

# ***ELECTRIC TRUCKS AND BUSES: ROLLING INTO THE FUTURE TOGETHER***

*EXPERT INSIGHTS ON THE ELECTRIC  
TRUCK MARKET, ITS IMPACT ON FLEETS,  
AND PREMIUM TYRE SOLUTIONS.*

*BY CONTRIBUTING TO THE DECARBONISATION OF THE TRANSPORT  
SECTOR, ELECTRIC VEHICLES HELP ADDRESS THE INDUSTRY'S  
ENVIRONMENTAL IMPACT. AS FLEETS INCREASINGLY ADOPT CARBON  
EMISSION-FREE VEHICLES THEY MUST REMAIN ATTENTIVE TO  
ESSENTIAL FACTORS:*

- What are the trends in the electric truck and bus market?
- What is the impact on vehicles and tyres?
- How does Michelin support fleets with EV transition?

**EXPLORE THESE KEY TOPICS AND MORE!**



## WHO IS DRIVING THE CHANGE TO ZERO TAILPIPE EMISSION VEHICLES?

All members of the transport chain are doing their part to reduce CO<sub>2</sub> emissions!

Rapidly expanding, the electric truck and bus market is driven by a greater number of environmental regulations that are also more rigorous, a growing demand for sustainable transport solutions, advancements in battery technology and new vehicle architectures.



### GOVERNMENT REGULATIONS

Beyond EU regulations, local policies are already in place in hundreds of European cities to reduce or even ban polluting vehicles from urban areas.



### SOCIETY

There is a fundamental societal expectation that the transportation sector will be able to reduce its CO<sub>2</sub> emissions.



### SHIPPING COMPANIES

To decarbonise their transport, shipping companies are developing multimodal transportation services and asking carriers to switch to zero-emission vehicles.



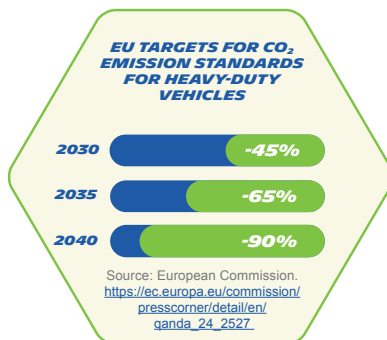
### CARRIERS

Carriers are meeting these requests and developing their own ambitious plans. Higher EU motorway tolls for higher emission vehicles are further pushing them to meet reduction targets.



### VEHICLE MANUFACTURERS

Carriers are meeting these requests and developing their own ambitious plans. Higher EU motorway tolls for higher emission vehicles are further pushing them to meet reduction targets.



## WHAT ARE THE MAIN ZERO TAILPIPE EMISSION TECHNOLOGIES?

In Europe, two main technologies that provide zero tailpipe emissions are being developed.

### BATTERY ELECTRIC VEHICLE (BEV)

#### MOTOR

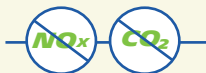
100% electric

#### ENERGY

Electricity stored in a battery

#### RECHARGING

At a charging station, where charging time is variable, and can be long



### FUEL CELL ELECTRIC VEHICLE (FCEV)

#### MOTOR

100% electric

#### ENERGY

Electricity is produced by the cell, by electrolysis, and stored in batteries

#### RECHARGING

With hydrogen, about the same time as filling up a diesel tank

## WHAT ARE THE EXPECTED LIFECYCLE EMISSIONS OF BEVS?

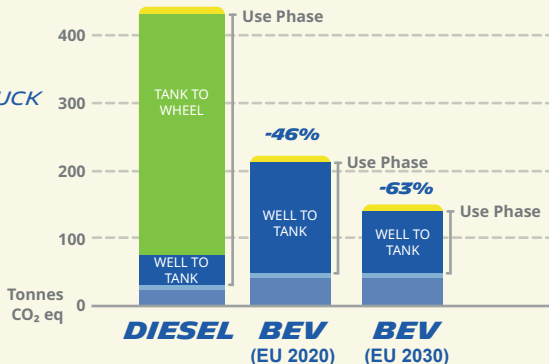
While electric trucks produce no CO<sub>2</sub> during operation, the emissions associated with their manufacturing and electricity consumption are significant.

Nevertheless, over their entire lifecycle, battery electric vehicles (BEVs) are projected to emit 63% less CO<sub>2</sub> than diesel trucks\*.

### SCANIA LIFE CYCLE ASSESSMENT COMPARING DIESEL TRANSPORT TRUCK AND ELECTRIC TRANSPORT TRUCK (May 2021)

- Recovery
- Use TtW
- Use WtT
- Maintenance
- Production

Source: <https://www.scania.com/content/dam/group/press-and-media/press-releases/documents/Scania-Life-cycle-assessment-of-distribution-vehicles.pdf>



\*Source: Scania Life Cycle Assessment  
<https://www.scania.com/content/dam/group/press-and-media/press-releases/documents/Scania-Life-cycle-assessment-of-distribution-vehicles.pdf>

## WHAT IS THE TCO OF BATTERY ELECTRIC TRUCKS WHEN COMPARED TO DIESEL?

Overall, the Total Cost of Ownership (TCO) at the moment for an electric truck is similar to that for an ICE vehicle\*.

Variations are mainly due to the local cost of energy. As the technology develops and becomes increasingly adopted, TCO will improve as well.

\*Source: International Council on Clean Transportation <https://theicct.org/publication/total-cost-ownership-trucks-europe-nov23/>

## WHAT MAKES MICHELIN THE RIGHT PARTNER FOR FLEETS?

Michelin's product offer makes tyre management simple as fleets transition to operating a mix of drivelines.

The MICHELIN X® Multi Energy™ 2 range meets the specific performance requirements of both diesel and electric trucks.

MICHELIN X® INCITY EV Z was developed to meet the primary challenges of bus electrification and the demands of passenger transportation.



Fleets recognise Michelin as the #1 brand based on total performance evaluation, which is key, as Electric Vehicles will require superior performance across multiple criteria.

CONTINENTAL  
37,56

GOODYEAR  
37,68

BRIDGESTONE  
38,12

MICHELIN  
59,25



MICHELIN,  
RANKED FIRST  
FOR :

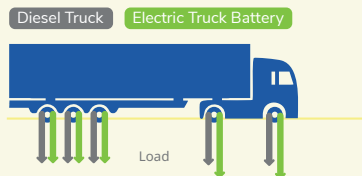
- VALUE & PARTNERSHIP
- INNOVATION & QUALITY
- SAFETY & RELIABILITY
- SUSTAINABILITY



Source : Brand study from 2023 conducted by Kantar at Michelin's request that surveyed 250 fleets in each of five countries (Brazil, France, Germany, Spain, United States) to evaluate the brand image of tyre manufacturers and their Brand Power Score (BPS). Among the following brands, which do you think offers tyres that...? Which of the following brands are...? Transporters could select several brands in response to each question.

# WHAT IMPACT DO ELECTRIC TRUCKS AND BUSES HAVE ON TYRES?

When transitioning to electric trucks and buses, tyres have more work to do!



## 01

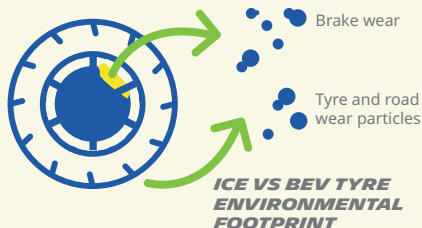
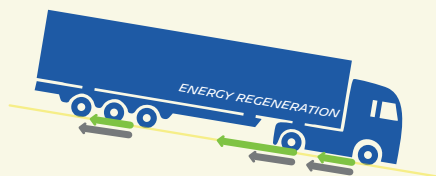
### DIFFERENT LOAD DISTRIBUTION

Tyre robustness, especially on the steer axle, is key to carrying the additional weight of the batteries.

## 02

### ENERGY REGENERATION

Braking and higher torque due to energy regeneration leads to higher wear on the drive axle.



## 03

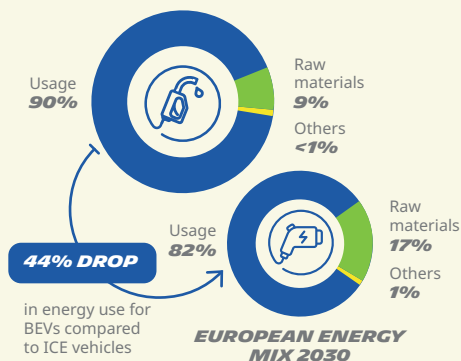
### PARTICLE EMISSIONS

Tyre abrasion performance is critical to reducing tyre particles.

## 04

### ENERGY CONSUMPTION

More than 80% of an electric truck's environmental impact occurs during use. Low rolling resistance tyres optimise a truck's stored energy by both increasing range and lowering TCO.



Source: Results from LCA methodology, EC of European commission for a 4\*2 tractor + semi-trailer 3 axles fitted with MICHELIN X® Multi 315/70R22.5 and MICHELIN X® Multi 385/55R22.5 tyres, March 2024 \* How the electricity will be produced in Europe in 2030 - Forecast by European Commission.

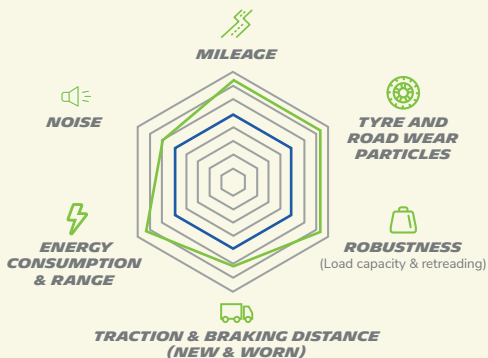
## WHAT KIND OF TYRE IS SUITABLE FOR ELECTRIC TRUCKS AND BUSES?

A tyre that's suitable is a tyre that has it all!

For an electric truck relative to an internal combustion engine (ICE) vehicle, rolling resistance, robustness, durability, abrasion and noise are all key factors, for steer and drive tyres in particular. A premium tyre is required to address the increased challenges.

### TYRE PERFORMANCE CRITICITY ON A BEV

— ICE\*  
— BEV\*



#### MILEAGE

Tyres need superior mileage performance to counter higher wear from a heavier load on the steer and drive axles, and higher torque on the drive axle.



#### TYRE AND ROAD WEAR PARTICLES

Low abrasion tyres minimise emissions due to higher wear and torque. They also ensure compliance with Euro 7 regulations.



#### ROBUSTNESS (LOAD CAPACITY AND RETREADING)

Robust tyres with an adapted load index carry the battery's weight throughout the tyres' lifespan, which can be extended through regrooving and retreading.



#### ENERGY CONSUMPTION AND RANGE

Low rolling resistance is critical to optimise both stored energy in terms of range and Total Cost of Ownership (TCO).



#### TRACTION AND BRAKING DISTANCE (NEW & WORN) / SAFETY

Extra torque and modified mass distribution among axles require superior traction, adherence and braking distance throughout a tyre's lifespan to ensure safety.



#### NOISE

Since BEVs\* make less noise than ICE\* vehicles, tyre noise becomes more prominent.

\*BEV (BATTERY ELECTRIC VEHICLE)  
ICE (INTERNAL COMBUSTION ENGINE)

## WHERE CAN I FIND MORE INFORMATION ON ELECTRIC TRUCKS AND BUSES?

For more detailed information about electric trucks and buses, and their specific needs when it comes to tyres, ask to your Michelin representative the complete white paper!

**The shift to electric trucks and buses is a major undertaking for the transportation industry. The underlying performance requirements for tyres are such that only premium tyres are capable of meeting them all. Michelin is well positioned to meet these demands.**

“ It's a decarbonisation strategy. We have a sizeable fleet, and as a carrier, we have a role to play in the ecological transition. So, it's not only good for the environment, but also for our image. By choosing these vehicles, we set ourselves apart from the competition. ”



High Value Goods transportation purchase manager, 300 vehicles, France

### GLOSSARY

#### **EV** (ELECTRIC VEHICLE)

Vehicles powered by an electric motor.

#### **BEV** (BATTERY ELECTRIC VEHICLE)

Vehicles powered exclusively by rechargeable electric batteries with no internal combustion engine (ICE) or fuel tanks.

#### **ZEV** (ZERO-EMISSION VEHICLE)

Vehicles using energy technology that emits no exhaust gas or other carbon emissions from the onboard source of power.

#### **ICE**

##### **(INTERNAL COMBUSTION ENGINE)**

An engine which generates power by burning fuel (such as petrol or diesel) inside a combustion chamber.

#### **FCEV** (FUEL CELL ELECTRIC VEHICLE)

Hydrogen fuel cell electric vehicles (FCEVs) run on electric power generated by hydrogen fuel which is kept in compressed fuel tanks.

#### **WTT** (WELL-TO-TANK)

Method used to calculate the energy consumed and GHG emitted from the moment of production of a transport fuel (petrol, diesel, electricity, natural gas) to the moment of fuel supply (at the recharging or refuelling station).

#### **TTW** (TANK-TO-WHEEL)

Method used to calculate the energy consumed and GHG emitted from the point at which the transport fuel (petrol, diesel, electricity, natural gas) is transmitted to the vehicle to the moment of its use.

SOURCE: European Commission [https://transport.ec.europa.eu/transport-themes/clean-transport/clean-and-energy-efficient-vehicles/clean-vehicles-directive\\_en](https://transport.ec.europa.eu/transport-themes/clean-transport/clean-and-energy-efficient-vehicles/clean-vehicles-directive_en)



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sustainable mobility