China Chemical Fiber Industry Initiatives in Driving Sustainable Chemical Fibers Supply Chain in The World

Mr. Li Lingshen

Vice Chairman of China National Textile and Apparel Council (CNTAC)

01

Current Status of Green & Sustainable Development

02

Strategic Directions for Sustainable Development

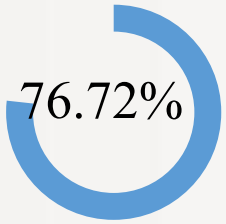
I. Overview of China's Chemical Fiber Industry

1. Industry Scale

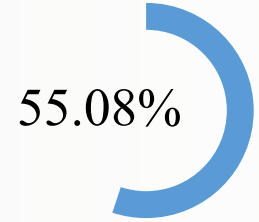
77.93 million tons

Output (2025)

Source: CCFA



China accounts of global chemical fiber production capacity



China's production of chemical fibers accounts of global textile fiber consumption

2、Green Development as an Inevitable Choice

- National Targets: Peaking carbon emissions by 2030 and achieving carbon neutrality by 2060.
- The "Action Outline for Building a Modern Textile Industrial System" from CNTAC emphasizes "Green Manufacturing and Social Responsibility".
- Industry Trends: Transitioning towards High-end, Intelligent, Green, and Integrated manufacturing.

1. Elevating Sustainability Across the Value Chain

- Upstream: Increasing utilization rates of waste resources and bio-based raw materials.
- Production: Upgrading technical equipment and scaling up renewable energy adoption.
- Diversifying the supply of Recycled, Bio-based, and Dope-dyed chemical fibers.

2. Strengthening Mechanisms and Channels

- Implementing Green Fiber & Product Certification.
- Building a multi- Green Manufacturing Standard System (National, Industrial, and Group Standards).

3. Advancing Research and Infrastructure

- Low-carbon development pathways
- Carbon Footprint (CFP) accounting methodologies
- Developing Green Factories

1. The green manufacturing system is continuously improving

93 National-level Green Factories

8 National-level Green Supply Chain Enterprises

8 national-level green design demonstration enterprises

39 enterprises' products have obtained green fiber certification

2. Core technical indicators have been continuously optimized

- Energy Efficiency: 21.14% increase in output was achieved with only 16.47% increase in total energy consumption during 2009-2023.

3. Low-carbon transformation of the energy mix

- While energy consumption grew by 16.47%, raw coal consumption decreased by 21.78% during 2009-2023.
- The electrification process accelerated, with electricity consumption increasing by 23.48% year-on-year, which was 7.01 percentage points higher than the growth rate of total energy consumption over the same period.

4. Carbon emission intensity is gradually declining

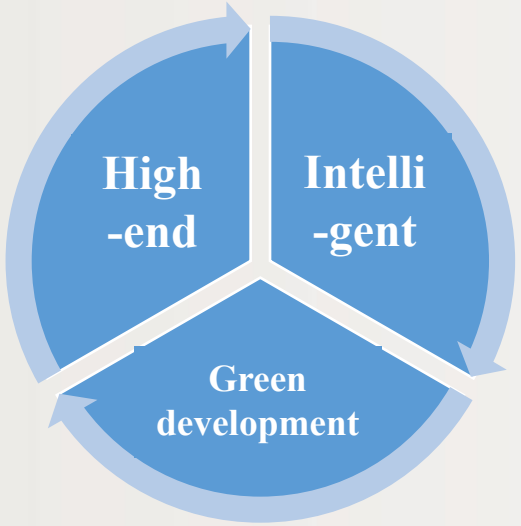
- carbon emission intensity per unit of product decreased by 24.54% during 2009-2023.

IV. Challenges/Difficulties in Green and Sustainable Development

First, the integration of intelligence (AI+), high-end development, and green transformation requires strategic decision-making and synergistic advancement.

Second, end-user brands expect the chemical fiber industry to take concrete and effective actions to reduce the resource and environmental burden of the textile industry chain and strengthen environmental information disclosure.

Third, due to the limited purchasing power of Chinese consumers and the need to further promote green consumption concepts, some green products lack an environmental premium.



01

Current Status of Green & Sustainable Development

02

Strategic Directions for Sustainable Development

1. Enhancing Supply Capacity for Green Fibers

- Bio-based chemical fibers come from sustainable raw material sources and are biodegradable after disposal; some possess natural antibacterial properties and phase-change energy storage functions.
- Recycled chemical fibers reduce the consumption of non-renewable resources such as petroleum and alleviate the pressure of social waste resource disposal. China has successively issued supportive policies such as t*he Action Plan for the Promotion of Recycled Material Application* and *the Measures for the Supervision and Administration of the Quality of Fiber Products*.
- Spun-dyed chemical fibers save the downstream dyeing process, featuring water conservation, energy saving, and carbon reduction.

2. Accelerate the industrialization process of biodegradable fibers

Aerospace

Wind energy

Solar PV

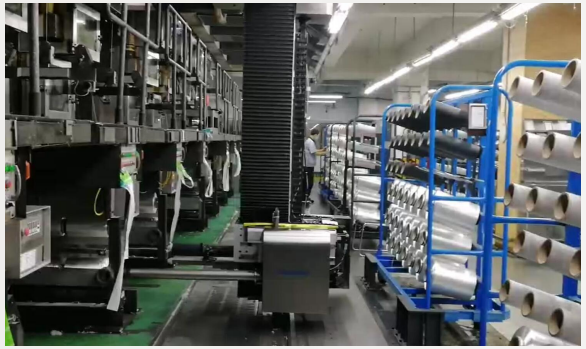
1. Emphasizing both large-scale and flexible production

- Guided by market demand, reasonably advance the construction schedule of new projects. New projects often benefit from economies of scale or coupling effects, with technology and equipment reaching advanced industry levels, significantly reducing the resource and environmental intensity of production and operation activities.
- Meet diverse market demands through AI+ industry integration and flexible production.

2. Deepening the integrated refining and petrochemical 2.0

- Transitioning from equity-based integration to plant/park-level integration, forming coupled development along the industrial chain.

Refining & petrochemicals



Spinning

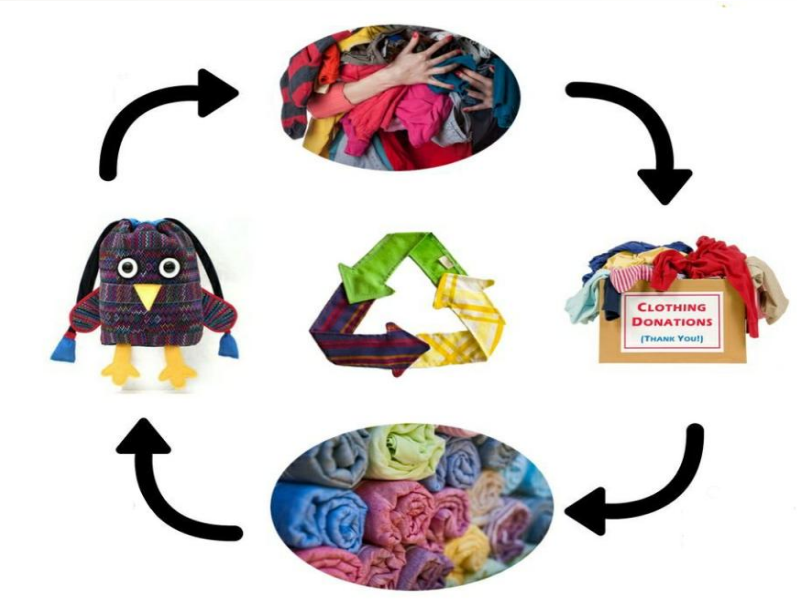
Weaving

Dyeing & finishing

II. Developing the circular economy to reduce pollution and carbon emissions

1. Strengthen the industrial production capacity, identification capability, and traceability of recycled chemical fibers

- Physical method
- Physicochemical method
- Chemical method

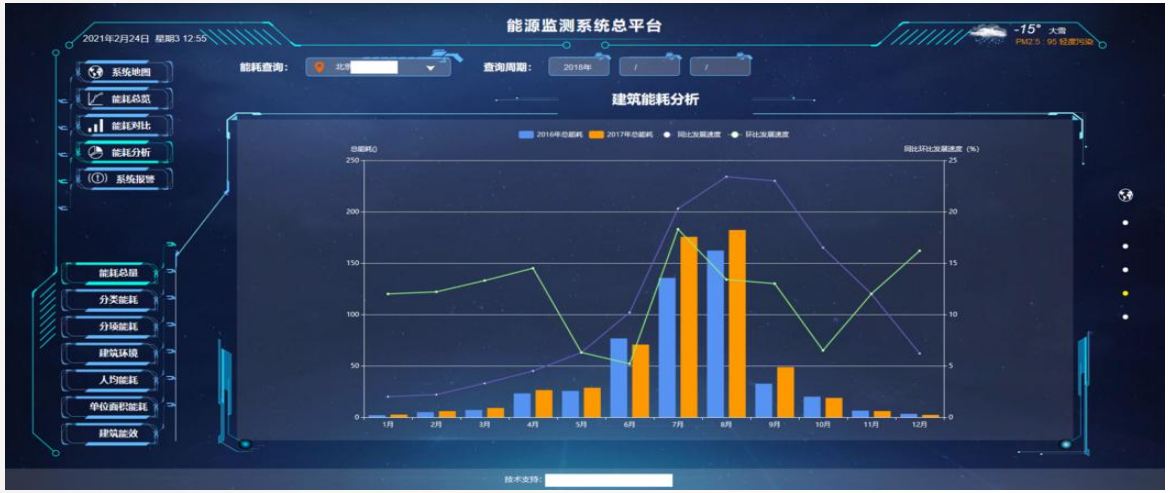


2. Enhance the comprehensive utilization level of resources in the production process.

- The reuse rate of waste yarn in the industrial production process has increased to 100%.
- Polyester filament enterprises recover by-products such as acetaldehyde, creating economic value along with low-carbon and environmental benefits.
- Viscose fiber enterprises recover sodium sulfate and hemicellulose, reducing pollutant levels in wastewater while generating economic value.

III. Improve energy efficiency and promote low-carbon energy transformation.

1. Improve energy efficiency and reduce energy intensity.
2. Adjust the energy structure toward clean and low-carbon sources (photovoltaics, green electricity, biomass fuel).
3. Strengthen energy utilization management.
4. Carry out energy consumption quota management (National energy consumption product standards, Energy efficiency front-runners).



Esterification steam waste heat power generation unit

Photovoltaic power generation

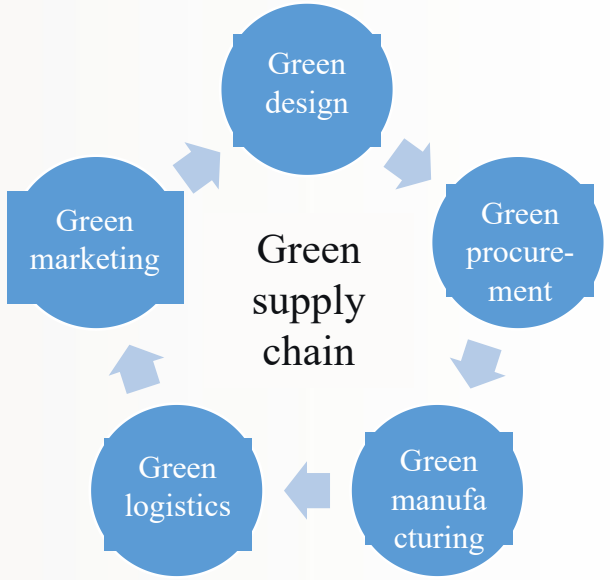
Biomass fuel

Online energy monitoring

IV. Establish a green industrial and supply chain

1. Implement green supply chain management

- Strengthen the concept of extended producer responsibility, build enterprises with green supply chain management, and enhance the transparency of the industrial chain.
- Increase the proportion of green and low-carbon raw materials, oil agents, auxiliaries, and catalysts consumed.



2. Build a green product industrial chain

- Promote the certification of green fibers and green fiber products, extending the green industrial chain.
- Collaborate across the industrial chain to develop green products.

Green Industrial Chain (Recycled Chemical Fibers)

V. Integrated development of intelligent and green technologies

- In the AI+ era, taking polyester filament as an example, starting from automatic feeding of PTA, through control software such as DCS, MES, and energy management systems, along with intelligent equipment including inspection robots, automatic winding robots, automated conveying and packaging lines, and three-dimensional warehouses, the entire process—polymerization, spinning, winding, coning, transportation, external inspection, packaging, and warehouse inbound/outbound—is automated.

VI. Fulfill social responsibility and industry responsibility

1. Fulfill Corporate Social Responsibility

- Encourage enterprises to publish annual social responsibility reports, sustainable development reports, or ESG (Environmental, Social and Governance) reports.
- Disclose key performance data such as carbon reduction development goals and carbon emissions.
- Protect employee rights, occupational health and safety, and carry out public welfare activities.
- Formulate green manufacturing improvement plans, focusing on green supply chain management, green products, green manufacturing, and resource recycling.

Social responsibility reports

2. Promote Industry Social Responsibility Development

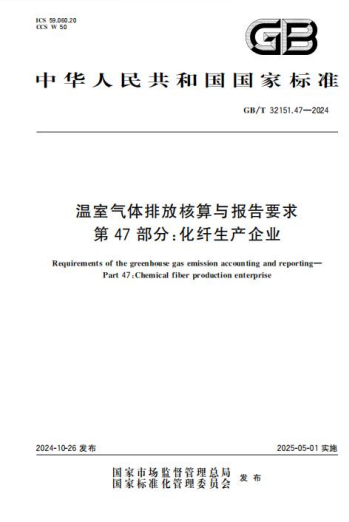
- Advocate industry self-discipline and guide enterprises to actively fulfill social responsibilities.
- Advance the development of ESG systems, establishing ESG information disclosure systems and performance evaluation frameworks.
- Publish industry ESG reports or sustainable development reports to shape a sustainable industry image.

Employee activities

VII. Efforts from all parties to improve the support system

1. Better leverage the platform role of industry associations as a supporting force
2. Expand the authority and coverage of Green Fiber and product certifications.
3. Establish a green manufacturing standards system

- **National Standards:** Corporate greenhouse gas emissions, Product carbon footprint quantification, Energy consumption product limits, Clean production evaluation indicator systems, Water intake quota national standard system
- **Industry Standards:** Green design products, Green factories, Water-saving enterprises
- **Association/Group Standard:** *Acetaldehyde – Extracted from Polyester Esterification Wastewater*



Thank you!