



中国北车集团大同电力机车有限责任公司  
CNR DATONG ELECTRIC LOCOMOTIVE CO., LTD



# China CNR Datong Electric Locomotive Co., Ltd.





## Company Brief Instruction

CNR Datong Electric Locomotive Co., Ltd. was established in 1954, it was reconstructed to a limited liability company in 2003.

The company is one of the specialized development and production bases of electric locomotive in China. The company covers an area of 2.34km<sup>2</sup>, has a total asset of 4.39 billion CNY, and employs more than 6,000 staff.

The company is the only manufacturer in China with products ranging from steam locomotive, diesel locomotive to electric locomotive.



## Company Milestone

|      |   |
|------|---|
| 1954 | Construction of Datong locomotive works                         |
| 1959 | First steam locomotive  |
| 1986 | First diesel locomotive   |
| 1990 | Turned over to electric locomotive                              |
| 2002 | First AC driven electric locomotive “China star”                |
| 2003 | Construction of Datong electric locomotive Co., Ltd.            |
| 2005 | Technology introduction from ALSTOM                             |
| 2006 | Delivery of first HXd2 high power AC driven electric locomotive |
| 2010 | Signed a sales contract of electric locomotives (BKT- 1)        |



## Introduction of capacity

*Introduction of research & design capacity*

*Introduction of manufacture capacity*

*Introduction of quality control capacity*



## Introduction of R&D capacity



The company has 2,091 technical persons in all kinds of professions, and 237 of them have the title of a senior professional post, 1,119 have intermediate technical titles; 14 doctors, 39 masters and 1006 bachelors. and 4 of them are awarded special allowance by the Chinese State Council.

The company establishes good cooperation with more than 30 research institutes, universities, high technology companies at home and abroad to quickly improve its R&D capability.



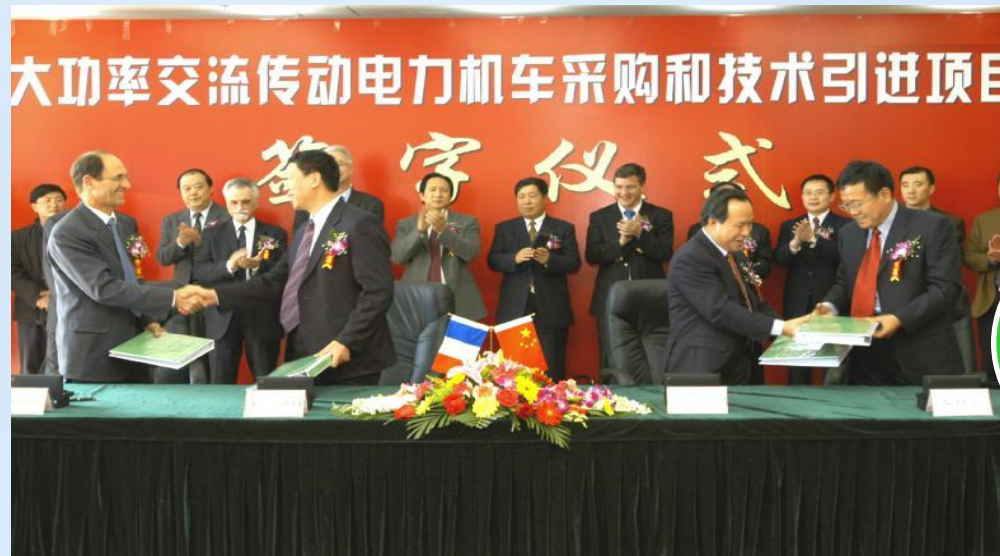


**In 2004 ,technology introduction from ALSTOM,**

**Established world top locomotive configuration (axle control+ IGBT power module+LOCOTROL),**

**Established a common technical platform for AC drive high power passenger & freight electric locomotive,**

**Greatly improved the core technology from low power DC drive to the field of high power AC drive.**



**The contract signing ceremony for 180 high-power  
AC Drive Electric Locomotives**



机车集成及调试技术

Locomotive integration test technology



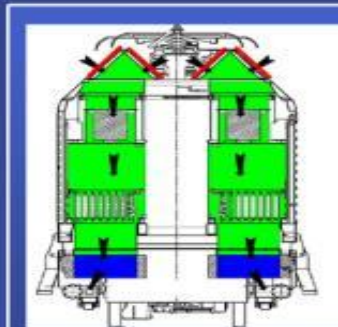
受电弓技术

Pantograph technology



真空主断路器技术

vacuum main circuit-breaker technology



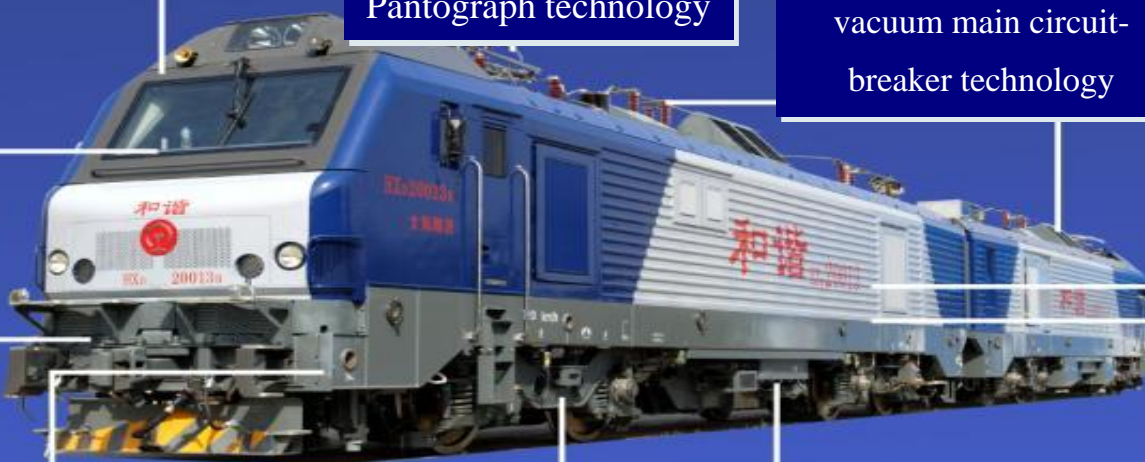
冷却装置技术

Cooling device technology



司机操控电器技术

Driver operation electric equipment technology



机车车体技术

Locomotive car body technology



辅助变流柜技术

Auxiliary convertor block technology



机车预布线技术

Locomotive wiring technology



转向架技术

Bogie technology



牵引变压器技术

Traction transformer technology



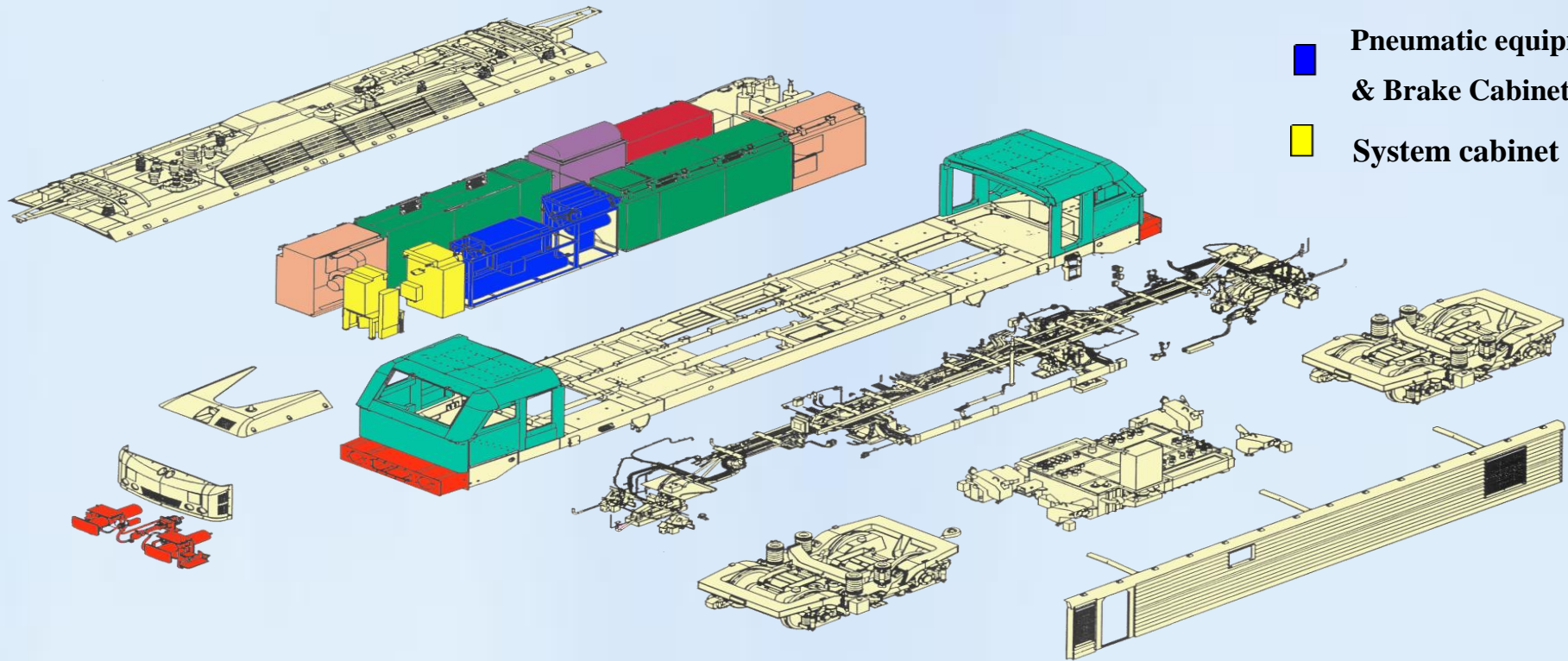
拉铆结构电气柜制造技术






Riveting structure apparatus cabinet manufacturing technology

Locomotive R&D Platform



## Locomotive R&D Platform



-  Auxiliary Converter Block
-  Common Block
-  Main Converter Block
-  Pneumatic equipment cabinet  
& Brake Cabinet
-  System cabinet

**Modularized Parts**

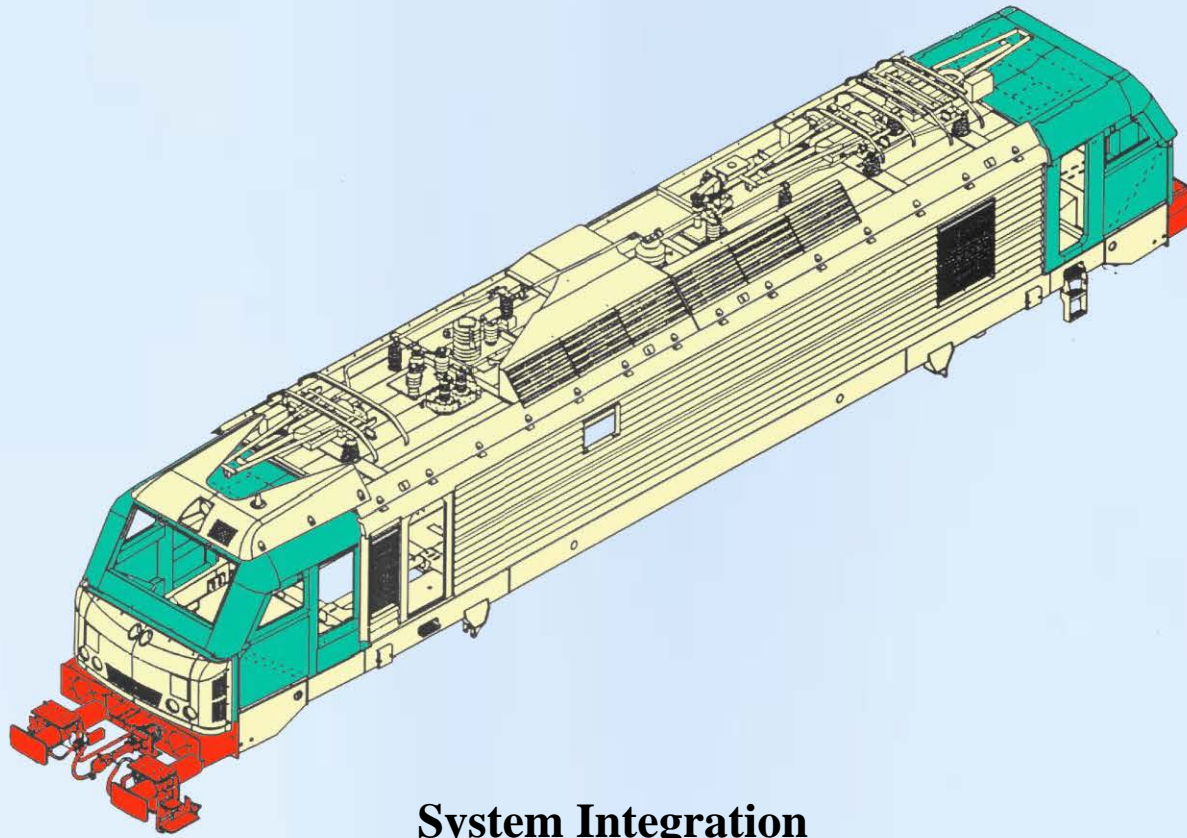




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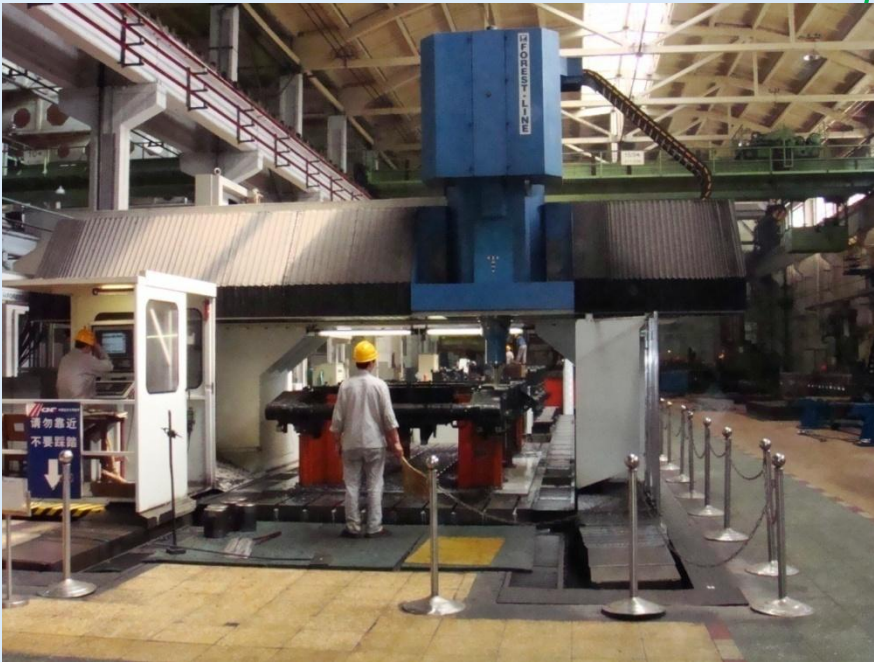
## Locomotive R&D Platform



System Integration



## Introduction of manufacture capacity



At present, the company has various production equipment 1,357 sets, among them, critical equipment 59 sets; important equipment 62 sets; numerical control equipment, including CNC, welding robot, NC shearing machine, NC bending machine, NC nibbling machine and laser cutting machine etc, 83 sets; large scale numerical control equipment 12 sets;

Has processing equipment 3,557 sets for the locomotive of different types, including various large scale welding positioner, tilter, assembly devices, process car, hydraulic wrench torque, crimping tools.

The current production capacity of the company is 500 sets of locomotives.



7  
production  
lines

- ★ **Digital Plate Stock Production Line**
- ★ **Unit Body Production Line**
- ★ **Specialized Bogie Production Line**
- ★ **Modularized Electric Cabinet Production Line**
- ★ **Specialized traction transformer manufacturing line**
- ★ **Specialized Mid & High Voltage Electric Apparatus Production Line**
- ★ **Locomotive Assembly Production Line**



## Digital Plate Stock Production Line





## Unit Body Production Line





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## Specialized Bogie Production Line





## Modularized Electric Cabinet Production Line





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## Specialized Traction Transformer Production Line







## Specialized Mid & High Voltage Electric Apparatus Production Line





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## Locomotive Assembly Production Line





## Introduction of quality control

### Quality Control of Self-made Parts

#### **Strict quality corrective & trace program**

--- to realize the traceability & closed loop management of quality corrective action

---

#### **Scientific method of FAI (First Article Inspection)**

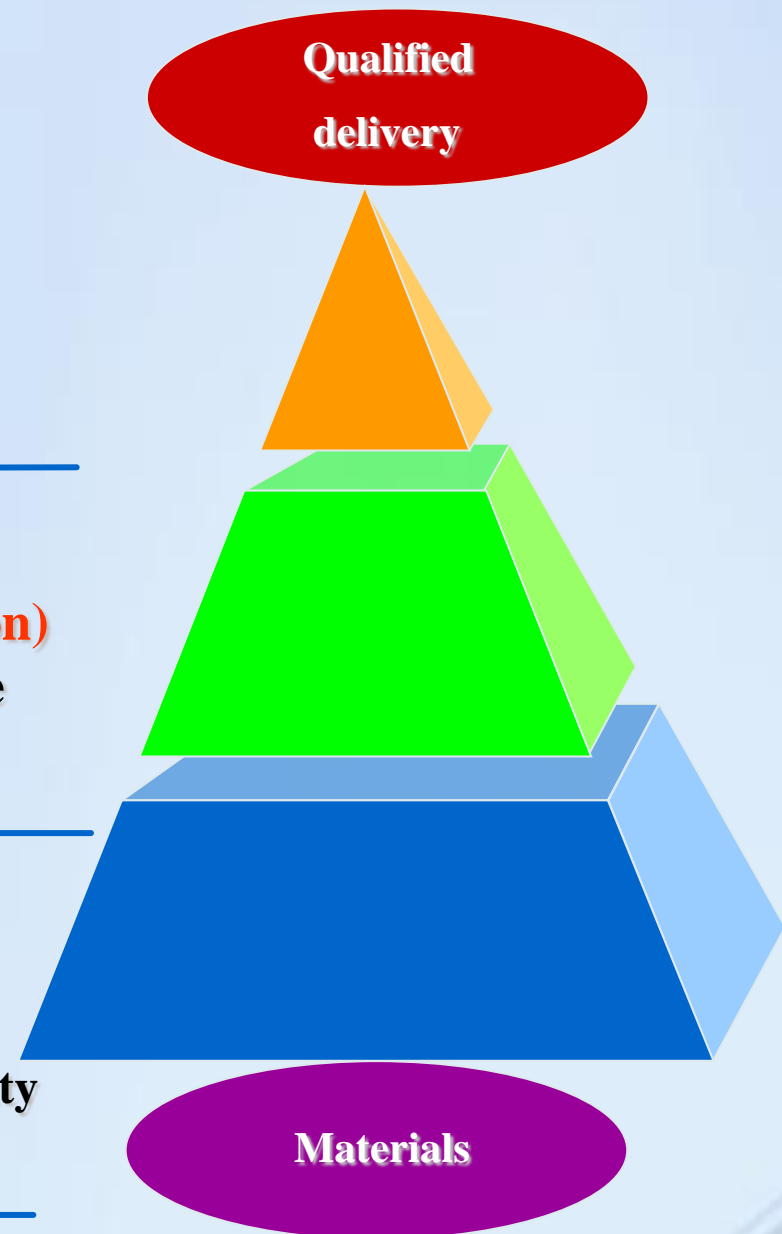
---to guarantee the delivery quality reliable & stable

---

#### **Advanced three-level quality control system**

---to execute the three-level product quality control respectively by operator, inspector and quality engineer

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## Quality Control & Supplier Training System of the Purchased Parts



# 澳大利亚机车项目

Australia locomotive project



CNR Datong electric locomotive Co., Ltd (hereinafter referred to as DELC) **pays close attention to Australia railway** since years ago, and CNR also established an agent in Australia.

中国北车集团大同电力机车有限责任公司（简称：同车公司）一直对澳大利亚铁路保持着密切的关注，中国北车集团在澳大利亚设有办事机构。

同车公司经过对澳大利亚铁路状况的了解，认为澳大利亚铁矿专线和煤运专线，更适合使用牵引力大、重载能力强的电力机车。

After carrying out investigations on the special Australia railway conditions and the domestic developing expectations, DELC considers that it is more suitable for using high power heavy haul **electric locomotives** on the lines for transportation of iron ore and coal.



电力机车与内燃机车相比，  
经济效益和技术优势明显。

Compare electric locomotive  
and diesel locomotive, electric  
locomotive is more available  
because of money saving and  
technical advantages.



电力机车：  
**electric locomotive:**

节约能源  
环保  
经济效益

energy saving  
environment protection  
money saving

功率大  
牵引力大  
重载能力强

higher power  
greater tractive effort  
better overload capacity



## 电力机车在节约能源方面的优势 **Electric locomotive: energy saving**

电力机车牵引所用的电能属二次能源，转化方式多样，可以综合利用资源。可以利用水力资源、核能资源、天然气资源和火力发电站供电，可使用劣质煤或重油，从能源利用多元化上，电力牵引具有无法比拟的优势。

如果考虑电力传动或液压传动部分损失，内燃机车的平均热效率仅为26%，而电力机车的平均热效率为28%；如果利用太阳能或核能发电则电力机车的平均热效率更高。因此，从提高能源利用效率，减少热损方面，大力发展电力机车牵引，对铁路运输的节能降耗工作有着重大意义。

**The electric energy is secondary energy. There are several kinds of converting methods which could be obtained comprehensively, for example from water power, nuclear energy and natural gas energy. Even from heat power plant, we can also use inferior coal or heavy oil.**

**From the point of loss of electric transmission and hydraulic transmission, the average thermal efficiency of diesel locomotive is only 26% and the electric locomotive is 28%. If the solar energy or nuclear is used, this efficiency would be higher.**

**So from the angle of energy saving and decrease thermal loss, we suggest to use electric locomotive which means a lot for the energy saving on railway transportation.**





## “再生制动”技术带来的节能环保效益 **Electric locomotive: regenerative brake technology**

随着“再生制动”馈电技术在电气化铁路牵引机车和动车组上采用，相比传统的机械制动方式，交流调速、再生制动系统具有能量再生利用、减低制动噪声等优点，节能环保效果明显。

再生制动是将牵引电动机变成发电机后发出的电能，通过接触线或第三轨反馈回铁路供电系统，所回馈的电能可以供其他机车使用。在能效利用率上，再生制动要比内燃机车常用的空气制动方式要高得多。

**Compared with traditional mechanical brake, regenerative brake technology, used on electric locomotives and electric multiple units, has the advantages of energy reuse, less braking noise and better energy saving and environment protection.**

**With the regenerative braking technology, during braking, the traction motors work as generators to feed the electric power back to railway power system through the overhead line or the third rail, so that electric power regenerated could be used by other electric locomotives. In respect of energy efficiency, the regenerative braking is much better than air brake usually adopted by diesel locomotives.**



## 电力机车运行时的环保优势

### Electric locomotive: environment protection

内燃机车废气造成的空气污染，对整个运行区域的生态环境、人体、植物、动物、气候都有影响。根据资料统计，1吨柴油燃烧排放的有害气体需要1.34万立方米的新鲜空气来稀释才能使空气质量达标，如果替换一台内燃机车，将相当于减少了4000辆小汽车的尾气排放。

电力机车依靠接触网上送来的清洁电能获得动力，本身不燃油，不产生废油，不排放有害气体，不但对运行区段不会造成环境污染，而且极大地改善了机车乘务员劳动条件。

**The exhausted gas emitted by diesel locomotives could harmfully affect the ecological environment, human body, plant, animal and climate. According to statistics, the noxious gas emitted by combustion of 1 ton diesel requires  $1.34 \times 10^4$  m<sup>3</sup> fresh air for dilution to meet the air quality standards, if a diesel locomotive is replaced with an electric locomotive, it equals to reducing exhausted gas of 4,000 cars.**

**The electric locomotives collect the clean power from the overhead line, they do not generate any noxious gas, so that they will not cause any pollution to the environment. Moreover they also greatly improve the working conditions of attendants on the train.**



## 电力机车具有明显的运输和通过优势

### Electric locomotive: technology advantages

电力机车与内燃机车相比，具有功率大、过载能力强、牵引力大的优势。电力机车还有一个优点就是无限行程，只要车辆不驶离电气化段，就不会“饿倒”（故障除外），无需像内燃机车那样经常补充燃料。

内燃机车的功率要增大，必须增加柴油机功率，加大发电机功率，同时必须加大燃料箱，体积上受到限制，而且燃烧效率下降比较厉害。电力机车的功率增大相对简单，目前单轴功率可达1600kW。

**Compared with diesel locomotives, electric locomotives have higher power, better overload capacity and greater tractive effort. Another merit of electric locomotive is that it could run on the electrified line unrestrictedly without stop due to empty fuel (except breakdown time).**

**To achieve a greater power of a diesel locomotive, the power of diesel engine and generator should be increased, meanwhile the fuel tank should be enlarged. With the tank increasing, the fuel efficiency decreases badly, and the tank also has volume limit. However, it is easier to increase the power of electric locomotive, at present single axle power is up to 1,600kW.**



## 其他优势

### Other advantages

除了以上几点的优势外，电力机车还具有速度快、整备作业时间短、维修量少、运营费用低、便于实现多机牵引等优点，特别是在山区爬坡更有优势，下坡时还可以利用再生制动反馈电网电能。

使用电力机车牵引列车，可以提高列车运行速度和承载重量，从而大幅度地提高铁路的运输能力和通过能力。电力机车启动加速快，爬坡能力强，工作不受严寒的影响。在运输繁忙的铁路干线和隧道多、坡度陡的山区线路上更能发挥电力机车的优越性。

**Besides the advantages above mentioned, the electric locomotive still has other superiority such as higher speed, higher efficiency of service work, less maintenance, less operation cost, more easily realize locomotive couple, etc. And the electric locomotive could display the climbing capacity specially in mountain region, and when the electric locomotive goes down the slope it could also feedback the electric energy to overhead line by regenerative brake.**

**The operation speed and carrying capacity can be highly increased and the transportation capacity and pass ability can also be greatly boosted by using electric locomotive to drag train. The electric locomotive has high start acceleration, strong climbing ability and less being influenced from ambient such as frost. The electric locomotive can also better display its advantage on busy railway and the trunk with many tunnels and slope in mountain region.**



目前，世界上最先进的内燃机车，单机功率在5000kW左右，同车公司生产的HX<sub>d</sub>2型电力机车，单机功率可达到10000kW，负载能力10000吨，非常适合在澳大利亚铁矿专线和煤运专线上使用。

At present, the most advanced diesel locomotive only has about 5,000kW single-machine power, but the HX<sub>d</sub>2 electric locomotive manufactured by DELC is with 10,000kW single-machine power and load capacity of 10,000t, and suitable to work on iron and coal railways in Australia.



HX<sub>d</sub>2机车大秦线上牵引两万吨煤炭  
HX<sub>d</sub>2 locomotive 20,000t heavy haul coal freight  
for China Da-Qin railway



同车公司目前主要生产以下四种大功率交流传动电力机车：

HXd2型电力机车

HXd2B型电力机车

HXd2C型电力机车

“中白货运I型”电力机车

**DELCO are mainly manufacturing four types of high power AC drive electric locomotive:**

**HXd2 electric locomotive**

**HXd2B electric locomotive**

**HXd2C electric locomotive**

**BKT-1 electric freight locomotive**



## HXd2型电力机车 **HXd2 Electric Locomotive**



同车公司目前共生产了180台该型机车，目前全部运行于太原铁路局湖东机务段。

“HX<sub>d</sub>2”型电力机车是由法国阿尔斯通交通运输股份有限公司和中国北车集团大同电力机车有限责任公司为中国大秦铁路牵引20000吨重载货运列车而联合设计开发的一种新型大功率交流传动电力机车。

**DELIC has manufactured 180 sets of “HX<sub>d</sub>2” locomotive by far and all of them are running at Hudong depot of Taiyuan railway bureau.**

**“HX<sub>d</sub>2” electric locomotive is jointly designed by DELIC and France ALSTOM. It is a new type high power AC drive electric locomotive specially developed for China Da-Qin railway 20,000t heavy haul freight train.**



### 主要技术参数:

机车持续功率 : 10,000 kW

机车最高速度 : 120 km/h

机车起动牵引力:  $\geq 700$  kN (23t 轴重)  
 $\geq 760$  kN (25t 轴重)

### 主要结构形式:

轴式:  $2(B_0-B_0)$

悬挂方式: 半悬挂

前后车钩中心距: 18,975 mm

### 机车主要特性:

- ★具有逻辑控制、自诊断功能
- ★采用独立轴控方式
- ★总功率达到10MW, 是目前国内所有既有机车中功率最大的机车

### Main Technical Parameter:

Continuous power : 10,000 kW

Maximum speed : 120 km/h

Starting tractive effort :  $\geq 700$  kN (23t axle load)  
 $\geq 760$  kN (25t axle load)

### Main Structure Form :

Axle arrangement :  $2(B_0-B_0)$

Suspension mode : half suspension

Length over coupler centers : 18,975 mm

### Main characteristics of Locomotive:

- ★ Logical control and self-diagnosis
- ★ Adopts independent axle control
- ★ Total power up to 10MW, is the highest power in existing domestic locomotives.





## HXd2B型电力机车 HXd2B Electric Locomotive



同车公司共出厂了500台该型机车，主要交付北京铁路局天津机务段、丰台机务段、唐山机务段和上海铁路局南京机务段和徐州机务段使用。

六轴大功率交流传动货运电力机车是由中国北车集团大同电力机车有限责任公司为牵引重载货运列车而设计开发的一种新型大功率交流传动电力机车。

**DELCO has manufactured 500 sets of “HXd2B” locomotive by far, and most of them are running at Tianjin, Fengtai, Tangshan depot of Beijing railway bureau and Nanjing, Xuzhou depot of Shanghai railway bureau.**

**It is a new type of six axle high power AC drive freight electric locomotive which is specially developed for heavy haul freight transportation by DELCO.**



### 主要技术参数:

机车持续功率: 9,600 kW

机车最大速度: 120 km/h

机车起动牵引力:  $\geq 584$  kN

### 主要结构形式:

轴式:  $C_0-C_0$

悬挂方式: 半悬挂

前后车钩中心距: 22,960 mm

### 机车主要特性:

- ★ 逻辑控制和自诊断功能
- ★ 采用独立轴控方式
- ★ 单轴功率达到1,600kW, 是目前国内所有既有机车中单轴功率最大的机车。

### Main Technical Parameter:

Continuous power : 9,600 kW

Maximum speed : 120 km/h

Starting tractive effort :  $\geq 584$  kN

### Main Structure Form :

Axle arrangement :  $C_0-C_0$

Suspension mode : half suspension

Length over coupler centers : 22,960 mm

### Main characteristics of Locomotive:

- ★ Logical control and self-diagnosis.
- ★ Adopts independent axle control.
- ★ Single axle power up to 1,600kW, is the highest single axle power in existing domestic locomotives.



## HXd2C型电力机车 HX<sub>d</sub>2C Electric Locomotive



同车公司共生产了220台该型机车，主要服役于郑州铁路局新乡机务段。

HXd2C型电力机车为中国北车集团大同电力机车有限责任公司自主研发的新型电力机车，机车技术指标达到了世界一流。HX<sub>d</sub>2C型电力机车主要针对铁路重载运输而设计，机车单轴功率1250kW，机车总功率大于7200kW，可实现单机牵引5000-6000t重载货物列车。

**DEL C has manufactured 220 sets of “HX<sub>d</sub>2C” locomotive by far, and most of them are running at Xinxiang depot of Zhengzhou railway bureau.**

**The HX<sub>d</sub>2C type of electric locomotive is the self-designed new type locomotive by DELC which has absorbed the advanced and mature technology of the world level electric locomotive and its technique index has reach the most advanced level of world. HX<sub>d</sub>2C electric locomotive is designed for the railway heavy-load transportation with the single-axle power 1,250kW and locomotive total power more than 7,200kW, which could perform the single unit leading 5,000-6,000t heavy-load train.**



### 主要技术参数:

机车持续功率: 7,200 kW

机车最大速度: 120 km/h

机车起动牵引力:  $\geq 520\text{kN}$  (23t 轴重)  
 $\geq 570\text{kN}$  (25t 轴重)

### 主要结构形式:

轴式:  $C_0-C_0$

悬挂方式: 半悬挂

前后车钩中心距: 22,960 mm

### 机车主要特性:

逻辑控制和自诊断功能

采用独立轴控方式

### Main Technical Parameter :

Continuous power : 7,200 kW

Maximum speed : 120 km/h

Starting tractive effort :  $\geq 520\text{kN}$  (23t axle load)  
 $\geq 570\text{kN}$  (25t axle load)

### Main Structure Form :

Axle arrangement :  $C_0-C_0$

Suspension mode : half suspension

Length over coupler centers : 22,960 mm

### Main characteristics of Locomotive :

Logical control and self-diagnosis

Independent axle control.



## 中白货运I型电力机车 **BKT-1 Electric Freight Locomotive for Belarus Railway**



中白货运1型机车是中国北车集团大同电力机车有限责任公司为白俄罗斯国家铁路设计开发的一种新型大功率交流传动电力机车，共计生产出口12台，根据白俄罗斯铁路运营环境而研发设计的轨距为1520毫米的宽轨八轴大功率交流传动电力机车。

**BKT-1 freight electric locomotive is a brand new high power AC drive electric locomotive which is designed by DELC in light of the requirement of Belarus Railways, and DELC will manufacture and export 12 sets. BKT-1 locomotive is eight axle high power AC drive electric locomotive which is developed according to the operating environment in Belarus and with 1,520mm gauge.**



### 主要技术参数:

轨距: 1,520mm

机车持续功率: 9,600kW

轴重: 25t

机车最高速度: 120 km/h;

机车起动牵引力:  $\geq 760\text{kN}$

### 主要结构特点:

轴式:  $2(B_0-B_0)$

悬挂方式: 半悬挂

前后车钩中心距: 19,075 mm

### Main Technical Parameter:

Track gauge: 1,520mm

Continuous power: 9,600kW

Axle load: 25t

Max. speed: 120 km/h;

Starting tractive force:  $\geq 760\text{kN}$

### Main Structural Form:

Axle arrangement:  $2(B_0-B_0)$

Suspension mode: half suspension

Length over coupler centers : 19,075 mm



中国北车集团大同电力机车有限责任公司  
CNR DATONG ELECTRIC LOCOMOTIVE CO., LTD



# Our commitments

Provide satisfactory locomotive product and service for you.

Bring you great economic benefit and social value.