftness of meager and recombination to reduce cutthroat competition and improve industrial concentration.

8. Fully understand the industrial periodicity (3-5 years).
   The period of industrial upgrade and technological advancement is in accordance with that of the industry, so the regional enterprises should establish municipal-level, provincial-level and national-level engineering centers.
   With the combination of production, learning, research and practice, the comprehensive use of waste bottles and waste textiles will be developed, introduced and spread.
   Make use of advanced and applicable technologies, as well as demonstration projects, to enhance the quality, efficiency, profit margins and closed & harmless production, and meantime to determine the technology roadmap for the comprehensive utilization of waste bottles and waste textiles in order to form a cascade-utilization technology support system of waste textiles.

IV. How to Grab Opportunities

9. Pay attention to brand power
   The construction of brand, hang tag, standard and authentication is very important to the industry’s social image and position, and it is also one of the soft clauses for the industry to set up a threshold.
   We can establish a green & low-carbon textile market and amplify the primary market via the alliance with purchasers and suppliers at home and abroad; gain the market share of high-end recycled chemical fiber products via the cooperation with famous brands; promote the reputation of recycled chemical fiber products via the authentication of system and product standards; and popularize the idea of recycling economy of chemical fiber industry, as well as improve the public awareness and international influence of the Chinese Federation of Chemical Fiber Recycling Economy, via public service advertising, professional exhibition and international collaboration.
   In 2009, the first industrial standards came out, effective from 1 April 2010; three new standards on recycled polyester filament yarn were submitted and approved in 2011, effective from 1 November 2012; and two new association standards surfaced for PET flakes, expected to be effective from September 2012, and for R-PET fibers, effective from 18 June 2012. These standards mean that our industry is developing towards standardization.
IV. How to Grab Opportunities

10. Industry’s threshold

The principle is to promote and develop the existing industry. Indicators such as the proportion of ratal to sales, ratal per capita and so on will be key to enterprises’ further capacity expansion or starting new projects. In this way, whether the enterprise can start new projects, especially the capacity expansion, will not be only determined by its capability of advertising, public relations and financing.

Via some rigid indicators of energy saving and consumption reduction, as well as water conservation and emission reduction, cut secondary pollution and secondary emission, and achieve cleaner production.

Via some soft indicators such as the establishment of brand, drop, standard and authentication, enterprises’ management level will be enhanced.

With the threshold for recycled chemical fiber industry, outdated capacities will be finally phased out to promote industrial development.

11. Improve the capability of energy saving and emission reduction to ease the conflict between resource and environment that has been accumulated in the development of recycled chemical fiber industry and textile industry.

- With the innovation and integration of energy saving, emission reduction, consumption reduction, water saving and so on, environmental-protection and sustainable chemical fiber recycling technologies will take shape, leading to further reduction of comprehensive energy consumption.
- Reuse rate of recycled water reaches above 90%.

Energy consumption comparison (kg standard coal/t)

<table>
<thead>
<tr>
<th>Project</th>
<th>Raw material processing</th>
<th>Staple fiber</th>
<th>Filament yarn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction of energy consumption</td>
<td>17%</td>
<td>16%</td>
<td>20%</td>
</tr>
</tbody>
</table>
IV. How to Grab Opportunities

12. Self-discipline of the industry

Strengthen the self-discipline of the industry and enterprises. First, start from the self-discipline of production and pricing, and then transfer to that of development. Widely launch the activities related to enterprise of integrity and legal education, to guide the enterprise to be honest, abide by the professional ethics, strive for honest and law-abiding enterprises and join in the industry competition orderly.

Enterprises in the industry should reach a consensus over the self-discipline of development, production and pricing, actively participate and become self-controlled.

13. Establish a strategic alliance for technological innovation of the industry.

With the enterprises as the body and the market as the orientation, integrate the related forces in the comprehensive utilization of polyester scraps and waste textiles, such as industrial organizations, research institutions, intermediaries (authentication, standard, drop, etc.), enterprises (upstream and downstream, equipments, auxiliary materials, etc.) and so on, to construct a technology innovation system for the comprehensive utilization of waste textiles together. Besides, use the collaboration platform of production, learning, research and practice to solve the common and key problems of the industry to set up a benign operating mechanism. Carry out the work such as technological breakthrough, the promotion of industrialization, the construction of standardization, research on policies and laws, consultation and so on of the comprehensive utilization of polyester scraps and waste textiles.
V. Introduction about the Regeneration and Recycling Economy Industry of CCFTISA

1. Structure

With the close combination of policy, production, learning, research and practice and taking China Chemical Fiber Association (CCFA) and Donghua University as supporting departments, the Regeneration and Recycling Economy Industry of China Chemical Fiber Technology Innovation Strategic Alliance (CCFTISA) has gathered many professional institutes and competitive enterprises in China’s recycled chemical fiber industry, and its combined capacity takes up over 60% of the total in China.

2. Overall goals

- Set up a recycle system of production, consumption, discard and reclamation of chemical fibers to boost the structural adjustments of raw material and products of chemical fiber industry and thus promote the scientific connotation and image of the industry.

- In allusion to the reclamation of recycled chemical fiber raw materials such as polyester scraps and waste textiles, a modern collector network will be founded. Emphasize the breakthrough of key technologies and equipments for high-efficient separation, modification and recycling of waste chemical fibers to improve cleaner production level and the quality of the derivative products, with the comprehensive recycling rate above 95% and added value of the derivative products up by over 30% year on year.

- Establish a green & low-carbon textile market and amplify the primary market via the alliance with purchasers and suppliers at home and abroad.
- Gain the market share of high-end recycled chemical fiber products via the cooperation with famous brands.
- Promote the reputation of recycled chemical fiber products via the authentication of system and product standards.
- Popularize the idea of recycling economy of chemical fiber industry, as well as improve the public awareness and international influence of the Chinese Federation of Chemical Fiber Recycling Economy, via public service advertising, professional exhibition and international collaboration.
V. Introduction about the Regeneration and Recycling Economy Industry of CCFTISA

- **Recycling subjects**
  - Training, encouragement and authentication for collectors
  - Strengthen the recycling business of recyclers
  - Unite recycled product consumers to participate in recycling
  - Provide bases for the government to make policies
  - Consolidate citizens’ awareness of recycling

- **Recycling technology**
  - Recycling of spinnable polyester scraps such as flakes
  - Recycling of waste fibers and textiles
  - Spinning and derivative production
  - Equipments

- **Purchase & application**
  - Increase the green procurement of governments, universities and large-size state-owned or state-holding enterprises.
  - Cooperate with large-size supermarkets and malls to popularize green products.
  - Together with branded enterprises

- **Authentication & brand building**
  - Authentication on recycled raw materials
  - Authentication on recycling technologies
  - Authentication on the ecological safety of recycled products
  - Carbon authentication
  - Drop

V. Introduction about the Regeneration and Recycling Economy Industry of CCFTISA

- **Technology**
  - Equipments and technologies of pretreatment and sorting for waste textiles
  - Equipments and technologies for recycled raw materials
  - Equipments and technologies for recycled fiber
  - Equipments and technologies for recycled products
  - Authentication on recycling system and recycled products
  - Equipments and technologies for energy-saving & emission reduction and cleaner production

- **Scale**

- **Standard**

- **Brand**
V. Introduction about the Regeneration and Recycling Economy Industry of CCFTISA

- Organize to draw up the threshold of industry, technological norms and production standards
- Greatly boost and unify the authentication on recycled chemical fiber products and systems in China.

- Set up green supermarkets, with coverage in the major cities in China.
- Have 15-20 key enterprises with the capacity at over 200 kt/yr.
- Establish 3-5 demonstration bases.
- Realize the total capacity of over 10 million tons per year, with an annual growth rate of over 20%.
- Make recycled fibers be the third largest raw material for textile use in China.
The numbers of newly added national-level, provincial-level and municipal-level trademarks are at around 5, 50 and 100 respectively, which propels brand internationalization.

Rate of output value of brands above municipal level reaches above 60%.

The number of regional brands arrives at above 15.

V. Introduction about the Regeneration and Recycling Economy Industry of CCFTISA

3. Technology roadmap

Overall design — industrial system
V. Introduction about the Regeneration and Recycling Economy Industry of CCFTISA

Major Tasks:
1. Set up and develop the recycling system for polyester scraps and waste textiles and adjust the structure and raw material composition of recycled chemical fiber industry, to significantly enhance the capacity of high-quality products and the proportion of recycled special textiles and promote the cluster development of key chemical fiber recyclers.
2. Scientifically propel the innovation of recycling technologies and establish a new-generation chemical fiber recycling system featuring high quality, multi function and low energy consumption.
3. Reinforce the capability of energy saving and emission reduction to ease the conflict between resources and environment that has been accumulated in the development of recycled fiber industry and textile industry.
4. Make industrial standards to normalize China’s recycled chemical fiber industry.
5. Conduct brand building to promote the reputation of enterprises and boost the consumption of recycled chemical fiber products.
## Technology Roadmap

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Recycling system</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Set up and develop the recycling system for polyester scraps and waste textiles</td>
</tr>
<tr>
<td>Technological system</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Establish a new-generation chemical fiber recycling system featuring high quality, multi function and low energy consumption</td>
</tr>
<tr>
<td>Standardization and authentication system</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Gradually establish and perfect examination and assessment system for the clean production of waste textiles</td>
</tr>
<tr>
<td>Brand building and promotion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Found the brand building and market promotion system for chemical fiber recycling economy</td>
</tr>
</tbody>
</table>

### V. Introduction about the Regeneration and Recycling Economy Industry of CCFTISA

- **2010:** Start the recycling of waste textiles from products
- **2012:** Set up material identification
- **2014:** Set up the producer-consumer-collector-recycler chain
- **2016:** Improve sorting and processing ability, and construct demonstration industrial parks
V. Introduction about the Regeneration and Recycling Economy Industry of CCFTISA

Year

Establish a new-generation chemical fiber recycling system featuring high quality, multi function and low energy consumption

Technology of polyester scrap and textile recycling
Technology of high-quality recycled chemical fiber (polyester fiber mainly)
Technology of high-quality products made from recycled chemical fibers (polyester fiber, PP fiber)
V. Introduction about the Regeneration and Recycling Economy Industry of CCFTISA

Achievement Equipment Technology

- Profiling and stretching for fibers
- Improved semi-combining
- Flexible carding and stretching
- Improved air and mechanical finish
- Functional after treatment
- High-quality differentiated recycled yarn
- Acupuncture and spunlaced nonwoven
- High-quality differentiated recycled polyester/PP and other composite nonwovens

Technology roadmap for high-quality products made from recycled chemical fibers (polyester fiber, PP)

- Environment-friendly dyeing
- New-type fiber color register
- Profiled spinneret for fiberfill
- After processing for high-elasticity fibers
- High-quality differentiated recycled nonwoven
- Variety and specification for color register
- 10kt/yr (or above) high-quality recycled polyester filling fiber line
- High-quality differentiated waterproof roll
- High-quality differentiated recycled fabric
- High-quality differentiated recycled yarn
- High-quality differentiated recycled PP roll
- High-quality differentiated recycled nonwoven
- Viscose compounding
- Identification and cleaning for profiled recycled fiber
- Functional after treatment
- High-quality differentiated waterproof roll
- Even laying
- High-precision identification for profiled recycled fiber
- Acupuncture and spunlaced nonwoven
- High-quality differentiated recycled yarn
- High-quality differentiated recycled polyester/PP and other composite nonwovens

Introduction

- Year
- Standardization and authentication system
- Gradually establish and perfect examination and assessment system for the clean production of waste textiles

Set up standards
- Quality standards
- Technical standards
- Cleaner production standards

Conduct enterprise authentication
- Ecological authentication
- Recycling authentication
- Quality system authentication

Dr. Theile
POLYESTER TECHNOLOGY
V. Introduction about the Regeneration and Recycling Economy Industry of CCFTISA

### Technology Roadmap for High-Quality Recycled Chemical Fiber (Polyester Fiber Mainly)

**R-PSF**
- Melting with high compression ratio and low viscosity loss
- Gas-phase extraction for small-molecular impurities
- Dedicated solid-/liquid-phase viscosity increasing for recycling
- High-precision filtering

**R-PIY**
- Dedicated melting for flake and fabric-based popcorn
- Gas-phase devolatilization for impurities
- Reactor for solid-liquid-phase viscosity increasing
- High-precision filtering

**R-PFY**
- Functional recycled fibers
- Dedicated masterbatch feeder
- Computer color matching system
- Profiled spinneret plate

**R-PIY**
- High-quality differentiated and functional recycled fibers
- Substantial viscosity increasing

**R-PSFPSF**
- Substantial viscosity increasing
- Blending/profiled/superfine/composite spinning
- Color compound and compensation

**R-PFY**
- High-quality differentiated and functional recycled fibers
- Substantial viscosity increasing

**R-PIY**
- Further improvement in viscosity increasing

**Technology**
- To set up criteria for industry admission, equipment, technology, raw material, clean production and energy saving for the industry

**Equipment**
- To establish and improve inspection and assessing systems of clean production

**Achievement**
- To establish certification system for safe production

**Standards and Certification Systems**
- To set up criteria for industry admission, equipment, technology, raw material, clean production and energy saving for the industry

**Safety Certification**
- To establish and improve inspection and assessing systems of clean production

**Certification System**
- To establish certification system for safe production

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V. Introduction about the Regeneration and Recycling Economy Industry of CCFTISA

**Year**
- 2010
- 2012
- 2014
- 2016
- 2018
- 2020

**Standards and Certification Systems**

- To set up criteria for industry admission, equipment, technology, raw material, clean production and energy saving for the industry

**Safety Certification**

- To establish and improve inspection and assessing systems of clean production

- To establish certification system for safe production
## V. Introduction about the Regeneration and Recycling Economy Industry of CCFTISA

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<tr>
<td><strong>Brand building and promotion</strong></td>
<td>To found the brand building and market promotion system for chemical fiber recycling economy</td>
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<td></td>
<td>To forge green purchasing channel</td>
<td>To establish professional distribution channel</td>
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<td>To enhance international cooperation</td>
<td>To enhance brand building</td>
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<td><strong>Guided and supported by CCFA</strong></td>
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<td>The Alliance to cooperate with world-known brands to promote recycled chemical fiber products to the public</td>
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<td>To boost consumption of recycled products through malls and franchise stores</td>
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Summary

1. New Concepts
To attach the concept of chemical fiber recycling economy with strategic importance

2. Tough Tasks
To propel the innovation of recycling technologies and establish a new-generation chemical fiber recycling system featuring high quality, multi function and low energy consumption.

3. Public Acknowledgement
It calls for scientific and strict criteria as well as innovation spirit to win public acknowledgement to recycled products.
VI. Perspective of Recycled Chemical Fiber Industry

1. Comprehensive Utilization of Resources

Since the late half of 20th century, plastics have been widely applied in daily life as a result of highly developed petrochemical industry, most of which are disposable and have become a severe menace to environment.

R-PET fiber industry, as an industry strongly encouraged by state government, plays a great role in reducing environment pollution caused by PET wastes. There has been 3.15 million tons of PET wastes collected in China within one year.

Recycling progress will reutilize a PET bottle with the bottle, cap and label paper, with 90-95% of the water to wash flakes acquired from waste water.

2. Social Benefits

PET recycling is attached with even more value regarding social benefits rather than economic benefits.

1) Helpful to ease employment pressure. There are around 450 thousand employees in collecting and washing section, 300 thousand in recycled fiber processing sector and 800 thousand in relevant industries.

2) Recycled fiber industry is a major source of tax and export revenue.

3) A major method to save petroleum resources. Each ton of flake to produce staple fiber saves energy equal to 6 tons of standard coal compared with PET chips as raw material.

4) Environment protecting, and a driving to relevant industries (collecting, international trading, logistics, textile machinery, accessories, etc.)
VI. Perspective of Recycled Chemical Fiber Industry

3. To construct demonstration industrial parks, helping to form recycling industry bases.

To foster leading enterprises
To foster leading enterprises with integrated waste collecting, processing and utilization system, with large scale and high concentration, able to be other enterprises' reference.

Construction of demonstration parks
To set up experimental bases and demonstration industrial parks, to forge an industry chain integrating collecting, transportation, sorting, processing and distribution.

4. Output targets
Recycled polyester capacity in China to reach 10 million tons/yr, output to reach 7.5 million tons/yr, output value to reach CNY 150 billion, among which capacity of R-PSF amounts to 7.5-8 million tons/yr, output to 6 million tons/yr, and capacity of R-PFY account to 2-2.5 million tons/yr, output to 1.6 million tons/yr, by the year of 2020.

5. Structural optimization targets
By 2015, proportion of recycled chemical fiber of high-tech and high-performance will see a significant increase, and differentiated fibers will develop into more varieties.

6. Technology innovation targets
By 2015, in China there will be more than 10 enterprises with recycling technology level at or above provincial standards, and more than 30 above municipal standards. Investment in R&D will account for more than 1% of total sales income, and sales value of new products above 25%. Leading enterprises being more capable in innovation.
7. Brand building targets
By the year of 2015, in China there will be 5 new national famous trademarks, 20 provincial-level famous trademarks and 50 municipal-level famous trademarks of R-PET industry, with output values of these famous trademarks above 60%, and there will be more than 10 regional famous brands.

8. Energy saving targets
By 2020, the economics and energy utility of China R-PET industry will be improved significantly. The reuse rate of process water will reach over 90% and after the energy-saving-oriented technological upgrading, the comprehensive energy consumption per ten thousand yuan of production value will decrease further, with further decline of the emissions of waste water, waste residue and waste gas.

9. Target for Envisioned Future
By 2020, China R-PET industry will become a differentiated-product-oriented industry with perfect industrial chain, advanced facilities, reasonable industrial layout and stronger capability of independent innovation. The industrial innovation system will be generally completed and the industrial characteristic and comparative advantage will be more highlighted. Finally, China R-PET industry will become the typical demonstration about the transformation of traditional industries and the development of recycling economy in China.