Competition vs Collaboration Across Clean Tech: Is Reshoring Possible?

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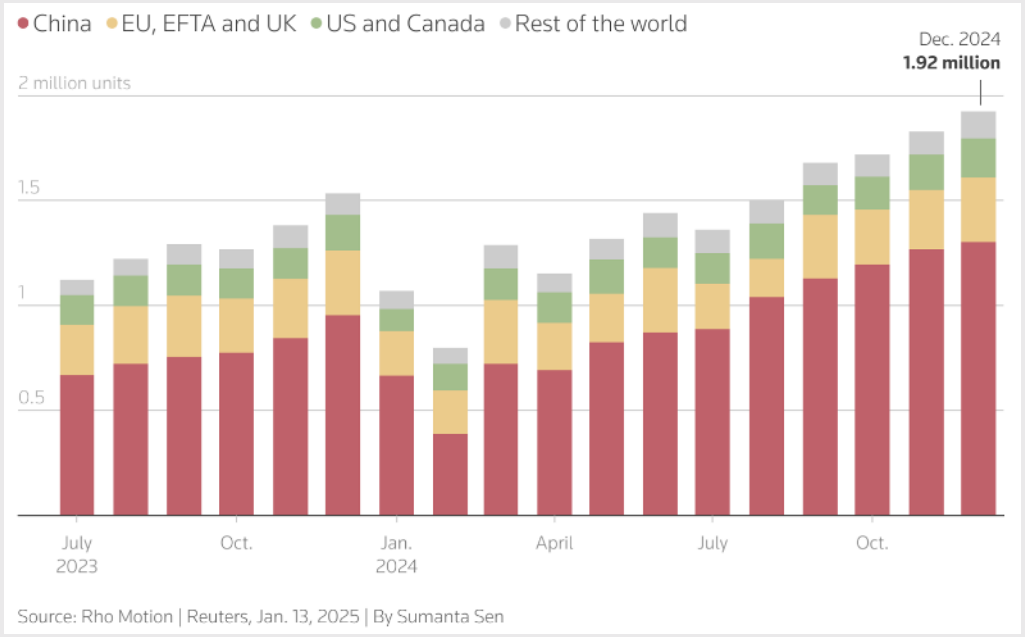
April 30, 2025

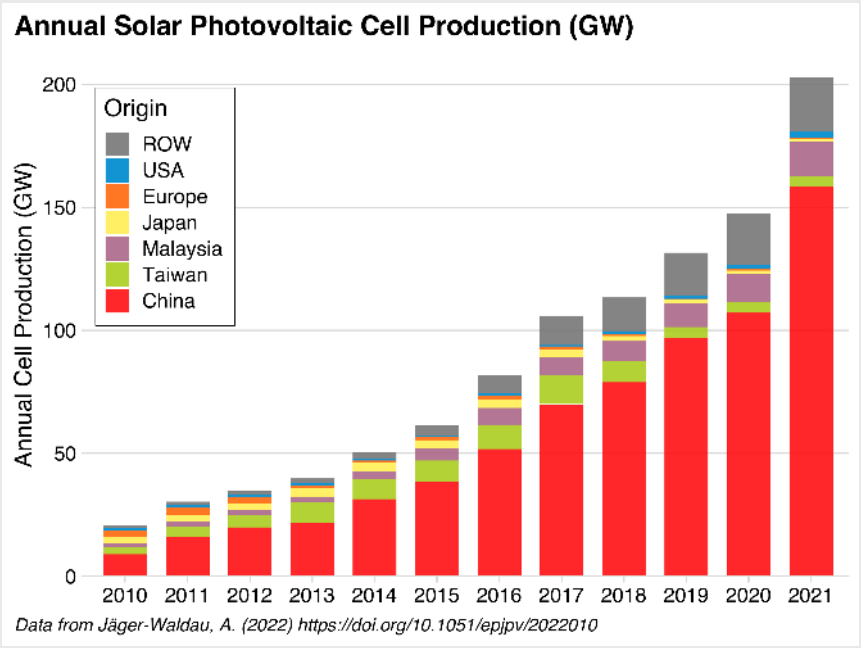
Chinese firms dominate EV and solar industries

EV sales (Jul. '23 - Dec. '24)



https://www.reuters.com/business/autos-transportation/global-electric-vehicle-sales-up-25-record-2024-2025-01-14/

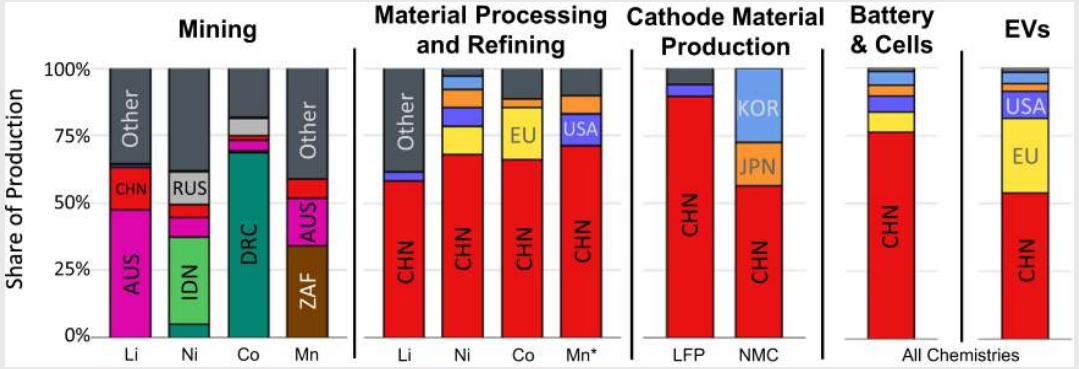
Solar module production ('10 - '21)



Helveston, J.P., He, G., & Davidson, M.R. (2022) "Quantifying the cost savings of global solar photovoltaic supply chains" *Nature*.

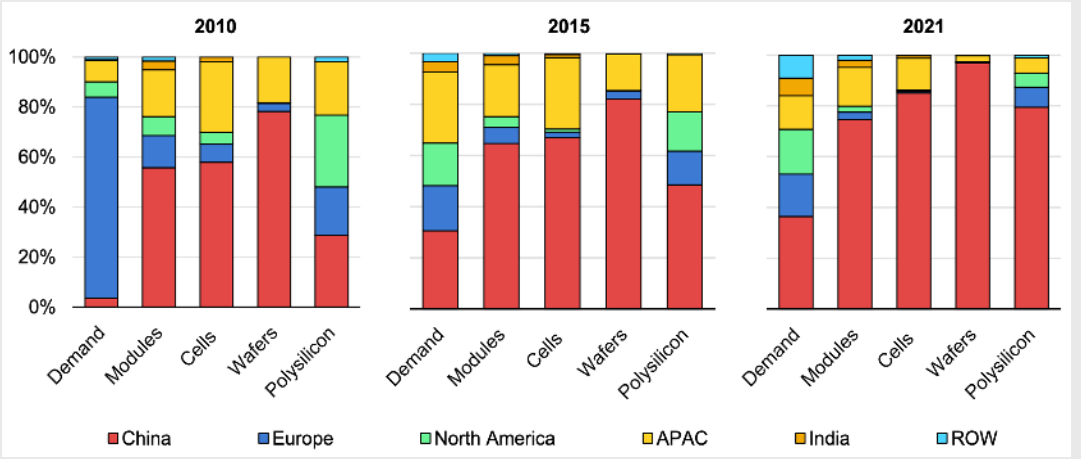
Chinese firms dominate EV and solar *supply chains*

EV battery supply chain



Cheng, Anthony L., et al. "Electric vehicle battery chemistry affects supply chain disruption vulnerabilities." Nature Communications 15.1 (2024): 2143.

Solar module supply chain



IEA Special report 2022: Solar PV Global Supply Chains, https://www.iea.org/reports/solar-pv-global-supply-chains

Bipartisan goal: The US needs to counter China's lead in clean energy tech

Keep Chinese clean tech out of US market: Steep tariffs on imported Chinese EVs, batteries, PV modules

Keep Chinese firms out of US clean tech supply chains: IRA restrictions on EV subsidy elligiblity, unclear guidance on Foreign Entities of Concern (FEOC) rules

Countering China by Investing in Manufacturing

IRA Strategy: Investing in *manufacturing* will lead to enduring support for clean tech through local jobs & economic benefits

To what extent are counter-China policies helping or harming the clean tech manufacturing goal?

Solar PV

Solar PV

Total available U.S. federal subsidies: $0.16 / W

Average U.S. module price (Q1 2024): $0.33 / W

Sources:

- https://www.nrel.gov/docs/fy24osti/91209.pdf
- Michael Davidson, “U.S.-China Clean Energy Race: Accelerating Innovation, Manufacturing and Adoption”, https://web.sas.upenn.edu/future-of-us-china-relations/climate-and-environment/

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Solar PV

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Risk: U.S. producers unlikely to be globally competitive

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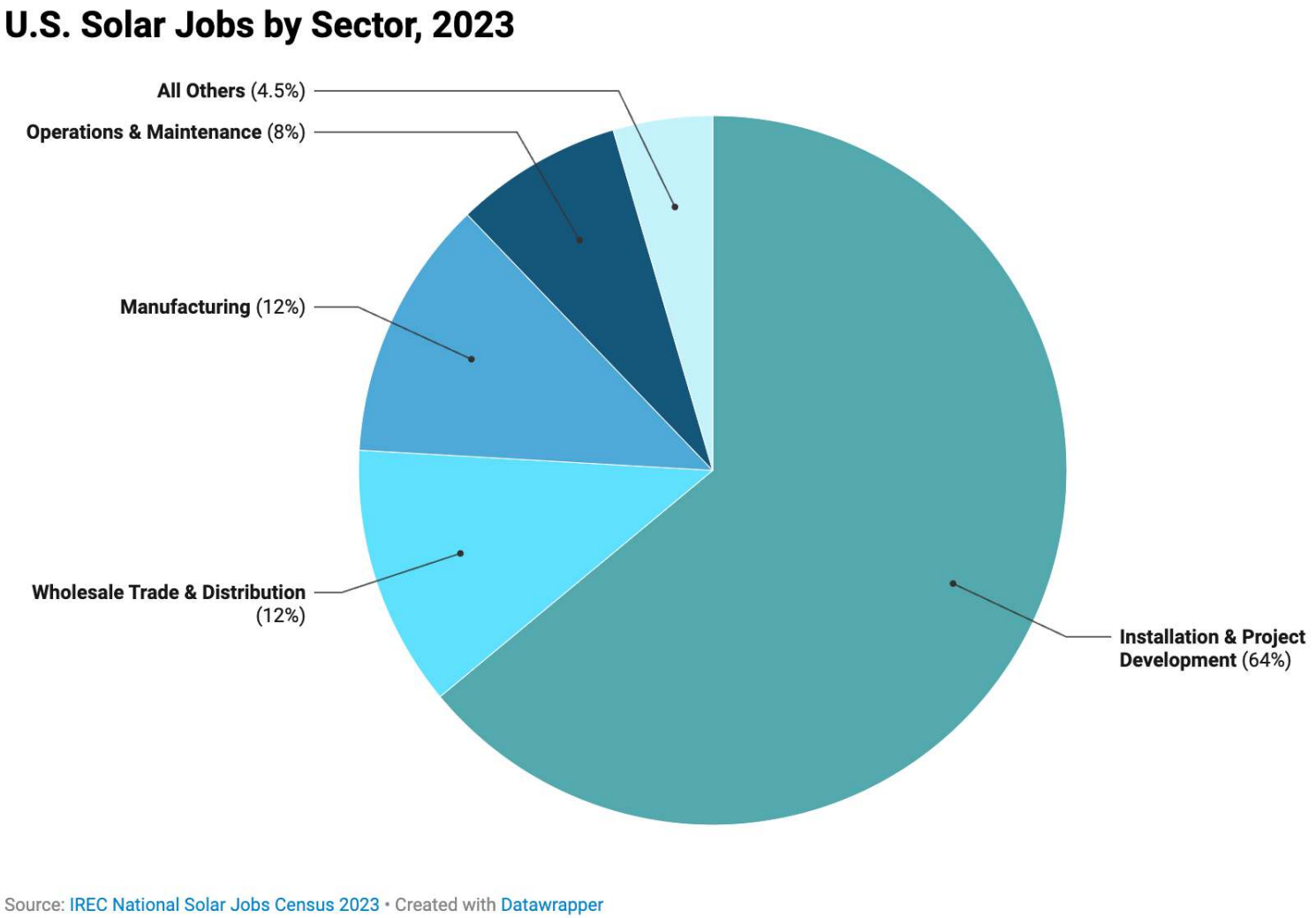
Solar unlikely to produce desired # of manufacturing jobs



Installation and project development accounts for 2/3 of solar jobs.

Manufacturing is 12% of solar jobs

https://irecusa.org/census-solar-job-trends/

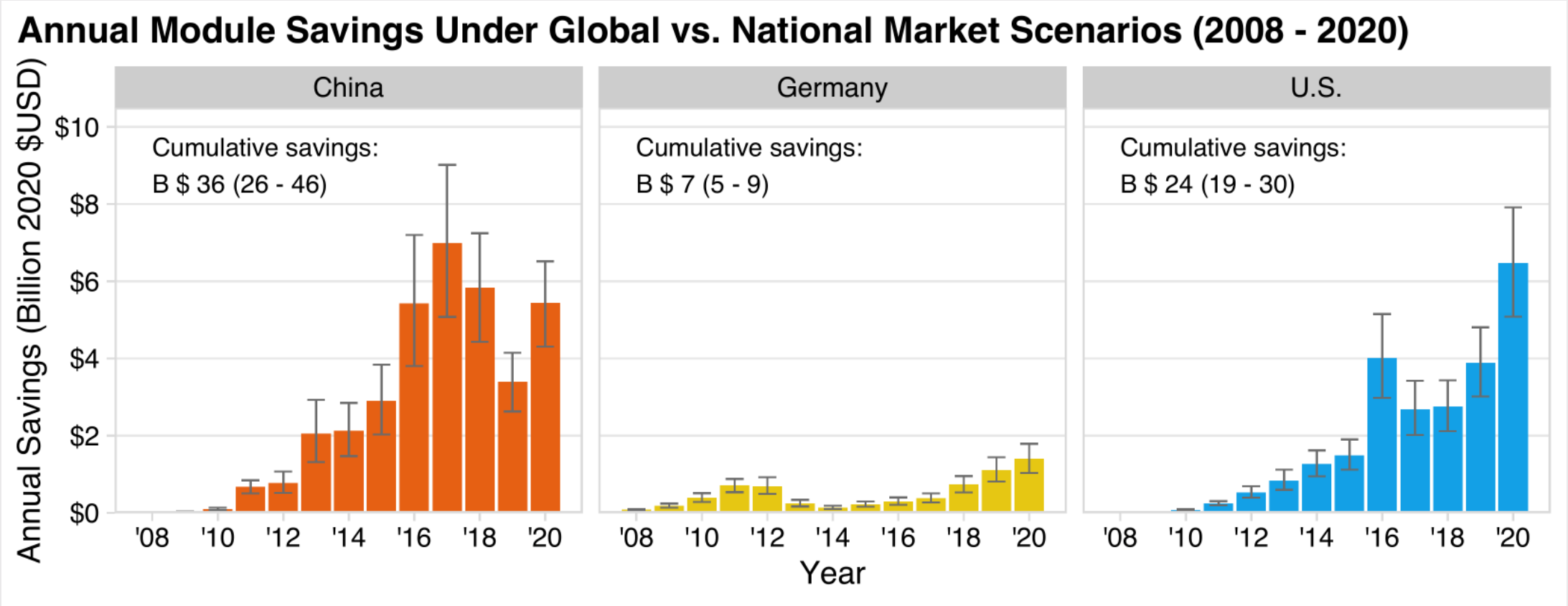
We need diversification

China has enough solar PV capacity to meet annual global demand through 2032.

Source: Wood Mackenzie, https://www.reuters.com/world/china/china-will-dominate-solar-supply-chain-years-wood-mackenzie-2023-11-07/

But do we need *onshoring*?

Estimated $67 B in savings from global supply chains

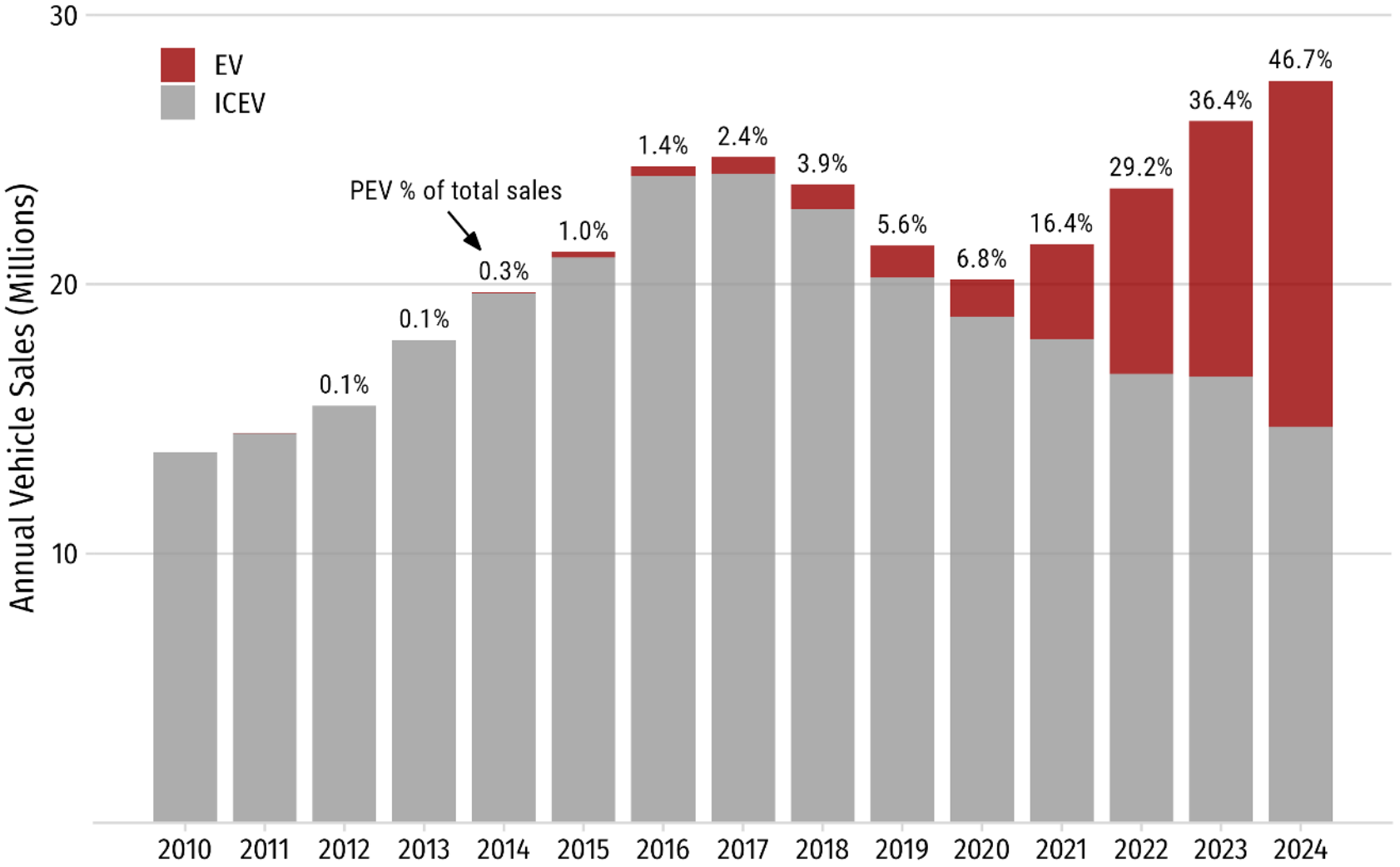


Source: Helveston, J.P., He, G., & Davidson, M.R. (2022) "Quantifying the cost savings of global solar photovoltaic supply chains" *Nature*. 612 (7938), pg. 83-87. DOI: 10.1038/s41586-022-05316-6

Electric Vehicles

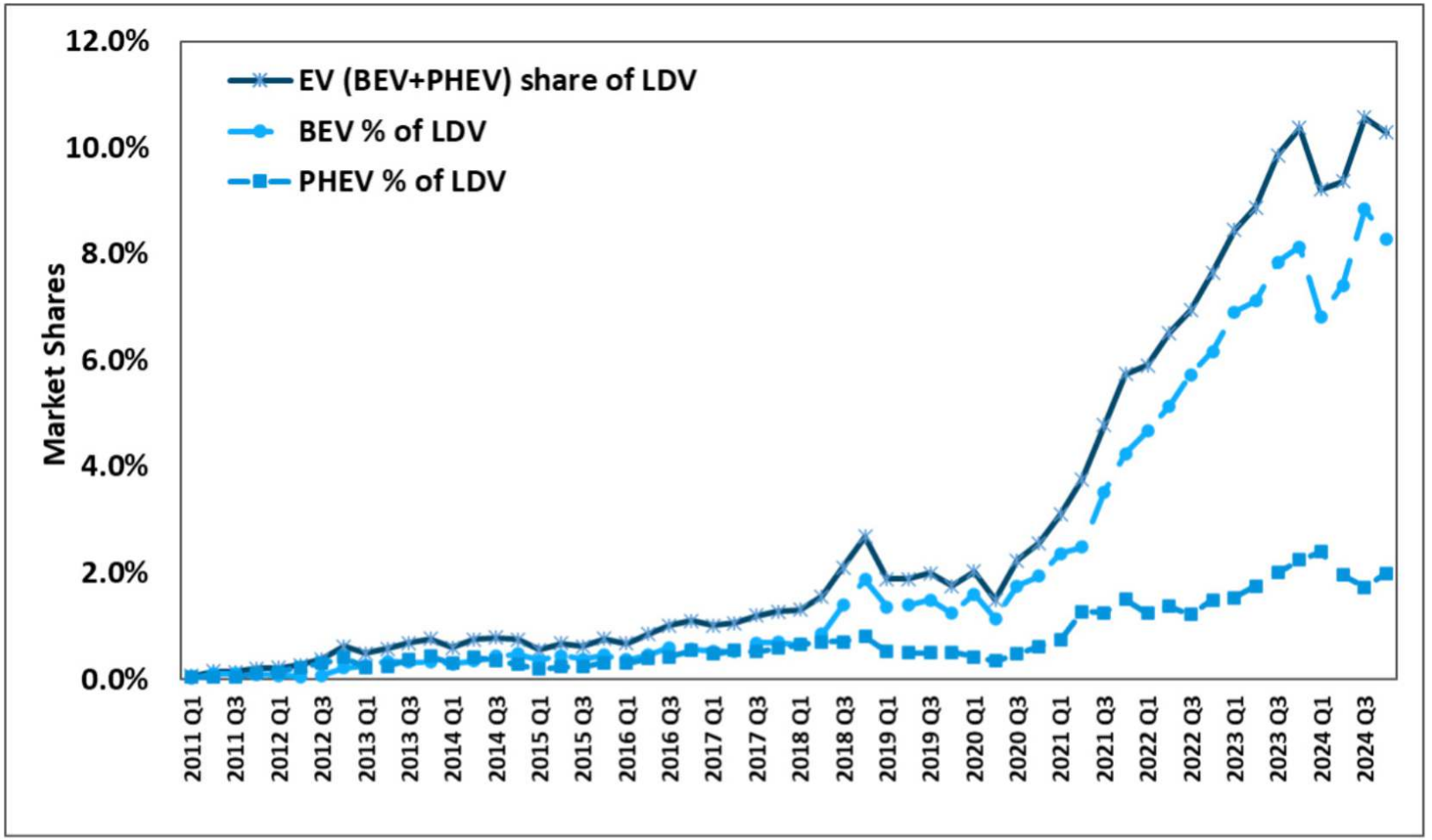
In China, PEV sales grow while ICEV sales slow

After peaking in 2017, internal combustion engine vehicle (ICEV) sales have declined for 7 straight years



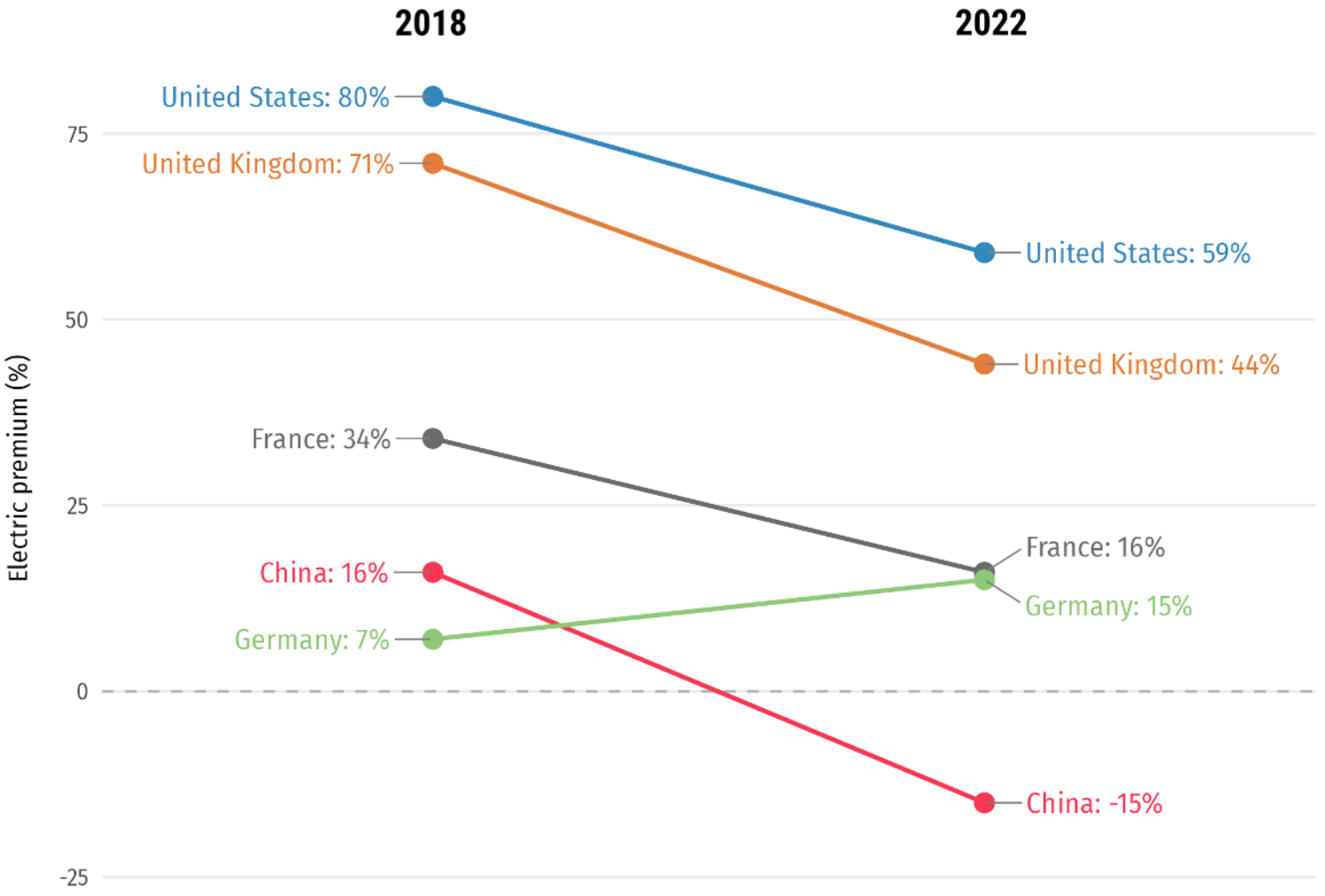
Data sources: OICA, marklines.com

EV sales in US reaching ~10% of sales



Source: Argonne National Lab, https://www.anl.gov/ev-facts/model-sales

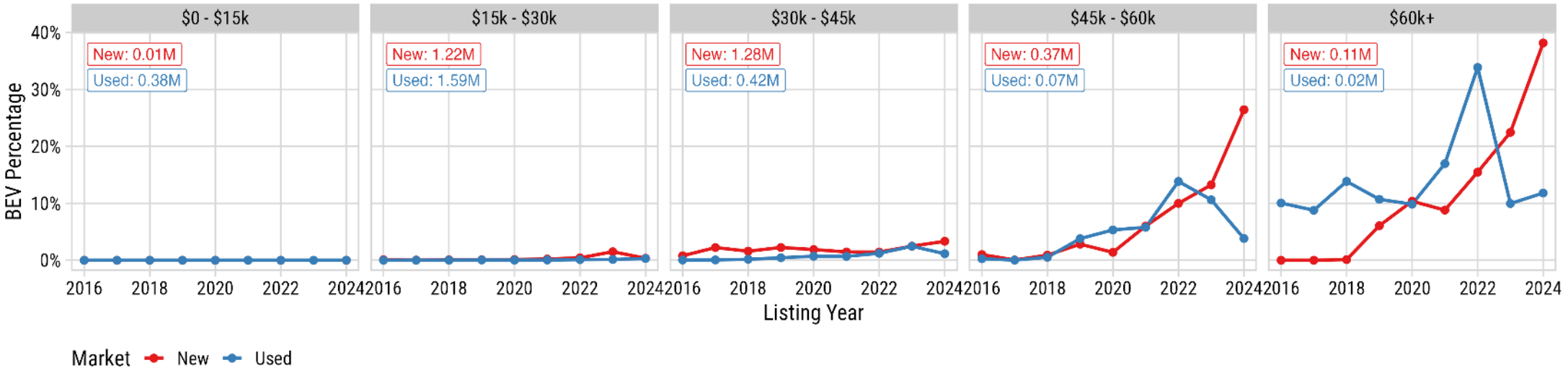
The EV sector has an affordability problem (except in China)



Source: https://www.iea.org/reports/global-ev-outlook-2024/executive-summary

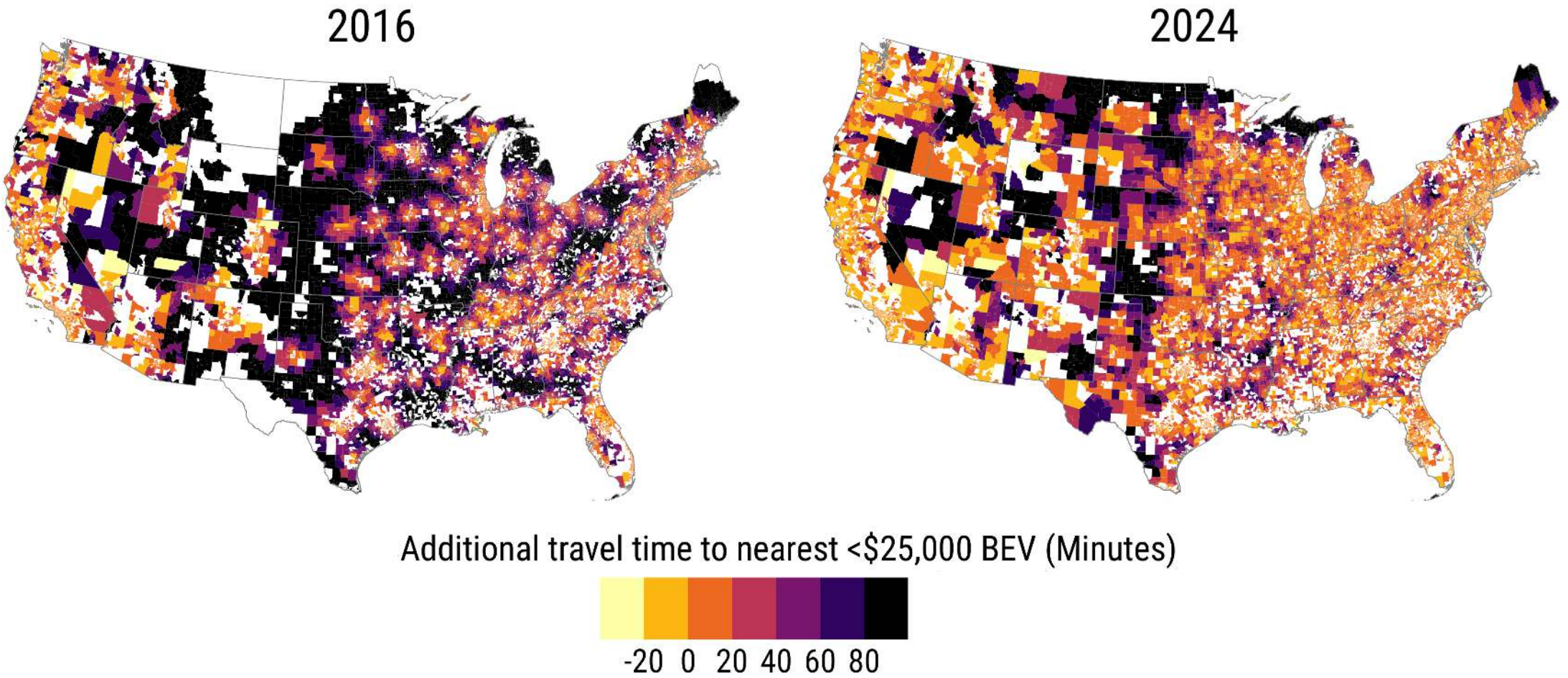
BEVs Concentrated in High-Price Segments in US

Only 1.8% of new and 0.4% of used listings under $45,000 were BEVs in 2024



Data pulled from ~80k dealerships, 2016 to 2024. Source: marketcheck.com

The BEV Deserts of America



Things that don't help affordability:

Tariffs (100% tariff on imported Chinese EVs since 05/2024)

Effectively banning the use of Chinese suppliers

Inflation (see tariffs)

Opportunities

Chinese FDI into U.S.

Gotion batteries: Multi-billion dollar investments in Illinois and Michigan

Challenge: Uncertainty around Foreign Entities of Concern (FEOC) status

Technology Licensing Agreements

Ford-CATL: Licensing battery technology in a Michigan plant

Challenge: CATL was recently added to DOD's list of “Chinese military companies”

The biggest competitor
to an American EV
is not a Chinese EV...

...it's a gas car

Top 4 Selling Vehicles in **China**

Xiaomi SU7
$30,171 - $41,909

BYD Song
$24,721 - $38,555

Geely Xingyuan
$ 9,615 - $13,667

Tesla Model Y
$36,822 - $43,809

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Tesla Model Y
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Top 4 Selling Vehicles in **USA**

Toyota RAV4
$29,250 - $38,955

Honda CRV
$30,100 - $41,100

Ford F-150
$44,095 - $79,005

Chevrolet Silverado
$42,700 - $70,000

Thanks!

https://jhelvy.github.io/2025-jeffries-us-china-summit

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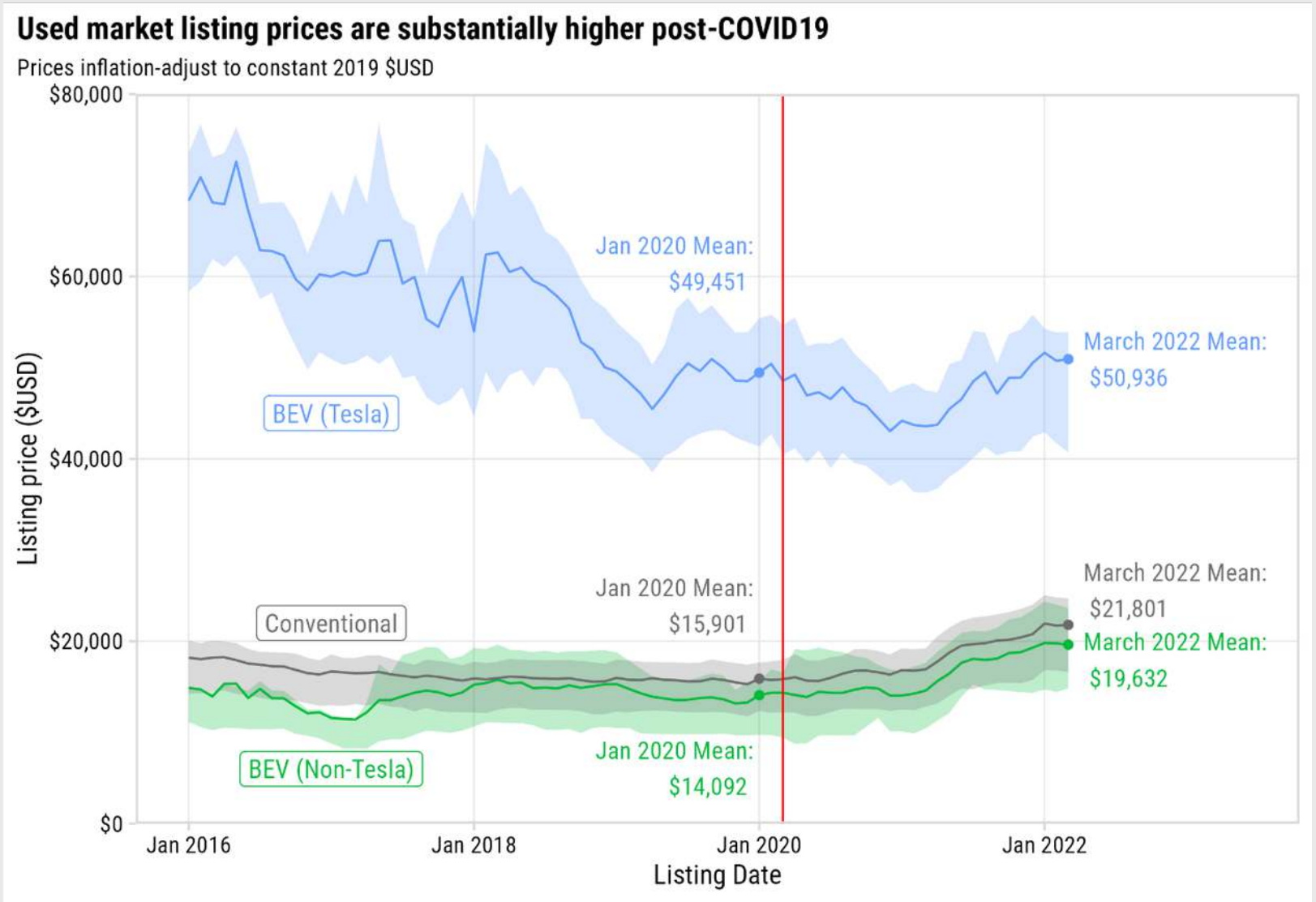
Extra Slides



Used market is more affordable, but post-COVID prices are up in all markets, not just EVs

Source: Roberson, Laura A., *Pantha, S., & Helveston, J.P. (2024) "Battery-Powered Bargains? Assessing Electric Vehicle Resale Value in the United States" Environmental Research Letters.