

Autos in Transition Addressing Demand

Steve Douglas, Vice President, Energy & Environment

Alaska's Minerals – A Strategic National Imperative

August 22, 2022



ALLIANCE
FOR AUTOMOTIVE
INNOVATION

Our Members



• APTIV •



Autoliv

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cruise

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LUMINAR



nuro



Panasonic

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Qualcomm



TOYOTA

VOLKSWAGEN GROUP OF AMERICA



1 Tailpipe, 3 Agencies, 6 Regulations

California
Advanced Clean Cars
(ACC I)

GHG, 2021-25MY
(GHG, Fuel Economy)
Adopted 2012

LEV III, 2015-25MY
(Criteria Emissions)
Adopted 2012

ZEV, 2015-25
(Criteria Emissions, GHG,
Fuel Economy)
Adopted 2012

U.S. EPA

GHG, 2023-26MY
(GHG, Fuel Economy)
Adopted Dec, 2021

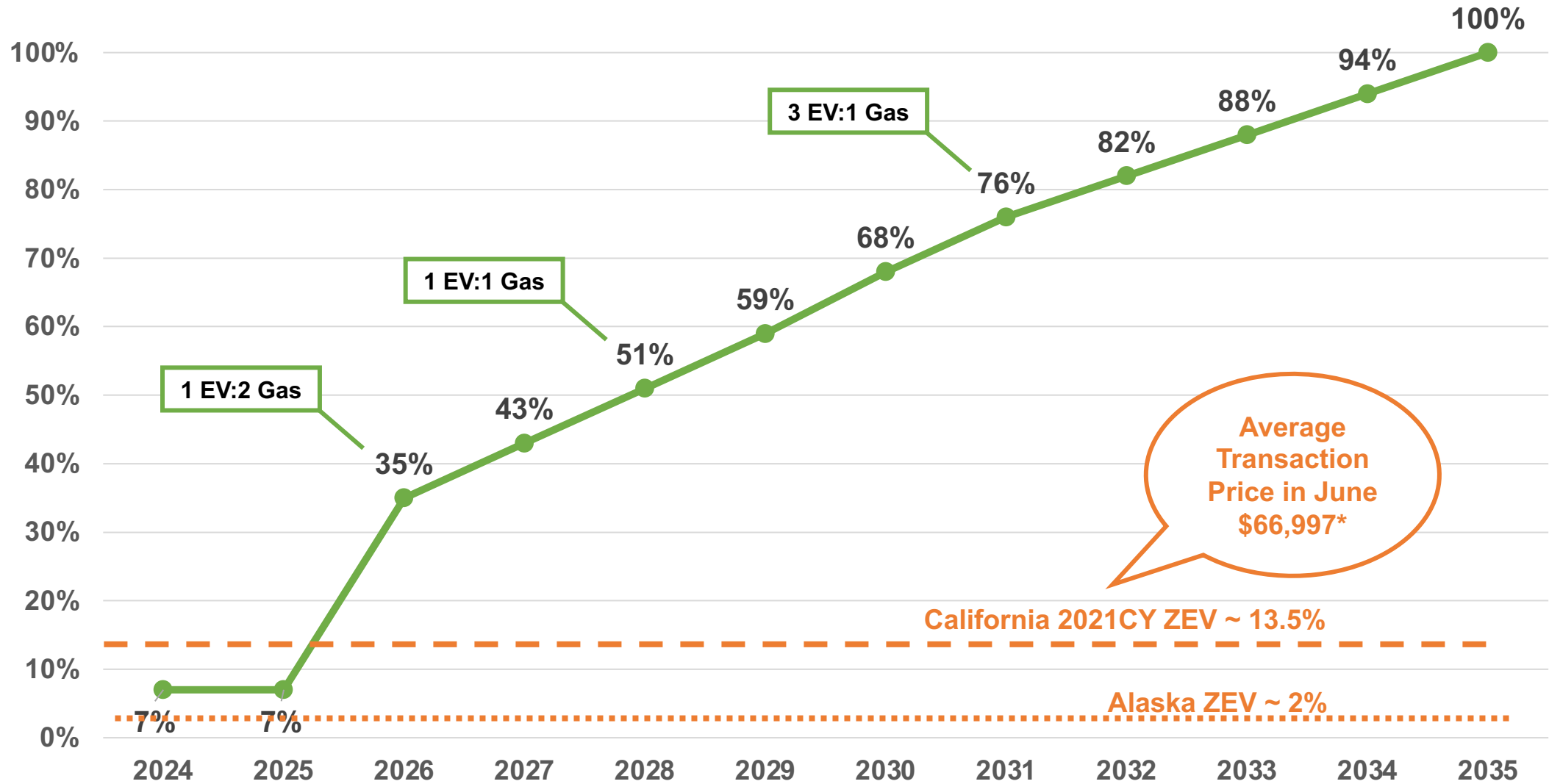
Tier 3, 2017-25MY
(Criteria Emissions)
Adopted 2012

NHTSA

CAFE, 2024-26MY
(Fuel Economy)
Adopted Apr 2022

August 2022
Update to
ACC 2.0

California ACC II – ZEV Mandate

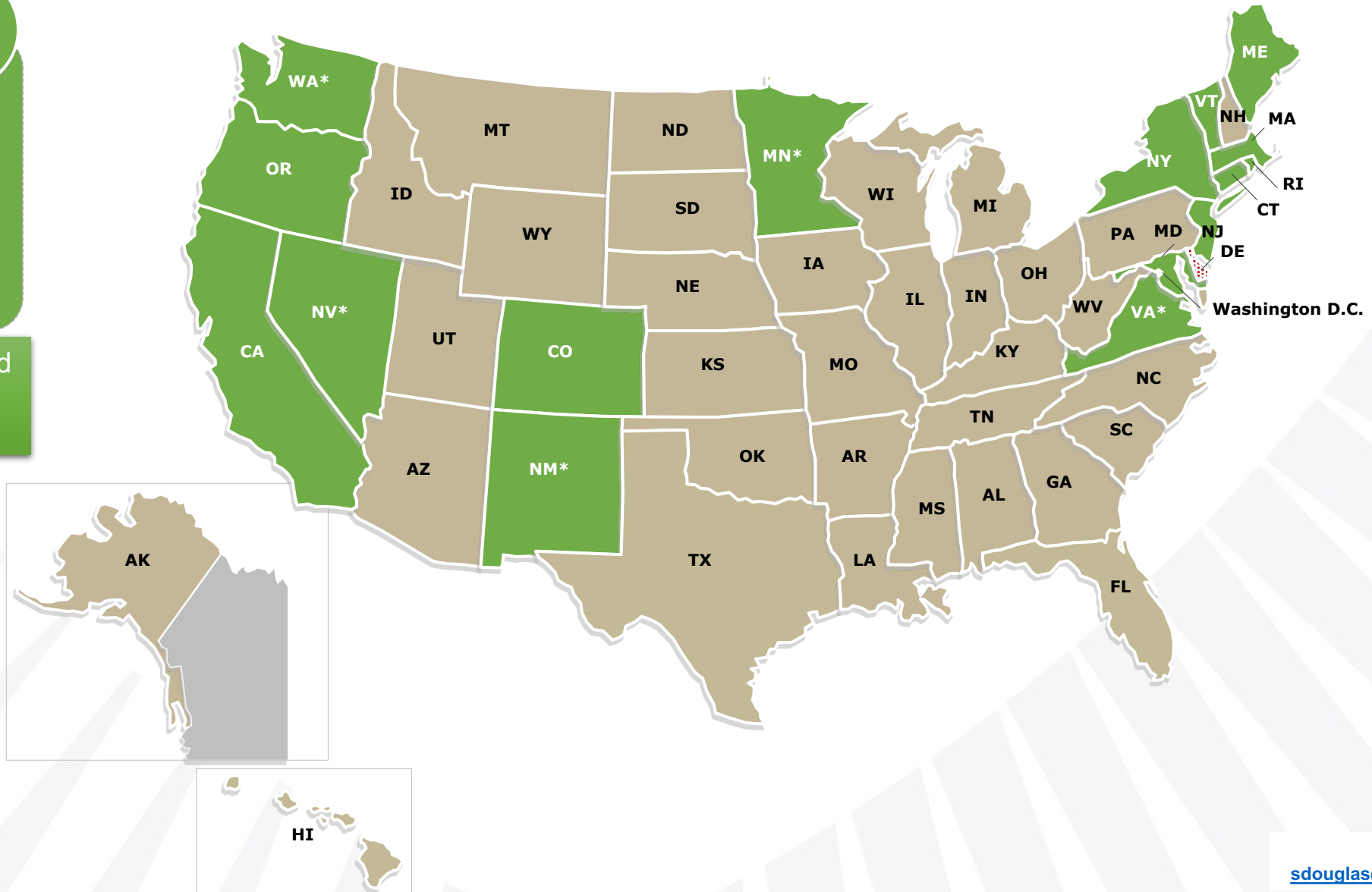


ZEV States (~ 35% of U.S. Market)

16 Existing ZEV States*

- CA
- MN*
- OR
- CO
- NJ
- RI
- CT
- NM*
- VA*
- MA
- NY
- VT
- MD
- NV*
- WA*
- ME

Most of these states will need to officially adopt ACC II or revert to Federal standards.



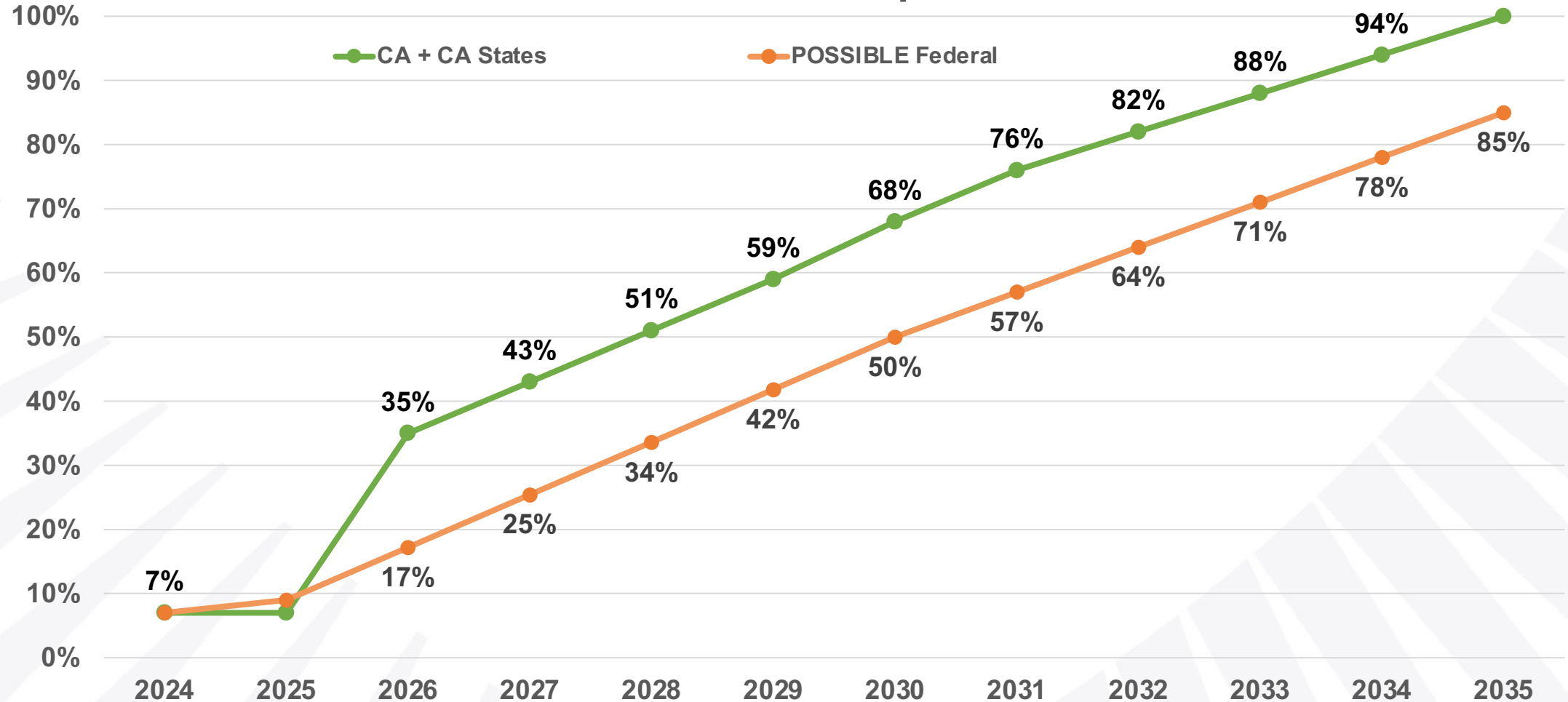
1 Tailpipe, 3 Agencies, 6 Regulations

California Advanced Clean Cars (ACC I)	U.S. EPA	NHTSA	
GHG, 2021-25MY (GHG, Fuel Economy) Adopted 2012	GHG, 2023-26MY (GHG, Fuel Economy) Adopted Dec, 2021	CAFE, 2024-26MY (Fuel Economy) Adopted Apr 2022	<u>March 2023 Update*</u>
LEV III, 2015-25MY (Criteria Emissions) Adopted 2012	Tier 3, 2017-25MY (Criteria Emissions) Adopted 2012		<u>March 2024 Final</u>
ZEV, 2015-25 (Criteria Emissions, GHG, Fuel Economy) Adopted 2012			

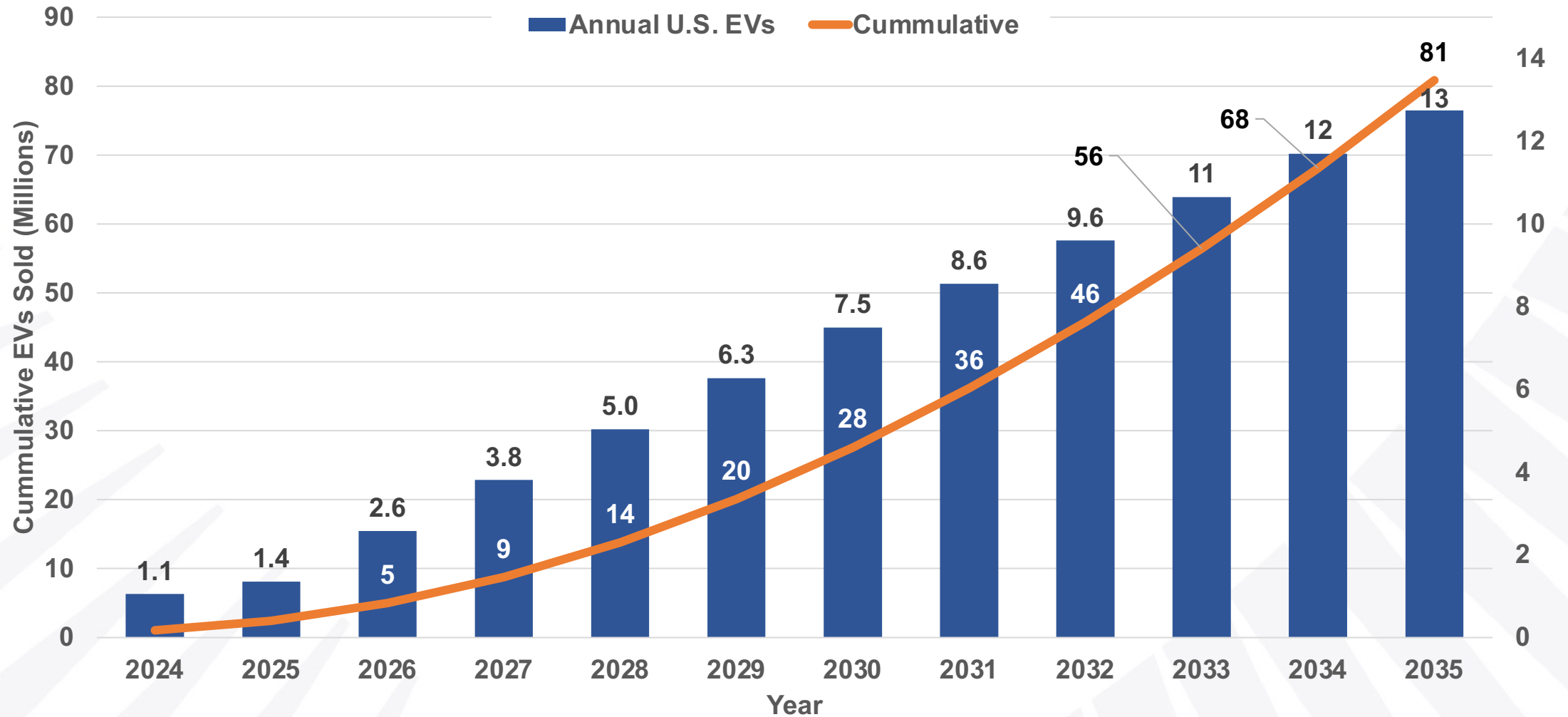
* President Biden EO 14037 set a goal of 50% ZEV by 2030.

Possible Combined U.S. EV Requirement

Possible U.S. ZEV Requirements

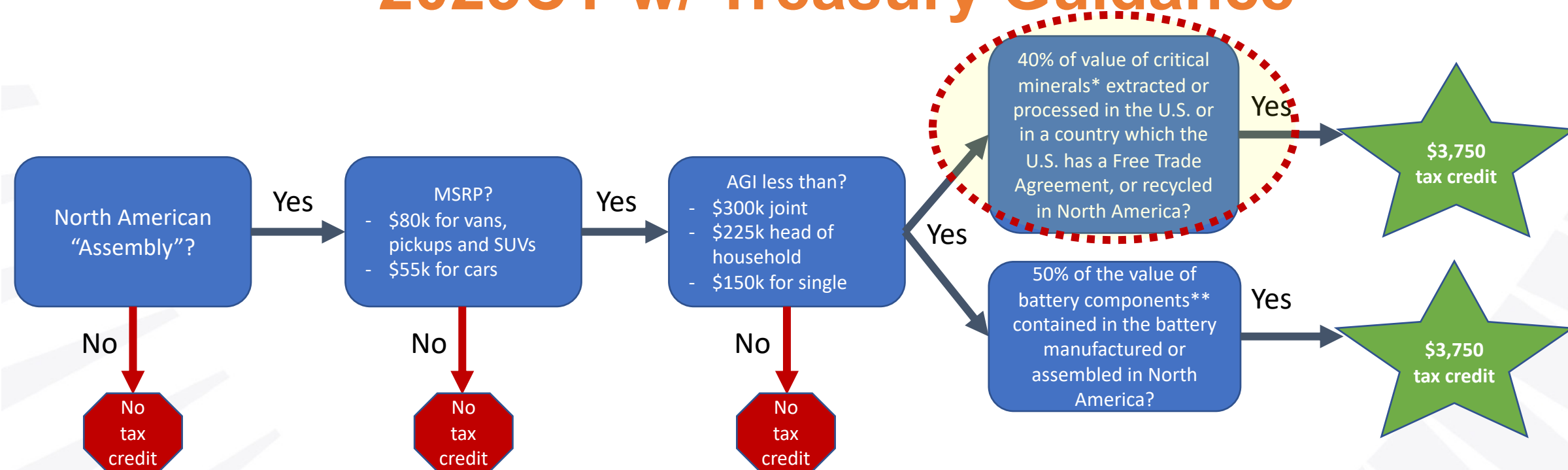


80 Million EVs ~ 6 Billion kWh (6 TWh) of batteries*



Inflation Reduction Act (IRA)

Retail – New EV Tax Credit (30D) 2023CY w/ Treasury Guidance



*Critical Minerals:

- Before CY2024 – 40%
- 2024 – 50%
- 2025 – 60%
- 2026 – 70%
- After 2026 – 80%

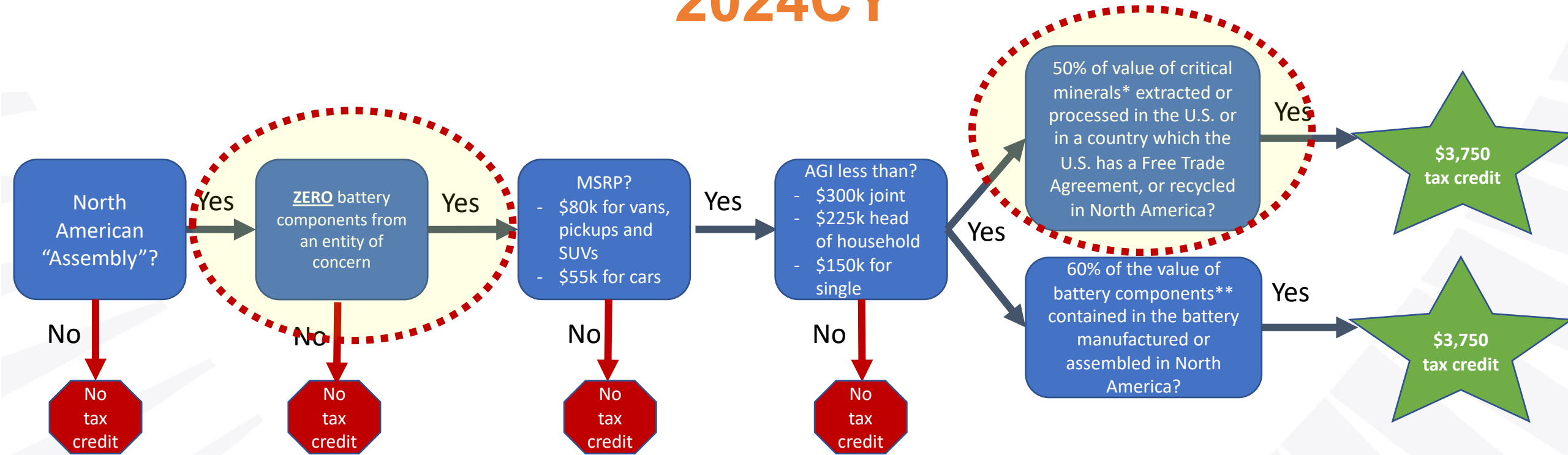
**Battery Components:

- Before CY2024 – 50%
- 2024-2025 – 60%
- 2026 – 70%
- 2027 – 80%
- 2028 – 90%
- After Dec. 31, 2028 – 100%

Notes:

1. The above is Auto Innovators staff interpretation of legislative language and issuance of Treasury draft guidance to no later than December 31, 2022
2. MSRP and AGI are not indexed to inflation. AGI is calculated for two tax periods (purchase year + prior tax year)
3. Critical Minerals: Calculated as the value of the critical minerals contained in such a battery as certified by OEM
4. Battery Components: Calculated as the value of components contained in such a battery as certified by OEM
5. Excluded entities:
 - Starting January 1, 2024, no components contained in a battery of such vehicle can be manufactured or assembled by an entity of concern.
 - Starting January 1, 2025, no applicable critical minerals contained in a battery can be extracted, processed, or recycled by a foreign entity of concern
6. Aggregate battery capacity must be greater than 7 kWh
7. Transfer of Credit not available to auto dealer until January 2024

Retail – New EV Tax Credit (30D) 2024CY



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- 2026 – 70%
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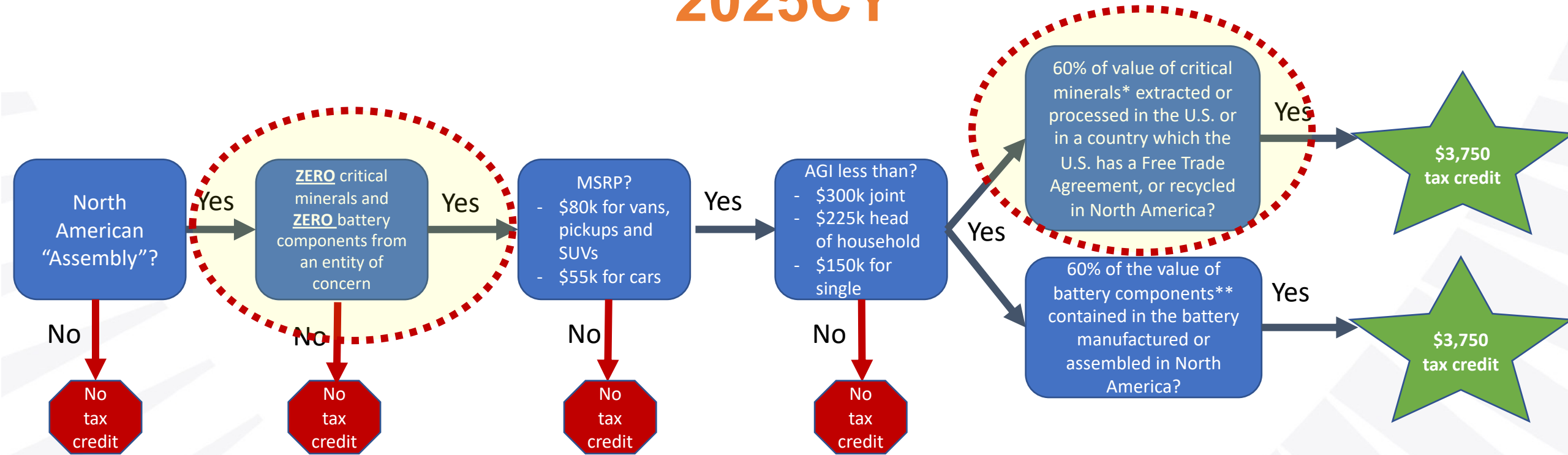
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4. Battery components: Calculated as the value of components contained in such a battery as certified by OEM
5. Excluded entities:
 - Starting January 1, 2024, no components contained in a battery of such vehicle can be manufactured or assembled by an entity of concern. **This makes a vehicle placed in service after 12/31/2023 ineligible**
 - Starting January 1, 2025, no applicable critical minerals contained in a battery can be extracted, processed, or recycled by a foreign entity of concern
6. Aggregate battery capacity must be greater than 7 kWh
7. Transfer of Credit to auto dealer available starting January 2024

Retail – New EV Tax Credit (30D) 2025CY



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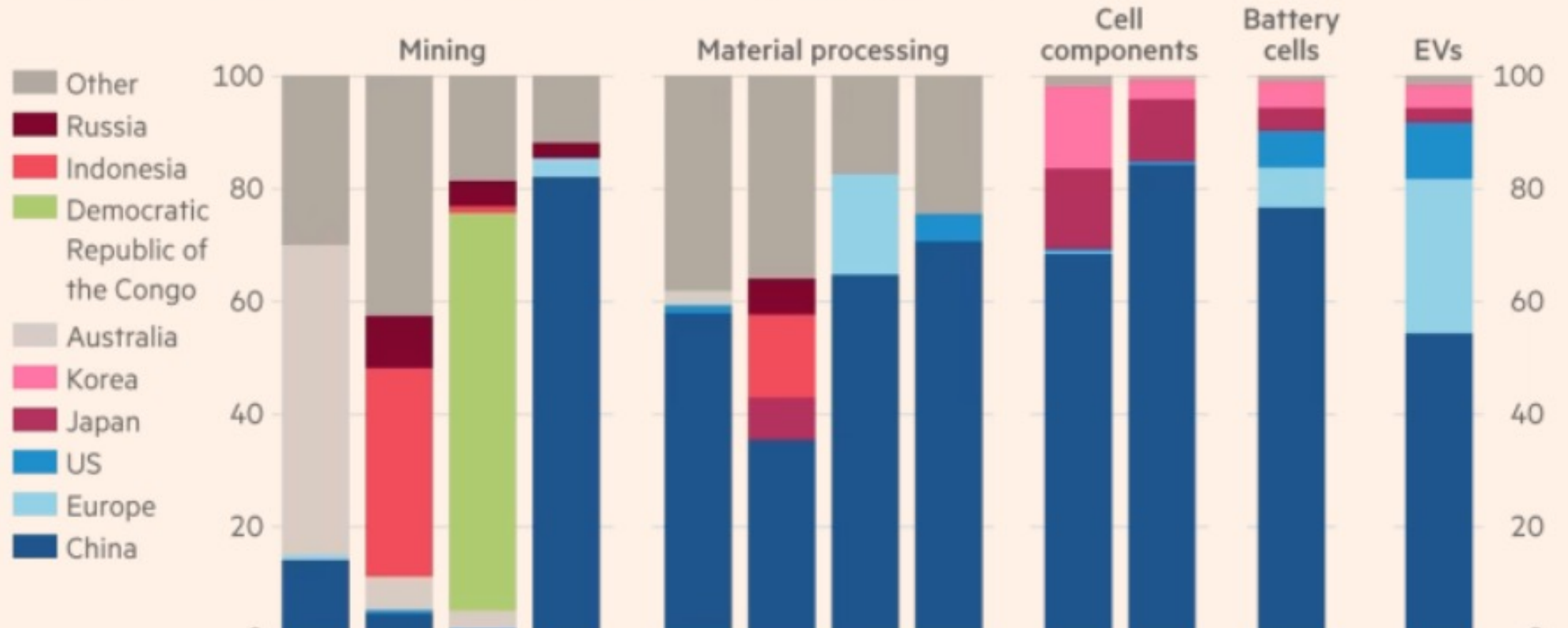
Notes:

1. All of the above is Auto Innovators staff interpretation of legislative language and pending Department of Treasury draft guidance to be issued by the end of December 2022
2. MSRP and AGI are not indexed to inflation
3. Critical minerals are calculated as the critical minerals contained in such a battery as certified by the manufacturer
4. Battery components are calculated as the value of components contained in such a battery as certified by the manufacturer
5. Excluded entities (China, Russia, Iran, North Korea):
 - Starting Jan. 1, 2024, no components contained in a battery of such vehicle can be manufactured or assembled by an entity of concern. **This makes a vehicle placed in service after 12/31/2023 ineligible**
 - Starting Jan. 1, 2025, no applicable critical minerals contained in a battery can be extracted, processed, or recycled by a foreign entity of concern. **Vehicle placed in service after 12/31/2024 is ineligible. See**
6. Aggregate battery capacity must be greater than 7 kWh

Current Critical Mineral Supply Chain*

China dominates the entire downstream EV battery supply chain

Geographical distribution* of the global EV battery supply chain (%)





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Transforming Personal Mobility

Automaker Announcements, Goals, and Aspirations

- Multiple new 100% EV brands
- Audi no new ICE designs
- Volkswagen no new ICE designs
- BMW 90% of market categories BEV available

- Ford 100% BEV (Europe)
- Cadillac potential 100% BEV
- JLR electric available on all
- Daimler 100% EV production
- Mazda some level of electric on all models
- Bentley 100% BEV
- Volvo 100% BEV
- Kia EVs 40% of production
- Subaru hybrid/electric available across models
- Polestar climate neutral

Source: Compilation of public announcements, media articles, etc. Does not include all announcements.

- Volvo carbon neutral
- Daimler carbon neutral
- GM carbon neutral

2020
to
2024

2025
to
2029

2030
to
2034

2035
to
2039

2040
to
2044

2045
to
2050

- Ford \$29 billion investment by 2025
- Mini all new models EV
- GM \$27 billion investment by 2025
- GM 40% of models EV; 20 EVs in N.A.
- Cadillac 100% EV available
- Jaguar 100% EV
- Bentley 100% plug-in
- Jeep 100% plug-in available
- Toyota 60 new hybrid/electric/fuel cell vehicles
- Volvo 50% of global sales EVs

- GM 100% BEV

Carbon neutral / near- or net-zero:
Ford, Nissan, VW, Honda, Mazda,
Toyota, Mitsubishi

All signs point towards industry-wide electrification