From Range Anxiety to Range Confidence

Winning with Intelligent EV Fleets

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From Range Anxiety to Range Confidence: Winning with Intelligent EV Fleets

Managing an EV fleet today means navigating battery degradation, unpredictable maintenance, and fragmented data systems. While the shift to electric vehicles is essential, it must be profitable.

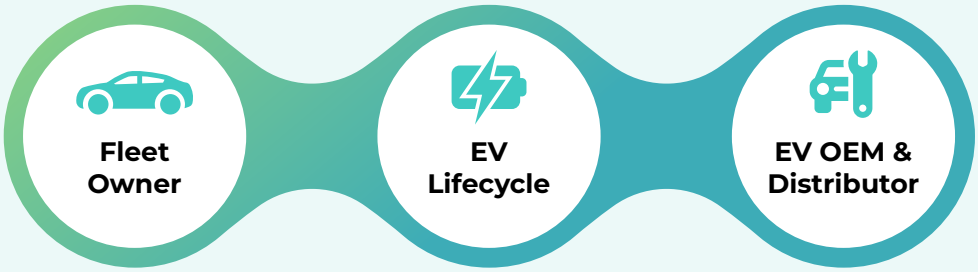
This whitepaper from Datakrew shows how leading fleet operators use AI-powered battery intelligence and real-time analytics to solve these challenges, delivering measurable impact across their operations.

| Battery = **Core** of EV | Battery cost **> 50%** of EV cost

| Battery data = **Key** of EV performance, maintenance and resale

But battery data is NOT used effectively today

Industry stakeholders face critical challenges without EV battery intelligence.



Reactive maintenance after failures + downtime

Risk of false warranty claims

Unpredictable after-sales schedules & costs

Datakrew's OEM-agnostic platform empowers fleets to:

Increase **safety by** **50%**

Improve **uptime by** **25%**

Extend **battery life by** **20%**

Boost **resale value by** **10%**

Achieve up to 20x more return on investment

Executive Summary

Built on a robust data layer through ITUS and OXRED, Datakrew offers complete visibility into battery health, warranty compliance, charging patterns, and fleet performance, enabling faster and smarter decisions at scale.

This is worth your time if you're serious about unlocking real ROI from your EV transition.

> An EV financing solutions provider approached us for a state-of-the-art system that could analyse ride efficiency, provide charging and usage data insights, and safety drop detection. Datakrew's EV Agnostic Analytic solution provided a comprehensive ride efficiency comparison and monitored the vehicle's safety parameters during charging and discharging.
>
> – **Datakrew**

The Benefit

- **Operational efficiency improved by up to 20%**
- **Significant reduction in vehicle malfunction and downtime**
- **Substantial cost-cutting**
- **Improved safety score**

The Sustainable Mobility Industry

Growth and Importance

The global shift toward sustainable mobility is accelerating rapidly, driven by increasing environmental concerns, stringent regulations, and technological advancements. Electric vehicles (EVs) have become central to this transformation, particularly in Europe and Asia, where governments are aggressively promoting the electrification of transport fleets to reduce carbon emissions and combat climate change.

Electric car sales exceeded

17 million

globally in **2024,** reaching a sales share of more than 20%.

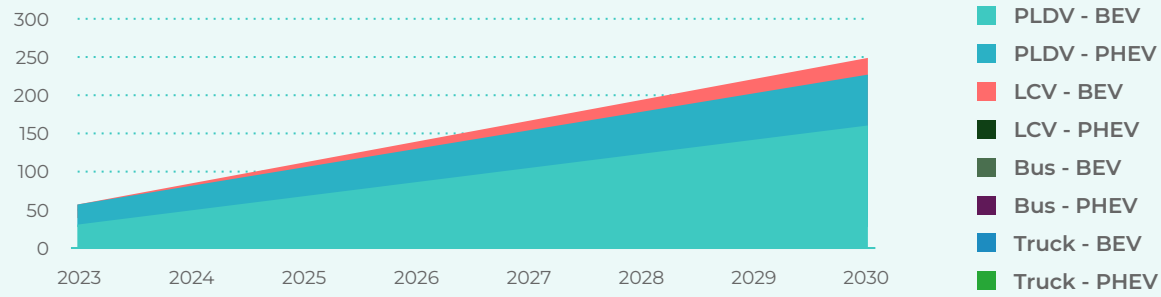
Electric car sales in **2025** are expected to exceed

20 million

worldwide, representing more than one-quarter of cars sold worldwide.

Sustainable mobility is not only about reducing greenhouse gas emissions but also about creating resilient, efficient, and cost-effective transportation systems. Fleet operators adopting EVs contribute significantly to lowering urban air pollution and achieving corporate sustainability goals. However, this transition comes with operational and technical challenges that need innovative solutions to unlock the full potential of EV fleets.

By 2030, the fleet of EVs across all modes reaches 250 million in the STEPS - four times as many EVs as there at the end of 2024



Stated Policies Scenario (STEPS)

Notes

PLDV = passenger light-duty vehicle; LCV = light commercial vehicle; BEV = battery electric vehicle; PHEV = plug-in hybrid electric vehicle.

Source: IEA Global EV Outlook 2025 (link)

Total Cost of Ownership (TCO)

ICE vs EV Mobility

While internal combustion engine (ICE) vehicles have long dominated the transport landscape, EVs are increasingly competitive when evaluating the total cost of ownership (TCO). Studies indicate that despite higher upfront purchase prices, EVs offer substantially lower running costs due to reduced fuel expenses, lower maintenance requirements, and longer vehicle lifespans.

Government policies play a huge role in managing the overall TCO of EVs. Countries that have seen a roll-back on EV acquisition subsidies have seen the TCO for BEV become higher than that of ICE vehicles. (Source)

The Global EV Outlook 2025 by the IEA uses the Stated Policies Scenario (STEPS) to outline a plausible path for EV adoption through 2030 based on current policies, market trends, and economic indicators. Rather than predicting outcomes, it provides actionable insights to help stakeholders navigate the evolving energy, trade, and industrial landscapes shaping electric mobility's future.

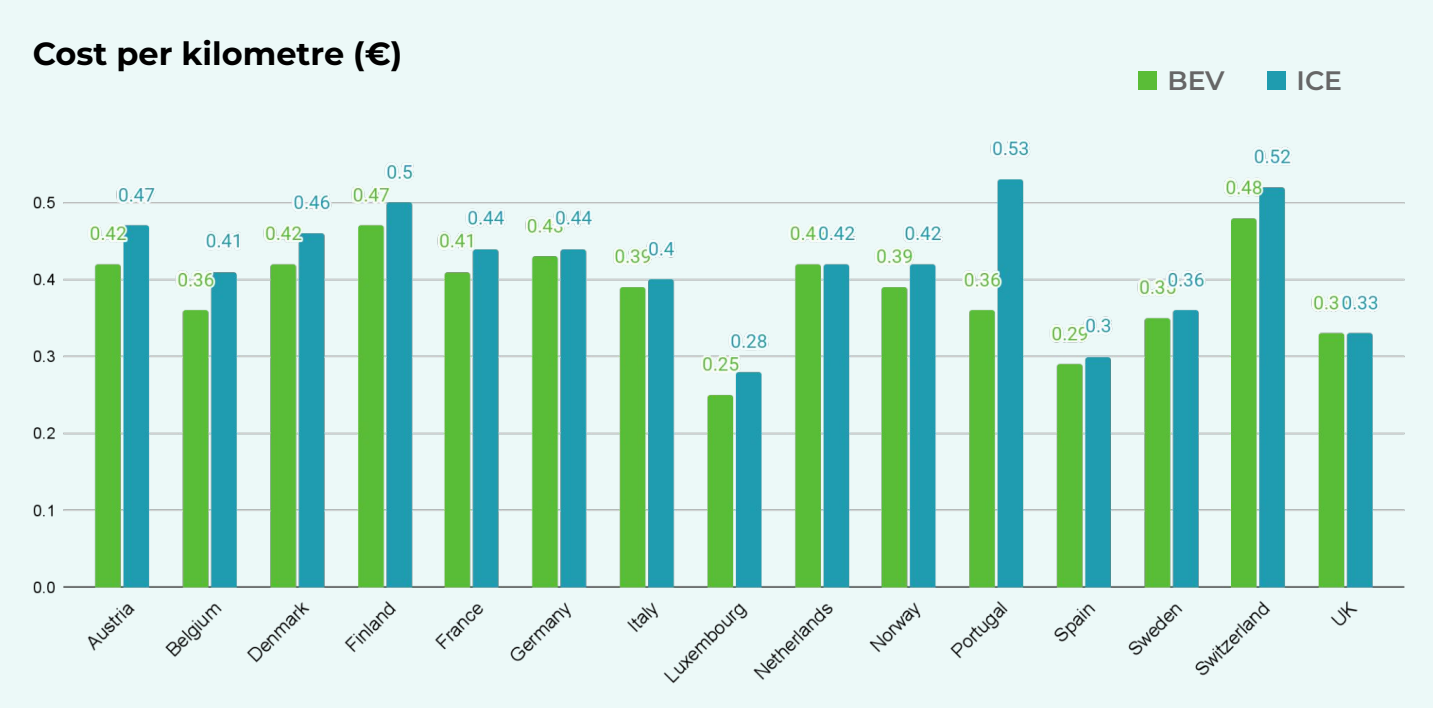
This cost dynamic is especially relevant for fleet operators who manage large vehicle groups and are highly sensitive to operational costs and vehicle uptime. The reduced maintenance and energy costs of EVs translate into significant savings over the vehicle lifecycle for these operators, improving fleet profitability and sustainability.

Total Cost of Ownership (TCO)

ICE vs EV Mobility

Key TCO components include acquisition cost, energy/fuel consumption, maintenance costs, and residual value. EVs benefit from fewer moving parts and regenerative braking, which reduces wear and tear. Moreover, government incentives in Europe and Asia further improve the financial attractiveness of EV fleets. The operational costs for EVs also consistently outperform ICEs.

Regional nuances influence TCO dynamics: Europe's higher electricity prices and robust subsidies contrast with Asia's rapidly expanding charging infrastructure and variable energy costs. Fleet operators must consider these factors when planning EV adoption.



Source: Ayvens - Examining total cost of ownership: battery electric vs internal combustion engine vehicles, May 2024
McKinsey "Fleet Electrification Europe" (2024)

ICE vs EV Mobility TCO

Managing EV Depreciation

The two biggest deterrents for EV adoption are higher upfront vehicle costs and larger depreciation costs. With government policies favouring EV adoption through rebates and tax benefits, the only real roadblock is the higher depreciation cost. But this is not a challenge. There are datapoints that prove EVs management can decrease depreciation-associated costs and increase the second-life usage of these vehicles.

“10% increase in resale value via Datakrew AI Powered EV battery analytics.”

ICE vs EV Mobility TCO

Managing EV Depreciation

Action to Control Depreciation	How it Helps	Benefits to EV Fleet Operators
Monitor Battery Health in Real-Time	Detects early signs of degradation and takes corrective actions	Extends battery life, retains higher resale value
Optimise Charging Cycles (Avoid Fast Charging Daily)	Reduces thermal stress and cycle fatigue	Lowers battery wear, maintains performance over time
Schedule Preventive Maintenance	Keeps components in peak condition, avoiding long-term wear	Reduces unplanned downtime and repair costs
Use Predictive Analytics to Flag Issues Early	Prevents major failures by addressing anomalies before they escalate	Increases vehicle uptime and value at resale
Avoid Deep Discharges (<20% SoC) and Overcharging (>90%)	Maintains battery within ideal operating ranges	Protects long-term battery efficiency
Rotate Vehicles Based on Usage Load	Distributes wear evenly across the fleet	Slows the depreciation of high-use vehicles
Track Driving Behaviour (Harsh Braking, Acceleration)	Discourages habits that accelerate component wear	Improves overall vehicle longevity
Keep Software and Firmware Updated	Enhances battery management and vehicle efficiency	Ensures optimal system performance over time
Document Service and Battery History	Builds trust and transparency for resale or leasing	Increases residual value and buyer confidence

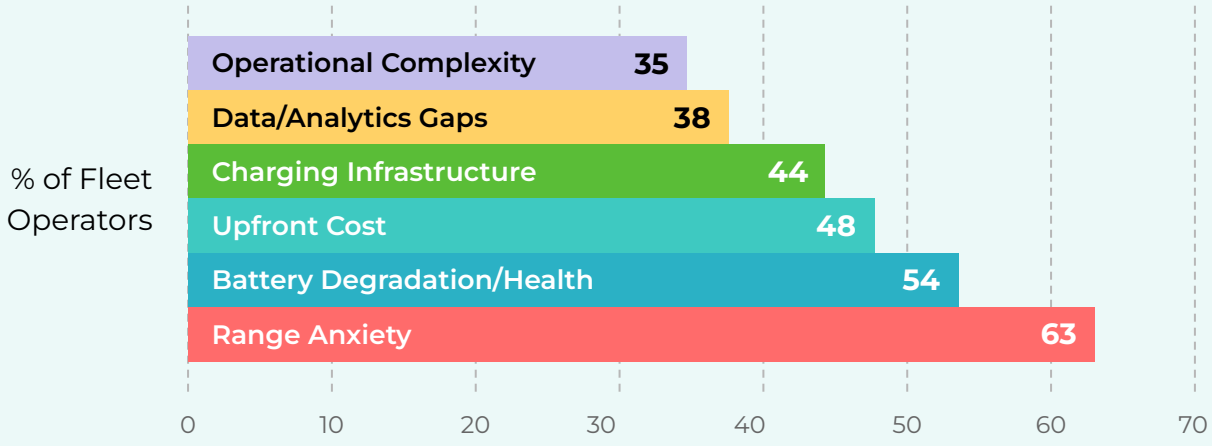
Top EV Adoption Inhibitors

Despite the clear benefits, several barriers inhibit wider EV adoption among fleet operators

- **Range Anxiety:** Concerns about battery range and availability of charging infrastructure.
- **Battery Degradation:** Battery health uncertainty (over time) affecting operational reliability.
- **Upfront Costs:** Higher initial investment compared to ICE vehicles.
- **Operational Complexity:** Managing charging schedules, vehicle downtime, and warranty compliance.
- **Data and Analytics Gaps:** Lack of real-time, actionable insights into battery and fleet performance

Regional differences compound these challenges. For instance, Asia faces infrastructure gaps in rural and suburban areas, while Europe grapples with regulatory compliance and integration complexities.

Top Inhibitors to EV Adoption



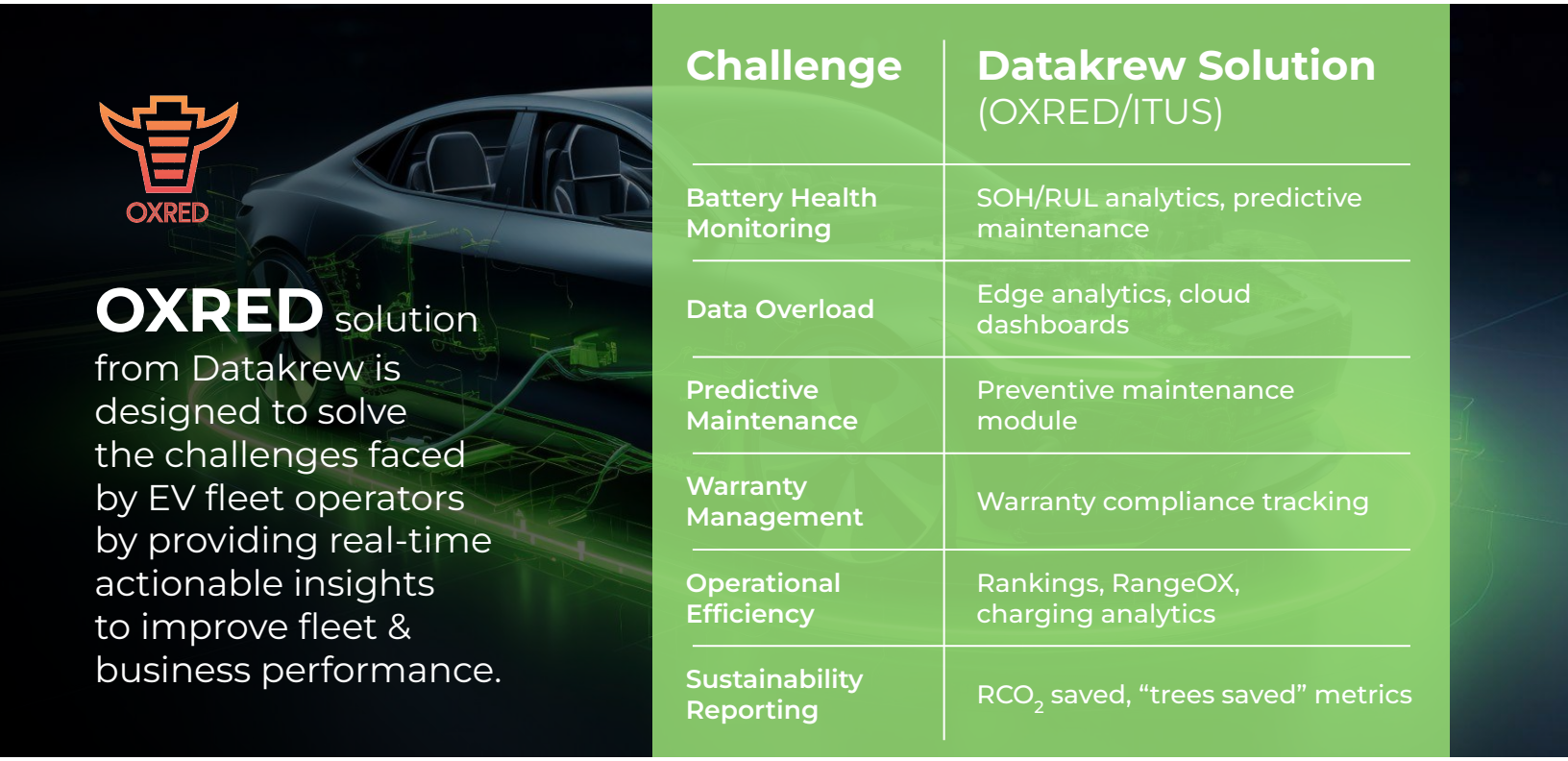
Sources:
EY Mobility Consumer Index 2024
Frost & Sullivan “EV Fleet Operator Survey” 2023

EV Fleet Operator Challenges

EV fleet operators face unique challenges that complicate efficient fleet management

- **Battery Health Monitoring:** Difficulty accurately assessing battery State of Health (SOH) and Remaining Useful Life (RUL).
- **Data Overload:** Managing vast amounts of high-frequency battery and vehicle data without adequate tools.
- **Predictive Maintenance:** Lack of precise tools to anticipate battery failures and schedule timely servicing.
- **Warranty Management:** Ensuring OEM warranty compliance to avoid costly liabilities.
- **Operational Efficiency:** Optimising charging, route planning, and driver behaviour to maximise fleet uptime and reduce costs.
- **Sustainability Reporting:** Credibly quantifying CO_2 savings and environmental impact for stakeholders.

These challenges demand sophisticated, data-driven solutions tailored to the operational realities of EV fleets.



OXRED

OXRED solution from Datakrew is designed to solve the challenges faced by EV fleet operators by providing real-time actionable insights to improve fleet & business performance.

Challenge	Datakrew Solution (OXRED/ITUS)
Battery Health Monitoring	SOH/RUL analytics, predictive maintenance
Data Overload	Edge analytics, cloud dashboards
Predictive Maintenance	Preventive maintenance module
Warranty Management	Warranty compliance tracking
Operational Efficiency	Rankings, RangeOX, charging analytics
Sustainability Reporting	RCO_2 saved, “trees saved” metrics

Datakrew's Solution

AI-powered EV battery intelligence that extends life, raises resale, and enhances safety

Datakrew addresses these challenges through its **cutting-edge ITUS IoT device and OXRED solution,** delivering comprehensive battery analytics and fleet management capabilities designed specifically for EV fleet operators.

ITUS EV Gateway

An IoT device connecting to each EV's Battery Management System (BMS) via CANbus, capturing operational data and GPS locations every 2 to 5 seconds . **It performs edge analytics for initial data sanitisation and securely transmits data** through post-quantum encrypted channels. **What does this mean for you? Your EV data is transmitted securely at all given points and cannot be misused by any external entity.**

OXRED Cloud Platform

A Virtual Digital EV Twin hosted for each vehicle, using Multiphysics simulations and advanced machine learning models to analyse battery SOH, RUL, risk profiles, and warranty compliance.

12 Modules of OXRED 2.0

Overview
Provides a high-level, user-friendly snapshot of fleet health, State of Charge (SOC), and environmental impact metrics like CO_2 saved and equivalent trees planted.

Rides
Catalogues past trips (or "rides") for each vehicle so managers can see exactly how their EV fleet was used on a daily/weekly/monthly basis.

Rankings
Enables comparative analysis of vehicles and drivers by SOC, SOH, energy efficiency, and more, highlighting top and bottom performers.

Servicing
Plan and track maintenance tasks. Keep a calendar of upcoming service needs, check-ups, and follow-ups triggered by usage patterns or alerts.

My Finances
Offers financial insights into battery depreciation, residual values, and usage impact, with simulations to optimise fleet utilisation.

Charging
Analyzes charging patterns to minimise battery degradation and costs.

Warranty
Tracks compliance with OEM specifications, flags warranty risks, and supports audit documentation.

Alerts
Consolidates all warnings, faults, and threats into one module. Operators can quickly see the most urgent issues and drill down into event details if needed.

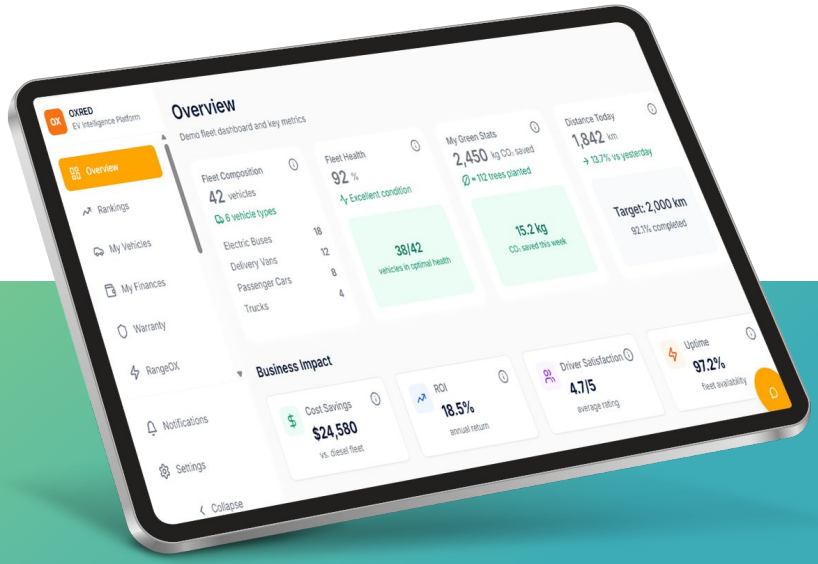
Range OX
Mitigates "range anxiety" by forecasting if a vehicle can reach a chosen location or charging station with sufficient SOC.

Reports
Generates summarised outputs from one or more modules, allowing users to quickly get "takeaway" documents or on-screen summaries covering various timeframes or business goals.

My Vehicles
Provides a vehicle-by-vehicle deep dive into the raw parameters and time-series data captured by our device (ITUS EV).

Map
Shows real-time locations of all vehicles on a map, providing quick spatial awareness for fleet dispatchers or managers.

Datakrew's solutions transform raw battery data into actionable insights, empowering fleet operators to make informed decisions that enhance operational efficiency, reduce costs, and extend battery life.



50%
Improved Safety

25%
Increased Uptime

20%
Longer Lifespan

10%
Higher Resale Value

Datakrew Differentiators

01

OEM Agnostic Solution for easy scalability across EV fleets of all vehicle brands and types

02

Tangible business results for every deployment:

- **Improved Battery Lifecycle**
- **Increased Operational Efficiency**
- **Higher Fleet Uptime**
- **Lower TCO**
- **Enhanced Safety**

03

Global EV fleet data for comparative assessment and benchmarking

Customer Success with Datakrew

An EV leasing company approached us with the following challenges:

Issues

Range & Charge Anxiety

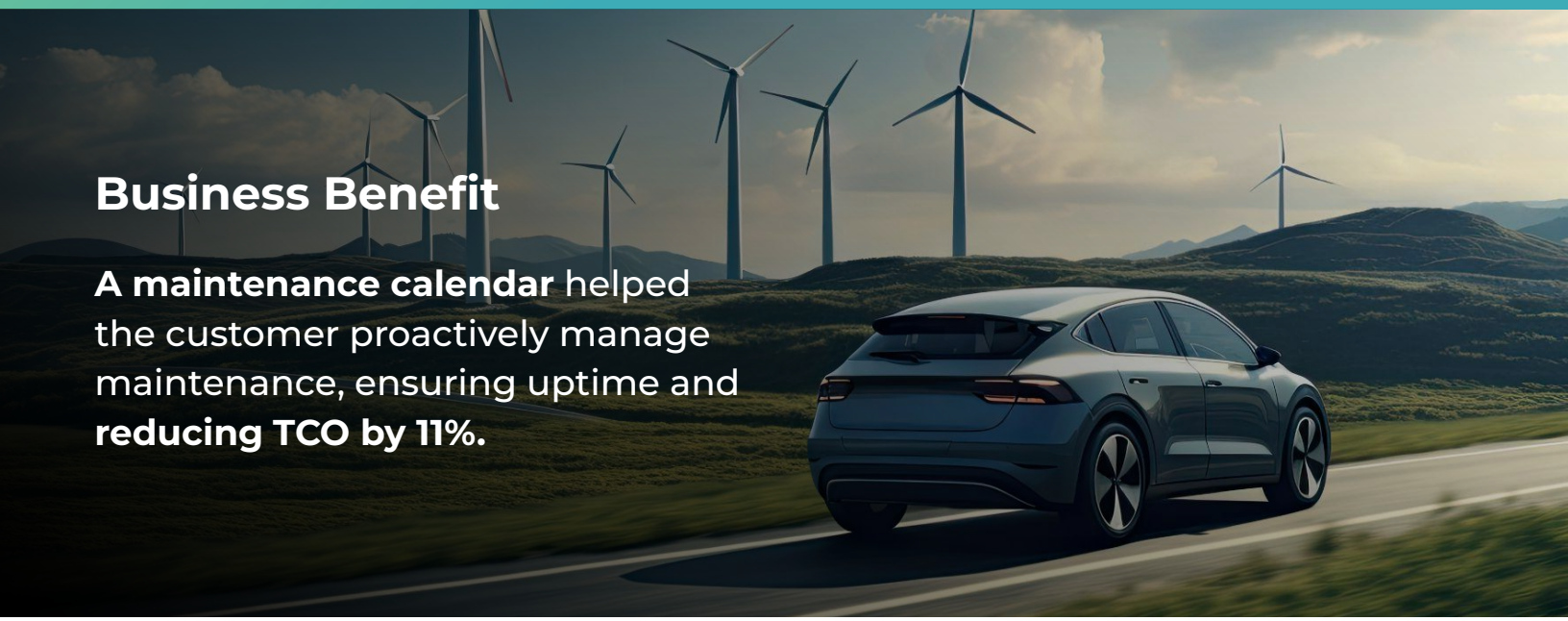
Abrupt breakdowns increasing the Total Cost of Ownership

Datakrew's Solution

EV Data Scanner + Software solution + APIs implemented across 250+ EV trucks & LCVs. Our innovative SOC prediction approach along the route provided the advantage of an optimised charging strategy.

Result

Trip-level SOC prediction with probable locations helped our customer maximise their EV's battery potential to the fullest & plan their charging sessions effectively.



Business Benefit

A maintenance calendar helped the customer proactively manage maintenance, ensuring uptime and **reducing TCO by 11%.**

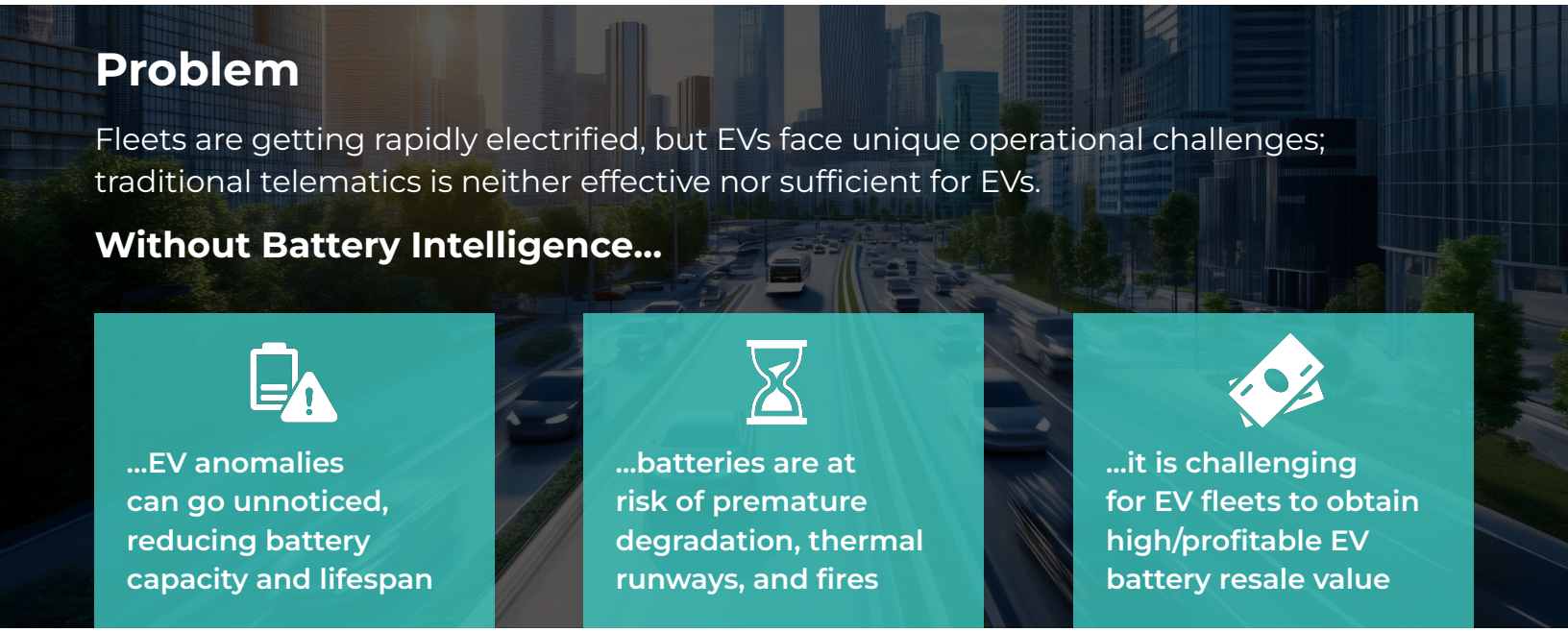
Leading with Data

Tangible Benefits for all Stakeholders

Stakeholder	Challenges	Key Analytics Solutions	Typical Business Outcomes (Based on Industry Ranges)
Fleet Managers	• Unplanned downtime • Range anxiety • OEM-fragmented data • Lack of preventive maintenance	• Predictive battery health analytics (SOH, RUL) • Smart route & SOC management • Driving behaviour risk scoring • Maintenance scheduling tools	• 20–30% fewer unplanned service events • 10–20% improved fleet uptime • 12–18% lower energy costs • >15% improved operational efficiency
Sustainability Heads	• Regulatory compliance (CO_2, EPAct, ZEV mandates) • ESG disclosure complexity • Lack of lifecycle tracking for batteries	• Carbon and energy savings analytics • Battery lifecycle extension modelling • Policy-aligned reporting dashboard • E-waste impact insights	• 10–30% annual reduction in emissions • 20%+ longer battery lifespan • Compliance with local/national EV mandates • ESG metrics for reporting
Financial Leaders	• High upfront CAPEX • Uncertainty around depreciation • Hidden operating costs • No data to justify ROI	• Real-world TCO modelling • Residual value forecasting • Battery usage optimisation • Cost-per-kilometre tracking	• $6K–$12K/year/vehicle saved • 10–18% lower TCO • 8–15% higher resale value • Improved ROI visibility

Source: (McKinsey, IEA, Ayvens, Frost & Sullivan)

Concluding Thoughts



Problem

Fleets are getting rapidly electrified, but EVs face unique operational challenges; traditional telematics is neither effective nor sufficient for EVs.

Without Battery Intelligence...

...EV anomalies can go unnoticed, reducing battery capacity and lifespan

...batteries are at risk of premature degradation, thermal runways, and fires

...it is challenging for EV fleets to obtain high/profitable EV battery resale value

The electrification of fleet vehicles is a cornerstone of sustainable mobility, but its success hinges on effective battery and fleet management. **Datakrew's ITUS and OXRED solutions provide the advanced analytics, real-time insights, and actionable intelligence that EV fleet operators need to overcome operational challenges and maximise the value of their investments.**

As the EV market continues expanding across Europe and Asia, data-driven fleet management will be essential to achieving economic and environmental goals.

Datakrew stands at the forefront of this transformation, enabling fleet operators to drive confidently into a cleaner, brighter future.

Sustainability Impact

CO_2 Saved:

120 TONS

That's Equivalent to Planting:

5,760 Trees!

*Based on EPA estimate: 1 Ton CO_2 = 48 Trees/Year

Connect with Datakrew Today

Schedule a Demo