新能源汽车国家大数据联盟

National Big Data Alliance of New Energy Vehicles

BAQ

BETTER AIR QUALITY CONFERENCE

DATA PLATFORM CONSTRUCTION AND APPLICATION OF ELECTRIC VEHICLES

November 17, 2023

Manila

新能源汽车国家大数据联盟
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Data Platform Construction and Application of Electric Vehicles

Sponsored by: National Big Data Alliance of New Energy Vehicles

Manila, Philippines

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FORMAT OF THE SESSION		SPEAKER
11:15-11:25	Opening The Emcees/Moderator will do a short introduction as a background on the session.	Yan Hantao Researcher International Big Data Alliance of New Energy Vehicles
11:25-11:45	Innovative Applications of Networked Big Data Platform of NEVs	Zhang Zhaosheng Associate Professor Beijing Institute of Technology Consultant Expert of International Big Data Alliance of New Energy Vehicles
11:45-12:00	Future Automobile - China's Solution and Path	Yan Jianlai Secretary-General for Specified Affairs China Society of Automotive Engineers
12:00-12:15	Current status and trend of electric vehicle industry development in the Philippines	Ferdinand I. Raquelsantos President of Philippine Parts Maker Association (PPMA) Chairman of electric-Vehicle Association of the Philippines (e-VAP)
12:15-12:30	Case sharing（Play the video to introduce the National Monitoring and Management Platform for NEVs）	Wang shuo Assistant Professor Beijing Institute of Technology
12:30-12:40	Q&A	All Panelists
12:40-12:45	Closing	Yan Hantao Researcher International Big Data Alliance of New Energy Vehicles

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Zhang Zhaosheng

Beijing Institute of Technology

Consultant Expert of International Big Data Alliance of New Energy Vehicles

Innovative Applications of Networked Big Data Platform of NEVs

Prof. Zhaosheng Zhang

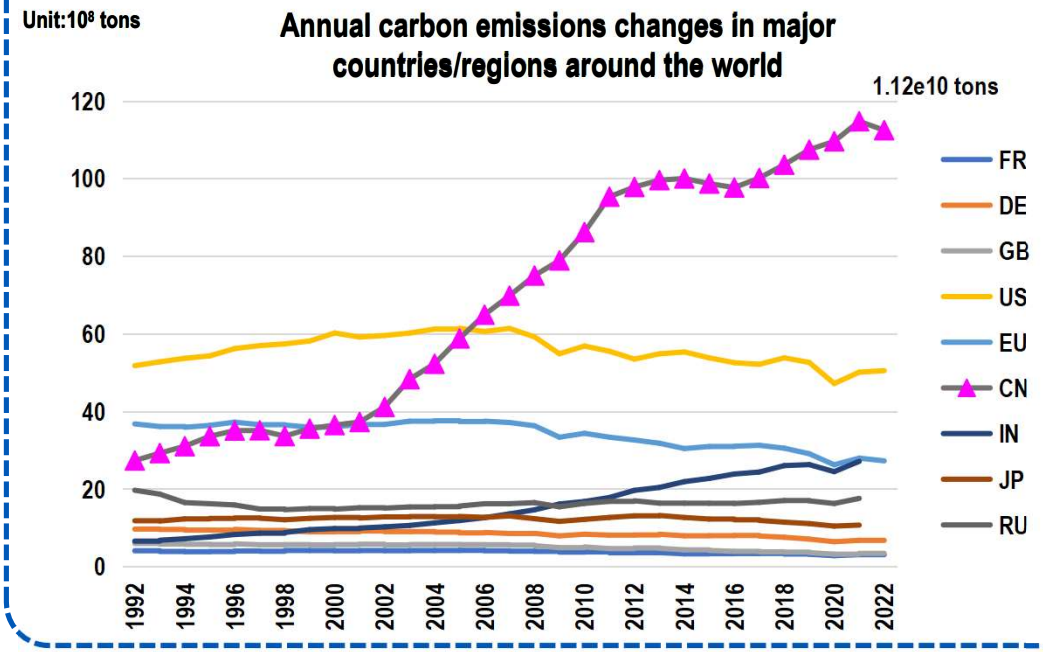
Beijing Institute of Technology

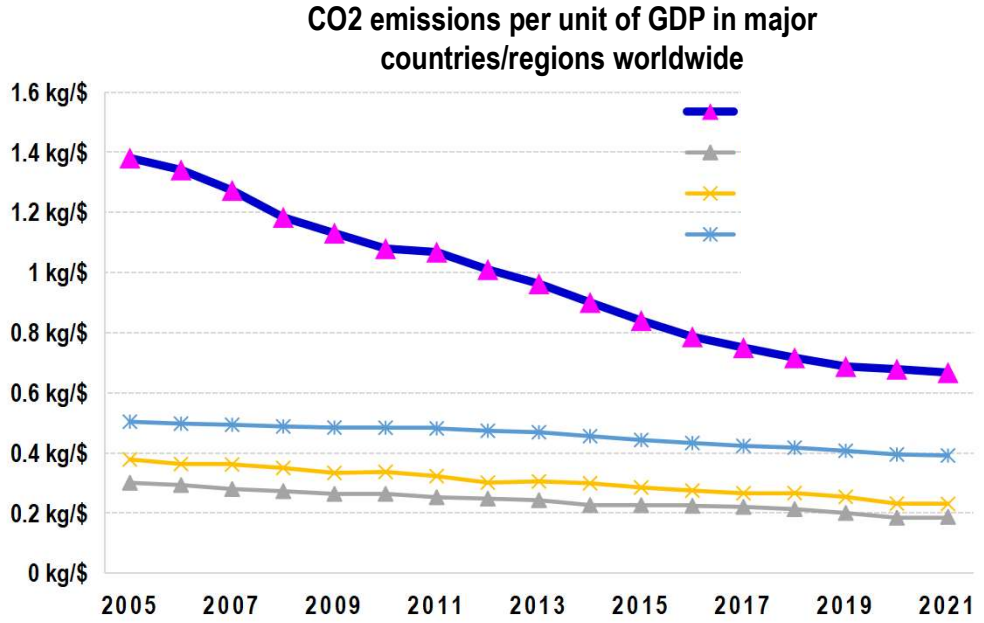
November 17, 2023

Content

Low Carbon Development – an Arduous Task

- China's total carbon emissions rank 1st globally, with an average annual growth rate of about 3% over the past five years.
- China's carbon emission intensity decreased by about 50% from 2005 to 2021 but is still 2-3 times higher than developed countries.
- Sustainable low-carbon energy transition is the basics, and energy saving and efficiency upgrading of the terminal sector is the main approach.

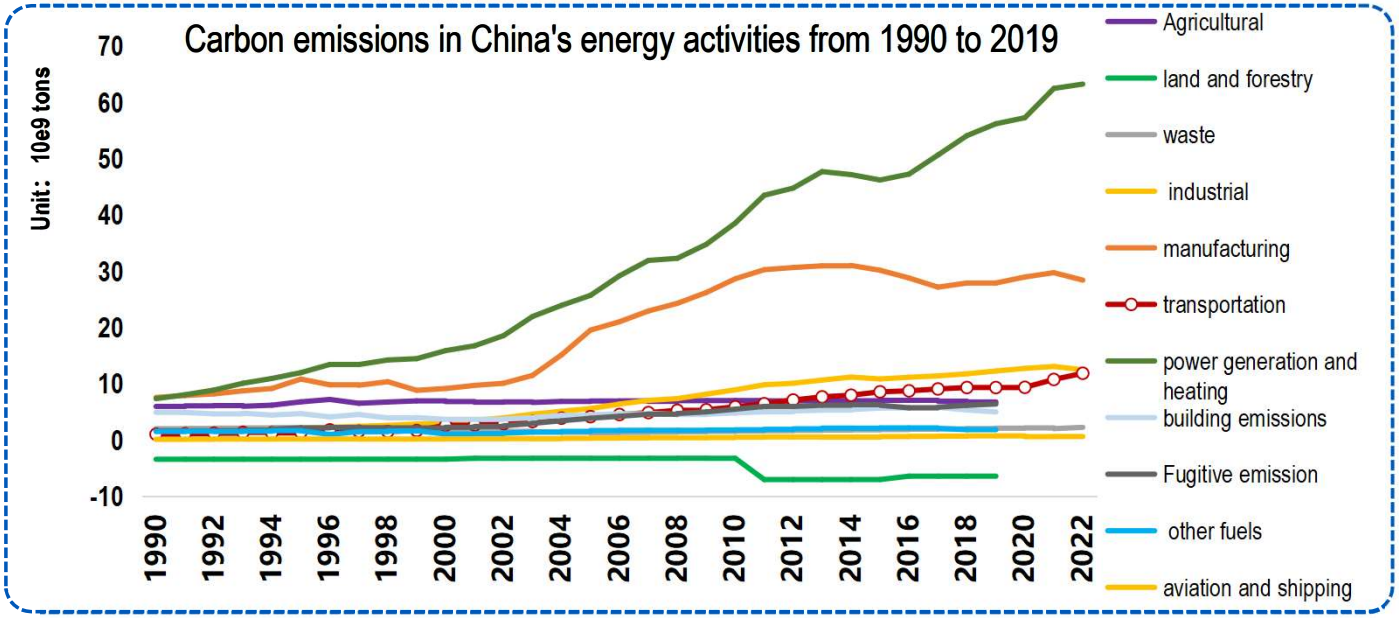


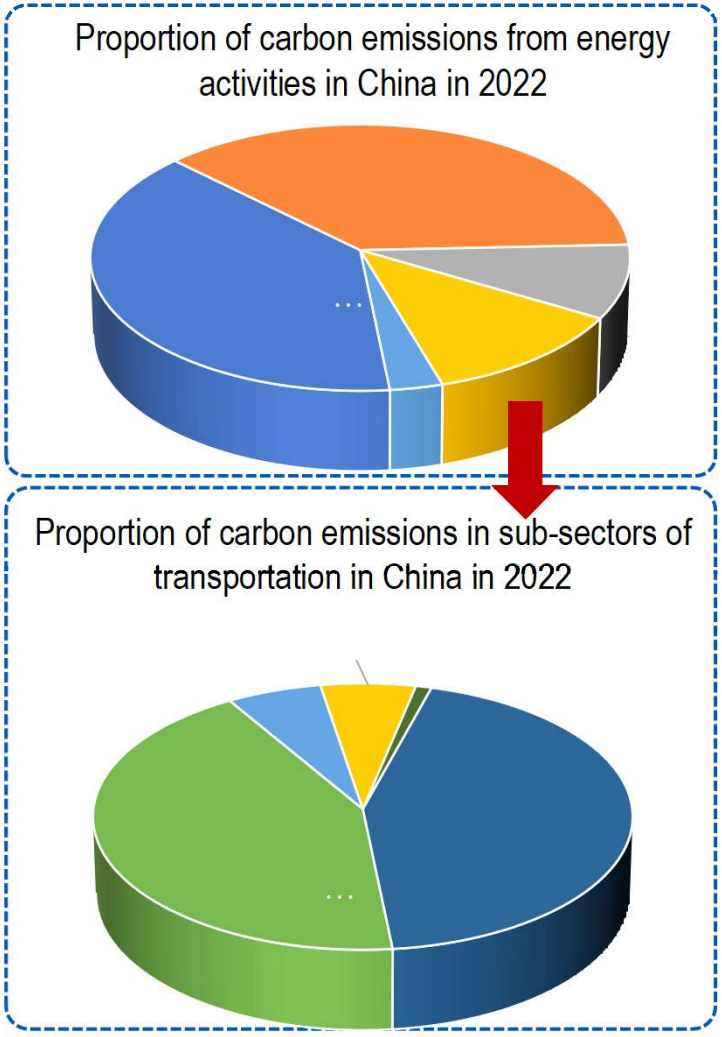


Source: Our world in Data、IEA、IMF

Carbon Reduction in Transportation - a Long Way to Go

- In 2020, 2021, and 2022, China's transportation sector's carbon emissions were approximately 0.93, 1.07, and 1.18 billion tons, accounting for 12% of the country's total carbon emissions
- In 2022, the carbon emissions of road traffic in China account for about 87% of the total carbon emissions of transportation sector
- The carbon emissions of China's automotive industry have not yet been decoupled from economic growth, and in recent years, it has maintained an average annual growth rate of around 5%



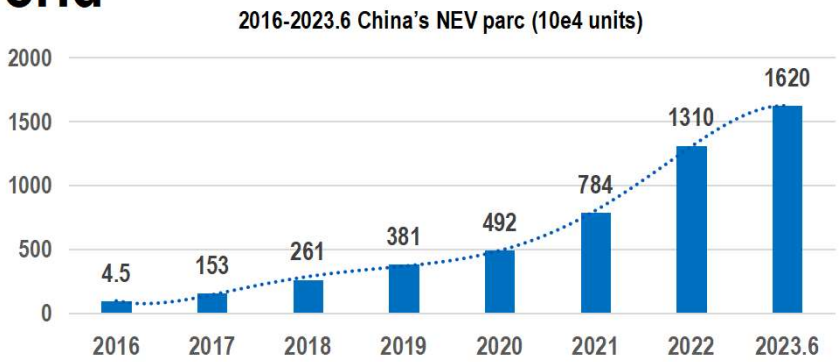


Source: Global Change Data Lab & Institute of Climate Change and Sustainable Development, Tsinghua University, ourworldindata.org; Tsinghua University Carbon Neutrality Research Institute's "Global Near Real-Time Carbon Dioxide Emissions Report (2022-2023)"

Status quo of the NEV Industry

NEVs are hot and competitive around the world

In May 2014, President Xi Jinping's visit to SAIC emphasized that NEVs are the way for China to move towards an automotive powerhouse



Vehicle parc of NEVs continues to grow rapidly

China make great achievement in NEV popularization

- Production and sales of complete vehicles rank first worldwide
- The number of charging facilities ranks first in the world
- Power battery sales rank first globally

Overall Leading

NEVs have become a new Symbol of "Made in China" in transportation sector

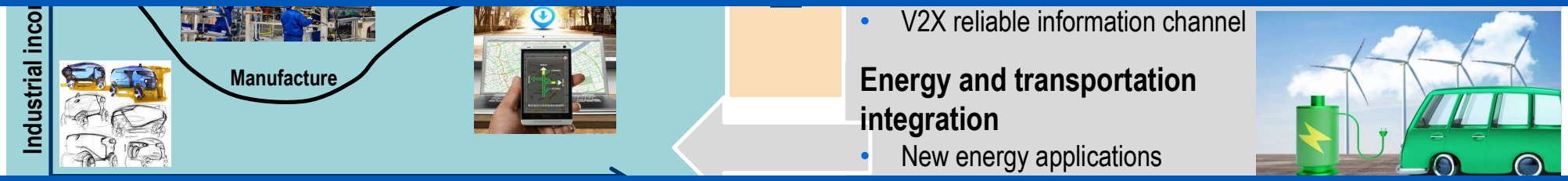
Status quo of the NEV Industry - Digital Applications

☐ Intelligent and Connected reconstruction of the automotive ecosystem

New technology such as big data, AI, and 5G become innovative carriers Transformation and upgrading happens in multiple technological fields, such as materials, manufacturing, and transportation services

"Whoever holds the data holds the initiative"

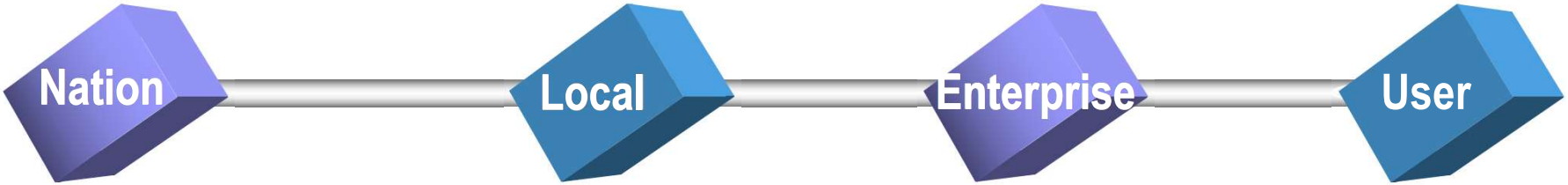
-President Xi



Big data has become the core of the present and future digitized industry

Research Background and Ideas

NEV industry are facing new challenges



- Emission reduction accounting
- Benefit and subsidy accounting
- Operational safety supervision
- Traceability of quality defects
- Traffic safety management

- Carbon Management
- Safety Supervision
- Customized Apps
- Blue Sky Defense Battle

- Product planning
- Quality control
- Safety control
- Precision marketing

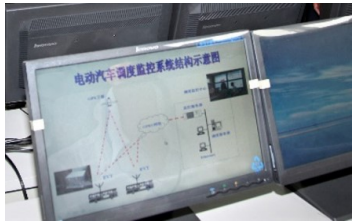
- Safety anxiety
- Range anxiety
- Charge anxiety
- Insurance Pricing

Industrial innovation and management change driven by big data have become an international consensus

Content

Construction of the National Monitoring And Management Platform For NEVs

Platform Construction



Electric bus supervision and dispatching platform during Beijing Olympics (Fleet Level)

Build: Beijing Monitoring and Management Platform for NEVs (First in China)

Build: Enterprise Platform (Million Level)

Host: National Monitoring and Management Platform for NEVs

Expand: National Monitoring and Management Platform for NEVs (10^8 Level)

2006 — 2011 — 2013 — 2016 — 2022

Standards

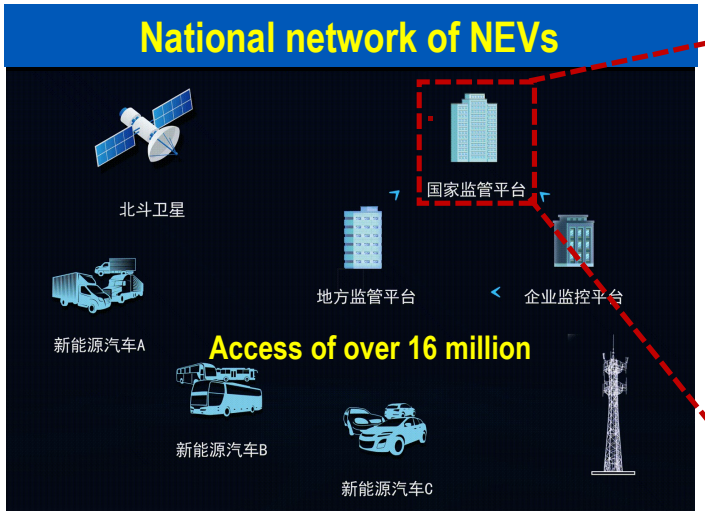
Enterprise Standard

Provincial Standard (First in China)

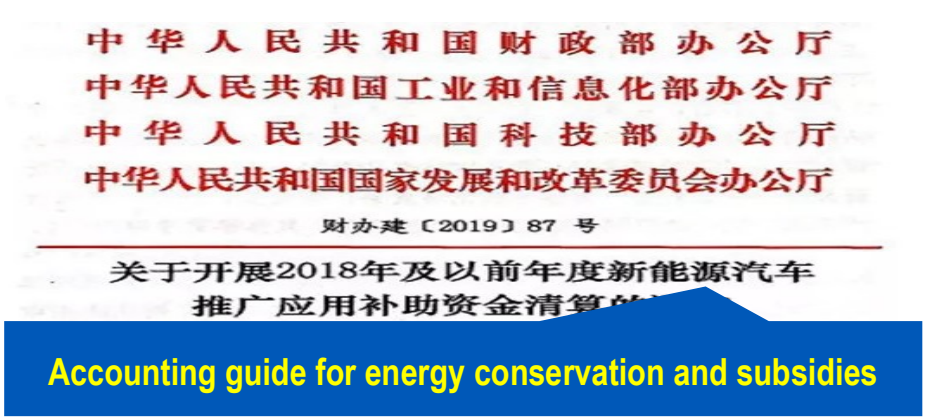
National Standard(First in the world)

Platform Development and Construction

- **Created** a nation-local-enterprise multilevel monitoring system
- **Building** the world's largest internet of vehicles



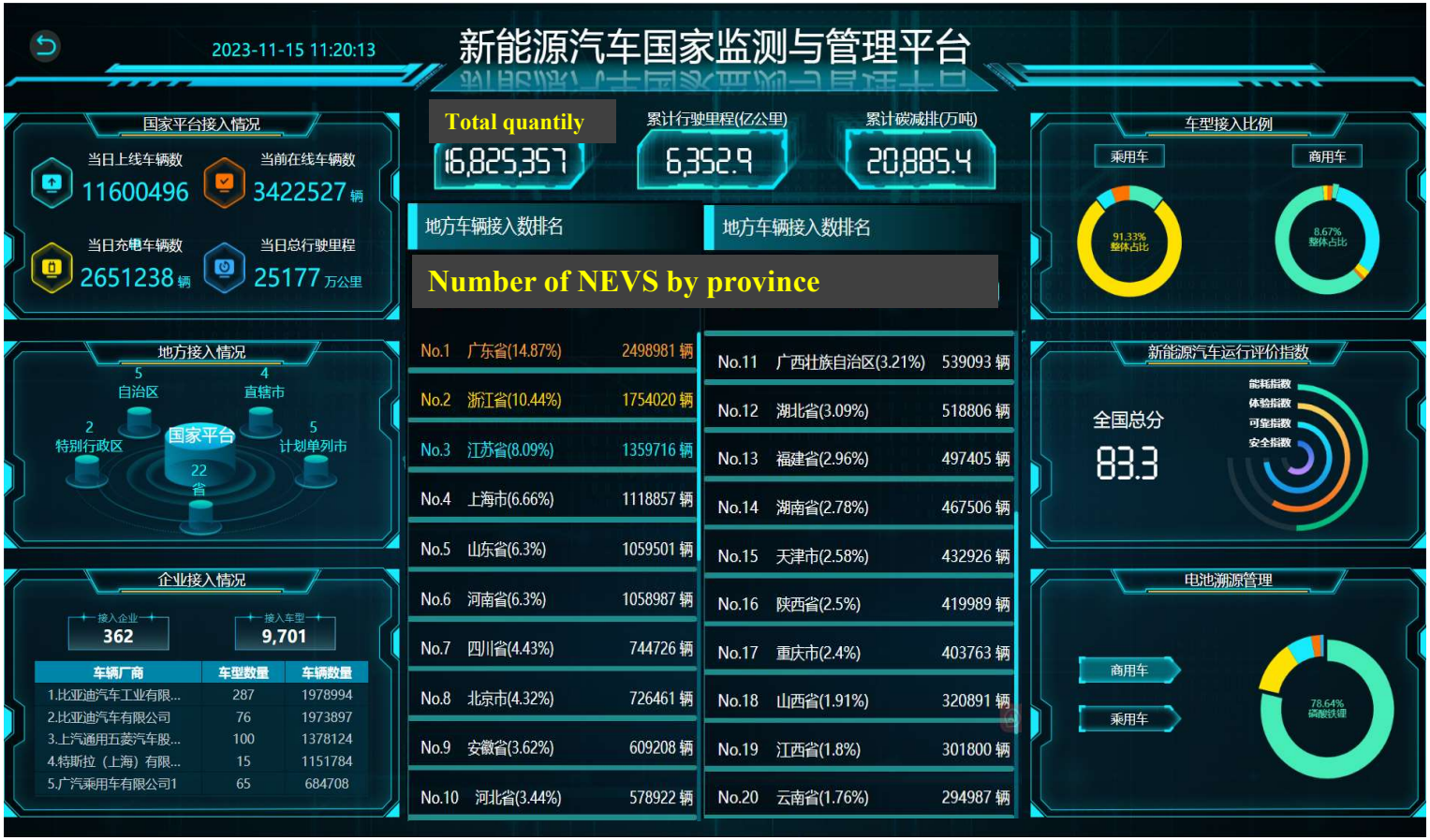
Supervision for vehicle safety in promotion



Accounting guide for energy conservation and subsidies

Status quo of the Platform – a Preview

- According to the statistics of the National Monitoring and Management Platform for NEVs, there are more than **16.82 million NEVs** connected by November 15th
- Daily online rate over **70%**, real-time online rate near **30%**



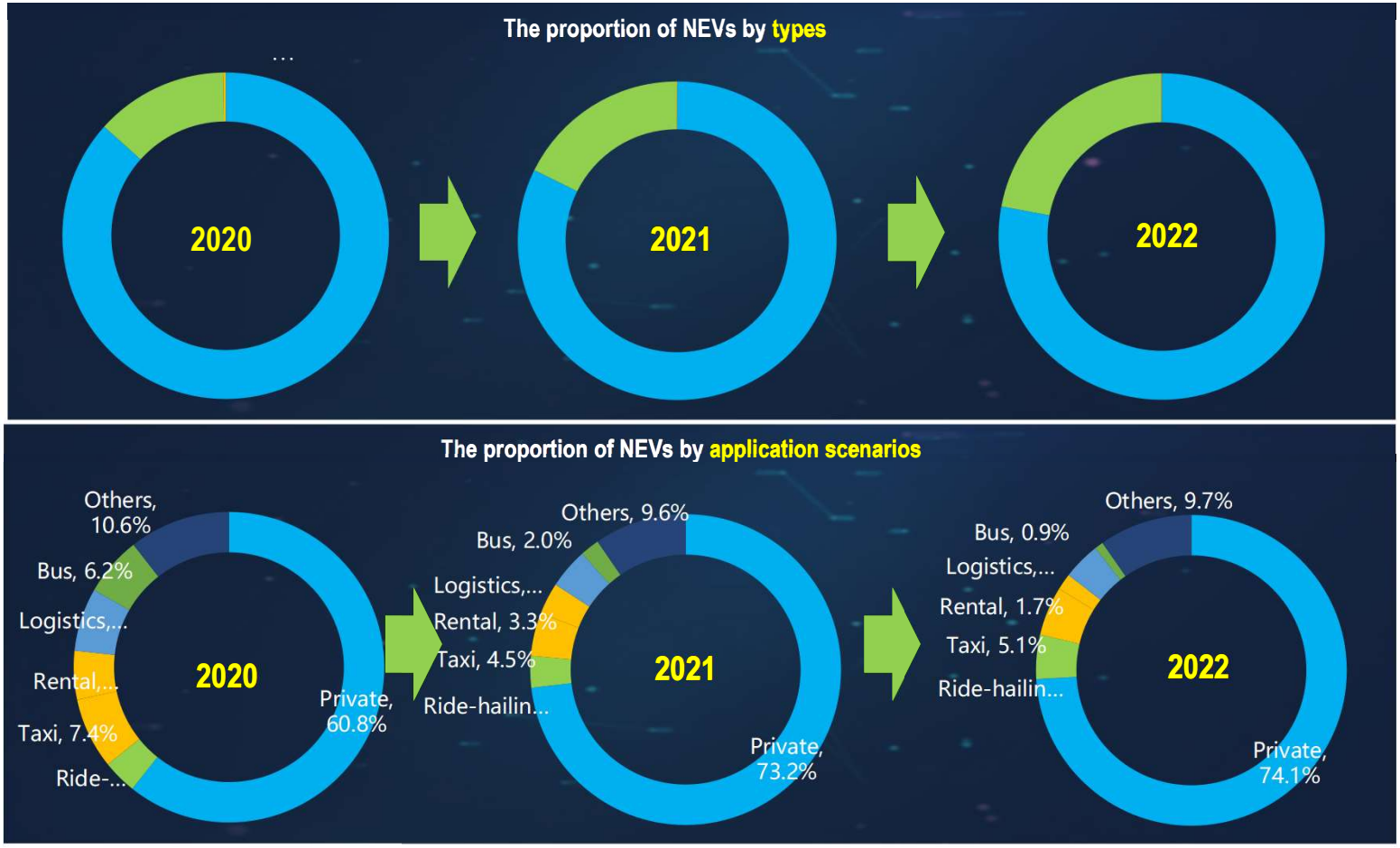
Function

- macro grasp of the development of new energy vehicles
- calculate carbon emissions by using vehicle operation data
- monitor the safety of vehicle operation
- Find quality problems of new energy vehicles and give feedback

Platform Display - Promotion of Vehicles by Type

Display the market share change of different types of NEVs annually

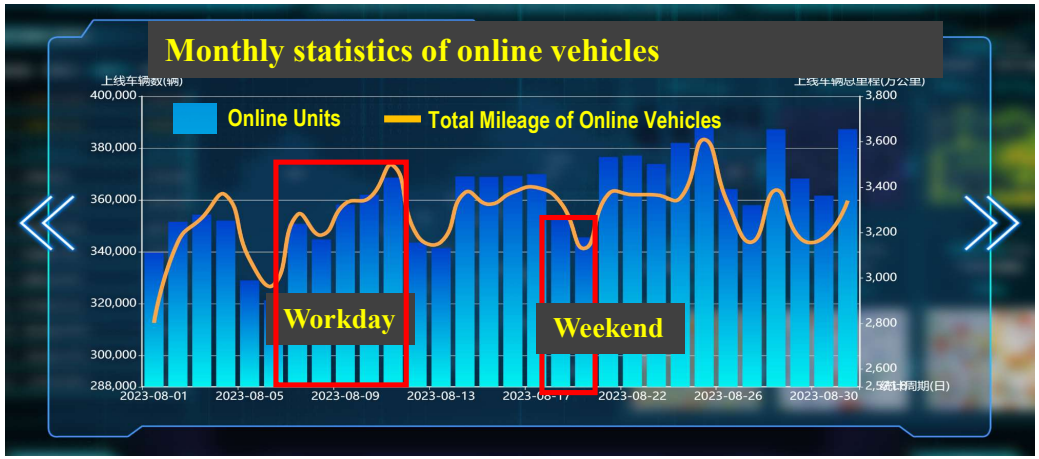
- The industry transforms from policy-driven to market-driven
- The market shows diversified structural characteristics
- Rich experience in promoting under all applications

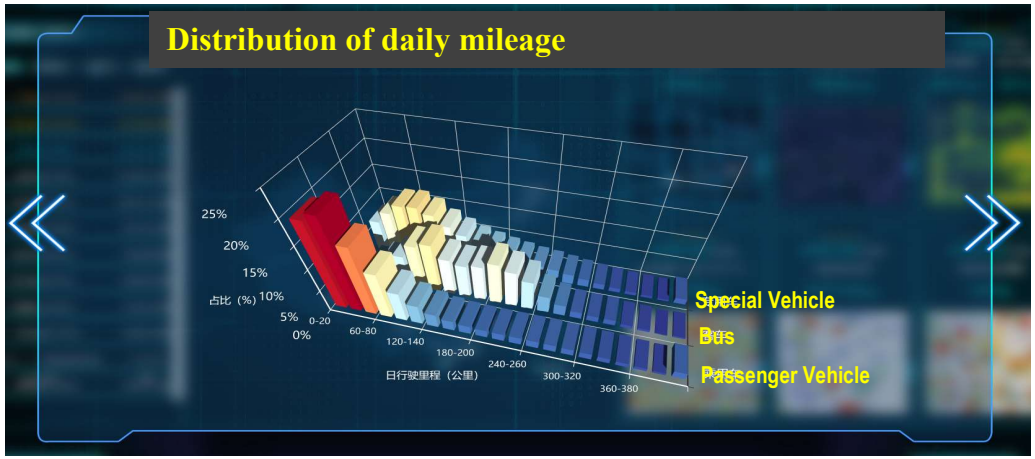


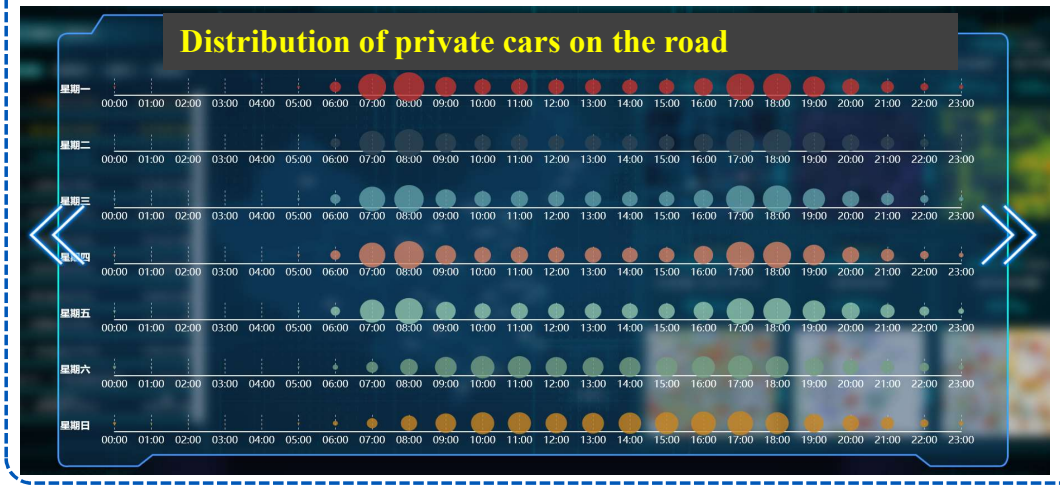
Source: National Monitoring and Management Platform for NEVs

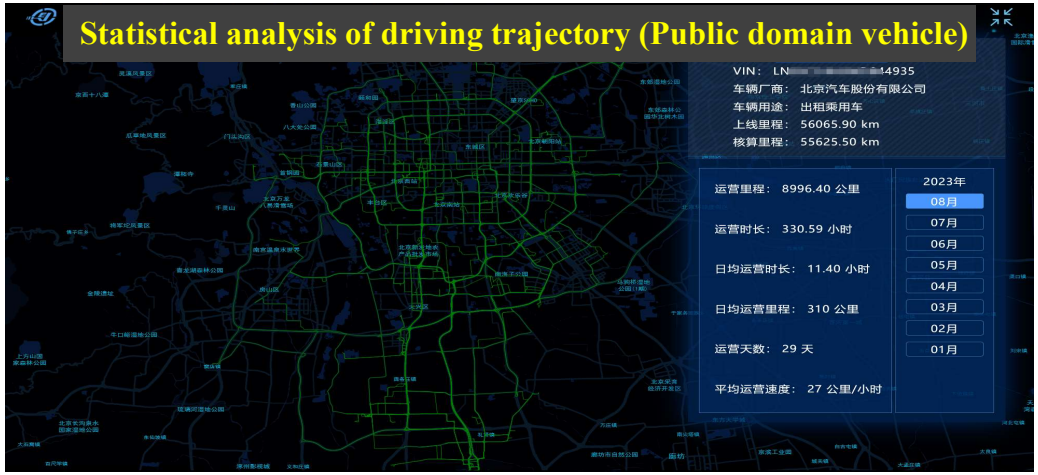
Platform Display - Operating Characteristics (Beijing as e.g.)

- The characteristics of vehicle activity, driving behavior, and trajectory of classified NEVs





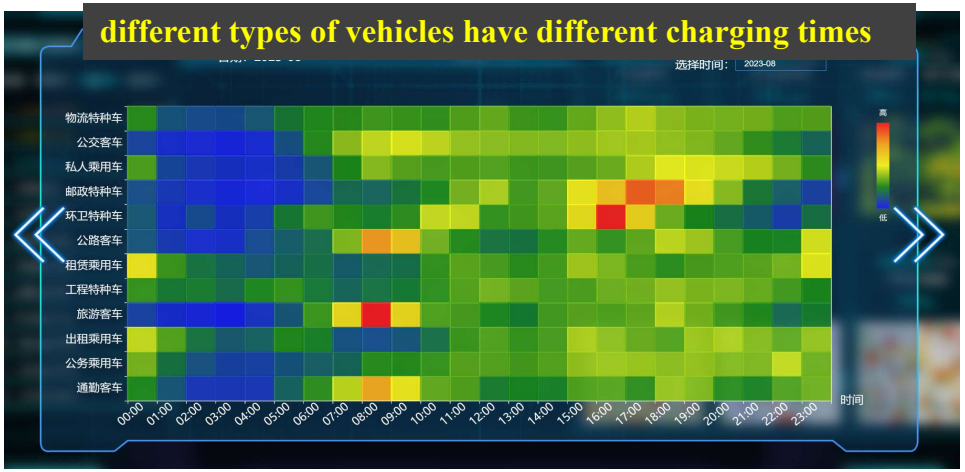


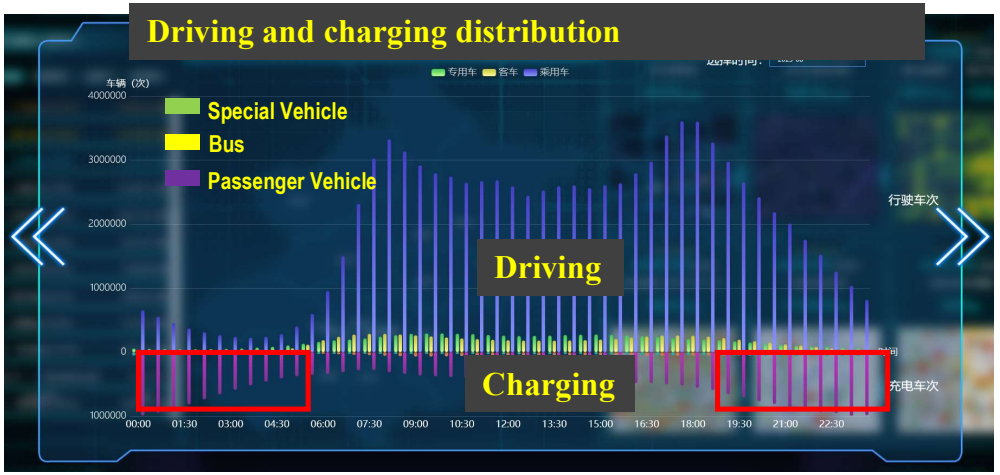


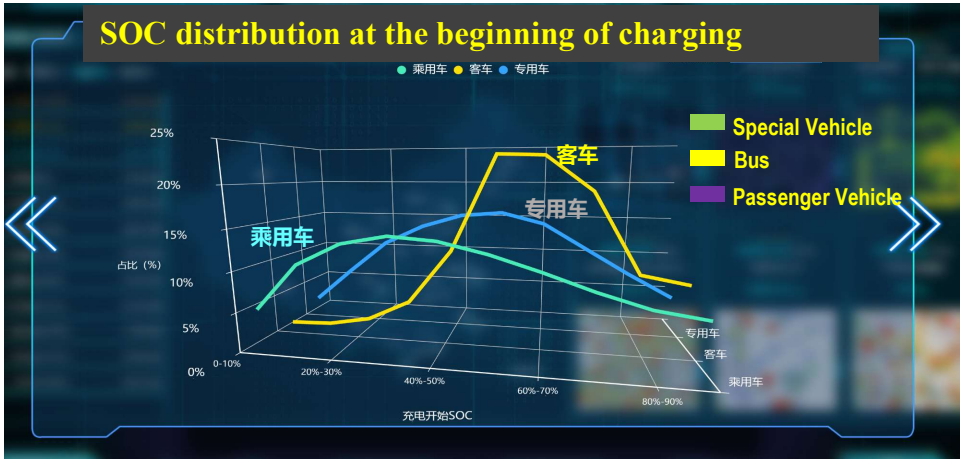
Source: National Monitoring and Management Platform for NEVs

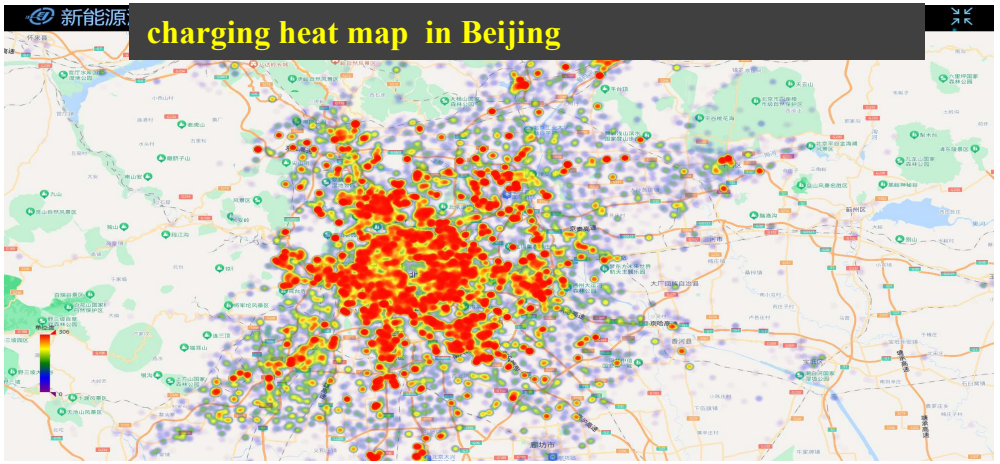
Platform Display - Vehicle Charging Features (Beijing as e.g.)

- Characteristics of charging behaviors including **start time, start SOC, and heat distribution**







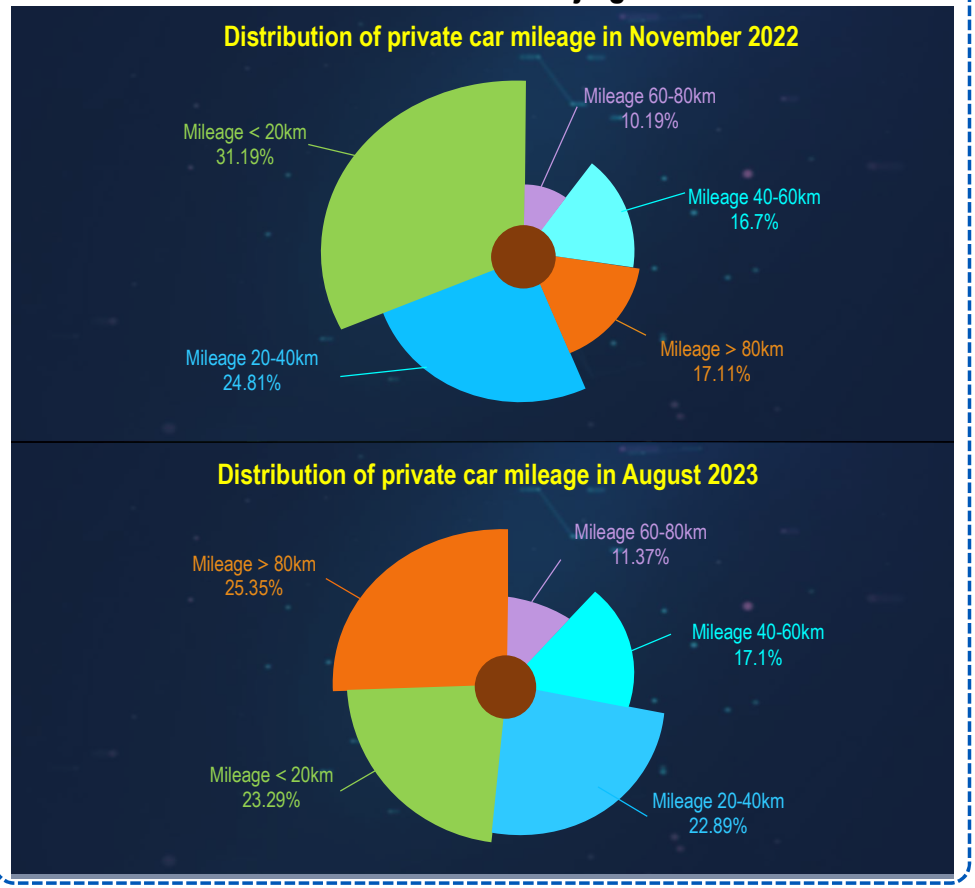


图片来源：新能源汽车国家监测与管理平台

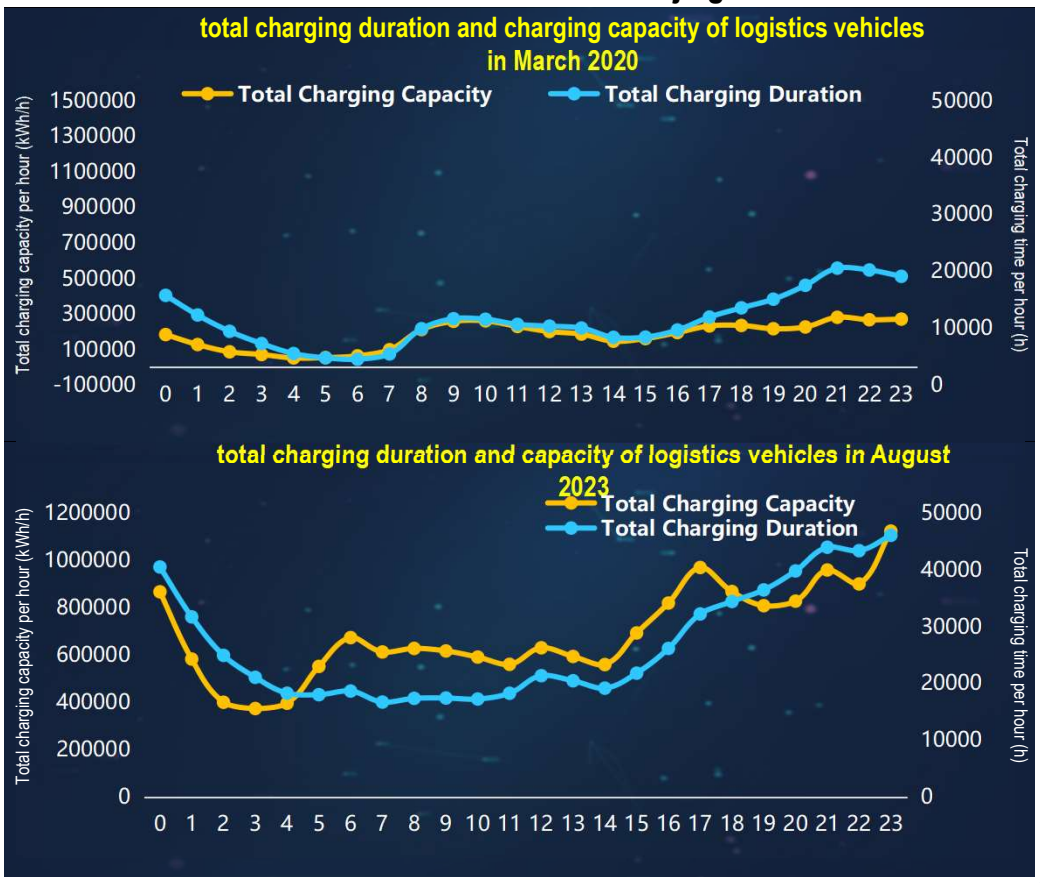
Platform Display - Time Period Comparison (Beijing)

The operation and charging characteristics of NEVs in the same city at different time periods

Comparison of Daily Mileage Distribution of Private NEVs at Different Time Periods in Beijing



Comparison of Daily Charging Characteristics of delivery NEVs at Different Time Periods in Beijing

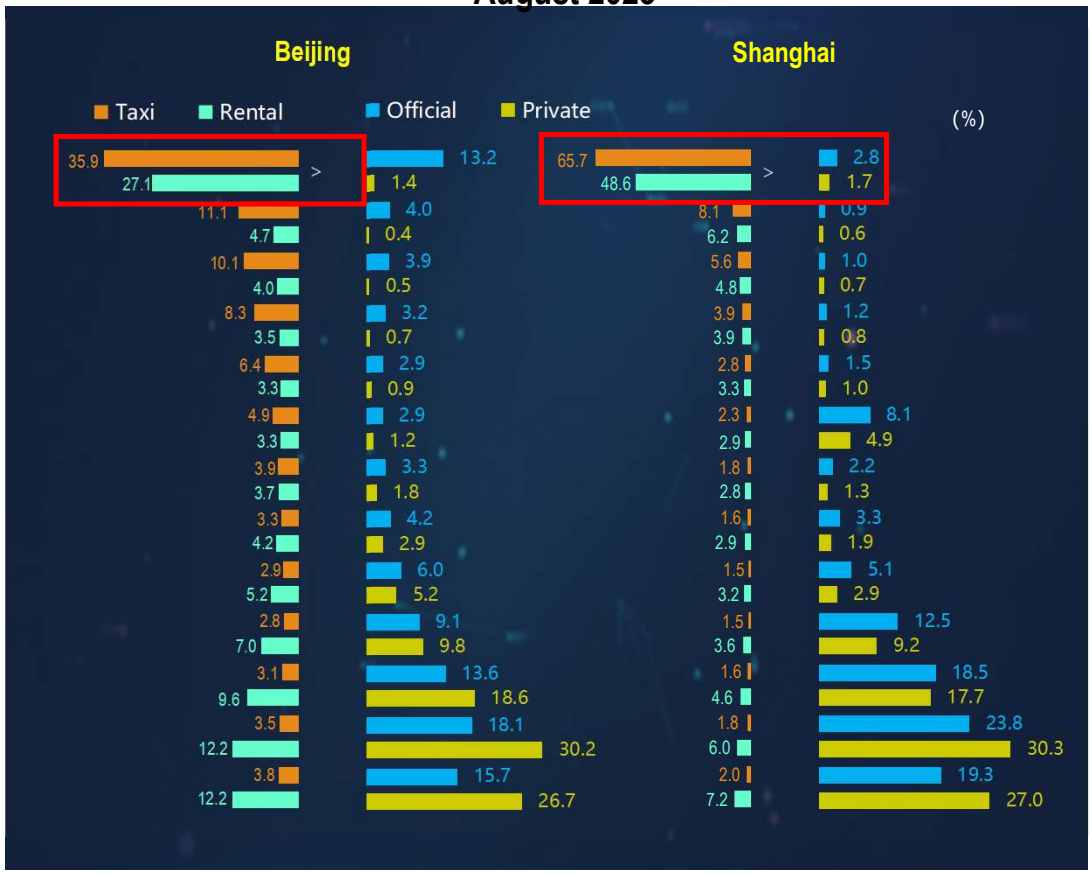


Source: National Monitoring and Management Platform for NEVs

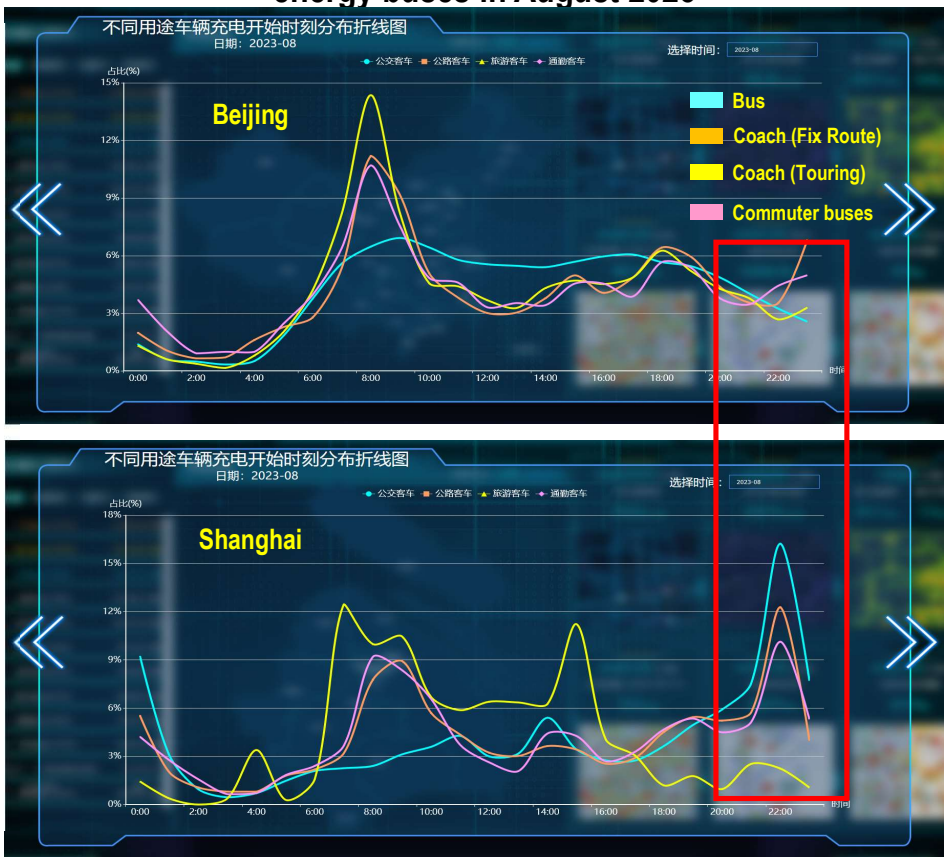
Platform Display - Comparison by City (Beijing vs Shanghai)

The operation and charging characteristics of NEVs in different cities during the same time period

Comparison of daily driving hours distribution of passenger NEVs in August 2023



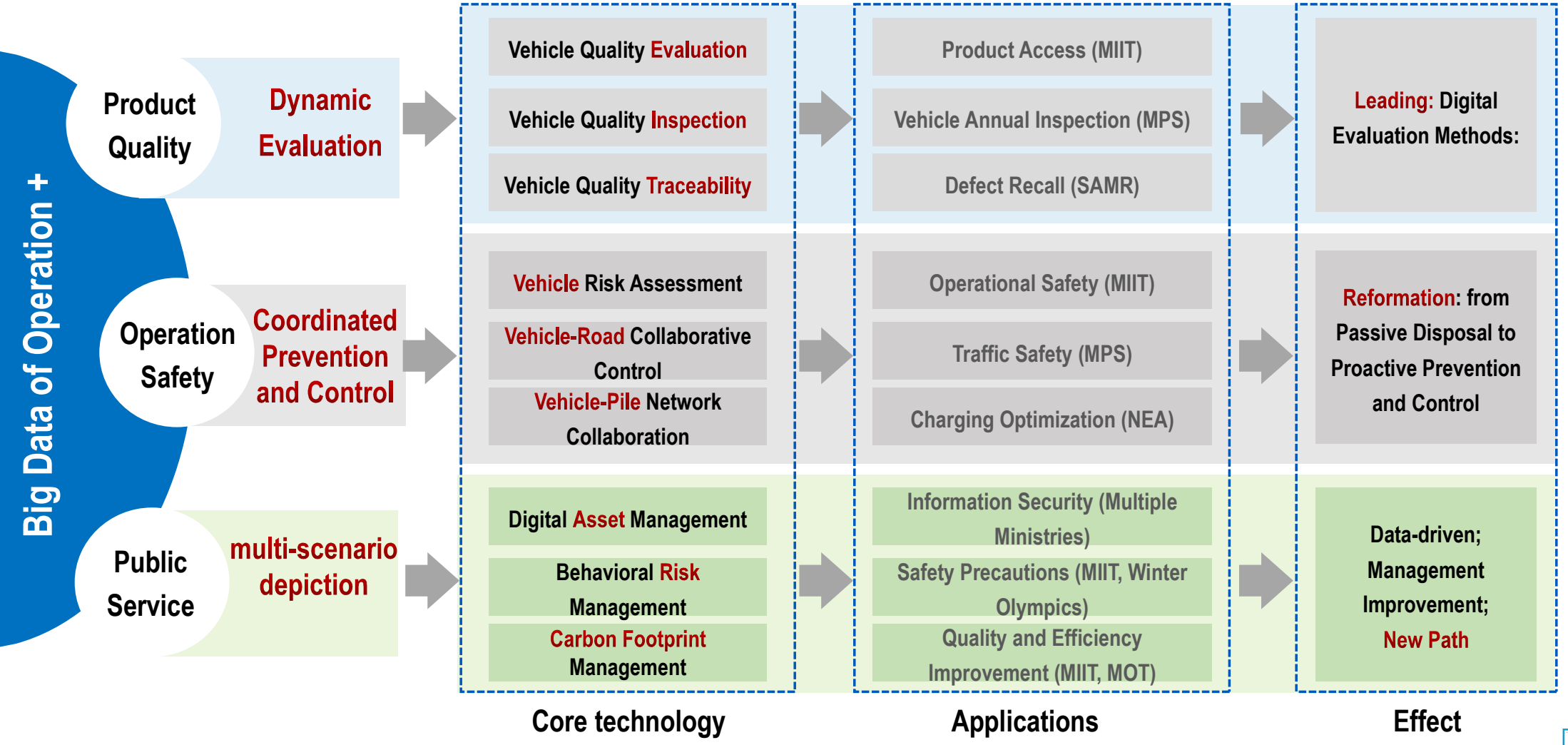
Comparison of the distribution of charging start times for new energy buses in August 2023



Source: National Monitoring and Management Platform for NEVs

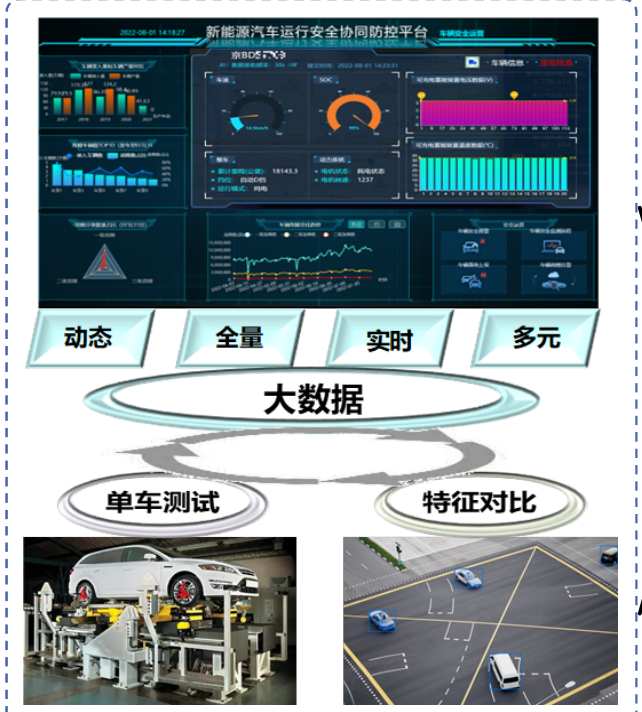
Content

Research Ideas for Innovative Application of Big Data



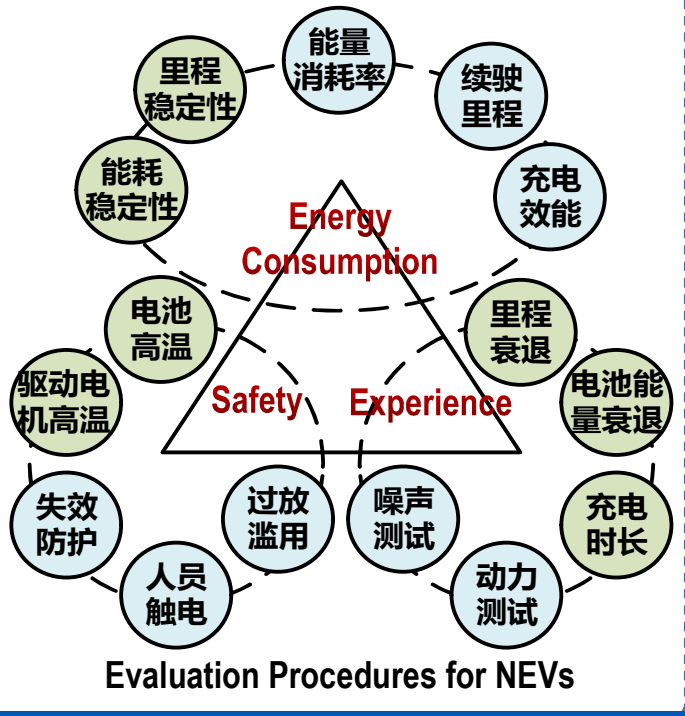
Innovative Applications (1) - Vehicle Quality Evaluation

- Overcame a technical challenge of multi-source data fusing and the normalization and quantification of characteristic parameters under both the conditions of full-volume operation and single-vehicle testing
- Established China's NEV evaluation procedure integrating "energy consumption, safety, and experience"

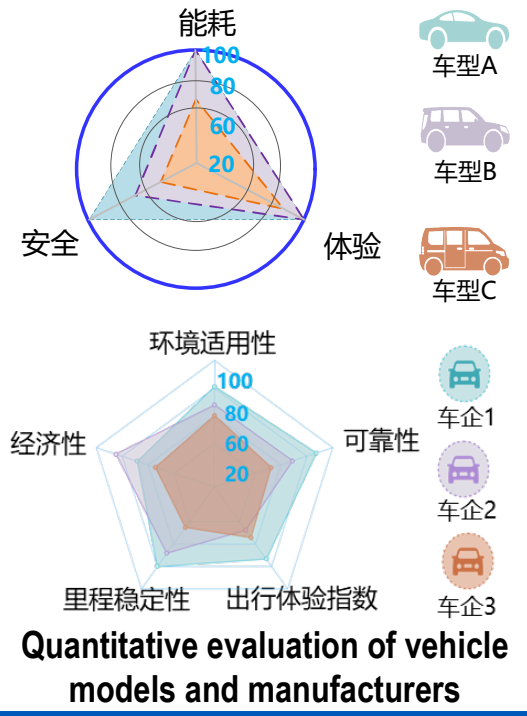


多维比较

多维评价



Evaluation Procedures for NEVs



Quantitative evaluation of vehicle models and manufacturers

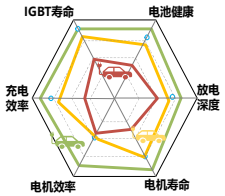
Realized a significant leap in evaluation methods by big data analysis other than using laboratories and testing grounds as single means

Innovative Applications (2) - Vehicle Quality Inspection

- Propose a long time scale data-driven online evaluation method with multiple parameters
- Form an "annual inspection" model of online-offline feature association and mutual verification

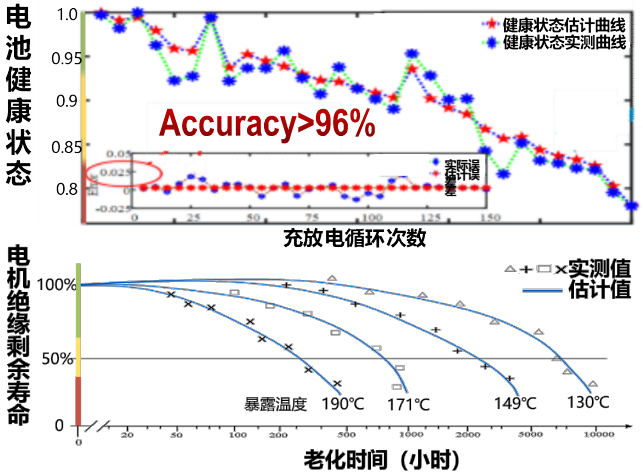
Online evaluation system

Evaluation system



Battery health	Depth of discharge	Motor lifespan
Motor efficiency	Charge efficiency	IGBT lifespan

Evaluation method



Annual inspection efficiency improvement >85%

Good (60%)	Inspection Exemption	
Ordinary (15%)	Annual Inspection	
Bad (25%)	Maintenance	

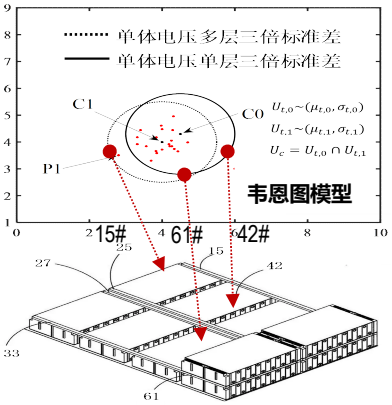
Online+offline annual inspection platform (Chongqing)

The first "online+offline" NEV annual inspection platform in China, providing an annual inspection plan for NEVs for "online tracking and warning, offline inspection and evaluation"

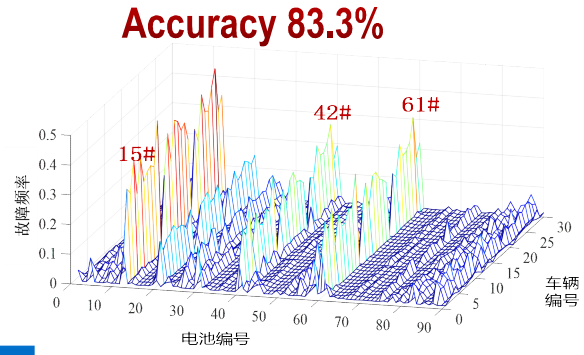
Innovative Applications (3) - Vehicle Quality Traceability

- Build a database of potential defect characteristics of "Battery-Motor-ECU," covering the entire range of vehicle models and their lifecycles
- A multiple regression model for recall prediction and early warning of defective automotive products with "Suspicion-Characterization-Confirmation"

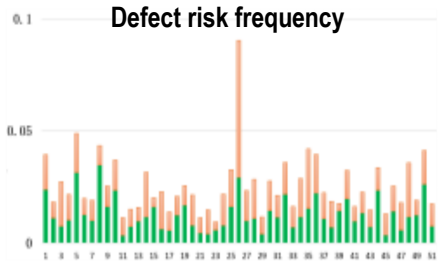
Single vehicle defect identification

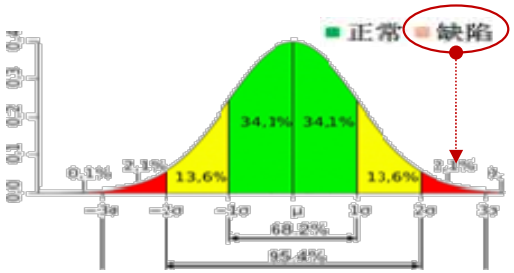


Vehicle defect identification



Defective vehicle screening

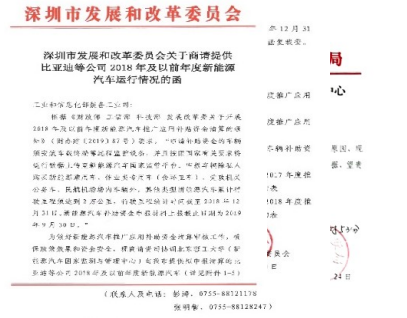




Technical performance

Support the SAMR in accident defect investigations

Accident investigation on site



Accident data analysis

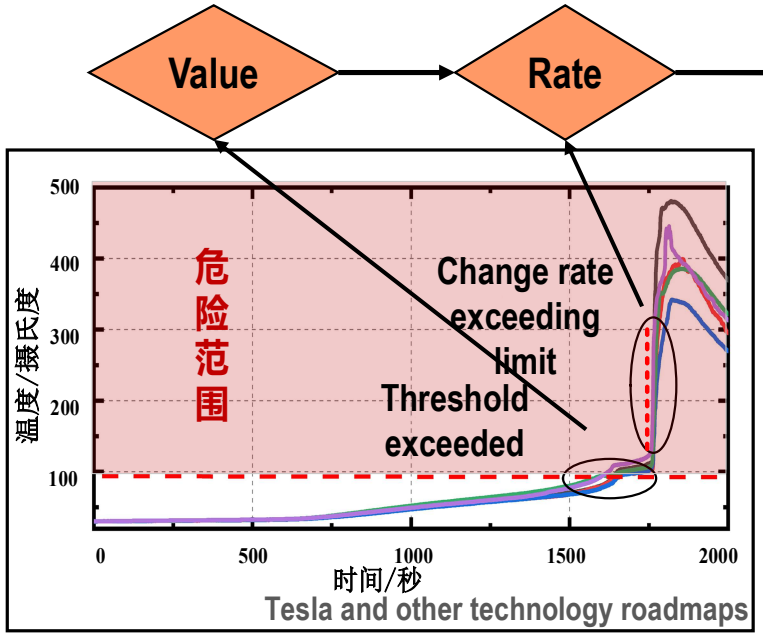
缺陷汽车召回

召回管理条例

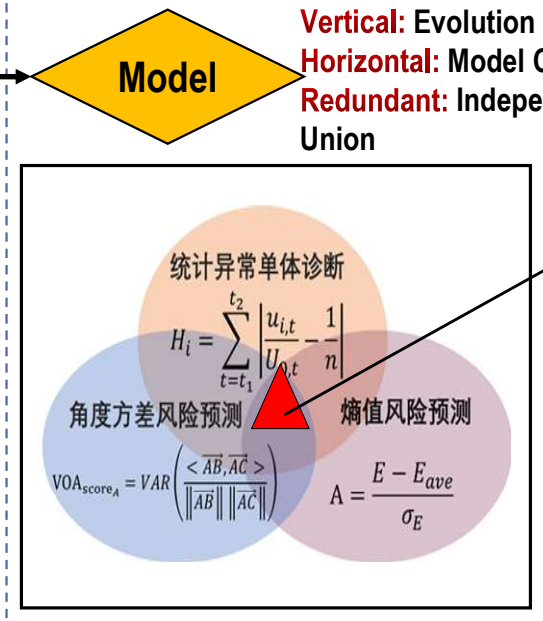
Created a new defect management model for NEVs that involves "pre-discovery and proactive traceability"

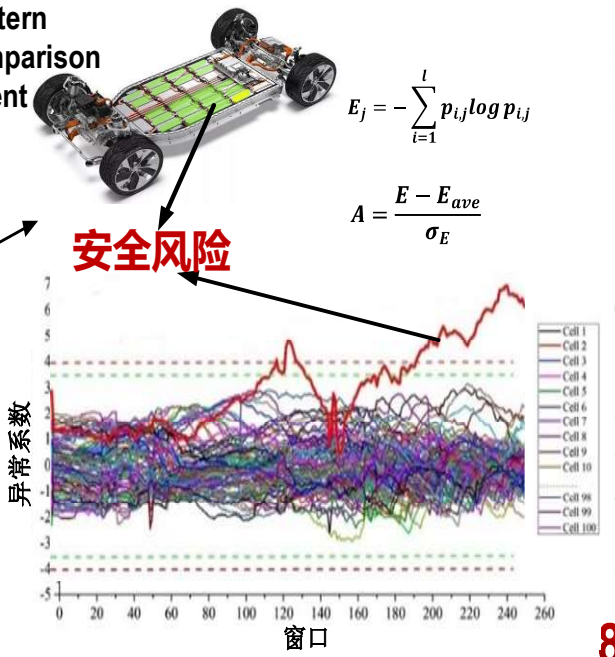
Innovative Applications (4) - Vehicle Risk Evaluation

- Create a "value-rate-model" safety state perception and an early warning technology system for new energy vehicles
- Propose a warning strategy of "prediction through a union of independent models, improve accuracy by Cross comparison"



Alarm · real-time security diagnosis





提前7天预测准确率 85%

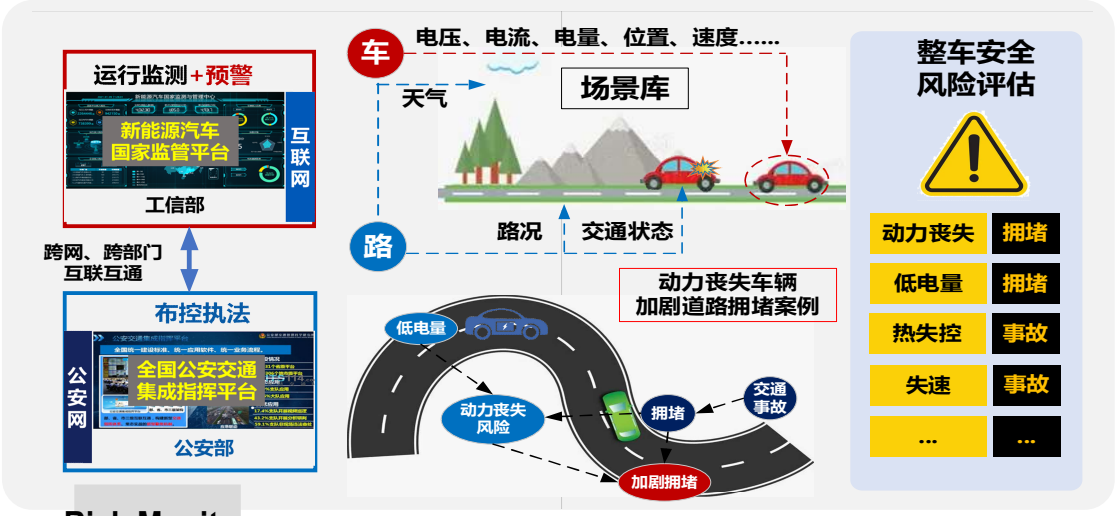
Early warning · Long-term security risk prediction

Risk evaluation technology services more than 90% of the country's total NEVs in-use,
Achieve a breakthrough from fault alarm to safety risk warning for NEVs

Innovative Applications (5) – Vehicle-Road Collaborative Control

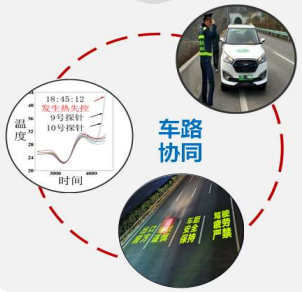
- Built a safety risk scenario set of "vehicle type, region, season, mileage, operation status" for vehicle-road integration
- Developed a NEV safety prevention and control platform with end-to-end cloud integration and human-vehicle-road collaboration

Traffic Safety Risk Identification Method



Integrated collaborative control technology

Risk Monitor



Zero accidents during the Beijing Winter Olympics

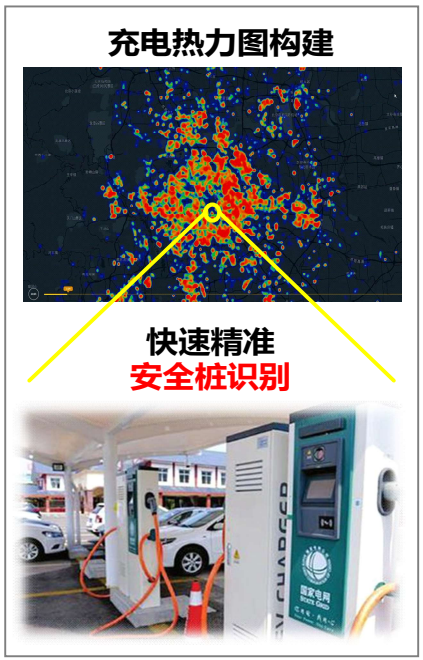
Zero accidents during Jiaxing Centennial Party Celebration

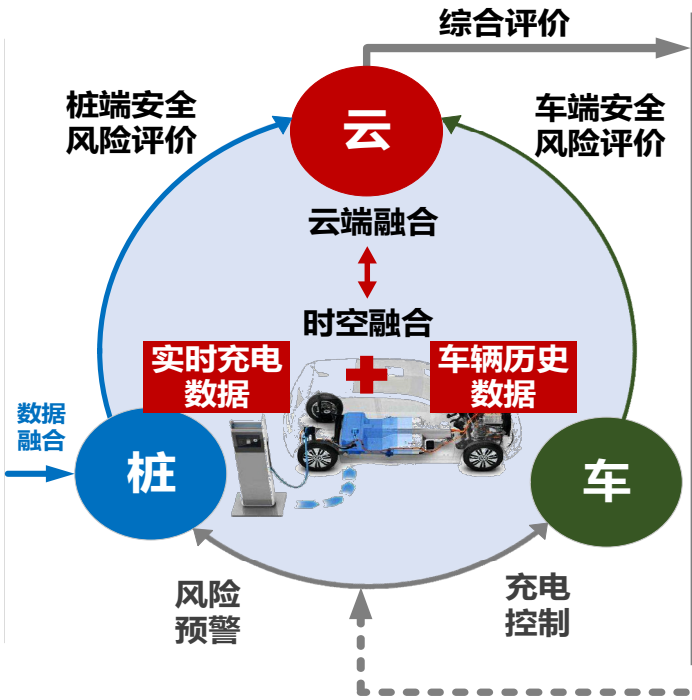
Beijing Winter Olympics NEV Safety Supervision Platform

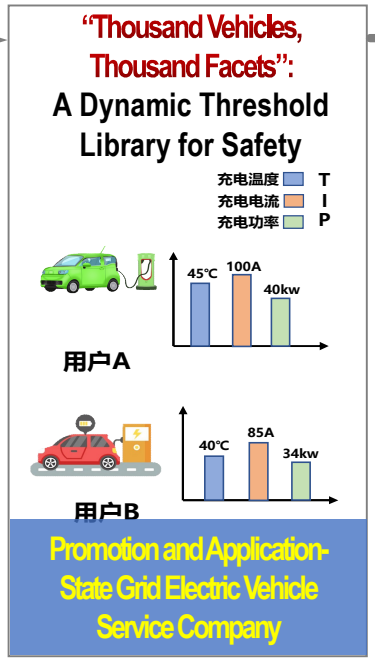
Dynamic real-time control of Vehicles

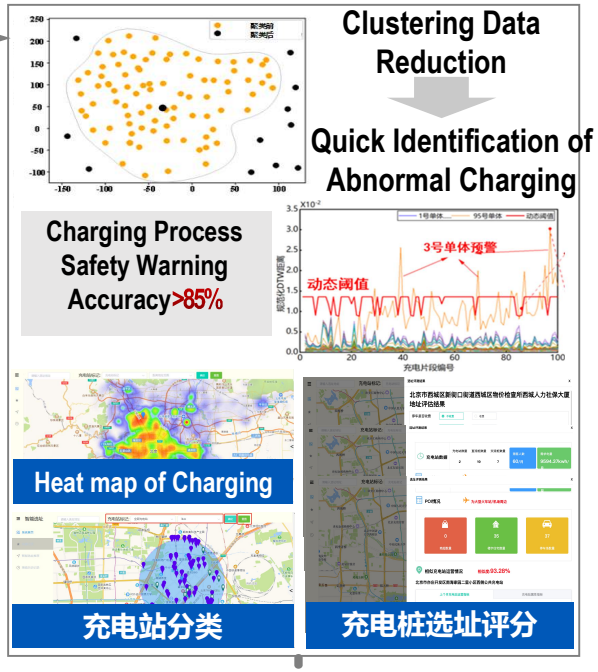
Innovative Applications (6) - Collaborative Safety between Vehicle & Pile

- Proposed a real-time identification method for vehicle-pile safety risks with vehicle history and real-time charging status data integrated
- Built a dynamic threshold library for the safe operational range of vehicles and a charging safety warning system





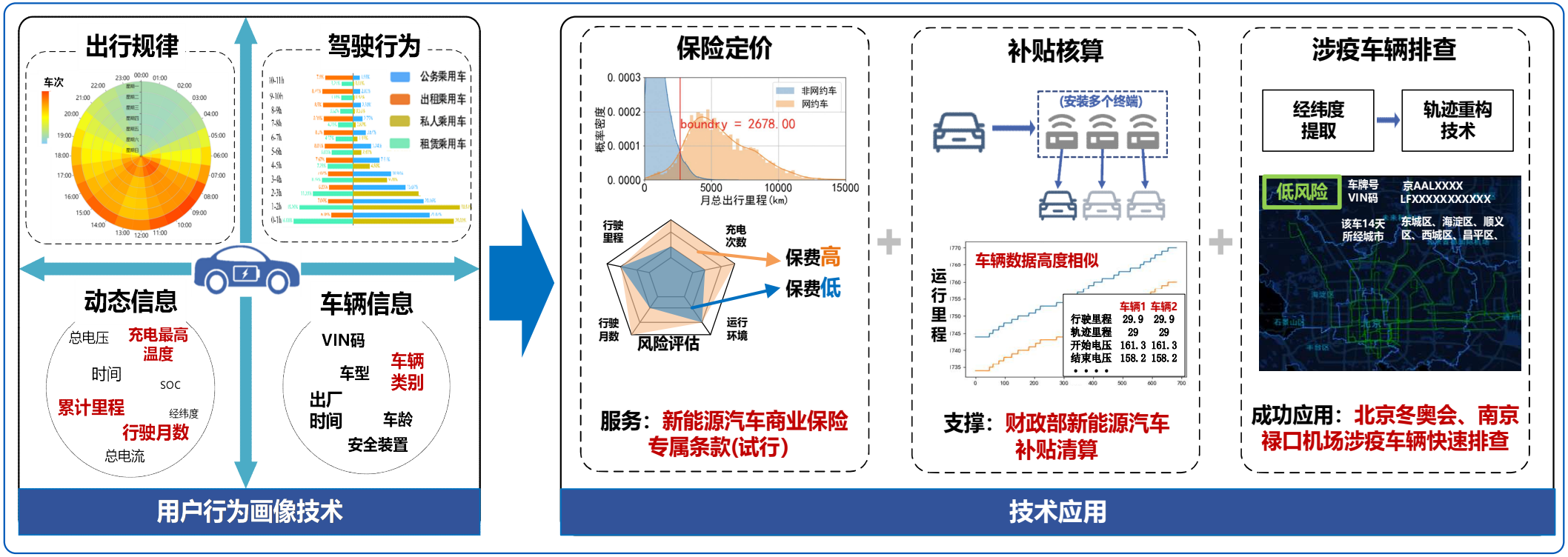




The risk identification method for vehicles and piles has been applied to the evaluation of charging station allocation, Successful applied vehicle-pile integration technology in the State Grid Electric Vehicle Service Company

Innovative Applications (7) - User Behavior Characterization

- Discover new features and patterns in the spatiotemporal distribution of NEV applications by data mining
- Established premium evaluation and subsidy verificationmethods that integrate user behavior with vehicle status



Achieve breakthroughs in NEV aftermarket service technology driven by big data

Innovative Applications (8) - Carbon Asset Management

- Establish a dynamic calculation model for carbon emissions from the application end to the production end of NEVs at multiple time and space scales
- Establish the world's largest NEV carbon asset platform and carbon accounting ecosystem

Carbon Accounting Model for NEVs During Operation

日均行驶里程 ML

私家车 出租车 公交车

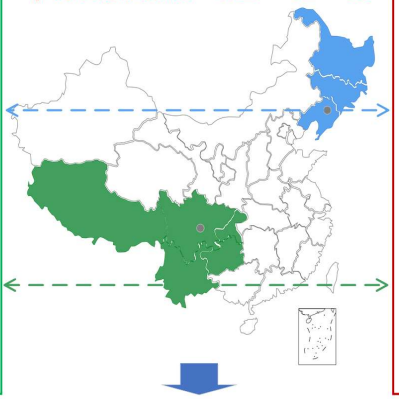
沈阳

2倍城市差异

成都

私家车 出租车 公交车

车辆运行碳排放= ML × CE × EI



电力碳排放因子 CE

火电 水电 核电 光伏 风电

东北

3倍地区差异

西南

火电 水电 光伏 风电

全国平均能耗强度 EI

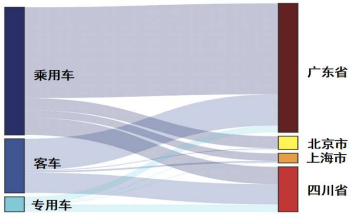
2018 2019 2020

3倍 车型差异

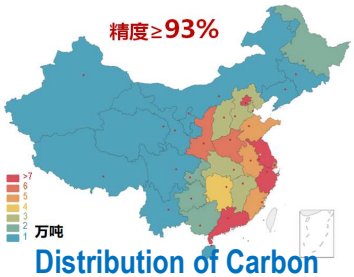
2018 2019 2020

Dynamic full coverage

Carbon Measurement and Tracking Technology



Carbon Emission Flow by Vehicle Type

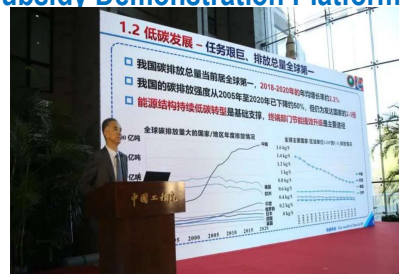


Distribution of Carbon Emission Reduction

精准实时核算

NEV Carbon Asset Platform

Jinan Carbon Emission Reduction Subsidy Demonstration Platform



Press Conference on Major Achievements of the Chinese Academy of Engineering

Global Release of "Carbon Accounting Platform of NEVs"- a major consulting achievement of the CAE in 2021, The carbon accounting and carbon credit technology for NEVs was first **demonstrated in Jinan and other cities**

Summary

Quality Supervision

- Test and evaluation procedure fusion with multi-dimensional data
- A breakthrough in data-driven quality Inspection and defect identification technology

Safety Control

- Proposed a "Value-Rate-Model" for safety control
- Constructed a "Vehicle-Road-Charging Post" safety system

Service Management

- Data-driven methodology for premium assessment, subsidy verification, and epidemic investigation
- Established the world's largest carbon asset ecosystem for NEVs

- Subverted the traditional testing and evaluation methods centered on sampling
- Created a "product-operation-service" system for full-volume evaluation and monitoring
- Realized the collaborative application of multiple ministries and commissions

Utilizing the world's first "big data of vehicle operation",
the "China solution" provides a reference for management innovation in the field of NEVs in Asia

新能源汽车国家大数据联盟
National Big Data Alliance of New Energy Vehicles

Data Platform Construction and Application of Electric Vehicles

Sponsored by: National Big Data Alliance of New Energy Vehicles

Manila, Philippines

November 17, 2023

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Yan Jianlai

Secretary-General for Specified Affairs

China Society of Automotive Engineers

中国汽车工程学会
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FUTURE AUTOMOBILE - CHINA'S SOLUTION AND PATH

Introduction to China Society of Automotive Engineers

Established in 1963
Current staff: 220
Total number of members: 100,000+
Core business:
——Auto Industry Science and Technology Think Tank
——Technology Promotion Organization

01 战略研究	02 学术交流	03 协同创新
04 CSAE标准	05 科技期刊	06 科普文化
07 人才培养	08 科技奖励	09 科技成果评价
10 会员发展与服务	11 国际合作	

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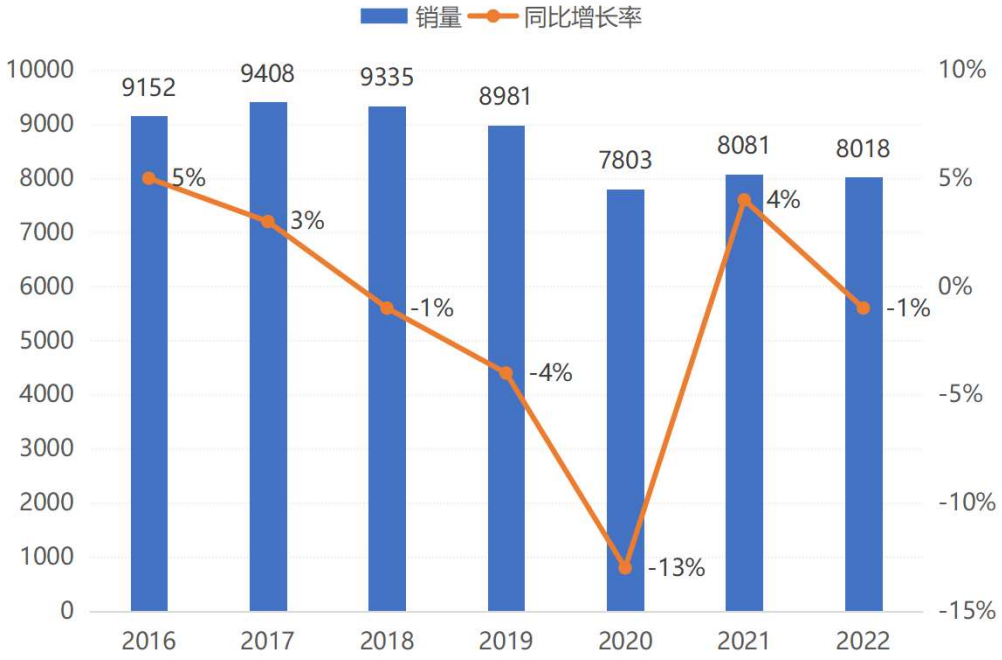
The global automotive market is in a period of deep adjustment

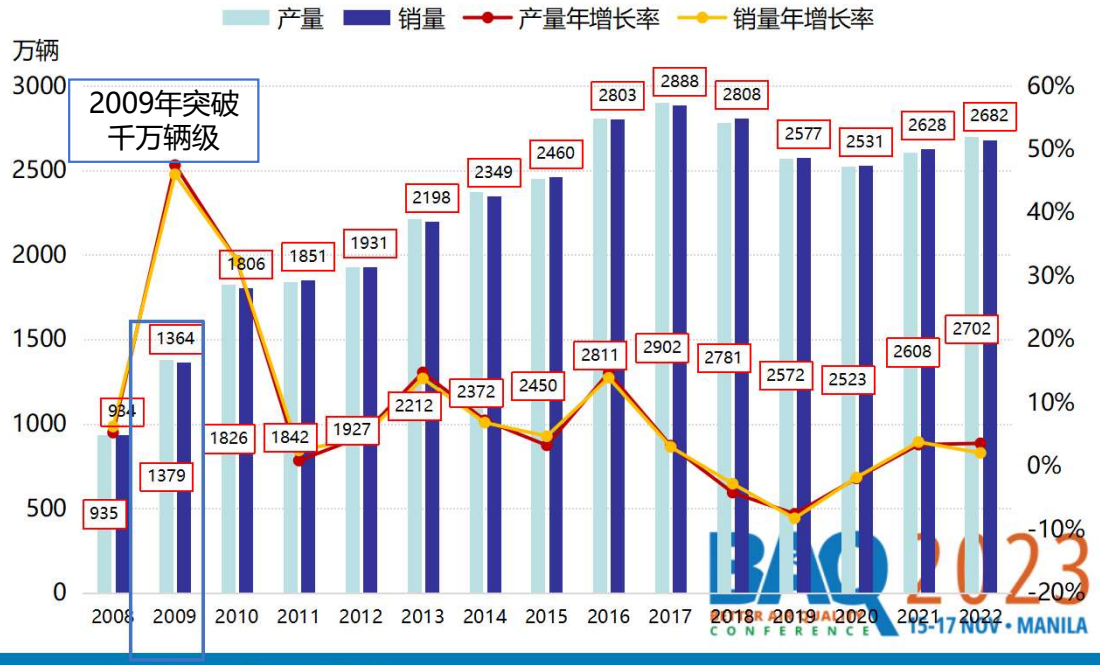
- Since 2020, affected by the chain effect of the COVID-19, the global automobile market has experienced a precipitous decline. From 2021, the market will slowly recover and enter a period of deep adjustment.
- China's automobile industry slowly recovered, with production and sales of **27.02 million** and **26.82 million** units respectively in 2022, up **3.4%** and **2.1%** year on year.

2016-2022年全球汽车销量数据



数据来源：乘联会

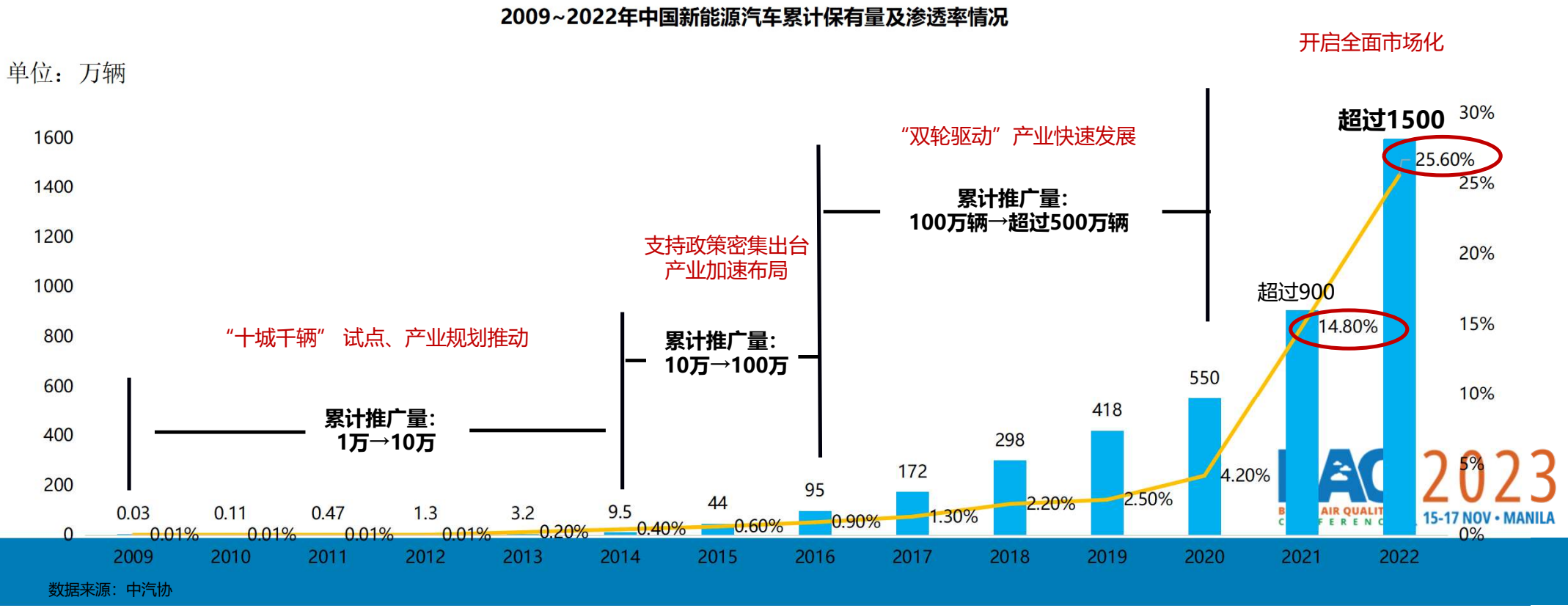
2008~2022年我国汽车产销量表现



来源：中汽协，中国汽车工程学会

The marketization path of China's new energy vehicles

- The sales volume and market penetration of China's new energy vehicles continue to increase, with sales volume reaching 6.89 million units (66%) and market penetration reaching 25.6% by 2022.
- In the next 10 years, new energy vehicles will gradually become the mainstream of automotive products, with a penetration rate expected to exceed 50%.

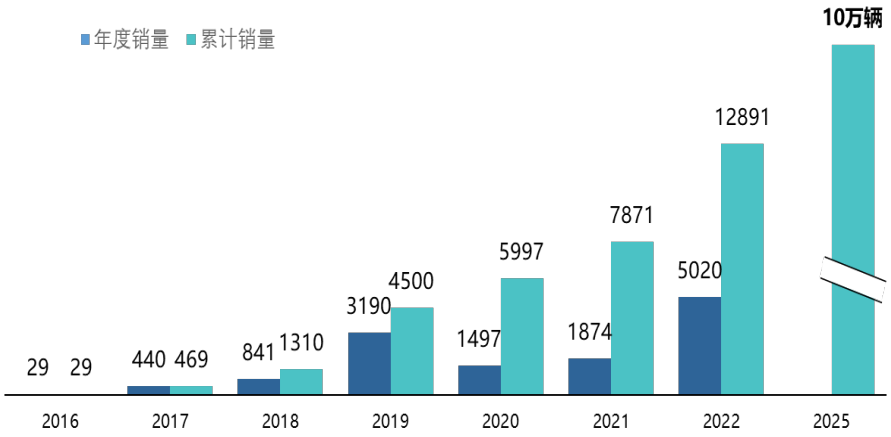


数据来源：中汽协

China's fuel cell vehicle demonstration is accelerated, mainly focusing on medium and heavy commercial vehicles

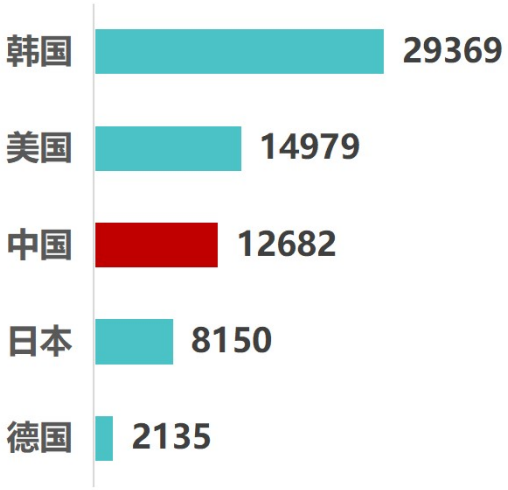
- In 2022, the promotion and application scale of hydrogen fuel cell vehicles in China exceeded 5,000, with a total of nearly 13,000 vehicles, ranking third in the world. The number of hydrogen refueling stations in operation in China reached 245, ranking first in the world.
- The promotion and application of fuel cell vehicles in China has formed five demonstration city clusters including Beijing-Tianjin-Hebei, Shanghai, Henan, Hebei, and Guangdong, with applications covering ports, mines, sanitation, urban construction, public transportation, intercity logistics, and other scenarios. Fuel cell vehicles have become an important choice for the green and low-carbon transformation of commercial vehicles.

2016年至2022年燃料电池汽车年销量与累计销量



数据来源：燃料电池汽车车险数据，中国汽车工程学会整理

2022年全球主要国家
氢燃料电池汽车保有量



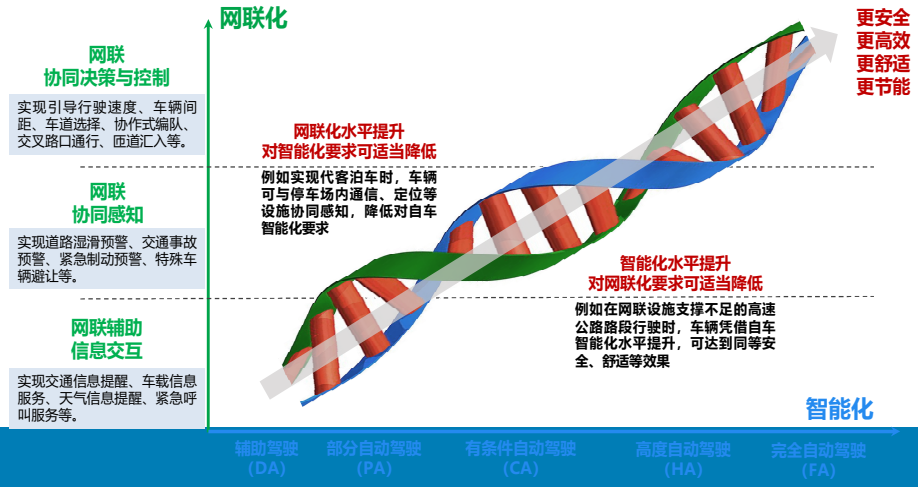
2022年全球主要国家
在营加氢站数量

数据来源：中国氢能联盟研究院

China's intelligent driving technology has achieved large-scale application, and its penetration rate has accelerated

- The market introduction of L2 intelligent connected vehicles is accelerating, and the penetration rate is rapidly increasing. In 2022, the market penetration rate of new energy passenger vehicles with partial assisted driving functions of PA level (L2 level) reached 46%, an increase of 16 percentage points year-on-year, significantly higher than the 32% penetration rate of traditional fuel vehicles. Some mass-produced intelligent new energy vehicles have been equip-ped with V2X technology.
- The key technologies and products of L4 intelligent driving have made continuous progress, and high-level autonomous driving has been dem onstrated an-d applied in specific areas. Products such as multi-beam laser radar, millimeter-wave radar, autonomous driving computing platfo rm and dedicated chips h-ave made great progress.

车型	2022年PA级销量	2022年PA级渗透率	渗透率同比增幅
传统燃油汽车	456万辆	32%	13个百分点
新能源汽车	239万辆	46%	16个百分点



来源：中国智能网联汽车产业创新联盟

搭载V2X技术的量产智能新能源汽车


上汽 Marvel R 搭载5G-V2X


福特锐界 搭载C-V2X


广汽AION V 搭载5G-V2X


长城摩卡 搭载5G-V2X

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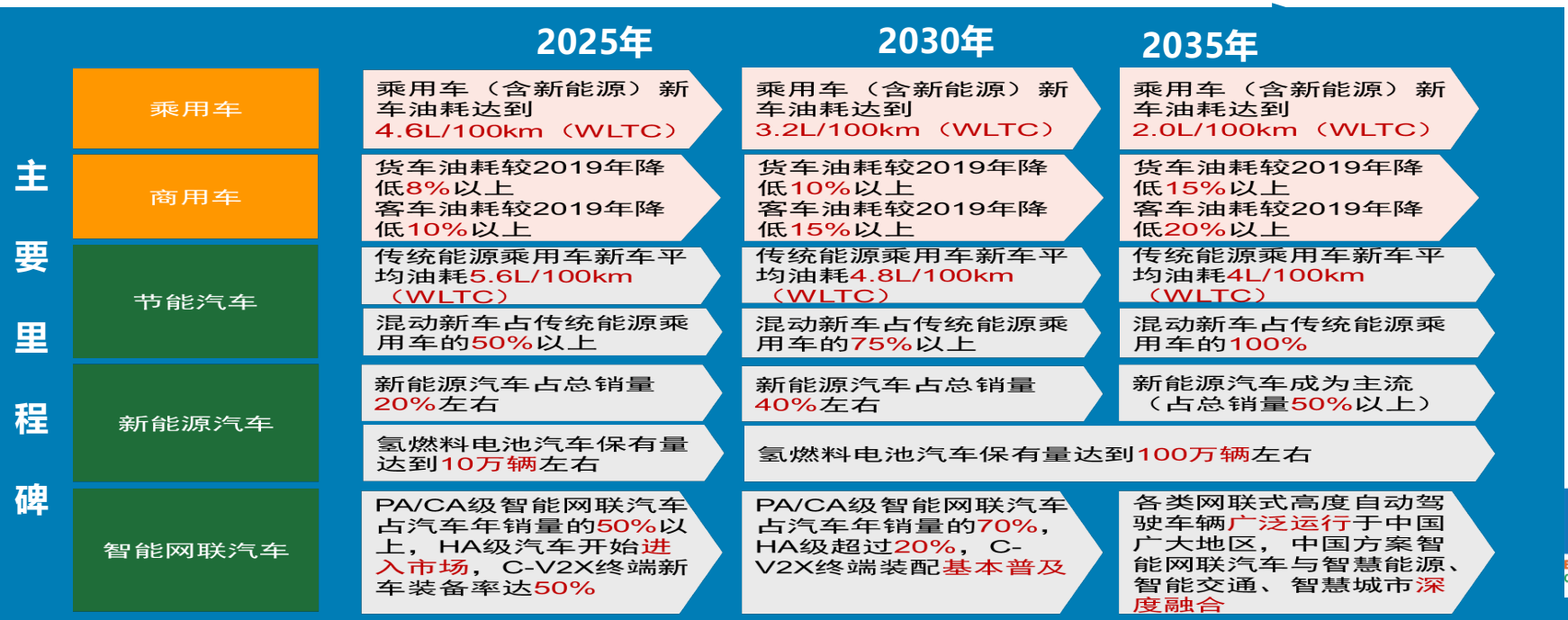
Vision and Goals for the Development of the Automotive Industry - Technology Roadmap 2.0

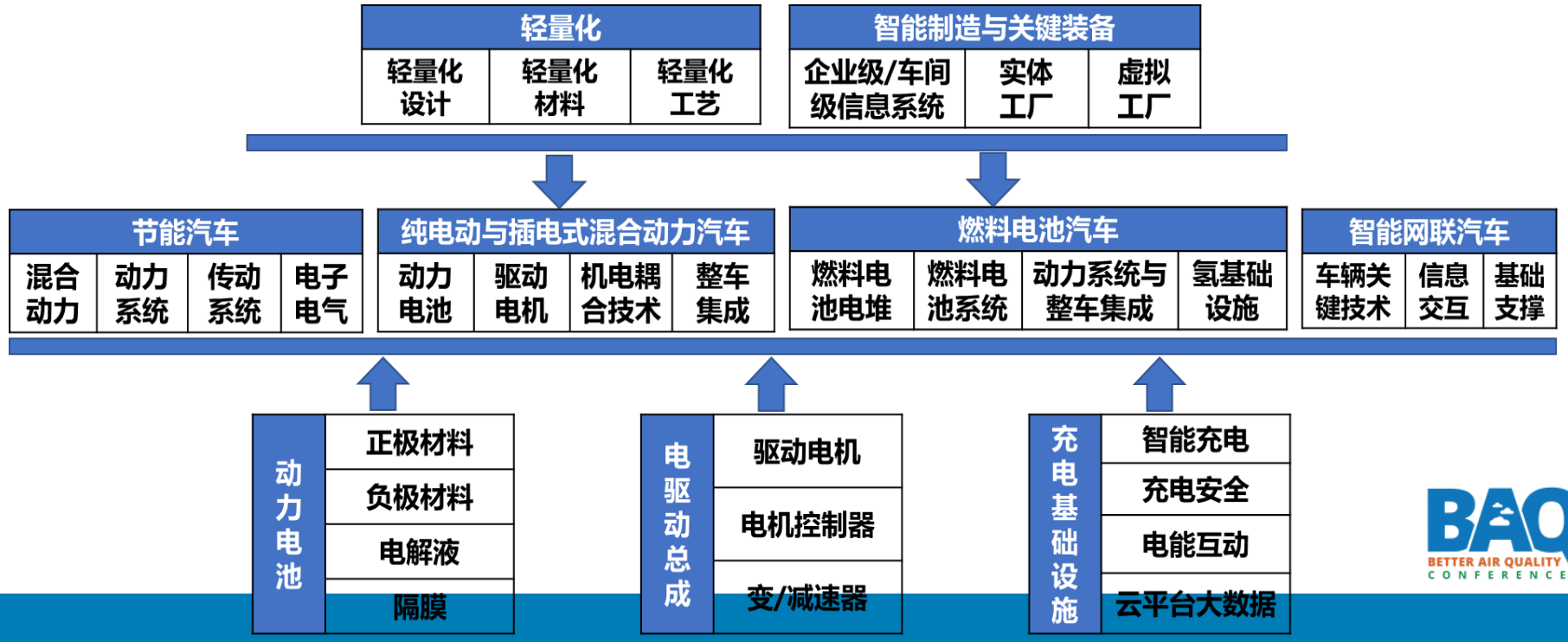
By 2035:

- The annual sales volume of energy-saving cars and new energy vehicles accounts for 50% each, and the a utomotive industry realizes the transformation of electrification
- The number of hydrogen fuel cell vehicles has reached about 1 million, and commercial vehicles have achie ved hydrogen power transformation
- Various types of networked highly autonomous vehicles are widely operated in China, and China's intelligent networked vehicle solution is deeply integrated with smart energy, intelligent transportation, and smart cities.



Objective Description - Technology Roadmap 2.0

- Research will be conducted around the overall industry and nine sub-technological fields, including energy-saving cars, pure electric and plug-in hybrid cars, fuel cell cars, intelligent networked cars, power batteries, electric drive assemblies, charging infrastructure, lightweight, intelligent manufacturing, and key equipment, to develop a "1+9" technology roadmap.



Forecast of China's automobile industry development

Future policy expectations

I. Market target: about 35-40 million vehicles
II. The technical route is aimed at low carbon and adheres to the diversified energy route (revised in 2024, version 3.0 of the roadmap);
III. We will unswervingly implement the "China Plan" with the development of intelligent electric vehicles as the core;
Note: smart vehicle, intelligent road, cloud for timely service, reliable network, accurate map + safe operation. "Vehicle, road, cloud, network, map" five-in-one + safety;
IV. It is expected that relevant policies for the marketization and promotion of intelligent connected vehicles will be introduced within the year;
V. More supportive policies will be introduced in the future.

Ten leading technologies that will be focused on in the next 3-5 years

01. 高安全、高比能全固态锂电池
02. 基于驾舱融合的智能计算芯片
03. 车路云一体化融合控制系统
04. 零碳内燃机
05. 驱动电机用新型软磁材料
06. 智能网联汽车场景库
07. 智能电动车用电子机械式线控制动
08. 基于规则+学习的融合型决策算法
09. 智能驾驶操作系统
10. 高温质子交换膜（HT-PEM）燃料电池

中国汽车工程学会
China Society of Automotive Engineers

Thank you for listening.

It is our wish to share China's automobile development experience with friendly countries under the framework of the "Belt and Road" initiative.

November 17, 2023

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新能源汽车国家大数据联盟
National Big Data Alliance of New Energy Vehicles

Data Platform Construction and Application of Electric Vehicles

Sponsored by: National Big Data Alliance of New Energy Vehicles

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Ferdinand I. Raquelsantos

President

Philippine Parts Maker Association (PPMA)

Chairman Emeritus

Electric Vehicle Association of the Philippines （EVAP）

Electric Vehicles in the Philippines: A Comprehensive Overview

Ferdi Raquelsantos
Chairman Emeritus

17 November 2023

The Electric Vehicle Association of the Philippines

- Established in 2008 and one of the very first EV industry associations in Southeast Asia.
- Spearheaded the creation of the Asian Federation of Electric Vehicle Associations (AFEVA), which comprises of members from the Philippines (EVAP), Thailand (EVAT), Indonesia (PERIKLINDO), Singapore (EVAS) and Malaysia (EVAM).
- EVAP has 76 members, which comprises of EV and EVSE manufacturers, research universities, importers and distributors.
- Recently organized its 11th consecutive annual EV show (October 2023).

- EVAP envisions a nation wherein the use of electric vehicles is highly promoted, encouraged and supported by its government and the society in order to develop a transportation landscape that is one with the environment ecologically and economically.
- EVAP's mission:
  - To educate
  - To accelerate
  - To partner

Activities: Electric Vehicle Owners Society (EVOS) Monthly Meet-up and Support to Launching of New EV Charging Stations

Electric Vehicle Association of the Philippines

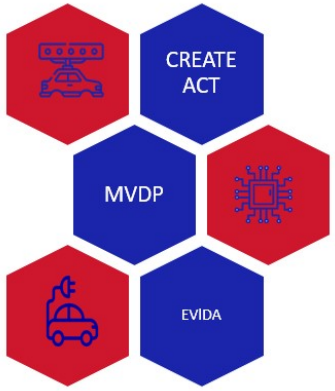
Overview of the Philippine Automotive Industry and EV Support Program

Electric Vehicle Association of the Philippines

369
Firms engaged in assembly and parts manufacturing

80,501
Employment

Source: Estimated figures from statistics from the Philippine Statistics Authority



A. Motor Vehicle Development Program

- 1% or 0% duty-free importation of parts/components

B. TRAIN Law

- EVs - exempted from excise tax;
- Hybrid - 50% reduction of applicable excise tax

C. EV Industry Development Act (EVIDA)

- CREATE incentives
- Non-fiscal incentives
- EV Industrial Strategy
- Comprehensive Roadmap on EV Industry (CREVI)

Executive Order no. 12

MFN Temporary Tariff Reduction to 0%

Key Features of the EV Industry Development Act (EVIDA Law)

Electric Vehicle Association of the Philippines

Mandatory EV Share in Corporate and Government Fleets:

- Ensure at least 5% of the fleet shall be EVs.
- CREVI to provide the mandatory percentage share.

Dedicated Parking Slots for EVs in Private and Public Buildings and Establishments:

- Designated dedicated parking slots to be exclusive for EVs and shall be installed with an EVCS.
- Required construction or installation of EVCS in gasoline stations.

Fiscal and Non- Fiscal Incentives:

- Priority processing of registration of EVs.
- Exemption from the number-coding traffic schemes.
- Expeditious processing of application for franchise to operate (for public transport EVs).
- Availment of training programs.

What is the CREVI?
BAU Scenario

Electric Vehicle Association of the Philippines

Currently Available EV Units in the Philippine Market

Electric Vehicle Association of the Philippines


Nissan


BYD


Chery Arrizo

Weltmeister W5

BYD Qin


Porsche

Hyundai Ioniq 5


Dong Feng Venucia

Chery Tiggo


BYD Tang PHEV


Jaguar iPace


BYD Song


Dong Feng Rich 6


Mitsubishi Outlander PHEV

Currently Available EV Units in the Philippine Market (2023 New Models)

Electric Vehicle Association of the Philippines

Lotus

Volvo XC60, S90 and XC90

Hongqi E-HS9

BYD Atto 3

Foton Tornado

Eclimo E-trike

Eclimo E-bike

Hatasu E-trike

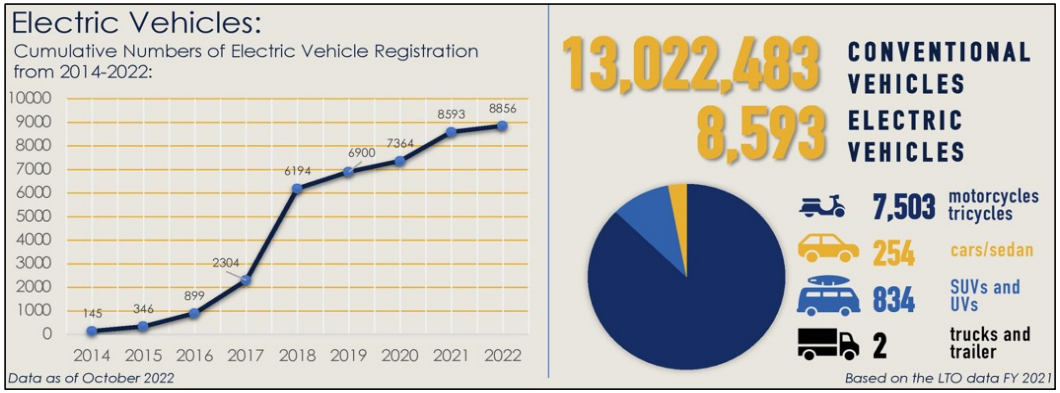
Jetour Ice

Tojo FLEV

Range Rover Sport PHEV

Overview of the Philippine EV Market

Electric Vehicle Association of the Philippines



CHARGER TYPE	NUMBER
AC CHARGERS	258
DC CHARGERS	59
BATTERY SWAPPING STATIONS	21
TOTAL	338

Source: Department of Energy

New Registrations

MV Type	Electric (2022)	Hybrid (2022)	TOTAL (2022)	Electric (Q1-Q2 2023)	Hybrid (Q1-Q2 2023)	TOTAL (Q1-Q2 2023)
CARS	87	5	92	79	423	502
SUV	91	161	252	128	949	1,077
UV	82	0	82	99	667	766
TRUCK	0	0	0	4	0	4
BUS	44	0	44	0	0	0
MOTORCYCLE	602	0	602	206	2	208
TOTAL	906	166	1,072	516	2,041	2,557

Electric Vehicle Association of the Philippines

Lets Plug In and Accelerate

Ferdi Raquelsantos
Chairman Emeritus
ELECTRIC VEHICLE ASSOCIATION OF THE PHILIPPINES (EVAP)

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Wang Shuo

Assistant Professor

Beijing Institute of Technology


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北斗卫星
国家监管平台
地方监管平台
企业监控平台
新能源汽车A
新能源汽车B
新能源汽车C

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