Understanding EV Maintenance Trends Through a Fleet Lens

Introduction

South Africa's electric vehicle (EV) market remains young, with limited exposure to high-mileage use cases. Yet the global transition to EVs is accelerating—and local fleets will need to respond. The question is no longer "if," but "when" and "how to prepare." This article draws on international research and trends to outline what South African fleet managers should know about EV maintenance: what's different, what's unchanged, and what challenges are emerging.

EV Maintenance in Practice: What Changes, What Doesn't

Common Failure Modes in Fleet Operations

While EVs have fewer moving parts than internal combustion engine (ICE) vehicles, they introduce new considerations:

Battery Capacity Degradation

Modern lithium-ion batteries have proven more durable than early predictions suggested. Most EVs still retain 90% or more of their original capacity after six to seven years of normal operation, with average degradation rates around 2–3% per year. Factors like frequent fast charging, heavy loads, and prolonged exposure to extreme temperatures have the greatest impact. Fortunately, batteries perform best in the same climate range humans prefer—roughly 15–35°C. South African fleets can manage degradation effectively by limiting fast charge cycles, avoiding extreme heat storage, and using telematics to monitor battery health.

Thermal Management Systems

To protect the battery and electronics, EVs employ thermal control systems using pressurised coolant loops, electric pumps, and temperature sensors. Malfunctions—such as coolant leaks, pump failures, or airlocks—can lead to reduced performance or permanent battery damage. In warm climates, preventive maintenance of these systems becomes especially important.

High-Voltage Component Failures

Key systems like inverters, onboard chargers, and battery management systems (BMS) are generally reliable but require specialist skills and tools for diagnostics and repairs. Failures in these systems can immobilise a vehicle and are not usually serviceable by generalist workshops. As EVs age, untrained teams may face longer downtimes.

Battery Repair and Refurbishment: The Modular Opportunity

Norway, one of the world's most mature EV markets, offers a glimpse into what future maintenance ecosystems might look like. Companies like Elbilmek.no and other Norwegian specialists have developed thriving EV repair practices. These workshops frequently refurbish older EVs by sourcing and installing used battery modules instead of replacing the entire pack.

The key is battery modularity. Where EVs are designed with modular architecture, used modules can be integrated—but only when their **State of Health (SoH)** is closely matched to that of the remaining modules. This practice helps maintain balance, ensures safe operation, and preserves expected range performance.

For South African fleet operators, this presents an emerging opportunity. While local EV infrastructure is still growing, lessons from Norway suggest that a circular economy for EV components—especially batteries—could become viable as the market matures. Over time, skilled local entrepreneurs may follow suit, offering specialised battery repair services that reduce total cost of ownership and extend vehicle life.

Charging Equipment

EV fleets depend on both AC and DC charging infrastructure. Charge port damage or poor communication between vehicle and charger can result in charge failures. High-usage vehicles and chargers must be routinely inspected for wear, and charger maintenance should be viewed as part of the fleet's preventive maintenance regime.

Sensor and Software Issues

EVs are software-heavy. Glitches in firmware, power management algorithms, or sensors can trigger fault codes and limit vehicle operation. Regular firmware updates and access to OEM-level diagnostics are critical to uptime. Fleet workshops will need to evolve from mechanical diagnosis to software troubleshooting.

Auxiliary 12V Battery Failures

Despite their modern architecture, EVs still use a conventional 12V battery to power startup logic and control systems. If this battery fails, the high-voltage system won't engage. In many cases, EV breakdowns are traced back to this overlooked component. It should be proactively managed just like in ICE fleets.

Brake and Suspension Wear

Regenerative braking reduces wear on pads and rotors, often extending service life by two to three times. However, the extra weight of battery packs increases stress on suspension and wheel components. Fleets should plan for earlier suspension component replacements, especially in high-mileage or heavy-duty applications.

Tyres

Instant torque and increased curb weight accelerate tyre wear. EV-specific tyres or harder compounds can help, but regular rotation and alignment remain essential. Tyre costs may increase in EV fleets—even as brake costs drop—making tyre strategy a critical lever in cost management.

Routine EV Maintenance Needs

EV service intervals and scope differ sharply from ICE vehicles:

- No oil changes, spark plugs, or fuel system services.

- Brake servicing is less frequent due to regenerative braking.
- Battery cooling systems still require coolant replacement, typically every 4–8 years.
- Routine consumables like cabin filters, wiper blades, and bulbs remain unchanged.
- Over-the-air updates and diagnostic scans replace some traditional workshop tasks, requiring stronger IT integration and technician upskilling.

Case Study: Hertz and the Cost of Unscheduled Repairs

In early 2024, Hertz announced it would sell 20,000 EVs, citing higher-than-expected repair costs and extended downtime. Although routine maintenance was minimal, EV-specific components like sensors, body panels, and battery packs had long lead times and required certified repairers. The lesson for fleet operators is clear: unscheduled repair events—especially after collisions—can offset routine savings. Insurance structures, driver safety programs, and access to trained body repairers all become more important in an EV fleet.

Skills, Safety, and Standards

Introducing EVs into a fleet requires more than plugging in chargers:

- **High-Voltage Safety**: With EV systems running at 400V–800V, proper technician training and PPE (gloves, insulated tools, arc protection) is essential to safety.
- **Certification**: South Africa has no mandatory EV certification yet, but forward-thinking fleets are already investing in training via OEM partnerships or international programs.
- **Workshop Readiness**: EV-capable workshops require insulated tools, EV-only service bays, battery fire protocols, and digital diagnostic platforms. While these upgrades carry cost, they also reduce repair delays and dependency on external providers.

South African Context

- **Market Maturity**: Most EVs in South Africa are privately owned and low-mileage. As a result, fleet-scale data is limited. Early adopters must combine global benchmarks with internal tracking.
- **Infrastructure Gaps**: Black-outs and limited charging infrastructure pose real constraints. Depot-based charging and route optimisation become critical to manage range and uptime.
- **Residual Value**: Battery health is the primary driver of EV resale values. While global data shows good longevity, South Africa's used EV market is small and unpredictable. Until resale data matures, conservative depreciation planning is prudent.
- **Policy and Incentives**: High import duties and limited EV tax benefits raise acquisition costs. However, policy may shift. Fleets ready to scale when incentives arrive will have a competitive advantage.

Implications for Fleet Strategy

- **TCO Models Must Evolve**: New cost categories—charging infrastructure, collision repair, and battery replacement—must be included in total cost of ownership models.
- **Telematics and Predictive Maintenance**: Monitoring battery SoH, charge patterns, and thermal data is critical to reliability and lifecycle planning.
- **Parts and Tools**: While fewer parts are needed overall, those that do fail are high-value and require specialised handling. Inventory and tooling strategies must shift accordingly.
- **Lifecycle Planning**: Battery degradation is non-linear, with most range loss occurring early, followed by a long plateau. Replacing a vehicle while it still has 90% of its range may leave value on the table; equally, waiting too long risks reduced resale value and driver dissatisfaction.

Conclusion

EVs redefine fleet maintenance. The absence of oil changes doesn't mean zero risk—it means new categories of risk, from battery degradation to software issues to infrastructure dependencies. Encouragingly, real-world battery longevity has outperformed early expectations. With smart operating practices and a solid understanding of high-voltage systems, EVs offer long-term reliability and value.

South Africa's environment—moderate climate, concentrated urban usage, and established fleet structures—makes it well positioned for EV success, if supported by investment in skills and systems.

The time to prepare is now. Not because EVs dominate today, but because they will sooner than expected. When that moment comes, readiness in safety, diagnostics, infrastructure, and policy will separate the leaders from the laggards.

Drawing on global best practices and real-world data, this article explores the key shifts South African fleet managers must make to prepare for an electric future: from mastering battery-health telematics and thermal management to building modular repair ecosystems and upskilling technicians for high-voltage diagnostics. Learn how to turn emerging challenges into strategic advantages—so when the EV transition accelerates, your operations stay ahead of the curve.

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