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Electric Vehicles Battery Re-use and Recycling Policies in China

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October 2021

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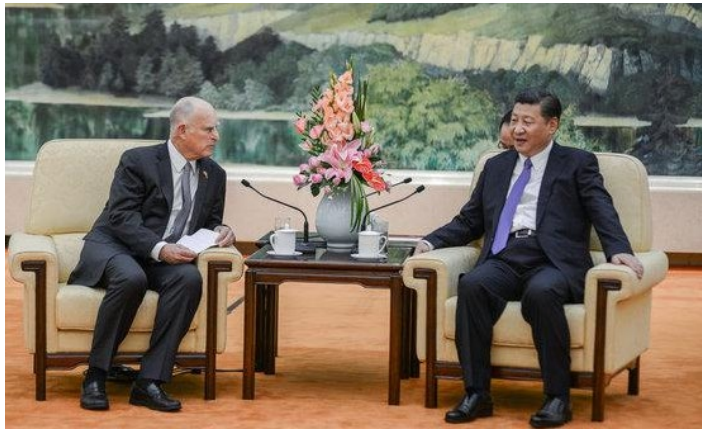
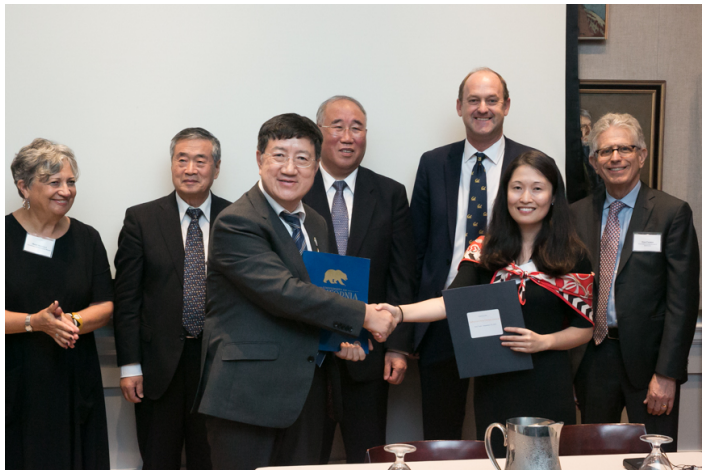
Mission

Aims to convert promising climate solutions into actual policies and outcomes across the pacific and advancing subnational climate leadership.

- **June 2017**, in Beijing, President Xi Jinping and Governor Jerry Brown agreed on the importance of climate change actions and building a platform to advance the cooperation between California and China on energy, climate and economic development;
- **June 2017**, in Being, Minister Xie Zhenhua, Governor Jerry Brown and Vice President of Tsinghua announced the intent to establish the U.S.-China Climate Institute;
- **Sep 2018**, University of California and Tsinghua University signed the Memorandum of Understanding to establish the California-China Climate Institute;
- **Jan 2019**, Governor Jerry Brown and Minister Xie exchanged ideas and confirmed serving as co-chairs to the institute;
- **Sep 2019**, California-China Climate Conference, launch of the Institute





- Overview of the electric vehicles (EV) battery industry in China
- Key battery re-use and recycling policies
- Summary

Overview of the electric vehicles (EV) battery industry in China

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Battery re-use and recycling policies are crucial as we reach higher shares of ZEV sales

- For passenger vehicles, our study suggests 50% ZEV sales share for China and the US in 2030, and 100% in 2040.
- For freight transport, our study suggests 30% ZEV sales share in 2030, 70% in 2040, and 90%-100% in 2050-2060.

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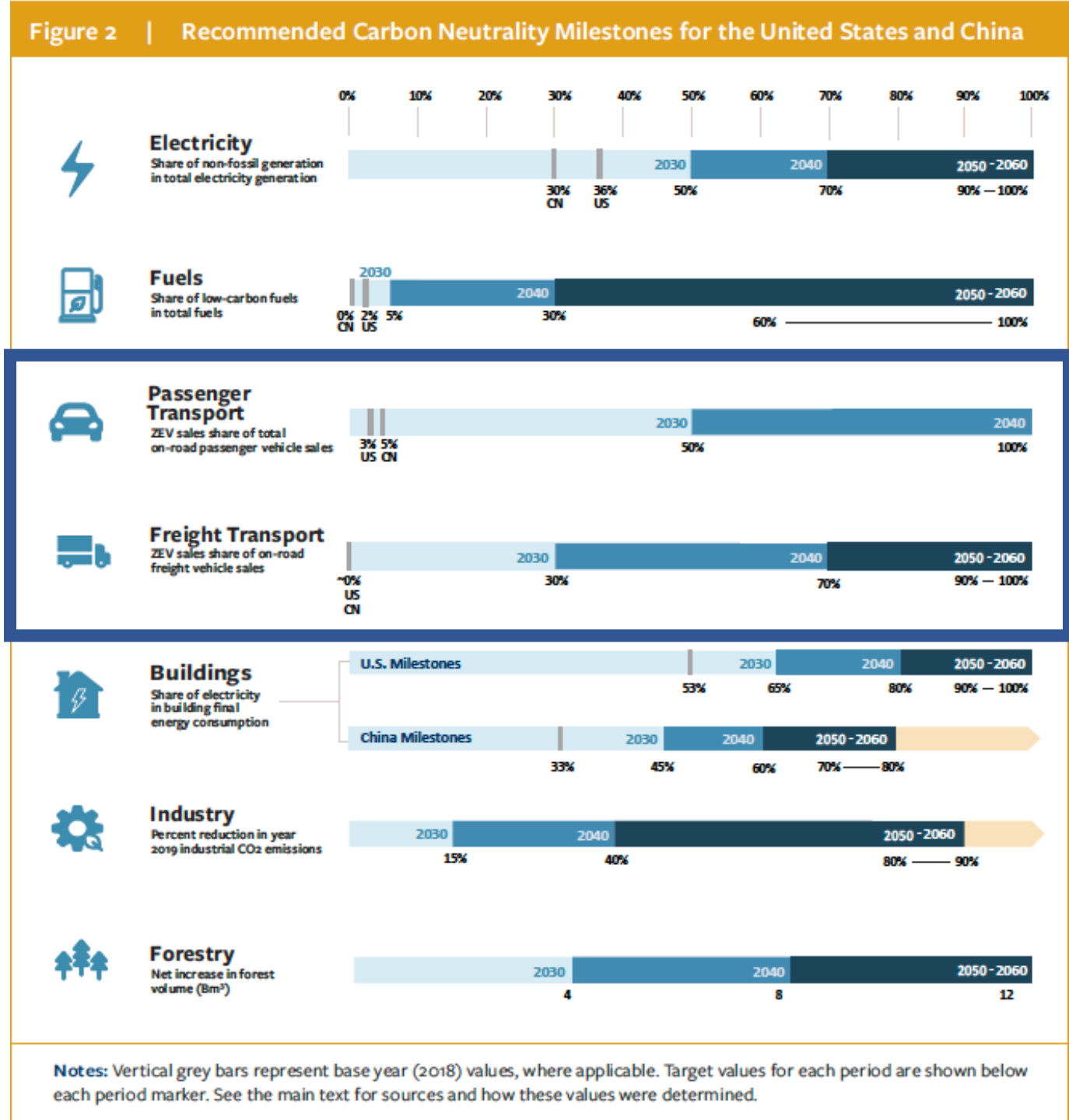

Safety concerns are driving the share of LFP batteries

- In the first half of 2021, NMC vehicle production declined to 57.5% while LFP share was **42.3%.** The share of LFP used to be **38%** in 2020, and lower than **33%** in 2019.
- **Tesla** just announced that all of its standard range models in China will use LFP batteries
- **Reasons for the rise in LFP batteries**: LFP batteries are cheaper and safer; consumer preference for shorter range vehicles; domestic manufacturers have been relying on LFP for a long time

Share of new light-duty electric vehicle sales by battery chemistry. *Note:* Based on EV-volumes (2020).

(Source: The International Council on Clean Transportation)

Two key battery re-use and recycling policies

- National Energy Administration's tentative ban on EV battery re-use
- Ministry of Industry and Information Technology: New rule on the re-use of retired EV batteries

China's tentative ban on using retired EV batteries in energy storage projects was lifted in the finalized policy

Before the industry achieves a breakthrough in technologies **managing battery uniformity in battery packs**, and establishes **comprehensive systems for battery monitoring and evaluation**, in principle, **no new large-scale echelon utilization** of vehicle batteries in energy storage will be allowed.

Proposed policy: June 22

Finalized policy: September 29

It's crucial to establish **systematic management and tracking systems** to control battery uniformity in battery packs. All reused batteries should pass **safety evaluation checks by qualified organizations**. New and existing energy storage projects with retired EV batteries need to be integrated into the **online monitoring platform** which provides real-time battery performance evaluation. Energy storage projects also need to be **maintained and evaluated regularly and prepare emergency plans**.

Change from a tentative ban to systematic regulatory approaches

Concerns in the draft policy

- managing battery uniformity in battery packs
- Real-time evaluation and monitoring
- No second-life use regulations for manufacturers when batteries are produced

Solutions in the finalized policy

- systematic management and tracking systems
- safety evaluation checks by qualified organizations
- Real-time online monitoring platform
- Regular maintenance
- Emergency planning

Benefits of re-using batteries in storage projects:

- Battery cost
- Grid stability
- Life-cycle emissions
- EV target

MIIT: Guiding battery re-use and recycling policy

- August 19, 2021
- Ministry of Industry and Information Technology and four other agencies
- Identifies requirements on companies that use retired EV batteries, batteries, and recycling companies
- Encourages cooperation between battery manufacturers and battery re-use companies
- Voluntary verification system of products that meet re-use requirements
- Identifies 26 re-use and recycling pilot companies

Coordinating standards between China, US and the EU

China	EU	US
• Currently only **regulations**, but MIIT announced that legislation is in process • **Safety** is the highest priority • **Online tracking and monitoring systems** • Standards for manufacturers, batteries, re-use and recycling companies • Fewer numeric targets or requirements	• New **regulation** concerning batteries and waste batteries, effective from Jan 2022 • **Includes both sustainability and safety requirements** • **Battery management system** storing data needed to determine the state of health of batteries • Standards for manufacturers, batteries, re-use and recycling companies • Also includes mandatory minimum levels for recycled content, electrochemical performance and durability, due diligence obligations, recycling efficiencies, and labelling requirements	**Federal Level** • No national level EV battery re-use or recycling guidelines **California** • CalEPA Lithium-ion Car Battery Recycling Advisory Group • California Energy Commission pilot projects