



EBIKEOS

**UNLOCK EFFICIENCY,
EXTEND RANGE,
OPTIMIZE YOUR FLEET.**

Differentiating efficiency gains and customized assistance for fleets and bike makers through data-driven motor control



EXECUTIVE SUMMARY

Battery performance is the single most important factor shaping the economics and reliability of e-bike fleets. Operators face high replacement costs, downtime, and user dissatisfaction when batteries fail to deliver. At the same time, manufacturers are challenged to balance performance with longevity and efficiency.

eBikeOS addresses this challenge by turning data into savings. Through advanced control algorithms, the eBikeOS-powered controller integrates multiple inputs to deliver an optimized motor command.

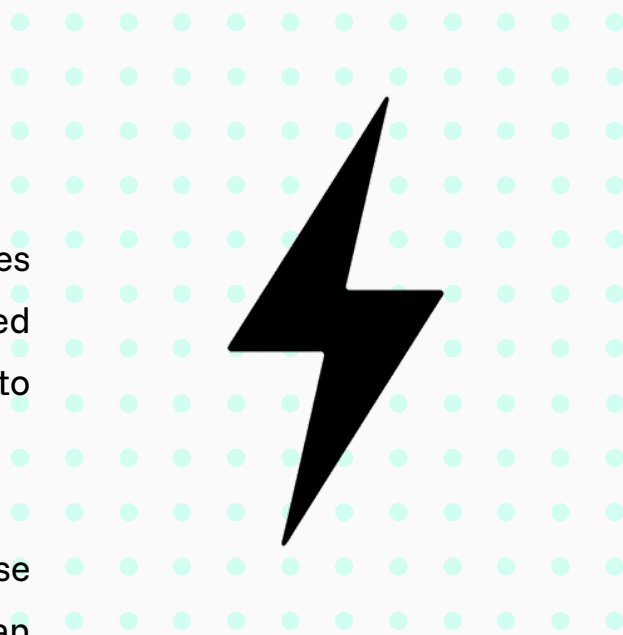
“Battery efficiency is no longer a 'nice-to-have'; It is a decisive factor in fleet profitability, customer satisfaction, and product competitiveness. With eBikeOS, fleets and manufacturers can achieve up to 45% battery savings, translating into longer range, lower operating costs, and extended system lifetime.”

— Maël Bosson, Founder, eBikeLabs

The result: up to 45% battery consumption savings without compromising slope performance*.

For fleet operators, this means longer ride times per charge, fewer charging cycles, and reduced battery wear. For manufacturers, it translates into higher product value and differentiation.

This paper explains how eBikeOS achieves these results, how we validated them, and how you can benefit from integrating the technology.



* Gains achieved on flat terrain with a market-representative shared fleet reference case.



Measurable battery savings with eBikeOS consumption optimization

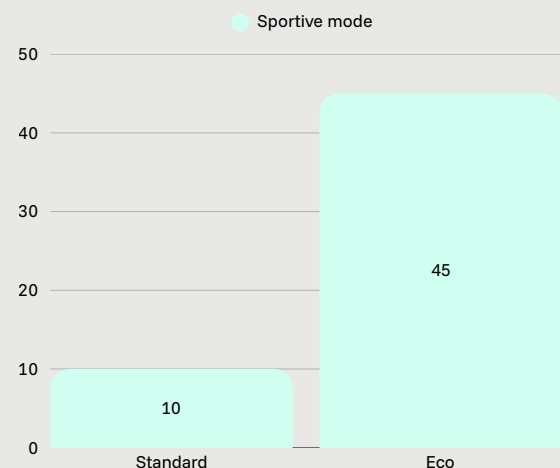
Battery savings

Up to
45%

Why it matters

- Longer range
- Lower cost
- Better reliability

Battery savings (%) by rider type & mode





TCO gains with battery savings

Battery costs drive TCO

For e-bike fleet operators and manufacturers, the battery is both the most expensive and the most sensitive component in the system. It drives total cost of ownership (TCO), determines range, and directly impacts rider satisfaction.

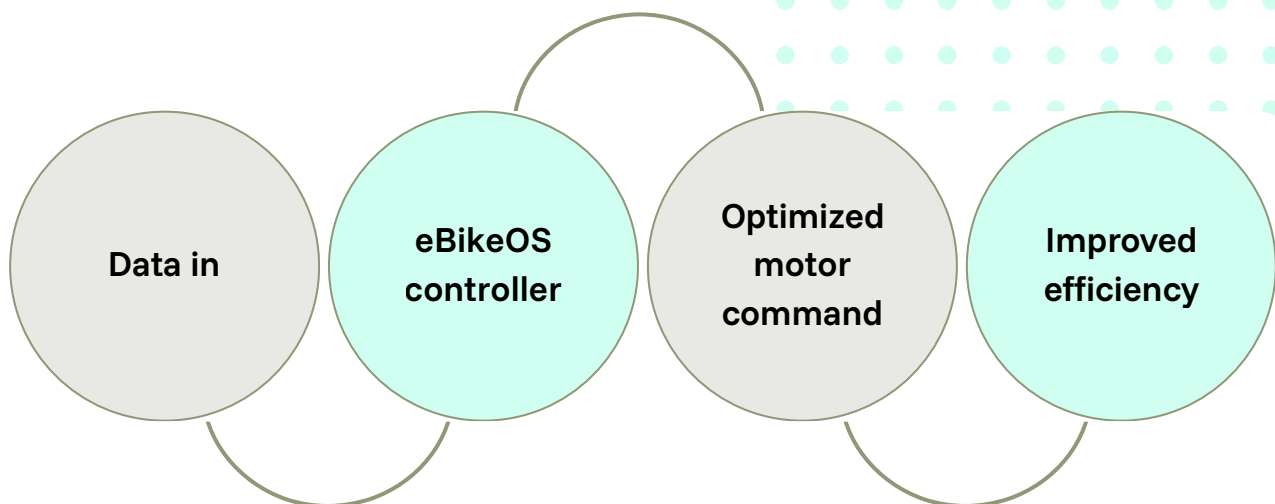
Yet, optimizing battery usage is notoriously complex. Consumption depends on multiple variables: rider profile, terrain, motor design, control algorithms, and traffic conditions. Traditional motor control strategies leave efficiency gains untapped. Gains that, when unlocked, can drastically reduce costs and extend the lifespan of the fleet.

eBikeLabs developed eBikeOS precisely to address this gap. By leveraging extensive ride data and a deep understanding of motor behavior, eBikeOS turns standard motor controllers into intelligent systems capable of learning, adapting, and saving.

Data-driven motor control that delivers real savings

At the heart of eBikeOS lies its ability to transform raw data into intelligent action. Not only does our electric bike assistance software enable optimized motor control, it also enables an assistance customized to your specific needs, allowing fleets and bike brands to both reduce costs and stand out in the market.

This adaptive strategy ensures that the motor delivers only the power needed, when it is needed, without waste. The outcome is substantial battery savings, achieved without compromising rider comfort or hill-climbing ability, and a signature assistance, customized to your unique wants and needs.



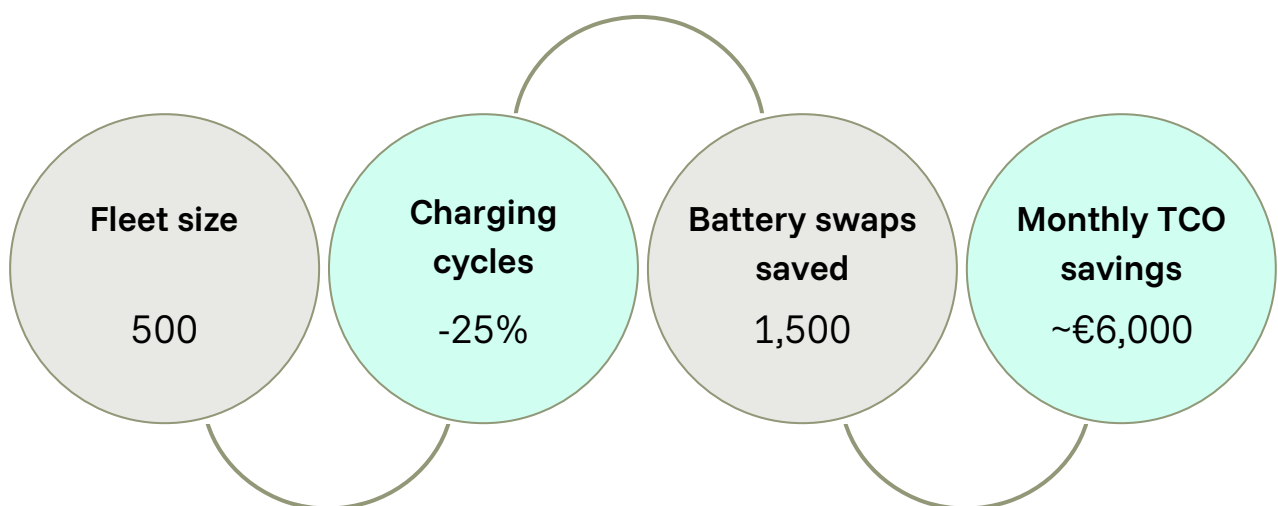
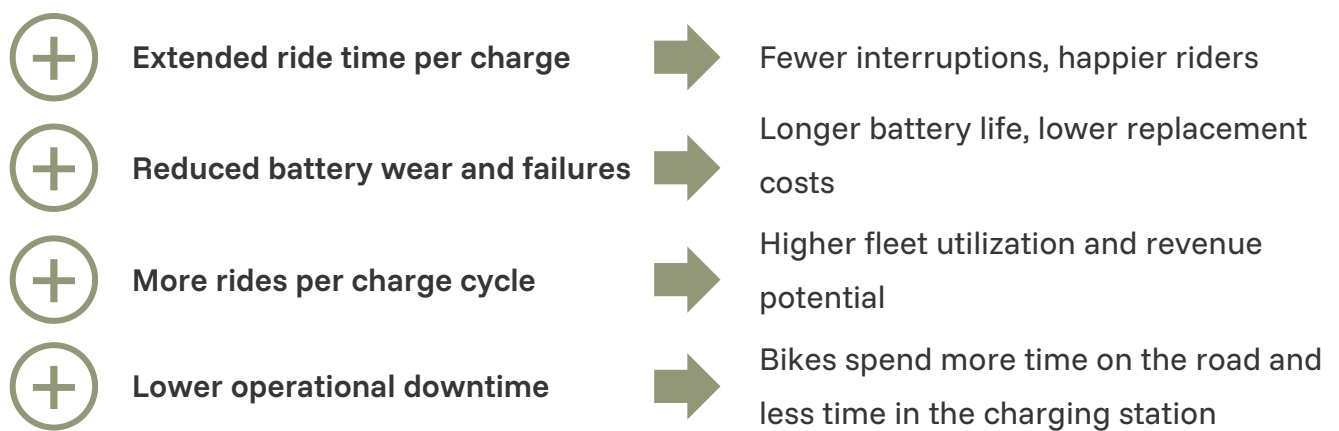
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More efficient operations & better customer experience

What battery savings really mean: translating efficiency into fleet benefits

Battery savings are not just numbers on a chart; they directly impact operating costs and customer experience. For fleets and bike makers, up to 45% less consumption translates into:

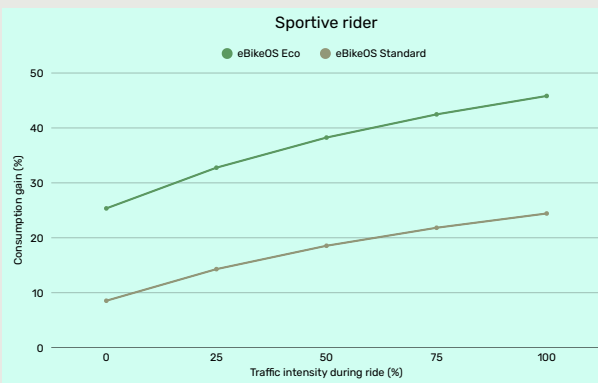
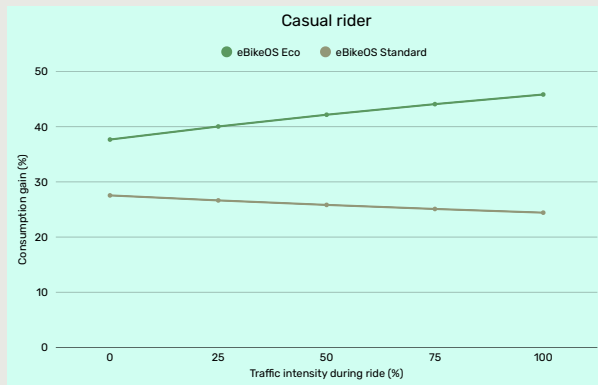


Indicative model based on: Fleet type: free floating II Rider type, casual II Average number of swaps per month: 12 II Price per swap: 4€ per swap



Up to 45% battery savings without slope compromise

Battery efficiency savings by rider type and mode



Battery savings*

Casual rider

25% up to 45%

Sportive rider

10% up to 45%

How we measured the results

We established a rigorous, repeatable test protocol that combined theoretical modelling with real-world measurements to verify energy savings. Using an apples-to-apples approach, we confirmed that eBikeOS consistently reduced consumption across rider profiles and use cases.

Validation was carried out through energy balance assessments and controlled instrumentation.

Study parameters:

- Variation in terrain
- Rider profiles: Casual rider vs. Sportive rider
- Bike configurations: Low-traffic, peri-urban areas vs. high-traffic, urban areas
- Rider modes: Reference assistance vs. eBikeOS standard profile/ eBikeOS eco profile

Technical foundations of eBikeOS

eBikeOS is designed to adapt to the diversity of hardware architectures found in today's e-bikes. To deliver its data-driven optimization, the system builds on a range of hardware elements that, together, form the input landscape that eBikeOS continuously analyzes to generate the necessary inputs for precise and optimized motor control, which balances efficiency, performance, and user experience.

These are: motor types (direct drive motors or geared hub motor), mechanical systems (clutchless motors or clutch motors), battery, sensors (cadence, torque, brake), and HMI & throttle integration

* Gains achieved on flat terrain with a market-representative shared fleet reference case.

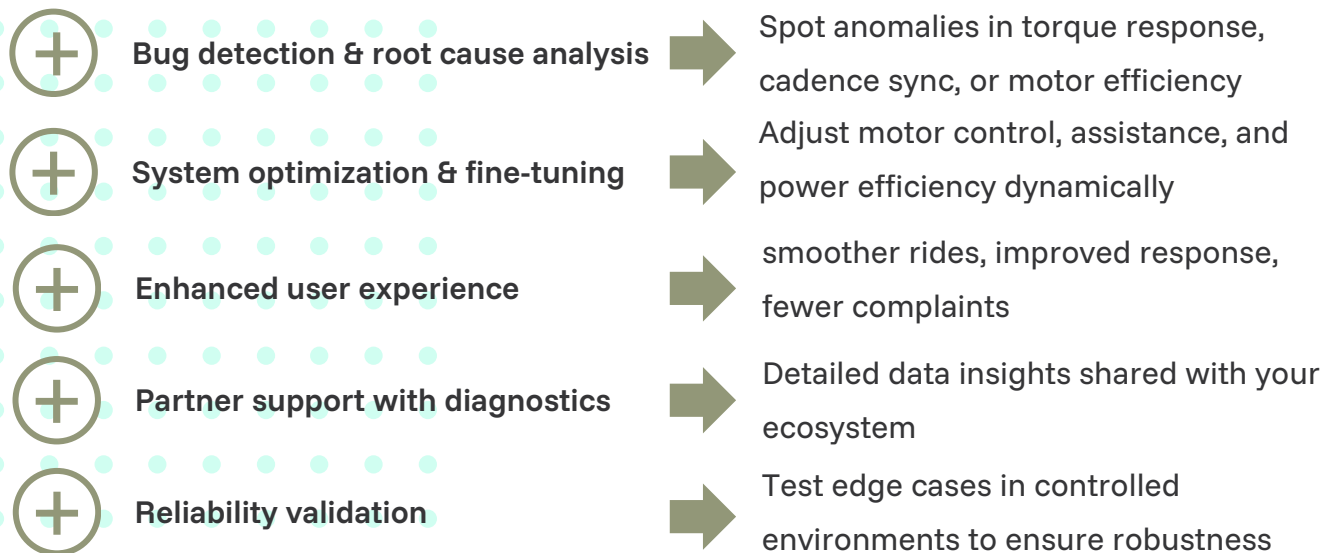


How fleet operators & bike brands can benefit

Battery efficiency is no longer a “nice-to-have”; It is a decisive factor in fleet profitability, customer satisfaction, and product competitiveness. With **eBikeOS**, fleets and manufacturers can achieve **up to 45% battery savings**. This means longer range, lower operating costs, and extended system lifetime. By combining data-driven intelligence with proven testing, eBikeOS enables both immediate efficiency gains and long-term strategic advantage.

Beyond battery savings: system-wide optimization

Battery efficiency is just one advantage. eBikeOS delivers value across the entire system:



The question is no longer whether battery optimization is possible, it is how soon you will capture the benefits.

Engage with eBikeLabs to evaluate your system today, and start unlocking the full potential of your fleet.



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