中国汽车技术研究中心有限公司

China Automotive Technology and Research Center Co., Ltd.

The 14th Public and Private Joint Forum in Asian Region

Country Report -China

China Automotive Standardization Research Institute (CASRI), CATARC

29th, Nov. 2023

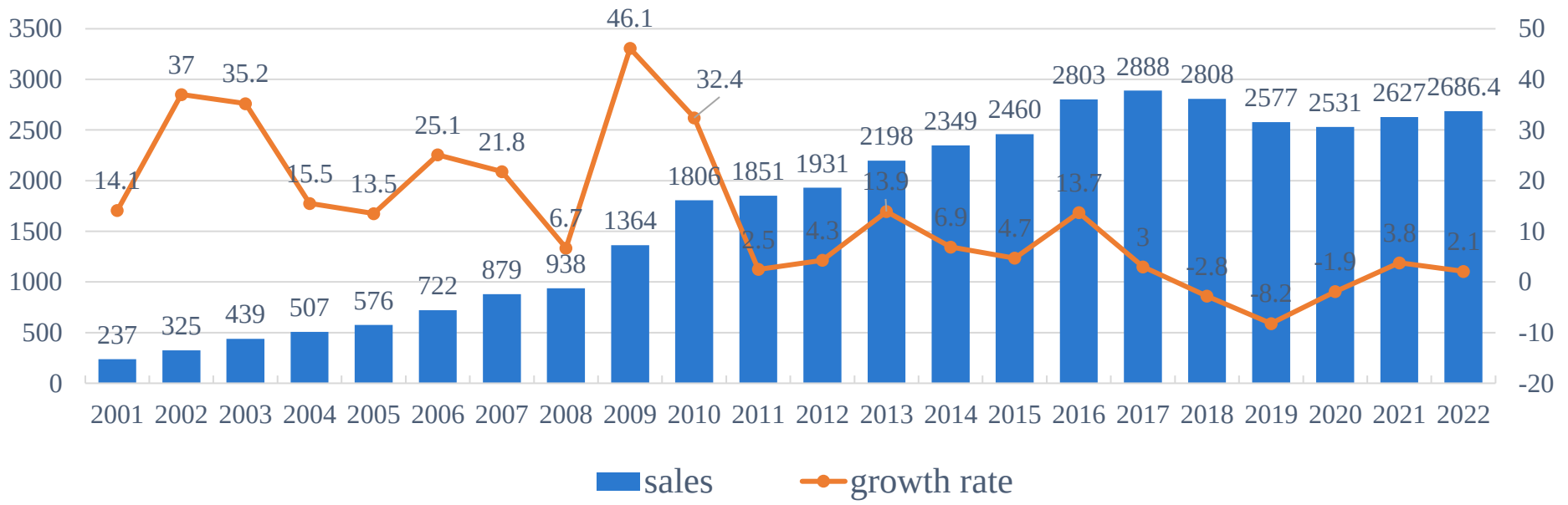
目录 Contents

1. Latest Development of Auto Industry in China

■ The overall operation of China's automobile industry in 2022

- In 2022, China's annual auto sales reached **26.86 million** units, a year-on-year **increase of 2.1%.**
- Reasons for market performance beyond expectation: Support from central and local government (such as halving the purchase tax for passenger cars, subsidies for the purchase of NEV and series policies to stabilize growth and promote consumption); Efforts from the OEMs (such as promotion, new products, etc.).

China's Automobile Sales and Growth Rate from 2001 to 2022
(Unit: 10,000 units, %)



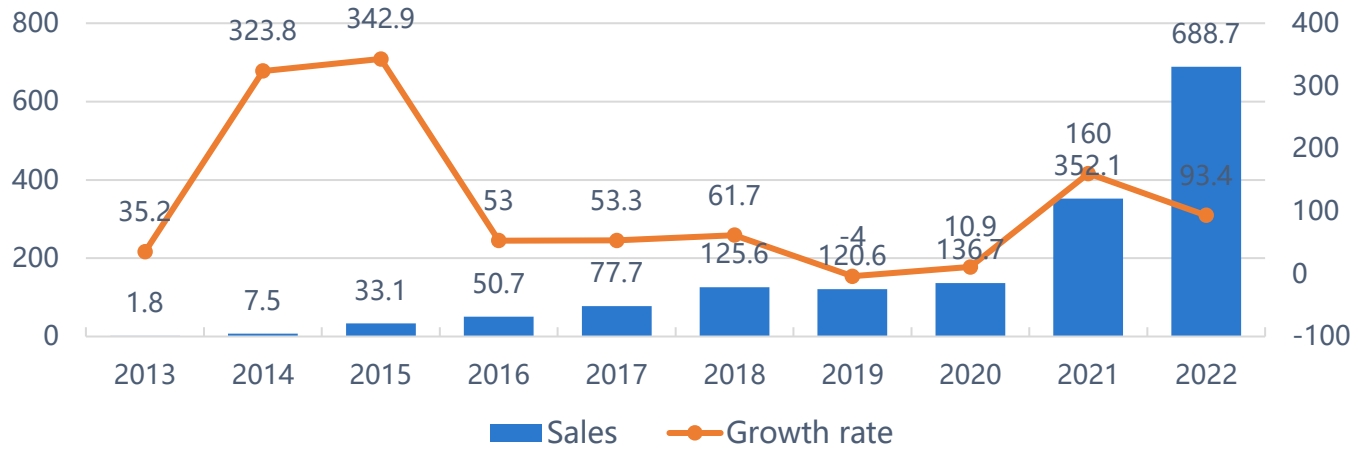
1. Latest Development of Auto Industry in China

■ NEV Market penetration continues to increase rapidly

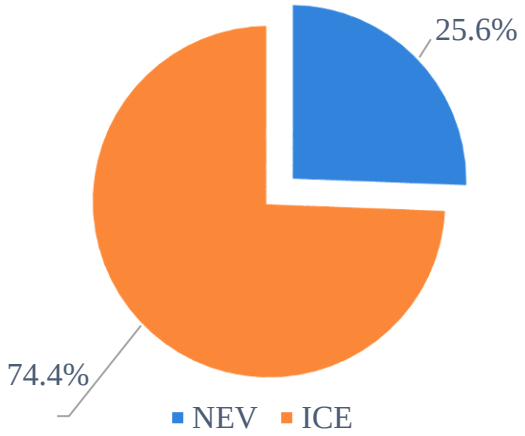
- In 2022, NEV production and sales continued to grow, reaching **7.1 million** units for production and **6.88 million** units for sales, up 96.9% and 93.4% y/y, respectively, and the market share of NEV continued to increase from 13.4% in 2021 to 25.6% in 2022.
- By the end of 2022, the number of new energy vehicles in China reached **13.1 million**.
- The new energy vehicle industry has shifted from policy driven to **market driven** new development stages.

*Note: The NEV mainly include battery electric vehicles, plug-in hybrid vehicles, and fuel cell vehicles in China.

China's New Energy Vehicle Sales and Growth Rate from 2006 to 2022（Unit: 10,000 units, %）



NEV market rate in 2022



The latest situation of China's ICV industry development

Large-scale application of L2 vehicles

In 2022, the installation rate of L2 intelligent and connected systems for new passenger vehicles reach **34.9%**, and the penetration rate of new energy vehicles far exceeds that of fuel vehicles.

Main vehicle companies fully deploy combined driving assistance systems

Testing and demonstration have been widely carried out

more than 10,000 kilometers of highways at all levels have been opened nationwide, and the cumulative test mileage has exceeded 39 million kilometers.

ADAS test

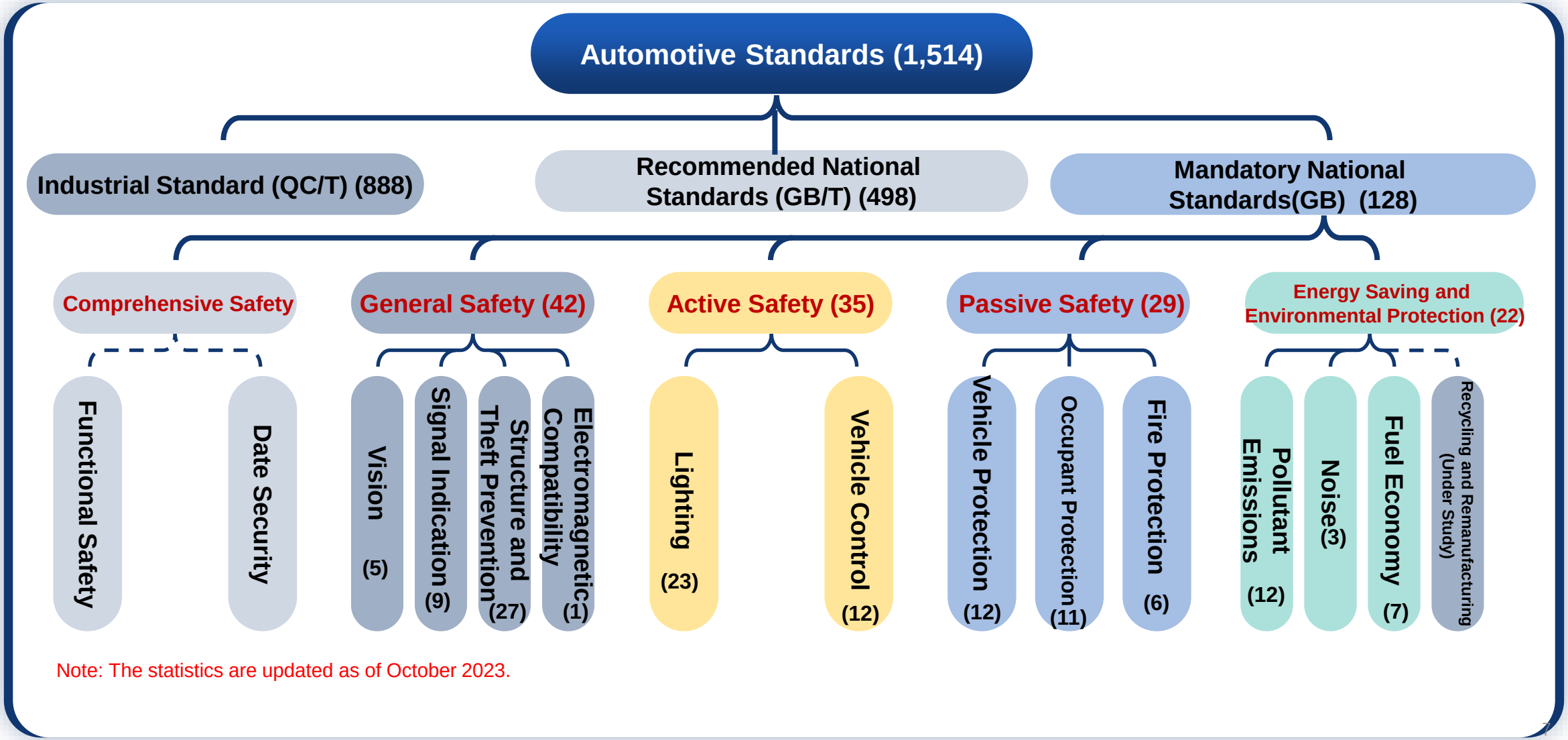
Accelerated deployment of connected infrastructure

More than 230 5G communication base stations, 17 test areas and 16 "dual-intelligence" pilot cities have been built across the country, more than 4,000 kilometers of roads complete intelligent upgrades, and more than 6,000 roadside connected equipment has been equipped.

High integration of connection and vehicle application

目录 Contents

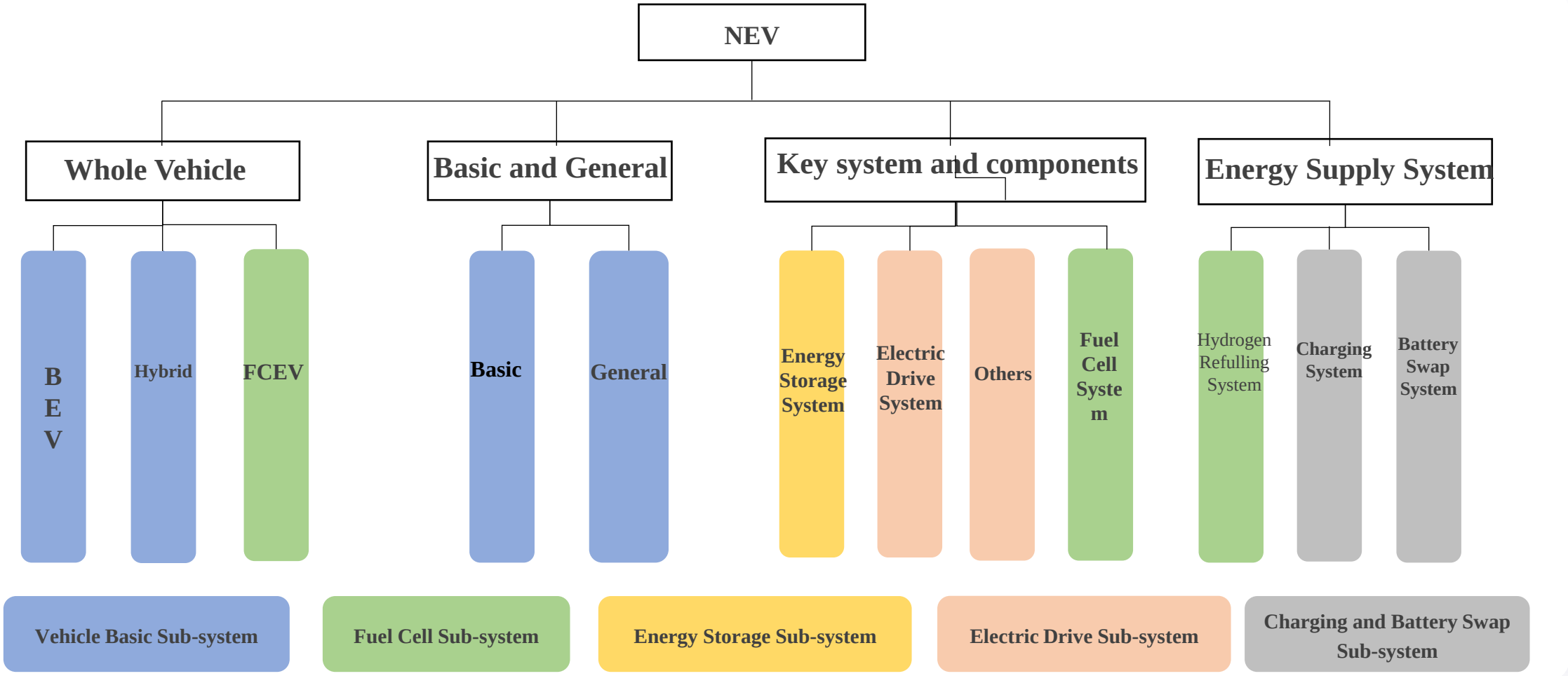
- **The well-established automotive standard system strongly supports the development of auto industry in China and continuously improves the traffic safety and environment conservation.**



Note: The statistics are updated as of October 2023.

2.2 Introduction of NEV Standards System

- The standard system includes: vehicle basic, fuel cell, energy storage, electric drive and charging and battery swap.
- In the year of 2001, 7 electric vehicle standards were first published, and the current effective standards are 109 (including 39 for certification).

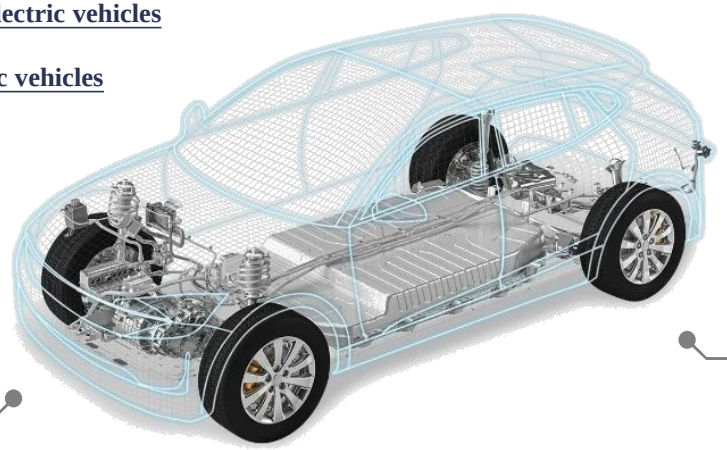


2.3 Introduction of Standards in Key Areas of New Energy Vehicles

■ **Electric vehicle and basic sub-systems inssued 36 standards covering 5 parts: Safety, Technical specifications, Economy, Dynamics and Basic.**

Safety

GB 18384-2020 Electric Vehicle Safety Requirements
GB/T 18387-2017 Electromagnetic field emission intensity of electric vehicles
GB/T 24552-2009 Electric vehicle defrosting and defogging
GB/T 31498-2021 Post-collision safety requirements for electric vehicles
GB/T 37153-2018 Electric vehicle low speed beep
GB 38032-2020 Electric bus safety requirements
GB/T 38283-2019Electric Vehicle Disaster Accident Emergency Rescue Guide
GB/T 38117-2019Electric Vehicle Product Instructions: Emergency Rescue
QC/T 1089-2017 Electric vehicle regenerative braking system



Economy

GB/T 18386 Electric Vehicle Energy Consumption Rate and Driving Range Test Methods （2 items）
GB/T 19753-2021,GB/T 19754Test method for energy consumption of light-duty hybrid and heavy-duty hybrid vehicles
GB/T 36980-2018Electric vehicle energy consumption rate limit
GB/T 37340-2019Electric vehicle energy consumption conversion method
QC/T 894-2011On-board measurement method of pollutant emissions from heavy-duty hybrid electric vehicles

Technical specifications

GB/T 18388-2005 Electric vehicle type test procedures
GB/T19750-2005 Hybrid electric vehicle type test procedure
GB/T 28382,GB/T 32694,GB/T 34585,
GB/T 34598,QC/T 1087Pure electric passenger car, plug-in Hybrid passenger cars, pure electric vans, plug-in hybrids Technical conditions of vehicles and pure electric sanitation vehicles
QC/T 838-2010Super capacitor electric city bus
QC/T 925-2013Supercapacitor electric city bus finalization test procedure

Dynamic

GB/T 18385-2005
Electric vehicle dynamic test method
GB/T 19752-2005
Hybrid vehicle dynamic test method

Basic

GB/T 4094.2-2017 Electric vehicle controls, indicators and signs of signalling devices
GB/T 19596-2017 Electric Vehicle Terminology
GB/T 19836-2019Meters for Electric Vehicles
GB/T 31466-2015Electric vehicle high voltage system voltage level
GB/T 32960.1.2.3,GB/T40855 Electric Vehicle Remote Service and Management System Technical Specification Series Standards
QC/T 837-2010Hybrid Electric Vehicle Type

*__Standards__ are used for certification.

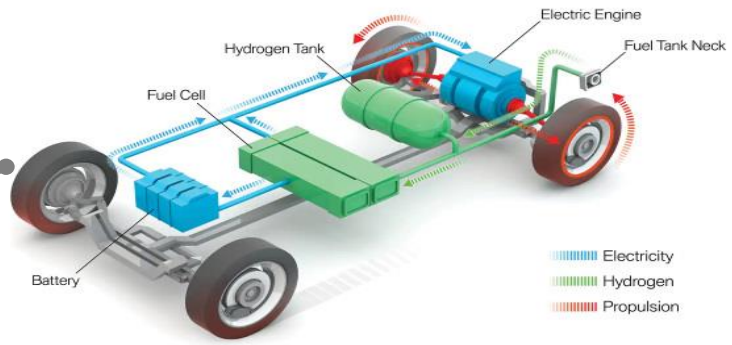
■ **Fuel cell electric vehicle sub-system issued 15 standards covering 6 parts: Safety, Whole vehicle, Demonstration project, Interoperability, On-board hydrogen system and Fuel cell system.**

Safety

GB/T 24549-2020
Safety Requirements for Fuel Cell Electric Vehicles
GB/T 37154-2018
Test method for hydrogen emission of fuel cell electric vehicle

Whole vehicle

GB/T 26991-2011
Test method for maximum speed of fuel cell electric vehicle
GB/T 35178-2017
Measurement method for hydrogen consumption of fuel cell electric vehicles
GB/T 39132-2020
Standard test procedure for fuel cell electric vehicle
QC/T 816-2009
Hydrogen refueling vehicle technical conditions
GB/T 24548-2009
Fuel Cell Electric Vehicle Terminology



Demonstration project

GB/T 29123-2012
Demonstration Operation of Hydrogen Fuel Cell Electric Vehicle Technical Specifications
GB/T 29124-2012
Specification for supporting facilities for demonstration operation of hydrogen fuel cell electric vehicles

Interoperability

GB/T 26779-2021
Fuel cell electric vehicle hydrogen refueling port
GB/T 34425-2017
Fuel cell electric vehicle hydrogen refueling gun

On-board hydrogen system

GB/T 26990-2011
FCVTechnical conditions of on-board hydrogen system
GB/T 29126-2012
FCVOn-board hydrogen system test method

Fuel cell system

GB/T 24554-2022
Fuel cell engine performance test method
GB/T 34593-2017
Test method for hydrogen emission of fuel cell engine

*__Standards__ are used for certification.

2.3 Introduction of Standards in Key Areas of New Energy Vehicles

■ **Energy storage subsystem issued 25 standards covering 6 parts: Safety, Interoperability, Product standards, Key components, Electrical properties &Cycle performance, Recycle and re-use.**

Safety

GB 38031-2020
Safety requirements for power batteries for electric vehicles

Interoperability

GB/T 34013-2017
Specifications and dimensions of power battery products for electric vehicles
GB/T 34014-2017
Automotive power battery coding rules

Electrical properties&Cycle performance

GB/T 31486-2015
Electrical performance requirements and test methods of traction batteries for electric vehicles
GB/T 31467-2015(2item)
Lithium-ion power battery packs and systems for electric vehicles1Section: Test Procedures for High Power Applications/the first2Section: Test Procedures for High Energy Applications
GB/T 31484-2015
Cycle life requirements and test methods of power batteries for electric vehicles

Recycle and re-use

GB/T 34015 Cascade utilization series standards (4item)
GB/T 33598 Recycling series standards (3item)
GB/T 38698management specification
QC/T 1156-2021
Technical specification for dismantling of vehicle power battery cells

Product Standards

GB/T 40433-2021
Technical requirements for hybrid power supply for electric vehicles
GB/T 18333.2-2015
Zinc-air batteries for electric road vehicles
QC/T 1023-2015
General requirements for power battery systems for electric vehicles

Key components

QC/T 741-2014
Automotive Supercapacitors
QC/T 742-2006
Lead-acid batteries for electric vehicles
QC/T 744-2006
Metal Hydride Nickel Batteries for Electric Vehicles

GB/T 38661-2020
Specifications for battery management systems for electric vehicles
GB/T 39086-2020
Functional safety requirements and test methods for battery management systems for electric vehicles
QC/T 897-2011
Specifications for battery management systems for electric vehicles

*Standards are used for certification.

■ Electric drive subsystem issued 17 standards covering 4 parts: Safety, Environment and Reliability, Subsystems & Components and Interoperability.

Safety

GB/T 18488.1-2015
GB/T 18488.2-2015
Drive Motor System for Electric Vehicles

Environment and Reliability

GB/T 29307-2022
Reliability test method of drive motor system for electric vehicle
GB/T 36282-2018
Electromagnetic compatibility requirements and test methods for drive motor systems for electric vehicles

QC/T 893-2011
Fault classification and judgment of drive motor system
QC/T 926-2013
Mild Hybrid Electric Vehicles (ISGtype) reliability test method of power unit

QC/T 1132-2020
Noise measurement method of electric powertrain for electric vehicles

QC/T 1136-2020
Insulated gate bipolar transistors for electric vehicles (IGBT) Module environmental test requirements and test methods

Subsystems & Components

GB/T 24347-2021
electric carDC/DCconverter
QC/T 1022-2015
Technical conditions of reducer assembly for pure electric passenger vehicle
QC/T 1068-2017
Asynchronous drive motor system for electric vehicle
QC/T 1069-2017
Permanent magnet synchronous drive motor system for electric vehicle
QC/T 1086-2017
Specifications for range extenders for electric vehicles
QC/T 1088-2017
Specifications of charge-discharge motor controller for electric vehicle
QCT/ 1174 -2022 HV fuse of electric vehicles
QC/T 1175 -2022 HV relay of electric vehicles

interoperability

QC/T 896—2011
Drive Motor System Interface for Electric Vehicles

*__Standards__ are used for certification.

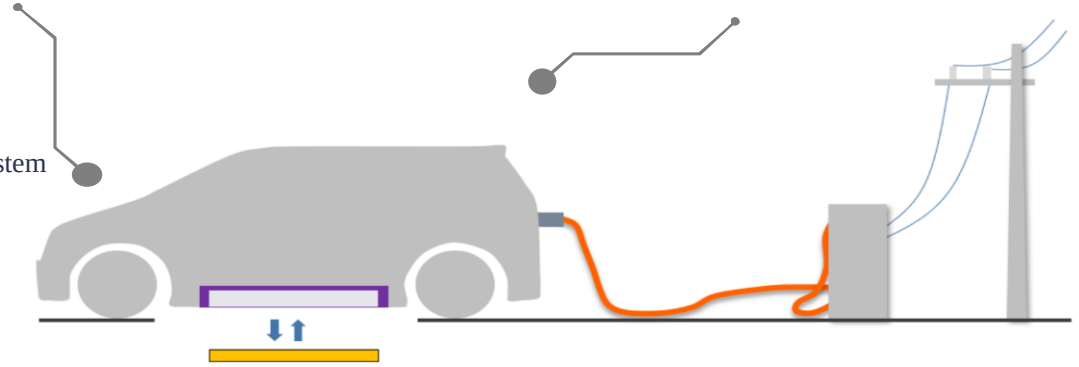
■ **Charging and battery swap sub-system issued 16 standards covering Charging safety (conduction charging), Battery swap, Charing compatible(conduction charging), Wireless charging.**

Charging Safety (Conduction Charging)

GB/T 18487.3-2001 Charging station
GB/T 37133-2018 High Voltage Harness Connector
GB/T 40428-2021 Charging Electromagnetic Compatibility
GB/T 40432-2021 Car charger
QC/T 895-2011 Car charger
QC/T 839-2010 Bus charging system
GB/T 29307-2022 Cybersecurity of EV charging system

Charging Compatible (Conduction Charging)

GB/T 20234.1-2023 General requirements for charging interface
GB/T 20234.2-2015 AC charging interface
GB/T 20234.3-2023 DC charging interface
GB/T 34657.2-2017 Interoperability Testing



Battery Swap

GB/T 40032-2021 Battery replacement safety requirements
QC/T 989-2004 General requirements for power battery box

Wireless charging

GB/T 38775.1-2020 General Requirements for Wireless Charging
GB/T 38775.5-2021 Wireless charging electromagnetic compatibility
GB/T 38775.7-2021 Wireless Charging Interoperability

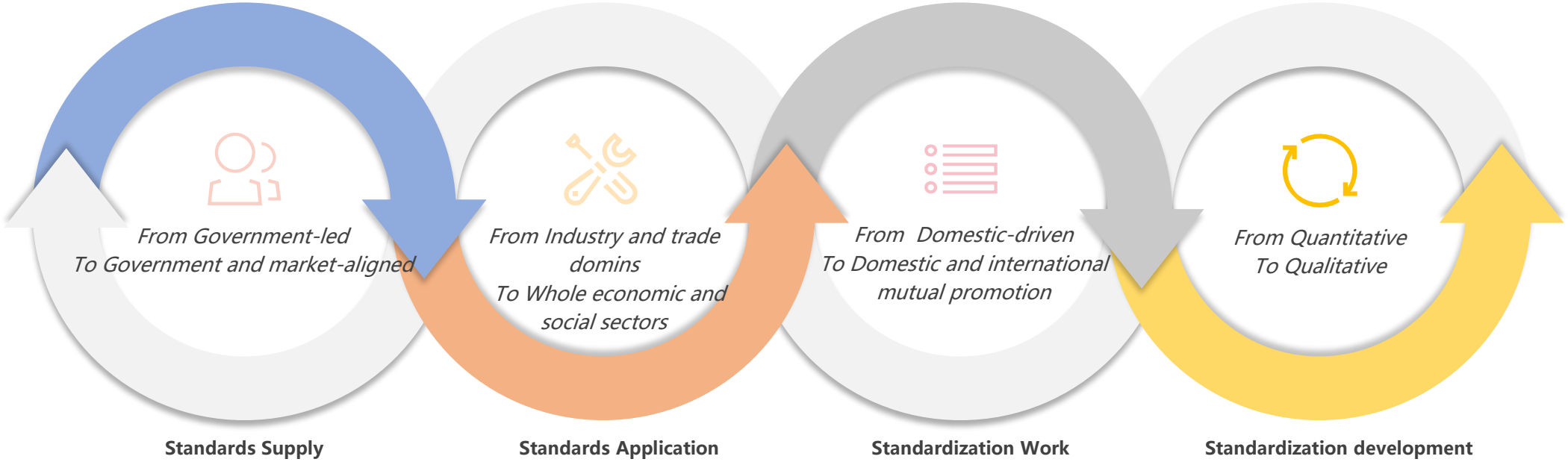
*__Standards__ are used for certification.

目录

Contents

3.1 National Standardization Development Outline

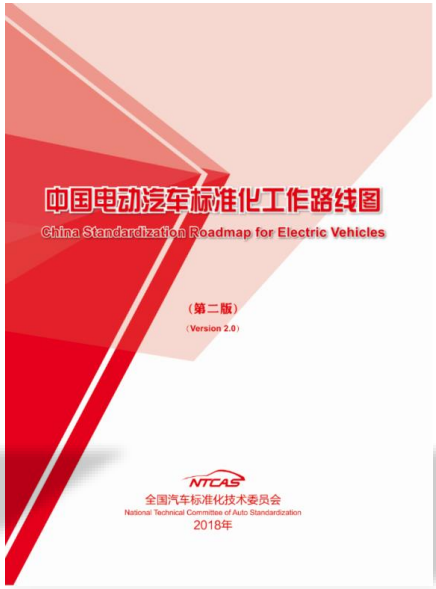
- *The National Standardization Development Outline* claims that by 2025, standardisation work will undergo "**Four Transformations**" around standards supply, standards application, standardisation and standardisation development.
- Achieve the transformation of standards supply from government-led to government and market-aligned, the transformation of standards application from industry and trade to the whole economic and social sectors, the transformation of standardisation from domestic-driven to domestic and international mutual promotion, and the transformation of standardisation development from quantitative to qualitative.



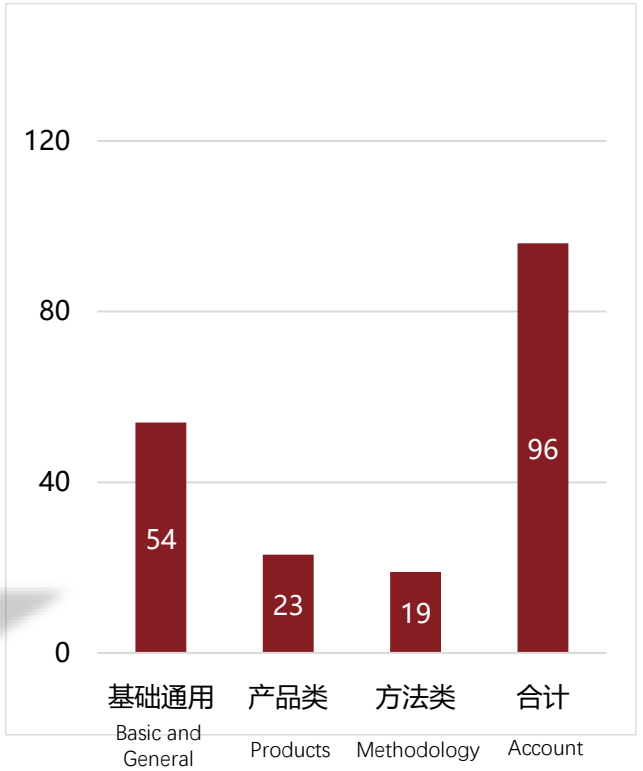
- **Improve and implement the “14th Five-Year Plan” of technical standards system of automotive industry**

Revision of the *China Electric Vehicles Standardizstion Roadmap*

2016 2018 2021



Number of standards to be revised duiring the “14th Five-Year Plan”



01 Accelerating the establishment of a new working mechanism for coordinating with international standards and regulations and realizing mutual promotion.

02 Follow up and actively participate in the United Nations World Forum for Harmonization of Vehicle Regulations (WP.29) and ISO/IEC related research.

03 Utilize multi-bilateral cooperation mechanisms and various types of cooperation and exchange platforms to strengthen standardisation exchanges and cooperation.

Thank You!

中国汽车技术研究中心有限公司

China Automotive Technology and Research Center Co ., Ltd.