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# China's Power Battery Technology Roadmap<sup>1</sup>

Source: 1. China Automotive Engineering Institute, <Energy Saving and New Energy Vehicle Technology Roadmap>, Oct. 2016

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# Power Battery Technology Roadmap<sup>1</sup>

## General Strategy

- **Near and Middle Term Goals:**

- Improve the current lithium-ion power battery technology to meet with the needs of new energy automobile industry scale-up development.
- Focus on developing new lithium-ion power battery to improve safety, consistency, lifecycle, etc.
- Conduct forward-looking research on new systemic power battery technology.

- **Middle and Long Term Goals:**

- Continue to improve the new lithium-ion power battery technology
- Focus on developing new systemic power batteries to increase the energy density, substantially reduce costs, and realize the large scale application of new systemic power battery technology

Source: 1. China Automotive Engineering Institute, <Energy Saving and New Energy Vehicle Technology Roadmap>, Oct. 2016

# Power Battery Technology\_ Goals, Paths and Priorities

## Development Goals

- To meet with the development of new energy automobiles, requires increasing the energy density and reducing the cost of power batteries

– Energy Density(Wh/kg):

	Yr.2020	Yr.2025	Yr.2030
BEV	350	400	500
PHEV	200	250	300

– Battery System Cost (RMB/Wh)

	Yr.2020	Yr.2025	Yr.2030
BEV	1	0.9	0.8
PHEV	1.5	1.3	1.1

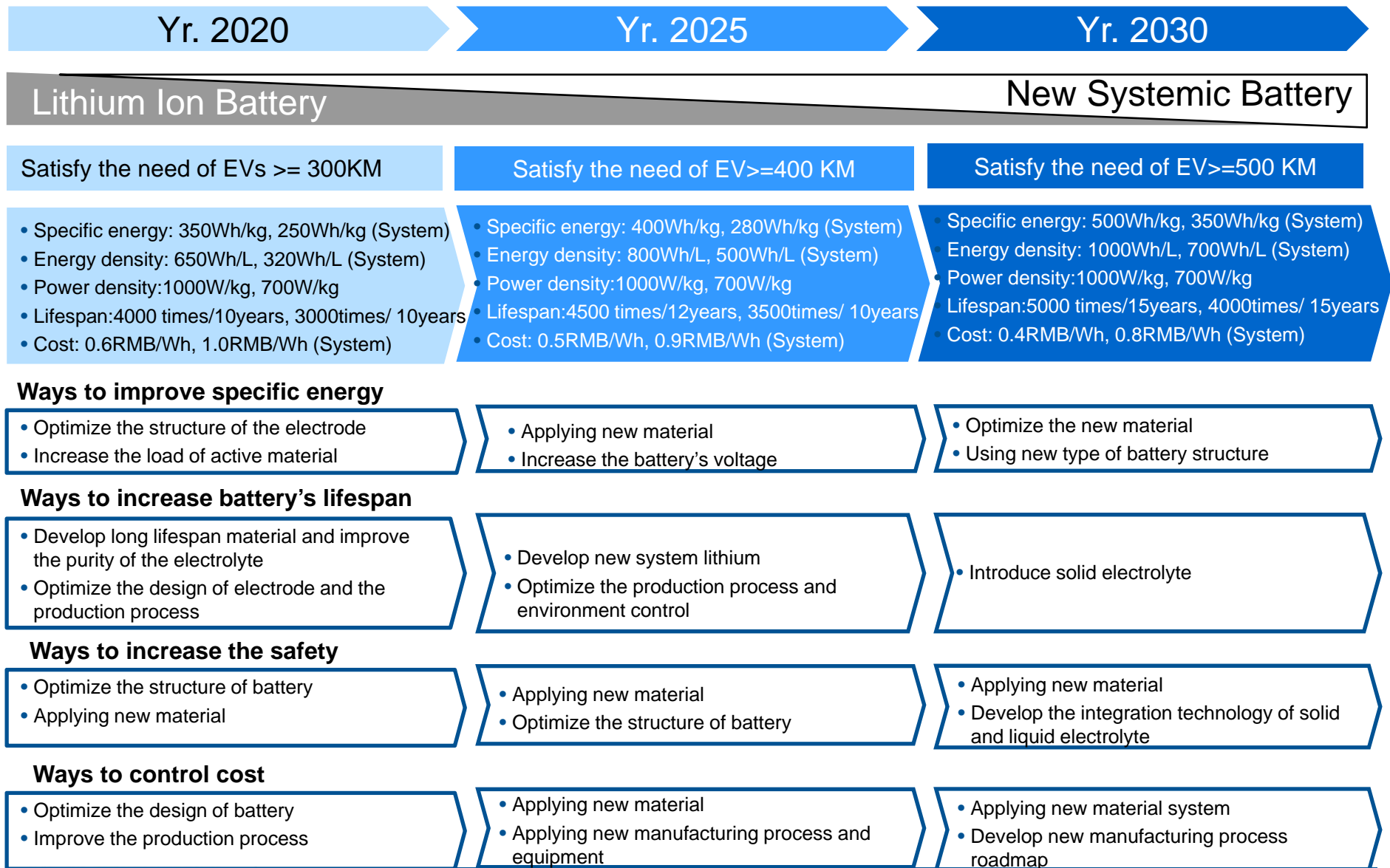
## Technology Roadmap

- Strengthen the effort on development new systemic power battery technology
- Promote the key materials and devices technology
- Increase the batteries safety, lifecycle and consistency
- Speed up the power battery standards establishment
- Speed up the research on battery recycle technology

## Development Priorities

- New materials for power batteries
- Power battery safety and lifespan extending technology
- Power battery design and simulating technology
- Power battery system and controlling technology
- Power battery testing and standards establishment
- Power battery cascaded utilization and recycle technology

# Power Battery Technology Roadmap\_ EV Battery Technology Roadmap



# Power Battery Technology Roadmap\_ PHEV Battery Technology Roadmap



## Ways to improve specific energy

Optimize the design of the electrode and increase the power performance

- Optimize the new material
- Using new type of battery structure

## Ways to increase battery's lifespan

- Develop long lifespan material and improve the purity of the electrolyte
- Optimize the design of electrode and the production process

- Introduce solid electrolyte

## Ways to increase the safety

- Optimize the structure of battery
- Applying new material

- Applying new material
- Develop the integration technology of solid and liquid electrolyte

## Ways to control cost

- Optimize the design of battery
- Improve the production process

- Applying new material system
- Develop new manufacturing process roadmap

# Power Battery Technology Roadmap \_ Priorities

Item	Technology Innovation Demands	Priorities
Frontier	<ul style="list-style-type: none"> <li>• Technical research of new type of battery energy storage material for &gt;500Wh/kg power battery</li> <li>• Technical research of power battery with the energy density &gt;500Wh/kg</li> <li>• Simulation technology research of new type of power battery and materials</li> <li>• Management technology research of new type of power battery</li> </ul>	<ul style="list-style-type: none"> <li>• Energy storage material and power battery testing platform</li> <li>• Industrialization technology research of power battery</li> <li>• Safety technology research of high specific energy battery with the energy density &gt;400 Wh/kg</li> <li>• Technical research of cascade utilization of battery' energy and recycling</li> <li>• Power battery digital factory technology research</li> </ul>
Application Technology	<ul style="list-style-type: none"> <li>• Safety technology research of high specific energy battery with the energy density &gt;400 Wh/kg</li> <li>• Long lifespan technology research of high specific energy battery with the energy density of &gt;400 Wh/kg</li> <li>• Technical research of cascade utilization of battery' energy and recycling</li> </ul>	
Demonstration and Industrialization	<ul style="list-style-type: none"> <li>• Industrialization technology research of key raw materials of power battery</li> <li>• Industrialization technology research of power battery</li> </ul>	
Commonality Platform	<ul style="list-style-type: none"> <li>• Energy storage material and power battery testing platform</li> <li>• Standardization platform of power battery</li> <li>• Power battery digital factory technology research</li> </ul>	