# HOW TO DECARBONIZE ROAD TRANSPORT IN THE US?

# POLICY SOLUTIONS

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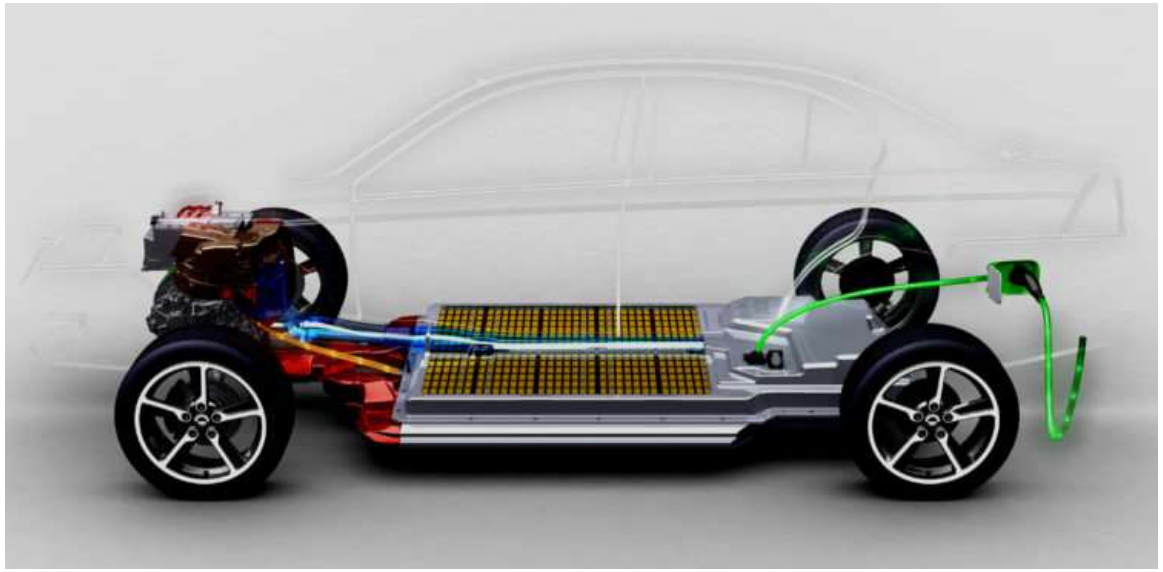
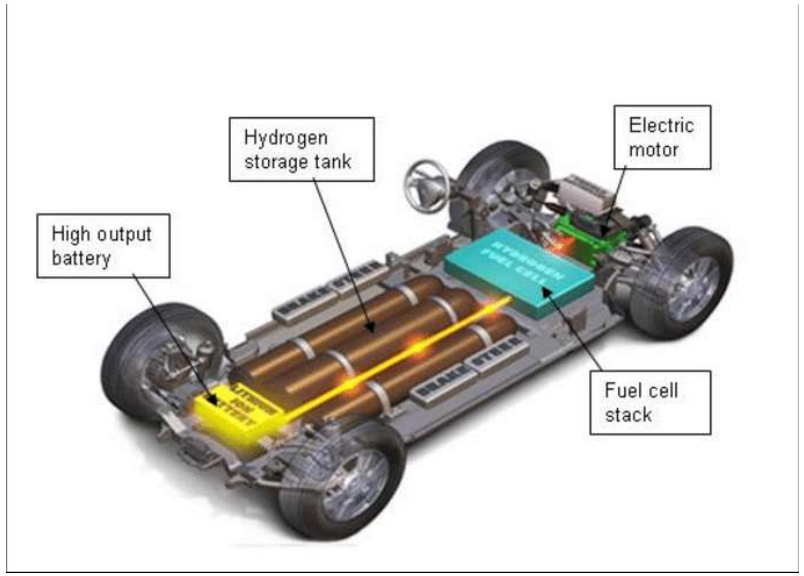
# 100% VEHICLE ELECTRIFICATION POWERED BY CARBON-FREE ELECTRICITY

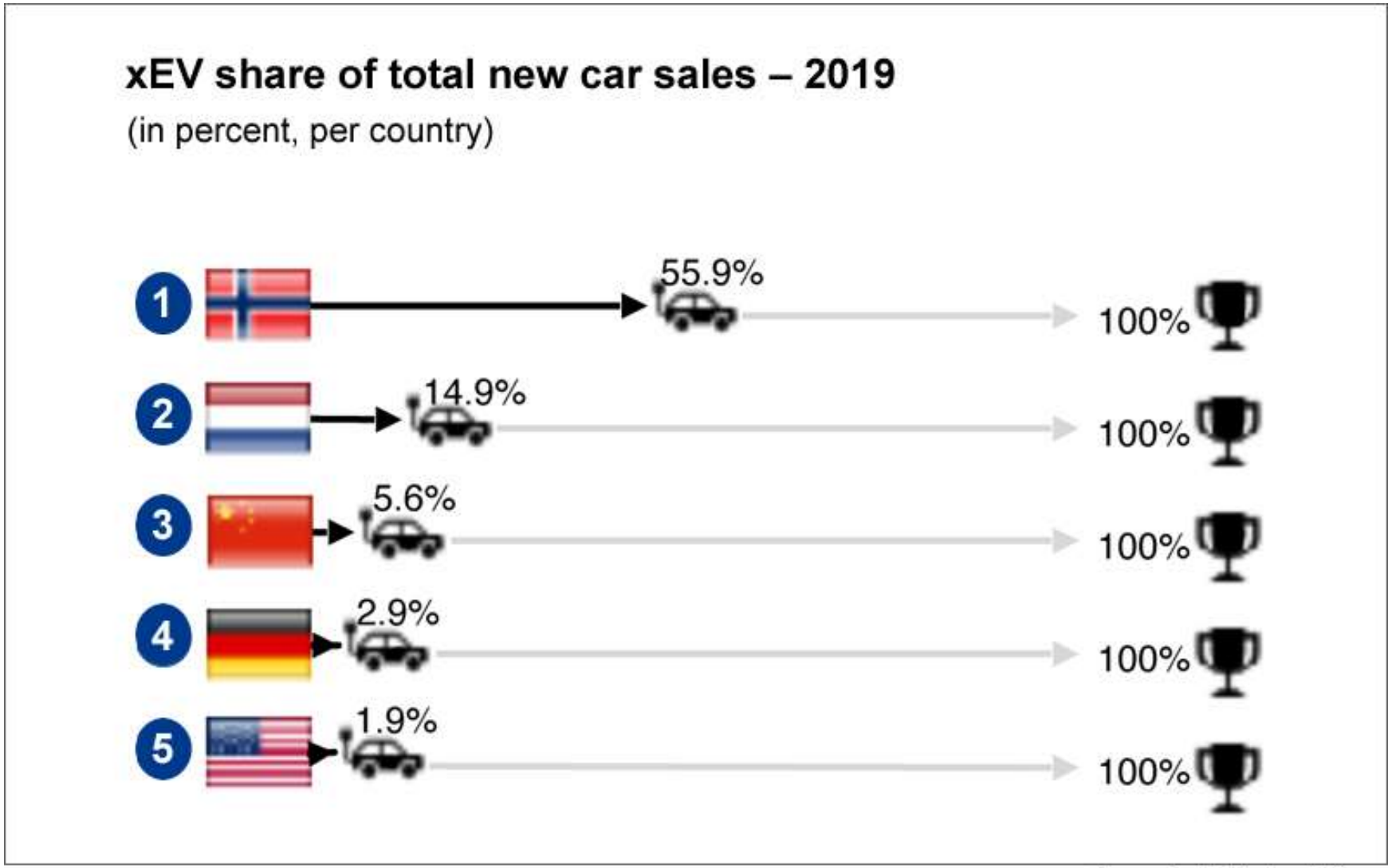
**Likely Batteries** **But** **Fuel cells are not excluded**





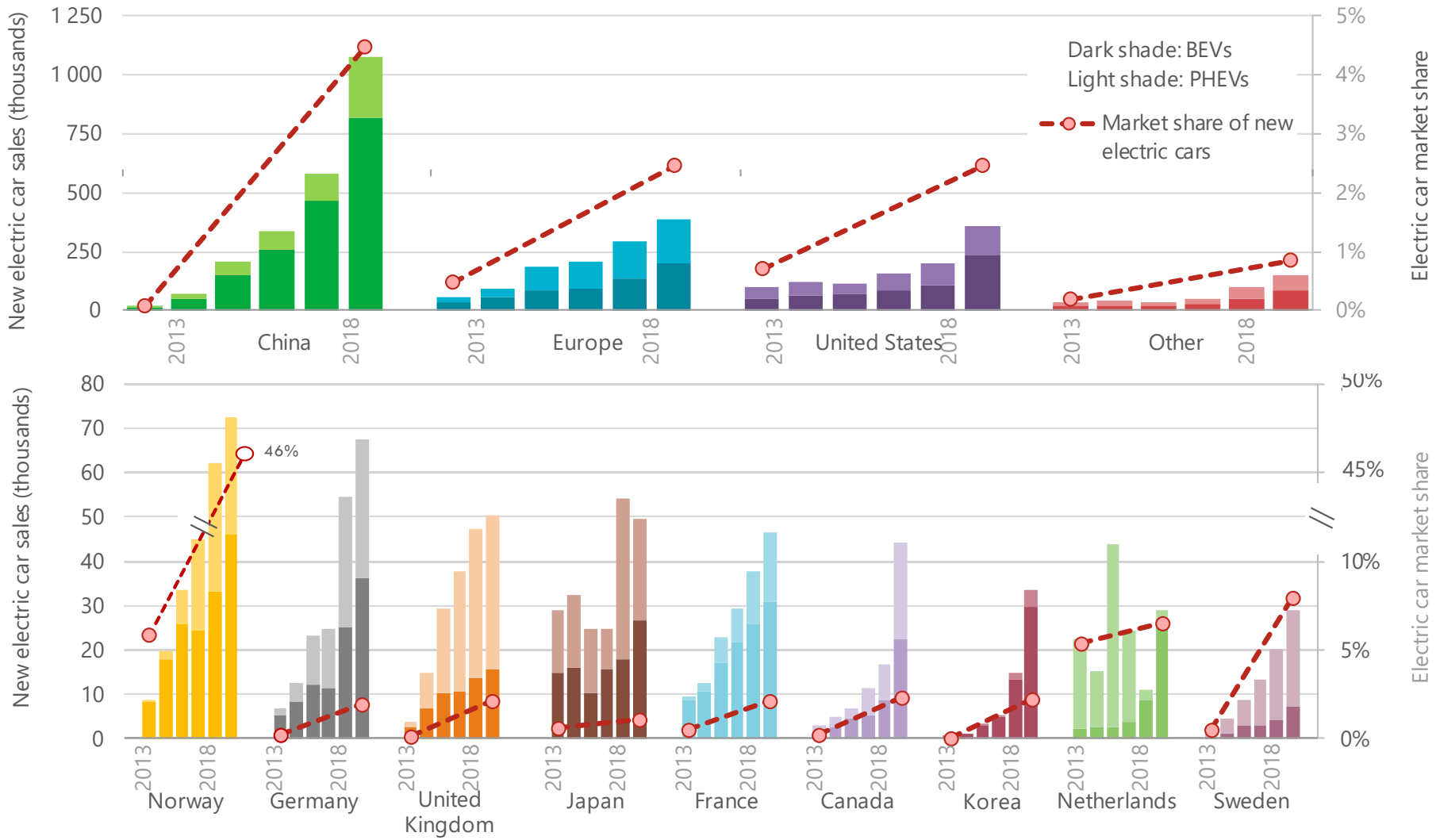

Electrification as a decarbonization pathway for transportation is dependent on achieving 100% clean electricity: strong synergy with our colleagues working on cleaning up the power sector

# 2019: GLOBAL SALES SHARE OF EV < 3% (PASSENGER) AND <0.5% (FREIGHT)




Source: Berylls Strategy Advisors

# BUT WE'VE COME QUITE FAR IN THE LAST FIVE YEARS




Source: Global EV Outlook 2019 (IEA)

# HOW DID WE GET THIS FAR?

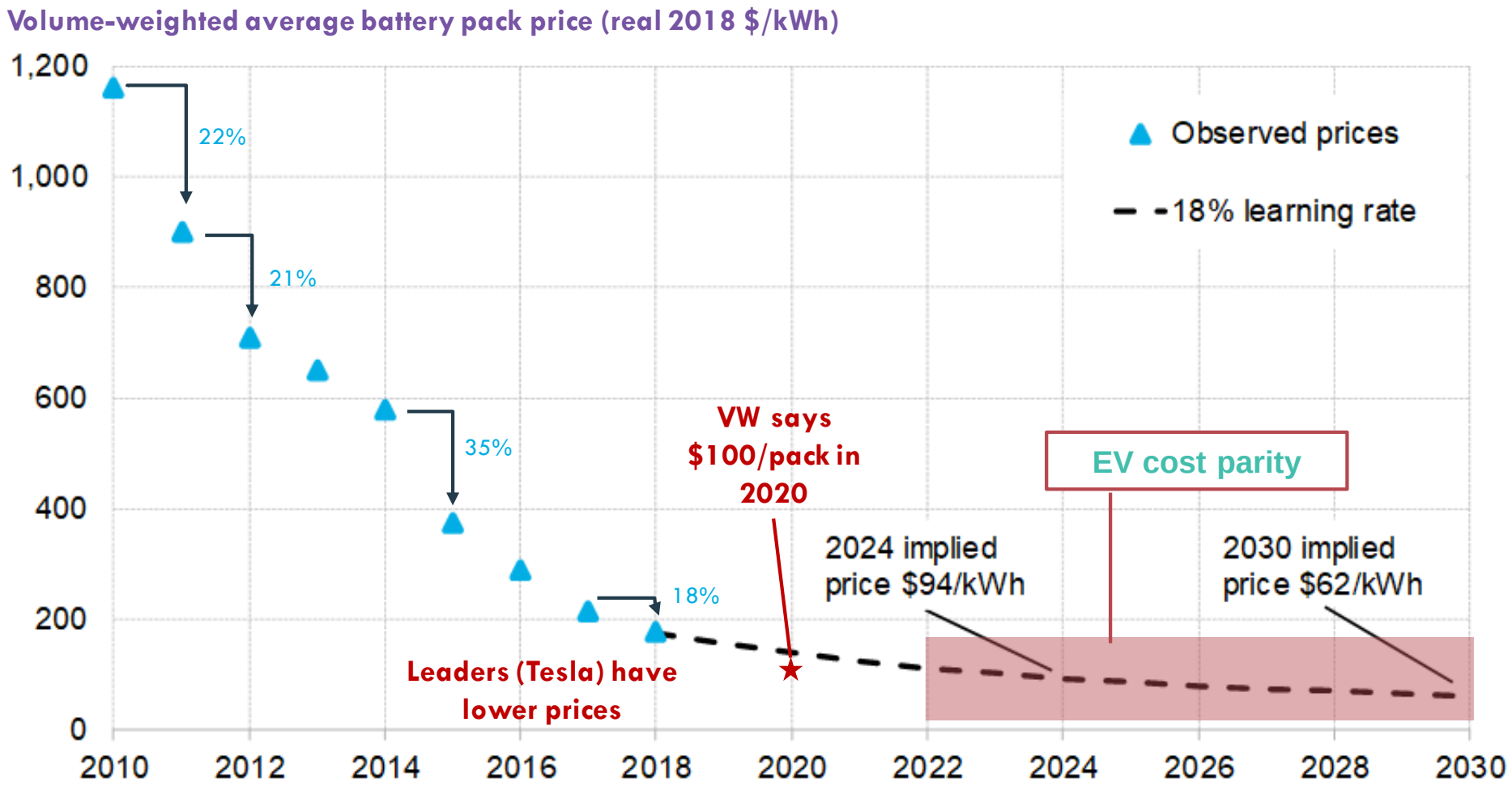
Many decades of Government R&D investment in batteries, fuel cells and hydrogen

California and Chinese EV policies – Zero emission vehicle standards, incentives, investments in charging infrastructure, etc

EV promoting policies in many other jurisdictions: Norway, EU CO2 standards, US federal tax credit, purchase incentives, etc

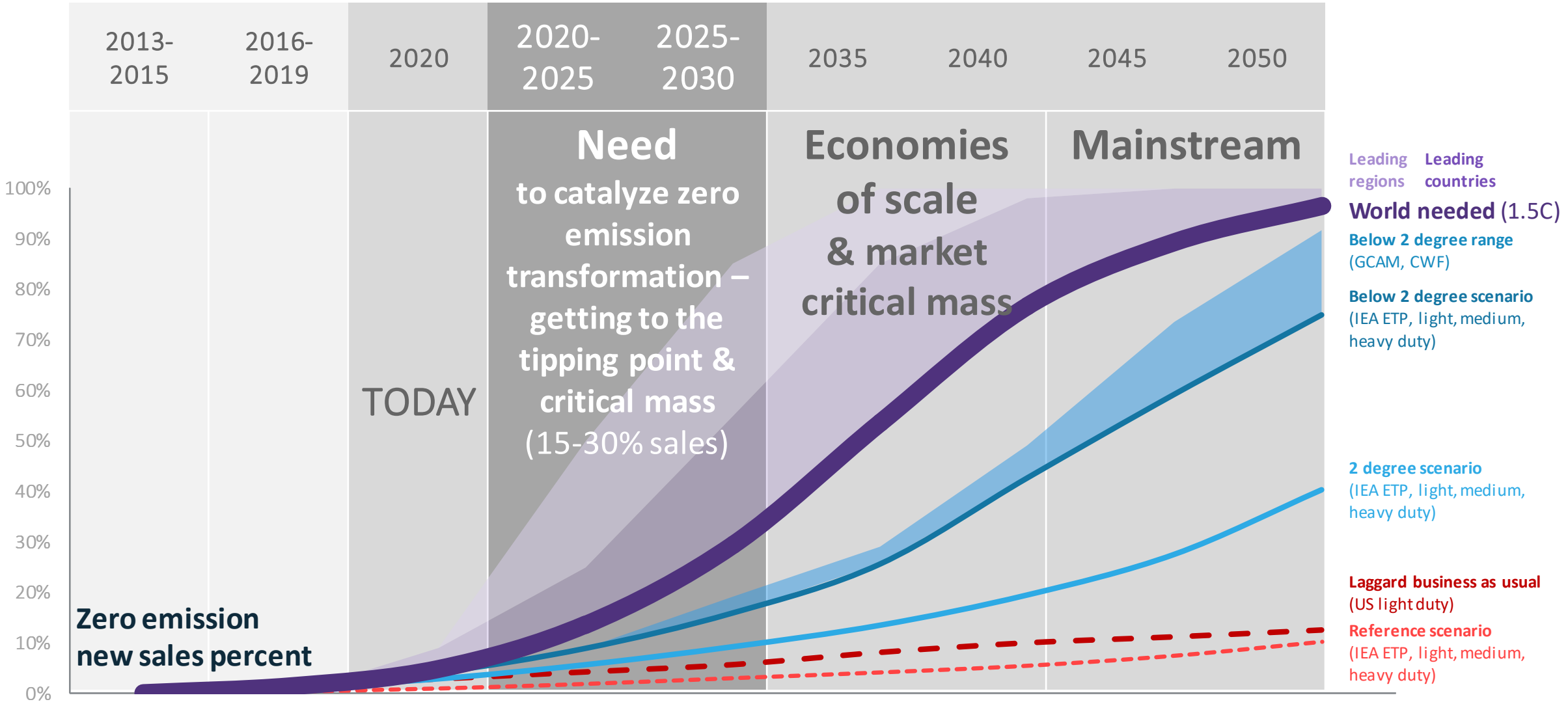
# DRAMATIC BATTERY PRICE DROPS

Avg. Lithium-ion battery pack prices projected to fall below $100/kWh around 2024




*Source: BloombergNEF.*

# BOLD POLICY IN THE NEXT 5- 10 YEARS ARE CRITICAL




Slide credit: Hovland Consulting

# POLICY: TRANSPORT ≠ POWER

## Clean Energy Standards

CES/RPS is a powerful policy tool that dramatically accelerated solar and wind deployment

- Hundreds of decisionmakers
- Primarily concerned about cost and reliability
- Seamless transition for end user – green electron replaces fossil electron

## Zero Emission Vehicle Standards

ZEV standards are the most powerful EV policy, but not as powerful as CES

- Tens of millions of decisionmakers
- Most not primarily concerned about capital and operating cost
- Not seamless for end user- Charging infrastructure is scarce

# POLICIES NEEDED FOR ELECTRIFYING TRANSPORT AT SCALE

| | Venues | Policy |
|---|---|---|
| Increase EV Supply | National, State | Vehicle regulations and enforcement: ZEV regulations, fleet requirements, pollutant (GHG or criteria) standards, industry policies |
| | National, State | ZEV manufacturing incentives |
| Increase EV Demand | City, Local | Selective access: city, port, clean air zones, diesel bans<br>Financial incentives / penalties: pricing policies, financing, new business models |
| | Vehicle Buyers | Freight fleet buyer mandates and incentives<br>Mobility provider mandates and incentives (Uber, Lyft, etc) |
| Increase Charging & H2 infrastructure/ | National, State | EV Charging infrastructure: Utility, public, and private investment |
| | National, State | Charging and fueling Infrastructure: Financial incentives, public/hub fast charging, supportive rules (siting), H2 stations<br>Fuel policy and pricing: sustainable fuel regulations, rate design |
| | Businesses | Incentives and requirements for workplace charging, charging and H2 depots (for freight) |

The Electric Power sector is critical to the clean transportation and buildings future. It also stands to benefit substantially if it aids in the transition

# WHAT'S NEW: ZERO EMISSION ROAD FREIGHT IS NOW POSSIBLE (NOT HARD TO ABATE)

More closely resembles the clean power transition: Fewer, politically powerful fleet buyers who also tend to be cost focused

Battery technology is ready for most segments of trucking – including long-haul – fuel cell potential is improving

Charging and fueling infrastructure could be easier in some ways – fewer stations, closer to high-voltage transmission on highways, depot charging for fleets, etc

COVID-19: Share of freight emissions has increased – shift to online retail could outlast the virus

# THANK YOU

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For more details on our recently released Zero Emission Road Freight Strategy, please visit

hewlett.org/getting-to-zero-a-strategy-for-delivering-on-clean-freight/