



MICHELIN
FOR MY BUSINESS



**10
MIN**

**MASTER TCO*
TO IMPROVE
YOUR BUSINESS**

***TOTAL COST OF OWNERSHIP**

TIPS FOR UNDERSTANDING,
CALCULATING AND OPTIMISING YOUR
OPERATING COSTS AS WELL AS LIMITING
YOUR ENVIRONMENTAL FOOTPRINT!



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SUMMARY

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- P.04** — WHAT IS TCO?
- P.05** — HOW TYRES IMPACT TRUCK TCO?
- P.06** — HOW DOES TYRE ROLLING RESISTANCE IMPACT FUEL CONSUMPTION?
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WHY TCO is the way to go?

Fleet owners across the globe face more and more challenges to maintain their business efficiency. **As gas prices soar, fuel price fluctuates, inflation weights on costs and pressure to reduce environmental impact mounts, fleets are looking for a new way forward.**



UNDERSTANDING AND MONITORING TCO MIGHT JUST BE THE ANSWER!

Objectives of this white paper:

- ↳ Explain what is TCO
- ↳ Debunk TCO myths
- ↳ Present tangible ways to lower the TCO
- ↳ Show how tyre choice and maintenance can reduce fuel consumption and so environmental impact and overall TCO

HEAR FROM YOUR PEERS!

“Operating costs have increased so much in the past five years that finding a balance between capital investment and profitability is no longer a certainty.”

— **General manager** of a German urban passenger transportation company, 6 vehicles

“Total Cost of Ownership is a popular subject amongst colleagues and other transporters — everyone faces the same problems.”

— **General manager** of a Polish general cargo company, 40 vehicles



What is **TCO**?

If you haven't heard of TCO or Total Cost of Ownership, you're not alone! But you're likely familiar with some components, which you might call "operating costs" or "cost of vehicle". Let's deep dive together.

Currently, regardless of fleet size, many fleet owner calculates a TCO, even if they don't include the same costs in their calculation. Today, there is no standard TCO formula, instead, each company decides what costs should be included.

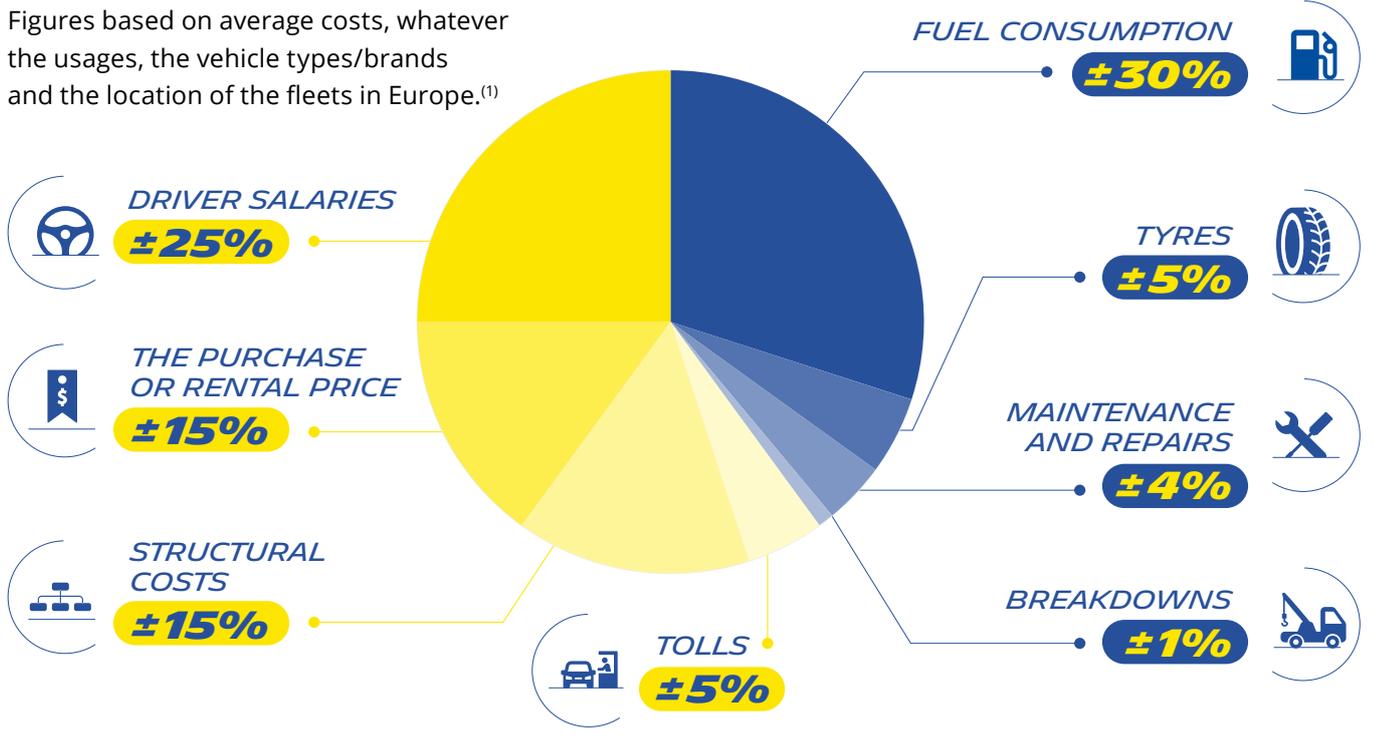
HOW TO CALCULATE A TRUCK TCO?

- > Purchase price of the vehicle
- > Direct and indirect costs involved in acquiring and operating the truck over its lifetime

PURCHASE PRICE OF THE VEHICLE + **DIRECT AND INDIRECT COSTS** = **TRUCK COST FOR THE FLEET**

WHAT IS INCLUDED IN A TRUCK TCO?

Figures based on average costs, whatever the usages, the vehicle types/brands and the location of the fleets in Europe.⁽¹⁾



⁽¹⁾Ducker worldwide report_ VEHICLE MAINTENANCE COSTS & PAINS_ Michelin Community - December 2017, study available upon request.

How tyres impact **TRUCK TCO?**

THEORY

5%

of truck costs are related to tyres, that's to say the tyres' purchase price⁽¹⁾

VS

REAL LIFE

The real tyre cost depends on how many miles you can get out of your tyres. Fleet owners generally calculate the CPM (Cost Per Mile).

To optimize this cost, they can choose tyres with better first life longevity and tyres that can be regrooved or retreaded to give tyres a second, third or fourth life. In fact, tyres are responsible for reducing fuel consumption. It's the second or the leading cost for a fleet, for up to as much as one-third of a vehicle's fuel consumption⁽²⁾.



WHY PRIORITIZE ROBUST AND RELIABLE TYRES?

- ↳ Help limit breakdowns, downtime and associated costs
- ↳ Reduce maintenance and repair costs
- ↳ Enhance the perceived image of your fleet
- ↳ Reduce fuel consumption

DID YOU KNOW?

- > Fuel consumption is the second or even the leading cost for a fleet⁽²⁾
- > Tyres are responsible for up to as much as one-third of a vehicle's fuel consumption
- > Fuel efficiency may vary a lot between two tyres in the same market segment

HOW MICHELIN CALCULATES TCO?

The substantial impact tyres have on a truck's TCO is mainly related to fuel consumption and the cost of tyres.



FUEL CONSUMPTION

+



COST PER MILES

=



TOTAL COST OF OWNERSHIP

⁽¹⁾Source: Figures based on average costs, regardless of usage, vehicle types/makes and the fleets' location in Europe.
⁽²⁾Ducker worldwide report_ VEHICLE MAINTENANCE COSTS & PAINS_ Michelin Community - December 2017, study available upon request.

How does tyre rolling resistance **IMPACT FUEL CONSUMPTION?**

The forces which are slowing your truck down and **directly impact your fuel consumption:**

- 

1. THE INERTIA
Prevents the vehicle from advancing - *resistance to movement variations.*
- 

2. AERODYNAMIC DRAG
The air it needs to push through to advance.
- 

4. THE GRAVITY
The gravity linked to the weight of the vehicle.
- 

3. MECHANICAL FRICTION
The mechanical friction of the vehicle.
- 

5. ROLLING RESISTANCE
The rolling resistance of its tyres.



THE ROLE OF THE TYRE ROLLING RESISTANCE

A tyre slows down a vehicle as it rolls over a surface is called rolling resistance. This is key because it accounts for up to as much as one-third of the total force working against the truck's forward motion and therefore one-third of the fuel consumption required to travel.

DOES THE IMPACT OF ROLLING RESISTANCE ALWAYS MATTER?

The higher the rolling resistance is, the more energy, and fuel, is needed for the vehicle to advance. The full impact of rolling resistance can vary greatly depending on the use case and driving conditions.



HOW TO CHOOSE LOW ROLLING RESISTANCE TYRES?

- ↳ The tyre best suited to your usage and main expectations can have a higher or lower level of rolling resistance.
- ↳ The labeling system implemented by the trucking industry ranks tyres using crucial criteria, including rolling resistance.
- ↳ The rolling resistance is displayed on a scale from A to E.

ENERGY
MICHELIN 495444
315/70 R 22.5 154 / 150 L C3

Rolling resistance scale: A (green), B (light green), C (yellow), D (orange), E (red)

Noise level: 70 dB (A B C)

Winter performance symbol: Snowflake



DID YOU KNOW?

Choosing a **GRADE A TYRE** with the **lowest rolling resistance** CAN SAVE ROUGHLY **UP TO 2 LITERS OF FUEL FOR EVERY 100KM TRAVELLED** ⁽¹⁾

VS

GRADE B TYRE with **higher rolling resistance**

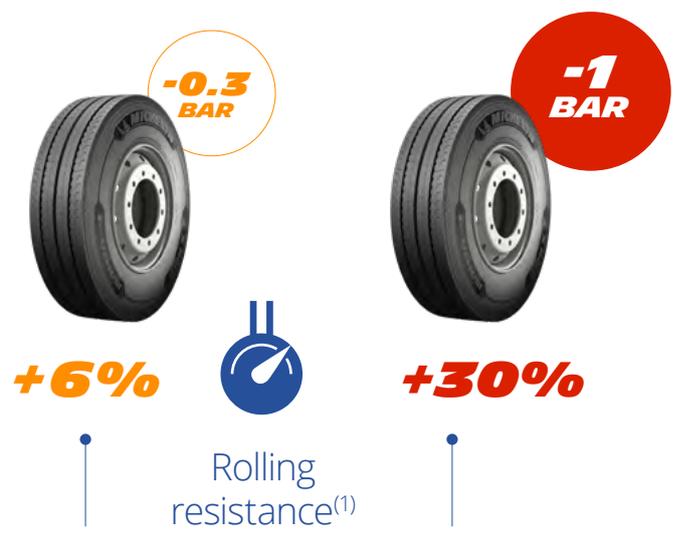
FOR A **50-TRUCK FLEET**, UPGRADING FROM **GRADE B TO GRADE A TYRES** CAN SAVE **AS MUCH AS 162 000 € A YEAR**. ⁽²⁾

⁽¹⁾ Internal calculation with TCO₂ tool, based on Vecto, shows a gain of 2.09 litres/100 km for a complete 40-ton convoys (tractor - semi-trailer) on long haul use, with all tires Label A (4.0 kg/t), compared to Label B tires (5.0 kg/t), on all axles Steer, Drive, Trailer.

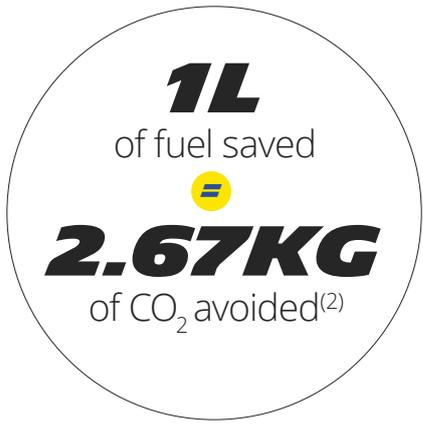
⁽²⁾ Simulation of an average saving of 2L/100km over the life of the tire between an A-labelled tire and a B-labelled tire, achieved by a vehicle travelling 150,000 km per year, on a total fleet of 50 vehicles, with an assumed price per liter of €1.45.

HOW TO TAKE FULL ADVANTAGE OF THE LOW ROLLING RESISTANCE OF YOUR TYRES?

Tyre maintenance is important to maximize your fuel savings. **To keep the lowest tyre rolling resistance, you need to maintain the right tyre pressure** because an underinflated tyre can considerably increase rolling resistance.



🔍 DID YOU KNOW?



Rolling resistance can reduce the fuel consumption and have a real impact on the environment

HEAR FROM YOUR PEERS!

“ In particular, we monitor the cost of diesel, which represents 25-30% of our cost price, which is a major expense.”

— **Operations manager, Refrigerated transport, 67 vehicles, FR**

“ When tyres are excellent, I think there is some savings, and you can also notice if the tyres are not so good, and you use more fuel.”

— **Fleet manager, General cargo, 460 vehicles, UK**



of the overall TCO, when Michelin compared the mileage performance of its tyres.

Our grade A rolling resistance tyres logged

11% higher mileage

&

20% lower RTT

versus grade B tyres.⁽³⁾

⁽¹⁾Data collected on French motorways in 2000, during MICHELIN «Fill up the air» operations.

⁽²⁾<https://www.futura-sciences.com/planete/questions-reponses/automobile-carburant-emet-plus-co2-essence-gasoil-947/>

⁽³⁾Internal Calculation done using VECTO for fuel, cost and CO2 emissions, Comparing MICHELIN 315/70 R 22.5 XLINÉ ENERGYTM Z2 and D2 versus MICHELIN 315/80 R 22.5 XLINÉ ENERGYTM F and D.



Why is TCO **IMPORTANT TO TRACK?**

Understanding the concept of TCO is one thing, but once you're able to accurately quantify it, **the benefits really hit home.**

FUEL PRICES ROSE BY 24%
between December 2020 and January 2022
in European Union⁽¹⁾

FUEL CONSUMPTION is a **BIG FACTOR**
that contributes to your total TCO

**ANALYZING YOUR FUEL
CONSUMPTION IS KEY**



WHAT FACTORS IMPACT YOUR FUEL CONSUMPTION?

1.



TOTAL VEHICLE WEIGHT

A full truck consumes more than an empty truck.

2.



ROAD CONDITIONS

Regional routes consume more than highway routes.

3.



VEHICLE AERODYNAMICS

An aerodynamic design can reduce consumption.

4.



DRIVER BEHAVIOR

Eco-driving consumes less than dynamic driving.

5.



TYRE ROLLING RESISTANCE

A grade A tyre consumes less than a grade B tyre.⁽²⁾

6.



WEATHER CONDITIONS

A truck consumes more fuel when temperature is low.

⁽¹⁾ https://energy.ec.europa.eu/data-and-analysis/weekly-oil-bulletin_en#maps-with-the-E2%82%AC-prices-in-eu-countries

⁽²⁾ Internal calculation with TCO₂ tool, based on Vecto, shows a gain of 2.09 litres/100 km for a complete 40-ton convoys (tractor - semi-trailer) on long haul use, with all tires Label A (4.0 kg/t), compared to Label B tires (5.0 kg/t), on all axles Steer, Drive, Trailer.



TCO HELPS FLEET OWNERS TO:

- ↳ Choose the most overall **cost-effective offers**
- ↳ Define the most pertinent **strategy and transport offers**
- ↳ Improve their **business profitability**

WHY SHOULD YOU MONITOR TCO AND NOT ONLY TYRE COST?

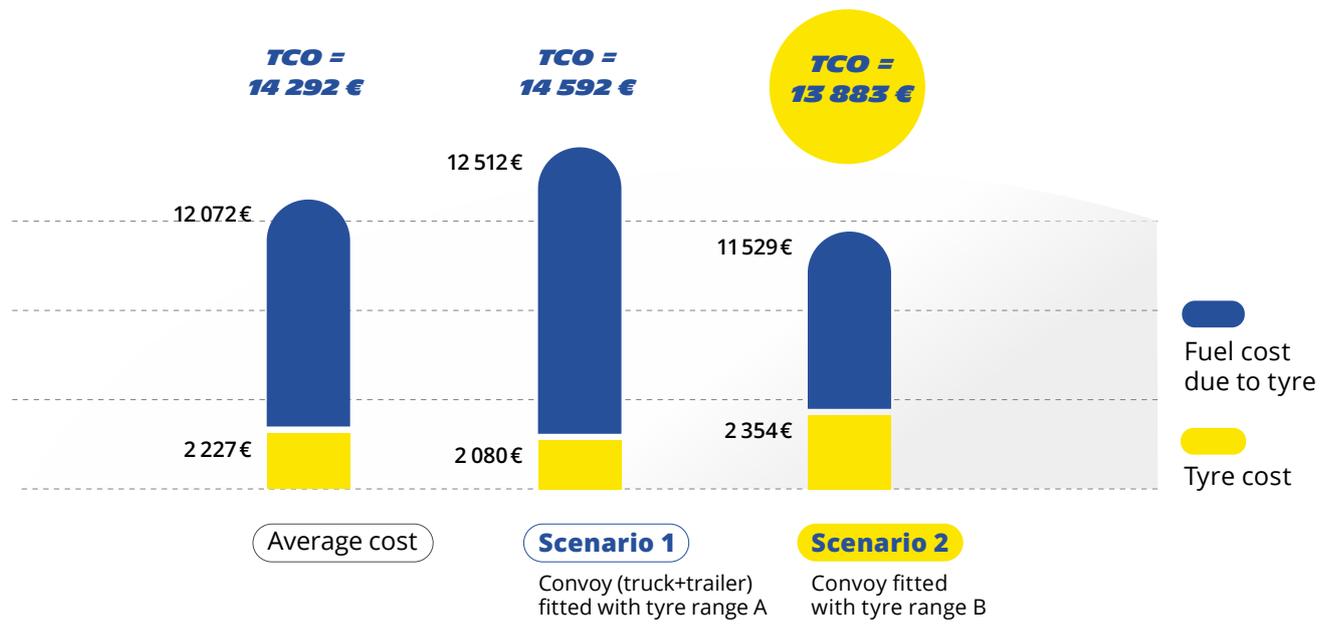
Let's take 2 scenarios and see what's happening:

Scenario 1

> tyre **range A** has a better CPM than tyre range B

Scenario 2

> tyre **range B** has a better TCO



You can save 700 € by convoy (truck+trailer) with tyre range B

after 100 000 km. Tyre range B is more expensive for purchase but it has a better TCO.⁽¹⁾

💡 **TCO (€ / 100 000 km) = Tyre cost + Fuel cost due to tyre**

**CONCLUSION:
LOW ROLLING RESISTANCE TYRES
WILL REDUCE
YOUR TCO.**

⁽¹⁾Study calculated with TCO₂ tool (calculation based on Vecto), for complete 40-ton convoys (tractor - semi-trailer), equipped for 100% long haul use, diesel liter price: 1.65€.

How to optimize **YOUR TCO?**

1. **REDUCE YOUR FUEL CONSUMPTION**



HOW?

- ↳ Choose **tyres with low rolling resistance** using rolling resistance labelling and fuel calculators⁽¹⁾
- ↳ Do **regular monitoring** of tyre pressure
- ↳ Select the **right tyres** depending your fleet usage
- ↳ Promote **technologies that help reduce fuel consumption:** lightened and optimized vehicle
- ↳ Do **regular inspections and maintenance** of the trucks
- ↳ Promote **good driving practices**



HEAR FROM YOUR PEERS!



We only use high-quality tyres (Michelin) because we are convinced that the investment in a good tyre pays off in the end. And that includes longer life and fuel savings."

● **General manager** of a German urban passenger transportation company, 6 vehicles

⁽¹⁾Ducker worldwide report_ VEHICLE MAINTENANCE COSTS & PAINS_ Michelin Community – December 2017, study available upon request.

⁽²⁾Certified value using VECTO calculation tool comparing CO₂ emissions of standard 445kW/12.7t tractor-trailer ensemble equipped with MICHELIN XLINE ENERGY™ Z2/D2/T with grade A labeling for rolling resistance and the same vehicle equipped with MICHELIN XLINE ENERGY™ Z/D/T with grade B labeling in rolling resistance, in long haul usage and average cargo load of 17t.



2. EXTEND THE LIFE OF YOUR TYRES



HOW?

- ↳ Choose tyres with **good rolling resistance / mileage balance**
- ↳ **Optimize tyre maintenance** in order to avoid removing tyres prematurely
- ↳ **Correct tyre alignment and balancing**, tyre rotation and reversal on rim and right tyre pressure can maximise tyre mileage
- ↳ Adopt a **smooth driving style**: avoid harsh acceleration or sudden braking, anticipate gear shifting and plan the most effective itineraries
- ↳ Use tyres **until the last legal limit**⁽¹⁾
- ↳ **Regrooving increases tyre life by 25%**⁽²⁾ and allows fleets to reap the benefits of lower rolling resistance compared to first life tyres



DID YOU KNOW?

Our study shows that

A tyre removed at **2mm versus 5mm can save as much as 8,507€ each year.**⁽³⁾

HEAR FROM YOUR PEERS!



We buy exclusively Michelin tyres because we know that this tyre has four lives with regrooving. We can retread it twice, which is not the case with all brands."

French fleet manager, General cargo, 1,250 vehicles

⁽¹⁾ 1,6mm in the UK.

⁽²⁾ True or false? Putting an end to misconceptions about regrooving and retreading - MICHELIN - 05/2015.

⁽³⁾ Internal VECTO calculation, for a fleet with 10 vehicles, driving 120.000km/year in Long Haul use with indicative price of gasoil at 1,65€/l based on CNR's professional price index in March 2022 in France without TVA.

3. LOWER BREAKDOWN AND REPAIR COSTS



HOW?

- ↳ Choose **robust** and **reliable equipment**
- ↳ Adopt a **good maintenance routine** including tyre inspection

Q DID YOU KNOW?

85%
of problems could be caught during a **walkaround check**

but less than half of heavy goods vehicle drivers routinely check their vehicles prior to leaving the garage.⁽¹⁾

⁽¹⁾ 2020 survey by CameraMatics, on 250 HGV fleet managers about vehicle checking systems.



In summary, **TO OPTIMIZE YOUR TCO,** you need:



Opt for **EFFICIENT TRUCKS AND TYRES** in terms of fuel consumption, longevity and reliability.



Ensure proper **TRUCK AND TYRE MAINTENANCE**



ADOPT A SMOOTH DRIVING STYLE.



MAXIMIZE TYRE LIFE
Use tyres until the last legal limit⁽²⁾

⁽²⁾ 1,6mm in the UK. True or false? Putting an end to misconceptions about regrooving and retreading - MICHELIN - 05/2015

Why TCO and sustainable mobility are **A GOOD MATCH?**

By understanding the total cost of ownership, the impact of fuel consumption, tyres and your environmental footprint - **you will make your fleet more sustainable.**

SUSTAINABILITY ON THE RISE

World's expectations for transport services:

- ↳ Adopt more sustainable practices.
- ↳ Make a revolution in the transport industry towards sustainable mobility.



Clients' objectives:

- ↳ Carbon neutrality and integrating renewable and recycled materials.
- ↳ Manufacture trucks powered by alternative energy sources.

78% of fleets today have set sustainability goals⁽¹⁾

YOUR CO₂ EMISSIONS, YOUR RESPONSIBILITY



- ↳ Every liter of fuel your fleet consumes releases 2.67⁽²⁾ kilograms of CO₂ into the atmosphere.
- ↳ **After analyzing your TCO, you can reliably track and control fuel consumption, in order to shrink your carbon footprint.**

Upgrading from a grade B rolling resistance tyre to a grade A tyre saves roughly **up to 2L of fuel for every 100 km**⁽³⁾



2,263 km of train travel⁽⁴⁾ in term of carbon emissions!

Electric vehicle equipped with **low rolling resistance tyres**



longer range and **less energy consumed**

Advancements in tyre technology



similar longevity to energy efficient tyres, no compromises!

⁽¹⁾ Ducker study - Michelin Fleet Community - June 2021.

⁽²⁾ <https://www.futura-sciences.com/planete/questions-reponses/automobile-carburant-emet-plus-co2-essence-gasoil-947/>

⁽³⁾ Internal calculation with TCO2 tool, based on Vecto, shows a gain of 2.09 litres/100 km for a complete 40-ton convoys (tractor - semi-trailer) on long haul use, with all tires Label A (4.0 kg/t), compared to Label B tires (5.0 kg/t), on all axles Steer, Drive, Trailer.

⁽⁴⁾ Calcul impact CO₂e Ademe - <https://impactco2.fr/convertisseur> with 5.32 kg CO₂e (2.67 kilograms of CO₂*2L).

EXTENDING TYRE LIFE & MAXIMIZING MILEAGE

To limit environmental impacts

OPTION 1

Choose lower rolling resistance tyre



OPTION 2

Extend the life of your tyres



How do you **extend the life** of your tyres?

Premium tyres can offer higher longevity, be used until the last legal mile, have multiple lives and so more mileage for your business!



1.

REGROOVING

- ↳ Everytime you regroove, you **extend tyre life by 25%**.
- ↳ Regrooving **4 tyres saves you one new tyre** and all the resulting environmental impacts (raw materials, carbon emissions).⁽¹⁾
- ↳ Thanks to regrooving, you can save up to 2L/100km.⁽²⁾



2.

RETREADING

- ↳ You eliminate 70% of the raw materials needed for a new tyre.
- ↳ You **reduce your carbon footprint** due to manufacturing.

HEAR FROM YOUR PEERS!



At first glance, the most convincing elements are of an economic nature: fuel consumption, budget, total cost of ownership, because this is what allows us to reduce operating costs and make our business profitable. Elements such as CO₂ and particulate emissions are interesting to communicate towards our partners to say that our company is concerned about a sustainable economy and limiting its impact on the environment."

— • **French fleet manager, Moving & storage, 31 vehicles**

⁽¹⁾True or false? Putting an end to misconceptions about regrooving and retreading - MICHELIN - 05/2015.

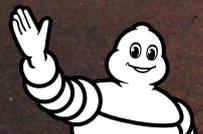
⁽²⁾1,94 LITRE/100KM Legally witnessed and certified in a june 2007 test comparing two combination trucks, one with new tyres, the other with regrooved tyres.



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