

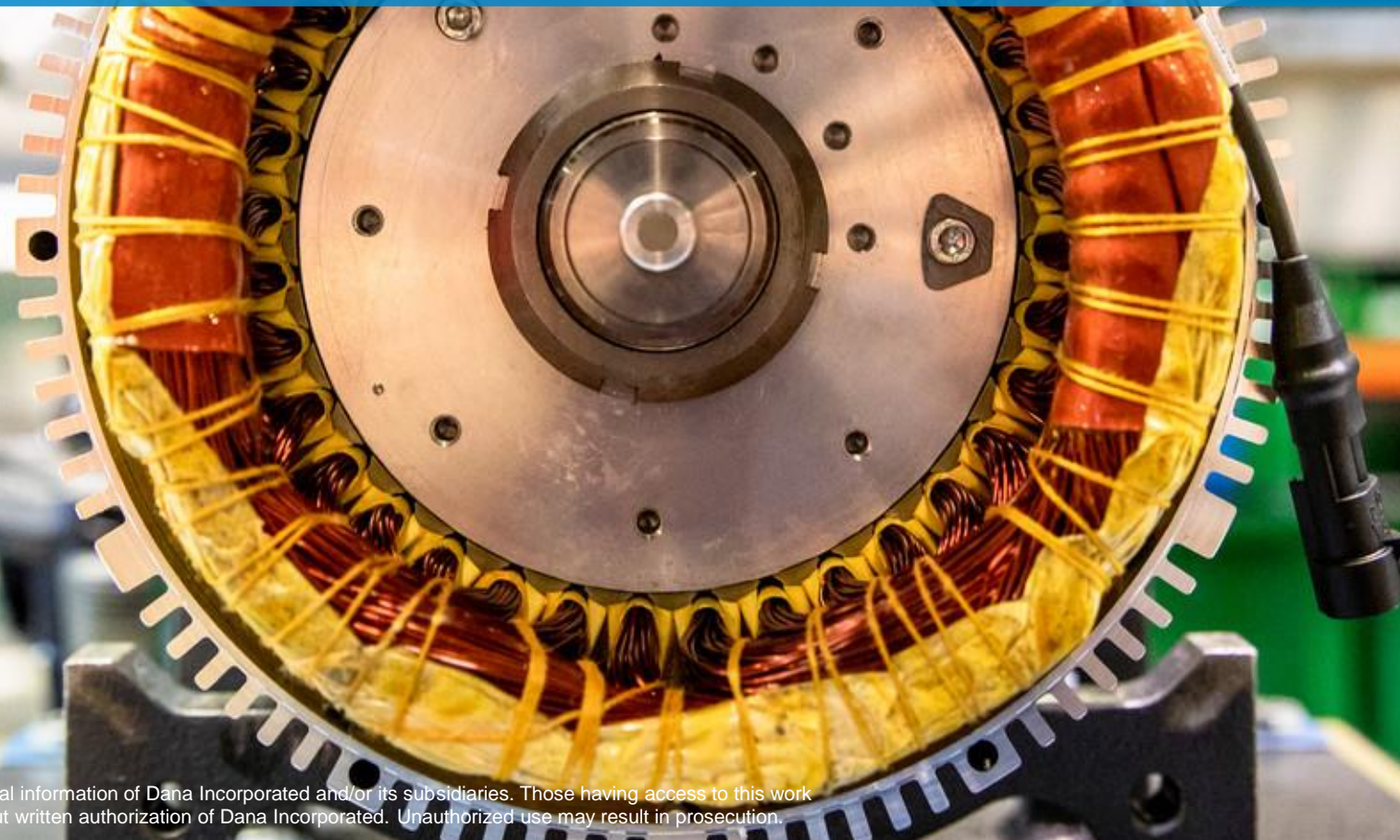


The Future is Diesel and New Energy

Diesel Progress Summit

October 20, 2020

Jim Kamsickas, Chairman and Chief Executive Officer



A blue-tinted photograph of a vehicle's rear wheel and the rear section of its body. The words "HYBRID ELECTRIC" are printed in white on the rear panel.

Hybrid

A blue-tinted photograph of an electric vehicle charging station. A blue charging cable is plugged into the station, and a car is partially visible in the background.

Electric

A circular inset showing a close-up of a diesel fuel pump nozzle. The nozzle is black with a blue handle and has the word "Diesel" printed on it.

Diesel

A blue-tinted photograph of a fuel cell vehicle. A hand is holding a blue hydrogen fueling nozzle with a white "H₂" logo. A pressure gauge is visible in the background.

Fuel Cell

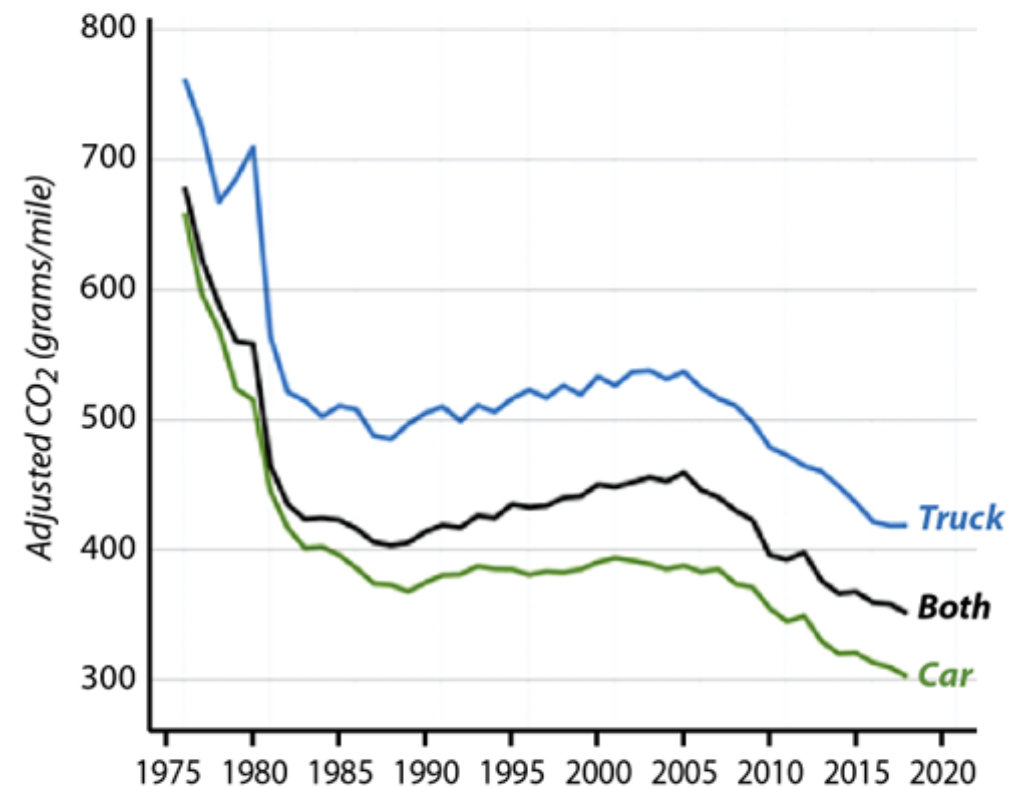
A blue-tinted photograph of a natural gas vehicle refueling station. A sign on the station reads "Natural Gas for Vehicles".

Natural Gas

Need for progress on emissions and fuel economy is driving change

AVERAGE U.S. VEHICLE CO₂ EMISSIONS

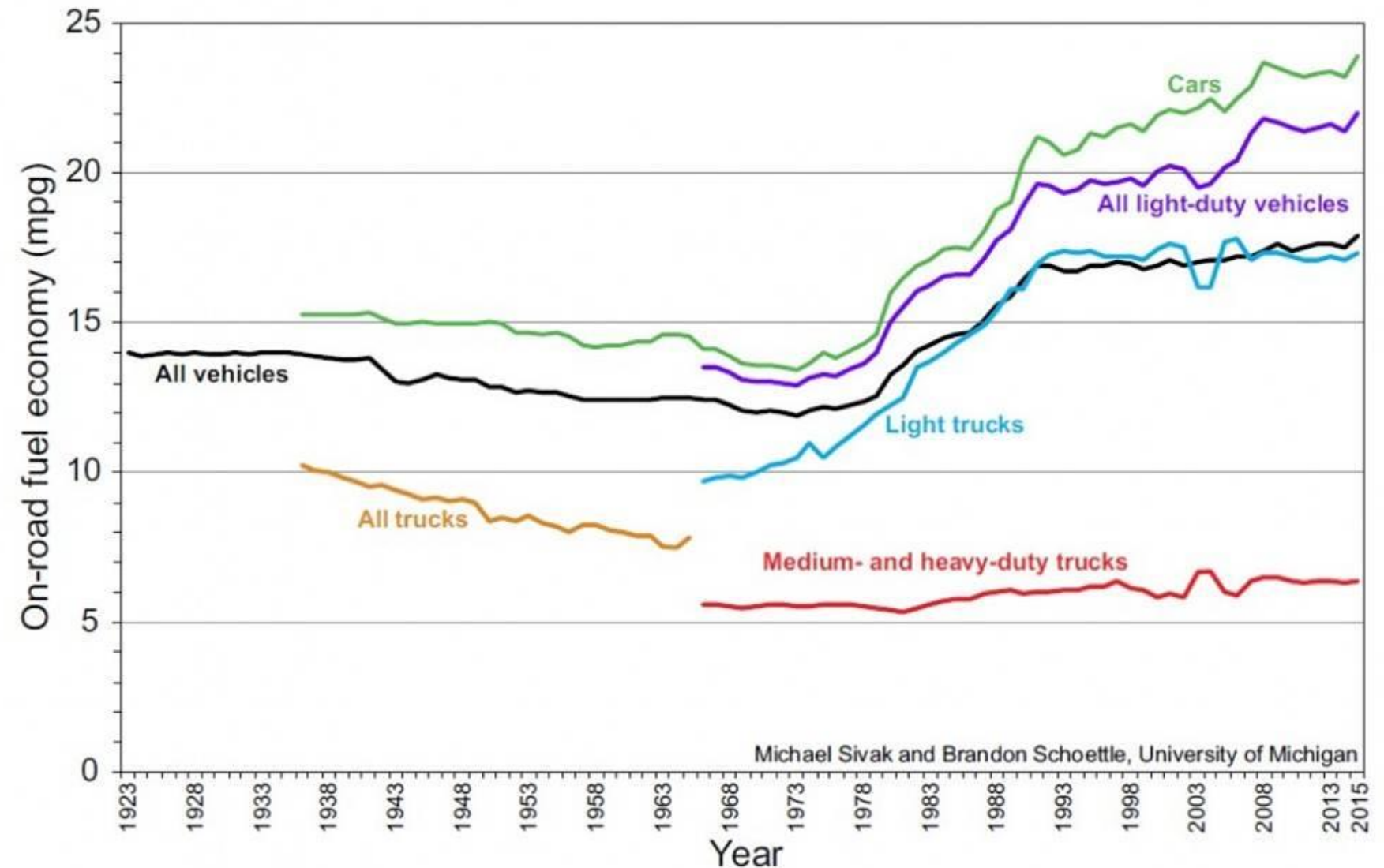
Model years 1975-2017



NOTE: Adjusted CO₂ values reflect real-world performance and are not comparable to automaker standards compliance levels.

SOURCE: EPA

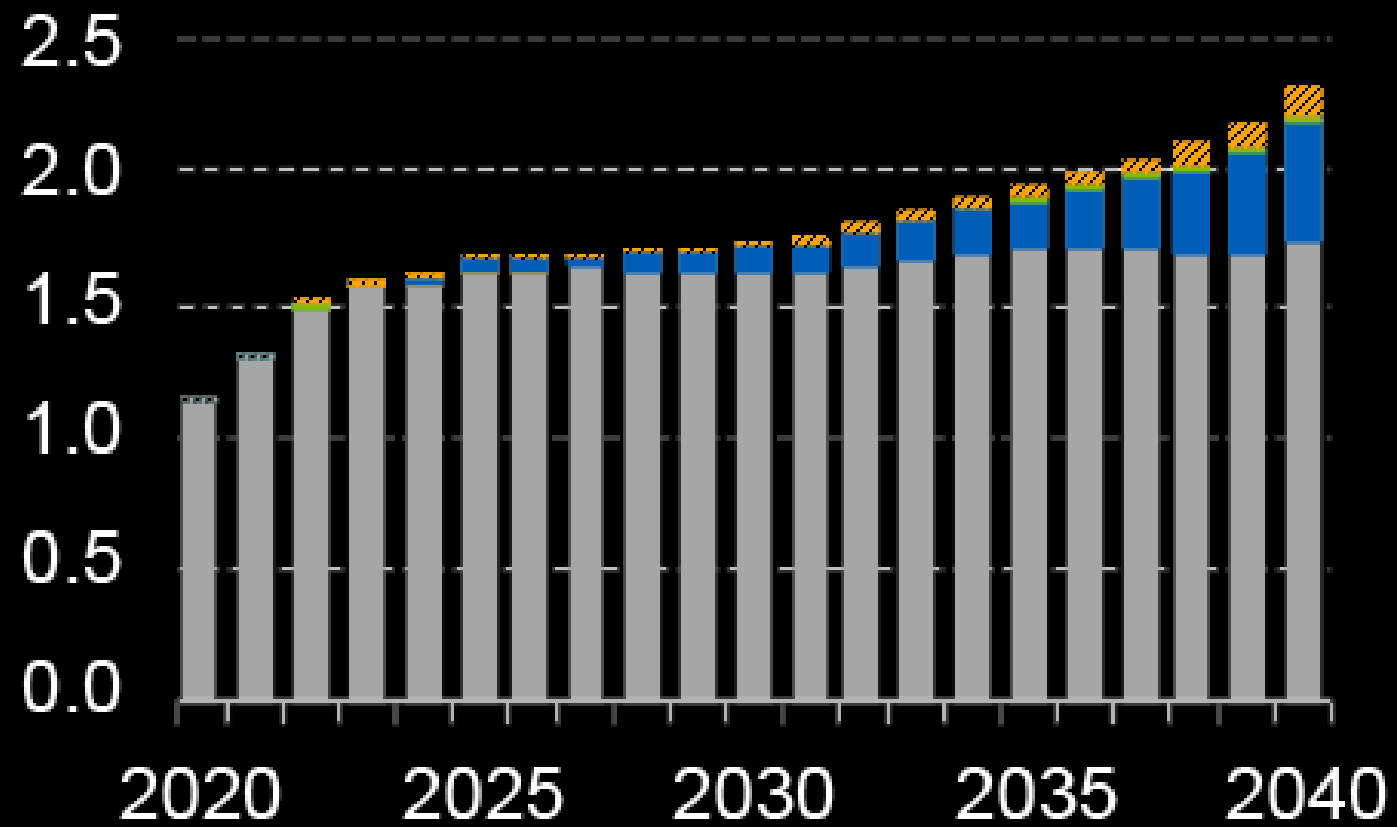
InsideClimate News



Michael Sivak and Brandon Schoettle, University of Michigan

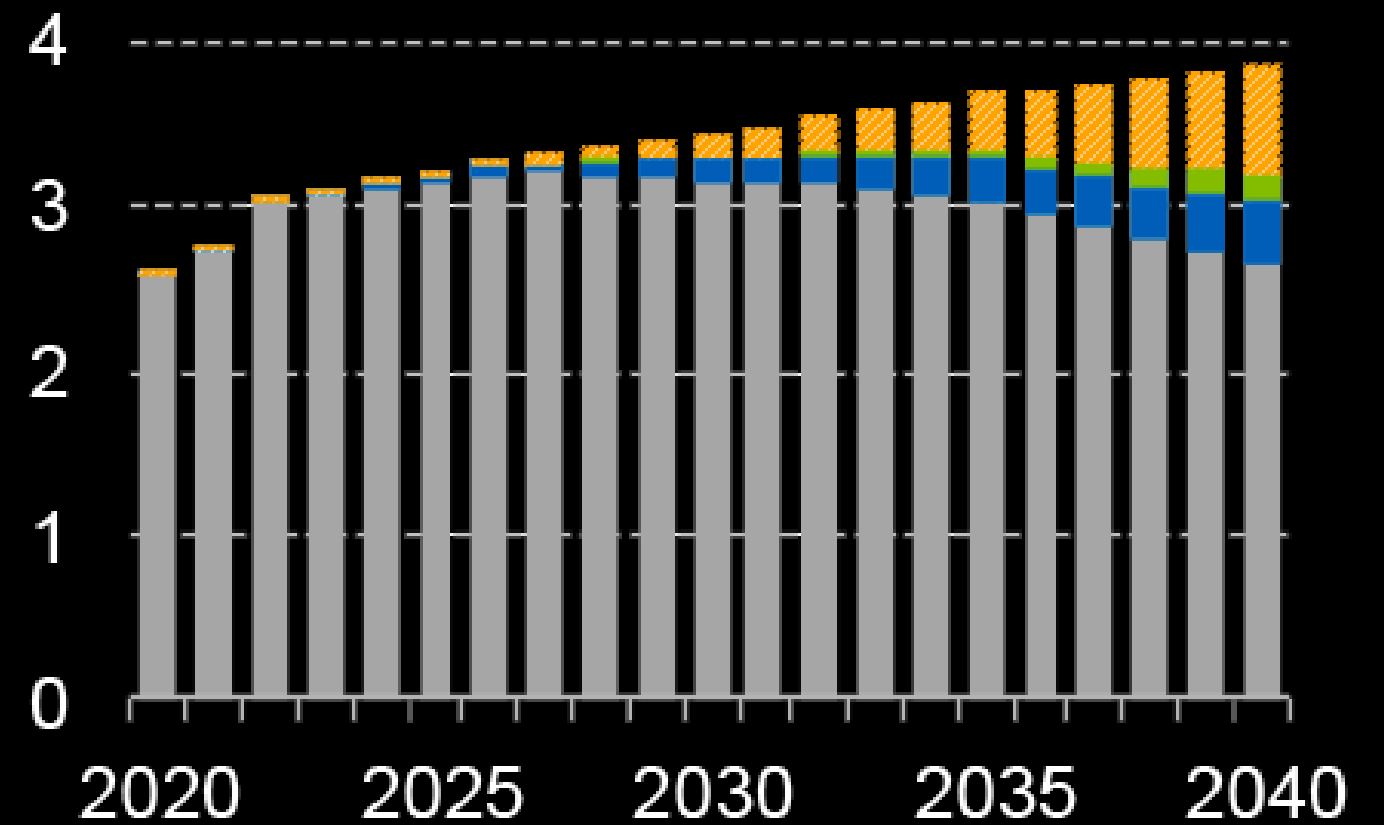
Medium-duty

Million



Heavy-duty

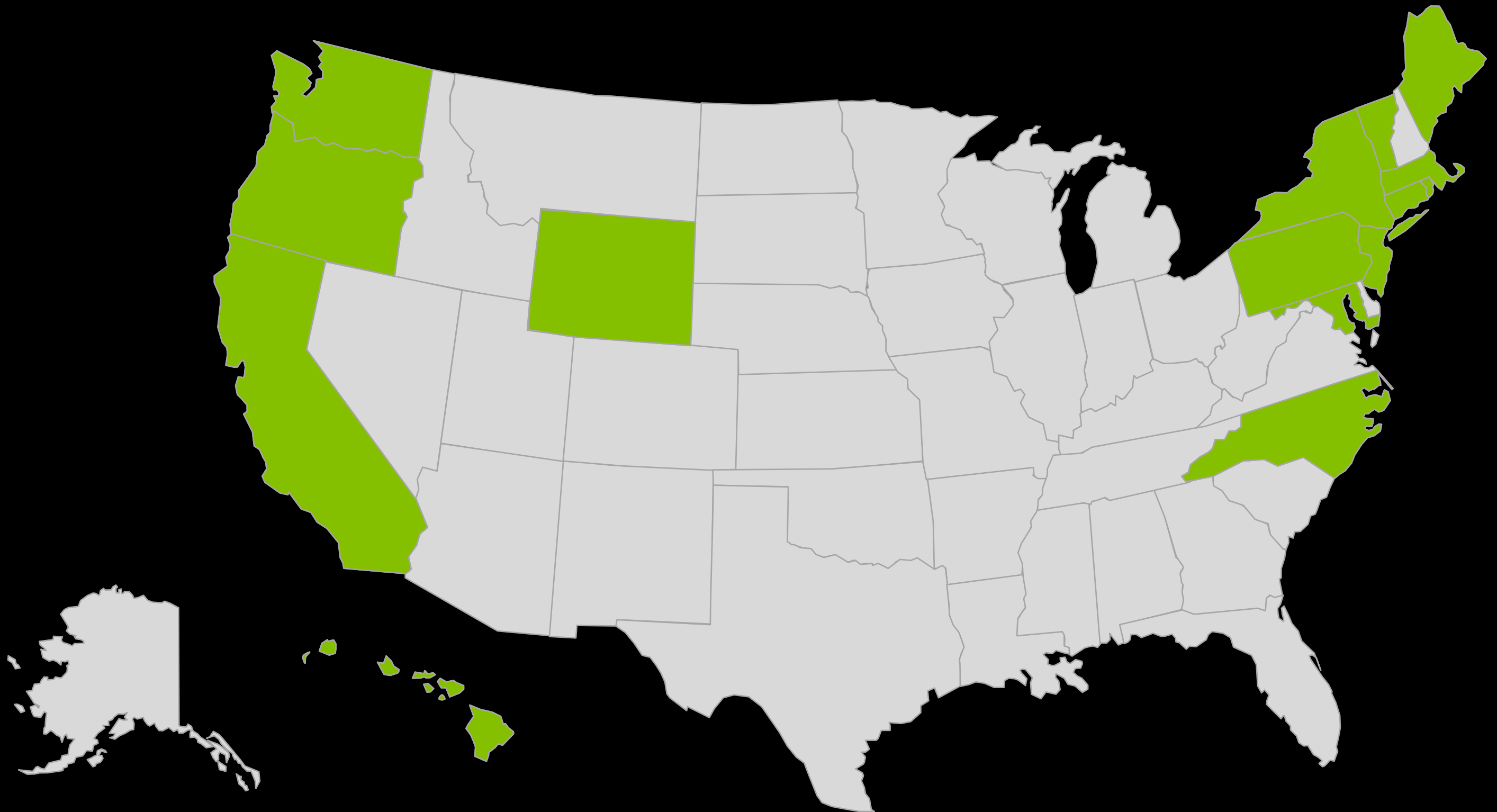
Million



A photograph of the United States Capitol building in Washington, D.C., featuring its iconic dome and neoclassical architecture with columns and steps. The word "Regulation" is overlaid in large white text across the center of the image.

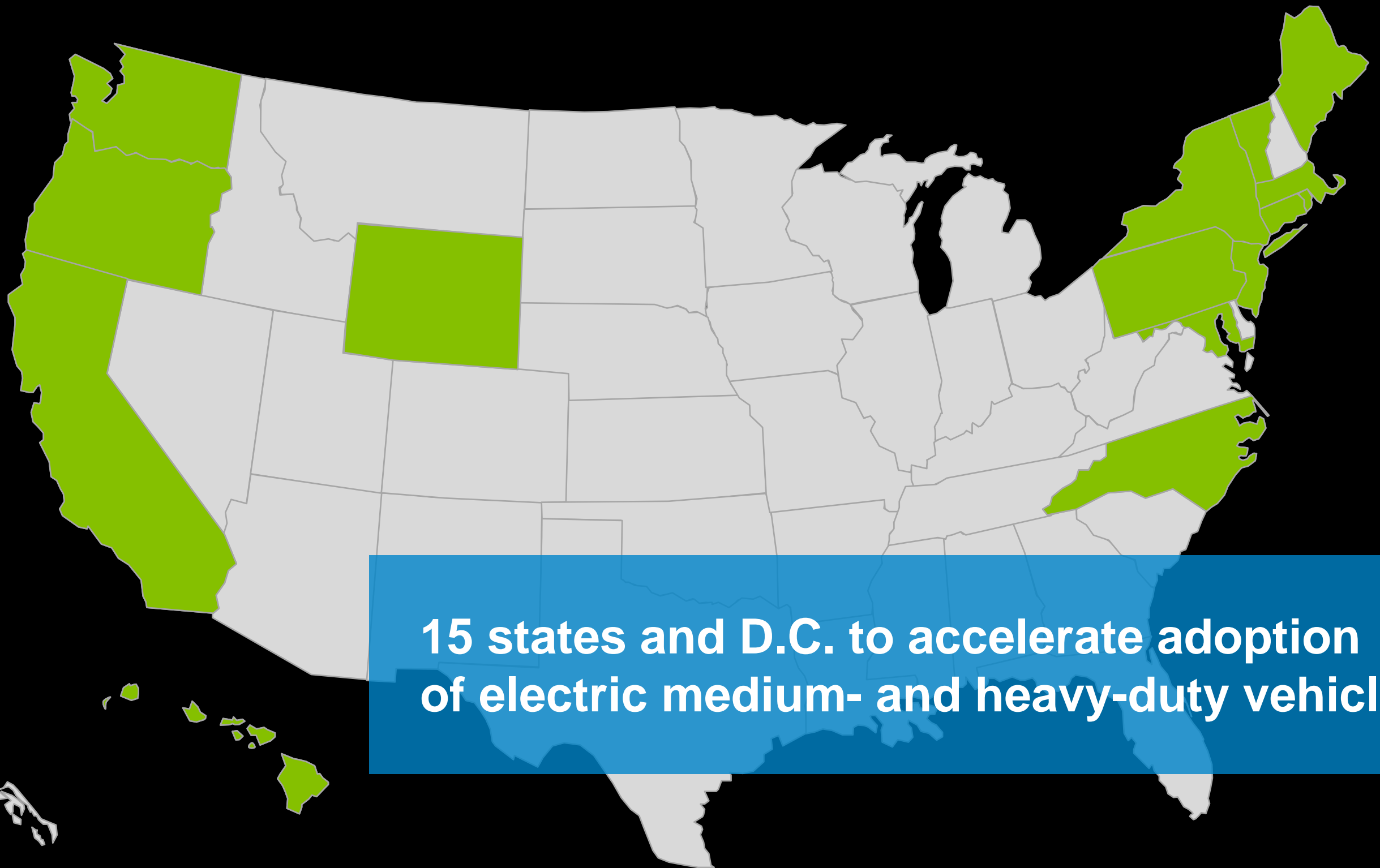
Regulation








**All trucks sold in California
will be zero emissions by 2045**



**15 states and D.C. to accelerate adoption
of electric medium- and heavy-duty vehicles**

Large ports are pushing for zero-emission material-handling equipment



A composite image featuring a target with concentric rings and a red bullseye. Several white arrows with blue fletching are clustered in the bullseye, while one red arrow is shown in mid-air, heading towards the target. The background is a soft-focus bokeh of light blue and white.

**Zero emissions
by 2050**



Sustainability and Social Responsibility

The background of the image is a blurred screenshot of a financial trading platform. It features multiple windows: a top window with a table of market data, a right window showing a line chart for EUR/USD, and a bottom window showing a candlestick chart for Gold. The text is overlaid on a blue banner that spans across the middle of the image.

8 in 10

**U.S. investors express interest
in environmental, social, and
governance (ESG) investing**

Transportation is largest contributor to U.S. GHG emissions, with over-the-road trucks representing 7%





Beijing, China



Los Angeles, USA



New Delhi, India



Barcelona, Spain



UPS: 40% of fuel from non-gasoline / diesel sources by 2025



Caterpillar: 35% of electrical energy obtained from renewable or alternative energy sources



Deere: Reduce GHG emissions by 15% by 2022 (50% renewable electricity and energy efficiency)



Amazon: 50% of shipments net zero carbon by 2030



AB InBev: Convert entire long-haul dedicated fleet to renewable power by 2025



JLG: 25% reduction in energy intensity from 2014 to 2024



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**TO BUILD A BETTER FUTURE FOR
OUR PLANET, OUR COMMUNITIES,
OUR WORKERS AND OUR ECONOMY,
WE NEED AMBITIOUS CLIMATE ACTION.
We need the Paris Agreement.**

Sponsored by The B Team

**STAND WITH CEOs OF MORE THAN 75
COMPANIES AND THE AFL-CIO. CALL
ON THE UNITED STATES TO STAY IN
THE PARIS AGREEMENT**

December 2, 2019

Joint Labor Union and CEO Statement on the Paris Agreement

We the undersigned are a group of CEOs who employ more than 2 million people in the United States and union leaders who represent 12.5 million workers. Together, we know that driving progress on addressing climate change is what's best for the economic health, jobs, and competitiveness of our companies and our country.

...

The promise of the Paris Agreement is one of a just and prosperous world. We urge the United States to join us in staying in.

Sincerely,

...

Alan Jope, CEO, Unilever

James K. Kamsickas, Chairman & CEO, Dana Incorporated

Dara Khosrowshahi, CEO, Uber

Isabelle Kocher, CEO, ENGIE

...

**Dana to reduce total
annual GHG emissions
by >50% by 2035**

**Annual reduction of 300,000+
metric tons of GHG**

Need to consider a well-to-wheel environmental strategy for the lifecycle of our products



Total Cost of Ownership





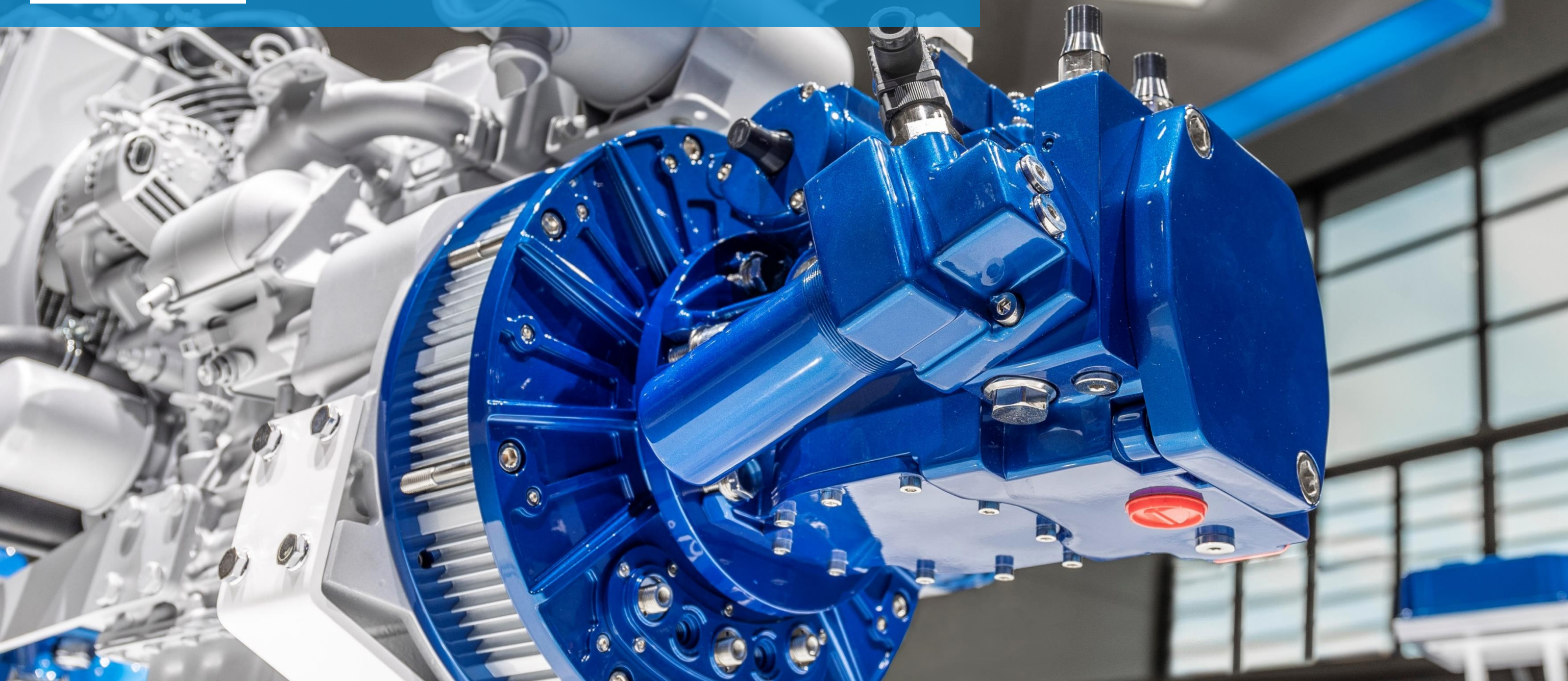


Spicer® HVT delivers up to 35% fuel savings over traditional transmissions





Dana TM4 on-engine generator enables new hybrid applications





Additional electric medium-duty vehicles with defined routes expected to reach cost parity with diesel powertrains in more locations by 2025

Cost-benefit scale and environmental benefits have started tipping in favor of electrified powertrains for city buses



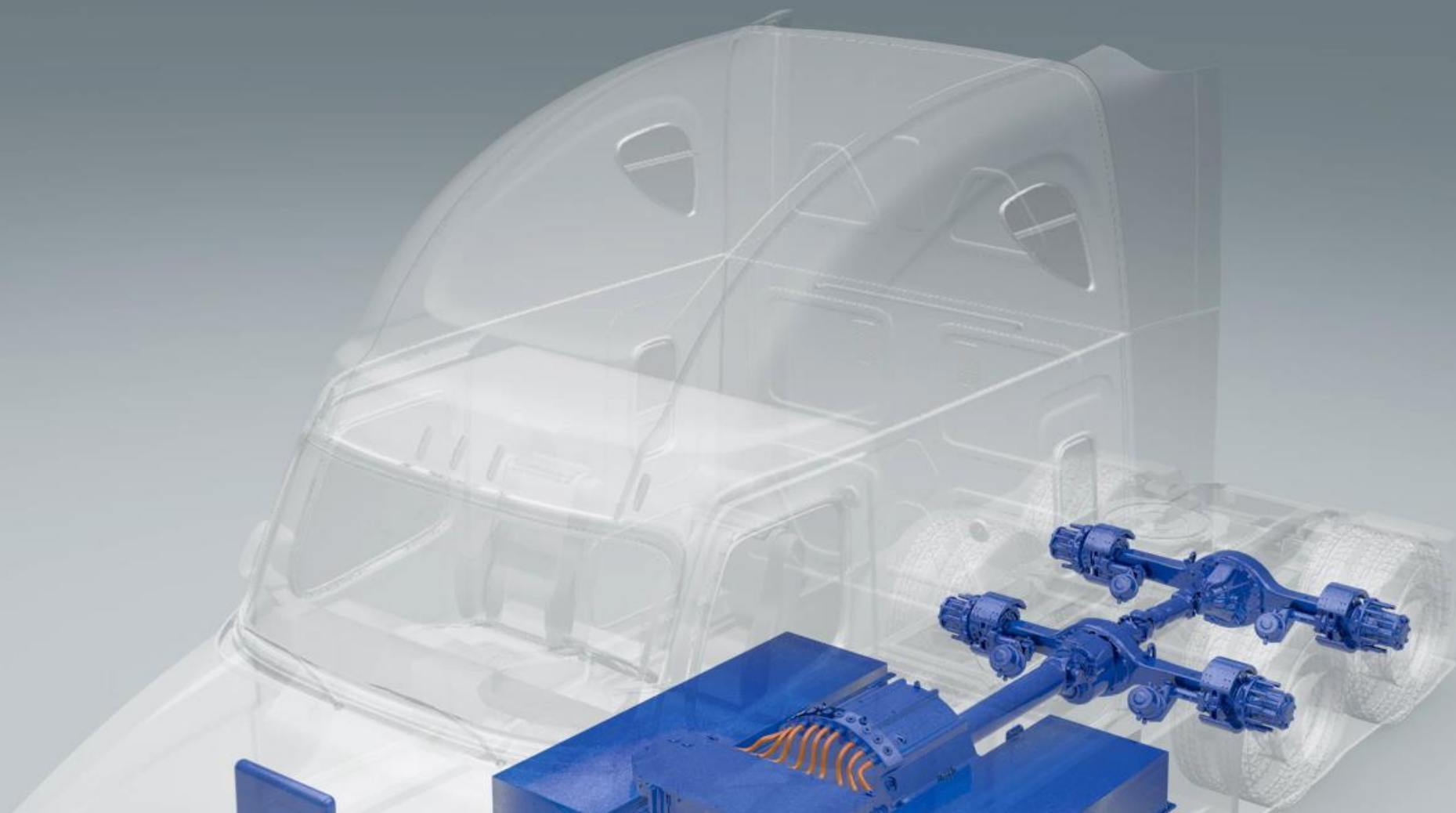


Metallic Bipolar Plates for Fuel Cells





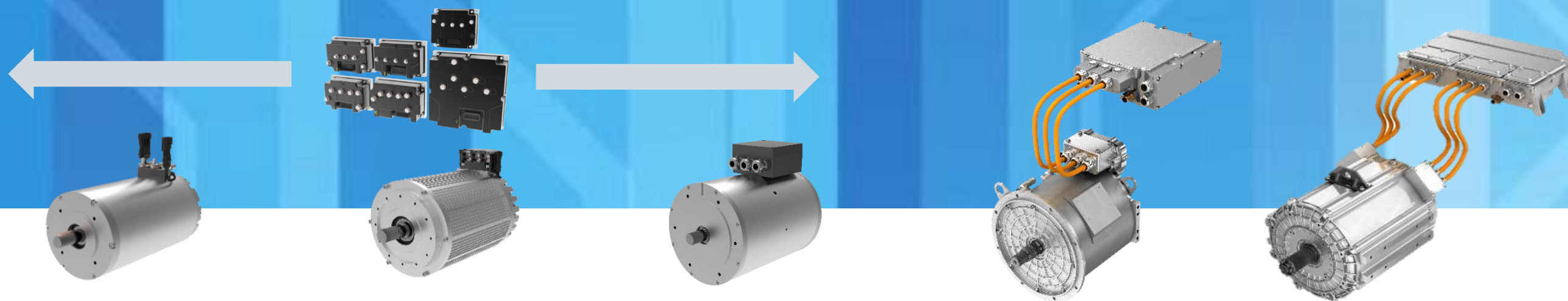
Modularity and Systems Integration



Product Line

24V

750V



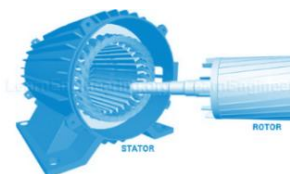
Torque Generation

Induction

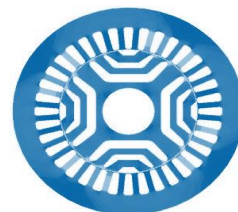
Variable Reluctance

Magnets

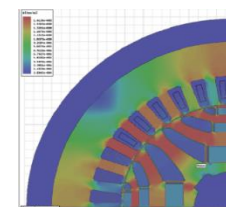
Motor Architecture



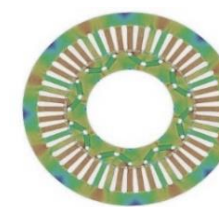
Synchronous Reluctance



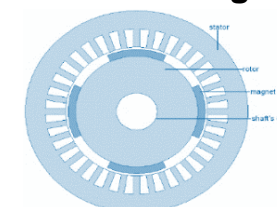
Synchronous Reluctance - Interior Permanent Magnet



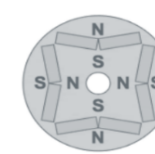
Interior Permanent Magnet

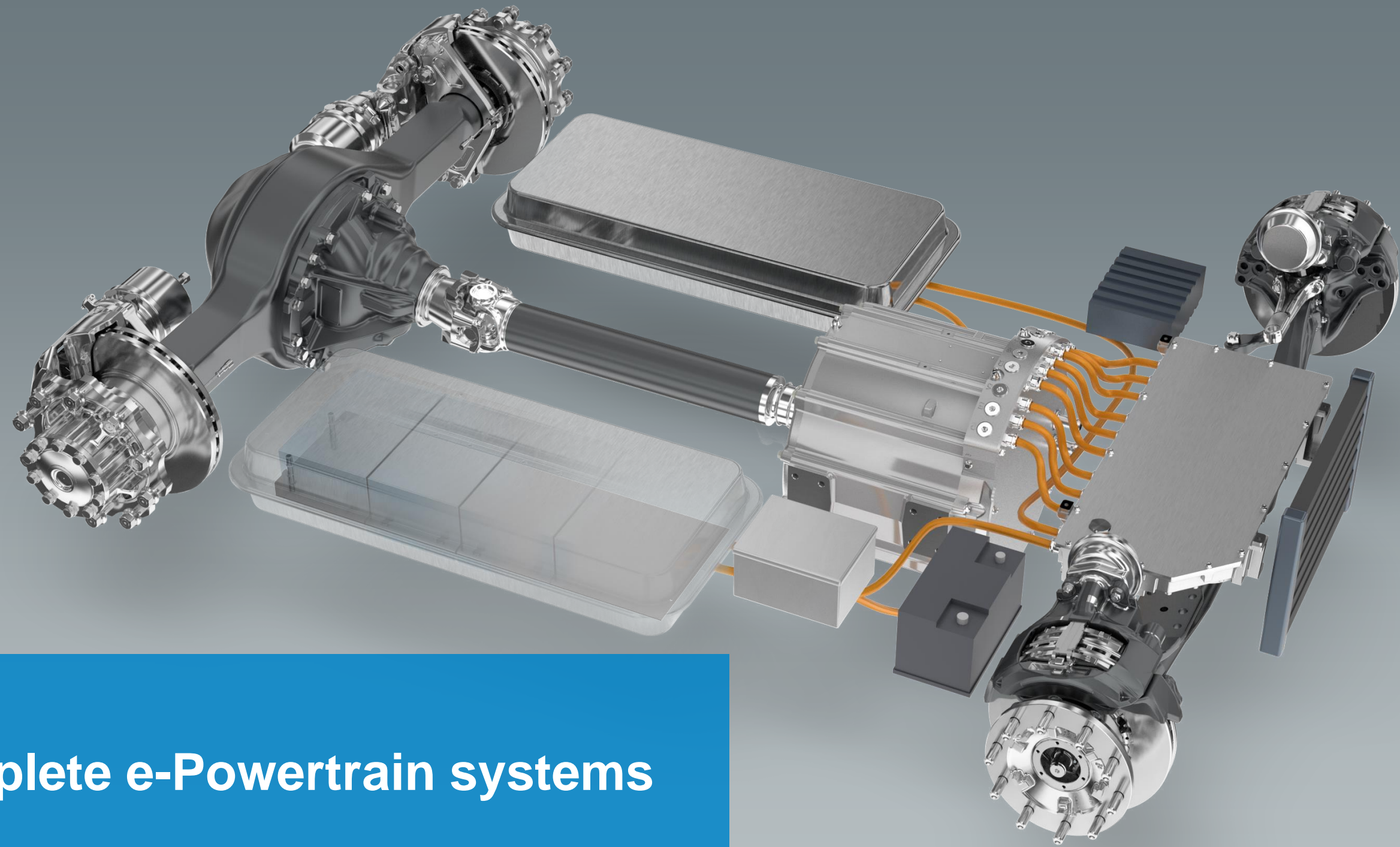


Surface-Mounted Permanent Magnet



Rotor Design



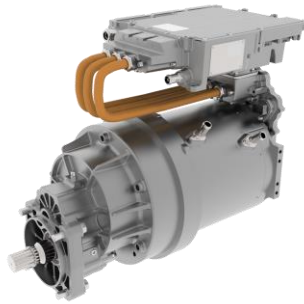


Complete e-Powertrain systems

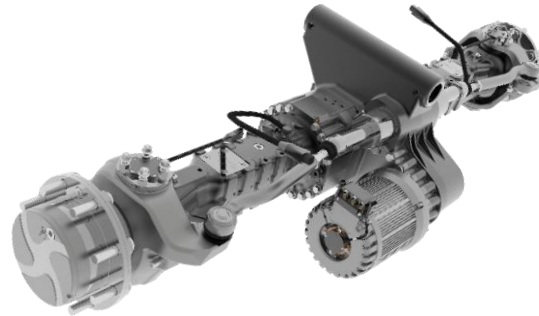


Leveraging software and energy
to maximize productivity

Powertrain



Motors & Inverters

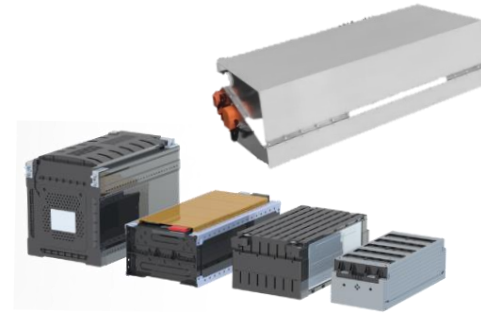


e-Axles

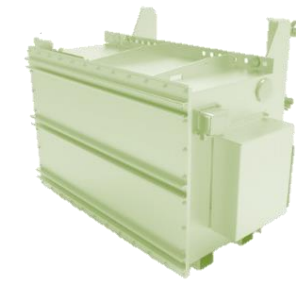


e-Drive Units

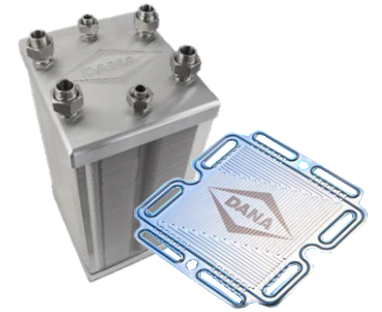
BMS / Fuel Cell Plates



BEV Batteries



Hybrid Batteries*



Fuel Cells*

* Enabled via partnerships

Accessories



Thermal Management



Controllers & Charger/Inverters



EHPS, EGEN, & EPAC Systems

Integration Services



Software, Vehicle Dynamics & Transmission Controllers



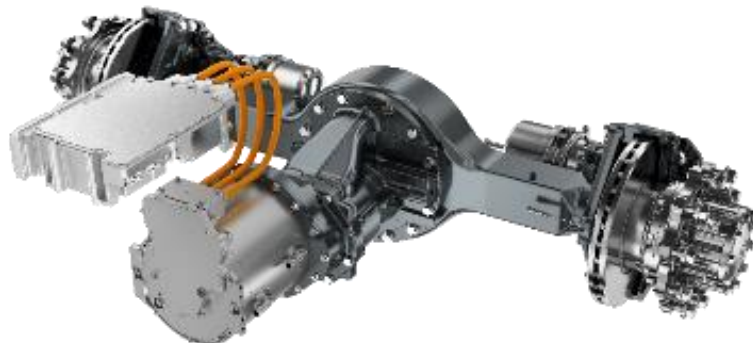
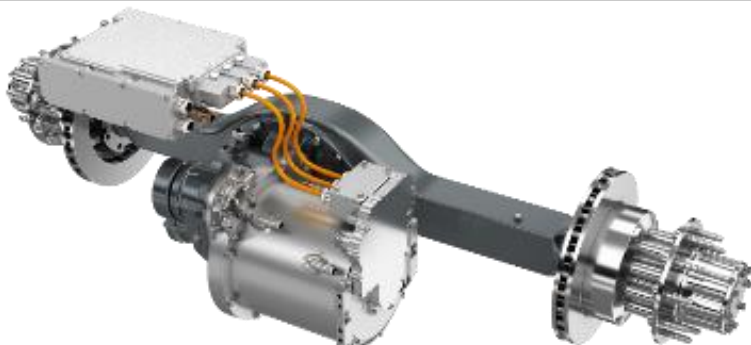
ASIL-D / PL-D



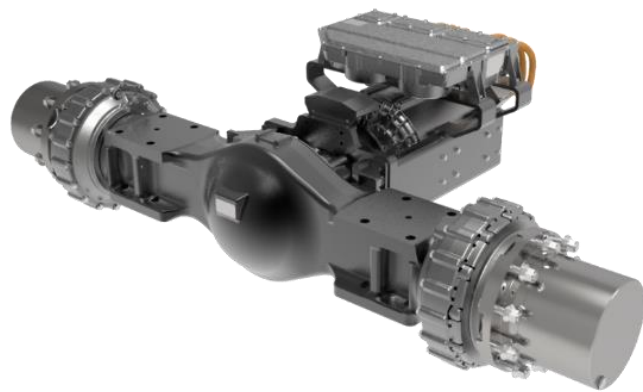
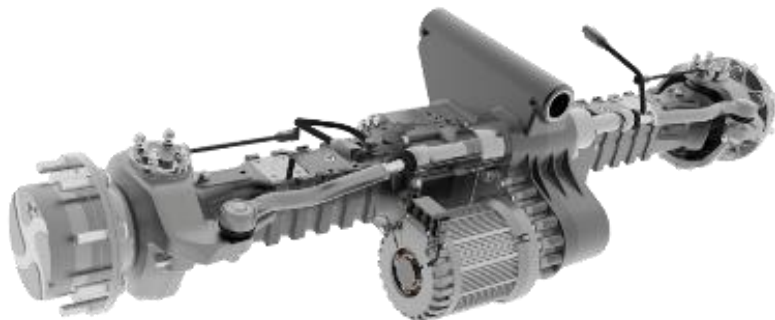
City Buses



Commercial Trucks



Off-Highway





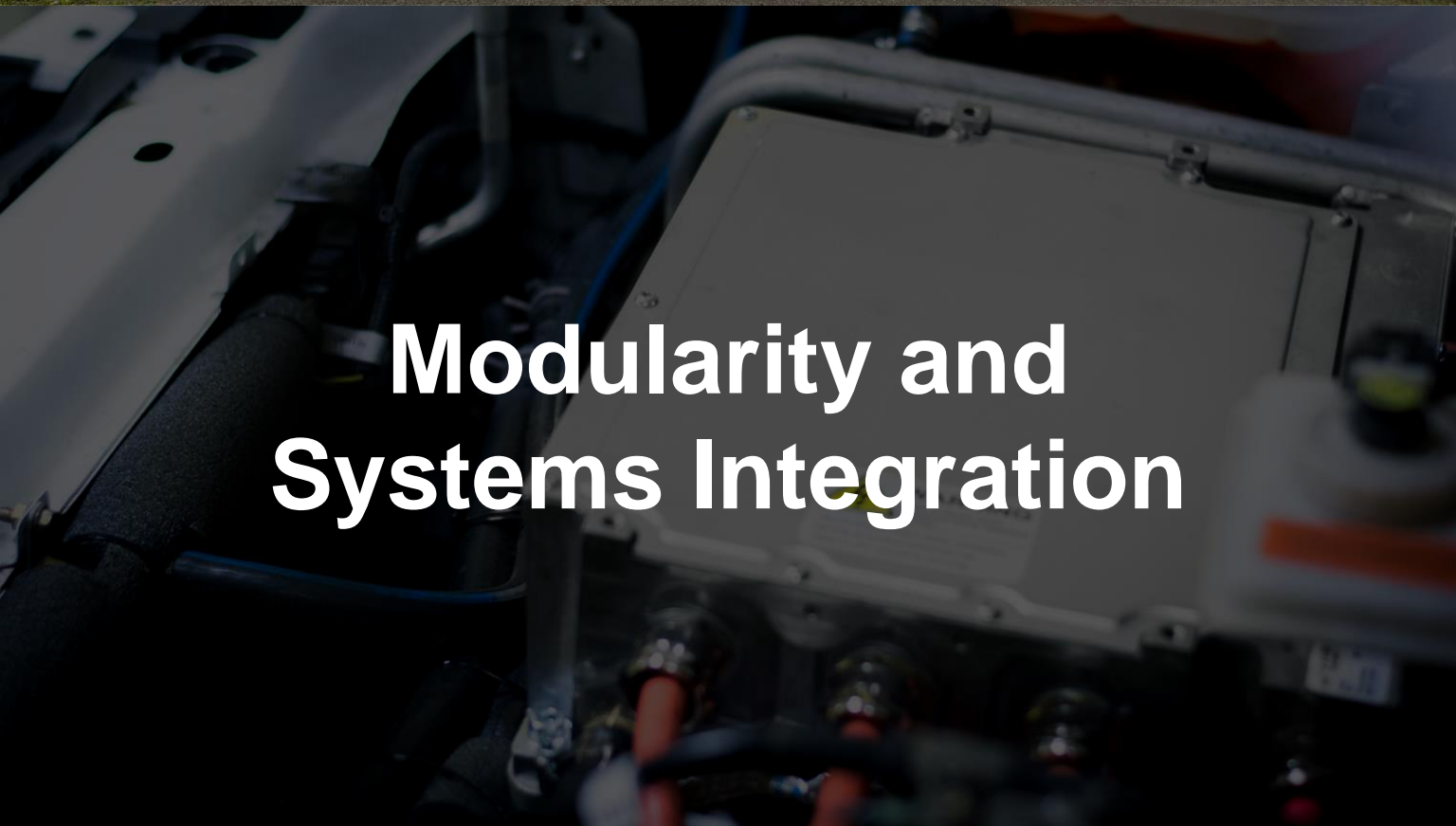
Regulation



**Sustainability and
Social Responsibility**



Total Cost of Ownership



**Modularity and
Systems Integration**