



POWER

UP

GLOBAL COMMERCIAL ELECTRIC VEHICLE
MARKETS TO 2050

How Battery and Fuel Cell Propulsion Will Decarbonise Heavy Transport.

A PARTNERSHIP OF KNIBB, GORMEZANO & PARTNERS & ACT RESEARCH





WE'RE TAKING ON THE WORLD

In August of 2020, ACT Research engaged in an eight-month multi-client study with the objective of providing a build and unit forecast for battery electric and fuel cell electric vehicles for North America.

With deep dives into battery technology, hydrogen, and fuel cell development, infrastructure and electric utilities, fuel cell infrastructure, government, regulations and subsidies, and comprehensive total cost of ownership (TCO) analysis, this work is the gold-standard for analyzing the future of electric vehicles in North America.

To bring a comparable analysis and forecast to the remainder of the world, Knibb, Gormezano & Partners (KGP), and ACT Research have partnered to produce a global BEV & FCEV study.

KGP, as the leader in global commercial vehicle powertrain analysis, and ACT Research, as the go-to for production data and forecast for North America, is uniquely positioned to forecast these market developments and work with leaders in the global electric vehicle space.

Given the progress of the technology, products, and evolution of the competitive arena around the world, the time has come to look at electric vehicles from a global perspective.

GLOBAL
BEV & FCEV
Forecast & Analysis





1) Scope of Study – Definition of Deliverables

A) Unit Sales

I) Geography

Regions	Countries
Europe	Germany, France, United Kingdom, Poland, Italy, Spain, Turkey, Netherlands, Baltic & Scandinavian Countries, All Other EU Countries
Asia Pacific	China, Japan, Korea, India
North America	United States, Canada
South America	Brazil, All Others

II) Timeframe/Horizon – Annually from 2021 to 2031 (10 years), then discrete single year outlooks for 2035, 2040, 2045, and 2050

III) Heavy Trucks, Medium Trucks, Bus>6t

IV) Comparison of Power Sources

a) Battery Electric, Fuel Cell Electric

V) Penetration - % share of the total market (Baseline comp is ACT/KGP total forecast)

B) Adoption Path – Viability, competitiveness, upfront investment requirements, and ongoing operating costs, policy impacts (regulation, incentives, taxes)

I) Competing ICE (incumbent) alternatives

a) Diesel

b) Gasoline

c) Other as appropriate in various regions

II) Competing ZEV approaches

a) Battery

b) Fuel cells

C) Battery Electric Challenges

I) Battery weight, density, and efficiency

II) Cost elements – purchase, maintenance, battery replacement, electricity, resale value

III) Battery life/charging cycle times

IV) Range

V) Durability and replacement

VI) Safety

VII) Extreme weather operation

VIII) Electricity grid and distribution, plus charging infrastructure/installation

IX) Driver issues including acceptance and productivity impact



D) Fuel Cell Challenges

- I) Cost elements – purchase, maintenance, fuel cost, and availability
- II) Hydrogen distribution infrastructure build-out
- III) Scaling challenges (without penetration in LV markets)
- IV) Reliability and durability
- V) Safety
- VI) Driver issues, including acceptance and productivity impact

E) Comparative Total Cost of Operation by Market Segment

















F) Fleet, Operator, & User Feedback

2) Regulatory Challenges and Incentives

- A) GHG/CO2 regulations & potential future initiatives, and incentives
- B) Tailpipe emissions regulations
 - I) Including increased NOx and/or PM stringency considerations
- C) ZEV requirements
- D) Diesel and/or ICE bans
- E) Regional vehicle congestion regulations
- F) Materials recycling and other environment considerations

Global vehicle segmentation and applications:

The table depicted below summarizes vehicle segments and applications that will be included in the study. This list is representative, but not fully exhaustive.

GLOBAL CLASS	US CLASS	APPLICATIONS	
MEDIUM 6 – 15 t	CLASS 4-5 14,000 – 19,500 lbs 6,350 – 8,845 kg	Last Mile Delivery/City Van Parcel Delivery Truck Service/Utility/Work Truck	  
	CLASS 6-7 19,500 – 33,000 lbs 8,846 – 14,969 kg	Local Delivery Step Van & Box Truck Beverage Truck, Reefer Box Truck Work Truck, Aerial Lift Truck	   
HEAVY 15 t +	CLASS 8 STRAIGHT 33,000 lbs + 14,970 kg +	Box Truck Refuse Truck / Construction Truck Terminal Tractor	   
	CLASS 8 TRACTOR 33,000 LBS + 14,970 kg +	Drayage Local TL / Regional TL Sleeper Long-Haul	  
HEAVY BUS 6 t +	CLASS 6 – 7 19,500 – 33,000 lbs 8,846 – 14,969 kg	School Bus	
	CLASS 8 33,000 LBS + 14,970 kg +	Long Distance, Transit, Coach Bus	



3) Packaging and Deliverables Description

A) Analysis – An extensive written analysis will provide technical background and context, plus power source commentary across segments. This will build on the expertise ACT Research and KGP have gained through years of work with alternative power, including recent customer projects and interactions with regulators and researchers focused on CEV in particular

B) Spreadsheets – Our “full transparency” approach to this work means that spreadsheet analytics will be provided to customers. They will have ready access to background assumptions, key metrics, and detailed financial projections for unit sales and market share detail. This enables customers to do their own independent hands-on work with our tool to test alternative assumptions, do the sensitivity analysis and run their own what-ifs.

4) Timeline

- A) May - September 2021 – Study Participants Sign-Ups Interviews
- B) July - October 2021 - Study Participant Interviews & Interactions
- C) October 2021 – Preliminary Project Deliverable to Multi-Client Participants
- D) November 2021 – Feedback Meetings with Multi-Client Participants
- E) December 2021 – Published Final Version of Study

5) Targeted Customer Groups

- A) Traditional OEMs
- B) Traditional suppliers – drivetrain, braking systems, other suppliers
- C) New entrants to the CV marketplace (OEMs and suppliers)
- D) Battery makers
- E) Fuel cell manufacturers
- F) Energy companies, fuel suppliers, and distributors
- G) Electrical component manufacturers
- H) Wall Street/Financial Community
- I) Trucking fleets
- J) Fuel distributors
- J) Regulatory bodies at the federal, state, and local levels
- K) Other industry stakeholders, including NGOs



ORDER FORM - STUDY PARTICIPANT

FIRST NAME _____ LAST NAME _____

COMPANY _____ JOB TITLE _____

COMPANY ADDRESS _____

ADDRESS LINE 2 _____

CITY, STATE, ZIP CODE _____

COUNTRY _____

EMAIL _____ PHONE _____

Yes! I'd like to purchase *POWER UP: Global Commercial Electric Vehicle Markets to 2040* study for:

- ☐ **Full Study - \$50,000**
- ☐ **Region Specific - \$20,000**
 - ☐ **\$10,000 for additional region(s)**
- ☐ **High Level Findings - \$15,000**

I understand I will receive the materials and an invoice by email. The invoice will be payable net 30 days.

The purchaser agrees not to distribute or transfer POWER UP reports or data in whole or part outside their immediate operating wholly-owned division/company. Copyright 2021 by ACT RESEARCH CO., LLC and KNIBB, GORMEZANO & PARTNERS all rights reserved. This confidentiality agreement extends to future study updates, editions, and transitions of study into long-term reports and renewals if and when a new subscription order form is not initiated at the time of invoicing and/or payment.

SIGNATURE _____ DATE _____

**CHARGING FORWARD* is the ACT Research North American BEV and FCEV study that is the foundation of this global analysis and forecast.