

The Ideas of the Development of a Circular Economy in the "Twelfth Five-Year" Plan of China

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1. Brief introduction of circular economy development in China

- Nowadays, the world economy is experiencing a major transformation; green development has become the international trend.
 - The Chinese government takes the development of a circular economy as an important strategy for national economic and social development. During the past few years, the circular economy in China has developed from ideas to nationwide action.
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- During the period of "the Twelfth Five-Year "Plan, China will continue the principle of "reduce, reuse and recycle ", and insist "reduce" is the higher priority. We will aim at improving the efficiency of the resources output ratio and promote circular economy development in the production, circulation and consumption, speeding up the construction of the resource recycling system covering the whole society.

2. Promoting the circular production and speeding up the economic transition

Promoting the circular production:

- in the industrial area, to promote ecological design actively, and strengthen cleaner production audits and technical reform of cleaner production in key industries, strengthen the development and application of the key technologies of the cleaner production.
- In the agricultural area, the technology for saving fertilizer and pesticides, and the large scale cleaner cultivation of livestock and aquatic products will be promoted.
- In the construction area, to improve construction design and develop green ecological and low-carbon buildings and promote cleaner construction technology, and speed up building reconstruction for energy savings.
- In the transportation area, scientific road system design, the clean and efficient transportation tools will be encouraged.
- In business services, to promote the use of energy saving equipment and high efficiency lighting products.

2. Promoting the circular production and speeding up the economic transition

promoting industrial circular combination

- China will optimize the industrial spatial layout, pay special attention to the construction of high industry concentration areas , and industrial parks, promote resource sharing and by-product exchange in the enterprises, promote the extension of different industries through the industrial chain and the coupling.
- China will consider together the whole space layout of urban infrastructures, design the distribution of food waste resource utilization projects, municipal solid waste landfill sites, landfill gas power generation facilities, sewage treatment facilities to realize resources recycling across the different enterprises, industries, and areas.

2. Promoting the circular production and speeding up the economic transition

promoting the circular utilization of resources.

- To implement the key projects on comprehensive use of resources, including the use of the associated mineral resources, large amount industrial waste, agricultural and forestry waste.
- To encourage development, demonstration and application of resource comprehensive utilization technology with aim at establishing a circular economy standard system including the comprehensive utilization of mineral resources, solid waste and recyclable resources.
- To foster service agencies, including industrial consulting, project evaluation and audit, engineering design and supervision, project performance evaluation, and service training.

2. Promoting the circular production and speeding up the economic transition

Promoting the circulating reform of the industrial parks.

- To plan, construct and renovate various kinds of industrial parks according to the requirements of circular economy in order to realize intensive land use, waste exchange use, energy use, sewage recycling and pollutants being disposed in centralized facilities.
- To speed up the circulating reform of the industrial parks according to the principle of “centralized industries in the district, centralized enterprises in the park, industrial chain for the enterprises, material cycle and centralized management in the park”.
- To implement "demonstration project on circulating reform of the industrial parks“ during the period of the "Twelfth Five-Year" Plan. In west of China, this has been carried out.

3. Improving resources recycling system and promoting development of industrialization

Improving the recovery system of recyclable resources.

- To speed up the recyclable collection network construction to realize complete network coverage. To speed up the construction of the collection and sorting industrial parks, promote the intensive and large scale development of collection industry.
- To develop leading enterprises and improve the level of organization and scale.
- To pay attention to the recycling of key renewable resources, improve the reverse logistics system in remanufacturing, strengthen the management of scrapped autos, improve the recycling proportion of the waste electrical /electronic products and other varieties , promote the effective recycling of abandoned energy-saving lamps and waste batteries.

3. Improving resources recycling system and promoting development of industrialization

Promoting industrialization of the utilization of recyclable resources.

- To promote the use of recyclable resources in a large scale, to build up a batch of "urban mining" demonstration bases which have advanced technology, high environmental protection level and standard management, large scale and strong demonstration effect.

Promoting municipal solid waste sorting collection and household kitchen waste separation and recycling.

- To implement the municipal waste classification step by step to improve the collecting system gradually, and to establish and develop the close, environmentally sound and highly efficient municipal solid waste collection, transfer and transportation system.
- To speed up the construction of facilities by the investment being mainly made by the local government while the central government will provide appropriate support and the social capitals being encouraged to participate.

4. Promoting the green consumption model and constructing circular society

- Advocating conservation consciousness, avoiding extravagance and reducing the products for daily use especially disposable products, discouraging behaviors such as excess packaging, and carrying out the construction of an economical government, green schools and the green community.

- Encouraging consumers to buy products with energy and water saving labels, or environmental labels, and buy high efficiency lighting products, the resource circulation products and environmentally sound automobiles and ground-saving and energy saving residential products. In addition, advocating green purchasing in the government, and improving the proportion of government purchasing recycle products, recyclable products and energy, water saving green products gradually in order to play a leading role throughout the country.

Development and Challenges of 3R Technologies Under the Framework of Circular Economy in China

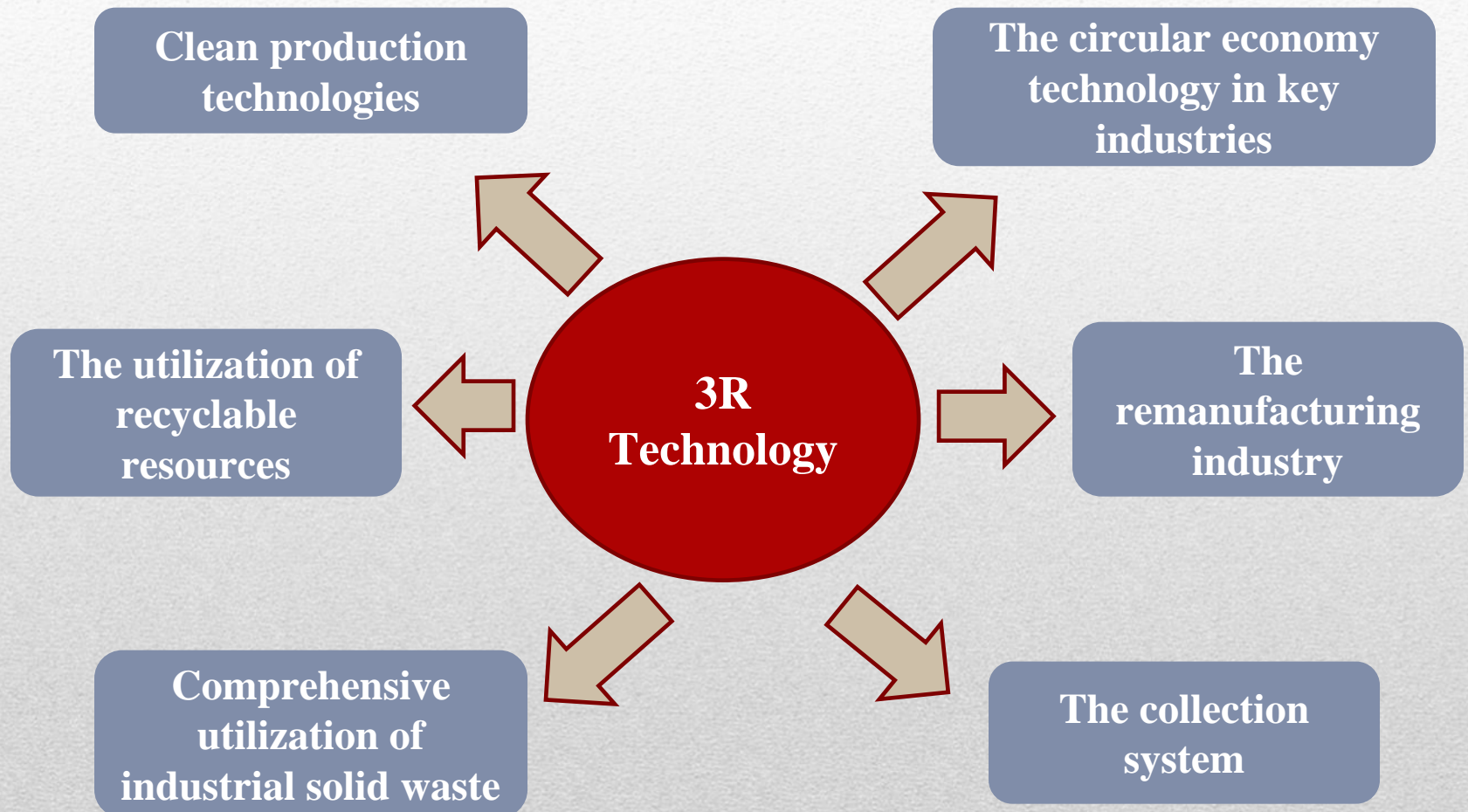
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1. Background of 3R technology development in China

- The 3R technology system is the key factor in supporting the fast development of circular economy in China. Circular economy can't be achieved without the support of advanced technologies. Cleaner production of enterprise, cycle transformation of industrial park, and efficient utilization of resources and waste recycling, can't be achieved without technology innovation.
- Since the "Eighth Five Year Plan", China has been paying attention to support the clean production technologies and carrying out research on the key circular economic technologies in metallurgy, chemical, printing and dyeing industries.
- The Chinese government schemed key technologies of circular economy into "Long-term Science and Technology Development Plan". And implementing "Demonstration of clean production and key technologies of circular economy" and "decision support system of circular economy and build key technology research and demonstration" and other support major projects

Background of 3R technology development in China



2. The Cleaned production technologies has developed continuously

- The cleaner production is an important measure in controlling the pollutant release and reducing the waste production. In 2002, the ‘Cleaner Production Promotion Law of the People’s Republic of China’ was issued, which promoted the cleaner production technologies and encouraged the enterprises to striving for greener production. The former State Economic and Trade Commission and State Environmental Protection Administration had published 3 batches of ‘National Guidance Catalogue of Cleaner Production in Key Industries ’in 2000, 2004 and 2006. The catalogue contained 141 cleaner production technologies related to the metallurgy, oil chemical industry, textile processing, mechanics, non-ferrous metals, construction materials, power and coal industries, which supplied important guidance for the cleaner production in China.



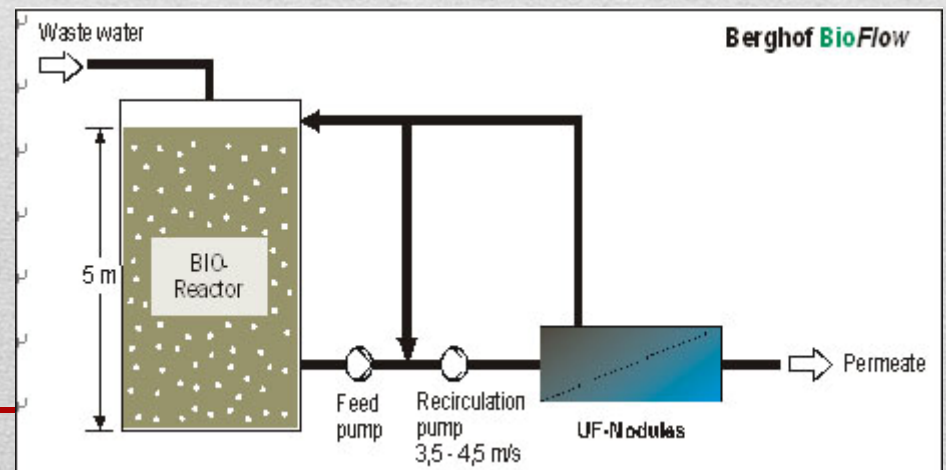
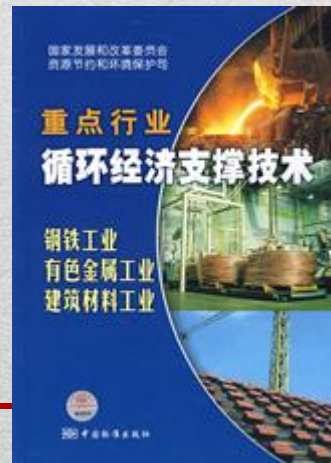
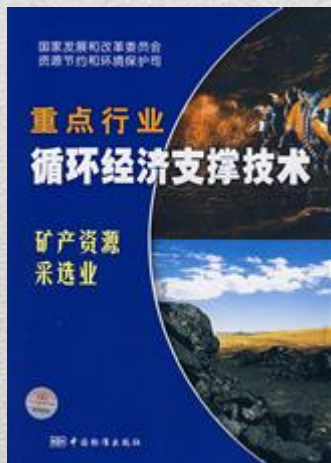
Cleaner production in steel industry



Cleaner production in metal plating industry

2. The circular economy technology are developing quickly in key industries

- In 2007, the State Development and Reform Commission arranged the experts from steel, non-ferrous metals, construction materials, mining, coal, power, petroleum, chemical, papermaking, ferment and leather industries to propose supportive technologies, and 269 advanced technologies were finally screened out and published. These technologies, which had both economic and environmental profits, were adapted to the requirements of the enterprises and played an important role in the technical progress of the industries.



Coking wastewater treatment and recycling technology

3. Recyclable resources

- With the development of the circle economy and the implement of the regulation, the recyclable resource industry in China is expanding gradually, with the technology improving. Some area with recyclable resources concentrated, has formed a number of large-scale leading enterprises, with high level of processing and utilization technologies, and also some foreign advanced production line adopted into these enterprises; with cooperating with other research institutions some companies develop many waste treatment facilities or equipment features suited the current situation of China.
- Taking the industry of non-ferrous metal recycling as an example, a number of recycling businesses with over 50,000 tons non-ferrous metals production capacity have been established and the equipment level promoted rapidly, in which the largest company has the capacity of 0.65 million tons of aluminum production, the largest copper recycling company has more than 400,000 tons of production capacity, the largest lead recycling company has more than 200,000 tons of production capacity.

The technological level of recycling industry has achieved prominent progress



- Hubei Jinyang company already has some of the advanced level of international technology and equipment, and also has developed “pollution-free recycling Lead technology” by themselves in international advanced level, lead paste desulphurisation technology, low-temperature melting technologies, oxygen combustion technology, the depth of deoxidation process etc.. These technologies provide a well basis for the development of waste lead-acid batteries recycling and reusing industry. Recycling of waste lead-acid batteries pre-crushing of used sorting, lead paste desulfurization conversion, to strengthen the smelting of lead-gate technology low-temperature waste melting technology and equipment. It has formed a treatment capacity of 100,000 tons lead-acid batteries, 60,000 tons secondary lead, 100,000 tons lead alloy and 100,000 tons aluminium alloy.

The technological level of recycling industry has achieved prominent progress

HUNAN VARY TECH CO., Ltd



SHENZHEN GEM HIGH-TECH CO.,LTD



Typical WEEE recycling factories in China

In the field of waste electrical and electronic products recycling in China, during the “tenth five-year plan” and the “eleventh five-year plan”, some studies and pilot project have been implement in the waste electrical and electronic products recycling system, metal recovery from scrap PCB, the dismantling of waste home appliances field. The research progress of mechanical and physical treatment process of PCB, the material separation breaking process, CRT display screen cone separation of have all been made advances. A number of standard treatment and disposal companies have established and developed rapidly, with processing capacity increasing and industrial development officially starting.

Technology demonstration and application of E-waste



TES-AMM, Suzhou



4. Comprehensive utilization of industrial waste

- A number of utilization technology and equipment with large volume, low cost and good economic were invented and developed. Fly ash with high volume percentage as 90%, coal gangue brick-making technology, phosphogypsum cement production, coal gangue coal-firing power generation technology etc. and rapid high-temperature slag granulation technology has been obtained the patent, and gypsum board production line of 50 million square meters has been developed. Full coal gangue brick manufacturing technology and equipment has developed to the international advanced level.



Comprehensive utilization of Coal ash



5. The remanufacturing industry has reached initial success

- In 2008, 14 enterprises implemented the auto parts remanufacturing pilot project. Till the end of 2010, reproducing capacity of totally 250 thousand sets of reproduced products, such as automotive engine, transmission, steering gear, generators, was achieved, and achieve positive progress in exploring the old pieces of recycling, re-manufacturing, remanufacturing product distribution system and regulatory measures. The fundamental theory and key technology research on remanufacturing has made important breakthrough, the automation nanoparticles composite coating technology has reached the international advanced level. Pilot work on engineering machinery, machine tools and other remanufacturing has also developed.



6. The collection system of recyclable resources has been set up basically

- The collection system of recyclable resources has been set up basically. 55 cities and 11 distribution market were identified as recyclable resource recycling system pilot project. On one hand, building a wide coverage of the community network facilitated the residents and improves the community environment; on the other hand, constructing sorting centers improved the distribution level, strengthening infrastructure construction, improve sorting, packing and other mechanical operations level, and strengthen environmental protection measures. Pilot cities have formed a community recycling network, sorting centers and distribution markets, which formed trinity recycling network system and substantial increased recyclable resources recovery.



7. Challenges and future development

- The construction of circular economy technology supporting system will refer to several kinds of factors, including the national science development, policies and regulations, the technical level and innovation capacity of enterprises. Nowadays, China is still facing challenges in the development of 3R technologies, for example, the proportion of enterprises which has carried out cleaner production auditing is still at low level(only 0.15% of the total quantities of enterprises); most of the recycling enterprises are small-scale and the technical level is still lower, which will lead to waste resources and environmental pollution; the development of remanufacturing industry is not enough and the collection network need further improvement too.

Trends of future development

- In the future development, with the development of circular economy, with the support of national policies:

The development of 3R technologies will tend to large-scale application and deepening

The research and development capacity and equipment level of enterprises will be promoted

A batch of key and general technologies will be popularized and applied all over the country.

Thank you
