Achieving energy efficient, sustainable and resilient transport sector through harnessing smart and new technologies

---rail sector of China

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• Promoting the green and low-carbon development of the transportation industry has always been one of the goals of China's sustainable transport development.

• For green railways of China, the 2035 development goals are: to take the lead in building an eco-friendly, energy-saving, clean, intensive and efficient green railway system.

• By 2050, the goal of green railway is to build a more efficient, intensive, and environmentally friendly railway system that matches the carrying capacity of natural resources and is in harmony with the ecological environment.
**Smart Railway Freight:** In-depth application of fifth-generation mobile communication (5G), Beidou, mobile Internet, big data, artificial intelligence and other technologies

e.g. 1) [95306 platform]
Optimize platform functions to enhance the experience of shippers.

The daily visit volume of the railway 95306 website has reached 4.88 million times; The average daily usage time of active users is 72 minutes, and the transport process tracking function is used more than 50000 times per day.
entirely online processing and convenient services.

At present, 3649 freight stations and 8392 dedicated lines across the country are all qualified for online processing. 81% of the shippers handle freight transport through 95306 websites and WeChat official account, and 97% of the electronic waybills are used. More than 6900 companies use electronic business licenses to register on the platform, and 55000 shippers apply for digital certificates and handle business through electronic signatures.
Promote intensive management and enhance quality and efficiency.

The per capita processing volume of freight handling has increased from 45 vehicles per day to over 400 vehicles, an increase of 788%; The per capita documents production number has increased from 27 vehicles per day to 180 vehicles, an increase of 560%.
Rail-water intermodal transport is the main action taken by China to achieve green and low-carbon development. The main task driven by technological innovation is to promote the deep application of 5G, Beidou Navigation, big data, blockchain, artificial intelligence, and the Internet of Things in the railway and water transportation industry.
e.g.2 rail-water intermodal transport

“One document system” Promote the entire process bill of lading and single document system

Unified external quotation for the entire transport process
Unified inland full booking
Unified issuance of entire process bill of lading
Smart transport organization

New artificial intelligence will become important supporting means for the development of railway transportation.

Comprehensive automation technology for marshalling yards
Comprehensive automation technology for marshalling yards use the methods such as information integration, technology integration, control integration, system integration, and network integration, and realize the overall decision-making intelligence of the marshalling yard Digitization of command and automation of execution.

### 新时期货运组织变化

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<th>新时期货运组织变化</th>
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<td><strong>货运产品</strong></td>
<td>快捷化、直达化、班列化 • 班列比例大幅度上升 • 点到点直达、阶梯直达类产品增加</td>
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<td><strong>货流组织</strong></td>
<td>集疏系统能力大幅度提升，轴辐式组织模式 • 货运中心成为主体 • 中间站功能弱化</td>
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<td><strong>车流组织</strong></td>
<td>长途车流直达化、短途车流多样化 • 车流中转次数降低 • 按图行车比例增加</td>
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<td><strong>技术站需求</strong></td>
<td>技术站分工和能力优化 • 强化主要编组站能力 • 调整技术站分工和布局 • 精细化作业管理</td>
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The comprehensive automation transformation of each marshalling yard has been basically completed, gradually entering the era of "automation".

The marshalling yard transformation project effectively improves the capacity of the marshalling yard.

- Technical Research on TW-2 Hump Automation Control System
- Extension and Renovation of the line
- Transformation of interlocking relationships between locomotive entry and exit depot lines and some connecting lines
- Empty car rolling test at the station, etc
The railway freight transportation organization has changed the traditional operation mode through information technology, optimized the transportation organization process, and improved transportation efficiency.

The informatization of railway freight transportation process has solved the problem of low efficiency of traditional production models.

With the help of information technology platforms, railway freight transportation process reengineering has been achieved, and innovative reconstruction of transportation processes has been carried out, achieving significant improvements in railway transportation organization in terms of cost, quality, service, and speed.
• remote monitoring and intelligent analysis system for shunting
• research on intelligent control technology for railway freight yard safety
• construction safety monitoring and control system of railway operation line