TRANSPORT DECARBONISATION ALLIANCE

GLOBAL COMMERCIAL VEHICLE DRIVE TO ZERO | A PROGRAM OF CALSTART

EV 100 by THE CLIMATE GROUP

GETTING ZERO-EMISSION VANS AND TRUCKS ON THE ROAD – THE NORTH AMERICA EDITION

September 3, 2020

Digital Dialogue Logistics

- Please use the Questions Pane on your GoToWebinar Control Panel to submit your questions
  - We will not be using the “raise your hand” feature

- Slides and a recording of today’s webinar will be distributed
- Participation is encouraged

Getting zero-emission vans and trucks on the road – the North America edition

Thursday, September 3 10:00 a.m. PDT / 1:00 p.m. EDT



Dr. Cristiano Façanha

Global Director

CALSTART

GLOBAL COMMERCIAL VEHICLE DRIVE TO ZERO



Scott Phillippi

Senior Director

UPS



John Luoma

Director of Product Planning

Kenworth



Aaron Gillmore

Vice President

BYD Trucks

Build Your Dreams

Participant Poll

- What is your zero-emission van and truck affiliation?
  - Government
  - Manufacturer
  - Fleet owner / user
  - Utility / infrastructure provider
  - Knowledge / service organization

Zero-emission vehicles will come in waves, and our “beachhead” strategy targets applications where zero-emission technology is likely to succeed first

Wave 1 Transit

ZE transit buses
Available now



ZE industrial lifts
Available now



Wave 2 Delivery

Chanje Class 5 Delivery Van
Available now





Fuso ECanter
Available now

Orange EV yard tractor
Available now



Wave 3 Medium Freight

E-Fuso Vision One
Announced 2021



Freightliner eM2
Demo now
Announced 2021



Wave 4 Heavy Regional Freight

Freightliner e-Cascadia
Demo Now; Announced 2021





Volvo VNR
Demo now; 2019 Europe; 2021 NA?



Mack e-Refuse
Demo 2020;
Coming 2022?



Tesla demo
Coming 2021?

Corridor Longhaul

Nikola FC tractor
Coming 2022?



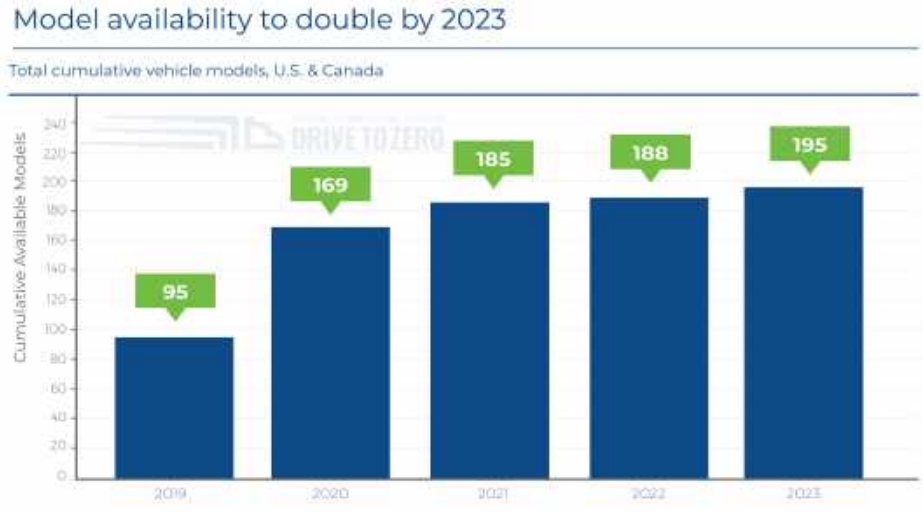
Similar drivetrain and component sizing can scale to early near applications

Expanded supply chain capabilities and price reductions enable additional applications

Steadily increasing volumes and infrastructure strengthen business case and performance confidence

2019 2020 2021 2022 2023

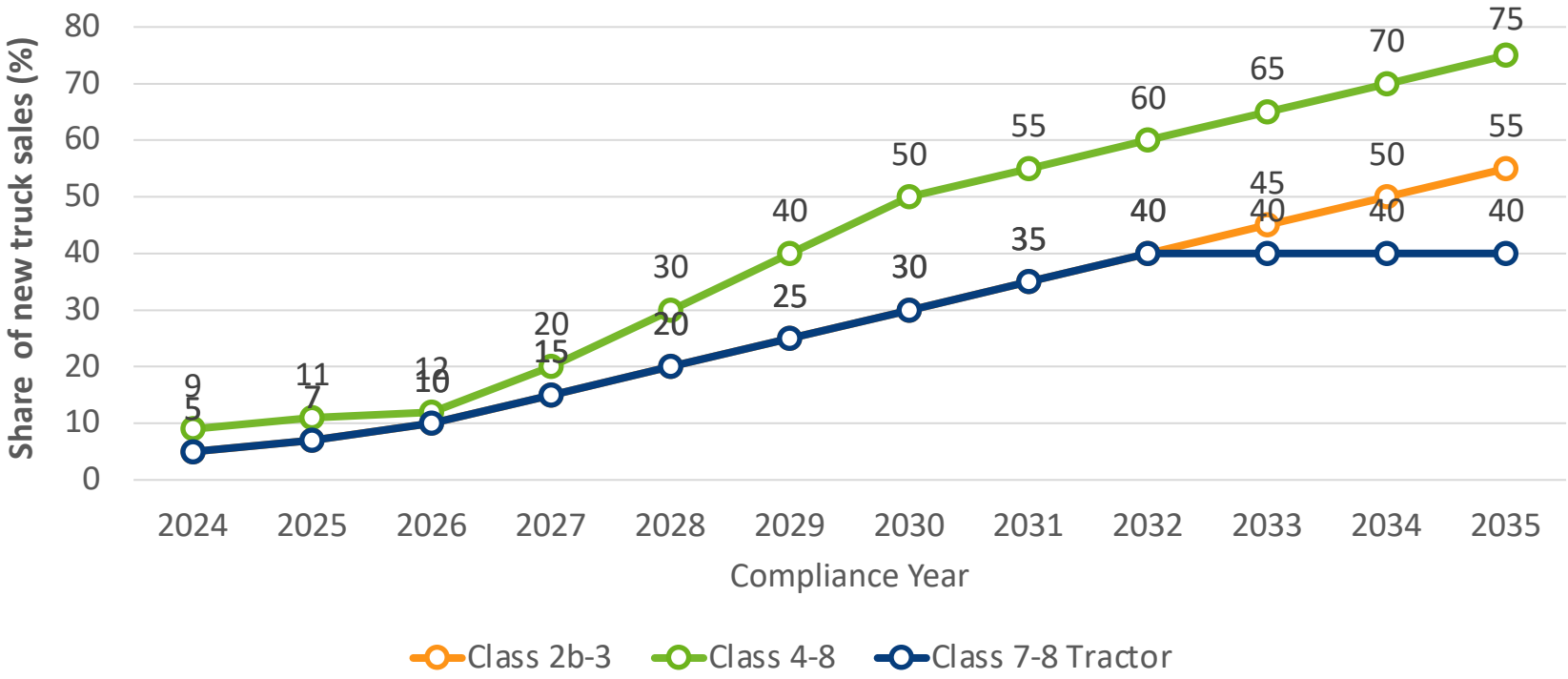
Model availability is increasing rapidly





Source: https://globaldrivetozero.org/tools/zero-emission-technology-inventory/

California and 14 other U.S. states are sending strong market signals supporting zero-emission trucks



Leading regions should adopt “ecosystems” of complimentary, aligned regulations, incentives and investments



Sales requirements for zero-emission trucks



Fleet purchase requirements that mirror sales requirements



Incentives for vehicle up-front costs



Infrastructure investments to match vehicle incentives



Development of zero-emission zones for delivery vehicles

Getting zero-emission vans and trucks on the road – the North America edition

Thursday, September 3 10:00 a.m. PDT / 1:00 p.m. EDT



Dr. Cristiano Façanha

Global Director

CALSTART

GLOBAL COMMERCIAL VEHICLE DRIVE TO ZERO



Scott Phillippi

Senior Director

UPS



John Luoma

Director of Product Planning

Kenworth



Aaron Gillmore

Vice President

BYD Trucks

Build Your Dreams



Scott Phillippi
Senior Director

KENWORTH
The World's Best®



Zero-Emission Vehicles

John Luoma

Director of Product Planning

Zero Emissions Demand

Regulations

- CARB
- Percent of Sales by 2030
  - 50% Vocational
  - 15% Tractors

Green Image

- Marketing
- Branding
- Sustainability Goals

R. O. I.

- Purchase Price
- Total Cost of Ownership
- Energy Cost

Incentives

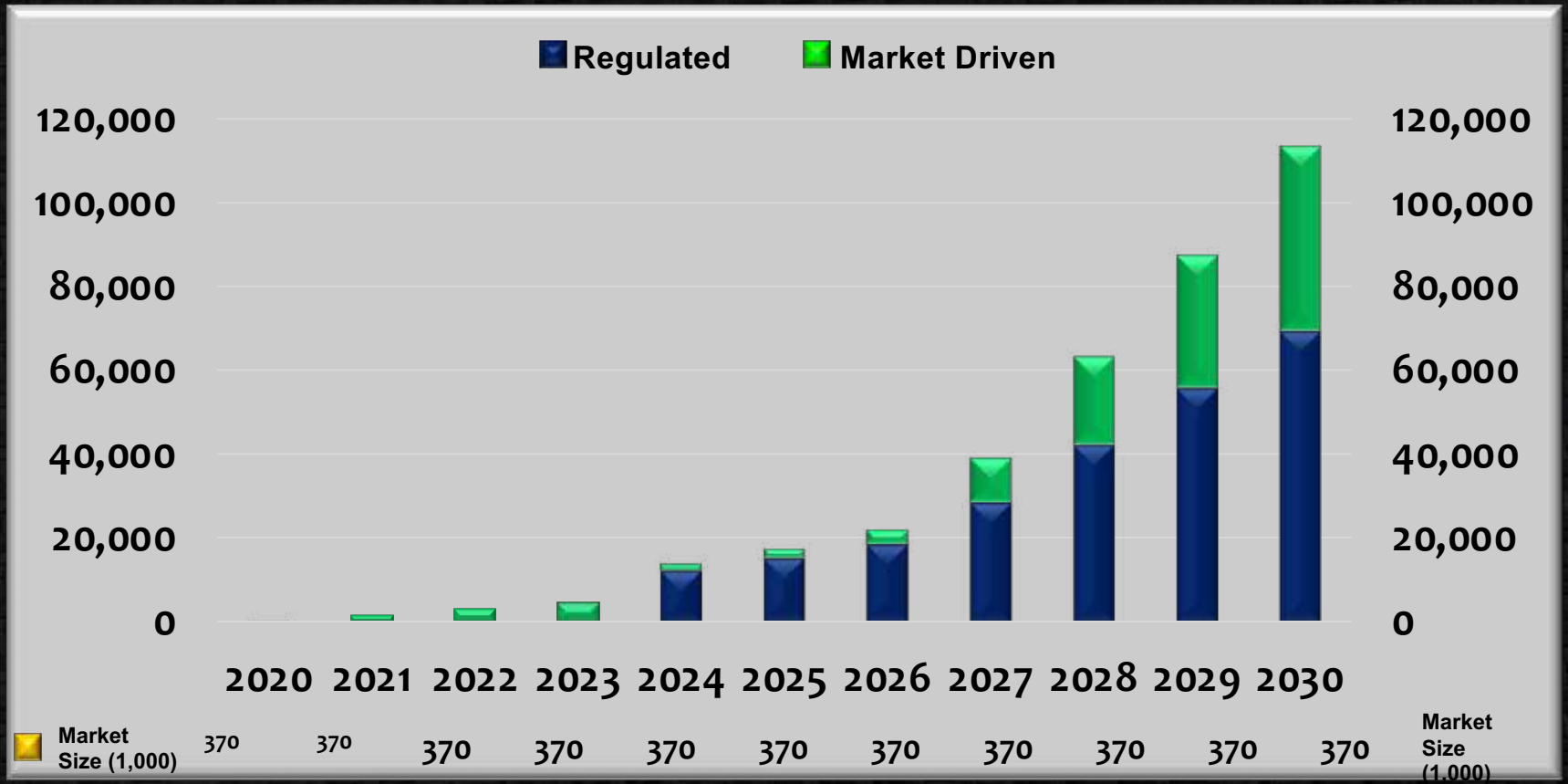
- Vehicle and Infrastructure
- Grants
- Vouchers







Zero Emissions Demand



Act Market Size US Cls 5-8 Forecast 2021

KENWORTH

The World's Best®



BYD Trucks
Hard at Work

Build Your Dreams®

BYD Business Divisions



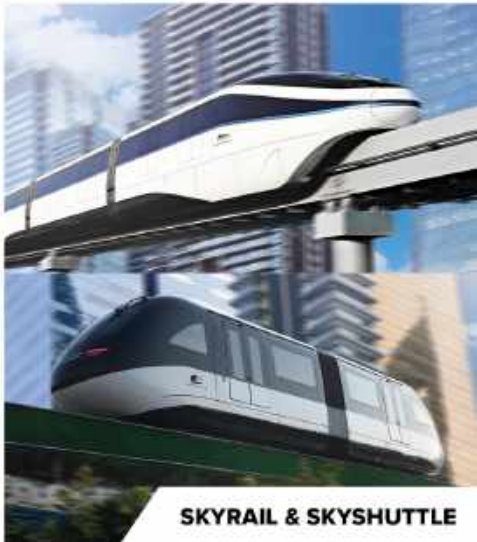














More than 750 Union Manufacturing Jobs

1000 U.S. Employees in All Locations

JOBS TO MOVE AMERICA

SHEET METAL | AIR | RAIL | TRANSPORTATION

SMART

Core Technology: BYD Battery



Founded as a battery company in 1995, BYD is now one of the world's top battery producers.

BYD's Iron Phosphate Batteries are ideal for truck applications:

- Safest in the industry
- High energy density
- Wide range of operating temperatures
- Battery Thermal Management System (BTMS) and advanced water-cooling technology maintain high efficiency

Safety Tested

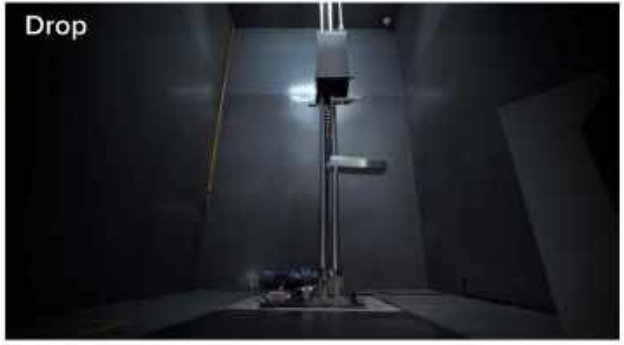








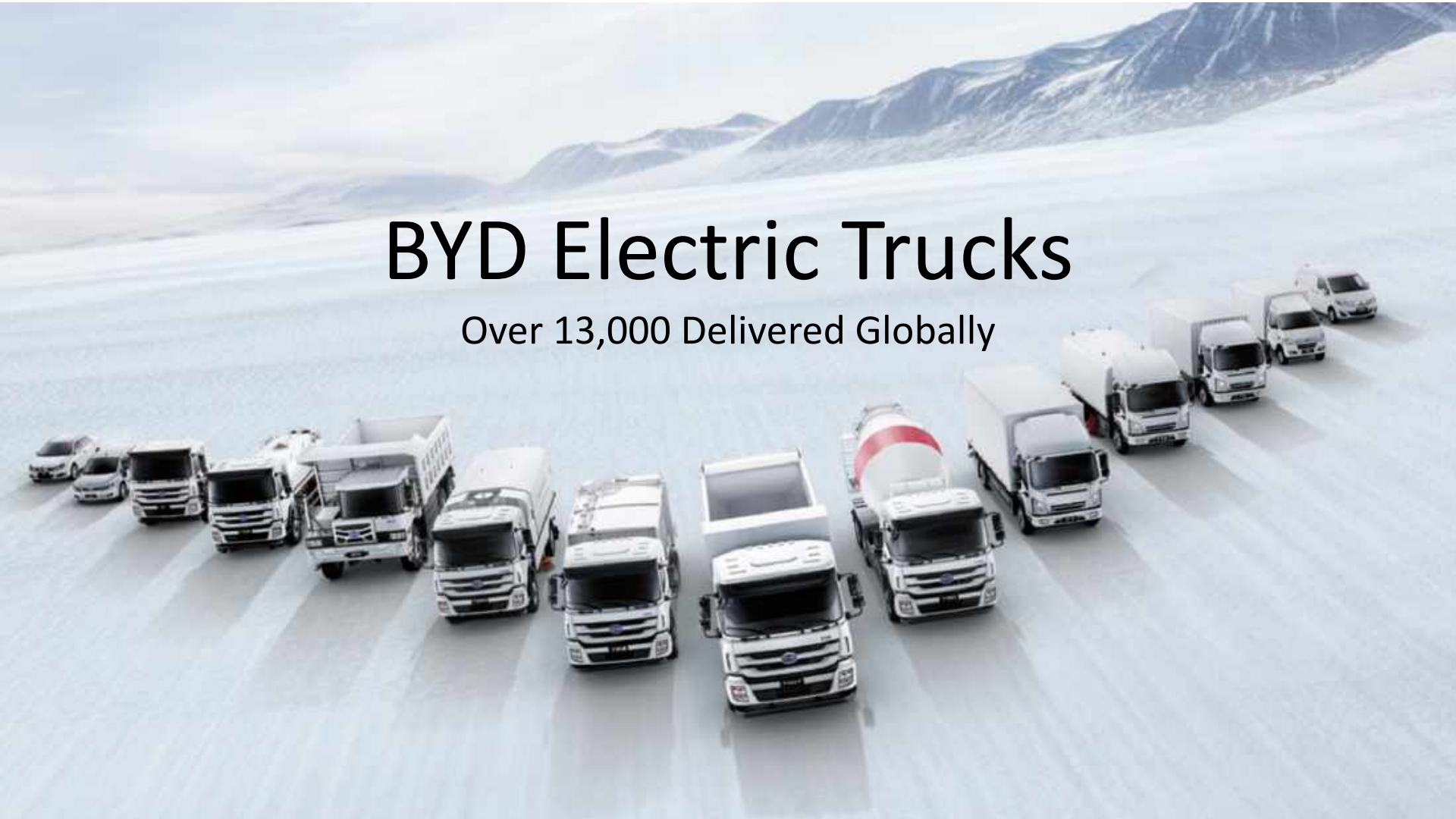




BYD batteries are rigorously tested and remain stable in even the most extreme conditions.

BYD Electric Trucks

Over 13,000 Delivered Globally



Transportation Market Solutions



Terminal Operations



Refuse Collection



Distribution & Logistics

BYD 8Y Yard Truck (Class 8)



Specifications

GCWR: 102,000 lbs
Range: 12+ hours working range
Battery Capacity: 217 kWh
Maximum Power: 241 hp
Maximum Torque: 1,106 lb-ft
Charging Power: 40kWac or 120kWdc-CCS1

Industry Applications

- Marine Terminal
- Warehouse
- Rail Yard
- Transfer Station
- Distribution Center

BYD 8TT Tandem Axle Day Cab (Class 8)



Specifications

GCWR: 105,000 lbs
Range: 125+ mile working range
Battery Capacity: 409 kWh
Maximum Power: 483 hp
Maximum Torque: 1,770 lb-ft
Charging Power: 40kWac or 120kWdc-CCS1

Industry Applications

- Drayage
- Food & Beverage
- Transfer Operations
- Distribution
- Logistics

BYD 6F Straight Truck (Class 6)



Specifications

GVWR: 26,000 lbs
Range: 125+ mile working range
Battery Capacity: 221 kWh
Maximum Power: 335 hp
Maximum Torque: 1,328 lb-ft
Charging Power: 40kWac or 120kWdc-CCS1

Industry Applications

- Logistics
- Delivery
- Food and Beverage
- Fresh & Frozen Goods
- Airport Operations
- Distribution

*BYD 6F Straight Truck offered in multiple wheelbase configurations

BYD 8R Refuse Truck (Class 8)



Specifications

GVWR: 66,000 lbs
Range: 60+ mile working range
Battery Capacity: 295 kWh
Maximum Power: 430 hp
Maximum Torque: 812 lb-ft
Charging Power: 40kWac or 120kWdc-CCS1

Available Body Configurations

- Automated Side Loader
- Rear Loader
- Front Loader
- Roll Off

*Compatible with all major body configurations

Other BYD International Truck Models









Thank You

Build Your Dreams®

Getting zero-emission vans and trucks on the road – the North America edition

Thursday, September 3 10:00 a.m. PDT / 1:00 p.m. EDT



Dr. Cristiano Façanha

Global Director

CALSTART

GLOBAL COMMERCIAL VEHICLE DRIVE TO ZERO



Scott Phillippi

Senior Director

UPS



John Luoma

Director of Product Planning

Kenworth



Aaron Gillmore

Vice President

BYD Trucks

Build Your Dreams

TRANSPORT DECARBONISATION ALLIANCE

GLOBAL COMMERCIAL VEHICLE DRIVE TO ZERO | A PROGRAM OF CALSTART

EV 100 by THE CLIMATE GROUP

1 EUROPE

2 NORTH AMERICA

3 INDIA

4 STOCK-TAKING AT CLIMATE WEEK NYC

TRANSPORT DECARBONISATION ALLIANCE

GLOBAL COMMERCIAL VEHICLE DRIVE TO ZERO | A PROGRAM OF CALSTART

EV 100 by THE CLIMATE GROUP

Thank you!

Cristiano Façanha
Global Director
cfacanha@calstart.org

For more information:
www.globaldrivetozero.org

@TeamDriveToZero